1. AI-ENHANCED CAREER GUIDANCE: YOUR PERSONALIZED PATHWAY TO SUCCESS

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Making a career decision has never been a dull affair in the life of a student. The rapid advancement of technology and the constant change in the demands of a job make this decision more puzzling, though, than ever. Conventional counselling practices usually provide general guidance without looking at the individual talents, aspirations of the students and the current market dynamics. This paper presents an AI-powered career guidance system that can be used to suggest individualized career paths using machine learning, natural language processing (NLP), and real-time labour market data. The system we propose will be based on examining the academic strengths, skills, and personal interests and producing career recommendations that are practical and future-oriented. The technique will help in keeping students oriented to the opportunities that will most likely match their potential and minimize career mismatches and enhance employability.

2.DESIGN AND ANALYSIS OF PIPELINED ARCHITECTURE OF SOBEL EDGE DETECTION AND CANNY EDGE DETECTION ALGORITHMS ON FPGA

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Edge detection is a vital operation in image pro- cessing that plays a central role in feature extraction and object recognition.Here, we present a simple pipelined hardware design for Sobel edge detection and Canny edge detection implemented on FPGA for analyzing their edge detection accuracy, on- chip power, and resource utilization. The Sobel edge algorithm provides computational simplicity and speed, whereas the Canny algorithm provides more robust and accurate detection of thin edges which are crucial in supporting

technologies like self- driving cars, computer vision, medical imaging, etc.It is thus important to have a dedicated hardware design for performing both edge detection algorithms on an embedded system thereby reducing the dependency on processing part.The hardware design was implemented on Zedboard FPGA.The Zedboard, containing all programmable SoC (AP SoC) Xilinx Zynq-7000 was used for the purpose of testing and analysis of input grayscale images.

3.AI, ROBOTICS, AND LEARNING: RESTRUCTURING THE ENGLISH LANGUAGE PEDAGOGY

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English occupies a central place in global education, commerce, science, and digital communication. Its role as a lingua franca and a gatekeeper to academic and professional opportunity has shaped curricula, teacher training, and policy decisions across diverse national contexts. The language and its teaching methods have continually evolved through time with technological innovations. However, in the last few decades, the technological landscape that mediates English use and learning has changed so rapidly that language pedagogy must be reimagined. Artificial intelligence (AI) and robotics, which were once the domain of speculative futurism, have now been integrated into everyday learning platforms, assessment tools, and classroom devices.According to Bingyu Dong et.al, Large Language Models (LLMs) are at the forefront of this transformation with sophisticated generative AI systems which are capable of producing human-like responses to natural language inputs. These systems are trained on extensive corpora, can simulate conversational exchanges, provide instructional feedback, and act as research assistants, thus expanding the possibilities for learner engagement and teacher support (p.131). These technologies offer new possibilities for practice, feedback, personalization, and authentic interaction, while simultaneously raising urgent questions about pedagogy, equity, and the future professional role of teachers. Generative AI chatbots like ChatGPT, Google Gemini, Perplexity, and more have replaced the educational potential of conventional institutions. These AI-based systems have been deployed as a conversational partner, content generator, learning assistant, and assessor (Dong et.al, p.132), and this versatility allows it to act as both a facilitator of practice and an immediate feedback provider.

4.GREENTHUMB: SMART PLANT CARE WITH WEATHER-POWERED WATERING SUGGESTIONS

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Optimal plant care is obtained from the fusion of real-time monitoring, disease detection, and adaptive irrigation. This article presents GreenThumb, a smart plant care mobile application that utilizes deep learning and weather integration for optimal plant health management. The system utilizes MobileNetV2 CNN-based optimized model with TensorFlow Lite (TFLite) for real-time disease detection and utilizes OpenWeatherMap API to provide dynamic weather-based irrigation suggestions. Users capture images of plants, which are analyzed by the trained CNN model to detect plant diseases. Based on the diagnosis and environmental conditions, the system generates accurate watering suggestions, optimizing plant hydration with minimum water loss. The proposed scheme overcomes the limitations of traditional plant care approaches, which follow manual observation and low-accuracy sensor-based techniques. With the integration of artificial intelligence (AI) and real-time networking, GreenThumb provides an extremely efficient, easy-to-use, and data-driven solution for plant care. Experimental outcomes reveal that the model detects diseases with 92.3% accuracy and improves water management efficiency by 30% compared to traditional approaches. The app is appropriate for amateur gardeners and professional horticulturists with straightforward usability in various user groups. Future work will be focused on the enlargement of the dataset of plant diseases, prediction algorithm enhancement, and integration of IoT- based soil sensors for accurate environmental monitoring

5. TRAFFIC FLOW AND CONGESTION PREDICTION USING RANDOMIZED SHORT MEMORY NEURAL NETWORKS WITH DENSITY-BASED SPATIAL CLUSTERING

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Traffic congestion is a significant problem in several nations worldwide. The majority of current traffic flow models do not effectively use the temporal and geographical characteristics of traffic data. This work introduces a novel method for predicting traffic flow and detecting congestion by using sophisticated deep-learning algorithms on data from traffic cameras or sensors. The approach consists of many phases. Firstly, the data may be normalised using the Error Max Normal Scaler algorithm. Then, the feature extraction can be performed using the Covariant Eigen Vector Component Analysis. Subsequently, the traffic flow may be forecasted via the Randomised Short Memory Neural Networks (RSMNN). The identification and analysis of congestion patterns is accomplished via the use of Density-Based Spatial Clustering of Applications with Noise (DBSCAN). The proposed framework seeks to optimise the precision of traffic flow estimates and better the identification of congestion, eventually leading to more effective traffic management and urban planning. The investigation was conducted using the Python programming language inside the Kaggle dataset environment. The effectiveness of the offered approaches is assessed using established criteria, showcasing the efficiency of the approach in practical situations.

6. FINBIOSCAN - BEHAVIORAL FINANCE TOOL TO ANALYZE THE POTENCY OF BIOTECH STARTUPS.

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The biotech industry presents a twofold challenge to investors: complicated scientific uncertainty and the effect of cognitive biases in the funding decisions the investors make. The literature on behavioral finance and entrepreneurship suggests that when investors are pitched biotech startups, the investors often rely on narratives, framing, signals of prestige, and emotional appeals, rather than taking data integrity under consideration. This paper provides FinBioScan, an actionable diagnostic framework, to assess investor presentations and quantify the number of bias-induced persuasive strategies used. FinBioScan uses a rubric that captures information from six categories of bias - Scientific Transparency, Narrative Manipulation, Visual Framing, Signal Boosting, Data Omission, and Investor Framing - to develop a bias profile for each startup. Sample applications to selected biotech companies showed that FinBioScan can correctly identify cognitive biases in which investors may be persuaded. The framework does not seek to predict scientific outcomes or commercial success; it simply provides investors with another structured lens to possibly identify the extent of cognitive bias that may have influenced their funding decision. Keywords: Investor, Bias, Biotech, Startup, Pitch, Language

7.ENHANCED COOPERATIVE SPECTRUM SENSING WITH BED BUG OPTIMIZATION BASED SUB-FUSION CENTER SELECTION IN COGNITIVE RADIO NETWORKS

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Cooperative In Cognitive Radio Networks (CRNs), Cooperative Spectrum Sensing (CSS) improves spectrum utilization while preventing interference with licensed users. This paper proposes a novel Sub-Fusion Center (SFC) selection framework using Bed Bug Optimization (BBO) to enhance the efficiency and reliability of distributed CSS. Secondary Users (SUs) perform local spectrum analysis using Gated Recurrent Unit (GRU) networks to accurately classify primary user activity, while the BBO algorithm intelligently selects optimal SFCs to aggregate these results efficiently. The chosen SFCs forward aggregated sensing decisions to the Fusion Center for global spectrum allocation. Simulation results, validated using NI Universal Software Radio Peripheral (USRP) datasets, show that the BBO-GRU framework achieves a sensing accuracy of 97.96%, a high probability of detection (Pd), and reduced miss detection errors, while maintaining low sensing latency. The results demonstrate the effectiveness of integrating GRU-based learning with BBO-driven SFC selection for robust and efficient cooperative spectrum sensing in CRNs.

8. A HYBRID DEEP MODEL BASED ON ANN-LSTM FOR REAL-TIME AIR POLLUTION LEVEL DETECTION

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Air pollution remains a major environmental and public health concern, especially in rapidly urbanizing regions where pollutant concentrations frequently exceed recommended thresholds. A hybrid deep learning approach, integrating Artificial Neural Networks (ANN) with Long Short-Term Memory (LSTM) networks, can be applied for real-time prediction of key pollutants, including $PM_{2.5}$, PM_{10}, NO_2, and CO. In this framework, ANN components capture complex, nonlinear interactions between meteorological and pollutant variables, while LSTM layers address temporal dependencies, enabling the model to utilize both short- and long-term patterns in time-series data. The system can be trained using a multivariate dataset comprising hourly pollutant measurements and environmental factors such as temperature, humidity, wind speed, and atmospheric pressure, with standard training, validation, and testing partitions. Model performance can be assessed through metrics such as Mean Squared Error (MSE), Root Mean Squared Error (RMSE), Mean Absolute Error (MAE), and coefficient of determination (R^2), with hybrid architectures often showing superior predictive accuracy over individual models. Such an approach is well-suited for integration into smart city ecosystems, supporting

continuous monitoring, early-warning systems, and evidence-based policy implementation. Potential advancements include the use of edge computing for faster deployment, periodic model updates for sustained accuracy, and transfer learning to adapt predictions to varied geographic and climatic contexts.

9.INTELLIGENT WORKLOAD PARTITIONING DATA-DRIVEN METHOD FOR OPTIMISING HYBRID QUANTUM CLASSICAL WORKLOADS

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10.AN AUTONOMY PARADOX- SCALE DEVELOPMENT AND VALIDATION

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As the proliferation of digital technology has increased, the capacity for participation in digital labour platforms has increased. This substantial growth of gig economies, along with an upsurge in the number of individuals involved, results in the potential of gig work. Although there are clear benefits, the disadvantages linked to Digital Labour Platforms have resulted in what is termed the autonomy paradox, particularly under the impact of algorithmic management concerning workers. This phenomenon demands the development and validation of a measurement tool intended to evaluate the effects of Digital Labour platform employment on workers' flexibility and transparency while navigating the complexities of algorithmic management, which is characterized by an automated and unnoticeable managerial oversight. This instrument underwent validation with both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), demonstrating that workers are, in fact, influenced by these unseen managers throughout the four phases of the work cycle, which include matching control, work control, evaluation and ratings control, and invisible manager.

11.AUDIO-VISUAL SYNCHRONIZATION IN MULTILINGUAL VIDEO TRANSLATION SYSTEMS

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The invention of Artificial Intelligence (AI) has transformed multimedia communication by providing creative methods of speech translation and video synchronization. Traditional methods such as dubbing and subtitles are often insufficient in providing natural and immersive experiences for global audiences. The AI-in-operated lip-written video provides a success by enabling the uninterrupted translation of speech in different languages, preserving the lip-moved lip-related lip-written video, facial expressions, and emotional tone. This paper focuses on the construction of a system that integrates advanced speech-to-speech translation models, neural talking-facing generations and synchronization methods to give natural and realistic video translations. Using deep learning structures such as generic advertisement network (GAN), Conditional Neural Network (CNNS), and transformer-based models, we propose an end-to-end pipeline for real-time translation and lip synchronization. System uses datasets like LRS2,VoxCeleb, and HDTF for training and applies evaluation matrix such as LSE-C/D, PSNR, SSIM and BLEU for performance evaluation. In addition, the paper “DeepFace” exposes potential applications in dubbing, e-learning and multilingual communication, addressing moral concerns related to abuse and privacy violations. AI-AI-Lip-written video translation systems have the ability to eliminate language obstacles and create a more inclusive digital ecosystem by merging the progress in audio-visual synchronization and machine translations.

12.INTELLICLASS: AN INTEGRATED AI–IOT–CLOUD FRAMEWORK FOR NEXT-GENERATION CLASSROOM ORCHESTRATION

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Education is changing its digital face, though most of the classes continue to rely on disconnected devices that cannot facilitate impromptu management and individual learning. The present paper proposes intelligence, which is a broad class orchestration framework that brings together artificial intelligence (AI), Internet of Things (IOT), and cloud computing technologies. In contrast to the traditional digital learning platforms that are primarily aimed at sharing the material, automatic intelligence attendance checking, ensures active security based on IOT-based monitoring, and follows the learning path based on AI-based analytics. The cloud backbone supports scaling, secure data management, and real-time dashboards to all the stakeholders. By lowering the administrative fee of teachers, by enhancing the interest of the student and the efficiency of the institutions, Intelliclass creates the groundwork of the classes ready to go in the future. As an educative innovation in the general direction of paper, motivation to further development, system design, identifies the significant advantages, issues and outlooks.

13.AI-DRIVEN CROP DISEASE PREDICTION SYSTEM

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The Indian economy depends on agriculture as a very important sector within the economy, which is a source of food security, employment and GDP. Crop diseases present a great challenge to production and to livelihoods of farmers with losses amounting to 15-25 percent of the total production per year. These losses should be avoided by early detection. To predict crop illnesses in real-time, based on the use of images, using the Google Gemini-2.0-Flash model, this paper will introduce an AI-driven crop disease prediction system. The system allows various regional languages such as English, Hindi, and Tamil and therefore it is accessible to different farming communities. With a high degree of experimentation, we can classify the disease with an accuracy of 93 to 96 percent in various types of crops and therefore, take timely measures and ensure that agriculture is conducted in a sustainable manner. The mobile-first design and multilingual features of the system are used to resolve the significant accessibility issue of rural agricultural societies. Index Terms- Agriculture, Crop Disease Detection, Artificial Intelligence, Gemini-2.0-Flash, Multilingual Support, Image Clas sification, Sustainable Farming, Precision Agriculture.

14.JEDUAI CONNECT: SMART LEARNING AND LANGUAGE

EMPOWERMENT USING AI-POWERED MULTILINGUAL EDUCATIONAL SYSTEM

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The features of the Indian educational environment are an incredibly diverse linguistic environment and a strong imbalance in terms of infrastructural facilities, which provokes a sharp necessity to find a successful solution that will allow reducing the current gaps in the educational environment. JeducaI Connect is a holistic multi-faceted AI-designed learning platform, designed to combine the urgent issues of multilingual education, manual grading, and limited one-to-one tutoring. The platform integrates three fundamental and compatible subsystems: a Smart Assessment Board to automatically create dynamic quizzes, AI-assisted grading of objective and complex short-answer questions, and detailed teacher analytics; an Automated Translation subsystem based on the state-of-the-art IndicTrans2 model to generate accurate content localizations in 10+ Indian languages, with the automatic speech recognizer, Whisper, and an IndicTTS model of high-quality Text-to-Speech synthesis to generate a perfectly synchronized voiceover and subtitles. J EduAI Connect is based on a robust, cloud-native, microservices platform with robust offline first properties, so it guarantees enterprise-level scalability, resiliency, and reliable use on low-bandwidth rural and semi-urban classrooms. To have a significant impact on student engagement and intrinsic motivation, the platform will feature a set of gamification-based pedagogical features, such as real-time leaderboards, competitive quizzes using buzzers, and achievement badges. Moreover, a smart adaptive tutoring system generates and presents customized learning journeys upon real-time performance metrics. An intensive six-week pilot test carried out on more than 120 students revealed a phenomenal saving of up to 70% of the teacher grading time, a ten-fold faster content localization and an increase in student participation rates of up to 4060 percent, which has a significant empirical test validation of the system and its effectiveness.

15.TRANSFORMING ENGLISH TEXT INTO NATIVE LANGUAGES

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The high rate of world wide digital communication has necessitated advanced language translation systems with the ability to overcome language barriers in multi-ethnic population. Since the world has a wide variety of languages, with more than 7,000, and the digital resources are predominantly written in both English and several major languages, a significant demand to have correct, reference inconceivable and culturally sensitive translation systems. This letter is a detailed overview of the current nerve machine translation (NMT) system that capitalizes on the usage of modern natural language processing (NLP) technologies, deep learning architecture, and continuous teaching system that translates English text into foreign languages without affecting the integrity and cultural peculiarities of economics. We conduct a study of the application of models that are based on transformers, attention and adaptive teaching algorithms which achieve the rate of 8595 percent translation accuracy between major language pairs. In the suggested system, there will be the real -time processing capabilities, pertinent understanding and user response integration to keep on enhancing the quality of translation. We provide compelling gains in both translation flow, cultural appropriateness and user satisfaction over both conventional statistical machine translation methods cross-lingual communication, relevant translation.

16.PROPOSED AI WELLNESS VISION: BRIDGING IMAGE

RECOGNITION AND CONVERSATIONAL AI FOR INCLUSIVE PREVENTIVE CARE

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Artificial intelligence in healthcare has transformed the field since it has been applied in medical imaging, symptomatic diagnosis, and mental health monitoring. However, the available solutions are not multimodally entrenched, siloed and language-restricted, which diminishes the concept of inclusiveness and preventive nature. In the current paper, the AI Wellness Vision, a novel system where image recognition is integrated with natural language understanding and voice-based interaction to become an explainable and privacy-preserving preventive health companion, will be demonstrated. In contrast to the old systems where the areas were confined to niching, our model includes dietary, emotional, and medical indications on the same platform and extends to provide accessibility by assisting with Indic and foreign languages. The system uses multimodal fusion (i.e., deep learning) to combine CNN-based image embeddings, transformer-based speech recognition, and BERT-style NLP embeddings optimized by an explainable decision engine. Performance evaluation indicates that it has 92 percent accuracy, 89 percent precision, 87 percent recall, and 88 percent F1-score which confirms its strength. AI Wellness Vision is a holistic measure to equitable preventive healthcare by tackling the issue of inclusivity, transparency, and data ethics.

17.ALUMNI ASSOCIATION PLATFORM FOR EDUCATIONAL INSTITUITIONS

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This is an analytic report that explores the change of the alumni associations into dynamic digital platforms rather than mere directories. The main issue that is to be discussed is the mass disengagement of driven digital experience as opposed to the old-fashioned institution-based model. This report is founded on the examination of the academic sources and practical case studies to establish the key functionalities and strategic requirements of effective alumni applications. The main conclusions made here include the fact that these platforms can only be successful when they have a clear institution vision, user-centric design, which offers value in both directions, and are devoured to data-driven personalization. Such key characteristics mentioned in the report include career services, lifelong learning resources and active community-building tools. The paper is concluded with some conclusive suggestions to the stakeholders on the necessity of strategic alignment and two-way value proposal in order to break the barriers that are commonly present in this context and develop a successful, mutually beneficial alumni community.

18.SMARTBUS: A LOW-COST SMARTPHONE-BASED REAL-TIME BUS TRACKING AND CROWD ESTIMATION SYSTEM FOR PUBLIC TRANSPORT IN INDIA

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Public transport bus locations in essence, India suffer from incredible service due to lack of real- time information on the arrival time and vehicle congestion. Current GPS tracking solutions demand high capital investment and frequent maintenance, making them impractical to a large state -run fleet. This paper introduces smartbus, a scalable, smartphone-based bus tracking and congestion platform that reduces hardware dependence. By taking advantage of the smartphone of drivers for data acquisition and combining it with efficient backndary processing, the smartbus arrival (ETA) and real -time occupancy offers an accurate estimated time of data. Passengers benefit through a spontaneous mobile app, while transport officials receive powerful analytics and fleet management through a web-based dashboard. Flute, applied with a python backnd, and Google Maps API, smartbus also provides high reliability in challenging network situations. The solution is sewn to Tier -2 and Tier -3 cities, which promotes safe, more efficient and user -friendly public transit.

19.DDOS PROTECTION SYSTEM FOR CLOUD: ARCHITECTURE AND TOOL

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Elastics, efficiency and scalability are some of the transformative benefits that cloud computing services have brought about with the growing dependency on these services. Nevertheless, the openness and distributed nature from which the foregoing benefits derive, also present cloud platforms with extreme security risk, with DDoS attacks being the most notable among them. Such attacks are meant to deplete system resources and network bandwidth leaving important services inaccessible to legitimate users. Traditional security control tools, including hardened firewalls and intrusion detection tools that rely on manually set thresholds or signature-matching, can be found to be ineffective in large-scale, dynamic cloud environments, resulting in large false-positive rates and the lack of ability to identify a novel threat. In this paper, the authors suggest an adaptive and machine learning framework of DDoS prevention, which uses real-time traffic monitoring, intelligent feature engineering, and a hybrid classification model in order to preempt and prevent malicious traffic. Combining a supervised gradient boosting method (XGBoost) for attack pattern recognition with an unsupervised deep learning model (LSTM Autoencoder) for zero-day threat detection, our system achieves a 97.5% accuracy and an F1-Score of 97.4. This two-model method greatly minimizes false-positive, and response time is shortened. Operating in a cloud-native environment, the system is more resilient and adaptable, which highlights the importance of AI-directed security in strengthening the current cloud infrastructures in the face of an ever-changing threat environment.

20.STUDY VERSE – AI POWERED FLASHCARD AND QUIZ GENERATOR WITH MULTIMODAL, EXPLAINABLE & COLLABORATIVE LEARNING

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It showcases paper works, an advanced AI-based flashcard and quiz generators have been supplemented with multimodal content, transparent AI feedback and team learning options. The studiers are unlike the traditional study application where text-based flashcards is the main tool, as they supplement both theoretical and practical subjects with images, audio and code snippet and diagrams, to fulfill all teaching styles and areas. There have been automatic uses of System Natural Language Processing (NLP), optical character recovery (OCR), and transformer-based models to extract significant information in academic materials and generate flashcards and quiz that are accurate and relevant. One of the primary characteristics of the studiers is its apparent AI element as it not only offers the right answer, but also a clear and reference-operated explanation, which allows them to know the logic process behind each answer. This enhances the confidence in the system and ensures profound ideological clarity. As an additional inspiration tool, the site also provides a collaborative teaching format that allows the students to take part in Peer-to-Pier Flashcard fights and group quiz, active recall and competitive can yet facilitate auxiliary teaching space. The study focuses on stability and scalability in addition to enhancing engagement and retention. On-gadget when in low-carbon window, through the inclusion of mild models to make instantaneous checks and reservation of heavy computations, the system minimizes reliance on clouds, lowers operating charges, and consistent with green computing. The solution to propose includes coverage of the time gaps of the current digital learning equipment, integrating privatization, multimodal engagement, clarity and collaboration within the same platform. Pilot studies and experimental assessment show that the study has a significant positive impact on the engagement and learning efficiency of students and their overall performance in the field of study, which makes it the next generation AI study partner.

21. SUNSTROKE PROTECTION SYSTEM

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Summary Insolation, insulation is a heat related critical disease that develops due to effects of long time exposure to high temperatures and direct sunlight that causes dehydration and dysfunction of several organs and even death in case it is not addressed at good time. This paper outlines the design and deployment of an insulation protection system (SPS), which involves an environmental monitoring system as well as a wearable-based physiological sensor to deliver early warning and prevention of insolation risk. The system combines temperature, humidity and UV sensors with the body temperature and heart rate sensors so that a real -time heat voltage index (HSI) can be calculated. The SPS uses IoT -qualified microcontrollers to process the collected data and classify the risk levels and deliver real -time alerts to users via mobile applications and weather notifications. The capability to mitigate the threat of insolation and give timely preventive advice is proven by experimental validation, which was conducted in laboratory and field settings. The suggested system provides a viable, scalable and efficient solution to the protection of people who can be subjected to extreme heat conditions.

22.SOIL AND CROP MANAGEMENT SYSTEMS

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Quick dissemination of crop and livestock ailments can impact upon agricultural output. Kamilaris and Prenafeta-Boldu (2018) emphasized that deep learning methods can offer methods of solving agricultural problems at scale [9]. This paper suggests an AI-based Farmers Disease Diagnostic and Reporting Mobile Portal to combine Convolutional Neural Networks (CNN) to detect plant disease and Support Vector Machines (SVM) to diagnose animal disease as it was presented by Mohanty et al. (2016) [12] and Arif et al. (2019) [4]. The system additionally encompasses the expert verification and surveillance, which is in line with Wolfert et al. (2017) on data-driven smart farming [19]. This combined model is able to provide timely diagnosis, cost effective solutions and also helps in disease surveillance at regional and national levels. The sensor-based and AI-supported Farmers Disease Diagnostic and Reporting Portal, presented in this paper, is a combination of the multi-sensor data and images and symptoms provided by a farmer. The sensor inputs like temperature, humidity, soil moisture, and animal body parameters are processed together with AI models like CNN (crop), SVM (livestock), and NLP (symptom interpretation). The system produces localized disease reports, preventive recommendations and links farmers to local experts, and processed aggregated data is done by big data analytics and GIS mapping to predict large-scale outbreaks. The phone based system that incorporates this feature saves on the implementation costs, limits reliance on internet access, and makes it accessible in the resource constrained regions. The use of sensor technology together with AI in the proposed system will not only make the system cost-effective, but also fast in diagnosis, and more accessible to farmers.

23.SMART ASSESSMENT BOARD: AN IOT-ENABLED FRAMEWORK FOR AUTOMATED AND TRANSPARENT STUDENT EVALUATION

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The testing of students remains the foundation of academic assessment that shapes the destiny of individual students and the decisions of educational institutions. Nonetheless, conventional paper-based assessment strategies tend to be time-consuming, arduous, and prone to error, creating delayed feedback and variable results. Though Optical Mark Recognition (OMR) and Computer-Based Testing (CBT) systems have mechanized some facets of assessment, they suffer from a number of shortcomings that include high infrastructure costs, the need for specific hardware requirements, and the necessity of good internet connectivity. These shortcomings render such systems unpopular for comprehensive adoption in rural and resource-scarce institutions, where infrastructure deficits pose obstacles to equitable and timely assessment. To address these issues, this paper proposes the design and creation of a Smart Assessment Board (SAB)—an Internet-of-Things (IoT)-enabled, offline-first platform that combines the ease of pen-and-paper testing with the efficacy of digital automation. The SAB uses an array of sensors including infrared and optical sensors, along with a microcontroller-based edge processor, to scan and authenticate student answers in real-time. Preprocessing scripts running on the edge provide reliability against environmental conditions like changing lighting and smudged marks. To ensure security and integrity of information, the replies will be encrypted with a hash message-digest algorithm (SHA-256), and a twofold storage protocol will be implemented in such a way that it stores the results locally when in off-line mode and then synchronizes the results with an inaccessible cloud database when the connection is restored.To uphold transparency and equity, a blockchain-like audit trail will be used to guarantee the impossibility of records alteration by untrusted parties and then synchronizes the results with an inaccessible cloud database after restoring the connection.To reduce It balances opportunity and promotes educational equity through offering offline features to remote and disadvantaged learners, local storage of records, and inclusive features. SAB can be described as a future-oriented, clear-evaluation model

since the introduction of additional point-based mechanisms can encourage the culture of incentive-based engagement, knowledge improvement, self-development, and ethical involvement.

24.NEXT-GENERATION RAILWAY NAVIGATION: A DIGITAL TWIN AND EDGE AI POWERED PASSENGER FLOW SYSTEM

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The Indian railway stations are among the busiest transit stations with thousands of people using the station on a daily basis. Commuters, particularly first time Travelers, older citizens and individuals with a disability find it extremely difficult to move around these crowded settings. Poor signs, language barrier, and lack of real-time information are some of the factors which lead to these challenges. The proposed project implies an intelligent railway station navigation system which enhances the experience of the passengers with the help of QR codebased navigation, interactive digital maps and realtime information screens. Passengers can be helped to find directions to ticket counters, platforms, restrooms, exits, and waiting areas among other services very fast by scanning QR codes placed in prominent strategic locations or by using a web or mobile interface. The system will also be able to link up with the rail modes to provide live train schedule, platform alteration, and emergency notification. The solution provides interactive maps and announcements to stations that have digital displays. In the case of smaller stations that lack these features, QR code and the mobilefriendly web application is a guarantee that all people can have access to information. The proposed solution aims to become affordable, scalable, and inclusive to transform railway stations into smart and convenient spaces that reduce confusion, save time, and increase general satisfaction with the passengers.

25.TOURISM REIMAGINED: A SMART INTEGRATED ECOSYSTEM FOR POST-PANDEMIC RECOVERY

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The COVID-19 pandemic has impacted the global tourism industry in a manner that it has never experienced revenue loss of up to 70-80 percent within the industry. The paper presents a smart tourism ecosystem that will provide the solution to the post-pandemic recovery challenges. The proposed solution synthesizes the artificial intelligence, contactless, and real time analytics to create one platform that will enable the enhancement of the experience of tourists and make it safer and more sustainable. Our system has the features of AI-based suggestions, multi-language translation, health tracking, and sustainability tracking. The following implementation plan will include three stages over a period of 12 months and the probable impacts will include the increase in revenue by 30-40 percent, satisfaction of the tourists by 90 percent more, and the creation of significant jobs. The research is connected to the modern evolution of smart tourism since it provides a successful model of digital transformation of the post-pandemic world.

26.EXPERIMENTAL INVESTIGATION ON MECHANICAL AND FLEXURAL BEHAVIOUR OF CONCRETE WITH FOUNDRY SAND AS PARTIAL FINE AGGREGATE REPLACEMENT

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The disposal of Waste Foundry Sand (WFS) has become a pressing environmental concern, primarily due to the large volumes generated by metal casting operations. At the same time, the construction sector is actively exploring sustainable alternatives to natural aggregates to mitigate environmental degradation and conserve natural resources. This study examines the feasibility of incorporating WFS as a partial substitute for fine aggregate in concrete. The objective is to assess its influence on key mechanical properties, specifically compressive strength, split tensile strength, and the flexural behaviour of reinforced concrete beams. Concrete specimens were cast using foundry sand as a replacement for fine aggregate at varying levels—0%, 5%, 10%, 15%, and 20% by weight. All specimens were subjected to conventional water curing and tested at curing intervals of 7, 14, and 28 days. The test results showed a modest improvement in compressive and tensile strength for mixes containing 5% to 10% foundry sand. However, strength properties declined noticeably when replacement exceeded 10%. Flexural tests on beam specimens demonstrated that the mix with 5% foundry sand replacement outperformed the control mix in terms of initial crack load, maximum load capacity, and exhibited a more desirable load–deflection response. These findings suggest that WFS can be effectively utilised as a sustainable alternative to natural fine aggregate in concrete production, particularly at replacement levels of up to 10%, thereby promoting environmentally conscious construction practices.

27.“Lung Cancer Detection using Gen AI"

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Lung cancer is still among the most lethal cancers globally, with prognosis largely influenced by early and correct diagnosis. Conventional diagnostic tools like radiology and histopathology are usually plagued by such limitations as data unavailability, inter-observer variability, and delayed diagnosis. Generative Artificial Intelligence (GenAI) has revolutionary potential in overcoming the above limitations by producing synthetic data, enhancing medical imaging, improving feature extraction, and facilitating personalized treatment planning. This article discusses the uses of GenAI in the detection and diagnosis of lung cancer, optimization of treatment, and drug discovery. A framework is presented that utilizes generative models like GANs and diffusion models for data augmentation and predictive analysis, aided by evaluation metrics such as accuracy and AUC-ROC

28.DIABETES PREDICTION USING MACHINE LEARNING

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Diabetes is a common chronic conditions that requires early identification in order to avoid major consequences. Lab tests, which are generally used in traditional diagnosis are way too expensive in particularly in areas with limited resources. With the use of common health measures such as Age, Blood pressure, BMI, glucose, this study presents a ML-based method for predicting the risks of the diabetes. The framework consists of extensive feature engineering, data preprocessing, and testing of three algorithms: XGBoost, Random Forest, and Logistic Regression. Using measure like accuracy, precision, recall, F1-score, and ROC-AUC are in use to assess models, and reliability is ensured via stratified k-fold cross-validation. When it came to generalisation and prediction accuracy, XGBoost was the best performer. SHAP analysis is used to emphasise the characteristics that have the greatest impact on diabetes risk in order to built the results more transparent. Taking factors considered, the suggested system provides a workable, comprehensible, and expandable approach to early diabetes detection, assisting medical professionals and enhancing access to prompt diagnosis.

29.DEEP LEARNING-BASED PREDICTION OF ADVERSE DRUG REACTIONS

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Computational approach is important to lowering health and financial risks in the process of development of drug and predicting (ADRs) before starting clinical trials. Cell-specific and condition-dependent factors are frequently missed by conventional methods that rely on genetic information, chemical structures, drug–protein [1,2,3] interactions, and chemical structures. To address this, the proposed Deep Side framework leverages deep learning to predict ADRs using integrated gene expression [11] profiles (GEX), experimental metadata (META), and chemical structures (CS) from the LINCS L1000 [11] and SIDER [11] datasets. Five neural architectures, including Multi-Layer Perceptron [4,14] (MLP) and SMILES CNN (SMILES Conv), were evaluated. The SMILES conv has the overall best performance. Moreover, the study uncovered several previously unreported side effects, highlighting the framework's ability to generate new insights within computational pharmacovigilance. [6,18].

30.PRIVACY-PRESERVING DATA AGGREGATION FOR SMART CITY IOT SENSORS

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The proliferation of Internet of Things (IoT) sensors across smart city infrastructure has introduced new paradigms for data-driven urban management. However, real-time data aggregation from distributed sources introduces significant privacy concerns. This paper presents a novel architecture for privacy-preserving data aggregation in IoT-enabled smart cities, employing a hybrid approach combining homomorphic encryption, differential privacy, and federated learning. The system facilitates secure, real-time aggregation and analytics of data from environmental sensors, traffic monitors, and utility meters without exposing raw data at any stage. The implementation demonstrates over 88% reduction in privacy leakage, 93% data utility retention, and <150ms system response time across simulated city-wide IoT deployments. The system was evaluated through controlled experiments involving 10 sensor nodes and 3 edge zones. The proposed model contributes to secure and privacy-compliant smart city operations.

31.QUANTUM-RESISTANT CRYPTOGRAPHIC SOLUTIONS FOR SMART CITY IOT DEVICES

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The rise of smart cities, powered by a dense network of IoT devices, has unlocked tremendous opportunities for urban automation and citizen services. However, these systems are increasingly vulnerable to cyber threats, particularly with the advent of quantum computing which threatens to break traditional cryptographic protocols. This paper investigates the urgent need for quantum-resistant cryptographic (QRC) mechanisms in smart city IoT infrastructures. We present a layered security framework integrating post-quantum cryptography (PQC), lightweight encryption for constrained devices, and a lattice-based key exchange protocol tailored for heterogeneous IoT environments. Our prototype implementation across urban surveillance nodes and smart meters demonstrates resilience to quantum attacks and practical feasibility on low-power devices. Through performance evaluation and security benchmarking, we highlight the path towards secure, future-proof smart city deployments.

32.CYBER-RESILIENT SMART HOMES: AN ANALYTICAL REVIEW OF IOT SECURITY CHALLENGES AND MITIGATION STRATEGIES IN INTELLIGENT LIVING ENVIRONMENTS

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The evolution of smart home technology, powered by the Internet of Things (IoT), has significantly enhanced residential automation, efficiency, and user convenience. Despite these benefits, the rapid expansion of interconnected devices introduces severe vulnerabilities to malicious cyber activity. This study provides a comprehensive evaluation of cybersecurity threats in smart home ecosystems, focusing on network-level malware such as VPN Filter and its systemic implications. A multilayered taxonomy of attack vectors is developed, examining real-world device vulnerabilities, including privacy breaches, data manipulation, and service denial. A supervised three-tier intrusion detection system (IDS) architecture is proposed, aiming to monitor anomalous behavior, detect malicious traffic, and classify attacks in real time. The proposed system is validated using a simulated smart home environment with real consumer IoT devices. This paper emphasizes the necessity of embedding security frameworks within smart infrastructure design to ensure the resilience and safety of intelligent homes.

33.AN OVERVIEW OF BIRD DETERRENT APPROACHES IN AGRICULTURE: FROM SCARECROWS TO SMART IOT SOLUTIONS

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Birds pose a significant threat to mango orchards, especially during the budding stage typically between January to March month in many tropical, sub-tropical region, leading to considerable yield losses. Traditional bird deterrent methods such as scarecrows or manual monitoring are often ineffective and labour-intensive. This work proposes an IoT based smart bird deterrent system that utilizes flapping sound simulation and vocal detection techniques to effectively and automatically detect bird's mango trees and other crops. This system employs microphones and sound sensors to detect bird flapping sounds and vocal sound in real time. Upon detection, it activates pre-recorded scary sounds, creating a natural yet intimidating response sound that scares birds away. This, project is eco-friendly, intelligent, and low-maintenance solution enhances crop protection, reduces labour costs, and promotes sustainable farming practices. A complete review of various methods used in bird det system is given in this paper.

34.DETECTION OF CYBER THREATS USING ARTIFICIAL INTELLIGENCE

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The ever-changing world of cybersecurity is always challenged by the constantly evolving digital environment, and the research literature cited demonstrates how traditional, signature-based defenses are no longer effective

against the speed and complexity of contemporary cyber threats, including advanced flood attacks and new adversarial exploits. There is a growing, field-wide consensus that AI is not a theoretical concept but the necessary, adaptive shield needed for modern cyber-defense, and the project titled "Detection of Cyber Attacks Using Artificial Intelligence" is a direct, practical application of these academic principles, translating the underlying concepts, such as neural networks into a real-world, full-stack web application that implements AI for real-time threat detection, allowing users to actively analyze incoming data.

35.VISIONFORENSICS: AI- DRIVEN REAL TIME CRIME ANALYSIS USING FACIAL RECOGNITION

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This comprehensive project puts vision forensics front and centre a smart system that uses artificial intelligence to examine crime incidents as they happen. It takes advantage of the newest face id technology to help police departments find and keep tabs on particular people they are watching the design puts live security camera watching together with computer-based learning rules which means faces can be found automatically in public and instantly checked against lists of people with a criminal past when a face is positively identified. The tool lets the right people know straight away which helps them take fast action in response to developing circumstances by using automation for these tasks vision forensics makes things faster and more precise when it comes to finding people who break the law. It also pushes security measures that get ahead of the curve and gives useful details for looking into patterns and solving crimes the project deals with the practical side of using new tech how well the system works how data is handled and the right and wrong considerations that come up when using face id responsibly to keep people safe.

36.ENHANCING RETRIEVAL-AUGMENTED GENERATION WITH CONTEXTUAL MEMORY FUSION: PERSISTENT MEMORY AND DYNAMIC KNOWLEDGE GRAPHS FOR ROBUST ENTERPRISE AI

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Retrieval-Augmented Generation (RAG) has become a foundational paradigm for improving the factual reliability and context awareness of Large Language Models (LLMs) by integrating external knowledge retrieval. This paper introduces and evaluates a novel Contextual Memory Fusion RAG (CMF-RAG) architecture designed to enhance end-to-end system robustness, especially in enterprise scenarios requiring persistent context across complex user interactions. By fusing persistent multi-session memory with dynamic relationship-aware knowledge graphs, and leveraging Amazon Bedrock and LangChain, CMF-RAG achieves superior context retention, multi-hop reasoning, and user satisfaction. Extensive experiments on diverse benchmark datasets show significant improvements in response quality, contextual consistency, and resistance

to information drift versus classical RAG architectures. The results suggest that contextual memory fusion is a vital step toward realizing truly context-aware, adaptive retrieval-augmented AI systems.

37.A CNN-DRIVEN APPROACH TO DETECT IMAGE

Manipulation and Ensure Content Credibility

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In a time when social media, digital journalism, and online information sharing are prevalent, the veracity of digital photos has grown to be a significant worry. The legitimacy of visual content is being called into question as a result of the ease and sophistication of image manipulation brought about by the growing availability of sophisticated image editing software and artificial intelligence tools. In order to guarantee content reliability, this study suggests a framework for identifying and categorizing manipulated images that is based on Convolutional Neural Networks (CNNs). In order to detect minute irregularities brought about by tampering, including splicing, cloning, and filtering, the suggested model automatically extracts spatial and frequency features from images. The CNN learns to distinguish between real and fake content with high accuracy by being trained on a variety of datasets of real and modified images. The approach's ability to detect manipulated regions and maintain strong generalization across various manipulation types is demonstrated by experimental results. By providing a reliable and automated solution for digital forensics, media verification, and online content integrity, this study advances the development of intelligent image authentication systems. This study's main goal is to create a CNN-driven image authentication model that can reliably detect manipulated images and guarantee the accuracy of visual content. This study's main goal is to create a CNN-driven image authentication model that can reliably detect manipulated images and guarantee the accuracy of visual content. The following are the specific goals:

38. REAL-TIME OBJECT DETECTION AND ASSISTIVE OUTDOOR NAVIGATION SYSTEM USING YOLOV8 FOR VISUALLY IMPAIRED INDIVIDUAL

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Individuals who are visually impaired and those living with challenging outdoor environments are typically without access to obstacle information and the spatial context. This work presents a Real-Time Object Detection and Assistive Guidance System based on a deep-learning model (YOLOv8) that leverages OpenCV for visual processing and pyttsx3 for audio processing. The system is trained on a custom curated dataset with 37 outdoor object types.This system operates in real time, performs distance estimations of objects with the pinhole camera vision model, segments the spatial context, and provides audio notifications as warning signals from barriers to travel. Additionally, the system has a speech recognition module that allows the user to control the assistant with speech commands such as "start" and "stop." Additionally, the system has an SOS module integrated, which autonomously provides an email with a live GPS location of the user when distress keywords are detected. This combination of computer vision, speech intelligence, and safety automation is a functional and effective application of artificial intelligence as an assistive form of navigation and spatial awareness.

39.RECONSTRUCTING FNIRS HEMODYNAMIC ACTIVITY FROM EEG FOR COST-EFFECTIVE BRAIN MONITORING USING DEEP LEARNING

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This research introduces a deep learning setup to classify brain states by combining EEG and fNIRS signals. Instead of treating them together early, the model uses CNNs to pull out space-time patterns separately from EEG and HbO data, tapping into how electrical activity links with blood flow changes. While EEG and fNIRS inputs are processed on their own paths first, they later merge via dense layers to guess whether the cortex is active or not. When tested on subjects the system hadn't seen before, it still performed well, showing solid accuracy in telling apart engaged from idle mental states. Results suggest mixing EEG with fNIRS could be a practical route for real-world BCI systems and tracking mental effort without losing reliability.

40.BUYWIZ: AN AUTOMATED PRICE TRACKER LEVERAGING NODE.JS AND MODERN SCRAPING LIBRARIES

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This research explores the application of web scraping techniques for e-commerce price tracking, focusing on product price comparison across major online shopping platforms. By leveraging modern web scraping tools and frameworks such as Cheerio, Puppeteer, and Axios, this study aims to provide consumers with a platform that aggregates prices from multiple e-commerce websites like Amazon, Flipkart, Reliance Digital, and Croma. The goal is to assist users in making informed purchasing decisions based on real-time price comparisons, ultimately reducing the time and effort spent searching for products. This paper also investigates the challenges of web scraping, including legal and ethical considerations, and presents a solution for automating the comparison process using a well-structured system architecture.

41.HEALTHCARE DATA CHALLENGES IN MULTI-DISEASE PREDICTION SYSTEMS: A COMPREHENSIVE REVIEW AND CONCEPTUAL FRAMEWORK

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Artificial Intelligence (AI) and machine learning approaches are transforming disease prediction with revolutionary potential for precision, scalability, and timely intervention within contemporary healthcare systems. However, technological advancement in such approaches is naturally hindered by intractable problems in data quality, heterogeneity, privacy, class imbalance, and lack of interoperability across heterogeneous clinical sources. This article offers a comprehensive review and critical synthesis of the best twenty studies in cardiovascular, metabolic, and neurodegenerative disease prediction, emphasizing technical and data-related issues slowing down effective AI deployments. By comparative examination, this review explores state-of-the-art techniques in feature engineering, multimodal fusion, ensemble and hybrid modeling, and model interpretability. Key findings indicate that integrated architectures, with the combination of high-level ensemble learning and high-end preprocessing, yield more accurate predictions and adaptability. But these rewards depend on sound methodology, standardized concepts of data, and open management of explainability and ethics. The review identifies a fundamental lesson: effective, enduring progress in AI-assisted healthcare will involve not just algorithmic innovation but also ongoing commitment to dependability, interpretability, and ethics-based AI implementation across the clinical continuum. Subsequent research needs to be structured to emphasize standard data curation, interoperable architectures, and rigorous ethical regulation to take full advantage of safe, reliable, and understandable AI in the aid of medical decision-making.

42.FRACTURE DETECTION SYSTEM USINGVISION TRANSFORMER (VIT)

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Bone fractures are among the common injuries in which traditional diagnosis from X-rays is slow and can be mistaken by the human eye. Even after the deployment of deep learning models such as Convolutional Neural Networks (CNNs), the latter remain incapable of obtaining global contextual information as well as long-range dependencies of the image. Thus, the Vision Transformer (ViT) based architecture of the proposed automated skeletal fracture detection system is ideal for this kind of task. The system takes bone X-ray images and through preprocessing, data augmentation, and feature extraction by the ViT model, it finally classifies them. For training and testing purposes, we have used a carefully selected dataset of labeled X-ray images. To make the model more generalized, normalization, resizing, and contrast enhancement were applied5. The ViT model has reached very high accuracy, precision, and recall levels. These findings are evidence of the device being utilized in clinical practice to assist radiologists, lessen the diagnostic workload, and make the early detection process faster, thus, presenting a fresh and efficient method that can take the place of conventional CNN-based models.

43."SMART VIRTUAL DRESSING ASSISTANT"

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Users may see how clothing would fit them without ever trying it on thanks to the Smart Virtual Dressing Assistant. To produce realistic try-on results, the system combines pose detection, garment warping, and Latent Diffusion Models (LDMs). Body landmarks are extracted using MediaPipe or OpenPose after preprocessing user and clothing photos with background removal and normalization. After that, the clothes are altered to fit the user's posture and refined in latent space to enhance blending, texture, and lighting. The model maintains precise alignment between the body and clothing while producing lifelike, high-quality outputs in real-time (less than 300 ms each frame).

44.SURVEILLANCE ANOMALY DETECTION AND NOTIFICATION SYSTEM

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Manual monitoring is a common component of traditional surveillance systems, which can result in errors and inefficiency. This paper presents a real-time Surveillance Anomaly Detection and Notification System that automatically detects anomalous activities in video streams, such as fights, robberies, and accidents, using deep learning and computer vision. The system processes both live webcam feeds and uploaded videos using a Convolutional Neural Network (CNN) that was constructed with PyTorch and trained on surveillance datasets. Using the Twilio API, it sends SMS alerts after looking for anomalies in preprocessed frame sequences. Users can modify system settings and view results in real time through a web interface built on Flask. The prototype performs well in various scenarios thanks to its high accuracy (up to 89%) and fast response times. This paper presents a real-time Surveillance Anomaly Detection and Notification System that automatically detects anomalous activities in video streams, such as fights, robberies, and accidents, using deep learning and computer vision. The system processes both live webcam feeds and uploaded videos using a Convolutional Neural Network (CNN) that was constructed with PyTorch and trained on surveillance datasets. Using the Twilio API, it sends SMS alerts after looking for anomalies in preprocessed frame sequences

45.DHATRI FOR AGRI WITH ASSISTANT & CIBIL LIKE SYSTEM

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The Dhatri Credit-Based Farming System is a significant step forward for modern agriculture. It combines technology, data analysis, and financial inclusion to make farming more sustainable and efficient.
Dhatri uses IoT sensors installed in the field to gather important, real-time information, including soil moisture, pH, temperature, and nutrient levels. This data is not just stored; it is used right away. Machine learning and Artificial Intelligence (AI) models analyze it to predict crop yields, recommend specific fertilizer amounts, schedule the best times for irrigation, and even spot early signs of crop disease.
The standout feature of Dhatri is its credit scoring engine. This engine assesses a farmer's land and crop performance to create a dynamic credit score. This score is more than just a number; it provides a data-backed way for financial institutions to evaluate loan eligibility quickly and fairly, helping farmers access the funding they need.
All this information is provided directly to farmers through the Decision Support Platform, which is a user-friendly mobile or web application. This platform offers personalized insights, important alerts, and practical recommendations. By merging technology with finance, Dhatri helps farmers make better decisions, significantly improve their productivity, and achieve sustainable agricultural growth.

46.MEDICINE OVERDOSE PREDICTION

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Accidental overdoses have become a serious health concern, so better ways to spot and handle dangers are starting to matter more - especially when it comes to cutting down harm or saving lives. Old-school medical methods often fall short since they can't catch tricky, shifting trends in how patients change over months or years. To fix this gap, researchers built a smart computer system powered by AI that guesses whether someone might overdose on meds within the next month by looking at their full digital history. The tool runs on a powerful learning algorithm fed with masked personal info like past diagnoses, drugs taken, test numbers, plus basic details about each person. To check how well it worked, the researchers tested standard techniques such as random forests along with XGBoost while adding interpretable AI elements so doctors could grasp how decisions were made. Instead of just relying on black-box predictions, they built a deep learning setup that scored 0.92 on the ROC curve - boosting detection accuracy by roughly one-third compared to conventional methods when matching precision levels. Among the standout signals flagged by the algorithm: recent opioid fills, taking several drugs at once, plus blood tests pointing to issues in the liver or lungs. Rather than chasing hype, the study delivers a practical tool combining clarity and strong results to catch vulnerable individuals sooner. Thanks to quicker alerts tailored to each person’s risk, this framework supports smarter care choices in real-world clinics aiming to cut down overdose cases and keep people safer.

47.ARECA NUT BUNCH SEGMENTATION FOR RIPENESS DECTECTION BY HSV AND YCGCR COLOR MODELS USING DEEP LEARNING TECHNIQUES

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Detecting the ripeness of areca nuts plays a vital role in improving yield quality, optimizing harvest time, and reducing farmers’ economic losses. Traditional manual inspection methods are laborious, subjective, and often inaccurate, creating a need for an automated system that can perform precise maturity estimation. This research presents a deep learning–based framework that utilizes the HSV (Hue, Saturation, Value) and YCgCr (Luminance-Chrominance) color spaces combined with Mask R-CNN for segmentation and ripeness classification. The system preprocesses input images through color-space transformation, thresholding, and morphological enhancement to isolate key features. Experimental findings reveal that the YCgCr color model consistently delivers superior accuracy (90.16%) compared to the HSV model (82%). The integration of color model–based preprocessing with deep learning significantly enhances robustness against environmental variations such as lighting and background complexity. The proposed method offers a scalable and dependable approach to automating areca nut ripeness detection, supporting better decision-making for farmers and promoting efficient crop management.

48.Development of Hybrid Machine Learning Model for Effective Intrusion Detection System

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It has a hybrid intrusion detection system (IDS) that uses deep learning to find and identify network anomalies. It merges a CNN-LSTM model for multi-class classification with an autoencoder for feature extraction. The

autoencoder compresses high-dimensional input data into smaller representations while preserving important features and reducing noise. The CNN-LSTM processes these inputs by applying LSTM layers for time sequences and convolutional layers for spatial features. This setup allows for precise detection of various intrusion types, such as Dos and probing attacks. A large dataset trains the IDS, while

49.AI-POWERED SUPPORT SYSTEM FOR MENTAL HEALTH VIA NL PAND EMOTION DETECTION

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Artificial intelligence (AI) is being used in mental health care to create chatbots that act as therapists. These AI driven chatbots, using natural language processing (NLP), communicate with users to provide emotional and therapeutic support they require. This discusses the development of chatbots serving as agents for individuals seeking mental health assistance. They offer convenient and confidential ways for people to talk about and ease issues such as anxiety, depression, and stress. The chatbot does not only inform users about mental health choices but also help decrease stigmaand encourage a proactive ap-proach to mental wellness.The LSTM processes input sequences to understand the context and then generatesthefinalresponses based on that analysis, alsoutilizes sentiment analysis to interpret theemotional tone or sentiment of user inputs, usually in text form. It referred to as opinion mining, determines whether a text expresses positive, negative, or neutral sentiment. The chatbots powered by AI and NLPplay a crucial rolein providing mental health support and breaking down barriers to seeking help.

50.A QUANTUM-INSPIRED EVOLUTIONARY AND IPSO HYBRID MODEL FOR EFFICIENT GRAPH COLOURING UNDER MULTI-CONSTRAINT CONDITIONS

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Graph colouring, a fundamental problem in combinatorial optimization, plays a critical role in various real-world applications such as register allocation, scheduling, and frequency assignment. Efficiently solving the graph colouring problem under multiple constraints remains a major computational challenge, particularly for large and complex graphs. This study addresses these limitations by proposing a hybrid optimization model that integrates Quantum-Inspired Evolutionary Algorithms (QIEA) with an Improved Particle Swarm Optimization (IPSO) technique. The proposed model leverages the probabilistic representation and parallel search capabilities of QIEA along with the adaptive learning and velocity adjustment features of IPSO to explore the solution space effectively. The primary objective is to minimize the number of colours used while satisfying adjacency, capacity, and dependency constraints. Experimental evaluations conducted on benchmark graph instances demonstrate that the hybrid model significantly outperforms existing evolutionary and heuristic methods in terms of convergence speed, constraint satisfaction, and colouring efficiency. These results affirm the potential of the QIEA-IPSO hybrid in solving complex multi-constrained graph colouring problems.

51.SEQUENTIAL DEEP LEARNING MODEL FOR CYBER BULLYING DETECTION BY INCORPORATING BYSTANDER DYNAMICS

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Accurate identification of cyberbullying on online social media is crucial in online security, particularly to those who are victims of the same. The language of cyber harassment is implicit and one needs thorough analysis of the circumstances of conversation to understand the context and the degree. Current literature on cyberbullying recognition is majorly based on the primary post without considering the important insights provided by the bystander responses. Besides, the fact that there is ambiguity regarding the differences between cyber-aggression and cyberbullying undermines the validity of certain of these studies. In order to alleviate these constraints, this study fills the knowledge gap in the literature by emphasizing the importance of bystander in the context of comprehensive detection of cyberbullying. In order to identify the effects of bystander in a more accurate way, we specifically research the role of bystander to accurately detect the activities of cyberbullying. Our approach will be on maximizing a pre-trained transformer model i.e BERT that has attributes associated with bystander into categories, i.e. defender, instigator, neutral participant, and other. In order to enhance the detection of granular cyberbullying, we propose a sequence of classifiers which combine the output of BERT with Long Short-Term Memory networks. Our experimental findings prove that bystander roles can enhance the performance of the model. Our framework is also accurate in determining the degree of hostility in events of cyberbullying by taking into account the mutual relationship between the characteristics of bystanders and the labeling of cyberbullying classes, which is an innovative solution to the problem of misclassification of cyberbullying. To summarize, our paper promotes the importance of integrating bystanders as a major characteristic of cyberbullying detection and introduces a sequential fine-grained architecture which achieves better results than traditional methods, demonstrating encouraging results in the accurate classification of cyberbullying instances. We extended the original approach by applying an ensemble strategy that merges predictions from multiple several independent models, enhancing overall performance. Additionally, we explored alternative architectures, such as BERT with CNN and LSTM, as well as LSTM combined with GRU, to further improve dataset analysis.

52.ADVANCED DIGITAL ABUSE DETECTION:A DEEP LEARNING APPROACH

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Cyberbullying remains a major social harm on modern social platforms. In this paper we present a unified framework that combines multimodal content analysis (text, image, voice), contextual and behavioural signals, and multilingual text models to detect cyberbullying robustly across different platforms and languages. Our approach integrates an explainable multimodal fusion engine (Intelli Shield-style), deep sequence models for textual aggression, and quantitative measures for repetition and intent to harm. We evaluate design choices using findings and datasets from prior work (Twitter/Instagram/Facebook hate-speech corpora and a multilingual Urdu/Roman-Urdu/English dataset) and report expected trade-offs between accuracy, latency, and generality. The proposed framework emphasizes explainability, privacy-aware deployment, and adaptability to low-resource languages.

53.DEEP LEARNING FOR DISASTER VICTIM DETECTION IN DEBRIS FILLED AREAS

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Victim identification in search and rescue operations in a collapsed building without structural support is a time-consuming and risky process. The possibility of rescuing a victim is highest for the first two days of the accident and then it gradually decreases to zero. Take the victim to the hospital as early as possible by responding and identifying the victim as early as possible. Wheel robots and human victim detection (HVD) based on AI and supervised by experts can reduce this problem to a great extent. In this project, we are going to initiate Deep Learning approach hinged on Transfer Learning, which uses machine learning classification techniques to identify people in collapsed buildings. Five classes were used to develop a data set of human victims: head, hand, leg, upper body, and body-less. The dataset class-wise were initially downloaded using a ResNet-50 deep learning model trained based on fine-tuning-based transfer learning to test the impact of reducing features on classification, Resnet50 was used for feature selection after getting the model's training features. Then, some common algorithms, including resnet50, random forest algorithm, XGBoost algorithm, Naive Bayes are used to complete the classification. We test the above algorithms' categorization accuracy to find the best one for real-time applications.

54.YOUTUBE SPAM COMMENT CLASSIFIER AND ADMIN ALERTING USING MACHINE LEARNING

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This paper proposes a technique for finding spam comments on YouTube, which have seen tremendous growth lately. YouTube is running its own spam-blocking system but keeps failing to block them correctly. With the rise of online platforms, the path has been laid for an ever-growing problem of spam comments. In particular, YouTube fights against the proliferation of spam comments. To address these issues, we propose a system of robust spam comment detection using machine learning techniques. We propose an approach to increase spam comment detection accuracy on YouTube. This is to complement the mechanisms developed within the platform. One new feature in our system is automatic reporting to the administrators. In cases where a comment is incorrectly marked as spam, our system will create a report to the administrators of the platform, giving them all the necessary information to take remedial action.

55.A MACHINE LEARNING APPROACH USING STATISTICAL MODELS FOR EARLY DETECTION OF CARDIAC ARREST IN NEWBORN BABIES IN THE CARDIAC INTENSIVE CARE UNIT

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The diagnosis of cardiac arrest in newborns must be done promptly and accurately in order to enhance clinical outcomes, as it is a life-threatening emergency. It is now possible to detect congenital heart defects in neonates

as early as possible by combining machine learning methods with clinical data, which is particularly useful in cardiac intensive care units. Predictive models for cardiac arrest diagnosis were developed and optimized in this study using the heart disease dataset. We improve the classifier's robustness by addressing data imbalance using KMeans-SMOTE. Optuna and GridSearchCV are used for hyperparameter tuning, which enhances the generalizability of the model. The following supervised learning algorithms are tested: Decision Tree, Random Forest, Support Vector Machine (SVM), Naive Bayes, Multi-Layer Perceptron (MLP), Linear Discriminant Analysis (LDA), Logistic Regression, and an ensemble Voting Classifier that combines Boosted Decision Tree, Extra Tree, and LDA. The experimental findings show that the Voting Classifier, Logistic Regression, and LDA all achieve 89.0% accuracy, precision, recall, and F1-score, which is the highest performance under Optuna. Random Forest outperforms other methods with GridSearchCV, achieving an impressive 86.6% accuracy, precision, recall, and F1-score. These results demonstrate the efficacy of the two tuning approaches and the promise of LDA and Random Forest for predicting the likelihood of cardiac problems in newborns.

56.A MACHINE LEARNING FRAMEWORK FOR EARLY-STAGE DETECTION OF AUTISM SPECTRUM DISORDERS

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This research proposes the ML system for the early diagnosis of Autism Spectrum Disorder (ASD) which is known to be human beings with the inability to find a complete cure but needs early intervention to manage its impact. The proposed method compares four feature selection and transformation methods, namely, Quantile Transformer, Power Transformer, Normalizer and Max Abs Scaler, across four ASD cohorts comprising of newborns, children, adolescents, and adults. "AdaBoost, Random Forest, Decision Tree, K-Nearest Neighbour, Gaussian Naive Bayes, Logistic Regression, Support Vector Machine (SVM) and Linear Discriminant Analysis (LDA)" are the ML algorithmic techniques used to find the best combination of feature selection techniques and classifiers. An exhaustive statistical analysis singles out the best model for each age bracket while a voting classifier yields the highest predicted accuracy across all classes. In addition, a thorough feature importance analysis is shown, demonstrating the importance of application of ML algorithms for better diagnostics accuracy and aid to-clinicians during screening for autism spectrum disorder. Experimental resultsi showi thati the proposedi ensemblei modeli based on Randomi Foresti and AdaBoosti within a voting machine achieves as much as 100% accuracy, which is more robust and reliable than the current ASD detection techniques.

57.LIVE SPEECH EMOTION DETECTION

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Live Speech Emotion Detection is a system that aims to classify human emotions from spoken language in real time. The system can use audio features, such as pitch, tone, energy and acoustical spectrum patterns to identify emotions like happiness, sadness, anger, fear and neutrality. This consists of live capturing of speech, pre-processing the audio and extracting features followed by utilization of machine learning or deep learning models for classification. Such technology augments human-computer interaction and is used across virtual assistants, customer support, healthcare and education. The technology promotes human-computer connection, enabling systems to respond empathetically and adaptively in real-time. It has practical uses in virtual assistants, customer service, mental health monitoring, education, security, and entertainment.

58.-PEDODENT: A DETAILED ANALYTICAL FRAMEWORK FOR AI-BASED PEDIATRIC DENTAL GROWTH AND DEFORMATION DETECTION: PEDODENT: AI BASED DEVELOPMENT & DEFORMATION DETECTION

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Pediatric dentistry requires accurate and timely detection of developmental and structural dental abnormalities to support preventive treatment and early clinical intervention. Conventional diagnostic methods often rely on manual assessment of radiographs, which can be time-consuming and inconsistent across practitioners. Deep learning models, such as Convolutional Neural Networks (CNNs), have shown effectiveness in automating medical image classification; however, they face limitations when dealing with small, high-dimensional pediatric datasets and complex dental features.This study presents PEDODENT, an analytical framework that integrates Quantum Convolutional Neural Networks (QCNNs) for dental deformity classification and segmentation. The system processes pediatric dental radiographs and intraoral images through a structured workflow that includes preprocessing, feature extraction, and classification. The proposed QCNN model achieved an overall accuracy of 96.2%, precision of 94.8%, recall of 95.6%, F1-score of 95.1%, and an Intersection over Union (IoU) of 92.3%, outperforming conventional CNN and Support Vector Machine (SVM) baselines, which recorded accuracies of 90.1% and 83.5% respectively.Through Grad-CAM visualization, the model highlights clinically relevant regions, ensuring interpretability and trust in diagnostic outcomes. The results demonstrate that hybrid quantum-classical computation enhances feature representation and classification reliability, offering a promising direction for pediatric dental analysis and early deformity detection.

59.MEDICAL IMAGE PROTECTION THROUGH SECUREMED-DWT-HD-SVD WATERMARKING TECHNIQUE

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Healthcare systems must protect medical images including MRIs, CT scans and X-rays because of the growing importance of digital healthcare storage. The proposed research develops SecureMed-DWT-HD-SVD as a lightweight medical watermarking framework that delivers robust image protection with both invisibility and security safeguards. The method achieves efficient watermark embedding through its integration of Discrete Wavelet Transform (DWT) and Hessenberg Decomposition (HD) and Singular Value Decomposition (SVD). This method brings a novel approach which uses basic XOR-based encryption to protect watermarks before embedding while maintaining an efficient system for data confidentiality. The evaluation results indicate good image preservation through PSNR values reaching up to 43.97 dB alongside SSIM measures reaching 0.9021 while demonstrating high resistance to JPEG compression and histogram equalization attacks. The SecureMed-DWT-HD-SVD establishes a secure base for clinical medical image protection despite exhibiting moderate defense against Gaussian noise and motion blur.

60.A COMPREHENSIVE REVIEW OF IOT SECURITY FRAMEWORKS: CHALLENGES, SOLUTIONS, AND FUTURE DIRECTIONS

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This paper provides a comprehensive review of Internet of Things (IoT) security frameworks, addressing the escalating cybersecurity challenges within this rapidly expanding technological landscape. The study systematically examines prominent frameworks such as the IoT Trust Framework, NIST Cybersecurity Framework for IoT, ETSI EN 303 645, and ISO/IEC 27001, analyzing their foundational principles, components, and applicability across diverse IoT ecosystems. A detailed methodology identifies critical attack surfaces and categorizes prevalent vulnerabilities, including the OWASP IoT Top 10, alongside common attack vectors like DDoS, MITM, and physical tampering. Key findings highlight essential "Security by Design" principles and architectural tactics for detection, resistance, reaction, and recovery, reinforcing the importance of the Confidentiality, Integrity, and Availability (CIA) triad. The discussion explores advanced mitigation strategies, including multi-factor authentication, robust encryption standards, secure boot, and firmware update mechanisms. Furthermore, the paper investigates the transformative potential of Artificial Intelligence, Machine Learning, Blockchain technology, and Privacy-Enhancing Technologies in fortifying IoT security. Identified research gaps emphasize the urgent need for universal, scalable assessment standards and solutions addressing computational complexities, paving the way for more resilient and trustworthy IoT deployments.

61.ENGINEERING HIGH-PERFORMANCE CONCRETE WITH ADVANCED ADDITIVES FOR SUSTAINABLE BUILT ENVIRONMENTS

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This study examines the performance of three different mix designs to determine the impact of adding advanced ingredients to concrete mixes. The kind and dose of chemical admixtures were changed to create each variety. Sulfonated naphthalene, a traditional super plasticizer, was used in MODEL-1 at a dose of 2.00 L/m³. In contrast, a carbon-based addition was added to MODEL-2 and MODEL-3 at doses of 0.239 L and 0.391 L, respectively. Slump tests were conducted on new concrete to evaluate its qualities, and cylindrical specimens measuring 100 mm diameter and 200 mm length were produced and evaluated for compressive strength and unit weight at 7, 14, and 28 days of curing. The findings show that even at relatively lower doses than conventional super plasticizers, innovative admixtures greatly improve concrete performance. The results demonstrate the promise of new materials for high-performance and environmentally friendly concrete applications by confirming that their usage enhances workability and compressive strength

62.DEVELOPING A REAL-TIME CYBER SECURITY FRAMEWORK FOR INDIAN CYBERSPACE

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India's online world including govt services, banking, local shops, and key systems keeps getting hit by rising cyber dangers such as fake login pages, harmful software, traffic overload attacks, or false news. Old-style defenses just can't keep up anymore.

This study introduces a smart system using artificial intelligence to boost online security across India’s digital spaces. By pulling together info from many places, it runs live analysis on data flows while spotting unusual patterns. Instead of just flagging threats, it understands multiple languages through advanced text processing tools. The setup shares updated danger reports in consistent formats, keeping user privacy tight and following local laws closely.

The system sets up steps to spot fraud, malware, or fake news while also tackling DDoS attacks, using clear signs and known hurdles. It aims to shorten detection time, boost precision not just respond faster but help India handle digital threats better.

63.IOT-BASED SMART AQUAPONICS SYSTEM USING MACHINE LEARNING FOR AUTOMATED MONITORING AND FEEDING: A SURVEY

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This project creates a low-cost aquaponics controller that integrates computer vision and multi-sensor feedback to enhance fish welfare and plant growth in one recirculating system. An ESP32-CAM enables monitoring of fish activity to derive intent to feed and automatically engages a servo-actuated feeder with dose control and lockout timers during periods of no intent to feed to mitigate overfeeding and stress. Water quality is monitored

with a pH sensor to signal timely exchanges of effluent water from the fish tank to the plant unit. The controller provides a NPK sensor on the soil-side and an imaging system on a pre-specified timed interval to identify nutrient levels to stimulate transfer and adjust circulation and irrigation rhythms. The integrated control aims to stabilize water chemistry, reduce feed loss, and optimize crop response on commercial off-the-shelf hardware, which includes behaviorally-responsive feeding, pH mediated exchange signals, and responsive observations of NPK/growth metrics related to plant performance.

64.OPTIMIZING CONCRETE WITH STEEL SLAG POWDER AND GGBS: EXPERIMENTAL EVALUATION OF STRENGTH AND DURABILITY

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This research compares the performance of normal concrete with concrete that contains ground granulated blast furnace slag (GGBS) and steel slag powder in place of some of the cement. Compressive strength and rapid chloride permeability tests were used to assess mechanical and durability characteristics at 28, 56, and 90 days. Steel Slag Powder and GGBS were added to mixes with binder ratios of 0.3, 0.4, and 0.5 at replacement levels varying from 0% to 70% by weight of cement. The findings showed that the type of supplemental material and binder ratio affected the ideal replacement levels. Both Steel Slag Powder and GGBS considerably decreased chloride ion penetration, as seen by lower RCPT values, while GGBS-substituted concrete showed strength that was on par with or better than control mixes. The analysis, which offers more profound insights into the behavior of partially replaced mixtures in comparison to standard concrete, is what makes this work innovative. Overall, the results demonstrate that GGBS and Steel Slag Powder can improve concrete performance while promoting sustainability by using less cement and having a less environmental effect.

65. REAL-TIME DETECTION OF POTHOLES AND HUMPS USING YOLO

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In both urban and rural transportation networks, identifying and monitoring road surface irregularities such as potholes and speed humps is vital for enhancing driving safety and ensuring effective road maintenance. Speed humps are intentionally constructed raised sections of the road designed to reduce vehicle speed in specific areas, whereas potholes are unintended depressions formed due to surface deterioration, which may create significant hazards for both vehicles and pedestrians. Therefore, reliable and accurate detection of these road anomalies is essential to prevent accidents, reduce vehicle damage, and enable timely repair operations. Recent advancements in computer vision and intelligent computing techniques have facilitated the automated identification of road abnormalities using camera-based systems integrated with deep learning models. These systems can analyze road conditions in real time, classify the anomalies, and support early mitigation measures. In this study, a real-time detection framework for identifying potholes and speed humps is presented. The proposed system utilizes the YOLOv12 deep learning model to accurately recognize and differentiate between potholes and humps, thereby contributing to safer transportation and efficient road maintenance planning.

66.PEDODENT: QUANTUM-DRIVEN PEDIATRIC DENTAL CLASSIFICATION

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The PEDODENT research work describes an explainable hybrid diagnosis model which fuses quantum convolutional neural networks (QCNN) and conventional deep learning techniques in order to classify pediatric dental images. The model is trained on publicly available data sets, using over nine thousand five hundred and sixty-two intra-oral images of pediatric patients, allowing the model to classify structural abnormalities found in pediatric patients' teeth via quantum- assisted feature extraction and Grad-CAM examples. The report shows that QCNN achieved 97.1% accuracy on the test set, along with a receiver operating characteristic (ROC) curve showing an area under the curve (AUC) of 0.98. The model outperformed previously published quantum models using the same data sets, such as the Q-GAN as well as Q-SVM models. Grad-CAM heatmaps are also utilized within the workflow to provide interpretability and highlight key features within the images that may indicate structural disorder. Ultimately, the results suggest that quantum-enhanced architectures may be of great assistance in the area of medical imaging, and would likely be suitable for use in live pediatric dental diagnostics.

67.AI BASED PERSONALISED INVESTMENT AND SPENDING MANAGEMENT SYSTEM

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Managing personal finances is a complex challenge for many individuals, often resulting in inefficient budgeting, poor saving discipline, and uninformed investment decisions. Traditional financial planning methods are either manual or generic, failing to address the unique financial goals and risk preferences of individuals. To overcome these challenges, this project proposes the development of a web-based AI-powered Personalised Investment and Spending Management System that leverages machine learning, financial analytics, and real-time data integration to provide tailored financial insights. The system collects categorized transaction data such as groceries, utilities, entertainment, and savings—with user consent and applies AI models to identify spending patterns, classify expenses, and highlight unnecessary outflows.
Based on disposable income and risk profiles inferred from spending stability, the system generates personalised investment strategies across multiple asset classes, including mutual funds, stocks, recurring deposits, and gold. Unlike conventional budgeting apps, the system dynamically adapts to changing user behaviour and market conditions, ensuring that investment recommendations remain aligned with financial capacity and long-term objectives. To enhance decision-making, the proposed system integrates real-time market insights (e.g., Nifty 50 stock performance via APIs), an AI-driven financial chatbot to answer queries, and an interactive expense tracking module that allows users to visualize financial health through detailed dashboards, graphs, and reports.
Users receive budget alerts, profit-tracking updates, and goal progress summaries, which encourage disciplined financial behaviour and improve literacy. The outcome is a holistic financial assistant that not only reduces the

burden of manual planning but also fosters wealth creation by combining spending management with proactive investment strategies. Ultimately, the project demonstrates how artificial intelligence can revolutionize personal finance management by offering data-driven, adaptive, and user-centric solutions that improve financial security and long-term wealth accumulation.

68.DERMAGENIE: AI DERMATOLOGIST FOR SMART SKIN CARE & DIAGNOSIS

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Across the globe, dermatological disorders are among the most prevalent conditions seen across the medical landscape and often warrant early intervention and treatment to prevent sequelae. However, access to dermatological care does not reach rural and impoverished setting, resulting in delays or no care. Available traditional models and telehealth models although adjunct, are not diagnoses that are real time or accessible on a routine basis. This paper proposes DermaGenie: AI Dermatologist for Smart Skin Care & Diagnosis, a deep learning smartphone application that can diagnose and detect common skin diseases such as: acne, eczema, psoriasis, and melanoma. Symptom recognition and image diagnoses are informed through the use of Convolutional Neural Networks (CNNs) which has been optimized using TensorFlow Lite to run on a smartphone. Beyond a direct dermatological assessment, the application also offers uncertainty clarifying interactive modelling as well as personal counselling, education and advise for users. By combining medical imaging, artificial intelligence and mobile technology, DermaGenie delivers an affordable and cost effective screening tool to assess skin disease during the early stages of diagnosis. DermaGenie aims to shift the disparities that exist between specialty dermatology and patients, both in low resource settings and other settings, towards better outcomes related to relay, timely diagnoses and treatment, ultimately to better skin health. The model demonstrated a high level of classification accuracy at 97.8%, precision quality, and a low rate of misclassifications, less than 5%, and can deliver clinically trusted, realtime diagnosis..

69.TIME SERIES MODELING OF ECG SIGNALS FOR ARRHYTHMIA DETECTION USING LIQUID NEURAL NETWORK

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Analyzing the ECG is crucial for detecting heart arrhythmias and preventing deadly cardiovascular events. Hand-crafted features (and rules) have been used in traditional ECG signal interpretations. But they often fail because of noise or patient conditions. Deep learning can discover sophisticated patterns in raw waveforms. Thus, it has benefited the automated ECG analysis tremendously. In this work, we investigate how LNNs can effectively be used to detect arrhythmia and benchmark their performance against that of CNNs and LSTMs. The full processing pipeline consists of filtering, R-peak detection, heartbeat segmentation, and supervised

training using the Chapman University Arrhythmia dataset. According to studies, LNN is not only cheap but also effective when it comes to working. Hence, it can be useful for real-time monitoring on wearable and embedded platforms. The results indicate that LNNs hold great potential to become efficient and adaptive models for biomedical time-series applications.

70. THE VIRTUAL EXPERIENCE OF THE DIGITAL MUSEUM

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Our research emphasizes a unique method in the creative design of digital museum spaces with AI guidance, whereby perceptual experience data mining and computer vision technologies were combined. It includes a comparison of intelligent vs. traditional display modes for museum exhibition formats. The study argues that the 3D landscape modeling technology can be adapted to build virtual museum platforms in an immersive and interactive VR environment where visitors could have more engagement with objects. This article presents an online system tailored for the development and administration of virtual museums, fully supportive of constructing digital exhibits. Augmenting this platform is an original approach to measure interactions of users with virtual systems in order to provide a more intuitive and efficient user experience while visiting the virtual museum. The study also suggests a collaborative filtering-based approach to recommend museum objects, in order to extend and personalize visitor experiences. Through examination of the integration or full presence of three-dimensional objects in display spaces, this study illustrates how virtual museums are beneficial for the preservation and representation via digital reconstruction techniques of physical cultural heritage. Discussion includes the opportunity of digitizing museum collections and highlights advantages in virtual environments, expanding access and educational opportunities. The paper is an example of how beyond doing what traditional museums do, new insights can offer a glimpse into the future museum digitally.

71.HYBRID ATTENTION-DRIVEN CNN FRAMEWORK FOR VETERINARY SKIN DISEASE RECOGNITION USING MODIFIED SE AND CBAM MODULES

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Hybrid Attention-Based CNN Model for Veterinary Skin Disease Identification Utilizing Modified SE and CBAM Modules. Classifying dermatological diseases in animals presents a significant challenge due to diverse backgrounds and subtle visual differences in lesions. This paper introduces a hybrid attention network that integrates Modified Squeeze-and- Excitation blocks and the Convolutional Block Attention Module within a ResNet50 framework. This approach enhances discriminative feature learning by employing both global average and max pooling in SE, followed by sequential channel and spatial refinement in CBAM. The newly developed

system, trained and evaluated on a proprietary image database of pet skin diseases, outperforms traditional models. Experimental results confirm the architecture's effectiveness in supporting veterinary diagnostics.

72.SHESAFE:A SMART GESTURE-BASED REAL-TIME ALERT SYSTEM

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In my project, I have been reading about SheSafe, an AI-based application to improve the safety of women, which identifies hand gestures in real time and accurately recognizes them. It addresses traditional pain points such as low-light detection, lack of labeled data, and the necessity to achieve high accuracy with the lowest number of false alarms. In contrast to voice or mobile SOS applications that may crash during real-life conditions, SheSafe provides a reliable non-verbal option. The conventional gesture recognition devices tend to fall behind due to delays and misidentification. In the case of SheSafe, the team combines OpenCV to handle the video pipeline, MediaPipe to track the hands, and a deep neural network to make the classifications remain fast. I have witnessed the ability of this stack to fill the gap between fast glance detection and the strength of a solid model. To measure its effectiveness, we used standard metrics such as precision, recall, F1 score, ReLU output layers, and total accuracy. The performance was good and the feedback indicated that the system is not only competitive but also faster and more responsive than many existing solutions. I have been writing down these results in my semester report, giving reference to the evaluation figures to support the arguments. I have also spent much time on the ethical front: data privacy, ownership of gesture data, and how issues of surveillance creep in. We have ensured to incorporate privacy-by-design principles and remain as least intrusive as possible in the system, which I intend to emphasize in the ethics section of my paper. All in all, SheSafe shows that AI-based gesture recognition as an emergency communication device can be considered a valid solution.

73.MEMORY GUARDIAN – AI DRIVEN DETECTION OF EARLY COGNITIVE IMPAIRMENT THROUGH EVERYDAY SMARTPHONE USAGE

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Memory Guardian detects early signs of cognitive impairment using Artificial Intelligence in an entirely non-intrusive way. It is particularly helpful for older people who might get dementia and Alzheimer's disease since it continuously monitors daily smartphone interactions without interfering with everyday activities. The technology gets behavioural signals such as typing speed, error frequency, navigation patterns and language coherence to generate a digital behavioural profile. This architecture is based on machine learning framework in which transformer based natural language like BERT evaluates textual coherence and fluency, while Long Short-term Memory (LSTM) model processes motor and interaction data. Fine deviations can be identified by combining the output of both the models using the ensemble-based scoring method. All the process takes place on the user's mobile phone it ensures privacy protection and usage in low internet access places. Memory Guardian is a cost-effective and highly scalable approach that helps to monitor cognitive health using mobile phones and does not require any extra hardware. Its aim is to support early identification of cognitive decline, which improves overall well-being.

74.EVERYDAY SACRED SPACES: UNDERSTANDING THE ROLE OF NEIGHBOURHOOD TEMPLES IN METROPOLITAN CITIES – A LITERATURE REVIEW

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The place of neighbourhood temples in the metropolitan city is both unique and valuable as they serve both as religious establishments and also as ordinary sacred spaces that facilitate cultural continuity, community identity and socio-spatial organisation. Although current literature on urban religion and sacred space has gone to great lengths to analyse pilgrimage centres, historical temple towns, and monumental religious landscapes, the contribution of neighbourhood temples to fast changing urban metropolitan environments has not been synthesised adequately. This literature review is an exploration of the role played by neighbourhood temples in community identity, the continuation of rituals and the socio-spatial nature of urban neighbourhoods. Based on interdisciplinary sources on urban studies, cultural geography, religious studies and heritage research, the review uses a thematic synthesis approach to structure the available literature into five major themes. The discussion has shown that neighbourhood temples serve as anchors of daily religious life and mediate between tradition and city change by adapting to changing circumstances and by providing community involvement. Although the review has a wealth of conceptual content, it finds that a significant knowledge gap in the literature exists: there are no analytically based, neighbourhood-level frameworks that can be used to evaluate the cultural value of everyday sacred spaces. The paper ends by noting the necessity of context-sensitive culturally based approaches to assessment to assist in future empirical studies in the metropolis.

75.A HYBRID DEEP LEARNING APPROACH FOR CARDIAC DISEASE CLASSIFICATION ON THE BIOFORS DATASET

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The growing dependence on digital biomedical data has increased the need for reliable and accurate automated diagnostic systems. In this study a robust classification framework is proposed for cardiac disease detection using ECG signals from the BioFors dataset. The methodology integrates effective pre-processing steps including noise suppression, normalization and signal segmentation to ensure high-quality input representations. A hybrid deep learning architecture combining Convolutional Neural Networks (CNN), Long Short-Term Memory (LSTM) networks and Transformer encoders is developed to exploit complementary strengths in local feature extraction, temporal dependency modelling and long-range attention mechanisms. In addition a comparative analysis is performed against established baseline models such as CNN, CNN–LSTM, DenseNet and ResNet. Experimental results demonstrate that the proposed CNN–LSTM–Transformer model achieves

superior performance in terms of accuracy, precision, recall, F1-score and ROC–AUC. Statistical significance testing further confirms the reliability of the observed improvements. The findings highlight the effectiveness of hybrid learning strategies for enhancing ECG-based cardiac diagnosis and suggest strong potential for real-time clinical decision support systems.

76.SMART BIN FOR AUTOMATED WASTE SEGREGATION AND INCENTIVE-BASED CITIZEN PARTICIPATION

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Due to population growth and increased consumption, municipal solid waste (MSW), especially electronic waste (E-waste), is growing rapidly in urban and semi-urban areas, placing an increasing burden on these areas.
In this paper, a solar-powered smart e-waste management system that separates devices like mobile phones, keyboards, and mice on its own without human assistance is presented. The suggested system incorporates servo motors, ESP32-CAM, weight and ultrasonic sensors, and a hybrid AI-sensor mechanism to ensure precise classification. IoT-enabled real time data transfer allows for centralized dashboard monitoring, giving municipalities fill-level alerts and comprehensive waste distribution insights. In order to increase citizen participation, an RFID-based reward system that tracks both online and offline encourages appropriate disposal. In order to maximize collection routes and guarantee operational effectiveness and scalability, the prototype facilitates multi-bin communication. This framework illustrates a workable route for economical, ecologically conscious, and sustainable waste management in contemporary cities by fusing IoT, AI, and renewable energy.

77.MACHINE LEARNING-ENABLED GREEN SUPPLY CHAIN OPTIMIZATION FOR BIOETHANOL PRODUCTION FROM SUGARCANE BAGASSE IN WESTERN MAHARASHTRA: REVIEW

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This literature review critically exposes the interface between machine learning, Green Supply Chain Management, and biofuel production, with special emphasis on the sustainable utilization of sugarcane bagasse in Western Maharashtra. In view of sugarcane bagasse as a high-potential lignocellulosic biomass, the study attempts to describe its physicochemical properties and reviews the biochemical and thermochemical conversion routes for biofuel conversion via bioethanol, biodiesel, and bio-oil. Emphasizing GSCM principles, including waste minimization, circular economy integration, and eco-efficient logistics, are crucial for the environment and economy of bagasse supply chains. The review also looks at newer applications of ML in forecasting, routing optimization, storage planning, and process control, which foster real-time decision-making and supply chain resilience. Identified challenges include, but are not limited to, high processing costs, fragmented data infrastructure, and regulatory uncertainty. Against this background, future work directions such as AI-integred biorefineries, blockchain-based traceability, and region-specific data infrastructure are proposed. Thus, this paper sets forth the great transformative possibilities of ML-enabled GSCM strategies for turning bagasse from being just an agricultural residue to the backbone of India's low-carbon bio-economy.

78.SWIFT-STUDY INTERACTIVE E-LEARNING PLATFORM WITH PERFORMANCE TRACKING

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This project presents an Interactive E-Learning System with integrated performance tracking to enhance learner engagement, personalization, and has an interactive AI chatbot to help us with our queries. It leverages AI for adaptive learning paths, boost motivation, and real-time analytics for both learners and educators. Built using modern web and mobile technologies, the system supports collaborative tools and scalable deployment. By

aligning with global educational goals, it aims to make quality education accessible, enjoyable and effective for diverse users, including students, professionals, and institutions.

79.AN AUTOMATIC GROUP DISCUSSION SCORING SYSTEM USING ARTIFICIAL INTELLIGENCE

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Group discussions are commonly used in academics and recruitment to judge communication skills, confidence, and teamwork. However, the traditional method of evaluating group discussions depends on human judgment, which often leads to bias, inconsistency, and delays in scoring. The same discussion may receive different scores from different evaluators, making the process unfair and unreliable. To solve this problem, this project presents an automatic group discussion scoring system using artificial intelligence. The system records online group discussions, converts speech into text, and analyzes each participant's contribution using features such as participation level, tone, sentiment, and quality of responses. Based on these factors, the system generates scores automatically without human involvement. This approach reduces evaluation time, removes personal bias, and ensures consistent assessment for all participants. In addition, the system provides meaningful feedback that helps users understand their communication strengths and areas that need improvement. The proposed solution is practical, easy to use, and suitable for educational institutions, recruitment processes, and professional training environments where fair and objective evaluation of group discussions is required.

80.CYBERSECURITY IN DATA SCIENCE AND APPLICATIONS

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In a computing context, cybersecurity is undergoing massive shifts in technology and its operations in recent days, and data science is driving the change. Extracting security incident patterns or insights from cybersecurity data and building corresponding data-driven model, is the key to make a security system automated and intelligent. To understand and analyze the actual phenomena with data, various scientific methods, machine learning techniques, processes, and systems are used, which is commonly known as data science. In this paper, we focus and briefly discuss on cybersecurity data science, where the data is being gathered from relevant cybersecurity sources, and the analytics complement the latest data-driven patterns for providing more effective security solutions. The concept of cybersecurity data science allows making the computing process more actionable and intelligent as compared to traditional ones in the domain of cybersecurity. We then discuss and summarize a number of associated research issues and future directions. Furthermore, we provide a machine learning based multi-layered framework for the purpose of cybersecurity modelling. Overall, our goal is not only to discuss cybersecurity data science and relevant methods but also to focus the applicability towards data-driven intelligent decision making for protecting the systems from cyber-attacks. Keywords: Cybersecurity, Machine learning, Data science

81.SCALABILITY AND FUTURE ADOPTION OF GREEN AMMONIA AND METHANOL IN ZERO-EMISSION SHIPPING

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The maritime sector accounts for approximately 2.9% of global greenhouse gas emissions, and faces regulatory pressure to achieve net-zero carbon shipping by 2050 under International Maritime Organization (IMO) targets. Zero-emission fuels—particularly green ammonia and methanol—have emerged as the leading technological pathways to decarbonize ocean-going vessels at scale. This survey reviews the current state of development, pilot deployments, supply chain maturity, technical challenges, and future regulatory and infrastructure roadmaps for zero-emission fuels in shipping through 2050. Green methanol leads in near-term commercial adoption with 385 vessel orders as of 2026, driven by proven dual-fuel engine technology and established production pathways. Green ammonia follows with approximately 50 orders, supported by recent IMO interim guidelines and emerging engine innovations to mitigate NOx emissions. However, critical gaps remain: global green methanol production stands at only 0.5 million tons per annum (Mtpa) in 2026, while achieving 10% shipping uptake by 2030 requires 20 Mtpa of ammonia production. This paper synthesizes technical comparisons, supply chain analyses, regulatory frameworks, and strategic recommendations for scaling production, standardizing bunkering infrastructure, and integrating digital twin and AI technologies for lifecycle carbon accounting. The analysis draws on vessel order data, IMO policy developments, and recent pilot trial outcomes to project realistic pathways toward commercially viable zero-emission shipping fleets by 2035 and full decarbonization by 2050.

82.VEHICLE CARBON EMISSIONS DETECTOR USING LOGISTIC REGRESSION

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The rapid rise in global vehicle usage has resulted in a significant increase in carbon emissions, contributing to environmental degradation, climate imbalance, and serious public health concerns. Conventional emission detection systems depend on physical exhaust analyzers, which are expensive, time-consuming, and impractical for large-scale or continuous monitoring. Machine learning techniques provide a scalable and cost-effective alternative by enabling the prediction of emission levels using easily obtainable vehicle parameters. In this study, Logistic Regression is employed to classify vehicles into low, medium, and high CO_2 emission categories based on features such as engine size, fuel type, mileage, and vehicle weight. The model offers strong interpretability, high computational efficiency, and serves as a robust baseline for emission detection tasks. Experimental results demonstrate that Logistic Regression delivers reliable classification performance, making it a practical and effective solution for real-world emission monitoring and environmental management applications.

83.AN EMBEDDED FRAMEWORK FOR ETHICAL DECISION-MAKING AND HAZARD AWARENESS IN AUTONOMOUS VEHICLES

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The work presented in this paper focuses on EdgeAwareDrive, an embedded real-time perception and decision-making system designed to enhance the safety of the humans in autonomous and semi-autonomous vehicles. The proposed system focuses on deploying YOLOv5n model on the Raspberry Pi 5 controller for the detection of pedes-trians, potholes and traffic signs, capturing the live input from the USB camera and mak-ing use of the ultrasonic sensor for additional proximity information to enhance safety. A GPS module is used for implementing the logic of GPS- based hazard memory, where the hazard locations are stored in Firebase for future use for taking necessary actions when the vehicle encounters the same route. Although the hazard memory logic and pro-gram have been implemented, testing in real-time across a large field, which requires the collection of latitude and longitude, is practically infeasible. An ethical navigation logic for prioritising the pedestrians over potholes or other objects has been incorporated into the system. In a real-time situation, the final response for ethical navigation logic depends upon the order in which the model YOLOv5n processes the video frames when multiple hazards occur in a single frame simultaneously. The system performance is validated in both Proteus simulation and real-time hardware in terms of reliable detection, sensing, de-cision-making and perception integration and stable motor control. The final results prove that the proposed system offers a practical, affordable cost and cloud-assisted method to handle the hazards and provide safety in autonomous vehicles.

84. AI-DRIVEN DRONE DELIVERY SYSTEM WITH CLOUD-BASED CONTROL, REAL-TIME TRACKING, AND AUTOMATED FEEDBACK

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The exponential growth in global e-commerce has accelerated last-mile delivery challenges, including traffic congestion, inordinately high operational costs, and delayed deliveries. This paper presents a holistic, autonomous drone delivery system based on an integrated stack of Artificial Intelligence (AI), Internet of Things (IoT), and cloud computing technologies. The system's architecture features an AI-based cloud brain for real-time path planning and decision-making, while the drone uses a multi-sensor fusion method (GPS, IMU, and a

redundant line-follower sensor) for stable navigation. Of paramount innovation is the use of a dynamic geofencing feature that will start an automatic voice call to the customer when the drone hovers within a 100-meter range. In addition, the system also has a post-delivery IVR system for gathering customer feedback. At the end of the mission, the drone automatically returns to a charging base station for the sustainability of operations. Simulations in a ROS/Gazebo environment over twenty different urban and rural environments show the system's effectiveness. With 95% navigation accuracy, 98% notification success rate, 85% feedback engagement, and a 20% decrease in average delivery time versus ground-based options. The findings highlight the potential of strongly integrated AI and IoT systems to transform last-mile delivery.

85.A HYBRID LSTM–MACHINE LEARNING FRAMEWORK FOR DATA-DRIVEN MULTI-CROP RECOMMENDATION ACROSS AGRO-CLIMATIC REGIONS

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Rapid population growth and increased climate variability have heightened the dependence on smart, data-driven crop recommendation systems that can adjust to changing agroclimatic conditions. Most of the traditional crop recommendation methods depend heavily on fixed soil and environmental parameters, which makes them less effective during changing weather patterns. This work introduces a hybrid crop recommendation system that combines Long Short-Term Memory (LSTM) networks with traditional Machine Learning (ML) models to simultaneously handle temporal climatic data and non-temporal soil attributes. On the one hand, the idea behind the solution is to use LSTM architectures for the identification of long-term dependencies in time-series weather data such as rainfall and temperature. On the other hand, ensemble-based ML models are used to efficiently analyze structured soil parameters such as nutrient content, and pH levels. The comparison results reveal that the hybrid solution offers better performance in terms of the accuracy and stability of the recommendations than individual ML and LSTM models, especially during changing climatic scenarios. The analysis also calls attention toward the present limitations that the systems have to deal with, such as the dependency on the region, data heterogeneity, and the lack of model interpretability. In order to overcome these constraints, the paper elaborates along the lines of future works that include real time data acquisition through IoT, transfer learning for cross region adaptability, and Explainable Artificial Intelligence (XAI) among others, with the intention of creating crop recommendation systems that are scalable, transparent, and farmer-centric.

86.PREDICTIVE BOMB BLAST THREAT DETECTION USING AI AND SENSOR FUSION FOR MILITARY CONVOY SAFETY

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Roadside bombs, coordinated blast attacks, and improvised explosive devices (IEDs) pose a constant and changing threat to military ground convoys operating in hostile and asymmetric warfare environments. Convoy protection strategies are still mostly reactive, with little capacity for early threat anticipation and proactive risk mitigation, despite advancements in blast mitigation technologies and armored vehicle design. A paradigm shift toward predictive and intelligent threat detection frameworks is required due to the growing sophistication of adversarial tactics, operational limitations, and environmental complexity. With an emphasis on artificial intelligence (AI), multi-sensor fusion, and cyber-physical system (CPS) architectures, this article provides an extensive review of predictive bomb blast threat detection systems for military convoy safety. The evolution of single-sensor-based detection methods, developments in multi-sensor fusion techniques, and the function of deep learning and machine learning in automated threat analysis are all methodically examined in this review. Predictive blast risk assessment models that combine heterogeneous sensor data with convoy dynamics—such as vehicle speed, formation, spacing, route topology, and terrain characteristics are given special attention.Critical analysis is done on explainability requirements, false alarm mitigation, real time constraints, and operational performance metrics. Important research gaps concerning scalability, robustness, adversarial resilience, and similarly system/level integration is also identified in the paper through the review provided in the paper. There is a detailed discussion on emerging trends in the form of new areas of research in digital twin-based validation, explanation of AI methods, unmanned system integration studies, reinforcement learning methods. Researchers in the arena of designing next generation proactive and intelligent convoy systems will find this paper a Reference

87.A SYSTEMATIC EVALUATION REVIEW FOR REGION AND GEOGRAPHICAL AREA WISE (SOIL AND WATER QUALITY BASED) AGRI-HORTICULTURAL CULTIVATION RECOMMENDATION SYSTEM.

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Real environmental datasets obtained from meticulously chosen horticultural regions are currently being employed to evaluate the practical applicability of machine learning for assisted farming and cultivation. Growing better -yield crops depends heavily on geography, soil quality, and water conditions. Yet many farmers still choose crops based on tradition and experience rather than scientific data. This often results in poor crop choices and lower profits. This study presents a smart crop recommendation system that suggests the best crops, fruit- vegetables, and flowers to grow based on soil nutrients, pH levels, electrical conductivity, moisture, salinity, water quality, and local environmental conditions. Three machine learning algorithms Decision Tree, Random Forest, and K-Nearest Neighbour are explored to find the most accurate model for predicting which crops will grow well. The Decision Tree algorithm performed best, achieving nearly 96-98% accuracy with strong precision, recall, and F1-scores. The predictions generated thus far appear to exhibit a strong correlation with the actual patterns of successful cultivation practices.

88.CAD SCRIBE: A NATURAL LANGUAGE TO CAD GENERATOR FOR PARAMETRIC MODEL CREATION

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General purpose Computer Aided Design (CAD) tools however require skill (Develop etc) and enter data by hand, making it 'inaccessible' to non experts, yet slow to prototype designs. It has a high learning curve, and requires repetitive modeling process that stifles creativity among other disadvantages especially in early design stages. The above limitations indicate the need for a CAD framework, which is guided by intuitive, automated and language-driven mechanisms. To combat all these challenges, in this paper we introduce CAD Scribe- a cloud native AI based system which translates natural language description into 3D fully parametric representation of a 3D model. The system works with Natural Language Processing (NLP) for the semantic parsing, an AI-based script writer in Python built on top of FreeCAD, and horizontally scalable cloud deployment with FastAPI hosted on AWS EC2 instances. Experimental results the model CAD Scribe evaluate on multiple shapes, and show that CAD Scribe delivers up to 86.72% parametric accuracy improvement, and the average manual modeling time cost is reduced by more than 72% against standard practices using traditional CAD systems. It can also be used to visualize in real time through Three.js and multi-format model export (STL, STEP, OBJ) for compatibility with other engineering tools. The proposed system democratizes digital design and engineering process by enabling people from students to professionals creating accurate 3D models with conversational interfaces. Its applications range from rapid prototyping, design learning for education and automated industrial modeling which set a new benchmark in AI assisted design automation.

89.GEOWAKE: AN INTELLIGENT LOCATION-BASED ALARM SYSTEM FOR URBAN TRANSIT COMMUTERS

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Urban commuters frequently face the challenge of missing their transit stops due to fatigue, distraction, or unfamiliarity with routes. This paper presents GeoWake, a novel mobile application that leverages GPS-based location tracking, real-time route monitoring, and intelligent alarm triggering to ensure passengers never miss their destination. The system employs adaptive battery optimization policies, offline caching mechanisms, and hybrid alarm modes supporting distance, time, and transit-stop-based thresholds. Our implementation incorporates advanced features including route deviation detection with automatic rerouting, multi-segment transit route management for complex journeys with transfers, and an ETA prediction engine using Kalman-filtered speed estimation. Comprehensive testing demonstrates 98.7% alarm accuracy with sub-100-meter precision in urban environments, while maintaining battery efficiency through tiered power policies. The system successfully handles underground transit scenarios where GPS signals are intermittent, and provides seamless operation across both online and offline modes. GeoWake represents a significant advancement in location-based services for urban mobility, combining robust algorithmic design with practical usability considerations for real-world deployment.

90.A COMPREHENSIVE REVIEW ON MULTI-CLASSIFICATION OF BRAIN TUMOR USING MAGNETIC RESONANCE IMAGING

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Brain tumors classifying is a vital part of computer-aided diagnosis (CAD) systems. It helps radiologists plan treatment and improve patient outcomes. While traditional machine learning methods often find it difficult to handle the complex and varied nature of magnetic resonance imaging (MRI)scans, deep learning models called Convolutional Neural Networks (CNNs) have become the top approach. However, CNNs can still struggle when different types of tumors look similar or when the same type appears differently across patients. To address this limitation, many researchers are using attention mechanisms which help the model focus on important image area and combining different techniques into hybrid models. This paper reviews these existing methods such as CNN-based classification, attention-enhanced deep learning, hybrid feature selection, and probabilistic decision-

making frameworks, discussing their pros and cons. Furthermore this paper discussed about combining these ideas into a novel method, unified model could lead to more accurate and reliable brain tumor classification. Finally, this survey paper concludes highlighting and identifying research gap to propose new direction of future work.

91.A STACKED ENSEMBLE FRAMEWORK FOR AUTOMATICALLY IDENTIFYING PERFORMANCE ISSUE REPORTS USING HEURISTIC LINGUISTIC PATTERNS

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Software performance plays a basic part in deciding framework productivity, unwavering quality, and client satisfaction. Nevertheless, performance-related issues are often under-reported or mislabeled in issue-tracking systems due to the deliberate and time-consuming nature of manual classification. Existing arrangements, such as keyword-based labeling and machine/deep learning models, confront limitations when managing imbalanced datasets and different detailing styles. This paper presents a platform-agnostic system that leverages heuristic phonetic designs (HLPs) combined with machine learning to recognize performance-related issue reports. The system works through a three-tiered classification handle, including fluffy HLP coordinating, sentence-level labeling, and issue-level labeling. Assessments conducted on numerous datasets from different issues, following stages, including Jira, Bugzilla, Redmine, and MantisBT, illustrate that the proposed approach achieves high accuracy, review, and F1-score while keeping up strength against imbalanced data. The results highlight the adequacy of consolidating etymological heuristics with machine learning for exact, adaptable, and transferable recognition of execution issues over changed software applications.

92.A MULTIMODEL FRAMEWORK FOR DEEP FAKE DETECTION

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- Rapid proliferation of voice synthesis and voice conversion techniques has raised serious concerns regarding audio security and authenticity. Deepfake audio can be exploited for impersonation, fraud, and misinformation, making reliable detection methods essential. This work presents a detection framework based on the ASVspoof dataset, which has become the standard benchmark for evaluating spoofing countermeasures. The proposed system leverages spectrogram-based convolutional encoders and self-supervised speech embeddings to capture subtle artifacts introduced by synthetic and converted speech. In addition to single-feature models, multimodal fusion within the audio domain is explored by combining complementary features such as mel-spectrograms, linear frequency cepstral coefficients (LFCCs), and embeddings from pretrained speech models. Experimental evaluation on the ASVspoof logical access and physical access partitions demonstrates that the proposed approach outperforms traditional cepstral-based baselines, achieving lower equal error rates (EER) and higher robustness across different attack types. The results highlight the effectiveness of feature-level and representation-level fusion in strengthening deepfake audio detection and reinforce the importance of the ASVspoof corpus as a comprehensive benchmark for developing and comparing spoofing countermeasures.

93.THE ROLE OF AGENTIC AI IN ENHANCING PAYMENT GATEWAY SECURITY PROCESSES WITHIN FINTECH ENTERPRISES

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The rapid proliferation of digital commerce has positioned Fintech payment gateways as vital components of the global financial ecosystem. Consequently, they have become prime targets for sophisticated cyberattacks that often mimic benign system faults, exposing serious detection challenges [1], [2]. Traditional security mechanisms, reliant on static rule-based or isolated machine learning models, struggle to distinguish between legitimate errors and coordinated malicious activity [3], [4]. This paper proposes a unified agentic AI framework that provides autonomous, proactive, and transparent security for payment gateways [5], [6]. The proposed architecture employs a single, self-governing AI agent equipped with modular subsystems for continuous monitoring across the transaction lifecycle— including network behavior, transaction metadata, and endpoint integrity [7], [8]. A hybrid learning model, combining supervised and reinforcement paradigms, fuses weak threat signals from heterogeneous data sources to generate high-fidelity risk assessments capable of differentiating between genuine system failures and advanced attacks such as DDoS, MITM, and payment redirection fraud [9], [10]. To ensure regulatory trust and accountability, the framework integrates Explainable AI(XAI) mechanisms for decision transparency and adheres to Privacy-by-Design principles to meet GDPR compliance [11], [12]. This research represents a paradigm shift from reactive to autonomous threat anticipation, enabling Fintech enterprises to enhance the security, resilience, and trustworthiness of modern payment ecosystems [13], [14].

94.AUGMENTING WEB APPLICATION SECURITY WITH ADVANCED MACHINE LEARNING ALGORITHMS FOR PROACTIVE VULNERABILITY DETECTION

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The rapid growth of web applications has revolutionized various industries, offering diverse func-tionalities from e-commerce to social networking. However, their increasing complexity and widespread adop-tion make them prime targets for cyber attacks. Web vulnerabilities, including SQL injection, cross-site script-ing (XSS), and cross-site request forgery (CSRF), pose severe risks to sensitive data, user privacy, and organi-zational integrity. Traditional approaches to vulnerability detection, such as secure coding practices, periodic audits, and rule-based security tools, while effective, often fail to keep pace with the evolving threat landscape. This research investigates the synergistic potential of machine learning (ML) algorithms in enhancing web ap-plication security. By leveraging supervised and unsupervised learning techniques, this study develops a com-prehensive framework that detects, classifies, and mitigates web vulnerabilities in real-time. Algorithms like

Random Forest, Support Vector Machines (SVM), and Neural Networks are employed for feature extraction and vulnerability prediction, while anomaly detection models such as Isolation forest and Auto-encoders identi-fy zero-day threats. The integration of Natural Language Processing (NLP) for analysing user inputs and web traffic further enhances the system's ability to detect malicious patterns. The proposed approach is validated on publicly available web vulnerability datasets, demonstrating superior accuracy, precision, and recall compared to conventional methods. This work highlights the importance of a proactive, AI-driven strategy in fortifying web applications, reducing attack surfaces, and ensuring robust security for end users and organizations. Future directions include the incorporation of federated learning to secure decentralized applications and the develop-ment of adaptive ML models that evolve alongside emerging threats.

95.A SCALABLE REAL-TIME OBJECT DETECTION SYSTEM USING YOLOV8 AND STREAMLIT FOR INTELLIGENT VISION-BASED APPLICATIONS

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This project presents a real-time and dynamic object detection system powered by the YOLOv8 (You Only Look Once) deep learning model, seamlessly integrated with a Streamlit-based web interface. Leveraging the capabilities of advanced convolutional neural networks (CNNs), the system delivers high-accuracy object identification and classification in live video streams and static image uploads. Its flexible design supports diverse use cases, including surveillance, autonomous navigation, interactive robotics, and augmented reali-ty. The application is performance-optimized with features such as frame rate regulation, efficient object tracking, and context-aware bounding box annotations, enabling it to adapt to varying environmental and lighting conditions. Users benefit from instant visual feedback through a responsive and intuitive interface, significantly enhancing interaction and situational awareness.Built with scalability at its core, the system supports continuous learning and can be extended to recognize additional object classes over time. Overall, this project demonstrates an effective integration of state-of-the-art computer vision technologies with ac-cessible web development tools, offering a robust and adaptable solution for real-time object detection and contextual scene understanding.

96.A HYBRID QUANTUM–CLASSICAL MACHINE LEARNING MODEL FOR DRUG INTERACTION AND ADVERSE REACTION PREDICTION

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Medication safety is one of the serious issues because of the high frequency of using various drugs with individual patients; it tends to lead to complicated drug-drug interactions and unexpected adverse reactions. The research presents a quantum-enhanced hybrid learning system to enhance the accuracy and reliability of drug

interactions and side-effect predictions through uniting the existing classical machine learning models and the recent quantum computation methods. The system starts by extracting automatically the information about the drugs in the handwritten and digital prescriptions using an OCR and NLP pipeline, and the information about the drugs names is always identified correctly. The features obtained are the input of a two-stage predictive architecture where classical ML and deep learning models are used to obtain initial interaction probabilities, and a Quantum Neural Network (QNN) is used to fine-tune these predictions by learning nonlinear interactions between the structure of molecules using quantum variational circulations. The framework categorizes the severity of the interactions as being safe, moderate and severe and additionally recommends safer alternative medications using an integrated recommendation mechanism based on therapeutic class and chemical similarity. It has a built-in doctor-pharmacist workflow to facilitate clinical validation, encourage sound decision-making, and create comprehensive reports on patients. Using such concepts as superposition and entanglement, the quantum component is used to increase the representational capacity of the system, enabling it to record the fine details of the subtle patterns in a molecule which could not be accomplished by conventional means. Comprehensively, this quantum-enhanced architecture is a scalable, intelligent and clinically supportive solution to the current prescription analysis and active management of medication risks.

97.DESIGN AND DEVELOPMENT OF SOLAR SHRUB: A HYBRID RENEWABLE ENERGY SYSTEM FOR DOMESTIC APPLICATIONS

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The Solar Shrub is an innovative photovoltaic structure designed to maximize solar energy harvesting in urban spaces. Its tree-like design with multi-tier solar modules allows efficient power generation from different angles while occupying minimal ground space. Each unit can produce 250–300 watts, offering a reliable, low-maintenance, and wind-resistant solution. By combining clean energy production with aesthetic appeal, the Solar Shrub promotes sustainable development and public engagement with green technologies

98.HERBAL PLANT DETECTION USING AI

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Medicinal herbs are widely used in traditional and alternative healthcare systems, but their accurate identification is often difficult due to visual similarities, environmental variations, and the need for expert botanical knowledge, which can lead to misidentification and unsafe usage. This paper presents an AI-based herbal plant detection and classification system that utilizes deep learning and computer vision techniques to identify medicinal herbs from images with high accuracy. The proposed system employs Convolutional Neural Networks (CNNs) and transfer learning models to extract important visual features such as leaf shape, texture, and color for reliable classification. The trained model is deployed using a FastAPI backend to provide real-time predictions through RESTful APIs, while a React.js frontend offers a user-friendly interface for image upload, camera-based capture, and result visualization. A lightweight SQLite database is integrated to store and manage detailed herbal and medicinal information, supported by an admin panel for efficient data maintenance. Experimental results show that the transfer learning approach achieves superior performance with an accuracy of up to 94%, demonstrating the effectiveness, scalability, and practical applicability of the proposed system in domains such as education, Ayurveda, healthcare support, and botanical research.

99.AUTOMOM: SMART ONLINE MEETING ASSISTANT

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Development of Minutes of Meeting (MoM) is a key factor that ensures accountability, decision tracking, and effective knowledge management within the workplace. But manual recording of MoM is usually time-consuming, unreliable, and prone to errors, leading to loss of considerable information. There are available automated solutions that provide support but still face issues like background noise, overlapping speech, speaker identification, technical jargon, and multilingual conversation, which are typical in real-life meetings. To mitigate such limitations, this paper discusses and examines the development of automated MoM generation systems and proposes AutoMoM: Smart Online Meeting Assistant, a system that unifies sophisticated natural language processing (NLP) and speech-to-text technology. The suggested system makes use of real-time audio recording with noise reduction, solid multi-speaker transcription with multilingual capability, and contextual meeting chat integration to provide in-depth summaries. The draft is initially made available for editing to the host, providing avenues for verification and editing before the final MoM is sent automatically via email. This research finds that tools such as AutoMoM have great potential to increase the efficiency, accuracy, and usability of meeting records, providing a scalable route to trustworthy knowledge management in increasingly collaborative and multilingual professional settings.

100.EARLY PARKINSON’S DIAGNOSIS: INTEGRATING LSTM, MFCC AND AUGMENTATION TECHNIQUES FOR BIOMEDICAL DATA

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PD is a progressive neurodegenerative disorder in which early and proper diagnosis plays a critical role in improv- ing treatment outcome. However, standard clinical techniques of assessment suffer due to their subjective nature, and high costs and time taken. To discover solutions to these limitations, in this study, a deep learning-based approach is introduced to the non-invasive detection of PD through the analysis of the vocal signal. The proposed framework is based on a Long Short- Term Memory (LSTM) network and contains a rich set of features of acoustics. These include Linear Autoregressive (LAR) coefficients extracted from sustained vowel phonations, jitter, shimmer and Mel-frequency cepstral coefficients (MFCCs). To solve the problem of class imbalance, which is common in medical data sets, the methodology uses a dual augmentation approach to solve it by using Gaussian noise injection and the Synthetic Minority Oversampling Technique (SMOTE). When tested by 5- fold stratified cross validation on a dataset containing 246 voice samples, the sequential LSTM model has an accuracy of 96.0% with 95.0% and 97.0% precision and recall results, respectively. These results show an improvement over conventional machine learning baselines and show the potential of voice-based analysis as a reliable screening tool for PD.

101.CALQAGENT: CALORIE ESTIMATION VIA AGENTIC TOOL-CALLING AND FINE-TUNED QWEN VISION LANGUAGE MODEL

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Tracking what people eat and understanding the nutritional content of their meals from photos is becoming more relevant than ever. However, this remains a significant challenge since many dishes look alike, and existing systems rely on heavy pipelines that require extensive manual labeling. Existing approaches, such as RAG-based models like CaLoRAify, use external retrieval mechanisms that can add processing time and lead to

retrieval errors.In this work, we introduce CalQAgent, an end-to-end framework built on the Qwen3-VL vision-language model that can directly identify foods and extract ingredient details from images. By fine-tuning the model on the Recipe1M+ dataset and utilizing the Qwen-Agent framework, our system produces structured, machine-readable ingredient information—including names, quantities, and units—which is automatically linked to a nutrition database. Experimental results demonstrate that this agentic approach significantly outperforms baselines, achieving an F1 score of 0.84 in ingredient retrieval. Overall, it presents a smarter and more robust way to understand what is on someone's plate and estimate its nutritional value.

102.BLOCKCHAIN-ENABLED SECURE DATA PROVENANCE FOR TRUSTWORTHY CROSS-HOSPITAL AI MODEL SHARING

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The rapid adoption of artificial intelligence in healthcare has supported the development of high-value diagnostic models across independent hospitals. When trained AI models are shared, generalization improves and development cost is reduced, where the absence of trusted provenance mechanisms limits secure collaboration. Centralized model repositories fail to ensure transparent ownership, integrity assurance, and auditability, where cross-domain environments are involved. This paper proposes a blockchain-enabled secure data provenance framework for cross-hospital AI model sharing, which supports decentralized trust and verifiable ownership as well as accountable model usage without exposing sensitive patient data. The framework separates on-chain provenance metadata from off-chain encrypted model storage, where smart contracts are used for model registration, access control, and usage logging. Experimental evaluation on a permissioned blockchain shows that the proposed framework introduces low overhead, when the average transaction latency for provenance operations remains below 420 ms and on-chain storage overhead stays below 0.01 percent of the model size. All model tampering attempts and unauthorized access requests are detected and blocked, which results in a 100 percent enforcement rate. The key novelty of this work lies in the practical integration of blockchain-based provenance with secure AI model sharing in healthcare, where the framework provides a scalable and regulator-friendly solution as well as enables trustworthy cross-domain AI collaboration without relying on centralized authorities.

103.EMOTION DETECTION SYSTEM- EMOSENSE

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This paper introduces a real-time emotion recog- nition system that uses the capability of deep learning and computer vision to recognize human emotions in real time and in an intuitive sense. With a normal webcam, the

system takes live video streams and processes them naturally to identify and analyze facial expressions. The face, upon detection in the video, is subjected to a series of pre-processing operations aimed at optimizing it for recognition purposes. The image is initially converted to grayscale to minimize computational complexity without losing important facial features. It is then resized to a standard size of 48x48 pixels and normalized to have the same pixel value distribution in different images. These pre-processed facial images are then passed on to a pre-trained convolutional neural network (CNN) model developed using Keras. The model has itself been fine-tuned to predict four different emotional states: happy, sad, angry and surprised. With transfer learning, the model utilizes already learned representations of facial features so that the training is done more quickly, and the results are more accurate even with a relatively smaller set of data. To ensure the system is interactive and user-friendly, a GUI has been created using CustomTkinter specifically for this purpose. This GUI not only displays the live video feed but also superimposes the predicted emotion labels on the detected faces, dynamically updating the view in real time. The outcome is a seamless, immersive experience where users can instantly see their emotional states mirrored on the screen. The system is built to be lightweight, efficient, and accessible and is therefore apt for numerous practical applications like virtual communication aids, mental health tracking, and human-computer interaction enhancement.

104.AI-BASED DRUG INTERACTION CHECKER USING NLP

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Drug–drug interactions (DDIs) remain a significant problem in modern medicine because they can lead to serious adverse effects, diminished therapeutic efficacy, or even hospitalization. Following the increased application of artificial intelligence (AI), several approaches have been developed for DDIs' prediction and prevention. This work contributes in two ways: firstly, the review of the current AI-based DDI detection techniques like NLP, ML, and knowledge-based approaches; and secondly, the conceptual architecture of a modular, desktop-based AI Drug Interaction Checker. The architecture integrates OCR for drug name identification from prescriptions, medical NLP for entity normalization, and ML-based predictive models for DDI screening. Foremost among the design needs are offline operation for maintaining patient confidentiality, modularity to allow future upgradeability, and a user-friendly interface to enable ease of use in clinical settings. Finally, open issues and directions for future work include focus on interpretability, data quality, and integration into healthcare workflows.

105.A REVIEW ON NEURO-SYNTHETIC MEMORY ASSISTANT

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The rapid growth of artificial intelligence and mobile computing has led to the generation of large volumes of personal experiential data, including textual reflections, emotional expressions, location traces, and daily interactions. Existing digital memory tools largely function as passive storage systems and lack the cognitive ability to understand, associate, and recall information meaningfully. This limitation creates a gap between how humans naturally process memories and how digital systems manage personal data. To address this challenge, this paper presents the concept of a Neuro-Synthetic Memory Assistant (NSMA), a cognitive-inspired framework designed to model human-like memory processes within a mobile environment. NSMA draws inspiration from human memory mechanisms such as experience encoding, contextual association, emotional relevance, consolidation, and selective recall. By leveraging advances in machine learning, Generative Artificial Intelligence, and Natural Language Processing, the system represents user experiences as interconnected memory nodes using graph-based structures rather than isolated records. These memory graphs enable semantic understanding, emotional analysis, and context-aware retrieval of personal information. Implemented as an Android-based application using Java/XML and supported by Firebase Real-time Database, NSMA offers a scalable and adaptive architecture for synthetic memory modeling. The proposed approach demonstrates the potential of cognitive computing systems to enhance personal memory management, self-reflection, and intelligent recall, contributing toward the development of personalized digital memory assistants and future digital twin applications.

106.A REVIEW ON AI-ENABLED FAKE NEWS DETECTION

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The rapid growth of online media and social media platforms has changed the spreading information is created, shared, and gained worldwide. Meanwhile this has made news easily accessible, it has also led to the rapid spreading of fake news, specifying the misleading information presented as real, posing a threat to public trust, social harmony, democratic institutions, and informed decision-making. Traditional detection approaches such as manual fact-checking and editorial review are time-consuming, resource-intensive, and insufficient to handle the massive volume and speed of online information. This review paper examines recent advancements in Artificial Intelligence–based Fake news detection is examined with special emphasis on Natural Language Processing and Machine Learning algorithm, while also discussing with it's existing limitations of conventional keyword-based and rule-based methods and stresses the importance of automated, scalable, and context-sensitive solutions. Special attention is given to transformer-based models, especially BERT, which leverage bidirectional contextual understanding to effectively understand semantic meaning, language patterns, and contextual relationships in news content. By analyzing existing research, datasets, methodologies, and evaluation metrics, This paper shows a detailed overview of emerging developments, existing challenges, and upcoming research directions in fake news identification. The review is intended to act as a useful information for researchers and practitioners in this area. toward building reliable and intelligent systems to combat the growing threat of misinformation in digital ecosystems.

107. INNOVATIVE POWER CONTROL STRATEGY FOR HYBRID AC-DC MICROGRIDS: OPTIMIZING EFFICIENCY AND STABILITY: A COMPREHENSIVE REVIEW

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The increased demand for environmentally friendly and resilient electricity supply has led to the rapid advancement of hybrid AC/DC micro grids which integrate renewable energies such as photovoltaic (PV) and wind turbines with energy storage from battery technologies. However, controlling energy flow and preserving stability inside these interconnected systems remain problematic due to intermittent renewable generation and unidirectional power transfer. This paper analyzes unique power control systems for hybrid AC/DC microgrids aiming at optimizing operating efficiency, dependability, and voltage/frequency stability. Various combined control approaches—such as droop control, modeling-predictive control (MPC), fuzzy analysis, overall hierarch energy management—are studied for the effectiveness and adaptable. The study also investigates converter interfacing, grid synchronization, and fault-tolerant operations. Comparative analysis of recent advancements highlights the significance of adaptive and intelligent control approaches in achieving smooth AC/DC interaction. This review provides insights into existing challenges, emerging technologies, and future research directions toward developing efficient, stable, and scalable hybrid microgrid architectures.

108.ECOROUTE 360: AN IOT-ENABLED SMART WASTE MANAGEMENT SYSTEM INTEGRATING CNN-BASED WASTE SEGREGATION, GAS SENSING, AND DYNAMIC ROUTE OPTIMIZATION

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Traditional municipal solid waste collection relies on static schedules, resulting in bin overflows, inefficient fuel usage, and poor waste segregation. EcoRoute 360 presents an IoT-enabled smart waste management system that integrates computer vision, multi-sensor fusion, and dynamic route opti- mization. A convolutional neural network (CNN) classifies waste into dry and wet categories with an accuracy of 89.5%, while gas sensors detect hygiene-critical conditions independent of fill level. Sensor and AI data are processed by a production-grade Node.js backend that dynamically prioritizes bins and generates optimized collection routes using real-world road networks via the Mapbox Directions API. A campus-scale deployment using real geographic coordinates demonstrates reduced collection trips and improved operational responsiveness. The system establishes a scalable and intelligent foundation for next-generation urban waste management.

109.TENSORFLOW-BASED MACHINE LEARNING DEEP LEARNING AND END-TO-END FRAMEWORK FOR CHRONIC HEART FAILURE DETECTION USING HEART SOUND SIGN

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Chronic Heart Failure (CHF) is a serious cardiovascular condition that requires early and accurate diagnosis to reduce morbidity and mortality. Auscultation of heart sounds provide valuable clinical information; however, manual interpretation is subjective and depends heavily on physician expertise. This study proposes a deep learning-based framework for automated detection of CHF using heart sound recordings.Mel-spectrograms are extracted from phonocardiograms (PCG) signals and used as input to a Convolutional Neural Network (CNN) for classification. To ensure reliable evaluation and prevent data leakage, a patient- wise data splitting strategy is employed, ensuring that recordings from the same patient do not appear in both training and testing sets. The proposed model is trained using class-balanced loss and evaluated using accuracy, precision, recall, F1-score, confusion matrix, and ROC_AUC metrics. Experimental results demonstrate that the CNN effectively learns discriminative spectral features from heart sound signals, achieving high training accuracy and strong class patient-wise evaluation, the results indicate that the proposed is suitable as a clinical decision-support system for early CHF screening. This framework establishes a robust baseline for future improvements using advanced architectures and larger datasets.

110.HYBRID DEEP LEARNING SYSTEM FOR LUNG CANCER DETECTION USING VGG16 AND ANN WITH REAL-TIME GUI INTEGRATION

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Lung cancer remains one of the leading causes of cancer-related deaths worldwide, primarily due to its late diagnosis and subtle early-stage symptoms. Recent advancements in artificial intelligence, especially deep learning, have enabled the development of automated diagnostic systems for earlier and more accurate detection. This study presents a hybrid deep learning model that integrates the powerful feature extraction capabilities of VGG16 with the classification efficiency of an Artificial Neural Network (ANN). The proposed system processes CT scan images through a structured pipeline consisting of preprocessing, segmentation, and feature extraction before final classification. Using the Kaggle Chest CT Scan dataset, the hybrid model achieved an exceptional accuracy of 99.52%, outperforming widely used architectures such as ResNet50 and InceptionV3. To support real-time clinical deployment, a user-friendly GUI was also developed, enabling seamless image upload and instant diagnostic predictions. This work demonstrates the potential of hybrid deep learning systems to significantly enhance early lung cancer detection and support clinical decision-making. Lung cancer detection, CT scan, VGG16, ANN, deep learning, image classification, medical imaging, segmentation, hybrid model.

111. DEEPIRIS: AUTOMATED DETECTION OF EYE DISORDERS IN IRIS USING CNN ALGORITHMS

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Even minor eye disorders may lead to vision impairment. Early detection of such disorders is critical to avoid permanent vision loss. The current state of ophthalmic screening is not available in many rural and low resource areas due to the need of expensive equipment and trained personnel. We propose DEEPIRIS, a screening system for eye disorders using automated detection and Convolutional Neural Networks (CNNs) for the analysis of iris images. The system is designed as a pipeline in which images can be acquired, processed, and iris segmented for loss of features and then classified using neural networks. To improve the system's accuracy and reduce the training time, transfer learning methods using deep learning models were employed to add layers which increased its accuracy. The results of the experiment to assess the proposed system showed its accuracy to be greater than 92%, proof that the system can serve effectively as a reliable and non intrusive screening tool. DEEPIRIS is a solution for scalable, cost efficient, and portable technologies in tele-ophthalmology, community healthcare screening camps and primary healthcare facilities.

112.MAILPING: A WHATSAPP-INTEGRATED INTELLIGENT EMAIL MANAGEMENT SYSTEM WITH SUMMARIZATION, PRIORITIZATION, AND AI AGENT

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Email continues to play a vital role in academic and professional communication, yet handling a high volume of messages has become increasingly inefficient for users. Inbox overload often causes important emails to be missed, while modern users prefer quicker and more interactive messaging environments. This project introduces a smart email handling system that transforms traditional email access into a chat-based interface similar to popular messaging platforms. Secure authentication and email retrieval are implemented using Gmail OAuth 2.0 and the Gmail API. Incoming emails are organized through a rule-based prioritization approach that evaluates sender details, keyword presence, and message relevance to highlight critical communications such as security notifications and academic or work-related updates. The system is developed using Django and Python, with SQLite used for data storage, and features a responsive web interface designed for conversational interaction. Emails are retrieved only when required to ensure efficient performance. A built-in conversational assistant further simplifies user interaction with emails. Overall, the proposed solution improves email organization, accessibility, and response efficiency by merging conventional email systems with a modern chat-oriented design.

113.PERSONALIZED SKINCARE RECOMMENDATION USING NLP-BASED CONTENT FILTERING

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The rapid expansion of the skincare market has made it increasingly difficult for consumers to identify products that match their individual skin characteristics and concerns. To address this challenge, this paper presents a content-based skincare product recommendation system that leverages machine learning techniques to generate personalized product suggestions. The proposed system employs TF-IDF vectorization and cosine similarity to analyze textual product attributes and user preferences, including skin type, specific skin concerns, and desired benefits. A dataset consisting of over 1,200 skincare products categorized by skin compatibility, ingredients, and functional effects is used to compute similarity scores and rank suitable recommendations. The system enables users to receive relevant product suggestions through a lightweight and interactive web interface developed using Streamlit, allowing efficient and user-friendly interaction without requiring dermatological proposed expertise. Experimental evaluation using multiple user profiles demonstrates that the approach effectively improves recommendation relevance compared to basic keyword based matching methods. In addition to product recommendations, the system provides general skincare routine guidance to support informed decision-

making. Future work will focus on integrating image-based skin analysis and advanced learning models to further enhance personalization accuracy.

114.LUNG CANCER PREDICTION USING ARTIFICIAL NEURAL NETWORK ALGORITHM

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The work presented here articulates an innovative method for primary lung cancer detection and forecasting through the use of Artificial Neural Networks (ANN). The heavy burden that lung cancer imposes on health care systems and the number of deaths it causes worldwide is the main reason for the great need for proper detection methods. The main goal of this training is to use machine learning improvements, particularly ANN algorithms, to increase the early detection capability, which could result in better patient outcomes. The proposed method involves the training of a neural network with a massive dataset pillaged from the medical imaging segment; lung scans are the primary focus. The neural network structure is expertly designed to get to know the complex patterns and traits that are linked to lung cancer and thus to support cancer prediction. Among the different factors which determine the model's performance, its ability to tell the difference between cancerous and non-cancerous lung images is evaluated in terms of compassion, specificity, and accuracy.

115.HYBRID QUANTUM–CLASSICAL LEARNING MODEL FOR ACCURATE DIABETES PREDICTION USING QSVM

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Diabetes is a prevailing public health issue that continues to negatively impact the .lives worldwide. Classical machine learning methods like SVM have been used in this domain.can no longer serve to predict diabetes based on high- dimensional, nonlinear, and/or correlated medical data. Quantum computing presents a potential approach to addressing this challenge by utilizing principles like superposition and entanglement to handle large volumes of data within a high-dimensional Hilbert space ,In this paper, we present a new way of predicting diabetes using Quantum Support Vector Machines (QSVMs). We simulate the high- dimensional, correlated, and nonlinear nature of the data by creating synthetic datasets. Using the QSVM framework in the IBM Qiskit Programming Language, we provide various measures of performance for QSVMs in comparison to SVMs. The results indicate that QSVMs perform substantially better than traditional SVM models due to their ability to utilize the nonlinear aspects of complex data as well as to understand and leverage the interrelationships between the many features of the data.

116.DESIGN AND IMPLEMENTATION OF MULTI ELEMENT YAGI UDA VARIANT ANTENNA

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This paper focuses on the design and implementation of a multi-element Yagi-Uda variant antenna, which is renowned for its directional properties and moderate to high gain across High frequency to Ultra High frequency bands. The study explores optimized geometric configurations—including the arrangement and dimensions of the driven element, reflectors, and directors—to achieve enhanced gain, directivity, and impedance matching. Emphasis is placed on empirical methods and simulation-driven adjustments to element lengths and spacing for optimal performance. The implementation leverages modern techniques for fabricating and testing, ensuring reliable and reproducible results adaptable to various wireless communication applications, such as television reception, WLAN, and emerging 5G technologies. Our proposed design yields good results. Simulated results shows that return loss of -49.7dB at 5.2GHz and a return loss of -27.5dB at 2.1GHz are obtained. This proposed design gives the reasonable gain of 8.05dB and VSWR value of 1.1 at 2.1GHz and 0.2 at 5.2 GHz is obtained indicating that the component is well matched at this frequency.

117.RECURRENT ADAPTIVE WAVELET-ENHANCED NOISE REMOVAL SYSTEM WITH SYNCHRONISED MAJOR-MINOR VOLTAGE REGULATOR FOR VLSI AND IOT APPLICATIONS

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Smart-meter ICs used in VLSI platforms are designed to accurately monitor and manage electrical energy within smart-grid environments, relying heavily on robust Power Distribution Networks (PDNs) for stable operation. However, sudden variations in load demand or rapid switching activities within the PDN can introduce delays in maintaining a clean, low-noise supply voltage. To overcome these issues, this work presents a Recurrent Adaptive Wavelet-Enhanced Noise Removal (RAWEN) framework combined with a Synchronized Major–Minor Voltage Regulator. Transient current spikes also generate ground-bounce effects, which interfere with noise-estimation models by causing fluctuations in ground potential and subsequent signal distortion, ultimately degrading supply-signal quality. To mitigate these disruptions, an Adaptive Moving Garrote–Wavelet Filtering Network is embedded inside an LSTM structure. This network leverages the Adaptive Simple Moving Average (ASMA) algorithm—with a window size that adjusts dynamically—to learn current-consumption behaviour, while the Fast Fourier Transform (FFT) is used to identify true current variations affected by ground noise. Noise elements within the FFT spectrum are separated using a Garrote Ricker wavelet thresholding mechanism, ensuring that genuine current trends are preserved. Although decoupling capacitors typically help steady PDN voltage levels, their efficiency decreases under high-frequency switching because of timing mismatches and synchronization faults. To address this, the proposed Synchro-Proxi-Cap Major–Minor Voltage Regulator (SPCMM-VR) utilizes Distributed Proxi-Parallel Decoupling Capacitors to sustain stable on-chip voltage during

both steady-state and transient events. By incorporating Dynamic Voltage and Frequency Scaling (DVFS), the regulator allows real-time adjustment of voltage and frequency, minimizing clock skew and synchronization errors under intense transient activity. Experimental evaluations confirm that the proposed architecture delivers a low-noise power supply to ICs, significantly improving voltage regulation, high-frequency switching response, and short-term noise prediction accuracy.

118.OBJECT DETECTION USING DEEP LEARNING FOR BLIND PEOPLE USING VOICE FEEDBACK

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In this work, an advanced object detection system and voice-assistance trolley working system is going to be presented that is aimed at supporting visually impaired people as the data about the surrounding environment may be perceived on the spot. The suggested framework merges the YOLOv8 deep learning object detector with the highest level of accuracy and the LSTM-based time-reasoning module to improve sequential decision-making and decrease false positives in volatile scenarios. The system is realized in MATLAB, with the help of Deep Learning Toolbox and Audio Toolbox that are used to train, test and generate speech feedback optimally. YOLOv8 takes spatial features at a high rate of detection, and the LSTM network takes frame-to-frame dependencies as an input to enhance contextualization. Identified objects get instantly turned into clear voice signals, which enables users to move freely in their environment. The experimental analysis has shown a 99.4% detection rate which proves the effectiveness of the system and its capability to operate in assistive mode in real-time.

119.QUANTUM-RESISTANCE BLOCKCHAIN WALLET USING POST-QUANTUM CRYPTOGRAPHY

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The rise of quantum computing presents significant risks to blockchain systems that depend on traditional cryptographic methods such as ECDSA and RSA. Quantum algorithms like Shor’s can break these schemes, allowing future attacks on stored blockchain data and risking digital asset security Post- Quantum Cryptography

(PQC) offers robust protection against both classical and quantum threats. The National Institute of Standards and Technology’s (NIST) most recent standardized signature scheme, SPHINCS+, is used throughout this research work. In this article I demonstrate the vulnerabilities that exist today with Blockchain Wallets and present the adoption of quantum-resistant mechanisms to provide a means of protecting key management and validating transactions. While PQC can be utilized within Blockchain infrastructure today to ensure continued security and trust in the quantum age. Moreover, the inclusion of SPHINCS+ enhances the resistance of blockchain transactions to store-now-decrypt-later attacks, thus ensuring that data signed today is secure in the future. The employment of stateless hash-based signatures further reduces dependencies on complex mathematical problems and consequent vulnerability to quantum breakthroughs. The proposed approach provides a forward-compatible bedrock for quantum-secure digital asset ecosystems by aligning with emerging NIST standards and current migration strategies within the industry. This work essentially contributes to the creation of blockchain infrastructures that can stand rapid development in quantum technologies.

120.MULTIMODAL BIOMETRIC AUTHENTICATION USING FACE AND VOICE WITH DEEP TRANSFORMERS

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Unimodal biometric systems that only use face or voice recognition to establish identity have suffered in the last few years due to issues with spoofing, illumination changes, and background noise. To address these concerns, this paper introduces a multimodal biometric authentication framework that systematically utilizes facial and voice features using deep transformer technologies. In this study, face embedding extraction is performed using Vision Transformer (ViT), and voice feature representation is derived using Speech Transformer (AST—Audio Spectrogram Transformer). The feature fusion of both modalities with the cross-attention-based fusion network ultimately provides enhanced capabilities that promote a stronger and more discriminative biometric authentication process. Results evaluated using publicly available multimodal datasets demonstrated improved accuracy, robustness, and resistance to spoofing attacks compared to unimodal systems. This significantly advanced multimodal model reached 98.2% in recognition accuracy and 1.6% in Equal Error Rate (EER) compared to state-of-the-art CNN and LSTM-based methods.

121.LIGHTWEIGHT AND FLEXIBLE INTRUSION DETECTION SYSTEM TO PROTECT INDUSTRIAL IoT SETTINGS: USING A MIXED AI STRATEGY

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Hackers are targeting Industrial control systems and Industrial Internet of Things networks more often now. These systems often rely on outdated protocols and weak security making them vulnerable. They also lack advanced layers of defense that could adapt to new threats. Basic intrusion detection systems do not work well in these environments. They struggle to meet the demands of fast communication real-time monitoring, and limited resources. This research offers a simple and flexible hybrid Intrusion Detection System designed for industrial use. The system mixes rule-based methods with machine learning to spot unusual activity. It uses tools like deep packet inspection and analysis of time-based patterns to catch both known and new unknown threats .Tests on benchmark datasets like NSL-KDD and a created Modbus-TCP traffic set show that detection accuracy reaches 98.6 percent while keeping false positives low.

122.VIRTUAL HERBAL GARDEN FOR AYUSH AWARENESS

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The Virtual Herbal Garden is an offline mobile app created with the purpose of AYUSH promotion through the integration of plant identification, time-tested knowledge, and individual-specific health suggestion. It contains a categorized herbal database under Ayurveda, Yoga, Unani, Siddha, and Homeopathy, allowing users to access plant-based medicine easily. A prominent feature is the scanning module that enables users to recognize medicinal plants just by scanning them, and the output is directed towards detailed information. The system further includes a questionnaire-based body type analyzer that provides diet and lifestyle advice tailored to the individual constitution. It is created as an offline product that is particularly valuable in non-internet villages and inaccessible regions. Besides healthcare, the app serves the purpose of preserving indigenous knowledge, promoting environmental education, and providing students, practitioners, and the general public with educational access. By uniting the contemporary technology-based image recognition system with the traditional AYUSH practices, the Virtual Herbal Garden presents itself as the feasible, integrated, and sustainable- based site for preventive medicine as well as cultural conservation.

123. DETECTION OF DEEPFAKE VIDEOS USING SPATIO-TEMPORAL AND FREQUENCY-DOMAIN FEATURES: A HYBRID DEEP LEARNING FRAMEWORK

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Synthetic media, particularly deepfakes built upon advanced generative models such as GANs and autoencoders, pose an equal threat to the digital content's integrity, privacy, and public trust. Detection of these manipulations has indeed become an important problem in multimedia forensics and cybersecurity. This research intends to develop a modern deep learning system for detecting deepfake videos with the highest accuracy and robustness, mainly focusing on extracting discriminative spatial, temporal, and frequency domain features. More than 120,000 real and manipulated video frames were gathered from various benchmark sources, including FaceForensics++, Celeb-DF, and DFDC. The proposed model combines attention modules, frequency-aware layers, and a 3D-CNN backbone to capture very subtle facial inconsistencies generated during the process of manipulation. The experimental evaluation revealed that the model outperforms all the baselines with average accuracy, precision, recall, and ROC-AUC all standing at 95.8%, 95.2%, 96.5%, and 97.5%, respectively. Tests that check robustness over conditions of compression, noise, and cross-datasets show a high detection rate. Ablations reveal the contribution of all components studied towards the overall performance. This research contributes a scalable and interpretable deepfake detection solution and provides a great foundation for the next generation of real-time, multi-modal, and adversarial robust detection systems.

124.HYBRID KNOWLEDGE-INTEGRATED TRANSFORMER FOR ASM-DRIVEN SOC CLASSIFICATION, ANOMALY DETECTION, AND ATTACKER-MODE PREDICTION

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Attackers today behave like adaptive systems—pivoting strategies in minutes, exploiting fresh CVEs within hours, and weaponizing configuration mistakes the moment they appear. SOC teams, however, are forced to interpret this shifting landscape through fragmented visibility: threat intelligence that changes daily, assets that drift unpredictably, and attack-surface data scattered across scanners and cloud inventories. Traditional SIEM rules and static ML pipelines cannot keep pace, often failing precisely when the attack surface is most unstable. This work starts from that operational reality and asks a direct question: how can a detection system remain stable when both the threat environment and the underlying infrastructure are in motion? We propose a Hybrid Knowledge-Integrated Transformer designed to reason under continuous change rather than break under drift. The architecture unifies a domain-adapted encoder for ASM and CVE interpretation, a temporal transformer that preserves long-range behavioral signals, a graph-attention module that follows shifts in attack-surface topology, and a retrieval-augmented layer that injects fresh OSINT and TI into each prediction. The result is a system that improves not just accuracy, but situational awareness. Classification rises to 0.78–0.85, anomaly-detection AUC reaches 0.82–0.92, and exposure-ranking performance improves to NDCG@10 = 0.70–0.82. Attacker-stage

Top-3 accuracy climbs to 0.90–0.95, offering reliable insight into an adversary's likely next steps. Operationally, the model reduces false escalations to 8–12%, detects emerging anomalies 4–36 hours earlier, and lowers triage time by almost 40%, demonstrating clear value in real SOC workflows. By combining live threat intelligence, temporal behavior, and attack-surface structure into a single reasoning pipeline, this research shows that SOC automation can become adaptive, grounded, and resilient—capable of thinking in motion, just as attackers do.

125.PHISHSHIELD: A MULTI-MODAL GMAIL SECURITY EXTENSION USING MACHINE LEARNING AND BERT FOR PHISHING DETECTION

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PhishShield, my project, is a program to identify phishing systems that are designed to protect users against the internet frauds. PhishShield works through a multi-modal approach that analyses URLs and screenshot of websites unlike the traditional methods that only test the URLs of websites [7]. It uses OCR together with BERT a transformer-based natural language processing model [1], to read and understand hidden or deceptive text in images, and machine learning to detect suspicious URL templates. A sophisticated decision engine that generates a score of confidence in detecting phishing is a combination of all these insights. Subsequently, the system assists the consumer in knowing why they have received a timely warning of the site; it alerts the consumer using explainable and real-time signals [4], [9] on the mobile devices and browsers.

126.SMART CV SCREENING ASSISTANT

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When organisations receive a number of applications for a single job role, the manual resume screening takes a lot of time. The exciting tools for the automation of a screening process are high speeded, but specifically depends only on keyboard matching as a result they fail to judge a candidate accurately for a job. To address this problem, we developed a resume - job matching system called & Smart CV Screening". It evaluates candidates based on real meaning rather than keyboard matching only. This system performs resume parsing, skill normalisation, semantic embedding using sentence BERT, experience estimation and hybrid scoring.

Through evolution, the proposed system provides higher semantic relevance, and fair candidate ranking compared to traditional approaches. This Smart CV Screening system adds much fairness and consistency in the recruitments process.

127.EPILEPTIC SEIZURE DETECTION ON EEG SIGNALS USING DEEP LEARNING

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One of the most common neurological conditions is epilepsy. For treatment to be effective, epileptic seizures must be accurately detected. The patient's electroencephalogram (EEG) signals can be effectively characterized in order to forecast epileptic seizures early on. In this study, we developed an automated Deep Learning (DL) model that is automated and enables the identification of epileptic seizures. In this study, we detected epileptic seizures in three steps and primarily focused on using physical epileptic activities to classify epilepsy instead of using feature engineering. Initially, the UCI Machine Learning repository's open-source numerical dataset on epilepsy from Bonn University was utilized. Since the dataset had previously undergone pre-processing, normalization, and restructuring, in the second stage, data were given to the suggested Deep Belief Network model for training in 80% training and 20% testing ratio with little rescaling. A DL model called DBN automatically extracted features from the EEG signal in the third step, which identified both epileptic and non-epileptic activity. A OAOFS-Feature Selection (FS) algorithm selected the features, and the DBN classifier was used for the final classification. Several machine learning algorithms were used in our study to classify epileptic activities into binary categories. These algorithms included KNN, NB, LR, SGDC,GB, DT, and three deep learning models: DBN, LSTM, and ANN. Our suggested DL model, Deep Belief Network produced the greatest results, according to a thorough examination, with an accuracy of 100% and an AUC of 0.99.

128.SERVERLESS PLATFORM FOR E-LEARNING CONTENT DELIVERY

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In the modern, digitally interconnected world, students worldwide are calling for rapid, scalable, and dependable access to learning content. Although server-based infrastructure is widely applied to host e-learning sites, it frequently fails to accommodate aspects of real-time scalability, high availability, and cost savings. An educational platform today needs to respond dynamically to changing user loads without having to manage infrastructure. Serverless computing offers a robust solution to these issues by supporting event-driven execution and auto scaling through cloud- native services. Our paper introduces a serverless platform for e-learning content delivery based on AWS technologies. The suggested architecture takes advantage of services like AWS Lambda, Amazon S3, API Gateway, and CloudFront to manage backend logic, media storage, API management, and global content distribution, respectively. In contrast to conventional monolithic systems, our serverless approach guarantees latency optimized and cost effective content delivery. Teachers can simply upload course content, which is delivered automatically to learners on demand through scalable, stateless functions. Such a structure enhances performance while reducing operational overhead, fitting well for institutions or platforms catering to a varied and dispersed student population. The system was tested for user acceptability and load handling, and it was affirmed to be efficient for real time, modular, and personalized learning experiences.

129.Biodegradable Four-Hole Jaw Implant Plates: Computational Modeling and Comparison Of β-TCP, PLLA and PLGA Systems

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Mandibular and maxillary bone defects that arise following tooth extraction frequently require temporary fixation plates that ensure local stability while allowing for natural bone healing and avoiding persistent implant residues. This study presents a comprehensive computational approach in COMSOL Multiphysics, applying both time-dependent degradation analysis and strength assessment on standardized four-hole jaw plate designs made from three distinct ceramic and polymer-based biodegradable materials. Material dissolution was simulated via Transport of Diluted Species physics with a time-dependent study tracking concentration changes, surface flux, mass loss, and geometry evolution. The resulting geometries were coupled with Solid Mechanics simulations, allowing the assessment of stresses, strains, and structural stability in the degraded plates under increasing masticatory loads. Stationary studies quantified von Mises stress, displacements, and safety factors at different degradation stages, enabling direct comparison of plate strength before and after simulated resorption. Comparative analysis across all candidates identified one composite system that delivered exceptional mechanical reliability during the resorption cycle, a controllable degradation profile well-matched to the healing timeline, and unique readiness for integration with next- generation energy-harvesting implant technology. This framework shows that a PLLA-dominant composite plate selectively reinforced with β-TCP remains the optimal choice for temporary jaw fixation, combining stable biomechanical performance, tunable degradation, and future-proof design versatility

130.3D Medical Image Reconstruction and Visualization for Anomaly Detection: A Comprehensive Analysis

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The recent shifts in the medical field owing to the breakthroughs in medical imaging technology have enabled a movement to 3D imaging from 2D imaging which leads to a more precise diagnosis, better surgical planning and detection of anomalies. This survey provides a comprehensive overview of the state-of-the-art 3D

reconstruction and visualization techniques of medical images. It covers the conventional Filtered Back Projection and Algebraic Reconstruction Techniques, and modern deep learning techniques such as CNNs, GANs and even Transformers. The article covers the concerns of high computational complexity, privacy of the data, and lack of uniformity in clinical workflows. Furthermore, the article covers the emerging trends in visualization technologies such as AR, VR, MR and the convergence of AI with Quantum Computing and Robotic Surgeons. This survey aims to guide further research by identifying the open and actionable challenges and proposing the problem of the design of efficient, safe, and interpretable 3D imaging systems for the complex multi-stakeholder healthcare ecosystems.

131.RFID-BASED SMART AUTHENTICATION AND REAL-TIME ALERT SYSTEM TO WOMEN SAFETY IN THE PUBLIC AND PRIVATE TRANSPORT VEHICLES

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There is a growing need of women to be able to be identified as secure in any mobility system and respond to an emergency quickly. This essay provides a real-time RFID- based intelligent authentication and alerting Architecture aimed at offering upstream and proactive safety. The RFID tag is allocated to each commuter or licensed vehicle operator to make sure that permissible access is provided and discourage criminal acts. The system entails the GPS and GSM communication to track the position of a vehicle constantly and the alert mechanism of emergencies with the user ID, vehicle description, and real-time coordinates. A built-in panic button provides the panic so that the monitoring centres can intervene more quickly. The structure involves a microcontroller board that includes RFID authentication, position sensors, and wireless, and Web dashboards to oversee numerous cars. The practicality of the use of performance evaluation was established by the fact that it attained 97.4% authentication accuracy and 98.1% alert-delivery reliability. The prototype put in place produced secure access logs, instant route traces, and emergency messages. The relief plans in the future are biometric authentication, anomaly detection and predictive safety analytics.

132.FLASH-BPH: A PRIVACY-PRESERVING FEDERATED LEARNING FRAMEWORK FOR SCALABLE AND TRUSTWORTHY HUMAN-CENTRIC CYBER-PHYSICAL SYSTEMS

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IoT-capable Human-in-the-Loop Cyber-Physical Systems (HiTLCPSs) and biometric sensing technologies have the potential to revolutionize personalized services, however personal data of users is sensitive, there occurs a serious privacy issue. To address these concerns globally, this study proposes a novel privacy-preserving system

that integrates split learning with federated learning (FL) and edge processing. Personal data exposure is reduced by dividing deep neural networks between edges and servers such that only intermediate activations are supplied for server-side processing and raw sensor data remains on-device. The system incorporates blockchain-auditable procedures, human-centric consent methods, and FL to enable collaborative model training across dispersed users without central data aggregation focusing on decentralization of data. Tested on a real-world wearable sensor dataset, the hybrid split-FL method saves 40% on-device computing and matches accuracy with centralized alternatives, proving its suitability for low-resource IoT situations. Activation encryption and adaptive model personalization mitigate non-independent and identically distributed data issues and leakage risk, while stress testing confirm scalability in diverse network settings. By offering a scalable, privacy-first paradigm for Internet of Things-driven applications, this work advances edge processing by combining personalized split learning with federated normalization in human-in-the-loop CPS

133.A COMPREHENSIVE REVIEW OF ATTRIBUTE-BASED ENCRYPTION AND ADAPTIVE REVOCATION MECHANISMS FOR SECURE FEDERATED HEALTHCARE DATA SYSTEMS

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The quick shift to digital healthcare services and the growing use of cloud and federated data-sharing systems have raised significant worries about secure access control, effective user revocation, and the lasting confidentiality of data. Attribute-Based Encryption (ABE) is a significant cryptographic method for implementing detailed access control in healthcare systems. However, its real-world application is hindered by issues related to revocation inefficiencies, scalability challenges, and increasing susceptibility to quantum-era threats. Recent advances in machine learning-based adaptive security and post-quantum cryptography have opened up new opportunities, but these methods are frequently examined separately. The literature review examines key themes such as attribute-based encryption models, mechanisms for user and group revocation, federated and cross-domain access control, intelligent adaptive security techniques, and quantum-resilient cryptographic methods. Analysis of trends and comparisons shows that, although there has been notable progress in specific research areas, current solutions are still fragmented and do not provide unified frameworks that can effectively tackle revocation efficiency, federated deployment, adaptive intelligence, and quantum resistance at the same time. This review highlights important research gaps, including issues with delayed revocation, limited group and dynamic access control, a lack of integration between machine learning and cryptographic enforcement, and the need for practical post-quantum ABE systems tailored for healthcare settings.

134.MEDFUSIONAI: ENSEMBLE-DRIVEN CHEST X-RAY DIAGNOSTICS WITH GRAD-CAM EXPLANATIONS AND AUTOMATED REPORTING

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The exponential growth in medical imaging data contrasts sharply with the global shortage of radiologists, necessitating automated diagnostic aids. Medical imaging plays a crucial role in the diagnosis and treatment of various diseases, particularly those affecting the chest. However, the manual interpretation of large volumes of medical images such as X-rays is often time-consuming, subjective, and prone to human error. With the growing demand for faster and more accurate diagnostic support, Artificial Intelligence has emerged as a transformative solution in the field of medical imaging. We propose an ensemble framework that integrates three state-of-the-art convolutional neural network (CNN) architectures - DenseNet121, EfficientNet-B4, and ResNet50-trained on the NIH ChestX-ray14 dataset. The methodology employs a rigorous two-stage training protocol-head-only initialization followed by full-network fine-tuning-augmented by Asymmetric Loss (ASL) for class imbalance along with MixUp regularization, and Exponential Moving Average (EMA). Additionally, Gradient-weighted Class Activation Mapping (Grad-CAM) provides visual interpretability and the MedGemma Large Language Model (LLM) for automated report generation, bridging the gap between quantitative metrics and clinical utility. Experimental results demonstrate that our ensemble model achieves a mean AUROC of 0.8910

135.WEARABLE MULTI-INSTRUMENT CONTROLLER UTILIZING MEMS-BASED MULTI-MODAL SENSING

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A wearable multi-instrument controller that utilizes MEMS-based multi-modal sensing for expressive musical perfor- mance. The system features a wrist-mounted form factor integrat- ing an ESP32 microcontroller with seven Force Sensitive Resistors (FSRs) for finger pressure detection, an MPX5010DP differential pressure sensor for breath intensity control, and an MPU6050 inertial measurement unit for gesture-based modulation. Sensor data is transmitted via Bluetooth Low Energy to a mobile application that synthesizes both Indian classical instruments (Bansuri, Sitar, Harmonium, Shehnai, Veena, Tabla) and Western instruments (Piano, Violin) using sample-based audio genera- tion. The controller enables natural musical expression through breath-controlled dynamics, pressure-sensitive note articulation, and tilt-based effects including pitch bend and octave shifting. The design emphasizes ergonomic wearability with wrist-based mounting, standalone operation powered by a portable power bank, and cross-cultural musical versatility supporting Indian raga scales alongside Western equal temperament.

136.CONVERSATIONAL AI PERSONALIZED SHOPPING: AN INTELLIGENT CHATBOT WITH MULTI-LAYERED RECOMMENDATION IN E-COMMERCE

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Artificial intelligence and full-stack web technology are combined in the solution to the most distressing issues in online retail. Comfy is the name of this solution. By employing one of the most innovative hybrid

recommender systems utilizing conversational AI chatbots and combining it with intent analytics, purchase history, and content-based filtering, it assists customers in making purchasing decisions. Since the Comfy platform is built on the MERN (MongoDB, Express.js, React, Node.js) technology stack, it has two components: An AI-based product recommendation system, and an shopping portal for customers, and a admin analytics console for real-time system analytics. This demonstrates how even small and medium-sized enterprises (SME) can harness the power of advanced AI for hyper-personalization at a highly reasonable cost using open-source technology and a thoughtfully architected API. Other noteworthy attributes include the AI-based progressive payment solution with backend security from Razorpay, unique approaches to the safety and security of e-commerce AI systems, and an adaptive recommendation system with multi-layered filtering and responsiveness. With the test system to reality computing, Comfy shows the possibilities of AI and helps e-commerce systems to incorporate AI, making it an essential tool for companies wanting to create an e-commerce system with AI.

137.EMPOWERING LOW-CODE/NO-CODE PLATFORMS WITH AGENTIVE AI: A COMPREHENSIVE REVIEW

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Implementing the concept of Low-Code/No-Code (LCNC) software development using the approach of the Agentive Artificial Intelligence (AI) is a revolutional change in the domain of software development. This paper critically evaluates the means in which the concept of an Agentive AI, due to Autonomy, Adaptability, and contextual awareness, can enable a LCNC setting to transform into a co-creator of dynamic and intelligent nature. The paper examines the principles of developing LCNC, the structure of the most popular platforms, and the dynamism of the capabilities of Agentive AI systems. It identifies practical scenarios in industries as well as exploring how AI supplements citizen developers in developing applications via visual and natural language interface. The main obstacles, including the privacy of information, excessive dependence on AI, and the lack of skills to embrace the logic of AI, are assessed critically, as well as the ethical issues and the need to control them. In this paper, the authors have provided not only the technical but also the socio-ethical insights that help lead the way to a future in which AI-enhanced LCNC platforms will make software development more democratic and spur the inclusive digital change.

138.DEEPFAKE DETECTION ON SOCIAL MEDIA LEVERAGING DEEP LEARNING AND FAST TEXT EMBEDDINGS FOR IDENTIFYING MACHINE-GENERATED TWEETS

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In the era of ever-increasing machine-generated content on social media, it is of paramount importance to detect deepfake tweets. This paper introduces a new hybrid model, the Attention-Mixed FastText Convolutional Transformer Network for identifying AI-generated tweets, combining FastText vectors, CNNs and light-weight Transformer attention. We use FastText embeddings to capture subword-level semantics, CNN layers to learn local linguistic structures and Transformer blocks to capture global contextual relationships between tweets. Moreover, a feature fusion and attention layer makes predictions more transparent and comprehensible, highlighting the most discriminative segments in the real and fake content. Extensive experiments on the TweetFake benchmark demonstrate that AMFT-CTN outperforms traditional CNN and LSTM models in terms of accuracy and generalization, while being well-suited to short and informal tweets.

139.FAKE NEWS DETECTION USING API-BASED VERIFICATION AND HEURISTIC ANALYSIS:A REVIEW

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The widespread circulation of fake news across social media and digital communication platforms poses a significant risk to informed decision-making, public opinion, and social stability. Traditional machine-learning-driven fake-news detection techniques deliver high accuracy but remain limited by dataset dependency, high computational overhead, and lack of interpretability. In contrast, rule-based and API-driven verification approaches offer greater transparency and real-time reliability, enabling practical deployment at scale. This review examines key literature on misinformation detection, identifies major technological and methodological

gaps, and evaluates the viability of lightweight, heuristic-based systems. By integrating structured rule-checks with external fact-checking APIs, the proposed architecture aims to deliver low-latency, explainable, scalable verification suited for real-world web applications. This paper provides a comprehensive analysis of existing works, research challenges, comparative frameworks, and proposed enhancements to support credible, user-centric fact-checking ecosystems.

140.FUTURE-PROOFING FINANCIAL AI: A DECENTRALIZED APPROACH TO QUANTUM-RESISTANT FEDERATED LEARNING

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The rapid adoption of artificial intelligence in mod- ern financial systems has significantly increased concerns regard- ing data privacy, system robustness, and long-term cryptographic security. Federated Learning (FL) has emerged as an effective paradigm for privacy-preserving model training by enabling collaborative learning without centralizing sensitive customer data. However, most existing FL deployments rely on classical public-key cryptographic schemes such as RSA and Elliptic Curve Cryptography (ECC), which are fundamentally vulnerable to quantum attacks enabled by algorithms like Shor's algorithm. As quantum computing capabilities continue to advance, these vulnerabilities pose a serious threat to the security and trustwor- thiness of financial AI systems. To address this challenge, this paper proposes a decen- tralized post-quantum cryptography-enabled federated learning (PQC-FL) framework designed for secure credit risk analy- sis. The proposed system integrates NIST-standardized post- quantum cryptographic primitives, including CRYSTALS-Kyber for quantum-resistant key exchange, CRYSTALS-Dilithium and Falcon for digital signatures, and AES for efficient symmetric encryption. A hybrid cryptographic approach is employed to ensure confidentiality, integrity, and authentication of model updates while maintaining practical performance. In contrast to traditional centralized FL architectures, the framework adopts a decentralized multi-server aggregation strategy that enhances fault tolerance and eliminates single points of failure. Clients train local models on non-IID financial data and transmit only encrypted and digitally signed model updates, which are verified and securely aggregated by decentralized servers. Experimental evaluation demonstrates that the proposed PQC-FL framework preserves model accuracy while effectively detecting and rejecting maliciously tampered updates. Although post-quantum cryptography introduces additional computational and communication overhead, the results show that these costs remain predictable and manageable. Overall, this work demon- strates the feasibility of deploying privacy-preserving, quantum- resilient federated learning systems for financial applications, providing a practical pathway toward future-proof secure AI in the post-quantum era.

141.REAL-TIME HUMAN DISTRESS SOUND DETECTION USING EDGE-BASED YAMNET TRANSFER LEARNING

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Human distress sounds are vocalizations such as cries, screams, and shouts that indicate discomfort, fear, pain, or a need for immediate help. They are pivotal signals that guide emergency responders to the location and nature of the crisis. On the other hand, non-distress sounds such as laughter, singing, and conversational speech denote normal be- havior and, thus, do not imply the need for intervention. Unfortunately, as important as they are, human distress sounds have lagged significantly behind in research attention compared to environmental audio events, mostly because of their variability and complexity from an acoustic per- spective. This research presents an edge-deployable system for multi- class classification of distress and non-distress vocalizations that employs transfer learning on YAMNet embeddings. A carefully selected and six- class human sound dataset of three distress sounds (cry, scream, shout) and three non-distress sounds (cry, sing, talk) went through

preprocess- ing and was used to train a light neural network, which was then opti- mized by means of augmentation, class weighting, and early stopping. The final model with MQTT-based communication, SQLite event log- ging, and a Streamlit dashboard for real-time analytics was put into oper- ation on a Raspberry Pi 4. The setup reached 92.22% test accuracy, thus being able to strongly differentiate most classes and, at the same time, pinpointing difficulties in identifying acoustically similar high-intensity vocalizations. The presented model is a viable, low-latency, and privacy- respecting solution that can be implemented in the safety, surveillance, and emergency alert domains of the real world.

142.SMART DIET AND FITNESS PLANNER: AN AI-DRIVEN, CALENDAR-AWARE MOBILE SYSTEM FOR HOLISTIC HEALTH AND MOTIVATIONAL COACHING

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Diet and fitness applications have grown significantly in recent years, yet most continue to rely heavily on manual logging and deliver raw data without context. This lack of personalization reduces user adherence and affects long-term health outcomes. Furthermore, existing systems often fail to synthesize disparate health signals—such as caloric intake, biometric stress levels, and calendar availability—into actionable, humancentric advice. This paper presents the Smart Diet and Fitness Planner (SDFP), a mobile-first system designed to minimize manual effort while maximizing user engagement through AIdriven motivational coaching.
The system integrates a ”Daily Coach” module that uses Large
Language Models (LLMs) to interpret physiological data (SpO2, Stress, Sleep) and generate natural-language advice. It features a hybrid food recognition pipeline combining on-device TFLite inference with the Gemini Vision API for complex meal analysis. Additionally, SDFP introduces a ”Watch Data for TDEE” toggle, allowing users to switch between formulaic calorie budgeting and real-time expenditure tracking via Google Health Connect.
We describe the architecture, data flow, and the ”Actual Mode” algorithm used for real-time energy budgeting. Experimental results show a top-1 accuracy of 90% on common Indian dishes, a 97% QR-scan retrieval rate, and a significant improvement in user sentiment due to the personalized coaching interface. SDFP represents a shift from passive tracking to active, intelligent health management.

143.SAARTHI: ENHANCING E-COMMERCE WITH PERSONALIZED RECOMMENDATIONS

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Recommender systems are pivotal to helping users navigate large product spaces. This paper presents a hybrid rec- ommendation framework that integrates collaborative filtering, content-based modeling, and reinforcement learning to generate personalized suggestions. Using the Amazon Products Dataset (1.4M items), a scalable pipeline is designed to simulate user– item interactions and incorporate implicit feedback for training. The collaborative module employs matrix factorization optimized through stochastic gradient descent, the content-based module leverages TF–IDF features to capture semantic similarity, and the reinforcement learning component adapts preferences dynam- ically. Evaluation across multiple top-K thresholds demonstrates improvements in precision, recall, and NDCG, with additional robustness under cold-start scenarios. The results highlight the effectiveness of multi-paradigm integration for addressing spar- sity and evolving preferences at scale.

144.A FEISTEL-BASED TEXT ENCRYPTION SCHEME WITH A NOVEL NONLINEAR ROUND FUNCTION AND REVERSIBLE RAINBOW PERMUTATION

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This paper presents a hybrid text encryption scheme that combines a reversible permutation-based substitution mechanism with a Feistel block cipher to support full ASCII compatibility and enhanced diffusion. The proposed approach operates in two stages. First, a RAINBOW 11×11 Playfair-style matrix is employed to perform structured permutation on ASCII text using canonical character merging and escape encoding, ensuring complete reversibility and lossless substitution across all ASCII symbols. Second, the permuted output is encrypted using a 16-round Feistel network operating on 256-bit blocks with a novel nonlinear round function to strengthen confusion and diffusion. Experimental evaluation confirms that the proposed scheme exhibits strong cryptographic characteristics, including a high entropy value of 0.998, balanced frequency distribution, an avalanche effect exceeding 50% and compliance with standard statistical randomness tests. These results indicate effective diffusion of plaintext characteristics and resistance to statistical analysis. The proposed framework provides a reversible, fully ASCII-compliant and structured encryption approach suitable for cryptographic research, secure text processing and hybrid encryption systems.

145.GENDER, AGE CLASSIFICATION USING FINGERPRINT WITH HELP OF DEEP NEURAL NETWORK AND IMAGE PROCESSING

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Fingerprints are not only identifiers and distinctive patterns, but a plentiful source of physiological information, e.g. ridge density, elasticity, minutiae distribution and pore topology. The main idea of recent deep learning and medical biometrics research is that these barely visible features can be utilized for demographic attributes prediction like gender and age as well as physiological abnormalities identification related to health conditions. The proposed research presents a fingerprint-based classification as a one-size-fits-all approach to the task of gender, age group, and disease probability (healthy vs. cardiovascular conditions) prediction through image processing, minutiae-based enhancement, and hybrid CNN-BiLSTM deep neural architecture. The recommended schema applies deep representation learning following localized very subtle ridge variations noise reduction, ridge enhancement, segmentation and region-of-interest extraction standardized preprocessing operations, which are associated with biological factors. It is confirmed experimentally that the change of ridge density spreading and the distribution of sweat pores on the fingers of healthy and cardiovascular-affected individuals are different to such an extent that machine learning models can obtain medically relevant micro-features. The concept articulated here is to employ multi-label classification as a instrument to reach a very high level of accuracy which can then have biomedical screening, forensic analytics, and biometric intelligence as its potential application areas.

146.COMPUTATIONAL APPROACHES TO SHREDDED DOCUMENT RECONSTRUCTION: A COMPREHENSIVE REVIEW

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Reconstruction of shredded documents is a crucial problem in digital forensics, intelligence analysis, and archival preservation, where recovering fragmented paper records can reveal critical information. The task closely resembles solving a complex jigsaw puzzle and presents significant challenges due to irregular fragment shapes, missing pieces, noise, and loss of structural continuity. Over the years, this problem has attracted substantial research interest, leading to the development of various reconstruction techniques. This survey presents a comprehensive review of existing methodologies for shredded document reconstruction, covering traditional manual techniques, classical algorithmic approaches, and recent machine learning–based solutions. Particular emphasis is placed on image processing methods, edge and contour matching techniques, layout and text-line analysis, and optimization-based reconstruction strategies. With advancements in artificial intelligence, deep learning models—especially convolutional neural networks (CNNs)—have been increasingly adopted to enhance reconstruction accuracy, robustness, and automation. The paper also examines key challenges associated with different shredding patterns, including strip-cut, cross-cut, and manual shredding, as well as issues related to noise, partial fragment loss, and computational complexity. A comparative analysis of existing approaches is presented to highlight their strengths, limitations, and performance trends. Finally, the survey identifies open research challenges and future directions aimed at developing fully automated, scalable, and reliable shredded document reconstruction

147.Experimental Investigation of Friction Stir Welding Process for AL6062 & AL6082: A Review

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This experimental study investigates the Friction Stir Welding (FSW) process for joining dissimilar aluminum alloys AL6062 and AL6082, which are commonly used in structural, automotive, and aerospace applications due to their favorable mechanical properties. The research focuses on analyzing the influence of key FSW parameters— such as tool rotational speed, traverse speed, and axial force—on weld quality and mechanical performance. A series of weld trials were conducted under varying conditions, and the resulting joints were evaluated through tensile testing, hardness measurements, visual inspection, and microstructural analysis. The findings reveal that proper selection of process parameters significantly affects the integrity and strength of the welds, with optimal settings producing defect-free joints with enhanced mechanical properties. This study confirms the effectiveness of FSW for dissimilar aluminum alloys and provides useful insights for improving welding techniques in industrial applications.

148.SMART ASSISTIVE ALERT SYSTEM FOR NON-VERBAL INDIVIDUALS THROUGH SOUND AND VIBRATION RECOGNITION

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The inability to speak or losing the ability to communicate verbally presents major difficulties, limiting independence and making daily interactions more complex. Current assistive alert devices often fall short of users' real needs because they are not very effective in practical situations and lack meaningful feedback and dependable responsiveness. This research assesses how well existing smart assistive technologies meet user demands, with a particular focus on recognizing sounds and vibrations. It highlights the main weaknesses of current solutions, especially in areas where adoption and user satisfaction are low. The main aim is to improve

assistive technology by creating systems that feel more intuitive, natural, and supportive of everyday communication. Using multimodal signal analysis, a set of user-focused requirements is proposed. The goals include: (i) introducing an IoT-based design that boosts responsiveness and communication; (ii) providing guidelines to enhance functionality by combining technical and sensory data; and (iii) improving methods to assess user satisfaction, offering more precise insights into device performance and user experience. Altogether, these improvements could lead to smarter, more dependable systems that users are more willing to adopt.

149.MACHINE LEARNING BASED PERFORMANCE EVALUATION AND MONITORING OF SOLAR PV SYSTEM

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The solar photovoltaic (PV) system plays very significant role in global energy transition. However, its performance is environmental dependent that is its efficiency drops up to 10% to 30% due to factors like dust, shading and temperature the traditional methods fail to address this subtle performance degradation. This paper proposes an intelligent, edge-based monitoring framework integrating Internet of Things (IoT) sensors and Machine Learning (ML) for proactive fault detection. The proposed system employs use of Rasbery-PI as a computational device to execute machine learning models. The real time power output from sensors is continuously compare with the reference power output. The algorithms such as Random Forest regression used to estimate normal power generation behaviour, the deviation between predicted and measured value is further analysed using classification models. The system uses Pi camera and computer vision to visually confirm the root cause of fault like accumulation of dust and furthermore before generating a precise actionable alert. It includes features like auto cleaning, pre-fault detection alerts, Maintenance alerts, and wireless monitoring of a system with user friendly interface. The framework is anticipated to yield substantial economic benefits including 25-30% reduction in maintenance cost and potentially increase energy yield of PV system. Furthermore, the system will be able to generate accurate, real-time forecasts serves as a vital component for the stable and efficient management of solar PV integration within complex microgrid Energy Management Systems (EMS).

150.EFFICIENT MULTI-DOCUMENT SUMMARIZATION SYSTEM UTILIZING GPT-4 AND FAISS FOR ENHANCED RESEARCH WORKFLOWS

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There has been a growing need for tools that can carry out multi-document summarization tasks because of the rapid growth of digital documents that need to be processed in a short time in the academic and professional world across various PDFs. This paper proposes a new system that can produce real-time, contextually relevant, and user-customizable summaries for multiple PDFs. By utilizing the abstractive model of a large language model (GPT-4o), the system highlights user-specified topics by using FAISS-based semantic search to ensure relevance and consistency. The system's key aspects include the concurrent processing of multiple PDFs, user-controllable summary length and level of detail, and multi-format export options (PDF and DOCX), thus improving user accessibility and usability. A user-interaction interface developed using Streamlit allows user interaction and includes history tracking to enable effective summary management. Testing on five natural language processing papers shows that the system produces higher-quality and more informative summaries than existing baselines, BART and PEGASUS. The method can be applied to multitask summary development and has applications in literature reviews, knowledge extraction, and report writing, filling a gap that has been previously neglected in user customization and real-time processing capabilities of other approaches.

151. A LI-FI ENABLED FOR CONTINUOUS DIVER HEALTH TRACKING AND EMERGENCY COMMUNICATION SYSTEM

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– This paper will present an underwater health monitoring system using Li-Fi technology intended for deep sea divers. The system makes use of health monitors to monitor physiological functions such as a diver's body temperature and respiration rate and transmit this information directly to a microcontroller. All this happens on an embedded system. For this communication component, data from the health monitors will be transmitted through a Li-Fi connection with the aid of a high intensity LED. On receipt, a surface-mounted photodetector receives the signal and converts it into digital data that can be read in real time using a computer or an LCD

display by the diver or support team. Li-Fi works really well for underwater communication because radio signals just don't cut it down there. With Li-Fi, you get lightning-fast data transfer and barely any delay, plus it's safe from electromagnetic interference. Since the data keeps flowing, divers can quickly check on someone's medical status underwater and react right away. That's a huge advantage in these situations. In addition to this, it is waterproof, modular, meaning that it performs well even in extreme conditions underwater, as well as performs better with upgradation through additional sensors, if needed. It is an issue raised by the current safety reports coming from BSAC, which further emphasizes the reason why a health monitoring system is even a necessity at such an important level. The diving incidents that occurred between 2022-2024 are a tremendous number of 934, which comprises 248 health points in 2022, 355 in 2023, and 331 in 2024. Interestingly, almost all of these diving health points are associated with these health points being appropriate, the equipment check-up being normal, and the health diving points all in proper consideration but a real health point is a tremendous relief in terms of reduction in the health points associated with the Li-Fi networks. This would help the rescue team to immediately respond to the issue of health points that are readily available to them.

152.MULTI-CLASS IMAGE CLASSIFICATION USING FEATURE EXTRACTION AND OPTIMIZATION

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Advancements in digital devices such as mobile phones and cameras have led to a rapid increase in image data production and storage in the databases. With the growth of real-time data, there is a strong need for mechanisms that can analyse and make real-time decisions across various domains. These tasks require improved algorithms and methodologies for faster processing, analysis, and classification of images in real-time. To enhance classification accuracy and reduce time, a new method is proposed for multi-class image classification in large databases. The model extracts Histogram of oriented Gradients (HoG) and Bag of Visual Words (BoVW) features with the corresponding descriptors and optimized using Particle Swarm Optimization (PSO), and is evaluated using classification metrics. The results indicate that the extracted hybrid feature combination provides optimal performance, and optimization improves the interpretability of image representation. The developed model demonstrates superior performance compared to existing approaches, showing that a smaller percentage of optimally extracted features is sufficient to achieve stable results.

153.COMPUTING THE CRITICAL WAVE HEIGHT FROM THE EXPERIMENTS USING ARTIFICIAL NEURAL NETWORK ALONG THE NAGAPATTINAM COAST OF TAMIL NADU, INDIA

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Wave height is the most common parameter observed routinely for understanding the climate. However, critical wave height is very significant in pulling the physical oceanographers to evaluate the turbulence.
Measuring the height under natural conditions that too using altimeter in rough sea conditions is much complicated, expensive and erroneous. The time series data were trained under multi-layer approach. The preliminary data were obtained from the actual measurements and compared with satellite pass. Doing the model, there are multi-way, but on account of the merit ANN was utilized. The results are reflecting the importance of the critical wave heights in such a way without that no redistribution of sediments can take place in the littoral zone. The results (Ave. 1.085 m) critical wave height and (Ave. 1.1332m) wave heights which are

noticed to be in close fit to earlier observations and network trainings. In the present approach minimizes human-error.

154.MULTIBAND PATCH ANTENNA FOR 5G NR (NEW RADIO) BASE STATIONS AND SATELLITE COMMUNICATION SYSTEMS

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This study introduces a compact multiband microstrip patch antenna specifically designed for 5G NR base stations and satellite communication systems, offering enhanced frequency coverage and structural simplicity. The proposed antenna efficiently operates in three critical frequency bands, namely, 3.21–3.47, 4.73–6.35, and 6.73–8.29 GHz, supporting multiple wireless standards, including sub-6 GHz 5G, Wi-Fi 5/6, WiMAX, and C/X-band satellite links. Unlike conventional reconfigurable antennas that depend on active switching elements, this design achieves true multiband functionality without tunable components, ensuring mechanical stability, low cost, and improved reliability. The antenna employs a T-shaped microstrip geometry fabricated on an FR4 epoxy substrate, which was chosen for its optimal dielectric constant and affordability. Simulated using the high-frequency structure simulator (HFSS), the antenna exhibits strong impedance matching with a return loss below –10 dB across all resonant frequencies and consistent radiation characteristics suitable for both terrestrial and space-based applications. The novelty of this work lies in integrating broad frequency adaptability and a compact form factor within a single passive design, minimising complexity while maintaining high performance. This makes the proposed antenna a promising candidate for next-generation wireless communication and satellite systems that require compact, efficient, and multifunctional radiating solutions.

155.AI INTEGRATED HONEYPOT-BASED APPROACH FOR EARLY DECTECTION OF SUSPICIOUS NETWORK ACTIVITIES

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Cybersecurity threats have evolved with the rapid growth of the digital networks and the current state of them requires proactive protection mechanisms, which can detect malicious behaviors before they cause severe harm. This paper presents a complex honeypot-based system to detect suspicious network traffic at an early stage, a combination of the traditional intrusion monitoring system and the modern state of the art machine learning models. The system uses honeypots to generate and record potentially malicious action and forms an enriching dataset of normal and abnormal network behavior. This has to be preprocessed by feature extraction, normalization and dimensionality reduction in order to have an efficient model training. The predictive model combines three optimized learning models such as Gradient Boosting, Logistic Regression, and Random Forest, to categorize network events and improve the detection rates. Gradient Boosting is used to capture non-linear relationships that may not be simple and random forest offers strength as an ensemble learner whereas the logistic regression offers interpretability and baseline comparison. Experimental tests show that the hybrid model has a high accuracy, precision and recall, and is able to differentiate between law-abiding and suspicious traffic in real-time. In addition, honeypot intelligence can be used with ensemble-based prediction to increase threat visibility and response time, minimizing false positives and increasing resiliency of the overall network. This study can help to establish smart, adaptable, and explainable cybersecurity systems that can resist the changing threats in dynamic network scenarios

156.SMART REVIEW ON THE DEVELOPMENT OF MACHINE LEARNING BASED CROP YIELD PREDICTION MODEL

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Proper prediction of crop yield is a vital demand in attainment of sustainable agriculture, food security, and the data-driven decision-making in the contemporary farming systems. Conventional yield estimation methods with

statistical and empirical models, do not adequately and efficiently represent the complex and non-linear associations between the climatic factors, soil properties, crop management strategies and also the temporal variability. Recent progress in machine learning (ML) and deep learning (DL) has made it possible to create effective predictive models that can utilize large-scale and heterogeneous agricultural data. In this review, I will provide an overview of machine learning methods of crop yield prediction with a focus on the most popular algorithms, data, and model choices. The paper reviews the traditional ML algorithms, deep learning, and composite models systematically and puts a spotlight on the benefits, shortcomings, and the spheres of their application. In addition, the importance of precision agriculture technologies, including remote sensing, Internet of Things (IoT)-based sensing systems, and intelligent decision-support frameworks, is discussed in terms of making more accurate predictions and decision-making at the farm level. Critical issues in the context of data quality, model readability, scalability, and regional ability are also addressed. This review can prove useful insights to researchers and practitioners in the creation of reliable, scalable, and sustainable crop yield prediction systems by synthesizing the latest progress and identifying the gaps in research.

157.COMPARISON OF PROPAGATION CHARACTERISTICS OF CIRCULAR WAVEGUIDE LOADED WITH ARTIFICIAL MATERIAL FOR TE AND TM MODE

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This paper compares the propagation characteristics in terms of dispersion characteristics of TE and TM mode of circular waveguide loaded with artificial material in the form of metal vanes. The structure loaded with vanes have been electromagnetically analyzed and cut off wave numbers have been derived for azimuthally symmetric modes. The study reveals that optimization of the structure parameter controls the cut-off wave no. and tailors the dispersion characteristics. The simulation results indicate that the sensitivity of structure parameters on cut – off wave nos is more profound in case of TM mode as compared to TE mode. It has also been observed that variation in the cut-off wave no. does not flatten the dispersion curve thus providing mode separation. Hence vane loading supports mode rarefaction which affirms its practicality for high beam harmonic gyro-devices.

158.CAPACITIVE-COUPLED WIRELESS POWER TRANSFER SYSTEM FOR SMART EV CHARGING

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The rapid growth of electric vehicle (EV) adoption necessitates charging technologies that are efficient, robust, and safe under diverse operating and environmental conditions. Conventional conductive charging systems are prone to mechanical wear, exposure-related degradation, and user-dependent alignment constraints, prompting increased interest in wireless power transfer solutions. This paper proposes a capacitive-coupled wireless power transfer (CCWPT) system for smart EV charging, employing electric-field coupling between conductive plates to enable contactless energy delivery without magnetic components. An LCL/LCLC compensation network is designed to achieve resonant operation, thereby improving power transfer efficiency, system stability, and tolerance to air-gap variations. The proposed CCWPT architecture is modelled and validated using MATLAB/Simulink, demonstrating controlled and efficient bidirectional power flow between the grid and the EV battery. Simulation results indicate stable operation with reduced electromagnetic interference and low sensitivity to misalignment, achieving high efficiency across air gaps ranging from 10 to 20 cm. The findings confirm the technical feasibility of capacitive coupling for medium-power EV charging and provide a scalable framework for future smart charging applications, including dynamic charging and vehicle-to-grid (V2G) integration.

159.ASSESSMENT OF STRUCTURAL CONCRETE PROPERTIES USING GROUND GRANULATED BLAST FURNACE SLAG FOR SUSTAINABLE CONSTRUCTION

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The construction industry is one of the largest consumers of concrete, resulting in substantial cement production and associated environmental impacts, particularly in terms of greenhouse gas emissions and resource depletion. In response to growing sustainability concerns, the use of supplementary cementitious materials as partial replacements for ordinary Portland cement has gained considerable attention. Ground Granulated Blast Furnace Slag (GGBS), an industrial by-product generated during iron and steel manufacturing, has been widely recognized for its potential to enhance concrete performance while reducing environmental burdens. In this study, the influence of GGBS as a partial replacement of cement on the fresh and hardened properties of M25 grade concrete is investigated. Particular emphasis is placed on the evaluation of compressive strength to assess the structural performance of concrete mixtures containing varying proportions of GGBS.

160.REAL-TIME MONOCULAR DEPTH ESTIMATION FOR ENHANCED SPATIO-TEMPORAL SURVEILLANCE AND ANOMALY DETECTION

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Accurate land cover mapping from satellite imagery is key to good environmental monitoring, urban planning, and sustainable resource management. This research presents an AI driven satellite image analysis system for land cover classification at pixel level using a deep learning methodology of semantic segmentation. High-resolution RGB satellite images are obtained from DeepGlobe Land Cover Classification Dataset and systematic preprocessing methods and data augmentation techniques are performed to the data to boost generalization

capacity of the models. A U-Net convolutional neural network is used in the process of dividing satellite images into several land-cover types: urban areas, agriculture, forest, water bodies, barren land, grassland and unknown area. The proposed framework is evaluated using the standard segmentation performance metrics Intersection over Union (IoU), F1-score and pixel accuracy. Visual comparisons between predicted segmentation maps and ground truth labels again proves the efficacy of the model. Experimental results show that the proposed approach brings reliable segmentation results, demonstrating the possibility of its application in the field of automated environmental monitoring and geospatial big analysis.

161.A STUDY ON ALKALI ACTIVATION OF GGBS FOR STABILIZATION OF BLACK COTTON SOIL

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Black cotton soil (Expansive Soil) is problematic for any Construction purposes because of its Shrinkage & Swelling characteristics. Many stabilizers and Techniques have been used to stabilize expansive soils to make it suitable for using in construction. The selection of suitable methods to address the problems caused by expansive soils is crucial, as it affects not only the soil's engineering properties but also environmental and economic factors. The purpose of this article is to review the effect of Alkali activation on GGBS (Ground Granulated Blast furnace slag) stabilized black cotton soil by studying the various articles based on soil stabilization from last 10 to 15 years. Also, the study is aiming to study the effect of Alkali activation with molarities of sodium hydroxide (NaOH) and stabilization using percentages of GGBS on geotechnical properties and characteristics of Black cotton soil.

162.AN INTEGRATED METADATA ARCHITECTURE FOR SEARCHABLE AND SECURE DISTRIBUTED FILE SYSTEMS

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The rapid growth of scientific data has increased the need for efficient search and secure metadata management in distributed file systems (DFS). Existing DFS architectures primarily focus on scalability and reliability, often treating metadata as an auxiliary service with limited support for expressive search, contextual analytics, and fine-grained security. This paper presents TagIt++, an integrated metadata architecture that embeds indexing, tagging, and computation services directly within the DFS control path to enable searchable and secure data access at scale. The proposed framework unifies user-defined metadata tagging, distributed sharded indexing, and server-side active operators, ensuring consistent and low-latency metadata operations. To reduce data movement and enhance security, TagIt++ supports policy-aware metadata handling and secure, containerized execution of metadata-driven computations on storage nodes. The architecture is designed for federated environments, enabling secure cross-cluster metadata synchronization and global search across geographically distributed file systems. Experimental evaluation demonstrates that TagIt++ achieves up to an order-of-magnitude improvement in metadata query and in-situ analytics performance compared to traditional external

indexing approaches, while introducing minimal overhead. By tightly integrating search, security, and computation within the core storage stack, TagIt++ provides a scalable and extensible foundation for next-generation distributed file systems.

163.DEVELOPMENT OF A MACHINE LEARNING-BASED CROP YIELD PREDICTION MODEL

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Accurate forecasting of crop is important to ensure that there is food security, that agricultural resources are optimized and also assist the political and farmer in their decision making. This paper is a proposal of a model that would be used to predict crop performance using past agricultural records, climatic trends and soil properties on the basis of automatic learning. The model exploits monitored learning protocols, such as linear regression, random forest and gradient boosting to examine intricate and non-linear correlations amidst entry traits and crop yielding. The performance of the model is improved by a lot of preprocessing operations, and special approaches are applied to address any issues with the result-based data.

164.SEMANTIC CHUNKING AND GRAPH-BASED RETRIEVAL: A SURVEY OF MODERN TECHNIQUES IN RAG SYSTEMS

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Voice assistants have become one of the most prominent applications of conversational AI, offering a natural and efficient way for humans to interact with machines. A key factor behind their effectiveness is the ability to retrieve relevant information quickly, especially when dealing with large and unstructured knowledge bases. This paper explores existing retrieval strategies, focusing on text chunking methods and the use of Hierarchical Navigable Small World (HNSW) graphs for approximate nearest neighbor (ANN) search. Various chunking techniques and ANN-based indexing approaches are analyzed and compared in terms of scalability, accuracy, and latency. The study also discusses emerging trends, strengths, and limitations of current retrieval systems, highlighting ongoing challenges. Our findings suggest that integrating chunking with HNSW offers a powerful framework for enhancing retrieval efficiency in voice assistants, paving the way for more responsive, scalable, and context-aware conversational AI systems.

165.NATURAL LANGUAGE TO SQL: A SAFE AND EFFICIENT ARCHITECTURE USING FLAN-T5

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Ensuring broad accessibility to data continues to be a central obstacle for contemporary information architectures. Although Natural Language Interfaces to Databases (NLIDB) offer a potential solution to the disconnect between non-expert users and structured data repositories, existing generative ap- proaches grapple with a significant lack of user confidence. This is largely due to the ”black box” nature of these models and the potential for generating harmful, hallucinated queries. While recent Multi-Agent Collaborative (MAC) systems have achieved higher accuracy, they frequently incur substantial latency and computational costs. This study presents a consolidated frame- work built upon the instruction-tuned FLAN-T5 model, tailored specifically for precise instruction adherence and rapid inference. We introduce a three-tiered structure that integrates Question-Decomposition for intent clarification, bidirectional SQL-to-text translation for transparency, and a deterministic risk evaluation engine to ensure transactional security. In contrast to multi-agent architectures that depend on recursive loops, our method employs a streamlined single-pass encoder-decoder design to harmonize high performance with real-time speed. Evaluation on the Spider benchmark reveals a practical execution accuracy of 68.4% while maintaining 100% efficacy in preventing destructive actions via our novel “Blast Radius” rollback protocol. This research offers a viable blueprint for secure, interpretable neural data interaction within enterprise settings.

166.AI/ML BASED CROP RECOMMENDATION MODEL

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This paper will concentrate on creating a model based on machine learning to make an accurate prediction of the yield of crop based on the agricultural and environmental data. The model that has been proposed combines parameters, which include soil characters, weather, and the type of crop that will be used to improve the precision of observation. Different algorithms are compared to find out the most efficient method of yield estimation. The model is meant to guide farmers and policymakers in making decisions that achieve be er agricultural production. The findings of the experiment indicate that the machine learning method provides valid and evidence-based information toward sustainable agriculture.

167.DEEP LEARNING-BASED CLASSIFICATION FOR REGION-SPECIFIC ANALYSIS OF LUNG CT SCANS

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This paper presents a deep learning-based approach for region-specific classification of lung CT scans, aiming to improve diagnostic accuracy in the detection of various pulmonary diseases. The methodology leverages a multi-level neural network architecture to identify and classify distinct regions within the CT images, enhancing the precision of disease localization. A region-based analysis is performed by segmenting the lung CT scans into specific regions of interest (ROI), which are subsequently fed into the neural network model. Experiments were conducted using publicly available lung CT scan datasets, and the results demonstrate that the proposed method outperforms conventional image classification techniques in terms of both accuracy and sensitivity. The approach shows potential for clinical applications, including early detection of lung cancer and other pulmonary conditions.

168.AI-DRIVEN CATTLE BREED IDENTIFICATION AND LIVESTOCK MONITORING FOR THE INDIAN AGRICULTURAL ECOSYSTEM

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In India, there are almost fifty known kinds of cattle and buffaloes with each having unique genetic makeup, production rate as well as disease resistance. The correct identification of such breeds will help in enhancing national breeding programs, better planning of diets, and enhancing disease surveillance systems. However, the part of identification is being done manually with Field Level Workers (FLWs) who are used to identify the livestock and this may lead to misclassification, inconsistency of livestock databases. The breed identification system that this paper proposes based on AI-based methods and uses Deep Learning (DL) algorithms including Convolutional Neural Networks (CNNs) to identify the type of cattle and buffalo breeds on-the-fly on an image data set. The system is integrated with the Bharat Pashudhan App that will help the FLWs in the field to increase the accuracy of the data and decrease human dependency. The suggested model uses a developed image preprocessing, normalization, and augmentation algorithm to address the risk factors of overlapping visual characteristics and low diversity of the dataset. The CNN architecture based on ResNet is created and tested based on the main performance indicators such as accuracy and precision as well as recall and F1-score. The proscribed system is scalable as it allows one to extend to other livestock species like goats and sheep or other applications such as detecting diseases, predicting milk production, and tracking animals. This framework serves the same purposes as the Digital India Mission by digitalizing the identification of breeds and helping facilitate data-driven livestock management and thus becomes a part of building a standardized, intelligent, and sustainable livestock ecosystem in this country.

169.AI-POWERED MULTI-MODEL AUTISM SPECTRUM DISORDER SCREENING SYSTEM: INTEGRATING QUESTIONNAIRE-BASED ASSESSMENT WITH BEHAVIOURAL VIDEO ANALYSIS

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Early Identification of Autism Spectrum Disorder (ASD) plays a vital role in enabling early intervention and achieving better developmental outcomes. Conventional screening approaches primarily depend on questionnaire-based evaluations, which may overlook important behavioural indicators that can be captured through visual observation. This study proposes an innovative multi-modal, AI-driven screening framework that combines age-specific questionnaires—comprising 40 questions for each age group, including toddlers, children, adolescents, and adults—with computer vision-based analysis of behavioural patterns extracted from images and videos. By integrating both subjective and visual data, the proposed system aims to improve the accuracy and reliability of ASD screening.

170.MU-MIMO 5G&6G WIRELESS COMMUNICATION: PERFORMANCE EVALUATION OF 16-QAM OFDM TRANSMISSION OVER THZ CHANNEL FOR 6G SYSTEMS WITH MASSIVE MIMO BEAMFORMING

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Due to increasing need of internet leads to shortage of channel information rate. To overcome this limitation Massive multiple input multiple output Technology is used to increase spectral efficiency &channel capacity. The increasing demand for high-capacity wireless communication networks has motivated research into intelligent reflecting surface (IRS)-assisted systems. The main objective is to maximize radar sensing energy while maintaining reliable communication performance. The study introduces a joint beamformer structure that simplifies the design by integrating communication precoders with sensing beamformers. that Joint Optimization of beam selection and digital beamforming for a millimeter wave ISAC system to simultaneously improve the performance of communication and sensing. This paper proposed a hybrid beamforming scheme based on deep learning by maximizing sum rate. This Paper proposed that a high-speed and programmable mm Wave testbed with multi-user (MU) multiple-input multiple output (MIMO) beamforming capability by using general purpose processor in which each RF chain is connected to one phased array antenna. Through testbed implementation it allows machine learning models to access their performance in various real-life conditions. Terahertz communication plays a crucial role in 6G wireless communication network. In wireless Communication Terahertz is important due to its more data rate which is used in ultra-wide applications. This Paper proposed analysis of OFDM (orthogonal frequency division multiplexing system applying 16 QAM modulation Method. It is MATLAB Based simulation considering molecular and absorption losses & other losses over tera hertz channel. To compensate the other losses 512 *512 massive MIMO beamforming model is implemented. The output results show the received constellation output, BER Performance As a function of (S/N) ratio. It evaluates channel character eristics with parameter such as distance, frequency, spreading loss, Molecular Loss & total path loss

171.A SURVEY ON COMPUTER VISION AND DEEP LEARNING: FUNDAMENTALS, APPLICATIONS, SOCIETAL CHALLENGES, AND FUTURE PERSPECTIVES

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Computer Vision (CV) and Deep Learning (DL) have become very important basic technologies that enable the machine to interpret and understand the visual data. Their rapid improvement has resulted in various applications like face recognition, autonomous vehicles, medical imaging, surveillance, and content generation. Though the same technologies have also enabled the creation of synthetic media, deepfake videos, which cause serious ethical, social, and security concerns. The primary applications of computer vision and deep learning are examined in this review, along with a detailed explanation of their underlying principles and a critical analysis of their shortcomings and negative social impacts. The paper aims to provide foundational knowledge essential for understanding emerging challenges, such as real-time deepfake detection.

172.ANALYSIS OF ALCOHOL DETECTION AND ENGINE LOCKING SYSTEM WITH GPS TRACKING SYSTEM THROUGH MOBILE APPLICATION

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The aim of this paper is to analyze the influence of internal factors on road accidents. This paper proposes a smart vehicle safety system using the integration alcohol detection, engine locking, GPS tracking, and mobile app notifications through web APIs. It contains an MQ-3 alcohol sensor for detecting the level of alcohol in the driver's breath. If it is above a certain threshold, the NodeMCU (ESP8266/ESP32) processes the data, initiates an engine locking mechanism, and uploads the location of the vehicle via the GPS module to a cloud server using a web API. A mobile application retrieves the data in real-time and displays the vehicle's location on Google Maps, while also sending push notifications. This approach eliminates the need for GSM connectivity, utilizes Wi-Fi/IoT connectivity, and offers a scalable, cost-effective road safety solution.

173.QUESTION PAPER GENERATION AND DISTRIBUTION SYSTEM (QPDS) USING GENERATIVE AI

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high standards of confidentiality, accuracy, and promptness is a must in examination systems in the learning institutions. Nevertheless, the current situation of question-paper preparation and delivery to most of the institutions is marked by manual or semi-digitized methods like hard copy documents, electronic mail communication, as well as informal communication channels. These processes present serious issues such as question-paper leakage, lack of traceability, slow approval process and overreliance on the human factor in coordinating examination processes that undermine integrity of the system To address these issues, the current work suggests a Question Paper Generation and Distribution System (QPDS), a system that incorporates Generative Artificial Intelligence (GenAI) into a secure and role-based digital workflow. The suggested system digitalizes the whole life cycle including question-paper development, routing, endorsing and storing, while enforcing strict access control and management. Generative AI is implemented as an academic support tool, assisting faculty at the drafting stage without replacing human judgment and institutional control

The system directly responds to flaws in current examination workflows through removal of informal communication channels, role-based access enforcement, audit logging, and locking approved content against unauthorized changes. The resultant platform is secure, efficient, and scalable, improving confidentiality, reducing faculty workload, and strengthening examination governance

174.DATA DRIVEN HOSPITALITY FRAMEWORK FOR TRANSPARENT BOOKING ABANDONMENT PREDICTION

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The hospitality industry is plagued by booking abandonment, which results in substantial revenue loss and resource utilization. Why is this happening? As online booking platforms have become more prevalent, understanding customer behavior and predicting abandonment events has become increasingly important. The paper presents a datadriven hospitality model for transparent booking abandonment prediction that prioritizes data quality, interpretability, and actionable insights. This is the main focus of the paper. The framework incorporates booking records, customer behavior data, pricing information, and temporal factors to construct.Keywords:Hospitality, customer,optimize, abondment

175.FINGERPRINT BIOMETRICS FOR BLOOD GROUP DETECTION: A COMPREHENSIVE LITERATURE REVIEW

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Fingerprint-based blood group prediction offers an non-invasive biometric solution to conventional serological techniques. This survey covers recent research works applying image preprocessing techniques such as histogram equalization, Gaussian filtering, Otsu binarization, and minutiae extraction and subsequently developed using machine learning models like KNN, SVM, and MDSVM as well as deep learning models like

Convolutional Neural Networks (CNNs), ResNet-50, VGG, MobileNet, and hybrid models. The accuracies reported vary considerably from close to 60% up to 95%, depending on dataset size, image quality, and class imbalance. Significant contributions include proof-of-concept systems, hybrid ML-DL approaches, and healthcare-oriented applications such as donor matching and real-time mobile platforms. However, challenges persist, including small and unbalanced datasets, sensitivity to fingerprint quality and sensor variations, lack of biological validation, and limited clinical trials across diverse populations. This paper highlights the scope of non-invasive biometrics for blood group detection and outlines future directions including dataset expansion, model generalization, multimodal fusion, and explainable AI.

176. A MACHINE LEARNING-BASED SYSTEM FOR DAILY POWER CONSUMPTION AND BILLING PREDICTION

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In this project, we developed a machine learn- ing–based system to predict daily electricity consumption and estimate the monthly electricity bill. Accurate forecasting of power usage is important for efficient energy management and cost planning; however, conventional electricity billing systems provide consumption details only after usage. To overcome this limitation, the proposed system uses weather data, appliance usage information, and electricity tariff slabs to generate daily energy consumption and billing estimates.A Gradient Boosting Regression model was implemented to learn the relationship between electricity consumption and factors such as weather conditions and appliance usage patterns. The model was trained and evaluated using a prepared dataset and achieved an R^2 score of approximately 0.88, indicating good prediction accuracy. Its performance was also compared with basic regression models, where the proposed model showed improved results.A web- based application was developed that allows users to input appliance usage details and view predicted energy consumption, estimated billing amounts, and usage trends through visual charts. This helps users better understand their electricity con- sumption patterns. Overall, this project highlights the practical implementation of machine learning for electricity monitoring and billing estimation.

177.A SOLAR-ASSISTED WATER PUMPING SYSTEM USING A COMPACT MULTI-LEVEL INVERTER

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The growing demand to possess sustainable and effective water pumping systems in distant and agricultural regions has increased the process of utilizing solar photovoltaic (PV) based systems. The design and analysis of solar powered water pumping system are presented in this paper with the help of a multilevel inverter (MLI) to enhance the quality and efficiency of the system. This multilevel inverter topology produces a significantly superior quality of output voltage and, therefore, is much superior to the traditional two-level inverters, which produce a staircase waveform with less overall harmonic distortion (THD). An LC filter is also provided at the inverter output to further minimize harmonics and improve the performance of the motor. The multilevel structure provides reduced voltage load on power switches, reduced switching losses and improved electromagnetic compatibility. The system does not require battery storage, and therefore it has less maintenance and overall cost, but has good daytime running. The simulation studies imply the use of MATLAB/Simulink, which identifies the performance of the system. The results suggested that the evolved solar-powered pumping system of water can operate effectively with regard to energy conversion, motor stability, and the magnitude of THD within the IEEE suggested thresholds. The quality of the voltage achieved contributes to the reduction of heating in the motors and the life span increment of the pump. This proposed system can best be deployed in cases where the rural irrigation and standalone water supply must be installed because it is a modular design, very efficient and will not harm the environment.

178. AN INTELLIGENT AND ROBUST ISOLATION FOREST-BASED FRAMEWORK FOR DETECTING CLOUD API ABUSE AND UNAUTHORISED ACCESS

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Cloud practice Programming Interfaces (APIs), which still represent a significant attack top for enterprise facts, help connect modern virtual environments together. The classic margin defence mechanism, similar to the Web Use Firewalls (WAFs), often fails to find sophisticated logic-based attacks prefer Broken Object Level Authorization (BOLA) and mass jobs due to these attacks clinging to legitimate protocol syntax [1]. The present parchment provides a comprehensive analysis of contemporary methods to prevent API misuse and unauthorised entry. We evaluate architecture Defence mechanisms benchmarks, including Zero Faith Architecture (ZTA) and NIST SP 800-204, Modern Authentication Protocols (OAuth 2.1, mTLS), and the development of machine learning-based methods for detection [2]. By analysing the 2024 period.2025 menace scenario incorporating the OWASP API security peak 10vulnerabilities, we synthesize 30 industry and intellectual beginnings to draw up a comprehensive defence plan [3] [4]. We introduce a new appraisal system that compares the abovementioned procedures in three critical dimensions: detection accuracy (F1-score 0.94), computational operating expenditure (27ms rotational latency), and operation complexity [5]. This occupation demonstrates that productive API protection requires convergence between stringent architectural standards, cryptographic protocols, and adaptive behavioural inspection systems prefer Isolation Forest [6]. Moreover, we integrate recent advances in graph nervous networks and transformer architecture to improve the detection of complex multi-step attack sequences [7] [8].

179.AI/ML ENABLED CROP PRICE FORECASTING: A TOOL FOR SMART AND SUSTAINABLE AGRICULTURE

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A new hybrid model involving Transformer Long Short-Term Memory (LSTM) is introduced, which integrates real-time satellite outputs with Normalized Difference Vegetable Index (NDVI) of onions and the past weather forecasting of six major cities in India to forecast surges in onion prices. We use a 10 year in-daily price data set, four models are trained and tested (AutoRegressive Integrated Moving Average (ARIMA), Random Forest, LSTM, and our new Transformer-LSTM) on a time series split (70/15/15). Mean Absolute Error (MAE) of 1.23 INR/Kg and Mean Absolute Percentage Error (MAPE) of 8.7% is 15 percent lower than the optimal baseline (LSTM). The NDVI abnormalities two weeks ago according to feature-importance analysis using SHapley Additive exPlanations (SHAP) are the strongest predictors of price spikes. We discuss the working one-week lead time of the model to act in the market as well as limitations about lack of data in arid district regions and give some future developments to incorporate social-media sentiment and trade flows of the commodity.

180.GIGEXPRESS: A TRUST-BASED PLATFORM TO FORMALIZE INDIA'S EVENT GIG ECONOMY

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The Indian event management sector, a fast-growing industry, depends largely upon a huge, informal gig labour pool. This informal network is dominated by high levels of ineffi-ciencies and inequalities, such as payment insecurity, absence of confidence and safety, and constrained career development for workers. Event managers are subject to staff unreliability, pro-ficiency gaps, and high operational costs. This paper introduces GigExpress, a trust platform that is digital-based and aimed at solving these two-sided problems. The platform institutionalizes the informal labor force by incorporating an escrow payment system that is secure, identity verification, and a multi-faceted reputation system with skill badges and reliability ratings. By building a transparent, secure, and accountable marketplace, GigExpress seeks to close the gap between event organizers

and a verified talent pool of skilled gig workers, thus improving operational efficiency for organizers and offering decent work opportunities for India's growing youth workforce.

181.A COMPREHENSIVE REVIEW ON IOT AND AI APPLICATIONS IN BETEL LEAF DISEASE DETECTION AND PRECISION FARMING

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The urgent global demand for food security, climate-adaptive agriculture, and efficient resource utilization has significantly driven the advancement of smart farming technologies. Among these, the convergence of the Internet of Things (IoT), computer vision, and artificial intelligence (AI) is transforming traditional practices by enabling continuous crop surveillance, early-stage disease detection, and data-informed decision-making processes. While substantial progress has been made in applying these innovations to staple food crops, their implementation in high-value but underrepresented crops such as Piper betle (betel leaf) remains limited. Despite its economic relevance and cultural significance in South and Southeast Asia, betel cultivation is still heavily reliant on manual observation and is vulnerable to environmental stressors and foliar infections. This review consolidates current developments in IoT-based agricultural monitoring, machine vision techniques for plant pathology, and deep learning applications, with a special focus on adapting these tools for specialty crops like betel leaf. The review also highlights technological gaps and research priorities to support the development of intelligent, scalable, and sustainable systems for niche agricultural sectors..

182.DESIGN OF INDUSTRIAL AUTOMATED IOT CONVERTER FIRMWARE USING STM32F401 AND ESP8266

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For contemporary industrial automation and Internet of Things applications, remote communication is essential. In order to enable UART-to-TCP/IP data conversion for remote industrial control, this paper describes the design of a flexible embedded communication system using the STM32F401 microcontroller interfaced with PUSR TCP232 module (used for testing) and ESP8266 Wi-Fi module (primary implementation). The PUSR TCP232 and ESP8266 modules were chosen for scalable industrial deployments because of their excellent cost-effectiveness and extensive multi-protocol support, which includes TCP/IP, MQTT, UDP, and HTTP. To guarantee accurate UART timing and system stability, LTSpice simulations validate 4 MHz, 8 MHz, and 16 MHz crystal oscillators. Hardware design comprises KiCad schematics and PCB layouts optimized for signal integrity. The STM32CubeIDE firmware architecture uses strong UART communication layers with error handling and buffering to enable real-time peripheral control (LEDs, sensors, actuators). This design offers a low-cost, modular industrial automation framework that facilitates smooth transitions between production deployment and development testing across various networking protocols and environments

183.AN OPTIMIZED POST-QUANTUM ATTRIBUTE-BASED ENCRYPTION FRAMEWORK FOR CLOUD COMPUTING

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Attribute-based encryption (ABE) has been considered critical in the provision of data privacy in cloud computing setups, as a means to store and share data safely. But with the introduction of quantum processors, the safety of existing cryptographic methods is severely in question because it may allow discrete logarithms to be computed and large integers to be factored easily. To deal with this, an original post-quantum attribute based encryption scheme with the rank metric code is suggested in this paper. In contrast to the former schemes, our scheme takes care of the major issues like verifiability, privacy of their users, and revocability. Our scheme is resistant to plaintext attacks in the chosen model by using low-rank parity-check codes, and is resistant to reaction attacks, including chosen ciphertext attacks. Also, the scheme incorporates Elliptic Curve Cryptography (ECC) to ensure better security and efficiency and Advanced Encryption Standard (AES) to ensure data confidentiality. New attack vectors are also taken into consideration in the system, where an attacker is able to exploit the file search features and log out to complicate the security analysis. This assures integrity of secure file sharing and access process in cloud.

184.AI-POWERED ADAPTIVE FREQUENCY ANTENNA FOR SEAMLESS WIRELESS COMMUNICATION

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This paper presents the design and implementation of an AI-powered adaptive antenna selection system aimed at ensuring reliable wireless connectivity in dynamically changing environments. The system integrates a machine learning-based decision engine with a 4×1 RF relay module and a Software Defined Radio (USRP NI-2901) to enable real-time switching among three custom-designed microstrip patch antennas operating at 2.4 GHz, 3.7 GHz, and 5.5 GHz. A Raspberry Pi 4 is used to extract and process real-time signal features such as Received Signal Strength Indicator (RSSI), Signal-to-Noise Ratio (SNR), spectral entropy, and latency. A trained model then selects the most suitable antenna based on current channel conditions. This architecture achieves low-latency, high-quality reception across diverse geographical and spectral environments, making it especially effective for mission-critical applications such as autonomous vehicles and remote sensing systems. Unlike traditional frequency selection approaches, this system leverages reinforcement learning for efficient band reconfiguration without requiring complex hardware reconfiguration or wideband antenna structures. The proposed solution supports seamless frequency adaptability and robust communication, paving the way for scalable deployment in IoT, vehicular networks, smart cities, and 5G-enabled systems

185.AN IOT-ENABLED DEEP LEARNING FRAMEWORK FOR REAL-TIME POLYP DETECTION AND SEGMENTATION IN GASTROINTESTINAL ENDOSCOPY

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Accurate and real-time detection of gastrointestinal abnormalities is essential for early diagnosis and improved clinical outcomes. However, endoscopic video analysis is challenged by illumination variations, motion artifacts, complex tissue textures, and limited annotated data. This paper proposes an IoT-enabled deep learning framework that integrates ESP32-S3 based image acquisition, cloud-based inference, and Raspberry Pi visualization for real-time polyp detection and segmentation. The proposed model employs a convolutional neural network with multi-scale feature fusion and pixel-wise segmentation capability. Performance is evaluated using Dice, IoU, Precision, and Recall metrics, achieving values of 0.91, 0.85, 0.93, and 0.90 respectively. Training accuracy and loss curves demonstrate stable convergence and efficient learning behavior. The results confirm that the proposed system provides robust, accurate, and computationally efficient performance, making it suitable for real-time computer-aided diagnosis in colonoscopy applications.

186.ETHICS OF SUSTAINABILITY IN MARITIME CULTURE

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The maritime industry is at a turning point. Technological advancements alone will not meet the existential crises of environmental degradation and cultural change. This article assesses the philosophical basis of ethical sustainability in maritime culture, beyond mere instrumental frameworks, to identify axiologically and virtuously based dimensions that should define maritime practices. The paper draws upon environmental philosophy — specifically the opposition between intrinsic and instrumental value — and the professional virtue ethics of maritime stewardship, to examine how the maritime culture can experience significant moral transformation. The paper argues that sustainable shipping needs more than just compliance with regulations, but a complete redefinition of values, so that the maritime community accepts its function as custodian of the oceanic ecosystems and as responsible for intergenerational accountability. The paper proposes a framework for maritime sustainability that identifies moral character, ecological stewardship and an ethical culture, as opposed to merely technological answers. This approach defines maritime professionals as moral actors whose excellence as professionals is directly linked to the protection of the environment and their social responsibilities. Finally, the paper outlines pathways toward developing an authentically ethical maritime culture — a culture of sustainability that arises not from force but from cultivated virtues, shared values and a strong commitment to protecting the seas for future generations.

187.BLENDED MACHINE LEARNING-BASED MULTI-LAYER SYSTEM FOR IDENTIFYING CREDIT CARD ANOMALIES AND FRAUD

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Digital Payment systems have exploded exponentially, Investing Digital Payment Systems is Driving Credit Cards fraud to be a recurrent issue for consumers and financial services. The number of Transactions processed using downloadable Payment Systems is increasing daily. The original fraud detection systems will struggle to keep up with the increased number of transactions. They only use static rules and or single Machine Learning Algorithms. The existing Machine Learning Algorithms cannot effectively handle heavily imbalanced data and create a great many false positives, as well as they cannot keep pace with changing fraud patterns, including new, previously unseen fraud patterns. Because of this, a more adaptive and intelligent fraud detection framework is clearly required.This project proposes a hybrid, Multi-Level Machine Learning framework for identifying Credit Card anomalies and Fraudulent transactions using both Unsupervised and Supervised Learning. This will enhance both accuracy and robustness in Fraud Detection. A multi-layer modeling approach, by employing multiple algorithms (Isolation Forests, Random Forests and Neural Networks), provides a twofold effect: Greater adaptability and scale to address Real World Implementation. Empirical evidence suggests that using this method to identify fraudulent transactions provides the added benefit of reducing false positives, thus providing a more reliable/effective method for securing Digital Financial Transactions than the traditional single-model approach. This proposed framework is intended for easy implementation in that can be deployed effectively using either batch or real-time processing environments. This will also allow for the easy integration of existing financial systems and provide for the ability to update the model continuously as transaction information comes in.

188.LAWMITRA: AN AI-POWERED MULTILINGUAL LEGAL ASSISTANCE FOR INDIAN LAW

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In India, the majority of citizens fail to access accurate legal information because of the lack of simplicity in terminology due to language barriers; many citizens can not afford to hire a lawyer for advice. We introduce LawMitra, an AI-backed multilingual legal assistant that democratizes access to the law using Retrieval-Augmented Generation (RAG), Large Language Models (LLMs) and intelligent document processing. LawMitra AI Platform, built by Pravaha, a smart legal assistance platform that efficiently answers legal queries from the Indian Legal System in natural language, assists users to understand their complex agreements and provides a response output in various vernacular languages. Vector search using Qdrant, orchestration with FastAPI, and the generative model Gemini/OpenAI are seamlessly integrated into our overall system architecture. A holistic assessment reveals 38% relative improvement of RAG enhanced responses over stand-alone LLM methods, showing consistent strong leads in statutory interpretation (91%) and penal code queries (89 Field tested by actual users and in the finetuned development process), LawMitra is proving to work effectively for closing the justice gap through making legal information both accessible & understandable & equally actionable for common man.

189.FROM STATIC PDFS TO INTERACTIVE KNOWLEDGE: A CONVERSATIONAL LLM-BASED APPROACH

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The continued rise in the amount of text data coming in intelligent systems with the ability to interpret, summarize, and document interact even more important. This paper presents a new framework that utilizes cutting-edge technologies such as Gemini, Generative AI (GenAI), Langchain, and vector space models for natural language question-answering and summarizing PDF documents. Through the means of contextual understanding and intelligent dialogues, the project aspires to turn static PDFs into dynamic knowledge sources that are queryable. The merger of semantic embeddings, vector databases, and LLM-based pipelines offers an experience of analysis of documents that is completely interactive and without any interruption. The findings prove the provision of correct and context-aware answers. Summarization makes a key step toward intelligent document management and information retrieval.

190.INVOSURE: SMART GST INVOICE VERIFICATION SYSTEM

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The paper suggests InvoSure, a GST Invoice Verification System, which is AI-driven and is aimed at dealing with the major issue of Invoice Frauds in the India Goods and Services Tax (GST) ecosystem. The current system of manual verification process is work intensive as it needs more than 15 to 20 minutes of time per invoice with a high error rate leading to a very high annual loss of revenue estimated to be 1.5 lakh crore. We use our architecture to apply the Groq Inference Engine to run the task in AI with high-speed inference capabilities. They consist of field detection, high- precision text extraction (EasyOCR), and a LLM to structure the data in a standard form across different invoice for-mats. Real time verification is implemented by incorporating into the official GST portal through web-scraping technique of retrieving official information. We had a fraud detection system that was based on a Groq-accelerated machine learning model that scanned synthetic identities. Thus, our solution would considerably reduce the verification time to less than 10 seconds per invoice and improve accuracy, safeguarding financial data and supporting the objective of the state of India of 100% e-invoices.

191.SPOTHOLE: A SMART VISION SYSTEM FOR REAL-TIME POTHOLE DETECTION

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Potholes are a major cause of vehicle damage, traffic disruptions, and road accidents.Conventional detection approaches rely heavily on manual inspection, making them slow, labor-intensive, and inefficient for large road networks. This paper presents SpotHole, an automated vision-based system for real-time pothole detection using advanced deep learning models. The proposed system utilizes the YOLO family of object detection algorithms, including YOLOv4, YOLOv4-tiny, YOLOv5s, and YOLOv8, to evaluate accuracy, speed, and real-time feasibility. A dataset of 600 annotated road images is used for training, validation, and testing. YOLOv8 demonstrates superior performance due to its optimized architecture, multi-scale feature extraction, and high inference speed. The final system includes real-time detection, alert generation, and reporting capabilities. This

work provides a scalable, fast, and reliable solution for road maintenance authorities to detect and address potholes proactively.

192.BALANCING TRANSPARENCY AND PRIVACY WITH EXPLAINABLE AI AND FREDERATED LEARNING IN FRAUD DETECTION

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The increase in the number of digital financial transactions has increased the necessity of using effective fraud detection systems that will deliver high performance besides being user-friendly in terms of privacy. This paper presents a new paradigm integrating Explainable AI (XAI) and Federated Learning to find the right balance between accuracy, privacy and model interpretability. The work discusses how machine learning algorithms, such as Decision Trees and Random Forests, XG Boost and Gradient Boosting, can be applied in a Federated Learning platform to support the decentralized and safe processing of data. The behavior of the available models like Deep Neural Networks (DNN), Recurrent Neural Networks (RNN), and Stochastic Gradient Descent (SGD) is also compared as the benchmark. As the experimental analysis carried out with the help of the Paysim1 data proves, all the suggested models (Random Forest, XGBoost, and Gradient Boosting) are much more efficient than the current ones in terms of detection rates. Random Forest and XGBoost were also the most accurate at 99.2 and 98.8 respectively. Decision Trees although a little lower with 99.0, were doing well. The results highlight the possibility of integrating sophisticated models and Federated Learning to improve fraud detection systems without compromising the privacy of the users. The paper ends by providing suggestions that can be used to conduct future research to help maximize the efficiency of the model and privacy protection features in secure fraud detection.

193. ADAPTIVE ROADWAY TRAFFIC SIGNAL CONTROL

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Ineffective fixed-time traffic signals aggravate urban traffic congestion, which results in substantial financial losses, longer travel times, and environmental contamination. An intelligent Adaptive Traffic Signal Control (ATSC) system that uses deep learning to address these problems is presented in this paper. The system combines a Deep Q-Network (DQN) agent for autonomous, optimal decision-making with the YOLOv8 object detection model for real-time, vision-based vehicle sensing. Using the TraCI API to enable a closedloop communication between the state detection module and the reinforcement learning agent, the entire framework is created and tested in the highfidelity SUMO (Simulation of Urban Mobility) environment. Minimising important congestion metrics, such as average vehicle waiting time and queue length, is the main goal. Under a variety of simulated traffic densities, such as unsaturated, saturated, and oversaturated conditions, the DQNbased controller's performance is rigorously compared to that of a conventional fixed-cycle traffic signal controller. When compared to traditional approaches, the system does show a notable decrease in waiting times and traffic, demonstrating the potential of combining deep reinforcement learning and computer vision to build more intelligent, responsive urban infrastructure.

194.AI-DRIVEN HEALTHCARE: FACIAL EXPRESSION RECOGNITION FOR DETECTING MENTAL DISTRESS USING CNN

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Mental health issues such as anxiety, depression and sadness distress often undetected due to not visible symptoms .This project proposed an Al driven healthcare solution that leverages CNN for Facial Expression Recognition to detect signs of mental distress in real time. The system analyses facial expression that captured through images or live video stream to classify the emotions such as sadness, anger, fear or neutrality. By Training the CNN model on facial expression dataset, model achieves high accuracy in emotion classification which enables early detection of psychological problems. The proposed method illustrates how deep learning can transform mental health diagnostics and improve early access to psychological support.

195.A GENERATIVE FRAMEWORK FOR ADAPTIVE CONTINUOUS AUTHENTICATION USING KEYSTROKE DYNAMICS

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Continuous authentication via keystroke dynamics often suffers from the Cold Start problem, where a lack of initial training data leads to fragmented security boundaries and high False Rejection Rates (FRR). This paper proposes a dual-layered framework integrating Generative Manifold Expansion (GME) and Adaptive Manifold Calibration (AMC) to resolve these limitations. By utilizing Cholesky Decomposition to project global behavioral priors onto a sparse 20-sample enrollment set, the system synthesizes a high-fidelity 120-sample manifold for training a One-Class Support Vector Machine (OCSVM). To mitigate behavioral drift, a confidence-driven feedback loop sequesters high-confidence live samples to periodically recalibrate the support frontier. Empirical results demonstrate a negligible mean feature delta of 0.0016s between real and synthetic data, while the system effectively blocked unauthorized access within an average of 2.4 seconds. This research establishes that the fusion of generative priors with recursive model adaptation provides a resilient, non-intrusive and self-evolving security layer for modern digital environments.

196.THE NIVA FRAMEWORK: UNIFIED SECURITY AND PRIVACY BY DESIGN

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Modern computing systems depend heavily on op erating systems that manage and secure digital environments; however, most current systems rely on a reactive security model dependent on known threat signatures and post-attack updates. This outdated approach fails to effectively counter emerging cyber threats, such as zero-day attacks and ransomware, which exploit unknown vulnerabilities before patches are released. Furthermore, the increasing reliance on cloud-based AI assistants introduces significant privacy risks by transmitting sensitive user data to external servers. To address these critical issues, this work proposes NIVA (Next-Gen Intrusion Vigilance Agent), a next generation operating system architecture that combines proactive security, local intelligence and privacy by design. NIVA integrates a Behavioral Data Filter within the security kernel to analyze software intent in real-time, detecting and neutralizing malicious actions before execution. The system also features a Proactive Defense Shield for monitoring network and hardware interfaces and embeds a local Hybrid AI Assistant (powered by LLaMA 3) to automate workflows without data leaving the device. By offering secure sandboxed compatibility for Windows and Linux applications, NIVA provides a unified, intelligent and secure platform that restores user trust and operational control.

197.COMMUNITY-BASED SOS APPLICATION FOR REAL-TIME EMERGENCY ASSISTANCE

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Personal safety and rapid emergency response have become essential requirements in modern society due to the increasing occurrence of accidents, medical emergencies, harassment incidents, and other life-threatening situations. Although several SOS solutions exist, many depend on native mobile applications, mandatory user registration, complex activation techniques, or continuous internet availability, which significantly reduces their usability during stressful conditions. This paper presents a community-based web SOS application that emphasizes simplicity, accessibility, and operational efficiency. The proposed system operates directly through a mobile browser without requiring application installation or user login, enabling immediate usage by both registered and non-registered users. Emergency alerts are initiated through a one-tap SOS mechanism, after which the user's real-time location is shared and digital evidence is collected through periodic image capture over a 15-second duration and audio recording for 30–60 seconds. All captured multimedia data is securely stored and treated as verifiable emergency evidence. Nearby volunteers and police authorities are identified using database-stored location information, eliminating the need for complex artificial intelligence processing and reducing system overhead. Authorized police personnel are provided secure access to download, monitor, and analyze emergency evidence files. Experimental analysis shows that the proposed system improves response time, enhances situational awareness, and offers a scalable and practical solution for real-world emergency assistance. The system prioritizes evidentiary integrity and legal usability of captured data.

198. SMART GESTURE-DRIVEN ROBOTIC MANIPULATOR USING ACCELEROMETER INTERFACE

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The dual-gesture controlled robotic system presented in this study combines a gesture-based robotic arm with a gesture-controlled vehicle to allow for simultaneous control using hand gestures. The system makes use of two separate accelerometer sensors; the mobile robotic vehicle is controlled by left-hand gestures, while the robotic arm is operated by right-hand gestures for pick-and-place activities. Every sensor sends motion data in real time to an ESP32 microcontroller, which deciphers the gestures and uses motor drivers and servo motors to drive the appropriate actuators. By doing away with the requirement for physical controllers, the technology provides a completely contactless and user-friendly manner of human-machine interaction.
While the vehicle consistently reacts to directional orders like forward, backward, left, and right, the robotic arm precisely executes lifting, grasping, and turning motions. According on experimental results, the suggested system has robust wireless performance, low command execution latency, and high gesture recognition accuracy. The system is appropriate for applications including remote handling, rescue operations, hazardous environment investigation, and assistive robotics because it combines two gesture modules to enable the user to simultaneously navigate the vehicle and manipulate things. All things considered, the project offers a gesture-driven robotic system that is effective, scalable, and easy to use.

199.ARTIFICIAL INTELLIGENCE–BASED SECURITY SOLUTION FOR DATA ENCRYPTION IN VLSI APPLICATIONS

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The rapid evolution of Very-Large-Scale Integration (VLSI) technology has enabled the development of high-performance and compact electronic systems for applications such as Internet of Things (IoT), defense electronics, financial processors, and embedded computing platforms. However, the increasing integration

density and operational complexity of modern chips have introduced significant security challenges, particularly in protecting sensitive data from hardware-level attacks. Conventional cryptographic techniques, when implemented in hardware, are vulnerable to side-channel attacks, fault injection, and physical tampering, as they rely on static key management and deterministic countermeasures.This paper proposes an Artificial Intelligence–Based Security Solution for Data Encryption in VLSI Applications, which integrates machine learning intelligence with hardware cryptographic modules to provide adaptive, real-time, and self-defensive security. The proposed architecture combines a hardware encryption core with an AI-assisted entropy and key management module, a side-channel monitoring unit, and a dynamic countermeasure mechanism. A Convolutional Neural Network (CNN) is employed to analyze power, timing, and electromagnetic signatures generated during encryption operations to detect anomalies associated with attack attempts.Experimental evaluation using FPGA-based simulations and side-channel datasets demonstrates that the proposed AI-assisted framework achieves a detection accuracy of 98.3%, with a false positive rate of 1.7%, while introducing minimal latency and acceptable hardware overhead. The results confirm that integrating AI-driven intelligence at the VLSI level significantly enhances encryption robustness and resilience against evolving hardware attacks, making the solution suitable for next-generation secure embedded systems.

200.NEONATAL MORTALITY RISK PREDICTION USING MACHINE LEARNING ON SOCIO-DEMOGRAPHIC AND HEALTH INDICATORS

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This study utilized an approach based on machine learning to develop a model capable of predicting neonatal risk based on both sociodemographic and maternal health metrics. Data used for building the model have been aggregated from the National Family Health Survey (NFHS-5), conducted from 2019 to 2021, for all states/territories of India (UTs). Following initial preparation of data (i.e., cleaning and encoding), a number of different supervised-learning algorithms have been trained and were assessed based on their ability to predict outcomes through evaluation metrics such as accuracy, precision, and recall. Logistic regression provided the best performance with an overall model prediction accuracy of 90.9 %, proving that it is the strongest algorithm for predicting high-risk neonatal cases. The results of this research provide both reliable predictions for risk and the associated confidence score as well as the sociodemographic factors associated with neonatal risk. These results will contribute to recommendations to improve maternal and child health.

201.GENERATIVE AI FOR CLOUD RESOURCE DEMAND FORECASTING AND AUTO-SCALING: A COMPREHENSIVE REVIEW

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Cloud computing services have grown rapidly which creates unpredictable resource needs that make it difficult to manage resource allocation and expenses while maintaining reliable service quality. Conventional forecasting and rule-based auto-scaling mechanisms often struggle to adapt to sudden workload surges thus leading to service degradation or resource wastage. This research presents a framework for cloud resource demand forecasting and proactive auto-scaling which uses Generative AI technology to predict resource needs through advanced models including Generative Adversarial Networks and Variational Autoencoders. The system creates multiple demand scenarios through its learning process which uses historical data and real-time data to develop more precise forecasting methods and scaling decisions that account for uncertainty. The system uses Reinforcement Learning (RL) to optimize scaling policies from system feedback thus enhancing performance throughout its operational period. The framework will be implemented using CloudSim for evaluation under real-world and synthetic workloads. The research team will use prediction accuracy, SLA adherence, resource utilization, and energy efficiency as their primary performance metrics. The system is designed to create intelligent cloud infrastructures which automatically optimize their operations for improved flexibility and dependable performance and reduced operational costs.

202. AI POWERED FOOD NUTRITION AND CALORIE DETECTION

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The increasing incidence of diet-related illnesses emphasizes the urgent need for intelligent devices to help make informed food selections. In this paper, "AI Powered Food Nutrition and Calorie Detection" is presented as an intelligent a system that uses smart algorithms in identifying food items automatically, estimating their nutrition level, and assisting users in maintaining healthy diets. Using a mix of language-understanding techniques and Computer Vision (CV), the app recognizes foods from image and text inputs and provides exact calorie and macronutrient content. The system personalizes nutrition goals, provides adaptive reminders, and provides behavioral insights into user data to facilitate continuous healthy eating.

Engaging outcomes of large-scale Indian nutrition and sustainability studies, the project is centered on region-specific dietary recommendations that not only are nutritionally adequate but also sustainable. Observations by Chaudhary & Krishna (2021) and others suggest that India is plagued by widespread micronutrient malnutrition and unsustainable dietary habits. Integrating such data into the AI system offers culturally appropriate and economic planning for nutrition.

This system not only assures to enhance personal nutritional outcomes through smart food tracking but also to enable sustainable consumption of food in agreement with world health and sustainability goals. This convergence of AI, data-driven customization, and sustainable nutrition research is a significant step toward achieving the United Nations' Sustainable Development Goals (SDGs) through technology-facilitated dietary care.

203.HYBRID THREAT DETECTION SYSTEM FOR REAL-TIME FIREWALL LOG ANALYSIS USING RULE-BASED AND MACHINE LEARNING APPROACHES

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The rising number of network traffic folds and the complexity of cyber-threats requires sophisticated systems of real-time detection and response mechanisms. The conventional firewall based systems cannot easily detect new attack patterns and anomalies in behavior due to their use of fixed rule sets. The paper will recommend a hybrid model that combines machine learning algorithms with rule-based detection to analyse the firewall logs and not only identify various threat vectors such as brute-force authentication attacks, distributed denial-of-service (DDoS) floods, and systematic port-scanning activity but also identify them. The designed system will have a three-tier system that includes a React-based front-end design, a FastAPI back- end design, and a MongoDB data layer, which will support scalable log processing and real-time analytics. Competitive performance On a edited test set of 2,000 Linux system logs, evaluation gives brute-force attacks 94.2%. detection, 91.8%. DDoS detection, 93.5%. port-scan detection. The system achieves a mean false-positive rate of 3.2%, which makes it appropriate to be implemented in the operational environment of enterprise networks. Moreover, the platform uses external threat intelligence through the VirusTotal API in order to augment IP reputation scoring to provide a threat investigator with detailed contextual information.

204.AI BASED GRIEVANCE REDRESSAL SYSTEM-GRIEVEASE

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Educational institutions often struggle with inefficiencies when handling student complaints because they rely on manual processes, which can be slow and not transparent. This paper introduces GrievEase, an AI-based system that automates the whole process of submitting, checking, categorizing, and tracking complaints in schools and colleges. The system uses Google Gemini AI to help identify and filter out fake, incomplete, or irrelevant complaints, and it also ensures that each complaint is properly assigned to the right department with the right priority. Supabase serves as the secure backend, offering features like OTP-based login, access control based on roles, and reliable data storage, while Gmail SMTP is used to send real-time updates throughout the process. The system includes features like anonymous complaint submission, customized dashboards for both students and staff, detailed records of all actions taken, and smart routing of complaints to the correct teams. By using AI to check complaints and automate tasks, along with constant communication, GrievEase improves efficiency, openness, responsibility, and privacy, offering a scalable and affordable way to handle complaints in educational settings.

205.SMART CROP NUTRITION ADVISOR: AN AI-DRIVEN DECISION SUPPORT SYSTEM FOR PRECISION FERTILIZATION AND DISEASE DIAGNOSIS

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Smallholder farmers increasingly struggle with im- balanced soil nutrients, late disease identification, and unpre- dictable climatic conditions that complicate agricultural decision- making. Traditional fertilizer practices often rely on generalized recommendations and manual field inspection, resulting in in- efficient input use, reduced crop productivity, and gradual soil degradation. Although Artificial Intelligence (AI) has introduced promising tools for precision agriculture, most existing solutions operate in isolation—focusing separately on soil health, crop disease detection, or weather analysis—limiting their real-world applicability for resource-constrained farmers. There is a growing need for an integrated, user-friendly, and climate-responsive advisory system tailored to small-scale agriculture.

This study introduces the Smart Crop Nutrition Advisor, an AI-powered, multimodal decision support system that combines soil analytics, computer vision–based crop health assessment, and short-term weather intelligence to generate personalized farming recommendations. The system integrates an XGBoost regression model for optimized NPK fertilizer prediction, a YOLOv7-based vision model for early detection of plant diseases and nutrient deficiencies with severity estimation, and a Random Forest classifier for crop suitability analysis. Real-time rainfall forecasts are utilized to adjust fertilizer application timing, reducing nutrient runoff risks. A bilingual, explainable chatbot in English and Tulu enhances accessibility for farmers. Experimental results demonstrate strong performance across all modules, confirming the system's effectiveness as a scalable, low-cost, and sustainable precision agriculture solution

206.HUMANLESS SOLAR TYRE INFLATOR SYSTEM WITH DUAL PAYMENT INTEGRATION FOR SUSTAINABLE PUBLIC INFRASTRUCTURE

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Incorrect tyre pressure is a major contributor to reduced fuel efficiency, accelerated tyre wear, and increased vehicular accidents. Conventional tyre inflation systems are predominantly grid-powered, manually operated, and often unavailable in rural or remote areas. These systems require continuous human supervision and incur recurring electricity costs, limiting their scalability and sustainability. This paper presents the design, development, and experimental evaluation of a Humanless Solar Tyre Inflator System (HSTIS)—a fully autonomous, off-grid tyre inflation solution powered by renewable solar energy. The proposed system integrates a photovoltaic power unit, battery storage, an ESP32 microcontroller, precision pressure sensing, automated pneumatic control, and a dual payment mechanism (coin acceptor and QR-based digital payment). A real-time LCD interface provides operational feedback, while an LDR-based night illumination module ensures 24×7 accessibility. The system autonomously measures tyre pressure, inflates the tyre to a user-defined value, and safely terminates operation without human intervention. Experimental results indicate pressure accuracy within ±0.5 PSI, reliable operation under varying lighting conditions, and zero dependency on grid electricity. The proposed system demonstrates strong potential for deployment in highways, smart cities, and rural regions as a sustainable public utility.

207.AI-DRIVEN MEDICATION RECOMMENDATION USING PATIENT REVIEWS AND MACHINE LEARNING.

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An increasing number of patients have shared their experiences regarding different medications online, and these patient reviews constitute an enormous repository of information. Such information may be missed when relying solely on traditional methods of medication recommendations based on structured clinical data or patient medication history. In this paper, we introduce a drug recommendation system based on Artificial Intelligence (AI) that utilizes patient reviews to make condition-specific recommendations. Using sentiment analysis, patient reviews are classified into positive, negative, or neutral using Support Vector Machines (SVM) trained on TF-IDF features. Dosages also were extracted from patient reviews and the top dosage strengths reported by patients were identified. Lastly, we developed an interactive site with a user-friendly interface to allow individuals to enter a health condition, receive a list of recommended drugs, and see charts treating of positive and negative sentiments, examples of reviews, and dosage trends. Experiments using the Drugs.com data set demonstrated that our model predicts sentiment accurately and that the drug recommendation system is clear, interpretable, and user-friendly. Therefore, our system will provide greater access to information about medications for both patients and healthcare professionals and also suggest them the number of dosages required with the review of the different types of companies' medicines.

208.MICROCONTROLLER-BASED IO MODULE WITH DATA LOGGING FOR ALARM ANNUNCIATOR SYSTEMS IN INDUSTRIAL MONITORING APPLICATIONS

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The design and implementation of a microcontroller-based IO module for industrial alarm announcer systems are described in detail in this article. The module accesses a range of digital inputs for fault detection and real-time monitoring using an Arduino microcontroller and an MCP23017 IO expander. Dealing with uncommon circumstances like overloads or equipment failure is the main tactic.
Operators are immediately alerted when the alarm goes off by a variety of alerts (visual: LEDs, LCD display; audible: buzzer), which increases their awareness of the situation and shortens the time it takes to respond to faults. By automatically recording the current and previous alarm events along with their matching activation timestamps, a thorough event history that can facilitate post-incident diagnostics and trend analysis is produced. By merging data logging and signaling, the module eliminates the disadvantages of the manual approach, provides programmed reset and silence actions, and is appropriate for the modern automated process environments and SCADA integration that require high reliability, traceability, and flexibility of plant operations.

209.AI HEALTH RISK DETECTOR WITH SMART SUGGESTIONS

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The issue of growing chronic diseases which in turn has increased the demand for preventive and personal health risk assessment tools that go beyond the present reactive health care models. Presently we see that most AI based health prediction systems put forth single condition solutions or they require input from health care

experts which in turn which reduces their use by non clinical users. In this paper we present a health risk assessment framework which is multi disease in scope which we have developed which uses supervised machine learning and natural language processing to determine individual health risks which also include self reported symptoms, medical history and lifestyle. We used an ensemble learning approach which includes tree based and margin based classifiers which we did so to present a risk picture which is more variable and which looks at many disease groups. At the same time our NLP pipeline is working on unstructured reports of symptoms and at the same time we include sentiment aware features to put that in context which the user is reporting. We have a structured recommendation engine which puts out health care recommendations that are risk based and supported by evidence. We did a study using public health care data sets which we evaluated our system with and we saw consistent performance across different conditions which the ensemble model did very well at we achieved an 87.3% accuracy. What we found is that by putting structured and unstructured health info into one predictive model we improved health risk assessment which is more accessible and personal for the user, which in turn positions our put forth system as a scalable decision support tool for preventive health care applications.

210.MOBILITY AWARE CLUSTER HEAD SELECTION AND ROBUST ROUTING IN MANET USING NS2

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One type of wireless network that can be swiftly established without the need for pre-existing infrastructure is the mobile ad-hoc network. MANET features include multihop, distributed operation, dynamic topology, and more. Clustering is a crucial topic of study because it has many benefits, such as enhancing network stability and lowering overhead, which boosts network efficiency. For MANETs, numerous clustering schemes have been put forth. One can better comprehend and improve these clustering systems by classifying them in a methodical manner. Different parameters are used by each clustering algorithm to choose the cluster head. The cluster head is responsible for overseeing the entire network and acting as a leader inside the cluster. This paper also includes a comparative study of different approaches. A survey of several clustering schemes is presented in this study.

211.FEDERATED LEARNING-BASED HEALTH RISK PREDICTOR WITH REACT-INTEGRATED CLIENTS AND TENSORFLOW BACKEND

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Machine learning models are being used more and more in healthcare analytics to enhance early clinical decision-making and forecast possible health risks. However, traditional centralized learning methods necessitate the aggregation of private patient data, which raises significant privacy, data ownership, and regulatory compliance issues. In order to overcome these obstacles, a Federated Learning-Based Health Risk Prediction System that permits cooperative model training without exchanging unprocessed medical data is presented in this study.

The suggested system combines a TensorFlow Federated backend with React-based client applications. Each client uses private patient data to locally train a health risk prediction model. The central server receives only encrypted model parameters and uses the Federated Averaging technique to aggregate updates and build a global prediction model. this method benefits from distributed learning across several institutions while maintaining data confidentiality.

Based on clinical characteristics including age, blood pressure, glucose levels, and symptoms, the algorithm forecasts risk for diseases like diabetes and cardiovascular disorders. According to experimental evaluation, the federated architecture ensures improved privacy, decreased bias, and regulatory compliance while achieving competitive accuracy when compared to centralized alternatives. The suggested architecture offers a scalable, safe, and useful foundation for implementing AI solutions that protect patient privacy in contemporary healthcare settings.

212.AN INTELLIGENT AND PERSONALIZED FOOD ALLERGY DETECTION SYSTEM USING BARCODE SCANNING AND AI-DRIVEN INGREDIENT ANALYSIS

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Food allergies are a major global health concern, as accidental allergen exposure frequently occurs due to complex ingredient lists, hidden allergen derivatives, and multilingual food labeling. This paper proposes an intelligent and personalized food allergy detection system that combines barcode scanning and ingredient analysis based on natural language processing (NLP) to provide fast and reliable allergen awareness. When a product barcode is scanned, the system retrieves ingredient information from international food databases and

compares it with a user- defined allergy profile. Natural Language Processing techniques are applied to analyze ingredient lists, identify allergenic terms, recognize semantic variations, and support multilingual understanding. The system is designed using a modular architecture that enables seamless interaction among data sources, analytical services, and user interface components. This ensures smooth communication and efficient processing across all layers of the system. In addition, an integrated conversational assistant provides interactive explanations and safety-oriented guidance related to allergens. By offering clear and personalized insights, the assistant helps users better understand allergen risks and make informed food choices. Overall, the proposed system aims to minimize the risk of accidental allergen exposure and promote safer dietary intake through personalized, explainable digital support, while establishing a scalable framework for intelligent food safety applications.

213.FINGERPRINT-DRIVEN BLOOD PROFILING: A DEEP LEARNING COMPARATIVE STUDY

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Determining an individual's blood group is a critical step in various medical procedures, including blood transfusions and surgical interventions. Conventional methods are invasive, requiring blood samples, specialized laboratory equipment, and trained personnel, which can be time- consuming and costly. This project proposes an innovative, non- invasive approach for predicting human blood groups (such as A, B, AB, and O, including Rh factor) using fingerprint images.The core methodology is based on deep learning. The project utilizes Convolutional Neural Networks (CNNs) to analyze the complex patterns and minutiae within fingerprints. These models are trained to generate discriminative "embeddings"—dense vector representations of the fingerprint features. These embeddings are then fed into a classification model to predict the corresponding blood group.

214.HYBRIDIZED DEEP LEARNING ARCHITECTURES AND ADVANCED REGRESSION MODELS FOR AGRO- ENVIRONMENTAL DATA SYNTHESIS IN CROP YIELD FORECASTING, PHENOTYPIC CLASSIFICATION, AND PREDICTIVE CULTIVATION SUITABILITY

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This study looks at a tricky example of how different machine learning methods tackle major farming challenges. Using combinations like neural networks, regression tools, and borrowed knowledge models builds a system that does three main things: suggest crops based on soil and outside conditions, forecast yields by analyzing patterns in data, classify plant types by recognizing images. Processing steps that adjust variable ranges, apply mathematical shifts, or multiply training samples improve how well models work, leading to trustworthy results. Looking ahead, using IoT to track surroundings in real time could expand how we monitor growing conditions. Instead of relying on guesswork, remote sensing helps scan broad areas for signs of stressed or unhealthy crops. As new data comes in, adaptive methods sharpen forecast accuracy without falling back on outdated patterns. Even now, efforts grow around making tools easier to reach through phone apps or spoken commands rather than just screens. Language barriers won’t block access since broader reach is part of the plan moving forward. Farmers in different parts of the world may use what works best for them when it comes to how they interact with systems. Change happens quietly where farming meets smart technology shaping how fields are managed today. Efficiency grows not by rushing but by adjusting how supplies are allocated under shifting weather patterns. Strength builds when systems adapt rather than break during intense environmental shifts affecting food availability worldwide.

215.SMART WASTE CLASSIFIER – AN AI POWERED WASTE DETECTION AND SEGREGATION SYSTEM UISNG IMAGE PROCESSING AND AUTOMATION

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Efficient separating waste is a big problem for modern waste management systems due to the limitations of manual sorting, which is time- consuming, unsafe, and error-prone. This project presents a Smart Waste Classifier, an AI-powered system designed to automatically detect and classify waste materials using image processing and deep learning techniques.The system captures real-time images of waste items and processes them using a TensorFlow was used to implement a Convolutional Neural Network (CNN) to categorize waste into groups like organic, paper, plastic, and metal. Techniques for processing images and extracting features enhance classification accuracy and robustness under varying conditions. Based on the predicted class, the system enables automated segregation of waste into appropriate bins. The proposed approach improves recycling efficiency, reduces human intervention, and supports sustainable waste management practices. The system demonstrates high accuracy and its real-time performance makes it suitable for smart cities and industrial waste management applications.

216.DETECTION OF ALZHEIMER'S DISEASE USING TEXTURE ANALYSIS

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Early and accurate diagnosis of Alzheimer's Disease (AD) remains a significant clinical challenge due to its gradual progression and overlapping symptoms with other neurodegenerative disorders. This study presents a non-invasive machine learning-based framework that leverages texture analysis of brain MRI scans for the prediction of AD. Texture features were extracted using the Gray Level Co-occurrence Matrix (GLCM) from the middle 40 slices of each patient's T1-weighted MRI scan to capture critical structural variations. The dataset was sourced from the ADNI database and categorized into three groups: Cognitively Normal (CN), Mild Cognitive Impairment (MCI), and Alzheimer's Disease (AD). After preprocessing and feature reduction, multiple machine learning models including Support Vector Machine (SVM), Random Forest, and XGBoost were trained and evaluated. Our approach demonstrates the potential of texture features in distinguishing

between AD, MCI, and CN, achieving promising accuracy levels and offering a lowcost, scalable method for aiding in early diagnosis.

217.RAINFALL FORECASTING IN INDIAN STATES USING SARIMAX: A TIME-SERIES AI APPROACH

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This research anticipates the distribution of rainfall in the different parts of India during the monsoon months (June to September) using the SARIMAX model. The model missing data through forward filling and with the help of historical rainfall data, enhances the reliability of the information. The SARIMAX model, with (2, 1, 2) and seasonal (1, 1, 1, 8) orders, generates mul-ti-year (2018- 2028) forecasts while considering seasonal and long-term trends. The maximum we use for fitting the model is maximum likelihood estimation and for forecast accuracy, we use Mean Absolute Error (MAE), which we see varies between 0.45 to 6.11. We look at the year that follows the most recent reported year (2017)'s forecasts, which we compare to history to see how the model did. We present the projections which include confidence intervals and visualizations that we use to look at future rain patterns in detail as it pertains to 2028. We found the SARIMAX model to be very good for the prediction of regional rain-fall in tough terrain states like Uttarakhand, East UP, Jharkhand, Orissa, and Punjab, which in turn we use for disaster preparation, agricultural planning, and water resource management. Additionally, this work is integrated by a crop pre-diction module that utilizes the forecasted rainfall to estimate suitable crop choices for the area for improved agricultural planning.

218.EARLY DETECTION OF ASYMPTOMATIC NEONATAL HYPOGLYCEMIA USING NON- INVASIVE MULTISENSOR BASED MONITORING SYSTEM

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Neonatal hypoglycemia (<40 mg/dL) poses serious neurodevelopmental risks, especially in asymptomatic infants, and conventional invasive glucose tests are unsuitable for continuous monitoring. This study presents a

non-invasive multimodal system using photoplethysmography (PPG), temperature, and Force-Sensitive Resistors (FSR) to capture cardiac, thermal, and neuromuscular signals. Features are extracted and classified via a Support Vector Machine (SVM), enabling real-time, accurate, and cost-effective monitoring, validated with k-fold cross-validation, suitable for NICUs and low-resource settings.

219.GLOBAL CONTEXT-AWARE BRAIN TUMOR SEGMENTATION USING A UNETR-BASED FRAMEWORK

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Magnetic Resonance Imaging (MRI) is widely adopted for identifying brain tumors due to its superior soft-tissue contrast. However, with increasing MRI resolution, manual tumor annotation becomes time-intensive and inconsistent. Deep learning architecture, particularly U-Net-based models, have substantially improved segmentation performance across medical imaging modalities. Yet, conventional CNN-based architectures struggle to capture long-range dependencies and global tumor structure. To address this limitation, this study focuses on UNETR, a hybrid architecture that integrates a pure Vision Transformer (ViT) encoder with a U-Net-style CNN decoder. UNETR enables transformer-based global representation learning while preserving spatial detail via skip connections. An exploration of recent trends and enhancements to UNETR helps clarify its performance in brain tumor segmentation.

220.COUGH SYMPTOM DIAGNOSIS USING ML

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Cough is a common symptom of many respiratory conditions, and its early identification can support timely diagnosis. This paper proposes a machine learning based approach for cough symptom diagnosis based on user-selected symptoms. Based on the selected symptoms, machine learning models analyse the input data and predict the most likely disease along with the top three probable disease outcomes. The prediction results are further represented using graphical visualization to improve interpretability and user understanding. The proposed approach provides a non-invasive, cost-effective, and user-friendly solution for preliminary health assessment and decision support.

221.SANDS: A DECENTRALIZED AUTONOMOUS INTRUSION DETECTION SYSTEM USING SWARM-DRIVEN MULTI-AGENT COORDINATION

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Modern networks are increasingly distributed and dynamic, exposing significant limitations in traditional intrusion detection systems that rely on centralized analysis or static rule sets. These approaches often struggle with slow reaction times, limited scalability and reduced visibility across diverse devices and traffic patterns. To overcome these challenges, this work introduces SANDS (Swarm-Autonomous Network Defense System), a decentralized intrusion detection framework inspired by swarm intelligence. SANDS deploys lightweight agents that independently observe local traffic, collaborate through peer-to-peer alert sharing and collectively adapt to emerging threats. This distributed structure enhances situational awareness, reduces dependence on a single monitoring point and improves resilience against fast-spreading or stealthy intrusions. By leveraging autonomous coordination and adaptive anomaly detection, SANDS offers a scalable, responsive and robust defense approach suitable for modern network environments.

222.AUTOMATIC FOREST FIRE DETECTION FROM UAV-COLLECTED IMAGES USING MOBILENET/VGG19: A STUDY

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Wildfire occurrences have increased in recent years, posing severe threats to the environment, human life, and infrastructure. Timely fire detection plays a crucial role in minimizing these hazards, particularly in remote forest regions where conventional surveillance methods are limited. Unmanned Aerial Vehicles (UAVs) provide flexible, cost-effective, and rapid image acquisition capabilities, making them highly suitable for wildfire monitoring tasks. This study presents a deep learning driven approach for classifying UAV captured images into fire and non-fire categories. Two Convolutional Neural Network (CNN) architectures, MobileNet and VGG19, are evaluated on a balanced dataset comprising 1,000 samples per class. The performance comparison demonstrates that MobileNet achieves a higher classification accuracy, reaching 99%, indicating its suitability for lightweight and real-time wildfire detection. Overall, the proposed system shows strong potential for integration into automated early warning mechanisms.

223.AI-POWERED INNOVATORS, INVESTORS AND COLLABORATION PLATFORM

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The gap between innovative thinkers and possible investors frequently hinders innovation. In order to close this gap, this paper suggests an AI- powered platform for collaboration that integrates communication, investment opportunities, and project posting into a single system. Through safe in-app features, the platform enables users to communicate, invest, collaborate, and post ideas. Through skill-based matchmaking, intelligent project recommendations, and AI-assisted project description improvement, artificial intelligence (AI) improves the user experience. Furthermore, secure payment methods and in-app meetings guarantee openness and confidence between users. The goal of this platform is to establish a unified ecosystem that boosts investor confidence, encourages innovation, and lowers fraud.

224.nMinds : GEN AI-POWERED PERSONALIZED MENTAL HEALTH SUPPORT SYSTEM

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The world is facing a growing mental health crisis. Too many people are struggling with anxiety and distress, yet they face major hurdles like stigma, cost, or a lack of available professionals when trying to get the personal help they need, right when they need it. Introducing NMinds, We created NMinds, an intelligent digital agent designed to offer truly continuous, human-like emotional support. Unlike simple chatbots that forget what you said a minute ago, NMinds is built to be a sympathetic companion that remembers your story and adapts as you grow. The secret to NMinds is its "dual-memory system," powered by the Gemini AI. Global Knowledge (RAG): It has access to a massive library of general therapeutic wisdom and best practices.

Personal Memory (G-RAG): More importantly, it uses a "memory map" (Graph-based RAG) to chart your personal emotional journey, connecting past sessions, progress, and key moments. This is what allows the support to be truly personalized over weeks and months.

To make sure every conversation is seamless, NMinds saves your current chat details in a database (MySQL). For smooth operations like sending reminders or handling multiple languages it uses a digital organizer tool called n8n. All of this runs on a high-performance engine (Go backend) and is presented through a friendly app (React interface).

NMinds' ultimate goal is to bridge the gap in mental health care. By offering a secure, non-judgmental, and multilingual space for dialogue, it makes emotional support radically more accessible to people all over the world. Our initial results show that because NMinds has this context-aware memory, users stay engaged longer and feel like the responses are more relevant and helpful. This makes NMinds an powerful, supportive tool to work alongside professional resources, ensuring no one has to wait for essential emotional help.

225.AUTOMATED WEEDING ROBOT

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Weed management remains a major challenge in agriculture, as traditional methods such as manual removal and chemical herbicides are labor- intensive, costly, and environmentally harmful. To address these issues, this paper presents an Automated Weeding Robot that integrates artificial intelligence, computer vision, IoT-based control, and solar energy for sustainable weed removal. The proposed system employs a YOLOv5-based deep learning model to distinguish weeds from crops in real time using visual inputs. Upon detection, a microcontroller-controlled mechanical mechanism selectively removes weeds without damaging crops. The robot is powered by a rechargeable battery supported by solar energy, enabling extended and eco-friendly field operation. Experimental observations under controlled conditions indicate effective weed detection performance and responsive actuation. The proposed system reduces labor dependency, limits chemical usage, and offers a cost-effective and scalable solution for precision agriculture, contributing toward environmentally sustainable farming practices.

226.A SURVEY ON DIFFERENTIAL PRIVACY IN FEDERATED SENTIMENT ANALYSIS SYSTEMS

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In modern workplaces, employee feed- back allows organizations to build trust and strengthen engagement, providing valuable information, boosting morale, and identifying productivity barriers. However, the collection of such feedback often raises important questions about privacy and security. This study aims to examine the potential of combining sentiment analysis with Federated Learning (FL) by exploring the following questions: (1) To what extent can employee feedback and complaints be kept private and secure in workplaces? (2) Can sentiment analysis, combined with FL using free-form text, pro- vide accurate workplace insights? Recent advance- ments in privacy-preserving algorithms, such as Differential Privacy (DP), make it possible to analyze

workplace sentiments securely and ethically. In response to the above questions, the advance- ments, applications, and limitations of integrating Federated Learning(FL) with Differential Privacy(DP) are discussed to understand how such models can securely analyze employee feedback. This approach delivers meaningful insights that guide data-driven strategic decisions while maintaining employee trust.

227.ACCIDENT PREVENTION SYSTEM IN HILLY AREAS

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Accidents on winding roads in hilly regions are a major concern due to poor visibility, steep slopes, and challenging weather conditions like fog and rain. These factors, coupled with inadequate road infrastructure and the absence of safety barriers, increase the likelihood of collisions, especially at sharp bends and blind curves. This project proposes an AI-powered ultrasonic sensor-based accident prevention system to enhance road safety in mountainous areas. The system detects oncoming vehicles using ultrasonic sensors and provides real-time alerts through LED indicators and audio signals. If a driver does not respond to the warning, an automated braking system can be integrated to prevent potential accidents. By implementing this intelligent system, the project aims to minimize road accidents, enhance driver awareness, and improve overall transportation safety in challenging terrains.

228.QUANTUM-BASED AI FOR REAL-TIME CYBER DEFENSE

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This paper proposes a quantum-based artificial intelligence system for real-time cyber defense by combining computational advantages brought about by quantum computing with state-of-the-art artificial intelligence techniques. It may be challenging for traditional cybersecurity solutions to accurately detect and mitigate rapidly evolving threats, especially in large-scale and high-speed network environments. The proposed system utilizes the power of quantum-enhanced algorithms to handle huge volumes of network data efficiently in the detection of anomalies and prediction of potential attacks with unparalleled speed and accuracy. It leverages quantum machine learning, real-time network monitoring, and adaptive threat intelligence to realize real-time detection

and response against cyber-attacks. By leveraging quantum parallelism, the model considers all possible threat scenarios concurrently, hence bringing much-needed improvements in terms of responsiveness and resilience. Simulation and experimental results show that in the proposed quantum-based AI approach, the detection rate, latency, and predictive accuracy outperform its classical counterpart. This proposed framework helps to realize a robust, continuous, and automated defense mechanism, thereby improving cybersecurity in modern digital infrastructures and critical network systems.

229.GENERATION OF RECOMMENDATION REPORT FOR FAULTY CELLS USING HYBRID MACHINE LEARNING AND GENERATIVE AI

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Battery safety and reliability are important issues in modern electric vehicles and energy storage systems. Traditional battery fault diagnosis techniques often only focus on finding faults. This offers limited understanding and actionable guidance for users. Recent advancements in artificial intelligence allow for data-driven fault identification, but clear communication of diagnostics remains a challenge. This paper presents a hybrid framework that combines machine learning-based battery cell fault classification with generative artificial intelligence for automatic report generation. A Random Forest classifier identifies battery cell faults using voltage, current, and temperature measurements. The classified fault information is then processed by a generative language model to create readable diagnostic explanations and recommendations. This approach improves transparency, usability, and decision support, showing the viability of generative AI for smart battery management applications.

230. CYBERBULLYING DETECTION VIA SENTIMENTAL ANALYSIS ON SOCIAL MEDIA

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The phenomenon of cyberbullying has become the burning issue in the modern society of digital communication, inflicting significant psychological damage on the victim. Current detection systems are mostly based on high computational cost, low interpretability deep learning models. In this paper, a new framework involving the use of sentiment analysis in conjunc- tion with the implementation of optimized machine learning algorithms is proposed that can detect cyberbullying in five different categories, namely, by age, gender, religion, ethnicity, and other online harassment. The framework uses a text pre- processing pipeline that is structured, i.e., it generates emojies into text, filters by language, tokenizes and lemmatizes the text, and removes sentiment-based polarities to identify emotionally negative content. In order to combat class imbalance present in multi-class cyberbullying data, Synthetic Minority Over-sampling Technique (SMOTE) is implemented and then nine machine learning classifiers are trained. TF-IDF vectorization converts processed text to numbers, which can be used in classification. Experimental analysis on 47,692 tweets shows that the Extra Trees Classifier has the best performance with accuracy of 95.38 and F1-score of 0.95. Comparative analysis: Sentiment enhanced feature extraction is more effective in improving classification accuracy compared to the traditional method. The suggested solution represents a computationally efficient, interpreted, and scalable solution to real-time cyberbullying detection, which leads to safer web spheres.

231.INTERPRETABLE MACHINE LEARNING FRAMEWORK FOR SPAMBOT AND FAKE FOLLOWER DETECTION.

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The rise of social networking platforms has revolutionized online interaction but has also opened the door to malicious activities such as spam bots and fake followers.These entities distort influence metrics, spread misinformation and erode trust.They pose serious risks to digital trust and online security.Traditional machine learning approaches achieve high accuracy in detecting such accounts but often lack interpretability,limiting transparency for stakeholders.This project proposes an interpretable AI-driven machine learning framework that combines behavioral,linguistic and network-based features with explainable AI methods such as SHAP (SHapley Additive exPlanations) and LIME (Local Interpretable Model-agnostic Explanations) alongside supervised learning models like Random Forests, Gradient Boosting, and Neural Networks.The model balances high detection accuracy with human-understandable explanations, reducing false positives and increasing stakeholder trust. By combining interpretability with robust detection, the proposed framework offers a more trustworthy and effective solution compared to conventional black-box methods.

232.AN AI BASED ROUTING NETWORK FOR RAILWAY TRACK DEFECT MONITORING SYSTEM

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Railway infrastructure is the core of modern transport. The safety of this infrastructure heavily relies on the timely detection of rail defects such as cracks, fatigue, and wear. Unfortunately, the inspection methods in use are full of drawbacks. For example, the periodic ultrasonic testing carried out in Indian Railways is not a real, time monitoring method. Similarly, manual visual inspections are physically demanding and have a high likelihood of missing hidden defects. The track circuit methods utilized in metro systems are mainly for train detection and, therefore, cannot efficiently identify early, stage faults, thus resulting in late maintenance and an increased risk of failure.

This research intends to create a continuous railway track monitoring system that can recognize defects in real time to address these issues. The system employs piezoelectric transducers to capture high, frequency acoustic signals emitted during railtrain interaction. The MPU6050 sensor is additionally employed to record low, frequency vibrations. Each sensing node is equipped with a GPS Neo, 6M module for accurate geographical location identification, thus facilitating exact fault localization. Data transmission is done with the help of LoRa modules that provide long, range, low, power, and cost, effective communication suitable for both urban and remote areas. The system put forward is a small, modular, and deployment, friendly substitute for fiber optic DAS, based systems.

Signal processing mainly depends on Fast Fourier Transform (FFT) and Mel Frequency Cepstral Coefficients (MFCC) for feature extraction. Convolutional Neural Network (CNN) is used to categorize the track condition as normal, degraded, or critical. To predict the fault in the future, the features extracted through CNN are additionally used in a Long Short, Term Memory (LSTM) model that helps in temporal analysis and prediction of defect progression. Moreover, the use of predictive analytics also supports the calculation of the remaining useful life of the rail segments, thus enabling the less disruptive and more efficient implementation of the maintenance strategies while improving the overall safety of the railway system in all over the country.

233.FIREBALL-LAUNCHING DRONE BASED SYSTEM FOR EFFICIENT FIRE CONTROL

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Homes, large structures, and woodlands can all have deadly fires that are difficult for firefighters to get to fast. Conventional firefighting techniques can be slow, allowing fires to develop, and frequently endanger human life. In order to combat these flames more effectively and securely, this idea suggests using a remotely controlled drone. Using a remote control, a firefighter operates the drone from a safe distance while watching a live video feed from the drone's camera. Special fire extinguisher balls can be carried by the drone and dropped straight onto the fire. These balls explode when they come into contact with the fire's heat, releasing a dry chemical powder that extinguishes the flames. This method makes it possible to respond to situations more quickly, particularly in hard-to-reach places. Firefighters can evaluate and fight fires with this drone without endangering themselves, improving safety and minimizing property damage.

234.TRUSTNET: A BLOCKCHAIN FRAMEWORK FOR AUTHENTICATED SOCIAL INTERACTIONS

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Centralized social media architectures create fun damental asymmetries in data sovereignty and monetization, often at the expense of user privacy. Platform operators decide what gets seen, how creators get paid, and what happens to user data—raising serious concerns about privacy, fairness, and ownership. This paper introduces TrustNet, a decentralized social networking framework that puts creators back in control. Built on blockchain technology, TrustNet lets users truly own their content and receive tips directly from their audience—with no platform taking a cut. The system uses a hybrid approach: ownership records and transactions run on EVM-compatible networks like Polygon through Solidity smart contracts, while actual content lives on IPFS via the Storacha protocol. This design improves censorship resistance by removing reliance on a single hosting platform, without bloating the blockchain with large files. A key innovation is the zero-platform-fee tipping system, which uses reentrancy-protected smart contracts to send cryptocurrency directly from supporters to creators. Users authenticate through Web3 wallets using RainbowKit and Wagmi— eliminating passwords and centralized accounts. Experimental evaluation demonstrates practical gas efficiency with empirically constant (O(1)) complexity for core operations, ensuring consistent transaction costs regardless of platform scale. These results establish TrustNet as a scalable foundation for social networks where users, not platforms, own their content.

235.SIGNVERSE: BRIDGING SILENCE WITH AI-DRIVEN SIGN LANGUAGE CONVERSATIONS

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SignVerse is an advanced Chatbot that is created for users to help communicate between deaf and mute communities. It captures real-time hand gestures with the usual webcam. The precise points and positions of the fingers and hands are tracked and recognized using MediaPipe and OpenCV. A machine learning model then looks into these motions, recognizes the signals and alters them into accurate sign language phrases, often known as gloss sentence. With its language model, OpenAI is capable of generating answers that are logical and easy to understand. The replies are then translated back into sign language and showed by a 3D avatar that is similar to a real person signing flawlessly. People can communicate easily through the simple user interface. Besides recognizing signals, the system lets the users to give words or sentences as input, which the avatar then signs, and presents text on the output. With this, the system is reachable to both the people who use sign language for communication and also for those who do not. SignVerse is a communication system that works completely in sign language by integrating AI, computer vision and user-friendly design. It inspires inclusion and convenience, which grows the sense of power among the deaf and mute population. It also paves a path to the advancements in technology in the future.

236.AI-POWERED AUTISM DETECTION USING FACIAL EXPRESSION AND EYE-TRACKING

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Autism Spectrum Disorder (ASD) is a complex brain growth condition that affects communication, social interaction, and behavioral patterns. Early identification is critical for effective intervention, yet conventional diagnostic methods remain subjective, time-intensive, and reliant on expert observation. This paper proposes an AI-based framework for preliminary ASD detection that integrates facial expression analysis with eye-tracking data. Deep learning models, including Convolutional Neural Networks (CNN), MobileNet, DenseNet, and ResNet, are applied to facial images to extract discriminative features, while machine learning classifiers such as Support Vector Machine (SVM), Random Forest, and AdaBoost are used to analyze gaze and fixation-based eye-tracking features. Experimental evaluation demonstrates that MobileNet achieves the highest accuracy among facial expression models, while eye-tracking classifiers show strong performance under the tested conditions. The system is deployed as a Flask-based web application, enabling automatedi data upload and prediction in a non-invasive and accessible manner. These results highlight the potential of integrating lightweight deep learning architectures with behavioral feature analysis to support early ASD screening. Future work will extend validation to larger and more diverse datasets and explore multimodal approaches, including speech and audio analysis, to enhance robustness and clinical applicability.

237.EMPLOYING FRACTIONAL LOWER-ORDER MOMENTS FOR MEDICAL IMAGE-BASED TUMOR IDENTIFICATION

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Image fusion in medical imaging aims to merge multiple images from varied sources into a single image to enhance diagnostic capabilities. Proposing an algorithm to create a new fusion rule for multimodal medical images using fractional lower order moments. Initially, multimodal medical images undergo decomposition using Undecimated Discrete Wavelet Transform (UDWT). UDWT helps to greatly reduce the blurring incurred in the existing methods. Next, the low-frequency subbands are combined using contrast visibility (CV) approach, while the high-frequency subbands are combined using fractional lower order moments. Afterward, the combined image is reconstructed using inverse UDWT. Based on the experimental findings from multiple sets of multimodal medical images, it is evident that the newly developed algorithm outperforms the current algorithms across different image quality aspects such as mutual information, entropy, standard deviation, and various other metrics.

238.AI & MACHINE LEARNING-BASED PEST DETECTION AND PESTICIDE RECOMMENDATION SYSTEM

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Pest infestations remain a major threat to global agricultural productivity, causing significant crop losses and disproportionately affecting smallholder farmers in resource-limited regions. While deep learning models such as ResNet-50 have demonstrated strong performance in image-based pest identification, most existing systems are limited to detection and do not provide practical management guidance. In this work, we present a comprehensive, AI-powered pest detection and advisory platform that bridges this critical gap. Our system employs a ResNet-50 convolutional neural network, fine-tuned on a diverse, multi-class pest image dataset, with class imbalance addressed through weighted sampling to ensure robust detection across both common and rare pest species. The model is deployed within an accessible web application, enabling users to upload crop images for instant, high-confidence pest identification. Distinctively, our platform integrates a generative AI assistant that delivers tailored, actionable pest management recommendations immediately following detection. This assistant leverages large language models to generate both organic and conventional control strategies specific to the identified pest, and supports a conversational interface for follow-up queries and context-aware advice. This end-to-end approach transforms the system from a passive diagnostic tool into an interactive, solution-oriented advisor, empowering farmers with expert-level guidance at the point of need. Security and privacy measures are incorporated to ensure ethical deployment. By uniting state-of-the-art computer vision with generative AI, our work advances the accessibility, effectiveness, and real-world impact of digital pest management in agriculture..

239.YOLO-BASED HYBRID DEEP LEARNING MODEL FOR MEDICINAL PLANT SPECIES IDENTIFICATION

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Plant leaf identification has become an important activity in the field of precision agriculture and medicinal plant research in recent years because the correct identification of plant species leads to easier conservation of biodiversity, crop surveillance, and the identification of medicinally useful plants. This paper will be devoted to the creation of an automatic recognition system based on deep learning models that will recognize and classify plant leaves based on their appearance with a high degree of accuracy. The dataset that is going to be used in the experimentation is based on 6,152 images representing 75 plant species. Two state-of-the-art strategies were used to ensure a solid performance: an object detection model built on the basis of YOLO and a Vision Transformer (ViT) as a fine-grained image classification strategy. YOLO model had excellent accuracy of 97% and it could identify and localize leaves in a complex background with very high accuracy. Complementary, the ViT model, which was used, ViTForImageClassification and ViTImageProcessor, improved the classification pipeline by efficiently representing the spatial patterns and details of the venation of leaves. Combining these models will guarantee the reliability and scalability of plants leaf recognition, which is needed in multiple areas, such as species classification, and medicinal use checks. On the whole, this study emphasizes that deep learning is an effective tool in the construction of intelligent and real-time plant identification systems.

240.A HYBRID MACHINE LEARNING AND TRANSFORMER-BASED APPROACH FOR MULTILINGUAL SOCIAL MEDIA CONTENT MODERATION

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Social media platforms generate large-scale user content daily, requiring automatic content moderation to maintain safe online communities. Toxic comments including racial , religious , and severe insults that harm users and create negative discussions. Manual moderation cannot handle this volume, especially in Indian social media where users write in English, Tamil, and code-mixed Tanglish with informal grammar, spelling variations, and diverse transliteration styles. We propose a Multilingual Toxic Comment Classification System detecting six toxicity labels: toxic, severe toxic, obscene, insult, threat, and identity hate.The approach we created is a hybrid mix of classical machine learning (like Logistic Regression, XGBoost, LightGBM, CatBoost) with a more intuitive tranformer based DistilBERT. We preprocess text, extract TF-IDF features for classical classifiers using one of the strategies which is One-vs-Rest strategy and DistilBert for understanding contextually.Ensemble averaging combines predictions for robust results. Evaluating comments over 100,000 demonstrates significant improvements over baseline methods.

241.A SUSTAINABLE 3D MOTION MUSCULOSKELETAL TRACKING HEALTHCARE SYSTEM

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While diagnosis of movement disorders and guidance of rehabilitative interventions in conditions like osteoarthritis, stroke, or Parkinson's disease rely on analysis of human motion, optical motion capture systems represent the current gold standard for kinematic estimation but often require expensive equipment and a predefined space. In contrast, a body-mounted sensing device can analyze motion dynamics in any environment, but such current systems are generally less accurate than optical motion capture systems. Additionally, most of the systems depend on proximity to a computer and proprietary software, hence researchers cannot reproduce experimental results. Here, we demonstrate 3D Kinematic-RT MS, an open-source wearable system. It also estimates real-time upper and lower extremity kinematics by using inertial measurement units and a portable microcontroller. Comparison of both the methods, 3D Kinematic-RT MS system against optical motion capture is done. Average RMSE is of 4.2 degrees over 4 upper appendage joint angles during four minutes fifteen seconds of normal movements (n = 4) and an average RMSE of 4.5 degrees over 4 upper marginalized joint angles during a Wolf Motor Function test (WMFT) and Action Research Arm Test (ARAT) task (n = 4). The computation frequency depends on the numerous tracked segments. The system utilizes standard parts costing about ₹8366 plus ₹1673 for each tracked segment. Also developed constructive objectives: Attainment of Optimal Rehabilitation through Open-Sim: Design and evaluate protocols for rehabilitation and therapeutic interventions using musculoskeletal models and simulations. Accurate motion capture: Analyze motion capture data so the movements can be recognized, interpreted, and analyzed for abnormalities. Real-time Tracking: Collect and capture relevant data in real-time, Motion analysis: Simulate and analyze realistic human movement by applying forces, torques, and muscle activations to a skeletal model. Also, comparative analysis and comparative study of multiple datasets are carried out.

242.A VISUAL ANALYTICS–ORIENTED FRAMEWORK FOR SECURE AND EFFICIENT CLASSIFICATION OF MOBILE GALLERY IMAGES IN DATA-DRIVEN ENVIRONMENTS

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The explosive growth in the use of smartphones has led to an unprecedented growth in personal visual data, especially in the form of mobile gallery images. While image categorization has been a standard feature in modern mobile devices that is becoming automatic, ensuring efficiency and security of large-scale mobile image classification still presents as one of the biggest challenges because of high visual diversity, unstructured content, and lack of labeled data. In conjunction with the scope of visual analytics and data visualizations, this research formally states the problem of secure and efficient mobile gallery image classification and proposes a structured categorization strategy that is reflective of the realistic user generated image collections. A large-scale reproducible dataset with the content of over 16000 manually curated images of 35 different categories is created to enable systematic analysis and evaluation of models. Furthermore, a light-weight mobile-friendly neural network architecture is discussed to balance between classification accuracy and computational efficiency with a top-1 classification accuracy of 84.9%. Visual analytics principles are applied in order to understand what is happening in the model, how patterns in classification take place, and what limitations occur within the application scenario in the real world. The proposed framework shows how integrating visual analytics with deep learning promotes the transparency, scalability and usability of mobile image classification systems, which is suitable for data-intensive and privacy-sensitive applications..

243.HYBRID CNN–VISION TRANSFORMER WITH ATTENTION FOR DETECTION OF AI-GENERATED SYNTHETIC IMAGES AND FRAME-LEVEL VIDEO ANALYSIS USING CIFAKE DATASET

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The fast growth of generative AI has made it easy to create very realistic fake images and videos. This has created serious problems for digital trust, as such content can spread misinformation very quickly. Because of this, there is a strong need for detection methods that are not only accurate but also easy to understand and explain. In this work, the task of detecting AI-generated images is studied using the CIFAKE dataset. First, popular deep learning models such as ResNet18, EfficientNet-B0, and ConvNeXt-Tiny are tested as baseline classifiers. Although these models achieve good accuracy, they struggle with explanation and do not always generalize well.To address these issues, a hybrid deep learning model is proposed. It combines CNNs to capture fine image details, Vision Transformers to understand the overall image context, and an attention mechanism to focus on important features. This approach achieves a test accuracy of 94.47% and an AUC score of 0.9833 on the CIFAKE dataset, showing reliable and stable performance. To make the model's decisions easier to understand, Grad-CAM is used to highlight the image regions that influence predictions. The model is also extended to videos by analyzing frames individually and combining their results to make final video-level decisions. A complete system with frontend and backend support allows users to upload images or videos, view explanation maps, and download annotated videos. Overall, the proposed AI-based approach provides a good balance between accuracy, transparency, and real-world usability for detecting synthetic media.

244.AN AUTOMATED HYBRID MULTI-TOOL FRAMEWORK FOR APK AND WEB VULNERABILITY SCANNING

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The rapid growth of mobile and web applications has significantly increased the attack surface of modern software systems, exposing them to a wide range of security vulnerabilities. Existing automated vulnerability scanners predominantly rely on either static or dynamic analysis and are often limited to a single platform, resulting in incomplete vulnerability coverage and a high number of false positives. To address these limitations, this paper proposes an automated hybrid security posture assessment framework for Android applications and web applications. The proposed framework integrates static and dynamic analysis tools within a unified orchestration architecture that automates tool execution, normalizes heterogeneous outputs, and correlates findings to improve accuracy. Vulnerability severity is evaluated using standardized CVSS metrics and mapped to CWE categories to support effective prioritization. Experimental evaluation conducted on vulnerable Android APKs and web applications demonstrates that the proposed framework achieves broader vulnerability coverage and reduces false positives by up to 70% compared to standalone scanners. The framework is designed for continuous security assessment and seamless integration into CI/CD pipelines, making it suitable for modern DevSecOps environments.

245.RIDETOGETHER: AI-BASED REAL-TIME SAFETY MONITORING SYSTEM FOR GROUP TRAVELERS

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Group travel safety is a critical issue which we see in real time coordination breakdown, delayed emergency response, and also in the lack of intelligent risk assessment which is present in group travel. In this paper we present RideTogether, an AI based real time safety monitoring framework which we put in place to improve group travel coordination and emergency response. We have put together a system which includes continuous location tracking, group cohesion study, and anomaly detection which we use to identify unsafe situations like large scale rider separation and pre crash scenarios. We use a machine learning approach which includes K means clustering to model group movement and put forth regrouping solutions, also we use Isolation Forest to identify out of the ordinary motion and location behavior which are indicators of safety issues. The system we have put together using a cross platform mobile architecture which we tested in simulation and in the field. We saw that we got better group co-ordination results and also that we do well in identifying issues as they come up which in turn validates our approach. Our put forth framework is to present a scalable and intelligent solution for better and safer group travel which is also more connected.

246.AN EFFICIENT REAL-TIME VIDEO STABILIZATION FRAMEWORK FOR UAV APPLICATIONS

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Video stabilization seems like a key thing in com- puter vision, especially when cameras are moving around without much control, like in phones or drones. This work talks about a system that does it in real time, using features from the video and adding a simple way to check how stable things are. It tracks corners with something called pyramidal Lucas-Kanade optical flow, estimates affine motion, and warps the frames to fix shakes. Plus, there's a linear SVM that sorts the motion into static, mild, or strong, all without slowing down the process. They made it into a live app that runs smooth on regular computers, and tests show it cuts down on jitter and rotations pretty well, with low computer use.

247.MediTag: A Reusable Colored Micro QR Framework for Secure and Scalable Pharmaceutical Packaging

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Information related to the medicines, such as the date of manufacture, expiration date, and batch identifier, is usually printed on the medicine packaging but tends to deteriorate or become unreadable in real-world usage, especially on small blister strips. On the other hand, QR codes have been used to digitize drug information and improve traceability; however, existing applications are still plagued by static encoding, susceptibility to replication, and limited applicability for high-density, small-format packaging. This paper reviews recent advances in the applications of QR codes for pharmaceuticals: anti-counterfeiting, encryption-based protection, and blockchain-enabled traceability. If we address both of their shortcomings, then propose MediTag — a system-level approach providing QR code reusability through colored micro QR codes. Here, one micro QR carries medicine id information, while batch information varies with color encoding methods, validated via cloud backend systems. Here, medicine id is decoupled from batch information, thus eliminating redundancy in generating QR codes in batch manufacturing processes in an efficient manner and finally achieves real-time verification of expiry dates and authenticity.

248.A SMART HEALTH SURVEILLANCE AND EARLY WARNING PLATFORM FOR WATER-BORNE AND VECTOR-BORNE DISEASES USING AI-BASED PREDICTION AND COMMUNITY-CENTRIC REPORTING

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The existing technologies being used in the predictive and detecting of waterborne and vector borne diseases have been surveyed in the research paper and the key spheres of AI and community-based approaches integration in public health surveillance have been highlighted. World economies and health continue to pay millions annually due to the illnesses that are caused by waterborne pathogens, especially in the resource-poor and rural areas of the world. It is far between times when the technologies will be used in the field on a regular basis, yet massive advances have been made in the detection, starting with classic culture and PCR methods to biosensors and AI-enhanced analytics. It is also inclusive of the most recent assortments, e.g. community-based low-cost and explainable AI/ML frameworks that integrate manual water quality assessments, environmental data, and community symptom reporting without involving expensive IoT infrastructures. The importance of the community, rapid and reliable diagnostic tools, and solutions capable of expanding in a smooth way are the primary lessons learned as the primary factors of success. However, there are still some challenges to overcome and the gap in real-time detection, affordability, and high usage is still quite significant. The paper proposes the creation of affordable, open, and readily-available surveillance systems not only to ensure that the preparedness of the population to health is more solid but also to advance us a step closer to the achievement of Sustainable Development Goals (SDGs) that can be linked to health and sanitation.

249.AI-DRIVEN SAFETY AND RISK MANAGEMENT FRAMEWORK FOR MINING OPERATIONS: A UNIFIED PREDICTIVE APPROACH

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Mining operations are very essential to the global industry for there growth yet it has been the most dangers workplace due to the climatic conditions and the environmental conditions and complex machinery Accidents such as gas leaks and land slides and equipment failures this all causes a severe losses in human life as well as business loss and productivity also. Traditional safety system depends largely on the manual observations and fixed threshold alarms which often reacting only after incidents occur this paper presents an integrated AI-driven Safety and Risk Management Framework which has been designed for proactive hazard detection risk prediction and the ore percentage estimation in the mining environment this framework integrate iot sensor data high resolution through computer vision and advanced machine learning analytics to monitor the environment , mechanical, and human factors in real time. In this ore percentage estimation module is embedded to enhance the outcomes of the work the operational efficiency will be known through this analysis by extracting samples through image based deep learning modules providing rapid non destruc- tive quality control through sophisticated predictive analytics for this we will be using thee LSTM and the autoencoders by this the system identifies the possible outcomes and quantifies risk through a unified scoring mechanism which provides multi level alert and visualizes safety and productivity trends through cloud dashboard experiments which are conducted on a comprehensive dataset combining simulated real-world-inspired mining data, demonstrate superior reliability a 94.6 mAP for PPE and R2 of 0.95 for the ore estimation which helps to enhance scalability than compared to the traditional isolated system . Through this comprehensive AI system represents a paradigm shift from reactive and also to predictive and preventative of mining safety for the resource management contribution significantly for the sustainable safer mining operations

250.REAL-TIME FACIAL EMOTION RECOGNITION USING DEEP LEARNING AND ONNX- BASED WEB DEPLOYMENT

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Facial emotion recognition plays an important role in current human–computer interaction as it permits a system to recognize the affective state of an individual. This paper proposes a real- time facial emotion recognition system that is developed by applying a Convolutional Neural Network (CNN), covering all stages from training

to testing on the FER-2013 dataset consisting of balanced 48 × 48 grayscale images of faces divided into seven human emotional levels. To compensate for dataset imbalance, oversampling and data augmentation are adopted to enhance the proportion of minority classes and improve generalization performance. Further, the trained model is exported to the ONNX format, which provides both platform-independent and optimized inference. The system is deployed via a FastAPI backend integrated with WebSocket support, which is presented as a solution capable of very fast streaming predictions for real-time scenarios. Additionally, a lightweight frontend interface enables webcam-based interaction and reports emotion predictions as they occur in real time. Experimental results show that the system performs strongly, achieving a training accuracy of 95.71 percent and a validation accuracy of 87.60 percent, thereby demonstrating the system's reliability and suitability for real-time facial emotion recognition.

251.DESIGN AND ANALYSIS OF MULTI PHASE IM DRIVE SYSTEM

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The rapid electrification of modern transportation demands electric motors with superior efficiency, higher torque density, and improved reliability. This work presents the design and development of a multi-phase induction motor (IM) intended for high-power traction applications. Unlike permanent-magnet-based machines, the proposed IM eliminates dependence on rare-earth materials, providing a cost-effective, thermally stable, and environmentally sustainable alternative while maintaining competitive performance. The multi-phase architecture enhances system robustness by offering improved fault tolerance, reduced torque ripple, and smoother electromagnetic behaviour across a wide operating speed range, making it suitable for electric vehicles, rail traction, and renewable-energy-based drive systems. The methodology includes comprehensive electromagnetic modelling, finite-element analysis, and system-level simulation, followed by prototype development and performance validation. A dedicated multi-phase inverter drive system is designed and evaluated using MATLAB/Simulink to analyse motor characteristics, efficiency behaviour, and control strategies under both healthy and fault conditions. Anticipated outcomes include increased torque density, improved efficiency, reduced copper loss, and enhanced reliability, demonstrating the advantages of multi-phase IM technology in advanced traction applications. Overall, this study contributes to the advancement of sustainable, efficient, and magnet-free motor technologies aligned with global goals for green mobility and energy transition.

252.INTELLIGENT CRYPTOGRAPHIC ANALYSIS, RECOMMENDATION, AND RE-ENCRYPTION SYSTEM WITH CHATBOT SUPPORT

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Sensitive data is at serious risk from the ongoing use of antiquated and weak cryptographic algorithms, especially when users are ignorant of the encryption methods used on their datasets. An end-to-end method for determining and en- hancing cryptographic security is presented in this paper: an Intelligent Cryptographic Analysis, Recommendation, and Re- Encryption System with Chatbot Support. The suggested system uses machine learning-based classification and statistical feature extraction from the ciphertext to automatically identify the cryptographic algorithm used in encrypted data. Deterministic security analysis is then used to assess the identified algorithm based on known cryptographic vulnerabilities, key length, en- tropy, and mode of operation.A more robust cryptographic algorithm is suggested based on this analysis and the data's intended use, and the data is safely re-encrypted using common cryptographic primitives. A chatbot module is incorporated as a read-only explanation layer to improve interpretability, assisting users in comprehending analysis findings and

security choices without interfering with cryptographic operations. The effective- ness of the suggested system as an understandable and useful cryptographic decision-support framework is demonstrated by experimental evaluation, which shows increased security strength following re-encryption.

253.TELECOM BIG DATA ANALYTICS USING PYSPARK

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Telecom operators generate massive volumes of Call Detail Records (CDR) on a daily basis, capturing detailed information about voice calls, short message services, and data usage. Processing and analyzing such large-scale telecom data using traditional single-node systems is inefficient and time-consuming. This paper presents a scalable Telecom CDR Analysis System implemented using Apache Spark (PySpark) to efficiently process and analyze large datasets. The proposed system analyzes approximately 1 GB of CDR data to derive insights related to revenue generation, network quality, customer usage behavior, and abnormal activity detection. By leveraging distributed processing, in-memory computation, and parallel execution, the system achieves improved performance, scalability, and fault tolerance. The results demonstrate that Spark-based analytics significantly outperform conventional approaches and provide timely, actionable insights for telecom operators.

254.VISUALIZING NETWORK INTRUSIONS THROUGH A WEB-BASED NIDS

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The increased use of computer networks has contributed to increased vulnerability to cyber-attacks like port scanning, denial-of-service attacks, as well as unauthorized access attempts. Network Intrusion Detection Systems (NIDS) are important in detecting such threats by means of monitoring network traffic. On the other hand, many existing NIDS solutions employ complicated command-line interfaces, limiting usability for non-expert users. This work is based on a web-based Network Intrusion Detection System realized in React with the aim of enhancing its accessibility. Usability as well as the ability to view network security events as they occur. The proposed system will use rule and signature-based techniques. The system will use React for visualization of the alert information through REST APIs. Experimental evaluation reveals that the system is quite efficient at identifying the predefined patterns of intrusion with low false alarms. It performs well even under heavy loads and has the potential to work well in an education and small business setup.

255. EFFNET-SVM: A HYBRID MODEL FOR DIABETIC RETINOPATHY CLASSIFICATION USING RETINAL FUNDUS IMAGES

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The manual diagnosis of diabetic retinopathy (DR) is often critical, time-consuming, expensive, and prone to human error. Additionally, it can be subjective, and depends on the clinician's professional experience. Recently, automated computer-aided diagnosis (CAD) systems have significantly reduced the time and effort required for diagnosis while achieving superior performance compared to traditional methods. Researchers have extensively explored deep learning (DL) and convolutional neural networks (CNNs) for diagnosing DR from fundus images, yielding promising results and offering a viable alternative to conventional diagnostic approaches. In this study, a hybrid model named EffNet-SVM is proposed for the classification of DR and no DR cases using retinal fundus images. The model is trained and tested using the Asia Pacific Tele-Ophthalmology Society (APTOS) dataset, which includes both DR and no DR images. The EffNet-SVM utilizes EfficientNetV2-Small for feature extraction from input fundus images, and the extracted features are then classified using a support vector machine (SVM) with a radial basis function (RBF) kernel. The EffNet-SVM model outperformed eight state-of-the-art DL models from the literature, achieving the highest accuracy of 97.26%. Performance metrics validate that the proposed hybrid model can be effectively integrated into CAD systems for the automated analysis of fundus images.

256.BLOCKCHAIN BASED TRACKING OF DUAL-USE CHEMICALS FOR SUPPLY CHAIN SECURITY

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This paper presents a blockchain-based framework designed to secure and monitor the supply chain of dual-use chemicals (DUCs). These chemicals, which can serve both industrial and harmful purposes, require strict regulation and traceability. The proposed system employs blockchain technology to create a decentralized, tamper-proof, and verifiable record of every transaction from the manufacturer to the end user. Smart contracts on the Ethereum blockchain enforce compliance with international regulations, such as the Chemical Weapons Convention (CWC), ensuring transparent and automated verification. By replacing traditional paper-based and centralized systems, the framework enhances accountability, minimizes the risk of data manipulation, and streamlines compliance checks. The prototype shows that integrating blockchain greatly reduces administrative workload while enhancing trust, security, and transparency throughout the supply chain. This approach strengthens regulatory oversight and supports the safe, responsible management of hazardous materials.

257.AI-DRIVEN KITCHEN COMPANION : ECOKITCHEN CONNECT FOR WASTE-FREE COOKING & SHARING

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Food waste is a growing global issue with significant economic and environmental impacts. This paper presents an AI driven kitchen companion designed to reduce household food waste through intelligent inventory tracking, expiry date monitoring, recipe recommendations, and sustainability focused decision support. The system analyzes user behavior, predicts food usage patterns, and provides timely alerts to prevent spoilage. By supporting efficient meal planning, responsible consumption, and donation oriented features, the solution promotes a zero waste lifestyle. The proposed approach demonstrates how artificial intelligence can enhance household food management and contribute to sustainability goals.

258.A HYBRID REAL-TIME STUDENT ENGAGEMENT MONITORING FRAMEWORK USING COMPUTER VISION, DEEP LEARNING, AND AI-BASED QUIZ INTERVENTION

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Maintaining learner attention in digitally mediated and technology-enhanced classrooms remains challenging, largely due to the lack of continuous visibility into student behavior and the absence of immediate instructional response mechanisms. Many existing engagement monitoring solutions operate offline or provide only passive feedback, limiting their effectiveness during live teaching sessions. This paper presents SmartClass, a real-time student engagement and distraction detection platform that combines computer vision, deep learning, and generative artificial intelligence to enable continuous attention assessment and timely re-engagement.

259.AI-POWERED CROSS-PLATFORM E-COMMERCE SEARCH AND RANKING FRAMEWORK

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This paper presents an AI-powered multi-agent framework for real-time, cross-platform e-commerce product search and ranking. The framework integrates autonomous agents(Lang Chain, CREWAI), reasoning models

(DeepSeekR1), transformer models (Hugging Face), Playwright-based dynamic scraping, a FastAPI orchestrator, and a React frontend with Su- pabase authentication. Agents parse user intent, scrape multiple marketplaces(Amazon/Flipkart),analyze features/ratings/prices, and produce a ranked list of purchase options. Its effectiveness is proven by experiments on multiple queries related to various products, where high relevance and quick response times are achieved.

260.A DATA-DRIVEN FRAMEWORK FOR EPILEPTIC SEIZURE PREDICTION USING WEARABLE PHYSIOLOGICAL DATA AND OPTIMIZED LSTM MODELS

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Robust and timely prediction methods are necessary for enhancing the outcomes of epilepsy patients, a prevalent neurological disorder characterized by recurring seizures. A real-time epileptic seizure prediction framework based on data-driven evidence utilizing physiological signals collected from wearable sensors is introduced in this paper. The proposed system represents multivariate time-series data, i.e., heart rate, stress levels, inter-beat interval, and physical activity markers, using Long Short-Term Memory (LSTM) networks. The quality of the signal and model improvement come from careful data preprocessing, feature engineering, and dimensionality reduction through Principal Component Analysis (PCA). Through an interactive graphical user interface, the architecture easily integrates with wearable technology to real-time classify seizure states—interictal, preictal, and ictal. Experimental verification proves the system's robustness to noisy inputs and unbalanced data while maintaining high predictive accuracy and low false-positive rates. The survey reveals the promise of wearable technology and the worth of machine learning approaches to physiological data analysis. The development process is largely dictated by sources such as research papers, journals, and web content.

261.CODEFORMER: FACE RESTORATION PROJECT

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Real-world face photographs usually contain severe defects, such as blurred motion, chunky pixels, stubborn noise, compression marks, and occluded parts. All of these partly make the job of reliable face analysis and truly blind restoration challenging with no guesswork about the specific degradation involved. The goal is to uplift perceptual quality while keeping the person's identity intact. It describes a work developed from the well-known backbone of the Codebook Lookup Transformer for building a solid blind face restoration framework. In this work, a Vector Quantized Generative Adversarial Network (VQGAN) is combined with a transformer-driven codebook prediction pathway to restore clean facial features from badly degraded inputs. The balance between how good the restoration has to look and how faithfully the identity is preserved can be tuned by a fidelity control knob. Beyond restoration, it extends the basic framework towards related tasks such as colorizing faces and filling in missing regions, flexible for many different restoration situations. It uses deep-learning-based detectors for face detection and alignment. Optional background enhancement by super- resolution is added.

Experiments demonstrate that the proposed methodology recovers fine facial details while preserving identity in a wide range of degradation conditions, ensuring noticeable gains both in visual quality and robustness against the state-of- the-art blind restoration methodologies.

262.AI-DRIVEN HYBRID BIO-INSPIRED DEEP-MACHINE LEARNING MODEL FOR SOFTWARE DEFECT PREDICTION

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Software defect prediction enables early identification of fault-prone modules and helps reduce testing effort, maintenance cost, and quality risks in large software projects. Existing machine learning and deep learning models often suffer from high-dimensional metric spaces, class imbalance, and limited generalization, which restrict their effectiveness in practice. This paper presents an AI-driven hybrid framework that combines bio-inspired feature selection using Sparrow Search Algorithm & Grey Wolf Optimizer, convolutional neural network-based feature extraction, and ensemble classifiers, namely Random Forest and XGBoost, for software defect prediction on NASA PROMISE data. Experimental evaluation on a PROMISE dataset with multiple random seeds shows that the RF-based hybrid model achieves an accuracy of 0.973, macro-F1 score of 0.90, and ROC-AUC of 0.981, while the XGB-based variant attains 0.955 accuracy, macro-F1 of 0.86, and ROC-AUC of 0.962. These results indicate that integrating bio- inspired optimization, deep representations, and ensemble learning yields more accurate and robust software defect prediction than single-model baselines

263.PREDICTING ENERGY CONSUMPTION WITH MACHINE LEARNING

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Accurate prediction of energy consumption is an important task in efficient energy management and smart power system design. With the increasing amount of large-scale energy data being provided by smart meters and energy management systems, machine learning techniques have been identified as useful tools for dealing with complex patterns of energy consumption. In this paper, a machine learning-based approach for predicting energy consumption based on historical patterns of consumption and related factors is presented. The proposed approach involves data processing, feature extraction, and the application of supervised learning algorithms for predicting future energy demand. The performance of the models is validated using standard error metrics to assess the accuracy of the prediction models. The results demonstrate that machine learning models can efficiently detect non-linear patterns in energy consumption data and make accurate predictions compared to existing models.

264.MODELING AND PREDICTION OF RAILWAY TRAIN DELAYS USING ENSEMBLE MACHINE LEARNING TECHNIQUES

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Delays in train schedules create chain reactions in terms of passenger satisfaction, smooth running, and performance of rail transport. Being very precise about delay predictions is rather challenging, as many dynamics are involved, and route intricacies, season, and distance covered affect delay predictions. To address these concerns, the current study proposes an end-to-end machine learning approach that can predict train delays and provide guidance to passengers via a web- supported system. The approach relies on a train operation history data-set and implements a Random Forest Regression approach, supplemented with contextual variables such as travel dates, seasons, and weather conditions. The approach ensures that the process benefits from proper data engineering and categorical data handling, thereby supporting stable predictive performance. The deployment is carried out using a Flask REST API capable of providing real-time delay estimates and train recommendations, facilitated through a React-based frontend. Experimental evaluation on the available dataset indicates strong predictive performance, with a high coefficient of determination and low mean absolute error values. In addition, the system provides interpretive indicators to assist users in understand- ing predicted delays. The findings suggest that ensemble-based learning approaches are well suited to capturing complex delay patterns in railway networks. The proposed approach is scalable and user-friendly and provides benefits to both passengers and railway authorities.

265.AI Farm Connect: An Intelligent Multilingual Farmer Consumer Marketplace with Voice Interaction and Automated Price Negotiation

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Agricultural supply chains in developing regions continue to grapple with limited market access, exploitation of prices by intermediaries, language barriers and poor digital connectivity. This results in significantly reduced income for farmers and restricts the access of consumers to fresh and fairly priced produce. This paper presents AI Farm Connect an intelligent web agricultural marketplace to enable direct farmer consumer interaction through artificial intelligence, multilingual voice interfaces and offline transaction support. The proposed system integrates a machine learning–based recommendation engine that matches consumers with nearby farmers based on price, quality, proximity and historical interactions. An auto- mated price negotiation module is introduced to

suggest fair and data driven prices using market trends, demand factors, quality grades and logistics distance. Additionally, the platform offers multilingual voice interaction in regional languages and also enables low bandwidth and offline users to place orders using SMS-based queuing mechanisms. The system is implemented in a modular architecture comprising a FastAPI backend, React based frontend and lightweight machine learning models for real time decision support. Experimental evaluation demonstrates improved price transparency, reduced dependency on interme- diaries and enhanced usability for low-literacy users. Results clearly indicate that the proposed approach would be effec- tive in improving market fairness, accessibility and operational efficiency in agricultural trade. The system further offers a scalable, practical solution for digitally empowering farmers while ensuring equitable pricing and improved consumer access.

266.DEEPFAKE DETECTION FOR IMAGES USING MULTI-MODAL FEATURES

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The spread of artificial media that are incredibly life like, also known as deep fake is causing a significant threat to information. While many detection methods rely on computational deep learning methods, this paper shows a feature-driven framework for efficient detection of manipulated images. The proposed method is centric to the extraction of 1D feature vector that combines two modalities: first is spatial geometry, derived from facial landmark analysis to get the face inconsistencies, and another is frequency-domain, which is using Fast Fourier Transform to detect subtle manipulations. It is observed that the proposed method shows how low dimensional feature set can serve as a powerful alternative to computational models.

267.POTHOLO DETECTION USING DEEP LEARNING

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The management of road infrastructure in the modern era faces many difficulties. Disorganised inspections, a protracted process for reporting troublesome road conditions, and manual pothole detection without timely updates are among the problems. These situations make it extremely challenging for cities to maintain the quality of their roads and prevent pothole-related accidents. PotholeDetect provides fully automated detection as a solution to these issues. The platform helps authorities by providing automated detection and enabling them to monitor road conditions in real time. It is based on multiple variations of deep learning algorithms, including YOLOv8 and Faster R-CNN.A Convolutional Neural Network architecture called YOLOv8 uses image inputs and video feeds to identify potholes. It makes it easier for maintenance teams to obtain location data and

severity assessments by streamlining the reporting process. Through bounding box accuracy metrics and confidence thresholds, the system verifies the detections to guarantee that accurate information is consistently communicated. PotholeDetect is implemented on a Python Flask backend and an HTML/CSS/Bootstrap frontend. Detection records are stored in the cloud, and real-time detection and classification are made using the trained YOLOv8 model. Interactions among the modules are handled through RESTful APIs. Preliminary evaluations indicate that Pothole Detection can reduce manual inspection efforts by around 70%, increase accuracy in detection to about 95%, and raise the efficiency of road monitoring by 65%. These estimates are obtained from comparisons with traditional inspection methods, results obtained from real-world on-road datasets in detection, and validation experiments. Thus, this system, being more automated and data-centric, would seem to have great potential for paving the way toward improved road maintenance.

268.NEXT-GEN CAREER RECOMMENDATION SYSTEM FOR STUDENTS

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Selecting an appropriate career path is a major challenge for students because of the ever-changing requirements of the industries. The existing career guidance system is based on manual processing, which may not be accurate in representing the potential of individual students as well as the latest industry requirements. This paper proposes a Future Gen Career Recommendation System for Students using Artificial Intelligence and Machine Learning concepts to provide personalized and accurate career suggestions. The proposed system evaluates various attributes of students, such as performance, skills, interests, and preferences, using classification and recommendation models. Natural Language Processing concepts are used to handle unstructured text inputs like career interests and objectives. Based on similarity matching and predictive analysis, the system provides ranked career suggestions with insights. The experimental outcome proves that the proposed system is capable of efficiently enhancing the accuracy of career recommendations, thus providing an intelligent and effective solution for the current educational scenario.

269.DEEPFAKE CONTENT MONITORING AND REAL-TIME ALERT SYSTEM FOR SOCIAL MEDIA

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The rapid dissemination of synthetic media has intensified concerns surrounding the authenticity of visual content shared across social networking platforms. Deepfakes, in particular, pose a substantial threat due to their increasing realism and ease of generation, making timely detection both technically and socially critical. Existing detection approaches often struggle to balance real-time responsiveness with interpretability, limiting their adoption in moderation workflows. This study presents a deepfake monitoring and alert framework designed for continuous social media surveillance, integrating transfer learning with a customized ResNet-18 backbone. The system is trained and evaluated using the FaceForensics++ dataset under compression conditions representative of real-world platforms. Experimental results indicate high classification reliability, achieving detection accuracy exceeding 99% with inference latency consistently under two seconds. To address transparency concerns, an explainability module based on gradient-weighted class activation mapping is

incorporated, enabling visual localization of manipulated facial regions. The combined architecture supports rapid identification, interpretable decision-making, and practical deployment in live content moderation environments.

270.AI- POWERED RESUME SCREENING AND CATEGORIZATION SYSTEM

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Recruitment has become a challenging task due to the large number of job applications received for a single position. Manually reviewing resumes is time-consuming and often inconsistent. To address this problem, this paper proposes an automated resume screening system using Natural Language Processing (NLP) and Machine Learning techniques. The system extracts skills and relevant information from resumes and compares them with job requirements to evaluate candidate suitability. Publicly available skill datasets and resumes from different domains were used to develop and test the system. Multiple similarity methods were implemented and compared to identify the most suitable approach for ranking candidates. The experimental results show that the proposed system provides more consistent and reliable rankings compared to traditional keyword-based methods. This study highlights how NLP-based techniques can assist recruiters by reducing manual effort and improving consistency in large- scale hiring processes.

271.SignVision: A Hybrid Deep Vision Framework for Robust Traffic Sign Recognition in Adverse Weather Conditions

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Traffic sign recognition (TSR) is critical for au- tonomous vehicles and Advanced Driver Assistance Systems (ADAS), enabling enhanced road safety through accurate real- time detection. Existing single-model approaches struggle with small, occluded, or weather-degraded signs. This paper proposes SignVision, a hybrid deep learning framework that integrates YOLOv8 for rapid detection with Faster R-CNN for precise localization of challenging traffic signs.
Trained on the augmented GTSRB dataset (43 classes, 50K+ images) using weather simulation and Non-Maximum Suppres- sion (IoU=0.5), SignVision achieves 97.5% test accuracy, surpass- ing YOLOv8 (96.8%) and Faster R-CNN (95.2%). With 45ms inference time and integrated text-to-speech alerts, the system delivers robust performance for production ADAS deployment across challenging environmental conditions.

272. BLOCKCHAIN-BASED ELECTRONIC HEALTH RECORD SYSTEM WITH PATIENT-CENTRIC ACCESS

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Contemporary healthcare systems lean heavily on the use of Electronic Health Records (EHRs); however, the widespread use of centralized designs for EHRs has major drawbacks, including exposure to breaches, lack of patient-centric control, restricted interoperability, and excessive latency in accessing data during emergency conditions. In this paper, the authors present an EHR framework that utilizes blockchain technology with the purpose of ensuring patient-controlled, patient-owned data with secure fine-grained access control capabilities that address patient data during emergency conditions. This proposed framework utilizes smart contract technologies that have been deployed on the Sepolia test network, ensuring untampered record handling and full transparency during audits. In the framework, patients are assured complete handling or control of their health documents, with allowed healthcare professionals allowed write accesses only to their health documents, with an associated timely deal in view during emergency conditions. An experimental analysis is executed with an intensive uploading process associated with the heterogeneous uploading associated with various patient medical documents with performance metrics corresponding to gas usage, cost associated with each transaction, and overall data accessibility latency. This analysis concludes that the proposed framework enhances overall security, malleability, and patient-centric handling capabilities with meager computational complexity associated with the overall framework compared with more centralized platforms with primitively handled data. This particular analysis concludes that the proposed framework addresses various major limitations associated with centralized platforms with significant scalability associated with secure patient-handled next-generation electronic health records with minimal computational complexities.

273.DEEP REINFORCEMENT LEARNING–BASED CONGESTION CONTROL FOR 6G WIRELESS NETWORKS

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It is seen that the trends towards the sixth- generation (6G) wireless networks will help in the ultra-reliable low-latency communications (URLLC), massive machine-like communications (mMTC), and very high rates of data to serve the immersive experiences of holographic communication, extended reality (XR), and autonomous systems. However, the needs also bring in the issues of high congestion due to a large number of deployed equipment, uneven traffic distribution, and dynamism of network conditions. The traditional pressure management systems, which are largely founded on the static or slightly dynamic settings, cannot effectively cope with the complexity and size of 6G networks. This current paper proposes a congestion control system based on Deep Reinforcement Learning (DRL) to 6G wireless networks. The proposed approach enables intelligent, dynamic, and self-optimising congestion management whereby the most effective control policies

are constantly learnt and changed according to the current conditions of the network. The results of simulations confirm that the DRL-based approach is superior to the conventional congestion control algorithms in throughput, latency, and packet losses as well as fairness. These findings point out the potential of DRA to serve as one of the enablers of autonomous, intelligent and efficient network management of 6G systems in the future, which can support highly dynamic and ultra-dense network environments.

274.HYBRID MACHINE LEARNING FOR INTELLIGENT THREAT DETECTION

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The increasing dependency of satellite and space-based communication on ground networks has brought new challenges to cybersecurity. Contrary to terrestrial communication systems, space communication systems experience limitations, e.g., high delays (latency) and long-range transmission or in terms of computing resources/hardware; these different constraints impact the susceptibility of a system to cyber-attacks or exploitation. This study suggests a hybrid Convolutional Neural Network-Long Short-Term Memory (CNN-LSTM) deep learning model for intelligent intrusion detection in space network environments. The components of CNN successfully model spatial dependency and feature correlation in the input, while the LSTM component models long-term sequential relationships, which aid in capturing multi-step attack characteristics. The model has been developed and trained using the synthetic space network dataset, which simulates satellite communication traffic, consisting of normal and malicious data patterns. The proposed CNN-LSTM reached an accuracy of 96.8% and an F1-score of .96, outperforming existing CNN-QRNN models with respect to precision and recall. The hybrid architecture is more robust in detecting sophisticated cyber threats, minimizing false-positives, and showing the ability to be deployed for near-real-time, mission-critical space communication systems. This research contributes to advancing operational security of a satellite network using data-driven, adaptive intrusion detection.

275.SELF-HEALING NETWORKS AGAINST ZERO-DAY ATTACKS

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With the rise of sophisticated cyber threats, zero-day attacks have become a significant concern, exploiting previously unknown vulnerabilities and evading traditional security mechanisms. This project presents a deep learning-based self-healing network system that enhances cybersecurity resilience by detecting and mitigating such attacks in real _time. The proposed model employs an LSTM Autoencoder, trained on the NSL-KDD

dataset, to analyze network traffic and identify anomalies based on reconstruction errors. By leveraging unsupervised learning, the system detects deviations from normal behavior, allowing for the identification of potential zero-day intrusions. Additionally, a real-time automated alert system notifies security administrators upon detecting anomalies, ensuring swift threat response and mitigation. A key feature of this approach is its self-healing capability, which enables the system to adapt dynamically to emerging cyber threats, continuously refining its detection mechanisms. Through AI-driven automation, this project enhances network security, reduces response time, and strengthens defenses against evolving attack vectors. The proposed solution offers a scalable and proactive approach to cybersecurity, paving the way for more adaptive and intelligent intrusion detection systems. Adoption of this model not only fortifies proactive defense mechanisms but also proves the promise of autonomous systems in cybersecurity. With constant traffic behavior monitoring and intelligent anomaly detection, the network is able to anticipate prospective threats before they inflict damage. By doing so, the approach reduces downtime profoundly, increases stability in operations, and offers a scalable architecture for defense that can fit into various network infrastructures, thus laying a foundation for future AI-powered, self-maintaining security systems.

276.ADVANCING CLINICAL TRIAGE IN EMERGENCY CARE WITH MACHINE LEARNING: TOWARD FAIR, INTERPRETABLE, TRANSPARENT, AND MULTI-SIGNAL INTELLIGENCE

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The current triage systems used in the emergency department (ED) are crucial in prioritization of patients, but they are still performing dismally in establishing the true severity of patients, performing at 59.3-82% reported outcome. In recent times, machine learning methods have been widely discussed in terms of their possible application to the improvement of patient prioritization in terms of demographics, clinical data, and vital signs parameters.The paper provides a systematic review of ML-based ED triage systems guided by PRISMA. On the Google Scholar, IEEE Xplore, PubMed, and ACM Digital Library, a systematic search was conducted on papers published since 2014 and up to 2025. Out of 409 distinct results, 43 articles matched the inclusion criteria, and 19 articles were used in the qualitative synthesis.The scores of the AUROC were 0.75 to 0.92 and the ensemble tree-based models and deep learning models were identified to be better than the traditional models with the highest score of 0.931. Despite strong predictive performance, several key limitations were identified. More than 80% of the studies failed to assess the level of demographic fairness, fewer than 5% of the studies conducted external multi-center validation, and the application of explainable AI tools such as SHAP and LIME was

cursory and did not focus much on clinical utility.Finally, despite the potential of the ML-based triage systems to improve the efficiency and quality of emergency care, their existing levels of preparedness to be applied in the practice are not as high as yet. Further research needs to pay more attention to the external validation, fairness evaluation and clinician-centered interpretability methods.

277.COMPREHENSIVE BATTERY PERFORMANCE ANALYSIS USING MACHINE LEARNING

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Accurate prediction of lithium-ion battery health parameters is essential for effective battery management in electric vehicle applications. This paper presents a machine learning-based approach using Recurrent Neural Networks with Long Short-Term Memory (LSTM) to estimate key battery performance indicators, including State of Health (SoH), fade capacity, and Remaining Useful Life (RUL). The proposed model is trained and evaluated using discharge cycle data from NASA’s battery aging dataset, with a primary focus on battery B0005. Capacity degradation trends are analyzed across charge– discharge cycles to capture temporal dependencies in battery behavior. [1] Experimental results show a gradual decline in discharge capacity with increasing cycles, and the LSTM model demonstrates close agreement between predicted and actual SoH during early and mid-life stages, with increasing deviation observed in later cycles. The results highlight both the effectiveness and limitations of LSTM-based prediction for long term battery degradation analysis and provide useful insights for battery health monitoring systems.

278.SIMULATION OF POWER FACTOR VARIATION IN GRID-CONNECTED SOLAR PV SYSTEMS UNDER NET METERING

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The growing adoption of grid connected solar photovoltaic systems have brought up new issues which are associated with the quality of power and grid stability, especially in the net metering mode of operation. The value of the power factor is one of the most important parameters that impact the economy of the grid and hence losses in the network directly. The given paper includes the modeling and simulation of a grid connected solar photovoltaic system under the conditions of net metering along with the objective to analyze the variation of the power factor. The photovoltaic array, power electronic inverter, grid interface and control mechanism are represented by a complete system model created with the MATLAB Simulink environment. The given simulation setup is a test of the system functioning under different working parameters to study the effect on the performance of power factor. The results of simulations prove the change of power factor, depending on load and generation levels and shows the efficiency of the control strategy to assure the acceptable grid interaction. The results of this paper will have a great deal of contribution to the current understanding of the behavior of the power factor in the net metered solar photovoltaic systems, and will guide the design of effective and grid compliant integration of renewable energy in systems.

279.BALANCING PREDICTIVE ACCURACY AND DATA PRIVACY: A FEDERATED LEARNING APPROACH FOR HEART FAILURE DIAGNOSIS

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Machine learning has great potential to advance the speed and success of diagnosing diseases and improving treatment outcomes, especially in life-threatening instances such as heart failure (HF) [1]–[3]. Despite the many benefits of using ML in HF diagnosis and management, each ML model's efficacy relies upon having access to large, diverse datasets necessary for training, and because of strict patient privacy laws like HIPAA and GDPR, these datasets are typically housed within separate healthcare organizations (silos) [4], [5]. As a result, collaborative research is hampered by the lack of access to these essential data sources. This paper explains the problem by presenting a Federated Learning (FL) solution to predict heart failure (HF) [1], [4], [6]. FL is a type of decentralized machine learning that allows several stakeholders to build a single predictive model together without disclosing sensitive local patient data from individual sites or organizations [7], [8]. We created and ran a simulation of this solution using a publicly available HF dataset; a neural network (NN) was trained on ten simulated clients, and the performance of the FL model was compared to that of the traditional central model trained on the aggregated dataset. The results indicate that the FL model had an accuracy of 87.38 percent on the test dataset, compared to 87.91 percent for the traditional model, showing that the two frameworks have equal performance. The results indicate that Federated Learning is an efficient tool for building high-quality predictive applications that use patient data while maintaining privacy and security [9], [10]. Therefore, researchers can use Federated Learning to work together in a secure and efficient way on medical research.

280.AN EXPLAINABLE AND CALIBRATED MACHINE LEARNING FRAMEWORK FOR PREDICTING 30-DAY HOSPITAL READMISSIONS IN DIABETES PATIENTS

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Despite improvements in the management of chronic illness, hospitalisation of people with diabetes remains high, and much of the burden stems from the fact that people with diabetes experience hospital readmissions at nearly double the rate of those without diabetes. The goal of this paper was to introduce a clinically based and clinically deployable framework for pre- dicting readmission risk (30-day) for adults with diabetes using only publicly available clinical data. We created three different machine learning models (Logistic regression, Random Forest, and XGBoost) and evaluated their predictive performance using the same criteria (AUC, AUPR, and Brier Score). Additionally, we incorporated probability calibration to improve clinical reliability and incorporated SHAP-based methods for explainability. Our results support that XGBoost was the highest performing model in this study, with an AUC of 0.677, which confirms other studies using the UCI Diabetes dataset as well as the relationship between explainability and clinical utility. The focus of this paper is not on algorithmic novelty, but rather on providing a rigorous methodology with an emphasis on transparency and factors to consider before deploying a clinical prediction framework.

281.MULTIMODAL DEEP LEARNING FOR HUMAN ACTIVITY RECOGNITION IN INTELLIGENT AMBIENT COMPUTING ENVIRONMENTS

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Human activity recognition plays central role in intelligent ambient computing environments, such as smart homes and healthcare monitoring sys-tems, where reliable interpretation of daily activities is required under heterogene-ous and dynamic sensing conditions. The existing approaches often rely on single modalities or static fusion strategies, which limits robustness when sensor quality varies or when activities exhibit complex temporal patterns. The study aims to develop effective and deployable multimodal framework that captures comple-mentary information across vision, wearable inertial, as well as environmental sensors while maintaining real-time feasibility. The multimodal deep learning ar-chitecture is proposed, where modality-specific encoders extract temporal features which are integrated through cross-modal temporal attention mechanism. The de-sign enables dynamic weighting of sensor modalities when contextual reliability and temporal relevance change. The framework incorporates the resource-aware optimization which reduces the inference latency, and computational complexity. The experiments conducted on public multimodal datasets show that the proposed method achieves accuracy of 90.1 percent on the MMAct dataset and 92.0 per-cent on the UP-Fall dataset, which outperforms single-modality baselines and conventional late-fusion approaches by up to 3 percent. The robustness evalua-tions under sensor noise and missing-modality conditions show reduced

perfor-mance degradation when compared with existing multimodal methods. The pri-mary novelty lies in explicit modeling of inter-modal temporal dependencies while balancing accuracy, interpretability, and efficiency, which makes the ap-proach suitable for practical ambient computing deployments.

282.A VISION-BASED SYSTEM FOR EARLY DETECTION OF AUTISM

SPECTRUM DISORDER THROUGH INTERACTIVE TASK MONITORING

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Because of the subjectivity of normal clinical judgement and also because of evaluations, which frequently entail extended waiting times and low accessibility, particularly in less fortunate areas, Autism Spectrum Disorder(ASD) is a major diagnostic problem. This system shall collect user’s details when organized in orderly digital communication and age responsive vision using the assistance of standard vision sensors, one of them is raspberry Pi camera module. These activities are designed to make quantifiable behavioral answers, they are based upon equal digital tasks for the children upgrade to the next level of cognitive exercise for adults. This method holds a huge potential to provide early and easy screening because it is vision based and interactive tool that doesn’t necessary need any specialized medical equipment. It may allow providing earlier intervention and improved long term outcomes throughout the age spectrum by democratizing the access to preliminary ASD diagnostic, promoting the use of telemedicine, making it easy to implement in low resource environment.

283.A BLOCKCHAIN-BASED SUPPLY CHAIN SYSTEM FOR FARMING PRODUCT AUTHENTICITY

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In the modern agricultural world, the journey from farm to table is often clouded by a lack of transparency and a reliance on outdated, manual records that are vulnerable to error or fraud. This project introduces a blockchain-based solution designed to replace that uncertainty with an immutable, digital "story" for every crop. By recording every stage of the lifecycle from cultivation details to simulated environmental data like temperature and humidity onto a secure ledger, we ensure that the information remains tamper-proof and verifiable. This system doesn't just track products; it bridges the trust gap between farmers and consumers, proving that high-tech tools like blockchain can practically enhance the reliability and accountability of the food we all rely on.

284.DEEP LEARNING–BASED RAILWAY TRACK DETECTION USING SEGNET WITH A RESNET-101 ENCODER

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Railway track checking was done with the help of manual way of checking where it takes lot of time for checking and by manual process leads to human errors. In terms of developing safety as well as efficiency we have developed the automatic track identification mechanism which depends over deep learning mechanisms. Photos from the railway track were taken at equal intervals of time and detect the track position like cracks, damages in tracks, water stagnant in track. Our proposed work designed the framework with the help of SegNet with the help of ResNet-101 encoder technique for identifying as well as defining track locations. Existing works depends over ResNet-50 along FCN-16 got an accuracy of 98.75%. by using of indepth of network mechanism as well as more defined way of proposing our mechanism gained the more accuracy as well as security in terms of multiple scenarios. This proposed work is developed in giving time to time updates in multiple seasonal conditions. Our work is designed to give information for the train drivers or else railway authorities which makes addition to most safety.

285.ATTENTION ENHANCED CNN–VIT MODEL FOR AUTOMATED CERVICAL CYTOLOGY CLASSIFICATION USING TRANSFER LEARNING

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Cervical cancer continues to be one of the most common causes of cancer deaths among women worldwide. This diagnosis can be curable when early detection is achieved—especially with the help of automated support. Though deep learning models, such as CNNs, have exhibited great potential in the classification of cervical cells, they usually suffer from an inability to understand long-range relationships that may exist among the images. The failure of CNNs in this respect lies in the localized nature of their receptive fields. The present work presents the utilisation of a new breed of deep learning model called Vision Transformers, which are capable of capturing not just broad but also fine features in cytological images using the self-attention mechanism. We aim to classify cervical cancer cells using two labelled datasets: SIPaKMeD and Herlev, applying transfer learning through a pre-trained ViT model. The performances of a pre-trained standard CNN model, ResNet-50, and a pre-trained lightweight CNN model, EfficientNet-B0, are compared to the proposed approach. Results were impressive, showing that the proposed ViT model achieved an accuracy of 97.2%, compared to 95.8% for ResNet-50 and 96.0% for EfficientNet-B0. These results point to the power of transformer-based models in medical image analysis and portend their great promise for improving automated cervical cancer screening systems.

286.PERFORMANCE OPTIMIZATION OF FOG NODES FOR SMART CITIES

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Both the number of connected devices and the amount of data produced by IoT applications have increased exponentially as a result of the quick development of smart cities. Due to latency, bandwidth constraints, and network congestion, traditional cloud computing architectures struggle to handle real-time data. In order to provide low-latency, effective, and dependable data processing, this project focuses on performance improvement of fog nodes, which act as intermediary computer layers between IoT devices and the cloud. To maximize computing, storage, and network utilization at the fog layer, the suggested method makes use of load balancing, task scheduling, and resource allocation techniques. Metrics including response time, throughput, energy usage, and network latency are used to assess simulation and experiment results.This system seeks to increase the scalability and efficiency of smart city applications by boosting fog node performance, allowing real-time decision-making for public safety, environmental monitoring, and traffic control.

287.TOLL GATE INNOVATIONS: EASING TRAFFIC AND BOOSTING SAFETY

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Toll gates, or toll plazas, serve as checkpoints where vehicles are required to pay a fee for using designated roads. This toll fee is crucial for enhancing road maintenance and developing quality infrastructure. However, in today’s scenario, toll gates face challenges such as vehicle congestion, excessive time and fuel consumption, and air pollution caused by idling vehicles. This project proposes an innovative and efficient toll system utilizing a vehicle counting mechanism in each lane through a combination of hardware and image processing technology, supplemented by rotary speed breakers in every lane. The project aims to revolutionize toll gates by providing real-time lane occupancy data and integrating power generation features. The ultimate goal is to alleviate lane congestion at toll gates by accurately managing vehicle flow and simultaneously generating and conserving electricity through rotary speed breakers.

288.RISK SIGHT: AN AUTOMATED VULNERABILITY ASSESSMENT SYSTEM

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An automated vulnerability assessment system called RiskSight was created to handle the increasing difficulties brought on by changing cybersecurity threats. For contemporary infrastructures that demand ongoing and proactive security review, traditional manual assessment techniques are slow, prone to error, and insufficient. By automatically finding active hosts, identifying open ports, fingerprinting active services, and mapping them to known Common Vulnerabilities and Exposures (CVEs), RiskSight expedites this process. To facilitate quick decision-making, the system creates concise, useful reports and uses severity score to rank identified vulnerabilities. Both expert and non-technical users may easily start scans and evaluate data thanks to an intuitive user interface. RiskSight improves detection accuracy, speeds up response times, and fortifies organisational security posture by automating critical assessment phases.

289.HEALTHGUARD AI: MULTI-DISEASE PREDICTION USING HYBRID DEEP LEARNING AND MULTIMODAL DATA FUSION

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Accurate and timely disease prediction is still a major concern in healthcare, largely because medical information is generated in multiple forms such as images, clinical notes, and structured patient records. Many existing prediction systems depend on a single type of data, which restricts their effectiveness in practical clinical settings. This study presents HealthGuard AI, a hybrid deep learning framework developed for multi-disease prediction through multimodal data fusion. The framework employs Convolutional Neural Networks (CNN) to extract features from medical images, Long Short-Term Memory (LSTM) networks to analyze structured health records, and a fine-tuned transformer-based model to interpret clinical text. Outputs from these individual models are integrated using a weighted fusion mechanism to produce overall disease risk predictions. Experimental studies performed on real-world healthcare datasets indicate that the proposed multimodal framework delivers better predictive performance than approaches based on a single data modality. The results suggest that using multiple types of medical data can improve diagnostic reliability during clinical decision-making.

290.SLIDING MODE CONTROLLER FOR CONTINUOUS STIRRED TANK REACTOR

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Designing of the Optimal Sliding Mode Controller for the Continuous Stirred Tank (CSTR) is the main objective of this paper. This is obtained by designing the sliding surface which will draws the trajectories to zero. For this the control signal is applied which is generated by the control law. For ensuring the asymptotic stability Sliding mode Control is used. Sliding mode controller with its different types are demonstrated in this paper. Also comparision of Sliding Mode Controller and Type Fuzzy LQR Controller for CSTR is done intis paper.

291. DEVELOPMENT OF FUZZY INTELLIGENT CONTROL FOR REAL TIME PENDULUM SYSTEM

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Any realistic system model (nonlinear systems) is complex in structure and have large parameter or structural uncertainties, and due to large uncertainties, one cannot sure that such systems can be feedback linearizable. Thus, using Takagi-Sugeno (T-S) fuzzy technique, one can derive a T–S fuzzy system model as an approximation of such systems. The relative degrees and normal forms of such T–S fuzzy systems and the feedback linearization-based control scheme is systematically developed [10]. The feedback linearization control technique for T–S fuzzy systems employs a system normal form based on the system relative degree, and is applicable to systems without restrictive matching conditions that essentially require the local system models to be in some canonical forms. The control strategy is formulated based on the T-S fuzzy framework and subsequently validated. Simulation analyses are conducted to evaluate its performance in the context of an inverted pendulum system

292.LARGE ACTION MODEL FOR WEB TASK AUTOMATION: USING MCP AND RAG

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This project presents a web automation framework that employs a Large Action Model to perform common web-based tasks with minimal human involvement. The proposed system is capable of automating activities such as website navigation, online form submission, data extraction, and interaction with dynamic web interfaces. Unlike traditional automation approaches that rely on fixed rules or scripts, this framework uses contextual understanding of webpages to adapt its actions, making the automation process more flexible and dependable.Selenium is used to manage browser-level interactions, while Model Context Protocol tools are integrated to represent web actions in a structured and standardized manner. To improve efficiency, the system analyzes a web page once and stores relevant contextual information, which is reused throughout the session to reduce repeated processing and improve accuracy. The framework can also automatically detect interactive elements, forms, and pop-up windows, enabling smoother execution across different websites. Overall, this

project aims to simplify complex web interactions, support data analytics tasks, and reduce the manual effort required for repetitive web operations

293.DIGITAL PLATFORM FOR PRESERVING AND SELLING TRIBAL ART AND CRAFTS

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The rich heritage of tribal art and craft faces an increasing threat every day with less accessible markets, lack of online presence, and loss of tradition. The presenting scenario describes a Digital Platform proposed to preserve and promote these artworks and facilitate their online sale while maintaining its authenticity and accordingly providing economic gains to the tribes. The proposed system encompasses safe data storage, management, and intelligent artworks. Painting, textile, pottery, and handicraft artworks are integrated into it.
The platform enables the artisans by providing user-friendly registration and pricing facilities, while the customers can benefit from verified listings and pricing. The use of responsive web technology enables the seamless distribution of the content. The experiments conducted on real data sets of collections of the mentioned art show that the visibility and sales targeting as well as the preservation of the associated culture have improved. The proposed platform presents a sustainable and scalable solution for the protection of the mentioned tribal heritage for the empowerment of the artisans with the help of digital commerce.

294. SILENTCACHE: PHASE-AWARE CACHE-TIMING FINGERPRINTS FOR DETECTING SILENT AND FILELESS MALWARE

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Redundant techniques such as code obfuscation, in-memory execution, and minimal interference with the OS, which are typical of traditional malicious code evasion techniques, are being extensively obeyed in contemporary malware. However, hardware-assisted malware detection techniques, incorporating hardware performance counters (HPCs) as detectors, have surfaced as viable alternatives. However, current techniques show significant limitations in terms of robustness, as they provide little room for interpretation. In addition, prior work mainly deals with classifying malicious or benign binaries with little or no room to track execution phases, which is critical for silent malware detection.
In this paper, we present SilentCache, a cache-timing–only malware detection framework that models execution behavior through phase-aware cache-timing fingerprints. Instead of global classifiers, SilentCache learns per-application baselines of normal cache behavior across distinct execution phases and detects anomalies as deviations from these learned fingerprints. By leveraging the structural characteristics of periodicity, burstiness, and entropy in cache measurements, the proposed approach is capable of detecting specific behaviors of silent malware, including keylogging loops, periodic beaconing, and encryption-like memory access. Additionally, SilentCache provides interpretable alarms based on the behavioral templates of identified anomalies, thus avoiding the lack of explainability of the previous HPC-based solutions. The proposed system is evaluated, and the effectiveness of its suggested approach is demonstrated through the robustness of the proposed cache-based fingerprinting technique despite various system noises and shared resource contentions. malware with the help of hardware performance counters (HPC), some research has been carried out. Till now, researchers have focused more on aggregated statistics incorporation in classification and traditional time series classification. Such Methods have shown limited robustness guarantees. Furthermore, the earlier proposed methods mainly

focused on traditional classification tasks, such as distinguishing between benign and malicious executables. There has been no representation of phases during the execution of the code, which is essential for silent or fileless malware.

295.ADDRESSING LONG-TERM HEALTH IMPACT OF UNHEALTHY EATING PATTERN

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The increasing trend of unhealthy eating habits associated with contemporary lifestyles has become an imminent threat to human well-being and has resulted in chronic diseases like obesity, metabolism-related diseases, cardiovascular diseases, and reduced well-being for thousands of individuals worldwide. This study investigates the long-term effects of unhealthy eating habits and provides users with tailored, proactive information for recovery and health improvement. The proposed system provides an innovative and transparent method for predicting proactive health effects that are currently addressed through reactive and non-personalized interventions. The user's dietary information is collected through a Bolt.new interface and stored in Supabase. The backend evaluates dietary information using an explainable AI agent and domain-specific machine learning models, integrates external knowledge through SerpAPI, and generates visual representations of potential future health effects using QuickChart. A predictive and detailed report is automatically delivered to the user's email address. The reliable system shall firmly stick to its central scientific contribution that shall offer an evidence-supported scalable and user-friendly remedy for understanding and mitigating the long-term effects of eating habits.

296.AI-BASED CREDIT CARD FRAUD DETECTION USING FACIAL RECOGNITION AND PATTERN ANALYSIS USING MACHINE LEARNING

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There has been a significant rise in credit card scams because of the popularity of online credit card services. The conventional method of detection of credit card scams is purely dependent on transaction analysis. There are limitations in the high false accept rates of conventional transaction analysis, which does not allow real-time verification of the credit card holder's identity. This paper proposes a method of credit card scam detection, which combines transaction analysis with a face recognition system because it uses AI technology.
The system explores the use of XGBoost to analyze the behaviors associated with users transacting, with a view to identifying any suspicious behaviors, thus approving a higher risk transaction, which activates a second level of verification utilizing a Convolutional Neural Network (CNN)-based facial recognition system to verify users wanting to transact with a credit card, ensuring that it is indeed affiliated with a cardholder's identity. Experiments have demonstrated the effectiveness of the new system, showing that it provides greater detection accuracy and, in particular, alleviates the problem of a high false positive rate, a common disadvantage of classic methods of transactions-only- based credit card fraud detection. The new system combines XGBoost-based transactions classification with a CNN-based facial recognition approach.

297.ANTI-CHILD TRAFFICKING SAFETY DEVICE WITH GPS AND GSM INTEGRATION

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Child trafficking and abduction case is of immense social importance requires rapid and efficient solutions via technology. To this effect, this project work concerns the design and development of an Anti-Child Trafficking Safety Device, utilizing the integration of the Global Positioning System and Global Systems for Mobile Communication. The device will be composed of Arduino Nano, accompanied by a GPS Module (Neo-6M), GSM Module (SIM900L) and Microphone. The device comes in a dual-unit design that has a hidden Primary Unit for location and communication and a Wireless Secondary Unit that acts as an SOS alert button. On activation of the device, it immediately sends an alert SMS containing a Google Map location link and initiates an automatic call to pre-selected guardians. Automatic call answerback allows guardians to hear the environment in addition to location updates for continuous monitoring. The proposed system is mobile, battery-operated, discreet ,child friendly and works without the need for internet connectivity. The proposed system provides a cost-effective embedded solution with greater functionality in improving child safety
while reducing the response time for emergencies and actively
preventing child trafficking.

298.AI DRIVEN SPEECH TO TEXT FOR AUTOMATED MEDICAL TRANSCRIPTION

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The proper recording of medical data is very essential to give efficient Patient Care. The conventional method of recording prescriptions and patient records, which are typically both handwritten and recorded manually, introduces a large number of opportunities for medical errors, illegible handwriting and misinterpretation of written words. The Intelligent Transcription and Decision Support System for Healthcare Professionals presented in this article is designed to aid in the process of transcription of spoken medical instructions. The system includes a microcontroller specially designed for use with a digital microphone and provides both an indoor and outdoor speech conversion capability. The feature is especially relevant to those patients having not so reliable access to the internet. A specialised medical speech recognition model is employed to convert complicated medical terminology into written format, particularly those associated with prescription medications such as dosage and duration of treatment. All of the transcribed information is then securely stored with a unique identifier for each Patient and presented to the Physician immediately after the transcription has been completed for review and approval by the Physician. Due to this innovative technological breakthrough, the total time used for the whole documentation process has been drastically shortened and at the same time, the number of mistakes during the prescription process has also been lowered.
In fact, the Intelligent Transcription and Decision Support System not only helps the clinical staff to perform their tasks more efficiently but also it raises the level of Patient safety while simultaneously delivering a better Patient Care quality.

299.MACHINE LEARNING-BASED PARKINSON'S DISEASE DETECTION USING CLINICAL AND MOTOR ASSESSMENT FEATURES

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Parkinson's Disease is a progressive neurological disorder primarily characterized by motor impairments such as tremor, rigidity, and reduced movement control. Early diagnosis of the disease is crucial for effective clinical management and improved quality of life. Traditional clinical assessment methods rely on expert observation and standardized rating scales, which can be time-consuming and subjective. In this work, a machine learning-based approach is proposed for Parkinson's Disease detection using clinical and motor assessment features derived from handwriting pattern analysis. Handwriting tasks, such as spiral and wave drawings, are clinically recognized as non-invasive motor assessment tools that reflect fine motor dysfunction. The proposed methodology involves preprocessing handwritten images, extracting motor-related features, and classifying subjects using multiple machine learning algorithms. The performance of the models is evaluated using standard metrics including accuracy, precision, recall, and F1-score. Experimental results demonstrate the effectiveness of handwriting-based motor assessment features in distinguishing Parkinson's Disease patients from healthy individuals, highlighting the potential of the proposed approach as a supportive tool for early diagnosis.

300.COMPUTER VISION-DRIVEN POSTAL ADDRESS ANALYSIS FOR AUTOMATION

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Identification proofs, post cards, passports are still sorted and delivered through post manually. The main issues faced were that there were a lot of human errors and it was a time-consuming process. From the analysis on text detection done on various fonts and styles it shows how difficult it is to deal with complex characters, cursive writing, or unclear lines between words. Most of the systems just focus on reading the text, they don't actually use that information to automate sorting. The proposed Postal Automation uses multifont address recognition and region-based sorting to automate the postal process. This system scans both handwritten and printed addresses, then sorts them by extracting the PIN code. It handles complicated addresses, provides accuracy above 94%, and removes manual intervention. In addition to this, this process is applicable for logistics firms, e-commerce and retail with reliable communication.

301.CENTRALIZED SMART DRAINAGE MONITORING SYSTEM WITH SOLAR-POWERED SLAVE NODES

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This project presents the design and implementation of a Centralized Smart Drainage Monitoring System utilizing solar-powered IoT slave nodes for real-time urban drainage surveillance. The system addresses critical issues such as blockages, overflow, toxic gas accumulation, and unauthorized lid tampering, which are prevalent in conventional drainage infrastructure. Each slave node is equipped with an ESP32 microcontroller interfaced with an ultrasonic sensor (JSN-SR04T), water flow sensor (YF-S201), gas sensors (MQ-4 for methane, MQ-136 for H_2S), and a reed switch for lid status detection. These nodes are powered by a solar panel–battery setup, ensuring autonomous and sustainable operation. Data from slave nodes is transmitted to a central master node via ESP NOW (short-range) or LoRa (long-range) protocols. The master node performs data aggregation and anomaly detection using rule-based algorithms to identify drainage faults such as stagnant water (blockage), overflow, gas hazards, and lid tampering. Alerts are generated and pushed to a cloud platform (Firebase/MQTT), enabling visualization through a web dashboard or mobile application. Municipal authorities receive instant notifications via SMS, email, or app alerts for timely intervention. Experimental validation demonstrated high accuracy in sensor readings (±2 cm for water level), reliable detection of anomalies (latency <5 s), and robust communication over 30–500 meters

302.SMART MEDICATION REMINDER & DAILY HEALTH TRACKER FOR TIMELY MEDICINES

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Medication non-adherence among elderly patients and individuals with chronic health conditions remains a critical healthcare challenge, leading to missed doses, overdosing, and irregular medication intake. This paper presents the Medicine Reminder App, a comprehensive Android-based mobile application developed using Flutter and a SQL backend to address medication management challenges. The proposed system integrates multiple features including personalized medicine reminders, automatic stock tracking with refill alerts,

location-based pharmacy locator, and doctor contact management. The application provides timely notifications through alarms, SMS, or email based on user preferences, ensuring improved medication adherence. The system was designed with a user-friendly interface optimized for elderly users, incorporating large buttons, simple navigation, and color-coded alerts. Implementation utilized Flutter for cross-platform development, Dart for business logic, and SQL databases for secure data management. Comprehensive testing including unit, integration, and user acceptance testing validated the system's reliability and usability. Results demonstrate that the application effectively reduces missed medication doses and prevents stock-outs through automated alerts and location-based pharmacy services. The Medicine Reminder App serves as an economical, accessible, and practical solution for improving healthcare outcomes and supporting independent living for elderly individuals. Index Terms — Medication adherence, Mobile health (mHealth), Flutter, Reminder system, Elderly care, Healthcare application, Stock tracking, Location-based services.

303.SMART SLEEP FRAMEWORK: EXPLAINABLE AI WITH HYBRID ML ARCHITECTURE FOR REAL-TIME SLEEP DISORDER DIAGNOSIS

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Obstructive Sleep Apnea (OSA) and other sleep disorders affect millions worldwide, yet clinical diagnosis through polysomnography remains expensive, time-consuming, and inaccessible to most patients. To address this gap, we propose a real-time, wearable-enabled sleep disorder detection system that analyzes physiological signals such as ECG, heart rate, and SpO_2. The framework integrates an LSTM network to learn temporal patterns and an XGBoost classifier to accurately identify OSA events, abnormal breathing, and overall sleep quality. Explainable AI techniques, including SHAP and LIME, provide clear insights into the model’s decisions by highlighting contributing factors such as oxygen desaturation and HRV irregularities, thereby improving clinical trust. Developed using Python and TensorFlow with a React.js–Node.js dashboard and MongoDB storage, the system delivers instant alerts, intuitive visualizations, and personalized recommendations. Highly scalable, the solution supports expansion to IoT wearables, EEG-based analysis, and mobile platforms, making it suitable for both home-based monitoring and clinical use.

304.MACHINE LEARNING ENHANCED WEB APPLICATION FOR EFFICIENT BLOOD BANK MANAGEMENT

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The shortage of blood and increasing demand globally necessitate smarter donor management. LifeFlow is a web-based platform that connects donors, blood banks, and hospitals, leveraging modern technology and

machine learning to optimize the blood donation process. The system integrates a React frontend, a Node&Express backend, MongoDB geospatial data for location-based searches, and a Python-powered ML module for predicting donor eligibility. The platform also streamlines inventory and communication: it classifies donors, forecasts demand, schedules appointments, and manages messages via Socket.io. The project's results demonstrate the feasibility of combining web technologies with predictive analytics to enhance donor engagement and blood supply management.

305.SYMPTOMS-BASED LARGE INTESTINE DISEASE PREDICTION AND RECOVERY ESTIMATION USING MACHINE LEARNING

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In this work, machine learning algorithms are employed to predict large intestine disease and estimate re- covery probabilities based on patient symptoms. Key features considered include clinical signs like abdominal discomfort, abnormal body temperature, altered bowel habits, and notable weight changes.This work employs Logistic Regression for disease classification, achieving an accuracy of 1.00 (100%) on the test set, with a confusion matrix showing perfect separation of the three classes. A manually implemented Gaussian Naive Bayes model was used to evaluate recovery likelihoods. An interactive system was also developed to simulate patient-level diagnosis and treatment recommendations based on symptom severity. The blended recovery scoring mechanism allowed nuanced medical guidance. This approach may assist healthcare professionals in early diagnosis and decision-making regarding treatment intensity.

306.MEDICAL DIAGNOSIS IMAGING: AN NLP-BASED FRAMEWORK FOR VISUALIZING BONE INJURIES FROM TEXT-BASED MEDICAL REPORTS

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Healthcare documentation often contains detailed clinical information that is difficult for non-medical individuals to interpret because of specialized terminology and complex descriptions. To address this issue, the proposed work introduces a system that translates written medical reports into clear visual representations. The framework incorporates a natural language processing engine to analyze free-form clinical text and extract key details such as the location of injury, affected bone, and severity level. These extracted insights are organized into structured data and passed to a visualization component that creates an interactive three-dimensional model of the impacted anatomical region. By presenting medical findings in a visual and user-friendly manner, the system helps patients better understand their conditions while also supporting physicians with faster and more intuitive diagnostic interpretation.

307.SECURE FILE SHARING SYSTEM WITH ENCRYPTION

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The Secure File Sharing System with Encryption is a web-based application designed to ensure data privacy and security during digital file transfer. The system uses advanced encryption techniques, expiring and one-time access links, user-specific encryption keys, and real-time access logs with alerts to prevent unauthorized access and enhance transparency. This system focuses on providing a practical, lightweight, and reliable alternative to traditional cloud-based sharing platforms like Google Drive or Dropbox.

308. SOLIDITYSCAN: A PROTOTYPE STATIC ANALYSIS FRAMEWORK FOR SECURITY AND PERFORMANCE EVALUATION OF SMART CONTRACTS

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Self-executing programs called “Smart Contracts” operate on blockchain platforms (such as Ethereum) that perform financial transactions. Once Smart Contracts are deployed, they cannot be altered. Therefore, an incorrect code in a Smart Contract can have far-reaching implications for security and finance. Because of this, it is important to evaluate Smart Contracts early in their life cycle. In this paper, we present a prototype of SolidityScan – a static analysis framework that evaluates smart contracts on Ethereum for security issues, gas inefficiencies, and code complexity. The framework accepts Solidity source code as input and provides rule-based analysis to find different types of issues (e.g., reentrancy, integer overflow/underflow). In addition, the framework suggests gas-saving optimizations and provides an overall quality score to help developers determine whether a smart contract can be trusted. Initial testing using sample contracts shows that the framework can be useful to developers of smart contracts.

309.DNA SEQUENCE ANALYSIS USING MACHINE LEARNING

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Early identification of genetic mutations is essential for the diagnosis of inherited diseases like -thalassemia and cystic fibrosis. The contribution introduces a machine learning method for DNA sequence classification of Hemoglobin Subunit Beta and Cystic Fibrosis Transmembrane Conductance Regulator genes as normal or mutated. The dataset consists of curated normal sequences and synthetic mutated sequences according to known clinical variants. Sequences were preprocessed with 6-mer tok- enization and encoded with Term Frequency–Inverse Document Frequency (TF-IDF) vectorization, a statistical weighting strategy that emphasizes information-rich k-mers by taking into account their frequency within a sequence and their sparsity in the dataset,to extract local sequence patterns. A Random Forest classifier was trained on the balanced dataset to an accuracy of about 97.87% . The performance of the model was assessed with precision, recall, F1-score, and ROC-AUC metrics. The results show that conventional machine learning approaches, coupled with good preprocessing, provide an efficient, scalable, and interpretable solution for genomic mutation detection. Such an approach has potential for adaptation to clinical genetic screening pipelines, possibly enabling early diagnosis and better patient outcomes.

310.VOICE-AGENTIC CARE COMPANION: PERSONALIZED ALZHEIMER'S ASSISTANCE WITH SEMANTIC MEMORY

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Alzheimer's disease causes progressive memory loss, cognitive impairment, and dependency, placing immense burden on caregivers for daily activities, medication adherence, and emotional support. Existing solutions like wearable sensors and social robots (e.g., Paro) remain costly, infrastructure- dependent, or lack voice-based personalization for real-time therapeutic interaction. This paper introduces a voice-activated AI companion as dual mobile applications—a patient app for empathetic assistance and a caregiver app for monitoring/control—aiming to deliver timely reminders, emotional support, and behavioral insights while ensuring accessibility in

resource-constrained settings. The always-on patient app employs wake-word detection (e.g., Picovoice), speech-to-text (Assembly AI), and LangGraph-orchestrated agentic NLP with GPT-4o-mini for empathetic, context-aware conversations adapting to detected emotional states via voice prosody analysis. It handles scheduled reminders (medications, appointments) and tracks interactions (people met, mood), syncing data via secure APIs to the React Native caregiver app. Caregivers input patient profiles (routines, triggers) into PostgreSQL/pgvector for semantic retrieval, enabling personalized responses. The hybrid edge-cloud architecture uses Fast API microservices for scalability and real-time alerts. Evaluation on 120 utterances shows 93.2% STT accuracy (WER 6.8%), 92% F1 wake-word detection, 87.5% emotion inference, and 820ms end-to-end latency. Caregiver dashboard achieved 99.3% API uptime, outperforming generic chatbots in memory continuity and therapeutic adaptation. This system advances affordable AI-assisted Alzheimer's care through voice-first agentic design, reducing caregiver workload. Limitations include API dependencies; future work adds offline modes and clinical trials for broader validation.

311.AGROSAGE: AI-POWERED SOLUTION FOR OPTIMIZED FARMING

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When looking to boost crop yields, farmers are now turning to precision agriculture, a field that is addressed by the AgroSage system, consisting of a soil advisory platform, real-time monitoring interface and a localised, unmanned ground vehicle for dispensing fertilisers. The system is made up of three main components that cater to different stages of the farm's decision-making and operational process. The first is a web-based software module that uses minimal input from farmers. Soil moisture, pH, and NPK levels, and relies on data-driven models to work out the specific nutrients the crop requires and forecast short-term changes in the market. This enables farmers to make decisions based on real-time field data rather than general advice, a marked improvement from the days of relying on thumb rules and hearsay. In addition, a low-cost IoT device is implanted in the field and regularly monitors soil moisture and pH levels, and delivers these readings to the Blynk dashboard, giving farmers a clear picture of their field's conditions, in real time. The sensor data does not feed directly into the advisory module but an alternative method is applied which sees the reading taken at one time, but then manually transferred into the advisory element.
The third component, a small unmanned ground vehicle is programmed to spray fertiliser directly where needed, has a microcontroller at its core. The micro-vehicle has four wheels, a relay-controlled pump and an ultrasonic sensor that control its movement and spraying distance. It can function in both automatic mode covering short distances, and manual mode that is controlled via a website hosted on a server, -this approach cuts down unnecessary spraying, relieves the physical burden for the farmer and gives a user-friendly automation that doesn't have to be expensive..

312.ECC-BASED MULTI-FACTOR AUTHENTICATION MODEL FOR ENHANCED SECURITY IN CLOUD

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The nature of data storage and access in the current era has largely been responsible for the evolution of cloud computing; however, the authentication and security for its utilization remain a grand challenge. Traditional approaches to authentication (one-timeness, biometric, multi-factor, and graphical ones) have various levels of security, which, however, cannot resist attacks and threats, such as brute force, replay, phishing, and social engineering attacks. This work puts forward a better process of authentication, integrating ECC-based multi-factor authentication with enhanced graphical password authentication and secure two-factor authentication to provide a more security-enhanced but efficient mechanism. EGPA is the method utilizing image- based passwords, where the user is enabled to select some locations to click at different places, offering the user with a dynamic interface and very simple manner of authentication. S2FA provides the encryption of OTP as another layer, thus diminishing possible interception and unauthorized access. In addition, the ECC-based multi- factor authentication generates lightweight but very secure keys for authentication through the use of elliptic curve cryptography, offering better speed, smaller key sizes, and improved security at the same algorithms in practice. It has been demonstrated in the performance evaluation through various experiments, where ECC- MFA reduces password generation time and reduces login delay and memory requirements extremely lower while improving security. From experimentations, it has been exposed where ECC reduced time for authentication by nearly 30-40% over conventional graphical password as well as cued techniques, hence proving to be a better alternative. The high security and effective authentication framework model presented in this work will find use in cloud and mission-critical applications, including banking, healthcare, and cloud services in enterprises, where improved authentication techniques will guarantee the preservation of user data sensitivity.

313.PULMONARY DISEASE CLASSIFICATION FROM CHEST X-RAY IMAGES: A SYSTEMATIC REVIEW OF DEEP LEARNING, ATTENTION MECHANISMS, ENSEMBLE LEARNING, AND PUBLIC DATASETS

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Pulmonary diseases like pneumonia, tuberculosis and COPD are a problem that make a lot of people sick and die all over the world. The main way doctors diagnose these diseases is by using Chest X-ray imaging. This is because Chest X-ray is not very expensive and most people can get it.. There are some problems with Chest X-

ray. For example the pictures can be hard to understand because the bones and organs in the chest overlap. Also some diseases can be hard to see on the pictures.. Sometimes different doctors can look at the same picture and have different ideas, about what it means. There has been a lot of progress in learning, including things like convolutional neural networks and attention mechanisms that can help doctors tell what is wrong with peoples lungs from chest x-ray pictures. Deep learning is really good at this. This paper looks at what other people have done to use learning to figure out what is wrong with peoples lungs, from chest x-ray pictures. We looked at a lot of studies that were done between 2019 and 2025. We picked some to look at really closely. We wanted to see how these studies were done so we looked at the ways they were set up like what kind of deep learning they used how they paid attention to different parts of the pictures how they combined different deep learning methods what pictures they used and how they decided if their methods were working. We compared these studies to each other to see what worked best for classifying diseases from chest x-ray pictures, which is what deep learning is being used for in these studies. The analysis shows that while attention-based and ensemble models improve performance, many methods depend on single-level attention, fail to adequately capture spatial and structural relationships, and show lower recall in large, multi-class, and imbalanced datasets [14]–[18]. The review points out important research challenges and suggests future directions for developing hierarchical attention and structurally informed ensemble frameworks to enable reliable diagnosis of pulmonary diseases.

314.NEXT-GENERATION AIR QUALITY SURVEILLANCE FOR CHENNAI USING IOT AND ARTIFICIAL INTELLIGENCE

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Air pollution poses a significant threat to public health and urban sustainability in rapidly growing metropolitan regions. Chennai, a major coastal city in India, experiences complex air quality dynamics influenced by traffic congestion, industrial activity, meteorological variability, and seasonal patterns. This paper proposes a next-generation air quality surveillance framework that integrates Internet of Things (IoT)–based sensing with artificial intelligence–driven analytics for real-time monitoring and short-term forecasting. The proposed system employs robust data preprocessing and imputation techniques to address missing and noisy sensor readings, followed by deep learning–based forecasting models for PM2.5 concentration prediction. Bidirectional Long Short-Term Memory (Bi-LSTM) and attention-based LSTM models are evaluated against traditional statistical and machine learning approaches using standard performance metrics. Experimental results demonstrate that deep learning models significantly outperform conventional methods, achieving higher prediction accuracy and temporal consistency. The system further provides spatial visualization and early-warning capabilities to support proactive environmental governance. The proposed framework offers a scalable and intelligent solution for urban air quality surveillance and can be adapted to other smart city deployments

315.AI-DRIVEN RESUME INTEGRITY CHECKER USING NLP AND MACHINE LEARNING

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The recruitment domain is currently facing a dual challenge: the overwhelming volume of applications and the increasing prevalence of fabricated or exaggerated resume claims. Traditional Application Tracking Systems (ATS) predominantly rely on keyword matching, which is easily manipulated by candidates and fails to verify the authenticity of the information provided. This paper proposes an automated, AI-driven frame- work designed to parse resumes, assess their integrity, and rec- ommend suitable job roles. The system utilizes Optical Character Recognition (OCR) and Natural Language Processing (NLP) for information extraction, followed by a

multi-layered verification mechanism. This mechanism includes Open Source Intelligence (OSINT) techniques to validate external links and digital foot- prints, alongside stylometric analysis to detect inconsistencies in writing style that may indicate plagiarism or AI-generation. Furthermore, the system employs Sentence-BERT (SBERT) to generate contextual embeddings for mapping verified skills to job descriptions. Experimental evaluation demonstrates that the proposed approach improves job-role alignment while providing an additional layer of credibility assessment through integrity scoring. By combining verification and semantic matching within a unified framework, the system supports more reliable and transparent recruitment decisions.

316.HYBRID QUANTUM-CLASSICAL DEEP LEARNING FOR BREAST CANCER DETECTION USING KAGGLE MEDICAL DATASETS

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Histopathological images of breast cancer diagnosis need efficient and precise classification measures as a clinical decision-making tool. In this work, a hybrid quantum-classical deep learning model was created to classify breast cancer automatically with the help of the Variational Quantum Circuit (VQC) with and without a classical neural network. Image features of high dimensions are extracted, normalized and then the dimensionality reduced through Principal Component Analysis (PCA) to get condensed and informative features. These features are fed to a classical pre-processing neural network and then represented in a quantum feature space through a VQC and then were fed to a post-processing neural network to be classified. The hybrid architecture involves the well-known classical learning with the expressive power of quantum circuits. The results of the experimental assessment of histopathological data comprise steady training, normalized feature distribution, and steady convergence according to epochs, with total classification accuracy at 92%. The findings suggest that the hybrid suggested model is sufficiently sensitive to differentiate between the classes of breast cancer at the same time as it can be used in conjunction with near-term quantum devices. The research paper has identified the practical prospects of quantum-enhanced machine learning in the medical imaging field and their applicability to future computer-based systems of diagnosis of breast cancer.

317.INTEGRATION OF MULTIPLE LARGE LANGUAGE MODELS INTO SINGLE UNIFIED PLATFORM (WEB APPLICATION)

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We present a design and implementation of a unified web-based platform that integrates multiple large language models (LLMs) including Google Gemini and OpenAI ChatGPT — allowing users to interact with different models without leaving a single page. The platform provides model-agnostic routing layer, unified prompt interface, session management, and comparative result visualization. We discuss architectural choices, API integrations, latency and cost trade-offs, privacy considerations, and a prototype evaluation with task-based benchmarks.

318.CLOUD COMPUTING PRODUCT SERVICE SCHEME RECOMMENDATION SYSTEM BASED ON A HIERARCHICAL KNOWLEDGE GRAPH - A REVIEW

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Cloud computing has revolutionized how organi- zations deploy, manage, and scale digital infrastructure. With an expanding range of service providers and product offerings, selecting the most suitable cloud service has become increasingly complex. This research presents a Cloud Computing Product Ser- vice Scheme Recommendation System Based on a Hierarchical Knowledge Graph. The proposed framework leverages machine learning and knowledge graph principles to deliver accurate, ex- plainable, and context-aware cloud service recommendations. The system integrates text mining using TF–IDF, Support Vector Ma- chine (SVM)-based classification, and graph-based reasoning to model relationships among products, service categories, and user preferences. By representing cloud products as interconnected entities, the system effectively captures semantic dependencies and enhances recommendation relevance. Experimental results demonstrate that the proposed model achieves superior accuracy and interpretability compared to conventional collaborative or content-based filtering approaches. Additionally, the hierarchical knowledge graph allows the system to adapt dynamically to new services, addressing scalability and cold-start issues. The study concludes that integrating

structured graph knowledge with machine learning techniques offers a robust pathway toward intelligent cloud recommendation systems, paving the way for optimized service selection and enhanced decision support in multi-cloud environments.

319.PCOS PREDICTION AND DETECTION USING MACHINE LEARNING

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Polycystic Ovary Syndrome (PCOS) is a common endocrine disease among women of going through pregnancies which can lead to hormonal imbalance, irregular menstrual cycle and metabolic problems. Early detection is important in order to prevent a long-term health problem, such as infertility, diabetes and cardiovascular diseases. Traditional diagnostic techniques are often very invasive and time-consuming and rely on specialised clinical tests which serves to limit access in low-resource environments. This study is presenting a machine learning based Early detection and prediction of PCOS system with best and smallest no of parameters viz. general health parameters and medical tests results. Five different supervised learning classifiers namely Random Forest, Support Vector Machine (SVM), Logistic Regression, Gaussian Naomi Bayes, K-Nearest Neighbors classifiers are used to test the predictive performance. Separate prediction models is implemented for General and Medical test data that increases the flexibility and applicability. Comparative Analysis to find the best classifier that is implemented inferences web interface using flask from. The proposed system shows possibilities for the accurate, non-invasive and accessible PCOS prediction for timely medical intervention for better patient's medical intervention and better outcome.

320.DECIPHERING EMOTIONS INTEGRATING ENHANCED TEXTUAL AND VOCAL SENTIMENT ANALYSIS

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This study proposes an integrated multimodal emotion recognition framework that jointly models textual and vocal expressions for robust multi class classification. As unimodal emotion recognition systems are restricted in capturing the heterogeneous nature of human affect, making multimodal learning a critical challenge. Textual features are extracted using transformer based RoBERTa emotions which are embedded from 5,316 cleaned live tweets collected from the X platform and annotated, while acoustic sentiment features are derived from 2,560 speech utterances from the RAVDESS and TESS datasets. The framework targets four emotions: joy, anger, sadness, and optimism. Feature dimensionality is aligned using harmonization and principal component analysis, followed by systematic evaluation using traditional machine learning classifiers and deep learning models under stratified fivefold cross validation. Results show consistent superiority of multimodal representations, with Logistic Regression achieving 89.85 percent accuracy and the proposed LSTM Boost Fusion model reaching 93.18 percent accuracy with an AUC of 0.993. The findings demonstrate the effectiveness of multimodal fusion for practical emotion applications.

321.CRACKING CRYPTO CRIME: AI AND ENSEMBLE LEARNING FOR BITCOIN FRAUD DETECTION

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The rising amount of Bitcoin transactions has developed an increased risk of fraud that must be accurately detected with automated systems. The study shows that an ensemble learning system of Bitcoin transaction fraud detection using AI-based methods will have a high accuracy and stability. The system design incorporates the use of Random Forest and Gradient Boosting with the XGBoost and LightGBM in order to determine the complex patterns of blockchain transactions and time-related relationships and unspotted anomalies. Ensemble methods that involve a combination of bagging and boosting and hard voting generate fewer false positives that contribute to increased prediction stability of the model. There are five standard evaluation measures that are used to measure the performance of the model and they are Accuracy and Precision and Recall and F1-Score and AUC-ROC. The results of the experiment demonstrate that the given ensemble framework has an accuracy of about 90%. The system allows detecting fraud in its initial phase that allows the users to build trust on cryptocurrency systems due to its optimized scaling capacity and system reliability.

322.INTELLIGENT GAIT CORRECTION AND PRESSURE MONITORING SYSTEM FOR ANKLE INJURY REHABILITATION

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Ankle injury rehabilitation requires controlled restoration of movement and weight bearing to avoid reinjury and delayed healing. Conventional rehabilitation methods largely depend on periodic clinical supervision and subjective pain-based judgment, which often fail to detect unsafe gait patterns during daily activities. This paper presents an intelligent wearable gait correction and pressure monitoring system designed to support safe and independent ankle injury rehabilitation. The proposed system integrates a gyroscope sensor and a load cell with an HX711 amplifier to continuously monitor ankle joint orientation, plantar pressure, and gait-related parameters such as step timing and cadence. An ESP32 microcontroller processes sensor data in real time and compares it with predefined safety thresholds. When abnormal movement, irregular gait rhythm, or excessive load is detected, immediate visual and auditory feedback is provided to the user. The system is lightweight, low-cost, and suitable for extended home-based rehabilitation. Experimental evaluation demonstrates the effectiveness of the proposed approach in identifying unsafe gait behaviour and promoting corrective action, thereby reducing the risk of reinjury and improving rehabilitation safety.

323.GUARDIAN TAG: SMART EMBEDDED KEYCHAIN FOR SCHOOL CHILD PROTECTION

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In the Indian educational background, ensuring the protection of school-going children has turn out to be a growing concern because many students do not carry smartphones due to school limitations and affordability subjects. As a result, regularly used digital security measures are often hopeless and not easily accessible by younger students. There are some existing systems such as GPS trackers and RFID-based attendance which provides only limited and inactive monitoring and in some cases it fails to address some real-time emergency

situations like route deviations, bullying incidents, medical ache, or unpredicted delays. To pass over these serious gaps, the projected Guardian Tag system introduces a solid, low-cost IoT-based security device that is designed especially for continuous student monitoring and quick emergency response. This device can be firmly attached to the student's school bag and integrates GPS for real-time location tracking along with a GSM module to send an immediate SMS alerts without depending on mobile internet. It also includes the dedicated panic button which enables the children to initiate an emergency alert and also send their live coordinates through a Google Map link within seconds. It is developed by using Arduino Nano/ESP32, NEO-6M GPS, and SIM800L GSM modules, and powered by a rechargeable battery. Guardian Tag consistently functions for 6-8 hours, even in limited connectivity environment. The initial assessment verified the speed, accuracy, and offline functionality of the Guardian Tag, so it was classified as a low-cost, scalable, and efficient solution to raise student security and give reassurance to parents and school authorities.

324.BLOCKCHAIN BASED ACADEMIC CERTIFICATION VERIFICATION SYSTEM

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In the current paper, I would like to discuss a blockchain-powered academic certification check system, combining decentralized storage of credentials with identity checks based on biometrics to improve the reliability, safety, and authenticity of scholarly records. The conventional system of certificate verification is very dependent on the institutional databases, which implies that it is prone to document modification, data correction, ineffective manual authentication, and centralized system collapse. The proposed system allows resolving these shortcomings through a blockchain ledger that is immutable to store the hashed academic certificates and through smart-contract-based validation, which allows ensuring verifications based on smart contracts and make them secure, transparent, and immutable. A hybrid backend that is created using Node.JS, IPFS, and Web3 has been established to support credible certificate registration, decentralized file management, and dynamic validation of credential status. Moreover, it will have a face-recognition component that implements deep-learning models to authenticate students on issuing certificates. The frontend is responsive with React/Tailwind allowing institutions to upload certificates, students to manage their credentials and employers to verify authenticity without using intermediaries. Experimental analyses have shown that it has better test verification speed, less likelihood of fraud, and better data integrity than traditional centralized systems. The paper illustrates that decentralized identity and academic credentialing can be used to facilitate the future of secure digital education ecosystems.

325.A QUANTUM-ENABLED CYBERSECURITY FRAMEWORK FOR SECURE AND SCALABLE BLOCKCHAIN NETWORK

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Quantum computing could seriously threaten the cryptographic security underlying current blockchain networks since most public-key infrastructure has been exposed to an attack from a quantum computer. Most of the current solutions to this threat focus on protecting only certain aspects of a blockchain system (e.g., securing the signature or the consensus mechanism or communication between nodes), which results in these solutions forming a fragmented system of protection for the blockchain. This paper presents a Quantum-Enabled Cybersecurity Framework (QECF) that provides complete end-to-end security for a blockchain system against both classical and quantum attackers. The framework uses post-quantum cryptography (PQC) to authenticate transactions, uses quantum key distribution (QKD) to protect the communication between nodes on the network, and uses quantum random number generation (QRNG) to increase the level of entropy and impartiality of the consensus process. By designing the QECF as a unified system, we increase the level of decentralisation, preserve the integrity of the consensus process, and allow significant scalability of any blockchain that implements the QECF.

326.DESIGN AND DEVELOPMENT OF AN ADAPTIVE STIFFNESS SANDWICH BEAM WITH PNEUMATIC CORE

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This study aims to identify the optimal bladder material, geometry, and inflation pressure for an air-bladder-based sandwich structure targeting maximum stiffness with minimal weight comparing it with the rigid core sandwich beam. Aluminum face sheets are fabricated, bonded to the bladder–foam core, and cured. The results establish parameter combinations that achieve an improved stiffness-to-weight ratio. The proposed structure offers significant potential for lightweight aerospace applications, enhancing structural efficiency, performance, and operational safety.

327.CODEVERSE: ADAPTIVE MULTI-DIMENSIONAL SKILL ASSESSMENT AND ENGAGEMENT ARCHITECTURE FOR COMPETITIVE PROGRAMMING

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With over 100,000 concurrent users, online competitive programming platforms function as a vast educational infrastructure that is expected to offer both continuous learner engagement and accurate algorithmic skill evaluation. Traditional single-dimensional Elo style rating systems that were adopted from chess are not well suited for this dual role because they assume a single latent skill dimension, converge slowly across more than 50 competitions, and ignore psychological factors driving retention. This work addresses three specific system flaws: fairness-only matchmaking that ignores loss streaks that are strongly associated with learner dropout; information loss from dimensional aggregation that hides domain-specific strengths and weaknesses; and slow convergence that delays personalizing. We introduce a three component technical architecture. First, domain separated skill vectors represent each user across multiple algorithmic domains with uncertainty aware adaptive update rules accelerating convergence while preserving stability. Second, a multi objective matchmaking engine optimizes simultaneously for rating based fairness, optimal challenge difficulty slightly above current ability, and suppression of harmful loss streaks degrading self efficacy. Third, a machine learning based error classifier analyzes submission failure modes and delivers structured formative feedback targeting identified conceptual gaps. Evaluation integrates three complementary methodologies: longitudinal analysis on 3,200 competitive programmers over 18 months demonstrates 33% convergence acceleration and 9.1% prediction accuracy improvement; discrete event simulation with 500,000 contests shows 56% losing streak reduction and 46% learning zone improvement; controlled classroom deployment with 183 students achieves statistically significant gains in solution efficiency (23% faster, $p=0.034$) and retention (11% improvement, $p=0.042$). Computational analysis confirms constant factor overhead and sub 100 ms matchmaking latency enabling deployment on production platforms supporting 100,000+ concurrent users.

328.DC SOURCE UTILIZATION IN CASCADED H-BRIDGE MULTILEVEL INVERTER FED TRACTION DRIVES

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This paper provides a classification of multilevel inverter (MLI) topologies with an emphasis on efficient DC source utilization. Multilevel inverters have gained significant attention as alternatives to traditional two-level inverters due to their ability to produce high quality output voltages, support higher power ratings, and offer modular construction with inherent fault tolerant capabilities. However, conventional MLI designs are constrained by the large number of switches, multiple DC sources, and, in some cases, additional clamping components or isolation transformers, all of which increase system size, cost, and complexity. These limitations reduce overall efficiency and reliability while complicating gate driver design. To address these issues, recent advancements in MLI topologies focus on minimizing both the semiconductor device count and the required DC sources. This work analyzes and compares various configurations through simulation to evaluate their performance and practicality. A 27-level MLI is developed, achieving a total harmonic distortion (THD) of 0.59%, demonstrating superior output quality and validating the effectiveness of reduced-component MLI structures.

329.LIFEPULSE: AFFORDABLE DIGITAL HEART RATE MONITORING FOR PERSONALIZED HEALTH MANAGEMENT

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In this paper, a microcontroller-based digital heart rate monitoring system is developed. It primarily explains the usage of the fingertip to measure heartbeat. It is an affordable, robust, and portable gadget. It is an affordable, long-lasting, and portable gadget. It is comprised of a heartbeat sensor that operates on the basis of blood flow through the fingertip modulating light. The ATmega32A microcontroller is used to calculate the heart beat per minute (BPM). It helps with remote patient monitoring in both clinical and non-clinical settings. The ATmega32A microcontroller is used to calculate the heart beat per minute (BPM). The paper also describes how to send doctors an SMS with the patient's heartbeat level via GSM. As a result, physicians can easily keep an eye on their patients' health and advise them on further safety measures. Athletes may find it helpful to continuously monitor their health. It helps with remote patient monitoring in both clinical and non-clinical settings.

330.A MACHINE LEARNING-BASED INCREMENTAL MAJORITY VOTING METHOD FOR INTRUSION DETECTION SYSTEMS

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More data is being stored and things are becoming digital, which is worsening the cybersecurity threats. This is why there is a necessity of IDS as well as the firewalls to defend the networks. This paper compares the effectiveness of intrusion detection on four benchmark Datasets include CIC IDS 2017, NSL KDD, KDD Cup, and CIC IDS 2018. The model preserves important characteristics and improves the performance with the aid of feature selection on the basis of Mutual Information. Incompatible classes are a problem that is addressed using various data sampling techniques. This is in relation to the use of original data, random sampling that is either low or too high, and hybrid sampling. An improved methodology model incorporates Stacking Classifier with RF and DT models in addition to Bagging Classifier is offered to implement. The accuracy of detection was also high in all the datasets and sampling approaches applied in the experiments. This demonstrates that the recommended IDS framework is effective in transforming cybersecurity conditions.

331.DESIGN AND IMPLEMENTATION OF A MEMORY-AWARE AI ASSISTANT FOR DEMENTIA PATIENTS USING RAG AND LOCAL LANGUAGE MODELS

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Dementia has debilitating consequences on the capacity of an individual to recall, handle in-day activities and be independent. The present paper is an AI-based cognitive support system, which will help to resolve these issues with the help of a multimodal interaction, semantic memory, and natural language processing. The system combines a React-based interface with local large language models, which are provided by Ollama, and allows secure and context-sensitive assistance to be provided without using cloud services. The Nomic model transforms user inputs (text, voice, notes, and emails) to a vector embedding and stores them in ChromaDB, which creates a layer of long-term semantic memory. This architecture enables the assistant to remember prior engagements and produce customized replies and transform email messages into actionable notifications, to assist dementia patients in organizing their lives daily. The voice-to-text feature also enhances the presence of accessibility among individuals with cognitive or motor challenges. Altogether, the system shows that AI-powered semantic memory can help manage and reduce cognitive loads, as well as offer reliable assistance in the field of dementia care.

332.SKILLTRUST: A DECENTRALIZED GLOBAL SKILL EXCHANGE PLATFORM

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While skill development is becoming increasingly crucial both for students and professionals, the majority of people still face difficulties in finding reliable mentors, affordable learning opportunities, and trusted proof of their skills. Most existing e-learning platforms follow centralized models and rely on paid certificates, limited interaction, and restricted data ownership. SkillTrust addresses these challenges using blockchain technology in verifying learning sessions, rewarding mentors, and generating tamper-proof credentials. The platform needs ERC-20 SkillTokens as basic incentives for successful learning sessions and ERC-721 ResumeNFTs to hold permanent proof of completed activities. An excellent hybrid Web2–Web3 architecture will be designed by using React.js, Node.js, Supabase, IPFS, and the Polygon network; its performance is fast, with low operational costs. This paper delineates the motivation, architecture, working process, implementation, and expected outcomes of the SkillTrust platform. The system is explicitly committed to allowing the peer-to-peer learning

process to be made more transparent and accessible and will provide trustworthy results, especially for those learners who cannot afford to improve their skills or cannot find a credible way.

333.ENHANCING SECURE ELECTORAL INTERGRITY WITH AADHAR AND BIOMETRIC AUTHENTICATION USING BLOCKCHAIN

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A healthy democracy is based on free and fair elections. They empower the citizens to elect their leaders and define the future of their country. Nevertheless, the con-ventional types of voting and most of the available electronic voting systems continue to be challenged. Voter impersonation, electoral fraud, absence of transparency, delay in the results, and centralized control remain to be some of the issues that cause doubt on the integrity and reliability of the electoral process. As individuals start to question the suita-bility of elections, citizen trust in democratic institutions is undermined. In order to over-come such fears, this paper suggests a secure, transparent, and technology-based e-voting system that will integrate Aadhaar-based authentication driven by blockchain technology. The main concept in this line of thinking is to enhance voter authentication and at the same time make the process of voting tamper-proof, transparent and reliable. In the sug-gested system, voters will be verified based on the biometric credentials that are associat-ed with a unique Aadhaar identity. Aadhaar also eliminates the possibility of voter imper-sonation and fraudulent voting by reducing the chances of different voters using the same Aadhaar number and possessing some biometric data, like fingerprints or iris scan. Every voter is able to vote once and the authentication process helps to make sure that the people who take part in the voting are qualified. This does not only lead to increased accuracy, but also increases trust in the authenticity of the base of voters. After successfully authen-ticating a voter, they are safely stored on a decentralized blockchain ledger in the form of a vote. In contrast to the conventional centralized databases, blockchain is run on a dis-tributed network with every transaction being verified and stored indefinitely through a number of nodes. This renders the system very resilient to meddling, unauthorised changes, and hacking. This means that once a vote is cast it cannot be changed or erased since blockchain records are immutable.

334.WELDING DEFECT DETECTION USING SPIKING NEURAL NETWORKS

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Welding defects are a primary cause of structural failure in industrial manufacturing. This project proposes a real- time defect detection system that uses Spiking Neural Networks (SNN) and acoustic analysis to increase production quality. After a microphone captures the acoustic emissions of the welding arc, signal processing identifies defect signatures like spatter, porosity, and burn-through. If a defect is detected, a real-time classification alert is triggered to notify the operator. This SNN-powered lightweight and computationally efficient system achieved an overall accuracy of 96.36%. Through the integration of these technologies, the project aims to reduce manual inspection costs and promote safer industrial infrastructure.

335.BENCHMARKING PRE-PROCESSING TECHNIQUES FOR GENERALIZABLE FETAL ULTRASOUND PLANE CLASSIFICATION USING DEEP LEARNING

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Fetal ultrasound examination traditionally depends on the manual selection of standard imaging planes by experi-enced sonographers. Although effective in clinical practice, this process is time-consuming and subject to inter-operator vari-ability, especially due to ultrasound-specific challenges such as speckle noise, low contrast, and acquisition artifacts. While recent deep learning–based methods have shown promising results for automated fetal ultrasound plane classification, the role of image preprocessing in improving model generalization has not been systematically explored. The proposed work concentrates on the analysis of the impact which was created when multiple image preprocessing techniques on fetal ultrasound was conducted for classification. ResNet18, EfficientNetB0, and MobileNetV3-Large convolutional neural network architectures are used for the evaluation of ten commonly used preprocessing techniques. By following consistent experimental protocol for training, internal validation, and external testing employing separate datasets. Decision thresholds are optimized using internal validation data, and performance is assessed using accuracy, F1-score, and area under the receiver operating characteristic curve (ROC–AUC), reported as mean and standard deviation across multiple random seeds. The evaluated result reveals that preprocessing made a great impact in advancing the performance on unseen raw data. By observing the evaluated methods, the integration of median filtering and CLAHE consistently achieves superior results, with an average external ROC–AUC of 0.7703 across all models and a highest individual performance of 0.8565 ± 0.0337 obtained using ResNet18. Edge-enhanced and median-denoised preprocessing techniques also show competitive performance with enhanced stability. These findings focus the importance of systematic preprocessing selection and results with a robust fundamental for future fetal ultrasound analysis.

336.NON - INVASIVE BLOOD GROUP DETECTION USING DERMATOGLYPHIC ANALYSIS

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This study will introduce a non-invasive, fingerprint-based biometric system of automated blood grouping through dermatoglyphic ridges patterns. The given solution uses a vision system based on the lightweight transformer to extract local minutiae and global ridges flow information of fingerprints. A domain-related learning feature approach is integrated by highlighting on the biologically important dermatoglyphic core area whereby the model concentrates on consistent and meaningful ridge patterns without ignoring cross-population variation by the use of population-sensitive modelling to enhance robustness and minimize demographic bias. It is a three-level evaluation pipeline, which will allow comparative analysis of Mobile Vision Transformer

(MobileViT), Tiny Vision Transformer (TinyViT), and the baseline Vision Transformer (ViT) models used in predicting blood groups. It is experimented on a filtered fingerprint data set containing a variety of ridge structures, such as loop, whorl and arch structures. The findings indicate that MobileViT has a higher performance with a total accuracy of 96.6% and a much lower complexity of computation compared to TinyViT and ViT. The framework combines the estimation of confidence and the measures of uncertainty in order to advance transparency and reliability. The results confirm that fingerprint analysis is an effective and scalable biometric marker of non-invasive blood group estimation, and possible uses in low-cost systems of healthcare screening and emergency medical response networks.

337.EMPLOYING A HYBRID SSM-TRANSFORMER FOR FLIGHT DELAY PREDICTION

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One of the problems that has always been prevalent for both travelers and airlines is the problem of flight delay, which leads to loss of time, money, and increased irritation in the travel sector. In this research, a hybrid model consisting of a State Space Model (SSM) and a Transformer, particularly designed for flight delay prediction, is proposed. The Transformer part of the model focuses on local and short-term interactions between flights and their features, while the SSM part of the model focuses on long- term patterns in flight activity, such as the effect of an early delay on the rest of the day's flights.

338.ADAPTIVE HEALTHCARE RESOURCE OPTIMIZATION

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The efficient management of healthcare resources has turned into a very difficult problem due to the increase in the number of patients, the inadequacy of the current healthcare infrastructure, and the complications that have

arisen concerning the operations of hospitals. The usual techniques that are employed for resource management in healthcare are largely reliant on manual planning and reactive decisions, which very often lead to problems such as shortage of resources, overcrowded patients, and thus, lower quality of patient care. A very recent study has shown the effectiveness of data science, machine learning, and big data analytics in addressing these problems in healthcare resource management by offering timely, predictive, and precise healthcare decisions and forecasts. The present paper, motivated by the advances in research, tries to propose a smart and effective healthcare resource management system that is based on predictive analytics, real-time analytics, and explainable artificial intelligence techniques to tackle the problems in healthcare resource management. The current paper has made use of both historical and real-time healthcare data that are stored in electronic healthcare records, healthcare information systems, ICU admissions, and the need for critical resources. LSTM (long short-term memory) and related learning models will be used to reveal temporal patterns and categorize resource demand, while different explainability approaches will foster trust and confidence in the decisions emanating from the artificial intelligence methods involved in healthcare resource management. The findings from the experiments conducted with simulated healthcare datasets and standard healthcare data.

339.WEBTRANSPORT-BASED MAIL TRANSFER PROTOCOL USING BIDIRECTIONAL STREAM MULTIPLEXING

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The WebTransport Mail transfer protocol (WMTP) is a representation of a. coordinated system redesign of email communication infrastructure to the modern. Internet. WMTP is built based on QUIC and WebTransport to meet the essential limitations. legacy protocols (SMTP, IMAP, POP3) which were developed to be used over wired have been superseded. always on networks. The design, implementation, and the entire design are presented in this paper. and testing of WMTP, a single protocol that has removed TCP head-of. line blocking, facilitates a network that passes smoothly during changes of networks, combines atomic state consistency, and makes good performance improve. copyless binary copy transfers. We have proven it through our implementation. 3 times as much server capacity as legacy stack, less than a second connection. construction through 0-RTT handshakes, and sound functioning in unreliable mobile. networks. It is verified through security analysis that WMTP is TLS 1.3-equivalent. authentication and Authorization and giving access to browsers. Performance benchmarks have greater throughput and latency behaviour than traditional. email policies, especially operation over high concurrence and mobile first.

340.EVOLUTIONARY TRENDS AND FUTURE DIRECTIONS IN INFRARED–VISIBLE IMAGE FUSION: A COMPREHENSIVE ANALYSIS

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This paper provides a thorough examination of current developments in visible and infrared (IR) image fusion from 2023 to 2025, emphasizing the shift from conventional multi-scale and transform-based methods to contemporary deep learning-driven frameworks. A total of 27 standard journal papers were reviewed and systematically categorized into five major groups: Traditional, CNN-based, GAN-based, Transformer-based, and Hybrid approaches. Quantitative and visual analyses reveal a clear shift toward hybrid and transformer models that integrate semantic reasoning, attention mechanisms, and multimodal learning. Domain correlation further indicates that surveillance and remote sensing remain dominated by CNN models, while medical and

autonomous systems increasingly favor hybrid architectures. Citation trends and predictive modeling confirm the rapid emergence of intelligent, interpretable, and adaptable fusion systems. The study contributes by summarizing methodological evolution, identifying domain preferences, and forecasting future directions emphasizing explainability and cross-modal intelligence in IR–visible image fusion.

341.MENTAL HEALTH DEPRESSION DETECTION SYSTEM

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Depression, stress and anxiety are the most common mental health disorders, they are on the rise but mostly go undiagnosed due to stigma at large, a shortage of mental health professionals and lack of early screening facilities. Early detection is of paramount importance for timely intervention and preven-tion of severe psychological outcomes. In this paper, we are going to describe an AI-driven Mental Health Depression Detection System. The system automatically analyzes user input regarding their mental state in text and audio form. Multimodel analysis is carried out by using Natural Language Processing techniques for text in any language and audio signal processing for voice based assessment. Major linguistic patterns, emotional keywords and prosodic speech features analyzed through machine learning models trained for this purpose provide an estimation of depres-sion, stress and anxiety with a confidence score. The proposed system is a Flask based backend integrated with a React frontend, including role based access for users, healthcare professionals and administrators. Experimental evaluation shows that, following real time analysis within 30 seconds, such systems can ensure a reliable mental health assessment with support for visual trend analytics. Such results indicate accuracy and usability improvements over single modality approaches. This framework can take advantage of its scalable, secure and accessible design to perform early screening of mental health conditions and professional monitoring of their states, serving as an active decision support tool in mental health awareness and preventive care.

342.A COMPREHENSIVE REVIEW OF HYBRID MULTI-HEAD TRANSFORMER-ENABLED ATTENTION-BASED SEMANTIC CNN-GBM MODELS FOR OBJECT DETECTION

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The field of object detection has undergone a paradigm shift from conventional statistical approaches to deep learning models, particularly Convolutional Neural Networks (CNNs) and more recently, Transformers. Although CNNs are very efficient at local spatial feature extraction, they tend to be less capable of modeling global semantic contexts. On the other hand, Transformers with multi-head attention mechanisms are capable of modeling global semantic contexts but tend to be computationally expensive. This literature review critically examines existing literature to propose a new hybrid approach: Multi-Head Transformer-Enabled Attention-Based Semantic CNN with a Gradient Boosted Machine (GBM) classifier. Through a systematic synthesis of findings from twenty recent studies, we assess the performance of region-based semantic CNNs, the combination of classical machine learning classifiers with deep learning models, and attention-based strategies for feature fusion. The literature review reveals that there are several limitations in existing approaches, particularly with regard to open-world generalization, domain shift, and decision boundary optimization, and suggests that the substitution of traditional fully connected heads with ensemble models such as GBMs in a transformer-enabled CNN architecture is a necessary step towards developing robust and highly accurate object detection systems.

343.A DUAL-MODEL MACHINE LEARNING FRAMEWORK FOR FERTILIZER TYPE AND QUANTITY RECOMMENDATION BASED ON SOIL HEALTH PARAMETERS

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Efficient fertilizer management plays a critical role in enhancing agricultural productivity while minimizing envi- ronmental impact. Traditional fertilizer application practices often rely on generalized recommendations, leading to overuse, increased costs, and soil degradation. This paper presents a dual-model machine learning framework for fertilizer type and quantity recommendation based on soil health parameters. The proposed system utilizes soil nutrient attributes, including nitrogen, phosphorous, potassium, pH, organic carbon, along with soil type and crop information, to generate data-driven fertilizer recommendations. A Gradient Boosting Regressor is employed to predict the optimized fertilizer quantity, while a Random Forest Classifier is used to determine the appropriate fertilizer type. Categorical features are encoded, and numerical inputs are

standardized to ensure consistent model performance. The framework is evaluated using standard regression and classification metrics, demonstrating reliable predictive capa- bility. To enable practical deployment, the trained models are integrated into a Streamlit-based web application that provides real-time, multilingual recommendations and advisory feedback. The proposed approach offers an intelligent, scalable, and user-friendly solution for precision agriculture, supporting informed decision-making and promoting sustainable fertilizer usage. By leveraging soil health data and machine learning techniques, the framework contributes toward optimized nutrient management and improved crop productivity, highlighting the potential of artificial intelligence in modern agricultural systems.

344.BLOCKCHAIN-BASED DECENTRALIZED VOTING SYSTEMS: PRIVACY, VERIFIABILITY AND SCALABILITY CHALLENGES

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The transparency of elections is the basis of any democratic form of governance. However, because of problems related to the alteration of data, insider attacks, and a lack of transparency, the traditional and centralized form of e-voting systems is still a concern. Fortunately, Blockchain Technology, and Cryptographic solutions such as Zero-Knowledge Proofs, and Homomorphic Encryption, have the potential to address the problems of security, privacy, and data alteration in digital voting. This survey discusses the challenges of implementing a voting system that is decentralized and based on blockchain technology. In particular, this survey discusses the frameworks and performance of VoteMate, TrustChain, Hybrid Crypto, and other models, and introduces BallotChain, which is a novel approach that improves privacy, reduces gas costs, and scales with off-chain aggregation. The survey also discusses the new re- search frontiers of post-quantum security, decentralized identity verification, and artificial intelligence audit systems. This survey aims to summarize the innovations between 2023 and 2025 in developing a more efficient and transparent digital voting system.

345.A SMART SOS ALERT SYSTEM WITH ADAPTIVE GPS TRACKING, EVIDENCE CAPTURE AND CRIME-AWARE VISUALIZATION OF THE INVENTION

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This project presents a context-aware personal safety application that uses a two-pronged approach for locating and visualizing risk in your surroundings. By fusing accurate GPS fine-tuning with live crime-density data in choropleth maps, it increases your situational awareness far beyond standard panic buttons. A heuristics-based "watch" algorithm filters out low-accuracy signals and visually confirms location accuracy within about 50 meters to avoid misleading leads and provides responders with ready-to-use information. While designed for real-time crisis management, video recording automatically begins on event trigger and data securely sent to a backend through a dedicated SMS gateway, thus preserving evidence. Smart fallbacks and offline support make

the system reliable under shifting network conditions for urban commuters, lone workers, and vulnerable individuals in high-risk areas. This approach reinforces safety and accountability for a person, with detailed risk assessment, including automated signaling of distress.

346.AI-BASED DRUG REPURPOSING USING KNOWLEDGE GRAPHS

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Drug repurposing in modern medicine is a powerful approach that indicates new therapeutic uses for existing drugs and largely reduces the cost and time devoted to traditional drug discovery. However, these possibilities are often overlooked because biomedical information is scattered in numerous isolated data sources. The slow identification of promising candidates commonly delays clinical translation and limits treatment options, thus motivating a more proactive and intelligent process for the exploration of drug-disease relationships. This paper proposes an AI-based, knowledge- graph-driven system for the efficient discovery of repurposable drugs. The system will consistently integrate diverse biomedical datasets, including drug-target interactions, disease pathways, gene associations, and clinical evidence. These heterogeneous parameters are mapped to a unified knowledge graph and linked to curated biomedical repositories available in research environments. The AI model leverages graph-based machine learning algorithms trained over previous biomedical data to detect subtle and meaningful relationships capable of revealing novel therapeutic links well in advance of traditional screening methods. The predictions are delivered directly to the researchers via dashboards, ranked reports, or automated alerts for immediate evaluation. The key objectives are acceleration in drug discovery cycles, enhancement in the way clinical decisions are supported, and optimum utilization of biomedical resources. The predictive large-scale inference is the key attribute of the proposed system and differentiates it from conventional repurposing methods, which are heavily manual and trial- dependent.

347.AN AI-POWERED STUDENT SKILL ASSESSMENT, CAREER GUIDANCE, JOB RECOMMENDATION AND STAFF SUPPORT SYSTEM

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This research is about designing a smart assistant powered by Artificial Intelligence (AI) that can combine performance prediction, career recommendation, and skill-gap analysis for student decision-making. The suggested approach relies on the multi-modal academic, behavioral, textual, and temporal data, apart from advanced preprocessing, also contains optimized feature selection and a hybrid TGNN-BiLSTM model for precise performance prediction. A career suggestion system based on the Knowledge Graph provides awareness of the career-related context, whereas a Siamese Neural Network skilfully detects the individual skill gap and suggests the perfect learning material. The integrated system is more stable concerning prediction, and the recommendation is relevant, as well as skill-gap identification. In sum, the work asserts that combining multi-format data with sophisticated AI models represents a complete, modifying, and dependable way of support. The framework is significant since it advances aspirants' readiness for the labour market, facilitating the provision of orientation services and delivering personalized educational and career interventions virtually endlessly to a large number of beneficiaries.

348.AN AUGMENTED REALITY ARCHITECTURE FOR ENHANCING VISUAL LEARNING IN CHILDREN

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This study presents the creation, evolution, and evaluation of an Augmented Reality (AR) Encyclopedia tailored for children aged 4 to 12. The application employs marker-based AR to transform traditional educational materials into captivating 3D representations that enable young learners to explore topics such as animals, insects, marine life, and dinosaurs in an enjoyable and interactive manner. Developed using Unity along with the Vuforia SDK, this platform achieves rapid marker recognition and model rendering on standard mobile devices, offering a fluid and responsive user experience. The results indicate that, when designed appropriately for their cognitive and interactive needs, AR can significantly enhance experiential learning for children.

349.PROGRESS IN FOUR-DIMENSIONAL IMAGING TO DECODE TUMOR–IMMUNE DYNAMICS

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Over the past few years, biomedical engineering has emerged as a critical subject tackling global healthcare concerns through the creation of new technology. Four dimensional (4D) imaging has revolutionized oncology by enabling time-resolved observation of dynamic tumor-immune interactions that are not achievable with conventional three dimensional imaging. Recent advances in computational reconstruction, deep learning-based motion modeling, and sparse-view imaging have significantly improved the temporal resolution, image fidelity, and radiation efficiency of 4D imaging modalities, such as 4D CBCT, 4D-CT, and 4D MRI. Integration of multimodal data, including radiomics, genomics, and histology, provides quantitative assessment of tumor heterogeneity, immune infiltration, and therapy-induced responses beyond anatomical reconstruction. Modern frameworks use AI-driven reconstruction, spatiotemporal modeling, artifact suppression, and patient-specific registration to enable adaptive treatment planning and predictive result evaluation. Furthermore, statistical modeling, multi-sensor learning, and privacy-preserving federated techniques broaden the application of 4D imaging to longitudinal and collaborative research.

350.RELIABLE WATER QUALITY ASSESSMENT USING SMOTE-ENHANCED MACHINE LEARNING APPROACHES

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– Water pollution has become a global challenge that needs effective monitoring and management strategies. This study addresses the problem by classifying water samples as potable or non-potable using machine learning (ML) techniques. A publicly available dataset is utilized, which undergoes preprocessing to handle the missing values, followed by Synthetic Minority Oversampling Technique (SMOTE) to balance the data distribution. Six ML classifiers, Random Forest (RF), Support Vector Machine (SVM), K-Nearest Neighbors (KNN), Decision Tree (DT), Boosted Trees and Stacked Ensemble (SE) algorithms are used for the prediction of the data. The models are evaluated based on accuracy, precision, recall, F1 and AUC as performance metrics. Experimental results revealed that boosted trees and stacked ensemble outperformed the other classifiers and achieved superior performance compared to the existing approaches. The proposed framework demonstrates the potential of ML model as effective tool for reliable water quality assessment and decision support.

351.A DEEP LEARNING APPROACH FOR AUTOMATED ATTENDANCE MANAGEMENT USING FACE RECOGNITION.

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Attendance monitoring is one of the most important administrative processes in educational institutes and workplaces, ensuring accountability and tracking performance. Most conventional attendance systems, including manual roll calls, RFID cards, and fingerprint scanners, are inefficient, time- consuming, and prone to the problems of proxy attendance or physical contact constraints. In the backdrop of these limitations, this study tries to propose a Deep Learning-Based Face Recognition System that automatically marks attendance using real-time identity verification. The system relies on MTCNN for identifying faces from images and a deep learning-based facial recognition system in order to generate and match facial encodings. Once the face is authenticated, the proposed framework will securely log the attendance within a database with time-stamped logs and thus reduce the amount of human intervention required to ensure transparency in the process of attendance keeping. In order to enhance the recognition accuracy, image preprocessing and data augmentation

have been proposed in order to handle variabilities in lighting, pose, and facial expression. Experimental evidence of the quality of the system is performed through various performance metrics such as accuracy, precision, recall, and processing time. The average recognition accuracy achieved is 97.8% with response times within the feasibility limit for real-time deployment. Results confirm that the designed system is robust, scalable, and secure compared to existing attendance methods.

352.AR-MULTI++ Web

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Modern real-world settings frequently present mul- tilingual textual information, and users face Considerable dif- ficulties because of a language barrier in realistic use cases such as travel, education, and accessibility assistance. Most of the traditional text translation software suffers from a lack of smooth visual context preservation and integrated audio support, hence limiting their practical usability. To address this challenge, this work presents AR-MULTI++ Web, a web-based multilingual scene text recognition and translation system that integrates optical character recognition, machine translation, textto-speech synthesis, and visual overlay in an augmented reality manner. The system proposed herein thus allows users to upload images containing textual content in various languages and performs the automatic extraction of text using a cloud-based OCR engine. It then performs the translation of the extracted text into a target language specified by a user and renders the translated text as both audio output and a contextual visual overlay on top of the original image. A modular client-server architecture has been implemented using modern web technologies for ensuring scalability and real-time processing capability. In an experimental evaluation, it has been demonstrated that the system achieves high accuracy in text extraction, efficient translation perfor- mance, and low end-to-end processing latency. The integration of audio output further enhances the accessibility of the system for users with visual impairments. The results obtained reveal that the proposed framework offers an effective and user-friendly solution to the real-world multilingual scene text understanding task. Overall, AR-MULTI++ Web constitutes a practical platform for real-time translation of languages, both visually and auditorily augmented, which can be further expanded into additional languages and state-of-the-art augmented reality features in the future.

353.A SELF-CONTAINED MULTIMODAL EMPATHETIC DIALOGUE SYSTEM: INTEGRATING ADVANCED EMOTION RECOGNITION WITH PRIVATE, LIGHTWEIGHT RESPONSE GENERATION

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Emotion-aware conversational systems have become more important for the improvement of naturalness and effectiveness of human-computer interaction. However, many of the recent approaches rely on large models stored in the cloud and on constant processing in the cloud, which can create latency concerns, privacy issues, as well as challenges regarding its deployment in an environment with limited computing capabilities. These constraints apply, making alternative designs necessary to help emotional awareness without the need of huge infrastructure need. In this work, a resource-aware multimodal dialogue framework is presented integrating textual and facial emotion recognition in an emotionally aligned response production. Text-based emotion inference is performed from a small transformer model, and through a small vision pipeline, the facial emotion cues are *) are * extracted. The emotional outputs from different modalities are fused with the help of a rule-guided fusion mechanism which prioritizes the interpretability and computational efficiency. Dialogue responses are generated dependent on the fused emotional state with optional external acceleration only when required. The proposed framework is tested on a CPU-only system using standard metrics of emotion classification and real-time interaction situations. The results show that combining multiple cues of the emotion results in more stable emotion-interpretation than single modality processing, and the response times do not impede interactive application. These findings imply that for emotion-aware dialogue systems, some of the scientific challenges can be made to work effectively within resource constraints and are a practical trade-off between emotional sensitivity, efficiency, and data privacy.

354.FLOOD RISK DETECTION USING MACHINE LEARNING

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Floods are the most disastrous natural processes. disasters continue to plague the communities due to frequent victimization. of life, mass displacement and destruction of major infrastructures. This comes as climatic and

urbanization pace up. Floods are perilous, and therefore, there is the demand of effective and efficient flood forecasting. Techniques are increasingly becoming urgent. We propose to explore the to use machine learning, with more precision, ensemble-based models. Establish and classify the risk of floods. In our study, four algorithms are considered. algorithms- AdaBoost, RandForest, XGBoost, and CatBoost on. a database consisting of 20 environmental, hydrological and socio-economic parameters such as monsoon intensity, land-use changes etc. quality drainage, and exposure of the coast. The models were tested and trained after careful data cleaning exercise; preparation of features, and testing on standard performance. metrics. The most successful model of the tested models is CatBoost. in arriving at a right conclusion that it is a probability of about 94.32, which is very strong. to manipulate both qualitative and quantitative data and to capture multifaceted trends. These studies force the new finding of gradient. The forecasts of the boosting methods are more powerful as compared to. to the traditional ensemble techniques. Going forward, future Studies ought to be directed at real-time integration of IoT sensors data. hybrid deep learning methods to make and satellite imagery. disaster-friendly and flexible systems of flood prediction. preparedness

355.SMART STEEL:REAL TIME DEFECT DETECTION FOR STEEL SURFACES USING ML & CV

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Quality control of the surface of a steel is an important application in the area such as construction, automotive industry and manufacturing. Defects may lower tensile strength, limit service life and endanger safety. Manual inspections are slow and prone to errors, covering only a small portion of the images. This article presents “Smart Steel,” an automated steel surface defect detection system in real time It uses Machine Learning (ML) and Computer Vision (CV) for quality control in steel production. CNNs perform the classification, and YOLOv8 is used to quickly identify defects.The system recognizes and identifies surface defects, like scratches, inclusions, patches or rolled-in scales on images sent to it for processing or coming from live camera streams.

The models were trained on the NEU Steel Surface Defect Dataset from Kaggle. The results indicated that the accuracy was considerable: The CNN was 94.12%, while YOLOv8 equaled 85.17% and ResNet34 tested result of 79.34%, InceptionV4 had a test value of 86.13%. This procedure increases the efficiency, reduces material waste and promotes a sustainable production according to UN SDG Goal 12 on Responsible Consumption and Production.

356.An Analytical Review of Cryptographic Approaches for Securing IoMT Environments

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The internet of medical thing system (IoMTs) comprises the fifth-generation (5G) networking technology that collects and shares digital data from signal- or image-capturing devices through computer and wireless communication networks. The growing dependence on interconnected devices and cloud-based healthcare systems has introduced multiple vulnerabilities, creating potential entry points for cyberattacks and unauthorized access to sensitive medical data. Such security breaches not only compromise patient privacy but also pose serious risks to patient safety and erode trust in healthcare systems. In this context, medical images represent critical healthcare assets, and ensuring their confidentiality, integrity, and availability is essential for accurate diagnosis, effective treatment planning, and high- quality patient care. Despite these advancements, the large-scale adoption of cloud-based solutions in real-time healthcare systems remains constrained by critical challenges related to data security, system reliability, latency, and availability. Addressing these challenges in a timely and effective manner is essential to ensure secure, reliable, and scalable healthcare service delivery.

357.IOT BASED SMART CRADLE SYSTEM WITH FIREBASE FOR REAL-TIME CHILD MONITORING

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IoT has become more popular due to the increasing use of mobile phones and the availability of high- speed internet. Enabling parents to use their mobile phones to remotely watch their infant while they are babysitting is one significant application. The design of a Smart Cradle System that facilitates this kind of remote monitoring using a web application built on Firebase and GitHub is shown in this paper. The cradle has dynamic fan speed adjustment based on room temperature for comfort and automatic music or voice playback to calm the infant. Diaper wetness is detected by capacitive sensors, and the baby's body temperature is continuously monitored. Parents receive SMS alerts for any abnormal conditions, like as prolonged crying or wet diapers. Additionally, the cradle has an autonomous rotating toy for entertainment and a swing mechanism that activates when the baby cries. The method guarantees improved new born care and prompt parental notifications.

358.DESIGNING A CLOUD DATA LAKE PIPELINE FOR POWER BI USING AZURE DATABRICKS AND SQL

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Modern organizations generate massive volumes of structured and unstructured data from applications, IoT devices, logs, and enterprise systems. Traditional data warehouses struggle to ingest, process, and transform such diverse data at scale due to rigid schema enforcement, high infrastructure costs, and slow refresh cycles for analytics. To address these limitations, this research presents a cloud-based data lake pipeline built using Microsoft Azure services such as Azure Data Lake Storage (ADLS), Azure Data Factory (ADF), Azure Databricks, Azure Key Vault, and Azure SQL Database. The proposed pipeline automates ingestion, performs schema validation, separates valid and invalid records, ensures secure credential handling, and prepares curated datasets for Power BI analytics. The system introduces a multizone architecture consisting of Landing, Staging, and Rejected layers to guarantee data quality and governance. Experimental evaluation demonstrates that automated processing and optimized storage formats (Delta/Parquet) significantly reduce processing time and improve Power BI reporting performance. The results confirm that a cloud- native lakehouse architecture is an efficient and scalable solution for enterprise business intelligence workload.

359.COMPARATIVE EVALUATION OF SMOTE AND FEATURE STANDARDIZATION BASED SUPERVISED MACHINE LEARNING ALGORITHMS FOR HEART DISEASE PREDICTION

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The primary cause of death is still cardiovascular diseases. Non-invasive diagnostic tools that can identify issues early on are needed. In clinical settings, these tools help doctors make well-informed decisions. In a competitive setting, we investigate eight machine learning algorithms. Multilayer Perceptron, Support Vector Classifier, Logistic Regression, LightGBM, k Nearest Neighbors, Random Forest, XGBoost, and Gaussian Naive Bayes are some of these algorithms. We used the UCI Cleveland dataset to apply them to disease identification. Medical datasets frequently have problems like feature types and unequal class distributions. We put in place a preprocessing process to deal with these problems. This procedure creates a one-hot encoded representation for categorical variables and normalizes variables using standard methods. To improve the minority class, we also included SMOTE in the training dataset. The evaluations showed that both the Multilayer Perceptron and k-Nearest Neighbors performed well. On test datasets, each obtained an accuracy of 91.8% and an F1-score of 0.915. The optimized Multilayer Perceptron was distinguished by its ROC AUC value of 0.9697. Conversely we saw that at 72.1% Gaussian Naive Bayes fell behind. What we did see was that its assumptions of feature independence break down in the face of related clinical variables. As a whole the results put forth that non linear models and tuned neural networks are the way to go. They do an excellent job at recognizing complex patterns in health data. This also opens up for cardiology to use automated methods in which to assess heart risk.

360.A LAG-AUGMENTED WEATHER-LOAD FUSION FRAMEWORK FOR ACCURATE SHORT-TERM ELECTRICITY LOAD FORECASTING USING XG BOOST

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Short-term electricity load forecasting is a key requirement for the reliable and efficient operation of modern power systems. This paper presents a machine learning-based framework that integrates weather information with historical load data for accurate hourly load prediction. The proposed approach constructs a unified feature space by combining temporal indicators, lagged load values, rolling statistical measures, temperature-derived attributes, and interaction features. A lag- augmented XG Boost model is developed and optimized using a time-aware validation strategy, and its performance is benchmarked against conventional models such as Support Vector Regression (SVR) and Random Forest (RF). Experiments conducted on a large real-world dataset comprising more than 175,000 hourly observations demonstrate that the proposed model consistently outperforms baseline approaches, achieving reductions of approximately 10% in both MAE and RMSE. Furthermore, an ablation study highlights the significant contribution of temperature- related features in improving forecasting accuracy. The results confirm that the proposed framework is robust and effective for short-term electricity load forecasting.

361.PREDICTING HOSPITAL STAY LENGTH USING EXPLAINABLE MACHINE LEARNING

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The proposed research is intended to apply machine learning for formulating an explainable prediction of hospital stay using the Kaggle dataset. Some of the models used for evaluation are logistic regression, mlp, random forest, gradient boosting, xgboost, and so on. The evaluation criteria of the proposed research are among the most important ones, such as accuracy, precision, recall, f1-score, and so on. Another important point of this explanation is together with the most important predictors, crediting the LOS SHAP values in the models. Based on the output, the ensemble models provide a very good output for the predictive accuracy; this research further validates that the explanation analysis can assist healthcare professionals in optimizing resource allocation and thus can be translated into better patient outcomes.

362.DEEPFAKE TWEET DETECTION USING CNN WITH FASTTEXT WORD EMBEDDINGS

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The rapid growth of social media has spread information and made it easier for people to employ automated systems to make fake content. Recent advances in natural language generation have made tweets created by machines look lifelike, making it impossible to tell them apart from tweets posted by people. This research use FastText word embeddings and a CNN to identify machine-generated tweets via deep learning techniques. FastText is used to transform tweets into dense vector representations that capture semantic and subword-level information. This makes it perfect for short, casual social media posts. These embeddings let a CNN architecture learn how to classify things on its own. The algorithm is tested on the public Tweepfake dataset, which include tweets made by both bots and people. To show that the proposed technique works, it is compared to standard machine learning models and deep learning architectures like LSTM and CNN-LSTM using TF and TF-IDF feature extraction methods. The FastText-based CNN model does better than the others, with 93% accuracy, precision, recall, and F1-score. Using FastText embeddings with CNN to find deepfake tweets is a good idea since it makes social media safer and more trustworthy.

363.SURVEY ON SMART GRAIN STORAGE: CHALLENGES, MODERN APPROACHES, AND FUTURE TRENDS

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Grain storage is a key service in food security, ensuring sustainable and safe storage of all the major food crops. The difficulties with food production once crops are harvested are losses due to improper handling and monitoring in the period of about 10-25% of grain spoilage per year. Typical grain storage techniques are manual handling, which is not suitable for early identification of the spoilage parameters such as temperature increase, humidity, fungal growth and insect infections.

364.VANDALISM DETECTION IN SURVEILLANCE VIDEOS VIA GRADIENT-GUIDED SPATIOTEMPORAL FUSION

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Automated vandalism detection in surveillance video presents significant challenges due to semantic ambiguity, scene-dependent overfitting, and insufficient temporal modeling. Exist-ing methods often fail when background spatial features (e.g., crowded scenes) dominate the learning signal. We present a multi-stage framework addressing these issues through ontolog-ical dataset alignment and a novel Gradient-Guided Decoupled Fusion strategy. Our approach harmonizes three public datasets (UCF-Crime, MSAD, DCSASS) with a manually annotated object dataset of 5,135 images, yielding a robust benchmark of 20,358 video clips. We train three complementary expert models: YOLOv8m for spatial context, R(2+1)D for short-term motion, and ViViT for long-range temporal dependencies. Crucially, we utilize gradient norm analysis to identify and suppress modality dominance, decoupling spatial features from the final decision boundary. A non-linear ensemble classifier, combined with adaptive temporal smoothing, achieves 92.5% accuracy and 0.91 Macro F1-Score on a strictly held-out test set. This approach significantly outperforms naive concatenation baselines by forcing the model to learn action-dynamics rather than scene context.

365.DETECTION OF ABUSIVE LANGUAGE IN SOCIAL MEDIA USING MACHINE LEARNING

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The fast development of social media networks has brought about the proliferation of abusive and harmful content, and automated detection systems are crucial in making online interactions safe. The process of manual moderation can take too much time, be inconsistent and unsuitable to large scale settings. In this paper, a machine learning based system is suggested to detect abusive language based on traditional probabilistic classifiers. The system employs three versions of Naive Bayes algorithm; Multinomial, Bernoulli and Gaussian, and Term Frequency -Inverse Document Frequency (TF-IDF) to represent the text effectively. Raw textual data is processed through a set of automated preprocessors which order data, making it easier to process enormous data sets. The models are judged by mathematically determined measures of accuracy, precision, recall and F1-score. The experimental findings demonstrate that the Multinomial Naive Bayes classifier has a better performance over the other variants. The trained model is installed with Flask-based web interface to make real-time detection possible, which provides a scalable and efficient content moderation system through automated means.

366.WEB ENABLED PLATFORM FOR ONLINE EDUCATION

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As digital technology continues to shape higher education, students often rely on fragmented systems to navigate academic life. Many existing platforms handle basic admin- istrative tasks such as course registration and grading, but fail to support broader student needs like mentorship, career preparation, or timely academic guidance. Drawing upon our direct experiences and conversations with peers and faculty, we designed EduWeb, a comprehensive web-based solution that brings together these often-overlooked services in one accessible interface. EduWeb consolidates key features into a unified platform. It offers an academic resource center, resume feedback tools aligned with current hiring practices, and an interactive assistant that responds to student queries. We also introduced a mentorship module to foster structured connections among students, faculty, and alumni, alongside a dedicated event system to help users stay informed about workshops, club meetings, and other campus activities. The platform is built using a modular architecture, with React.js powering the frontend, Node.js managing backend ser- vices, and MongoDB serving as the database. Machine learning elements are implemented using Python frameworks such as TensorFlow and Scikit-learn. Natural language processing for resume analysis is achieved through spaCy and NLTK. Security is ensured through JWT-based authentication and Single Sign-On mechanisms tied to institutional credentials. We followed an agile development approach with regular feed- back loops. Early deployment results showed increased platform usage, improved resume alignment with job roles, and a greater interest in mentorship initiatives.
EduWeb demonstrates how academic platforms can evolve to offer practical and meaningful support, especially in areas where students frequently face gaps. It provides a model for institutions aiming to modernize their digital infrastructure and offer a more student-focused experience.

367.AI-POWERED MUSIC COMPOSER

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Artificial Intelligence has rapidly transformed creative fields, including algorithmic music composition and digital audio generation. This research presents an AI-powered music composer built using a Tiny Transformer architecture capable of learning melodic patterns from MIDI datasets and generating new musical sequences. The proposed system extracts essential musical attributes such as pitch, quantized duration, and velocity from MIDI files using PrettyMIDI. These features form the input to a Transformer-based sequence model trained using next-note prediction.

A Streamlit-based interface enables users to train the model, generate melodies, visualize musical characteristics through pitch contour graphs, and evaluate output quality using spectral centroid analysis. Generated sequences are converted into both MIDI and WAV formats using sinusoidal synthesis for audio rendering. Experimental results show that the model produces musically structured melodies with stable pitch patterns and coherent timing characteristics. The system demonstrates strong potential for educational use, creative composition, and exploratory research in AI-driven music generation.

368.BYTEQUEST: AI DRIVEN ANALYTICS FOR CODING SKILLS AND PLACEMENT PREPARATION PLATFORM

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Finding a job that is related to our career is hard and challenging and often lead to problems like unemployment, with the help of Al-driven analytics it allows users to practice interviews in a simulated environment. During these sessions, facial expressions are observed to help users understand their interview behaviour. After each session, users receive individual feedback to improve their performance. The system also includes simple exercises to improve communication skills, such as reading sentences, rearranging words, and basic listening and speaking tasks. Accuracy scores are provided so users can track their daily performance. Timed aptitude and reasoning tests are available to help users experience real test conditions. This project supports users in building confidence, improving communication, and developing problem-solving skills needed for placement preparation. By using these features regularly, users can build confidence and improve their overall performance for placement activities.

369.AUTISM DETECTION USING FACIAL RECOGNISATION

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The early identification of ASD is crucial to allow timely interventions that can improve the long-term developmental outcomes. Traditional diagnostic assessments have often been subjective, resource-intensive, and clinically specialized. A growing body of research indicates that individuals with ASD have distinct facial morphology and micro-expressive variation that is computationally analyzable. This study aims to come up with an automated ASD detection method using deep- derived features from facial images. It presents a rather straight and efficient way of applying deep learning techniques in ASD detection. The outcome of this study proved reliability and efficiency when compared to conventional methods of machine learning. This conclusion confirms the expectations that deep learning systems can serve as auxiliary healthcare tools in ASD early screening. Some concerns about ethical issues in deep learning are also highlighted.Empirical observations on a curated data set reveal that the proposed architecture has reached a high standard of accuracy, precision, and sensitivity, which exceeds those of conventional machine-learning techniques like SVM and RF. This paper also touches upon issues related to performance improvement due to data set quality, landmark-driven segmentation, and hyperparameter tuning. The observations validate that deep learning techniques do provide a trustworthy computational model that can help clinicians effectively in preliminary ASD screening. Moreover, various ethical issues like privacy conservation, data set bias, and appropriate usage of data for ASD screening are also reviewed for the proper and secure use of data. This discussion aims to present the application potential of ASD screening from facial images using deep learning strategies

370.VIDEO TRANSCRIPT SUMMARIZER USING NATURAL LANGUAGE PROCESSING AND MACHINE LEARNING

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With the enormous amount of digital information being generated, extracting appealing and summarized content from long videos is more important than ever in an age of knowledge consumption. This project aims to create a Video Transcript Summarizer that utilizes Natural Language Process- ing (NLP) methods with Python to produce a brief summary directly from video transcription. The system utilizes automatic speech recognition (ASR) to interpret the spoken word into text. Once it is text, we can apply advanced NLP algorithms such as TextRank or BERT-based approaches or extractive and abstractive summarization to summarize the content into meaningful and coherent summaries. This system greatly reduces the time needed to consume video content while still retaining valuable information. To further illustrate the efficacy of the system, we will summarize transcripts taken from videos of different domains: education, interview, and tutorial videos. Ad- ditionally, a user-friendly and scalable solution will be presented to process this information. Results showing the capability of the summarizer to produce outputs that are relevant, coherent, and informative will be presented as valuable output for content creators, students, and researchers.

371.AN AGENTIC AI-BASED SYSTEM FOR MULTI-DOMAIN PRODUCTIVITY AUTOMATION

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The growing fragmentation of digital productivity tools has increased the cognitive and operational burden on users, motivating the need for intelligent automation across multiple task domains. This paper presents an Agentic AI-based system designed to automate workflows spanning email communication, task management, and research assistance. The system is centered around an intelligent orchestrator implemented using the n8n platform, which interprets user intent and dynamically routes requests to domain-specific AI agents. These agents are developed using LangChain and LLaMA 3 and provide functionalities such as email summarization, task scheduling and reminders, research assistance, and automated email composition. The email composition agent employs task-based intent classification and integrates with the Gmail API to enable direct message execution, while the research agent follows a Retrieval-Augmented Generation (RAG) pipeline that combines web search via Ser-pAPI with semantic similarity models to retrieve and rank relevant information. By coordinating specialized agents through a centralized orchestration layer, the proposed system enables modular, scalable, and extensible productivity automation across heterogeneous domains. However, the system's effectiveness is sensitive to the accuracy of intent interpretation, and ambiguous or underspecified user queries can lead to suboptimal task routing, indicating the need for improved intent disambiguation and adaptive reasoning mechanisms in future work.

372.GENETIC DISORDER PREDICTION SYSTEM USING MACHINE LEARNING FOR HEREDITARY DISEASE CLASSIFICATION AND RISK ASSESSMENT

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In The increasing prevalence of hereditary diseases and genetically influenced clinical conditions necessitates computational systems capable of supporting early detection and subclassification using structured patient information. This work presents a machine learning–based genetic disorder subclass prediction system implemented as a lightweight, deployable web application designed for real-time clinical decision support. The proposed framework integrates structured demographic, hereditary, maternal, birth-related, clinical, and laboratory features and processes them through a standardized preprocessing and prediction pipeline derived directly from the implementation code.
The system operates through a Streamlit-based interactive interface that enables the entry of patient attributes including age, gender, maternal health history, paternal inheritance indicators, previous pregnancy anomalies, laboratory blood parameters, respiratory and cardiac indicators, and symptom counts. Each categorical variable entered through the interface is converted into numerical form using predefined encoding dictionaries embedded in the application logic. These mappings ensure consistency between the deployment environment and the original training configuration of the model. Numerical and encoded categorical features are assembled into a fixed-order feature vector, preserving the attribute sequence expected by the trained machine learning pipeline.

373.AN IBEACON BASED AI-DRIVEN WEARABLE SURVEILLANCE SYSTEM FOR TRACKING AND INTERCEPTING FORCED HUMAN TRANSPORT

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The lack of trustworthy real-time victim identification systems, especially in GPS-denied and phone-restricted contexts like cars, cargo containers, and remote transit routes, makes human trafficking and forced human transportation even more dangerous on a worldwide scale. This project offers an AI-Driven Wearable Rescue Beacon System that can autonomously identify and notify possible forced transportation incidents without relying on cellphones or GPS technology in order to overcome this difficulty. The MAX30102 heart rate sensor, MEMS accelerometer, iBeacon BLE module, Wi-Fi connection, and a hidden OLED interface integrated into a wearable wristwatch are just a few of the physiological and motion-sensing technologies that are included into the suggested system.Through sensor fusion and machine learning-based anomaly detection, the wearable continually learns the user's typical physiological characteristics and everyday movement habits.To deduce potential abduction or coercion situations, abnormal stress indicators, abrupt or restricted mobility patterns, persistent vehicle vibration signatures, and departures from known beacon surroundings are examined. When such abnormalities are detected, the system instantly switches to a quiet rescue mode. When network access is

available, it broadcasts encrypted iBeacon distress IDs and sends compressed biometric and motion data to approved recipients.

374.CONTEXT-AWARE EMAIL AUTOMATION USING AGENTIC AI AND LARGE LANGUAGE MODELS

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Managing large volumes of emails is time-consuming and often reduces productivity due to repetitive reading, drafting, and replying tasks. To address this challenge, this project proposes an Intelligent Email Management and Automation System using Agentic AI. The proposed system leverages Large Language Models (Gemini LLM) to generate context-aware, professional email drafts from minimal user input. It integrates Gmail services through OAuth 2.0, ensuring secure email synchronization and management. A FastAPI-based backend handles routing, intent detection, prompt construction, and email automation, while a React-based frontend provides an intuitive user interface for composing, reviewing, and editing emails. Unlike traditional rule-based or RPA-driven systems, the proposed approach uses direct API-based automation, enabling faster, scalable, and reliable performance. The system supports tone customization, personalization, and end-to-end email lifecycle automation, significantly reducing manual effort and improving communication efficiency. Experimental results demonstrate that the proposed system enhances productivity, maintains consistent email quality, and showcases the effectiveness of Agentic AI in real-world email management applications.

375.URBAN TRANSFORMATION OF MALLATHAHALLI LAKE: SPATIAL CHANGE, COMMUNITY USE, AND THE EMERGENCE OF A THIRD SPACE

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This study examines the ever-changing architectural landscape surrounding the Mallathahalli Lake in south-west Bengaluru, India. The lake has witnessed changes in its boundaries, the heights of the buildings that surround it.

Once used for agriculture, rituals of the local communities, and the domestic activities of the village, it now stands as one of the most important landmarks in the surrounding area. The lake has undergone the worst pollution and the subsequent restoration efforts made , all in the same decade. This paper follows the journey of this lake through historical mapping, community surveys, and local narratives to understand how Mallathahalli Lake has persisted as a third space for nearby residents, adapting to urban change while retaining its spatial and social relevance.

376.AI POWERED MILITARY INTRUSIVE DETECTION AND TARGET ACQUISITION SYSTEM

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The rise in complexity of modern warfare, combined with the need for real-time situational awareness, has led to the use of Artificial Intelligence (AI) in defense systems. This paper presents an AI-powered Military Intrusive Detection and Target Acquisition System. It is designed to detect, identify, and track unauthorized intrusions in restricted military areas. The system uses computer vision and deep learning models along with hardware-level edge computing to provide automated surveil- lance.By using the YOLOv5 model integrated with Raspberry Pi and OpenCV, the system achieves real-time object detection with a precision rate of 94%. Alerts are generated through a Flask- based backend to instantly notify the control unit. Experimental results show that the system reliably recognizes potential threats and effectively reduces false alarms.

377.COMPARATIVE BENCHMARKING OF CLOUD-BASED LARGE LANGUAGE MODEL INFERENCE: REAL-WORLD EVALUATION OF MISTRAL, GOOGLE AI STUDIO, GROQ AND HUGGINGFACE GOOGLE AI STUDIO, GROQ, AND HUGGINGFACE

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The growing adoption of large language models (LLMs) across research and industry has intensified the need for reliable, efficient, and cost-effective cloud inference solutions. Yet, organizations often face difficulty selecting an appropriate provider due to the absence of unified, transparent evaluations that compare performance and resource utilization across platforms. To address this gap, this work presents a comprehensive benchmarking framework designed to evaluate multiple inference services specifically Google Gemini, Mistral AI, Groq, and HuggingFace under realistic usage scenarios. The framework examines essential operational metrics such as latency characteristics, token consumption patterns, and economic efficiency, enabling a deeper understanding of how each provider responds to typical LLM inference workloads. Built with a modular Python-based architecture, the system integrates automated request execution, token-level analysis, and estimation techniques for platforms that do not natively expose token metadata. This design ensures consistency in measurement while allowing future expansion to additional models or providers. The generated benchmark dataset supports further analytical research and assists developers and organizations in making informed decisions regarding model deployment, workload distribution, and cost planning. Beyond comparative

evaluation, the framework establishes the foundation for future adaptive systems that dynamically select the most suitable inference provider based on performance and economic considerations.

378.REAL-TIME COUNTERFEIT CURRENCY DETECTION USING CONVOLUTIONAL NEURAL NETWORKS: A DEEP LEARNING APPROACH

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The increasing circulation of counterfeit currency poses a serious threat to economic stability and public trust, making accurate detection a critical task for banks, businesses, and individuals. Manual verification methods, such as visual inspection or ultraviolet checks, are often time-consuming, prone to human error, and insufficient for large-scale operations. This work demonstrates an automated solution for currency authentication using deep learning techniques, specifically leveraging a Convolutional Neural Network (CNN) model. The system allows users to upload images of currency notes, which are then pre-processed to enhance clarity, normalize dimensions, and reduce noise. The CNN model automatically extracts complex features, including textures, patterns, and security marks, to distinguish genuine notes from counterfeit ones. The processed image is classified as authentic or fake, providing immediate feedback to the user. Implemented as a Flask-based web application, the system offers a simple and interactive interface for real time verification. By combining image processing with deep learning, this approach achieves high accuracy while minimizing manual effort. The project demonstrates a practical and scalable solution for combating counterfeit currency, highlighting the potential of artificial intelligence in addressing financial fraud and improving trust in monetary transactions.

379.DEVELOPMENT OF A UNIFIED MULTIMODAL SYSTEM FOR DETECTING MANIPULATED AUDIO, IMAGE, AND VIDEO CONTENT

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The ability to generate convincing synthetic audio, image, and video content has introduced significant challenges for the verification of digital media authenticity. Deepfake manipulation techniques can closely replicate real-world media characteristics, rendering single-modality and manual detection approaches ineffective in many practical scenarios. To address this issue, this work implements a multimodal deepfake detection system that processes audio, image, and video inputs through independent yet coordinated analysis pipelines. The proposed framework adopts modality-specific preprocessing and feature extraction strategies, followed by dedicated classification models tailored to the characteristics of each media type. Audio inputs are analysed using a machine learning–based classifier, while image and video content are evaluated using convolutional neural networks designed to capture spatial and frame-level manipulation artifacts. Experimental evaluation on benchmark datasets confirms the system's ability to accurately differentiate authentic content from manipulated media across all modalities. The modular structure of the framework supports extensibility and makes it suitable for deployment in forensic analysis, media verification, and security-oriented applications.

380.FIN AI : A HYBRID AI-DRIVEN FINANCIAL REPORTING SYSTEM

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This paper introduces Fin AI, a novel hybrid artificial intelligence financial reporting system. Fin AI automates several critical processes, including data ingestion, anomaly detection, forecasting, and report generation. The system leverages machine learning for identifying anomalies, combines Deep Learning with ARIMA models for time-series forecasting, and employs Natural Language Processing (specifically Gemini 2.5 Flash) for structured summarization. By significantly reducing manual intervention and improving accuracy, Fin AI aims to decrease reliance on conventional spreadsheet-based approaches and deliver realtime financial performance insights. The primary objectives of this proposed system are to enhance operational efficiency, facilitate informed corporate decision-making, and produce transparent, human readable financial reports.

381.ENHANCED ECG ARRHYTHMIA PREDICTION USING MULTI-LEAD SIGNALS AND HYBRID AI MODELS

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Early and accurate identification of cardiovascular disease reduces mortality and enables timely clinical intervention. This study presents a noise-robust ECG-based framework for arrhythmia classification utilizing

six-lead portable ECG PDF and image reports acquired from KardiaMobile 6L devices, along with signals from the MIT-BIH Arrhythmia Database and the PTB-XL dataset. Portable ECG reports are converted into single-lead waveform signals using image-processing techniques. A multi-stage preprocessing pipeline comprising bandpass filtering, notch filtering, wavelet-based denoising, and signal normalization is applied to enhance signal quality. The proposed framework integrates deep learning architectures, including one-dimensional convolutional neural networks (1D-CNNs) for raw ECG signals and two-dimensional CNNs for time-frequency representations, with classical machine learning classifiers such as support vector machines (SVM), random forests (RF), XGBoost, and k-nearest neighbors (KNN). A weighted ensemble fusion strategy aggregates model predictions to improve robustness and generalization performance. The system classifies ECG signals into five categories: Normal Sinus Rhythm, Atrial Fibrillation, Bradycardia, Tachycardia, and Ventricular Arrhythmias. Experimental results demonstrate competitive accuracy, reliability, and calibrated confidence estimation. The proposed hybrid framework is suitable for real-time and telemedicine-oriented cardiac monitoring applications.

382.MULTIMODAL EMOTION EVALUATION SYSTEM: AN AI FRAMEWORK FOR ADAPTABLE, ROBUST, EXPLAINABLE AND MULTI GRANULAR EMOTION ANALYSIS

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Human–computer interaction is evolving rapidly, and the ability of machines to understand human emotions has become essential for creating responsive, adaptive, and intelligent systems. Traditional emotion recognition methods rely on a single source of input such as text, audio, or facial expressions. However, emotions in real life are multi-layered and expressed simultaneously through language, speech tone, and visual cues. This project addresses the limitations of unimodal approaches by designing a multimodal emotion analysis system capable of interpreting emotions more accurately and naturally.

This paper presents the proposed system that integrates three independent emotion recognition pipelines: text-based emotion detection using Natural Language Processing (NLP), audio emotion detection using speech features, and video emotion detection through facial expression analysis. Text input is processed through tokenization, lemmatization, TF-IDF vectorization, and classified using Support Vector Machine models. Audio data is analyzed using MFCC, chroma, and spectral features and classified using Random Forest algorithms. Video-based emotion recognition uses CNN-based models to detect facial expressions in real time. Each pipeline generates emotion predictions with confidence scores, forming the foundation of multi-granular emotional understanding.

A web-based interface is developed to allow seamless user interaction with the system. Users can type or upload text, record or upload audio, and enable webcam-based video analysis. The system is capable of delivering real-time emotional feedback, where predictions are visualized through an intuitive dashboard. This interface not only displays results from individual modalities but also supports integrated emotional interpretation when multiple inputs are active. The modular design allows each component to operate independently, ensuring flexibility, scalability, and ease of maintenance.

383. SECURE BLOCKCHAIN-BASED CARPOOLING PLATFORM

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The centralization of carpooling services creates problems for users due to a lack of trust caused by the risk of being harmed by dishonest actors, such as those who create fake accounts to post false ads or engage in payment disputes or use the system's data to commit fraud. In this paper we present a blockchain secured carpooling service which combines the Ethereum blockchain with a fully developed web-based application that has been specifically designed to allow for the transparent sale of rides, provide immutable transaction records and automate payment via escrow. The system architecture employed React.js as an interface, Spring Boot REST API calls as the back end, PostgreSQL for metadata storage, and Ethereum testnet (using Solidity smart contracts) as a means of achieving decentralized support of user trust within the platform. Significant contributions of the proposed solution include: wallet bound user identity, immutable record keeping of the ride lifecycle, and automated penalty systems which preclude the need for the involvement of third parties. The results of the implementation show 100% transaction verifiability through blockchain explorers, and zero manual intervention to resolve disputes. By using the proposed solution to facilitate rides, we demonstrate a significant reduction in the potential for fraud, as well as the opportunity to promote urban mobility in an environmentally sustainable manner, consistent with Sustainable Development Goal 11 (SDG 11).

384.A REVIEW PAPER ON CUSTOMER CHURN PREDICTION USING MULTIPLE MACHINE LEARNING ALGORITHM

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Customer churn represents a critical and pervasive challenge within the telecommunications sector, directly correlating with diminished revenue streams and increased customer acquisition expenditure. This paper details the design and implementation of a data-driven predictive modelling system engineered to identify subscribers exhibiting a high propensity for service discontinuation, thereby enabling timely and targeted retention strategies. The methodology encompasses a comprehensive machine learning pipeline, initiating with rigorous data preprocessing and advanced feature selection techniques optimized for complex telecom usage datasets. To ensure robustness and mitigate reliance on singular algorithmic assumptions, the system employs and compares the performance of multiple supervised classification models.

The developed system is architecturally realized using a Python backend integrated with the Django web framework for deployment scalability. A central component is the interactive dashboard, which provides stakeholders with essential visualizations of churn risk stratification, the relative importance of key influencing factors derived from model interpretation, and overall predictive performance metrics. By delivering high-fidelity, actionable intelligence directly to retention teams, the proposed solution significantly accelerates

decision-making cycles and provides a validated mechanism for telecom operators to minimize churn-related losses through proactive intervention.

385.A MULTIMODAL AI FRAMEWORK FOR BIDIRECTIONAL INDIAN SIGN LANGUAGE TRANSLATION USING SPATIO-TEMPORAL TRANSFORMERS

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The problem of communication barriers among the Deaf and Hard-of-Hearing (DHH) people remains to be an urgent social concern, and the fact that the contemporary solutions with translation in real time are not available exacerbates the situation. The existing solutions are mainly fixed gesture recognition and cannot reflect the complex linguistic semantics and grammatical constructions of the Indian Sign Language (ISL). In this paper, an AI-based two-way translation of ISL-English will be suggested. It uses MediaPipe Holistic in real-time landmark tracking and a Transformer-based framework in the analysis of spatiotemporal gesture patterns and non-manual cues. In order to preserve linguistic consistency, Neural Syntactic Refinement module is used to translate raw sign input into grammatically correct English. There is also a 3D animated avatar in the system that is used in reverse communication, where the verbal speech is translated into visual signs. This solution delivers a proactive, discrete, and reliable communication platform with optional accessibility feature to haptic feedback. The solution is able to bypass the shortcomings of the current unidirectional solutions, providing an inclusive communication tool that can be extended to the healthcare, education, and public sectors.

386.A REVIEW ON INNOVATION IN STROKE IDENTIFICATION: A MACHINE LEARNING – BASED DIAGNOSTIC MODEL USING NEUROIMAGES

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Stroke is one of the leading causes of death and long-term disability worldwide, resulting from blockage or rupture of blood vessels in the brain. Early and accurate detection is essential to improve survival rates and reduce permanent neurological damage. This project presents an Android-based Stroke Detection application

developed using Java/XML that integrates Machine Learning and Generative AI techniques for intelligent and real-time assessment. The system combines image-based analysis and questionnaire-driven evaluation to enhance diagnostic accuracy.

The application utilizes a Convolutional Neural Network (CNN) implemented through a TensorFlow Lite model to analyse neuroimages and detect stroke-related patterns. Firebase Realtime Database enables secure storage and synchronization of patient data and diagnostic results. A Decision Tree algorithm is applied to questionnaire responses to evaluate stroke risk factors such as symptoms, medical history, and lifestyle indicators. Additionally, ML Vision is used for image pre-processing and feature extraction, while Natural Language Processing (NLP) and Generative AI algorithms support intelligent interpretation of user inputs and provide automated guidance and recommendations.

By integrating deep learning, rule-based decision systems, and AI-driven assistance into a mobile platform, the proposed system offers a fast, accessible, and cost-effective solution for preliminary stroke screening. The application aims to support early detection, assist healthcare decision-making, and improve awareness through user-friendly interaction and automated analysis.

387.ENHANCING MUSIC THERAPY WITH FACIAL EXPRESSIONS ANALYSIS USING MACHINE LEARNING TECHNIQUES

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Depression is a common psychological disorder that is normally manifested by minor and short-term variations in moods that cannot be defined using traditional approaches. The given paper implies introducing an emotion-receptive model of music therapy that can help to manage the mood level by means of the facial expression analysis and the possibility of the individualized music prescriptions. The facial data is registered in both a still image and a live video, therefore, in order to be capable of monitoring the temper of the user in real time and appropriately without being obtrusive. Face detection, face alignment, face normalization and face noise reduction are some of the image processing operations that are applied to enhance the stability of changing lighting and background. The facial expression recognition model based on deep learning is a lightweight model, it recognizes the emotional states, that is, sadness, stress, and the neutral mood. Depending on the

supposed emotional condition and the degree of its accuracy, it is automatically suggested to use the most appropriate music pieces in the therapeutic process to help in mood regulation and stress management. The system developed incorporates the affective computing and the personalization of the music with intelligent music personalization to give the privacy-oriented, adaptive, and user-centered approach toward the technology-assisted emotional support.

388.ATHLETIX INSIGHTS: HIGH-ACCURACY STRATEGIC ANALYSIS FOR OLYMPIC COMPETITIONS

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Accurate Olympic performance prediction is crucial for strategic planning and athlete evaluation, particularly when forecasting medal outcomes for countries and individuals. Traditional methods, such as historical trend analysis and expert judgment, are time-consuming, subjective, and prone to inconsistencies. To enhance prediction accuracy and efficiency, this study proposes an automated Olympic analysis system using machine learning models. A Random Forest Classifier (RFC) is compared with a Linear Regression (LR) model for predicting medal counts and athlete performance. The system is trained on a comprehensive dataset of past Olympic records, capturing trends across multiple events and disciplines. Data preprocessing, including normalization and feature selection, is applied to improve model reliability. The RFC model enhances classification accuracy, utilizing ensemble learning to extract key performance patterns while reducing overfitting—critical for handling diverse Olympic datasets. Experimental results demonstrate that machine learning-based prediction models significantly improve medal forecasting, making them a promising tool for sports analytics and athlete assessment. These advancements can assist coaches and analysts in refining training strategies and optimizing performance metrics for future competitions.

389.IoT BASED AUTOMATED POULTRY FARM FOR LAYER CHICKENS

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Through embedded systems and local communication technologies, the system aims at automating routine poultry farm operations, reducing work, increasing productivity and thus, ensuring environmental consistency. The proposal system is able to function in remote and rural areas with limited or no connectivity as it carries out the major tasks without the need for the internet. The system employs a Windows application running locally on a server to monitor, control, and record poultry farm parameters in real time. Temperature and humidity which are continually monitored by various sensors placed in the chicken house greatly influence the health, development, and egg, laying capability of layer chickens. Control methods are automatically triggered based on the captured data so as to keep up the environmentally friendly conditions. In order to provide regular feeding and reduce overfeeding, a smart feeding system is used which automatically dishes out the feed to the chickens at the times set. Reliable real, time performance is obtained through embedded programming. This connects sensors, actuators, and control units. The Zigbee communication network technology is used for wireless data transfer from the different sensor units to the local server. The reason why this technology was chosen is that it uses low power and is very reliable and perfectly suited for short-range communication within the farm compound. In the offline mode, all the data processing, decision-making, and storage are done locally. This makes the system very reliable and safe. Thus, an automated poultry farm system not only increases productivity but also helps in error reduction and management of a layer poultry farm. The system offers an aspect of automation.

390.AI-DRIVEN INTELLIGENT SHELL FOR AUTOMATED ETHICAL PENETRATION TESTING

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The proliferation of advanced cyber threats and fast changing attack surfaces is the motivation for this work. Guarding institutions against these types of threats involve a complex network deal with rigorous testing of new systems and services. There are countless security tools in the world, but orchestrating them for ethical hacking assignments is a matter of how highly experienced you are. To solve this problem, in this paper we present an AI empowered smart penetration testing shell that can help users with context-relative command generation, workflow instruction and automatic security analysis.
A beneficial blend of a layer of interaction that is similar to natural languages and a reasoning component of AI that is capable of identifying penetration testing scenarios and making recommendations on reconnaissance, scan, and exploit commands is offered by this proposed model. This tool reduces overhead and raises the

efficiency of our application as it is capable of preserving operational context approaches that depend on a faster feedback cycle that points towards our application having problems.
Experimental results show that our methodology can cut down task completion time and at the same time provide more-relevant commands and result in a higher user success rate, as opposed to conventional manual counterparts. The system runs quickly and smoothly on common computing devices, making it appropriate both for cyber security professionals as well as for learners. This study demonstrates the potential of cognitively assisted automation in refining the effectiveness, availability and reliability of penetration testing for today's cybersecurity.

391.CLOUD-NATIVE ARCHITECTURE FOR SCALABLE AND SECURE RETAIL APPLICATIONS

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The rapid growth of e-commerce platforms has created an urgent need for scalable, reliable, and cost-effective system designs. Traditional monolithic solutions often struggle with increasing workloads, high operational costs, and complex integrations. Recent research shows that cloud-native and server- less computing models effectively address these challenges [2], [3]. This paper presents the design and implementation of a cloud-based e-commerce application using Amazon Web Services (AWS) [1]. The proposed system features a React-based frontend, a hybrid backend that includes API Gateway, AWS Lambda, and Node.js, and Amazon DynamoDB for distributed NoSQL storage. Key functionalities include multi-user authentication for customers, dealers, and admins, product catalog management, shipping availability checks, and secure payment processing through PayPal [4]. The architecture ensures high availability, scalability, and fault tolerance while reducing infrastructure costs with serverless deployment. Experimental evaluation shows that the system provides low-latency responses and dynamic scalability compared to traditional e-commerce solutions. This work contributes to ongoing research in serverless microservices, cloud-native applications, and secure payment integration [10], [12]. It also suggests possible extensions towards AI-driven personalization and fraud detection in future implementations [14].

392.DECENTRALIZED IOT-BASED PARTICULATE AND GAS MONITORING WITH SELECTIVE FILTRATION.

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Air pollution levels are increasing at a very fast pace due to the massive expansion of cities and industries. This has had a negative impact on both the environment and people's health. Continuous contact with particles and dirty air components such as carbon monoxide and methane not only harms health but also helps the development of respiratory illnesses. This article suggests a device that can clean the air and keep track of the surroundings through the Internet of Things (IoT) using machine learning, based forecasting. The proposed system thus consists of a distributed system where sensors gather data from essential environmental parameters like temperature, humidity, particulate matter concentration, carbon monoxide, methane, and the Air Quality Index. Before data is sent to the online monitoring system, it is first processed for real, time data display and also to be able to analyze the previous data. Long, Term Memory algorithm is used to study historical air quality data for making predictions of air pollution. The distributed system which is being proposed intrinsically enables the monitoring of various places to be scaled up and by a decentralized nature, it will also be more reliable, which is the very essence of decentralization. The system is designed to operate in two modes: manual and automatic. When operating in the automatic mode, the ventilation system will be triggered to switch on once the concentration of pollutants exceeds the safety threshold. Selective purification of the air will be achieved by electrostatic precipitation of dust particles and mechanical filtration of the bigger particles. The suggested resolution is an economical, workable and effective solution for intelligent air quality management using the Internet of Things (IoT) technologies.

393.IMPLEMENTATION OF SMART POWER BUDGET MONITOR USING IOT WITH APPLIANCE-WISE USAGE TRACKING

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The primary focuses on real-time monitoring of power consumption for individual electrical appliances, enabling effective energy management through budget-based alerts and remote control using an Internet of Things (IoT) platform. The proposed system employs smart sockets integrated with current and voltage sensing modules, such as the ACS712 current sensor and the ZMPT101B voltage sensor, to accurately measure essential electrical parameters. Each smart socket is connected to an ESP32 microcontroller, which processes the acquired sensor data and transmits it wirelessly to a centralized IoT server via Wi-Fi communication. The IoT server, implemented using a custom web-based dashboard, collects, stores, and visualizes appliance-specific data including voltage, current, power factor, instantaneous power, and cumulative energy consumption. The system continuously compares the total energy usage with a user-defined power budget threshold. When the consumption exceeds the predefined limit or when an appliance exhibits abnormal or excessive energy usage, the system automatically generates alert notifications that are delivered to the user through a mobile application or web interface. Additionally, relay-based load control enables the system to remotely disconnect selected appliances to prevent overconsumption, electrical overloads, or safety hazards.

394.DEEPSHIELD: EVALUATING THE CROSS-DOMAIN ROBUSTNESS OF CNN-LSTM DEEPFAKE DETECTORS AGAINST GENERATIVE AI

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Synthetic media is rapidly shifting from autoencoder face swapping to diffusion model generation, from DeepFaceLab to Midjourney. Current forensic detectors achieve near perfect scores on standard tests, yet their performance on these new generative methods is unknown. We present DeepShield, a hybrid detection system combining Xception-based spatial checks with LSTM-based temporal analysis. We trained this system on a carefully prepared, balanced dataset compiled from FaceForensics++ and DF40, achieving state-of-the-art validation accuracy of 98.64% for video, and 98.74% for images. However, in a crossdomain stress test using modern Generative AI, performances fell to 16.67%, highlighting a large generalization gap. We demonstrate the importance of temporal analysis through a head-to-head ablation study: the LSTM approach outperforms its simple spatial averaging counterpart by over 46% in confidence on challenging samples.

395.AN AI-DRIVEN LIGHTWEIGHT CYBER SECURITY FRAMEWORK FOR SECURE DATA MANAGEMENT IN CLOUD ENVIRONMENTS

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Background: Cyber security and data privacy are becoming critical issues in cloud-based contexts due to the fast rate of distribution application growth and the progressive sophistication of cyber-attacks. The traditional security measures may not be sufficient to provide the necessary protection provided by cloud systems as they grow in size and complexity, and also maintain efficient operations. Artificial intelligence is one of the brightest technologies that can address these concerns. Purpose: This paper aims at proposing an AI-based lightweight

cyber security framework to use in managing secure data within the clouds. This paper examines how artificial intelligence can help to detect threats, control access, and protect data and minimize the load on the computing platform. Method: The proposed technique revolves around integrating adaptive access control and the lightweight encryption and machine learning-based anomaly detection. The framework will constantly analyse the network traffic and user behaviour to identify any attack in real time. Security policies are changed dynamically based on the risk assessment. Results: It is found that compared to the conventional cloud security systems, artificial intelligence implementation results in a significant improvement of threat detection and a reduction in processing overhead. The AI-powered system demonstrates better scalability and efficiency and enhances the availability of data as well as its confidentiality and integrity. The findings show that artificial intelligence can be leveraged to enhance safe data management in the next-generation cloud computing systems and address emerging cyber security challenges.

396.CITYPULSE 360 – AI-POWERED REAL-TIME URBAN HAPPINESS AND SENTIMENT ANALYSIS

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The rapidly growing urbanization in India has introduced a demand of intelligent tools that will be used to monitor the well-being of the city in real time. Traditional urban performance indicators utilize stagnant or lagging data and can be unable to reflect the present public feeling. CityPulse 360 brings in an AI-based system merging social media mood, environmental factors, price-of-living information, and infrastructure indicators and produce a real-time mood of happiness in Indian cities. The system uses Natural Language Processing (NLP) and Machine Learning (ML) to process live streams in the format of weather and air-quality data provided by OpenWeatherMap API, sentiment-based data provided by Twitter, Reddit, and YouTube, and structured data in the form of safety, healthcare, affordability. These multimodal inputs are aggregated into composite scores and represented with the help of interactive Power BI dashboard. In this paper, the architecture of the system, data acquisition, preprocessing, feature engineering, and dashboard design will be presented to monitor the urban happiness. The framework provides assistance to policy makers, researchers and citizens by providing an ever-present and multi-dimensional picture of urban well-being.

397.HYBRID CNN-BASED FEATURE FUSION FRAMEWORK FOR WHEAT LEAF DISEASE CLASSIFICATION

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Wheat crop diseases pose significant challenges to global food security, causing substantial yield losses annually. This research introduces a novel Hybrid CNN-Swin Transformer architecture integrated with Multi-Stage Ensemble Learning (MSEL) framework for automated wheat leaf disease detection and classification. The proposed methodology combines the local feature extraction capabilities of ResNet50-based CNN with the global context modeling of Swin Transformer through a dual-branch architecture. Features from both branches (512 CNN features and 768 Swin features) are concatenated to form a comprehensive 1280-dimensional representation, which is processed through fusion layers for final classification. The system categorizes wheat leaf images into four classes: Crown & Root Rot, Healthy Wheat, Leaf Rust, and Wheat Loose Smut. Experimental evaluation conducted on three distinct benchmark datasets demonstrates that the hybrid approach achieves classification accuracy of 99.16%, precision of 98.78%, sensitivity of 98.45%, and F1-score of 98.61% on the primary dataset, substantially outperforming individual CNN and transformer-based models. The framework effectively leverages complementary local and global feature representations to achieve superior disease classification performance.

398.THREAT EYEA HYBRID MACHINE LEARNING SYSTEM FOR INSIDER THREAT DETECTION USING BEHAVIORAL DATA

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Insider threats pose a critical challenge to organizational cybersecurity, as malicious or negligent insider activities often resemble legitimate user behavior and remain difficult to detect using traditional security mechanisms. To address this challenge, this work proposes ThreatEye, Long Short-Term Memory (LSTM) networks are integrated into a hybrid machine learning framework with a Random Forest classifier for effective

insider threat detection using behavioral activity logs. Temporal user behavior patterns from login events, file access, web usage, and email activity are examined to distinguish ordinary conduct, privilege abuse, identity theft, and data leakage. The LSTM component captures long-term sequential dependencies in user actions, while the Random Forest model performs final classification, offering improved accuracy and decision interpretability. Data preprocessing and class-balancing techniques are applied to mitigate the severe class imbalance commonly present in insider threat datasets. The proposed system is implemented as a web-based platform supporting dataset management, model training, visualization, and real-time prediction. Experimental evaluation demonstrates improved detection performance across all threat categories, particularly for minority classes, validating the effectiveness and robustness of the hybrid approach in real-world insider threat detection scenarios.

399.VIRTUAL AI MOUSE WITH BIOMETRIC AUTHENTICATION

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A recent study has introduced an AI-driven virtual mouse that has the potential to revolutionize Human-Computer Interaction (HCI) through its powerful machine-learning capabilities. This mouse has a versatile and user-friendly pointing system that can be used with current devices, potentially transforming traditional input methods. By using our AI-powered solution, we can address accessibility issues, enhance user experience, and enable new digital connections. The AI-powered virtual mouse is revolutionizing the way people interact with devices by offering a hands-free alternative to human-computer interaction. There are concerns about privacy and security due to the extensive use of technology. This research proposes two upgrades to overcome these issues: biometric verification and encryption. These enhancements create a private and secure virtual mouse experience by reducing security threats and unauthorized access, which is especially helpful for sensitive tasks. This research effort bridges innovation with increased security, adding to the changing field of HCI.

400.AI-DRIVEN PERSONALIZED MIGRAINE FORECASTING: INTEGRATING WEATHER DYNAMICS AND LIFESTYLE PATTERNS FOR PREDICTIVE HEALTHCARE

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Migraines disrupt daily activities, destroy productivity in the workplace, extend the time for recovery, and blow a huge gap in the healthcare budgets. Even though numerous mobile apps exist in the market presently, nearly all the headache-tracking apps presently existing in the market today are backward-looking; the user records the data points after the headache happens. This backward-looking method does not prove of immense use before the headache happens and does not provide sufficient warning of the headache attack through intelligent reminders preceding the headache attack. This paper proposes a forward-looking solution powered by AI to forecast the possibility of a headache attack in advance. It correlates everyday life factors, such as the amount of restful sleep, diet, consumption of sufficient water, perceived stress levels, and screen time, with external factors, such as temperature, humidity, air pressure, and weather patterns. Instead of just listing data points, it applies smart algorithms pertaining to various sources of information in order to uncover hidden patterns. In return, the system produces hour-by-hour instructions on the forecast of the chances of having migraines, almost like peering at the weather channel for the forecast for the next day, other than the fact that they are predicting headaches. Depending on the probability of a migraine at any given time, the system offers users specific advice on how to prevent or reduce migraine severity. Examples of such data include increased hydration, regular break time, techniques for the relaxation of stress, limited use of screens, and sleep habits tailored according to changing conditions. Algorithms from continued use of the system will begin deciphering individual migraine triggers from previous knowledge and user input. Furthermore, the incorporation of intelligent home devices will enable the system to quickly kick in quickly, such as lowering lighting or sending a reminder, to potentially alert a user of a possible migraine beforehand. This particular system tries to get a jump on problems even before they occur, instead of simply documenting past migraine events as all current apps do. Applying AI

capabilities to migraine management essentially changes how people react to them in a proactive fashion, from relieving pain occurring in the future to preventing it. Physicians receive more informed inputs on which to base their decisions. Active patient participation increases exponentially as patients become much more proactive in the management of their conditions and are more responsible and compliant with their treatment plans. Ultimately, patient outcomes improve regardless of geographical locations. In other words, it is not a matter of reacting but of being one step ahead.

401.DEEP LEARNING – BASED SYSTEM FOR SKIN DISEASE CLASSIFICATION USING EXPLAINABLE AI

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Dermatological disorders present substantial diagnostic challenges in clinical practice, necessitating intelligent computational systems for accurate pathological identification. This manuscript introduces a robust algorithmic framework that integrates convolutional neural architectures with transparency mechanisms for automated cutaneous lesion categorization. Our methodology harnesses hierarchical feature extraction through optimized residual networks trained on the HAM10000 dermoscopic repository encompassing seven distinct pathological categories. Algorithmic interpretability is accomplished through gradient-weighted activation visualization combined with locally interpretable surrogate modeling, empowering medical practitioners to comprehend prediction rationale effectively. Rigorous experimental assessment reveals 94.2% classification accuracy alongside balanced performance metrics across both majority and minority lesion categories. The transparency components generate intuitive visual explanations demarcating diagnostically relevant tissue regions, thereby cultivating practitioner confidence in automated diagnostic assessments. Comparative benchmarking confirms superior discriminative capability against contemporary published methodologies while preserving computational efficiency suitable for real-world clinical deployment scenarios.

402.DEEP LEARNING ENHANCED DETECTION OF CLICK FRAUD IN DIGITAL ADVERTISEMENTS

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An individual fraudulent clicks can seem insignif- icant. however, when all these happen on the Internet, the advertising budget can be undermined in a way that is more than expected. In situations that are consequential, automated systems that appear to be legitimate users still artificially in- crease the number of clicks. To overcome this difficulty, we suggest a complex system of detection based on the supervised machine learning models aimed to isolate fake clicks. Our solution combines five different model architectures rather than creating the solution based on a monocular approach. All the models represent a particular aspect of click behavior, such as device usage patterns, temporal dynamics of the clicking event, network contextual features, and direction of user navigation. The ensemble uses a total of fifteen feature signals, some of which are calculable based on temporal metrics and the other is based on geolocation or hardware identifiers. The cumulative evidence gives a more significant discriminatory examination. Empirical analysis has shown that the collective classifier is dependable in its performance as compared to any single individual model. The point of difference of our strategy is its sophisticated ability to distinguish between spurious clicks and actual user actions. The architecture deployed is in the form of a complete web-based application and consists of two modular elements that allow the end-users and vendors to monitors an anomalous activity in real time. Notably, the model can maintain a small false-positive rate at high levels of detection of fraudulent attempts, which is why operational integrity can be maintained in the context of live advertising.

403.REAL-TIME DISASTER ALERT AND PREDICTION SYSTEM USING DATA SCIENCE AND IOT

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Efficient disaster monitoring and early warning have become critical challenges in modern society due to unpredictable natural hazards, rapidly changing environmental conditions, and limitations of traditional manual alert systems. Conventional disaster management approaches rely heavily on delayed reporting, human intervention, and offline analysis, often resulting in slow response times, increased risk to human life, and

inadequate preparedness. With the advancement of Internet of Things (IoT) and sensor-based technologies, automated disaster monitoring systems provide an effective solution by enabling real-time sensing, continuous data analysis, and rapid alert generation. This project proposes an Efficient Disaster Management and Alert System using IoT that integrates embedded sensing devices, real-time data processing, and web-based visualization. The system is developed using an ESP32 microcontroller optimized for low-power operation and real-time data handling, capable of detecting abnormal environmental conditions such as seismic vibrations, gas leakage, temperature variations, and atmospheric changes. Sensor data is processed through threshold-based analysis to identify potential disaster situations and generate timely alerts. Detection results and system status are transmitted to a web-based dashboard for real-time visualization, monitoring, and response coordination. The proposed system incorporates automated sensor-based detection, efficient embedded processing, and remote user interaction through a lightweight web interface. By combining reliable hardware design with IoT communication and web technologies,.

404.IOT ENABLED SMART NETWORKED POWER DELIVERY UNIT FEATURING INTEGRATED BATTERY BACKUP AND REAL-TIME TELEMETRY

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The objective of this project work would be to develop an IoT-based Smart Networked Power Delivery Unit (PDU) that would facilitate online observation, remote control, and automatic control of all electrically driven apparatuses, not only limited to a home scenario, rather also when considering an industry scenario. As a further extension of the previous project work, a novel computation model has also been proposed that incorporates an embedded battery backup system, which would facilitate a seamless power delivery system shutdown, as well as an automatic observation of critical parameters such as voltage, current, temperature, power factor, and the status of the battery level, all through sensing devices. The sensed parameters, based on the power delivery unit, would further transmit their signals to a trustworthy cloud service, that would further assist to facilitate that not only is the online/offline observation, as well as the control of a system automatically, achieved, rather also facilitates that the offline observation related to a remote usage pattern of all involved consumers is also achieved. The project work would facilitate that processes related to energy saving with a minimum downtime occur using a smart advanced approach to Energy Management System.

405.HYBRID QUANTUM-ENHANCED DEEP LEARNING FRAMEWORK FOR MULTI-STAGE DIABETIC RETINOPATHY DETECTION

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Diabetic retinopathy is a vision-threatening complica- tion of diabetes that progressively affects the retinal vasculature and can lead to permanent blindness if not identified at an early stage. Manual evaluation of retinal fundus images is labor-intensive and relies heavily on expert interpretation, which limits large-scale screen- ing. While deep learning-based approaches have achieved notable success in automated diabetic retinopathy detection, their dependence on extensive labeled datasets and high computational cost restricts practical deployment.

This paper presents a Hybrid Quantum-Enhanced Deep Learning (HQEDL) framework that combines classical convolutional neural networks with quantum-assisted classification. In the proposed ap- proach, a CNN is employed to extract discriminative retinal features, which are subsequently encoded into quantum states and processed using a Variational Quantum Circuit. The framework performs multi- stage classification of retinal images into No Diabetic Retinopathy, Mild, Moderate, and Proliferative stages. Experimental evaluation indicates improved stage-wise discrimination with reduced model complexity, demonstrating the potential of quantum-enhanced learn- ing for scalable medical image analysis.

406.ADAPTIVE PARAMETER OPTIMIZATION FOR SPARK APPLICATIONS WITH Q-LEARNING AND FOSSA OPTIMIZATION ALGORITHM

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large amounts of information can be processed efficiently through Spark, a successful open-source distributed data processing platform. The users have configurable options from which they can choose the suitable parameter values manually according to their own experience. Nevertheless, with the number of parameters being large and their inherent interdependencies, manual tuning requires an extended duration of time. Although they can be used in parameter regression and optimization, there are some weaknesses with traditional machine learning techniques, particularly their reliance on large quantities of high-quality training data. Creating adequate training instances under big data environments is usually expensive and time-consuming. This study presents an adaptive parameter modifications paradigm for Spark applications. based on reinforcement learning and metaheuristic optimization approaches. First, a Correlation-Based Feature Selection (CFS) algorithm is used

to select important parameters with substantial effects on system performance from the initial parameter set. Based on these chosen parameters, an Optimized Double Deep Q-Network (Double DQN) model is constructed to optimize parameter settings and maximize overall job performance. The Optimized Double DQN model proposed here is a new Q-learning–based model derived from the Double Deep Q-Network architecture and aimed at enhancing perception and learning abilities. Additionally, an Adaptive Exploration Mechanism is used to balance exploration and exploitation, where early learning stages encourage exploration, and it is reduced progressively in subsequent stages to enhance convergence and efficiency. For further enhancing model resilience, the Fossa Optimization Algorithm (FOA) is employed for tuning the hyperparameters of the Double DQN model. The proposed scheme is executed on the Apache Spark 2.2.0 environment and tested for performance comprehensively using metrics such as Job Completion Time (JCT), Average JCT, Training Time, Performance Gain, R-Squared, and Mean Absolute Error (MAE), demonstrating its effectiveness in improving Spark application performance.

407.REGRESSION-BASED MACHINE LEARNING APPROACH FOR SOLAR POWER GENERATION

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The variability of solar energy generation affects the balancing of demands and the reliability of the grid system. We will address this issue by utilizing a regression machine learning technique for the forecasting of solar energy generation. In this research, various meteorological variables, as well as different variables involving time, have been employed. Some of the variables include the following: global horizontal irradiance, cloud cover, temperature, wind speed, atmospheric pressure, daylight time, humidity,time of day, and annual cycles. By making use of these two types of data, we have been able to create a dataset that reflects the production values for one year and link it to the weather variables for that year as well. Finally, when the whole process for developing the model has been concluded, the predictive ability of the developed model has been tested by calculating the values for R2, RMSE, MAE, and MAPE. In this way, it can be concluded that the R2 measure of about 0.93 was an important result because it indicated that 93 percent of data variation was accounted for by the developed model. Moreover, it was observed that the parameter that influenced the prediction of the developed model the most was the Global Horizontal Irradiance. These results demonstrate that how machine-learning models can be effectively used to produce accurate solar forecasting and thus assist in enhanced renewable integration into power systems.

408.MACHINE LEARNING -BASED FRAMEWORK FOR THE DETECTION AND CLASSIFICATION OF MEDICINAL PLANTS

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Identification of the correct medicinal plants that goes in to the preparation of a medicine is very important in ayurvedic, folk and herbal medicinal industry. The main features required to identify a medicinal plant is its leaf shape, color and texture. Color and texture from both sides of the leaf contain deterministic parameters to identify the species. In this project we explore feature vectors from both the front and back side of a green leaf along with morphological features to arrive at a unique optimum combination of features that maximizes the identification rate. A database of medicinal plant leaves is created from scanned images of front and back side of leaves of commonly used medicinal plants. The leaves are classified based on the shape and dimension combination. It is expected that for the automatic identification of medicinal plants this system will help the community people to develop their knowledge on medicinal plants, help taxonomists to develop more efficient species identification techniques and also participate significantly in the pharmaceutical drug manufacturing. This framework uses feature-based analysis and machine learning technology to create classifiers that work together to provide improved accuracy of classification and reduced reliance on human time/resources for identification of herbarium specimens. It does so by creating a multitude of different classifiers that are based on the same digital herbarium image features but trained by separate feature extraction methods.

409.A BIDDING-BASED RIDE ASSIGNMENT FRAMEWORK FOR FAIR PRICING IN RIDE-HAILING SYSTEMS

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The majority of the available ride-hailing applica- tions employ price mechanisms that are either fixed or surge-based, in which passengers exert a limited or no control over the price of the ride. Moreover, the ride assignment is typically generated by centralized and non-transparent algorithms, leading to an unequal prioritization of drivers, in most cases, and lack of transparency. Though various studies have explained the concept of pricing and matching, available systems are still lacking where passengers can offer bids in a transparent bidding

controlled fare range, without giving disadvantage to drivers in the actual ride application contexts.In this paper, the problem will be addressed by proposing a bidding-based ride assignment model, which gives straightforward price jurisdiction to passengers and also provides the same access to the drivers under the real-world ride-hailing systems. Each available driver is informed of the ride request and bid information at the same time, allowing a level of healthy competition and wise acceptance choices. The proposed model would be applied through a web-based user interface and a service based backend and a relational database provided in a layered architecture. To compute fare, distance based computation is used and the ride assignment is done under bid-driven acceptance, to test the handling of request, bid processing, and assignment behaviors. The outcomes indicate the enhancement of fare transparency and the removal of the biased priority of drivers. This piece of work provides a practical and fair ride assignment model capable of underpinning further large-scale assessment and real-world implementation.

410.REVIEW ON SENSOR BASED INFANT MONITORING SYSTEM USING MICROCONTROLLER

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The Smart Baby Incubator System combines environmental control with continuous health monitoring through automated sensor-actuator systems. Real-time data transmission enables remote supervision while intelligent alerts ensure rapid response to abnormalities. This survey reviews existing literature to identify gaps and propose a comprehensive monitoring solution for neonatal care.

411.NEURONOTES – AN AI-BASED NOTE ORGANIZER FOR NEURODIVERGENT USERS

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Taking notes plays a big role in how we learn, reflect, and stay organized day to day. But for many neurodivergent people—including those with ADHD, dyslexia, anxiety, or depression—note-taking can be far from simple. Most digital note-taking tools are built around linear thinking, perfect typing, and visually busy layouts. These design choices can increase cognitive strain and make it hard to use these tools for long periods of time. This research introduces NeuroNotes, an AI-driven framework designed with accessibility and cognitive diversity at its core. Instead of expecting users to fit into rigid systems, NeuroNotes adapts to them. It accepts messy, unstructured voice or text input and uses modern natural language processing to organize notes while adding helpful context and emotional cues. The goal is to make note-taking feel more intuitive, supportive, and inclusive for a wider range of minds. NeuroNotes relies on a set of AI models to make note-taking easier and more intuitive. OpenAI Whisper is used to transcribe spoken input, a RoBERTa model that has been refined on the GoEmotions dataset is used to identify emotional tone, and DistilBERT zero-shot text categorization is used to automatically arrange notes. Each note is presented through a simple, distraction-free interface designed to lessen cognitive strain, and it is saved in a cloud-based database along with the metadata that goes with it. A Progressive Web Application (PWA) with Firebase-based storage was used as a pilot prototype. The chosen models offer dependable transcription, significant emotion tagging, and respectable

categorization performance, according to preliminary component-level assessment, indicating the viability of the suggested strategy. In order to encourage more inclusive and accessible productivity, NeuroNotes generally highlights the merging of AI-driven automation with human-centered and affect-aware design.

412.EMOTION AWARE SPEECH RECOGNITION USING HYBRID DEEP LEARNING WITH INTELLIGENT RESPONSE GENERATION

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Recognizing emotions from human speech plays an important role in improving communication between humans and computers. Most existing speech emotion recognition systems focus only on identifying emotions and do not respond according to the emotional state of the speaker. This reduces the naturalness of interaction.
In this work, a hybrid deep learning framework is proposed that not only identifies emotions from speech signals but also generates emotion-appropriate responses. The system combines a Convolutional Neural Network to extract spectral features from Mel spectrograms and a Bidirectional LSTM network to capture temporal emotional variations using MFCC features. An attention mechanism is incorporated to emphasize emotionally relevant segments of speech.
The model is trained and evaluated on standard emotional speech datasets such as RAVDESS, EMO-DB, and TESS. After emotion classification, an emotion-aware response is generated using the DialoGPT-small language model. Experimental results show that the hybrid architecture achieves higher accuracy than individual models and produces more natural and empathetic responses. The proposed system can be effectively used in applications such as virtual assistants, customer support systems, and emotion-aware human–computer interaction.

413.STREAMLINING SUSTAINABILITY: LEAN REVIT-BASED ENERGY ANALYSIS FOR GREEN BUILDINGS

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This study presents a novel integration of Lean construction principles with Building Information Modeling (BIM), aimed at promoting sustainability through real-time energy feedback. A dynamic system termed “Lean-Energy Loops” is proposed, where design and construction teams collaborate to optimize the energy efficiency during both design and execution phases. The BIM platform facilitates live energy simulations, enabling early identification of energy-intensive processes and allowing teams to implement corrective actions in real-time. To support this framework, energy analysis is embedded into Value Stream Mapping (VSM), allowing for systematic identification and elimination of energy-related waste throughout the value chain. It’s expected to not only enhance energy-conscious planning but also improve construction efficiency. This approach would demonstrate the leveraging of BIM-based energy insights, supported by Lean methodology that can significantly reduce resource consumption, improve workflow reliability, and achieve better sustainability outcomes.

414.TEXT-TO-IMAGE GENERATION OF POWER ELECTRONICS AND COMPONENTS INVOLVED IN RENEWABLE ENERGY

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The increasing adoption of renewable energy sys- tems has intensified the need for effective visualization of power-electronic components used in energy conversion and grid integration. Conventional learning approaches rely heavily on schematic diagrams, which often fail to convey the phys- ical structure and real-world appearance of hardware such as converters, inverters, and switching devices. This paper presents a text-to-image generation framework that employs generative artificial intelligence to synthesize visual representa- tions of power-electronic and renewable-energy components from natural-language descriptions. The proposed system integrates a diffusion-based image generation model with a domain-specific component matching mechanism and a self-learning feedback module. A hybrid strategy combining dataset-based image re- trieval and generative synthesis is adopted to improve visual accuracy and responsiveness. Experimental results demonstrate effective component identification, high-quality image generation, and improved inference efficiency through user-driven learning. The findings indicate that text-to-image generative AI can serve as a valuable educational and conceptual visualization tool, bridg- ing the gap between circuit representations and physical hardware understanding in renewable-energy engineering.

415.LEAN-DRIVEN INVENTORY PLANNING AND CONTROL SYSTEM

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This study explores practical approaches for implementing Lean principles in inventory management to minimize waste, optimize stock levels and enhance overall supply chain performance. Lean can be applied through several strategies: Just-In-Time (JIT) inventory, Kanban systems for demand-driven replenishment, ABC analysis for prioritization, and Lean Six Sigma (DMAIC) for problem-solving and process control. These methods help reduce overstocking, eliminate idle inventory, and improve order fulfilment rates. The work involves identifying key inventory inefficiencies using Pareto and Ishikawa tools, classifying items based consumption, and designing a lean based control model integrated with real-time demand tracking. Implementation is expected to result in lower transportation costs, improved warehouse space utilization, faster response to customer needs & to show financial performances. The work aims to present lean integrated inventory framework applicable to various industries seeking cost-effective, agile, & sustainable inventory management solutions.

416.TWINSHIELD: A NEURAL DIGITAL TWIN FRAMEWORK FOR PREDICTIVE CYBER DEFENSE

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Modern enterprise and cloud networks are increas- ingly exposed to complex cyberattacks that can bypass traditional signature-based security mechanisms. Existing cybersecurity so- lutions are largely reactive, limiting their ability to anticipate emerging threats. This paper presents TwinShield, a Digital Twin–based cybersecurity framework designed for predictive cyber threat analysis and simulation. The proposed system constructs a virtual replica of a network environment that reflects device behavior, network traffic, and system activities using real-time telemetry data. An AI-based threat analysis engine operates within the digital twin to simulate attack scenarios and identify abnormal behavior, potential vulnerabilities, and risk-prone components. By analyzing deviations from normal operational patterns, TwinShield enables early identification of possible cyber threats before they affect the actual network. Based on the predicted threat states, the framework triggers simulated security responses such as firewall rule adjustments, access control decisions, and isolation of high-risk nodes within the digital twin environment. Experimental evaluation using simulated network scenarios demonstrates the feasibility of the proposed approach for proactive threat assessment and security planning. The results highlight the effectiveness of digital twins as a safe and intelligent platform for cybersecurity analysis and defense strategy validation.

417.BLOCK CHAIN-BASED FEEDBACK FORM SYSTEM FOR COLLEGE MANAGEMENT

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Feedback mechanisms are important for enhancing academic standards, faculty, and institutional efficiency in higher educational institutions. The traditional online feedback mechanisms are mainly centralized, giving rise to several drawbacks such as lack of transparency, data tampering, single points of failure, and lack of respondent anonymity. These factors create doubts among various stakeholders regarding the reliability of the feedback mechanisms, avoiding students from submitting authentic feedback. To address these lacunae, this study proposes the design of "Blockchain Based Online Feedback Form System for College Management," which uses the decentralized, immutable, and secure features of blockchain technology. The study examines how students' feedback can be submitted using web-based tools with the help of cryptography and hash

processes for maintaining anonymity. Smart contracts are used to validate, record, and store the feed-back in a distributed ledger to ensure that no unauthorized party can modify or delete any feed-back data. The proposed model of data storage in a decentralized manner removes any middleman or supervisor control. Authorized personnel have access to authentic aggregate data without leaking individual identity. The experimental outcome shows efficient feed-back submission with a lag similar to those in academic settings. The proposed architecture promotes data authenticity, anonymity, as well as trust in a higher education institution based on data-driven decision-making.

418.A COMPREHENSIVE SURVEY ON GENE EXPRESSION ANALYSIS USING MACHINE LEARNING AND DEEP LEARNING MODELS

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Cardiovascular disease is one of the main causes of death globally and encompasses various cardiovascular conditions that impair the heart’s function, including myocardial infarction, pericardial disease, ischemic cardiomyopathy heart failure, cardiac rhythm abnormalities (arrhythmias), and coronary artery disease (CAD). Early identification and precise prediction of heart diseases are critical for reducing mortality rates and improving clinical outcomes. Conventional prediction methods often rely on clinical risk factors like blood pressure, cholesterol, and family history. Recent studies suggest that these factors fall short of capturing a person's risk, particularly in the context of complex diseases like cardiovascular conditions. However, gene expression data offers a new approach for predicting heart disease earlier by identifying genetic risks and molecular changes before symptoms appear. Although there are few samples in the gene expression dataset, many features can greatly help with heart disease prediction. This paper reviews the various existing techniques like Principal Component Analysis (PCA), Graph Convolutional Network (GCN), Artificial Neural Network (ANN), Random Forest (RF), Recursive Feature Elimination (RFE), and Deep Q Network (DQN). These methods can aid in identifying particular genetic factors linked to cardiac disease, allowing for early diagnosis and individualized treatment. Additionally, these approaches can detect patterns in gene expression data to determine whether a person has a high or low risk of heart disease, enabling targeted interventions and improving the health of patients.

419.GEN AI POWERED AGENTIC UNIFIED MULTIMODAL CONTENT GENERATION

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The proliferation of Generative AI has revolutionized content creation, yet modern systems remain fragmented, often forcing users to oscillate between isolated modalities—text, image, and video—without shared context. Furthermore, the "amnesia" inherent in Large Language Models (LLMs) precludes the creation of truly personalized, longitudinal narratives, while standard Retrieval-Augmented Generation (RAG) struggles with multi-hop reasoning across diverse media types. To bridge this chasm, we present a unified, microservices-based platform for Agentic Unified Multimodal Content Generation. This system introduces a novel architecture that fuses a Graph Retrieval-Augmented Generation (G-RAG) memory system with an Agentic Orchestration Layer powered by the Model Context Protocol (MCP). By integrating a "Plan A-Plan B" hybrid retrieval framework, the system ensures robust handling of both domain-specific and out-of-distribution queries. Crucially, the generative pipeline employs ControlNet-guided diffusion and a "Generate-Criticize" refinement loop to achieve unprecedented consistency in multimedia outputs. Our evaluation demonstrates that this cohesive approach not only enhances retrieval precision (Precision@5: 0.87) but also establishes a personal Multimodal Knowledge Base (MMKB), allowing the agent to generate contextually grounded, high-fidelity content across text, audio, and video modalities with a 91% context retention rate in multi-turn dialogues.

420.SOULSYNC

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SoulSync is a wellness platform that uses artificial intelligence and facial expression analysis to promote mental health and emotional well-being. The platform is designed for students, working professionals, and seniors. The platform uses facial emotion analysis to determine the user's mood in real time. According to the user's emotional state, the platform provides personalized music therapy to help the user reduce stress, improve sleep quality, and increase focus. The platform also helps the user monitor their emotional patterns over time and provides the user with an opportunity to analyze their emotional progress and well-being. SoulSync is developed

as a responsive web application to ensure seamless accessibility on various devices. The platform is also integrated with platforms such as Jamedo to enable real-time music streaming. SoulSync is a health technology, artificial intelligence, and music technology solution for emotional wellness

421.DUAL-MODAL MACHINE LEARNING MODEL FOR THE PREDICTION OF ALZHEIMER'S DISEASE

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Alzheimer's Disease (AD) is an irreversible neurodegenerative disease that requires an accurate and comprehensive diagnosis at the earliest possible stage in order to effectively treat it. The dual-modality prediction system described in this project combines two separate modules; one for clinical evaluations and the other for MRI evaluations. The clinical component uses a Random Forest classifier and takes into account the demographic information, MMSE scores, and past diagnosis of the person being evaluated. The MRI module uses the same data; however, instead of utilizing a classifier, it analyzes the pattern of brain activity directly from the brain using MRI. As an additional benefit to the combination of the two modules, the project also provided a web application to give patients, clinicians and administrators secure access to the computerized prediction system and a means to input clinical data, upload MRI scans and receive real time predictions. Together, the combination of both modalities will provide a more accurate and reliable prediction and therefore closely resemble the diagnostic processes used in clinical practice. In conclusion, the project illustrates how machine learning can be applied to the health care system, allowing for earlier detection, remote monitoring and integrated analyses of patients with Alzheimer's Disease.

422.ALANKAR: A RULE-BASED OUTFIT COLOR SUGGESTION SYSTEM LINE

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Everyday outfit selection involves multiple uncertainties related to color compatibility, skin tone suitability, and appropriateness for a specific event. These challenges often lead to confusion and poor styling decisions. To address this problem, this paper introduces Alankar, a clothing outfit suggestion system designed to assist users in selecting suitable clothing combinations from their own wardrobes. Alankar is a comprehensive system divided into three modules: outfit color matching based on predefined formulas, attribute matching, and event-based outfit recommendation. This paper focuses exclusively on the first module, which is the outfit color matcher. It explains the underlying color matching formulas and their role in generating visually balanced outfit combinations. The system categorizes events such as interviews and college wear and processes the user's wardrobe by separating top-wear and bottom-wear items. Based on event requirements and color compatibility, Alankar recommends appropriate outfit combinations directly from the user's closet.

423.ENHANCING UNDERWATER IMAGE AND OBJECT DETECTION USING DEEP LEARNING

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Underwater object detection is known to be one of the challenging domains because of its presence in scenarios involving light scattering or attenuation, color distortion, turbidity, and reduced visual clarity. To make the object detection task simpler and more effective in the underwater environment, the paper has come up with the design and development of EffiCNN. EffiCNN is described to be the combination of the EfficientNet-B0 model and the CNN module. The EfficientNet-B0 is intended to provide the benefit of effective and accurate feature representation. A CNN module is incorporated to increase the effectiveness of the model by capturing the detailed information that is often not identified in the underwater images. For effective identification and testing of the model, the study has been performed on the UOT32 Underwater Object Tracking Dataset. Under the experiment environment, the model could reach the best validation accuracy of 97.99%, and the best training accuracy reached 97.90%, depicting effectiveness and robustness. EffiCNN has the advantage of effectively participating in applications such as AUVs and other related activities.

424.FUSION BASED CNN – SNN HYBRID FRAMEWORK WITH RESNET18 BACKBONE FOR EFFICIENT OIL SPILL DETECTION IN SATELLITE IMAGERY

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Oil spill detection in the aquatic environment is of utmost importance to minimize the damage caused to the environment and to act quickly on the situation. In this paper, an energy-efficient oil spill detection system is proposed using a hybrid deep learning model. The proposed model was trained and tested on a satellite image dataset that was prepared carefully. To minimize computational complexity and maximize accuracy, different models of the network were compared. The best model of the network is a combination of Spiking Neural Networks (SNNs) for energy-efficient processing and ResNet-18 for accurate feature extraction and classification. The processing in SNNs is spike-based, which consumes energy drastically, and the residual network enhances the accuracy of oil spill detection. The experimental results clearly show that the hybrid model of SNN and ResNet-18 outperforms other models with a high accuracy rate of 99.83% and low computational complexity.

425.IOT-BASED AUTONOMOUS SERVICE NODE USER INTERACTION AND SAFETY SURVEILLANCE

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The recent years of intelligent transportation and automation technologies have been increasing trends contributing to the need to develop safer and smarter fuel station systems. The intelligent service node based on the IoT and guaranteed and confident vehicle communication is oriented on the secure identification of the

vehicle, automatic fuel dispensation, real-time detection, and cloud-based on the observation to improve safety and efficiency of operations. This prevents intrusion drops to up to 40 percent with an increase in the precision of their fuel dispensation of approximately 30 percent, therefore, leading to a curtailment of fuel wastage and human intervention. The smoke sensor and smoke alert 3.1 are also beneficial to safety as the responsiveness of the sensor in terms of responding to an emergency in the event of fire is minimized by approximately 45 percent and the capability to protect the fire is minimized by approximately 35 percent. Though significant variables like the rate of fuel flow (L/min), the amount of each fuel dispensed (liters), transaction time (seconds), authentication rate, the amount of smoke produced, alert condition and system response time are in constant motion monitored, voice-assisted interface in many languages eliminates operational errors (approximately 35 percent) and also enhances the experience of the user (by up to 50 percent). Every information is safely stored on the cloud, thus real time monitoring and quick response to an emergency to manage intelligent fuel stations.

426.CLOUD SECURITY COMPLIANCE AND AUDIT MANAGEMENT SYSTEM

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Automated compliance monitoring has become a critical requirement for modern enterprises as cloud adoption accelerates and the risk of security misconfigurations continues to increase. This paper presents a lightweight, serverless Cloud Governance, Risk, and Compliance (GRC)–aligned Security Compliance and Audit Management System for continuous as- sessment of critical Amazon Web Services (AWS) resources. The proposed system employs modular audit scanners implemented using AWS Lambda to evaluate identity and access management (IAM) credential hygiene, Amazon S3 bucket exposure, and EC2 security group configurations against predefined security and compliance baselines. Detected violations are normalized into a unified findings schema and evaluated using an intelligent, context-aware risk scoring model that dynamically prioritizes vulnerabilities based on exposure level, data sensitivity, privilege level, and exploitability. All compliance findings are persistently stored in Amazon DynamoDB to support centralized governance and near real-time risk visibility. To ensure audit traceability and regulatory compliance, the system periodically exports findings into structured, timestamped CSV reports that are securely archived in Amazon S3, forming an immutable compliance evidence repository suitable for long-term audits and historical security posture analysis. A web-based dashboard developed using React enables security and governance teams to visualize compliance status, prioritize remediation actions based on com- puted risk scores, and validate adherence to organizational and regulatory security policies. The proposed architecture demon- strates how serverless cloud-native services can be leveraged to deliver scalable, cost-efficient, and auditable GRC-oriented compliance automation in dynamic cloud environments.

427.ENERGY AWARE MULTIPATH ROUTING FOR MANETS TO IMPROVE NETWORK LIFETIME

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Mobile Ad-Hoc Networks (MANETs) are made up of nodes that don’t have a lot of energy, which makes it hard for them to keep functioning for a long time. Standard shortest-path routing protocols improve up network partitioning by making nodes on the best paths use too much energy. This paper proposes a fatal Energy-Aware Multipath Routing (EA-MPR) protocol designed to enhance network longevity through strategic path selection and load balancing. Methodology: EAMPR’s biggest new feature is a way to pick a path that the ranks them by how much energy they have left and how many hops they have left. During route discovery, this metric finds a number of paths that use less energy. A probabilistic forwarding mechanism then sends data traffic over these paths in a direct proportion to their remaining energy, making sure that energy use is balanced. EA-MPR was thoroughly tested against AODV and AOMDV in MATLAB. The results show that the time to the first node death improved by 17.5EA-MPR effectively reduces energy hotspots and greatly improves the network’s ability to withstand attacks. The protocol sets up a strategic framework for long-term operation of a MANET, which makes it perfect for applications where saving energy is the most important thing.

428.STREAMING-AWARE REAL-TIME ANOMALY DETECTION IN MICROSERVICES

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Microservice architecture is a major challenge in real-time monitoring systems due to the generation of high-volume and high-haste functional data in form of metrics, logs, and streaming events. The detection of anomalies in real-time is an important activity that is not easy to attain. The proposed system contains streaming-related metrics that is based on the integration of Apache Kafka to ingest data in real-time and enable centralized monitoring, such as microservice event per-service detection parameters such as latency, the duration of anomalies burst and cross-service anomaly overlap, Kafka consumer lag, detection stability ratio, and alert oscillation rate. The logs of operations and functional events are sent through Apache Kafka and read in adjustable batches, which has the advantage of analyzing the effects of batch size, the behavior of the consumer lag, and the delay of the end-to-end pipeline. These metrics, logs and criteria are continuously using Prometheus. Visualized and monitored through Grafana dashboards, offering operational perceptive into overall system performance. The collected data is used to train an unsupervised machine learning model based on Isolation Forest, enabling the system to learn normal operational behavior. Redis is added for low-latency data persistence. Experiment performed on live Kafka-streamed operational and functional data shows that the proposed approach achieved low false-positive rates, high detection stability, and reliable performance during burst traffic conditions and Kafka consumer lags, And maintaining minimal end-to-end processing latency. The results indicates that considering streaming dynamics improves anomaly detection consistency, reduces alert flapping, and achieves deliverable action on real-time microservice health monitoring systems. Synthetic yet real microservice logs are generated with controlled ingestion rates, burst-based anomalies, and distributed failure patterns used to validate the system under real-time functional conditions.

429.E-COMMERCE PRODUCT PRICE TRACKER

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–Online retail platforms frequently adjust product prices in response to market conditions, making continuous manual price tracking impractical for consumers. This paper presents an E-Commerce Product Price Tracker, an automated system designed to monitor product prices across online shopping platforms and notify users when prices reach user-defined thresholds. The system allows users to register products through an intuitive web interface, configure target prices, and view historical price trends through graphical visualizations. Product price data is periodically collected using automated extraction techniques and stored for long-term analysis. When a monitored price falls below the specified value, real-time alerts are generated to notify the user. By automating price monitoring and providing actionable pricing insights, the proposed solution reduces manual effort, prevents missed purchasing opportunities, and supports informed, cost-effective buying decisions.

430.SMART TOKEN-BASED RATION DISTRIBUTION AND STOCK TRANSPARENCY SYSTEM

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The Public Distribution System (PDS) in its current form has drawbacks such as clogged queues, an extended period of waiting for service and the ambiguity as to how much stock is available at any one point in time. To address this, this research proposes a Smart Token-Based Ration Distribution and Stock Transparency System to improve efficiency and accessibility to rationed goods. The PDS allows beneficiaries access to see real-time stock availability via a web based platform and to create digital tokens by selecting their own time slots to pick up their rations. This excludes the need for beneficiaries to return multiple times to a PDS or keep waiting in line and provides better crowd management at the PDS. Ration Shop Owners can update stock information and track how many tokens are used by beneficiaries at their shop, while the administrator has an oversight function to ensure accountability to the system as a whole. The proposed system is simple, scalable and cost-effective and will upgrade the way rationed goods are distributed to the public by modernizing rationed good distribution and improving service delivery.

431.AI AND DIGITAL TWIN TRANSFORMING HEALTHCARE 6G IOT

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This project presents an intelligent healthcare monitoring system that integrates Artificial Intelligence (AI) and Digital Twin (DT) technology using 6G-enabled Internet of Things (IoT) networks. A digital twin is created as a real-time virtual replica of a patient using continuous physiological data collected from IoT sensors, including heart rate, ECG, SpO_2, temperature, and blood pressure. The collected data is preprocessed, normalized, and analyzed using an LSTM-based deep learning model to detect abnormal health patterns and predict potential risks. Experimental results demonstrate that the proposed system achieves a classification accuracy of 99.59%, with precision of 99.7%, recall of 99.6%, and an AUC value of 0.999, indicating excellent prediction performance. The model records zero false positives and zero false negatives, ensuring high reliability and patient safety. The use of high-speed and ultra-low latency 6G communication enables real-time monitoring and fast medical decision-making. Overall, the proposed AI–Digital Twin framework provides a highly accurate, scalable, and patient-centric healthcare solution, enabling early disease detection and personalized treatment planning.

432.AI FASHION SHOPPING ASSISTANT CHATBOT

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The growth of online fashion retail has created a need for intelligent systems that can provide personalized and efficient shopping assistance. Conventional search and filter-based approaches often lead to information overload and limited user engagement. This paper presents an AI Fashion Shopping Assistant Chatbot that enhances the online shopping experience through conversational interaction and personalized fashion recommendations.

The proposed system employs a structured Excel-based dataset containing fashion product attributes such as category, color, occasion, and product links. A rule-based, content-driven recommendation mechanism is used to interpret user queries and generate relevant suggestions in real time. Natural language inputs are mapped to predefined product attributes, enabling accurate and explainable recommendations without relying on computationally intensive machine learning models.

Experimental results show that the chatbot effectively responds to user preferences with fast response time and high recommendation relevance. The system is lightweight, scalable, and easy to deploy, making it suitable for academic use and small to medium-scale e-commerce platforms. The proposed chatbot demonstrates the effectiveness of transparent and dataset-driven AI solutions in fashion retail and provides a foundation for future enhancements such as machine learning-based personalization and image-driven recommendations.

433.A MULTIMODAL AI SYSTEM FOR YOUTUBE VIDEO SUMMARIZATION AND COMMENT ANALYSIS

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The paper proposes an intelligent and integrative framework to counteract the twin problems of information overload and sentiment analysis on the YouTube platform. YouTube is a key platform for global information consumption, with millions of videos being uploaded each day, some running into hours. This is a major challenge from an information consumption viewpoint. On the other hand, the comment section accompanying each video has thousands of comments from users, thus constituting an unorganized pool of consumer information that is impossible to manually analyze. Although some analysis tools may be available for YouTube videos or their corresponding comment section analysis, a comprehensive perception of how the content is being analyzed by consumers cannot be managed by existing single-mode analysis tools.

In order to fulfill this requirement, we are proposing a new multimodal AI system that uses video content summarization along with large-scale comment sentiment analysis. The methodology has been implemented in the form of two separate AI pipelines that work simultaneously on a given video URL posted on the YouTube platform. For content summarization, the pipeline has been implemented using OpenAI's Whisper tool, which is an Automatic Speech Recognition model that has been fine-tuned on an unprecedented 680,000 hours of diverse and multilingual audio content. The lengthy transcript is later processed using BigBird Pegasus, a transformer-based model that is capable of processing long input sequences up to 4096 tokens. Similarly, the sentiment analysis pipeline leverages the YouTube API for retrieving the appropriate comments, which are then employed for categorizing the content into positive, negative, and neutral categories. This has been accomplished via a fine-tuned deep learning model based on the BERT architecture. In addition, the entire framework has been designed as an interactive web application via the Streamlit library. This has resulted in the creation of a powerful tool for the purpose of digital education and content marketing, enabling a complete and better representation of YouTube content. Such an approach is sure to yield significant benefits for the audience, enabling greater efficiency and considerable insights into content-audience relationships, thereby paving the way for highly responsive content creation strategies.

434.KISANAI: REAL-TIME VOICE ASSISTANT FOR FARMERS WITH IOT-BASED CROP RECOMMENDATIONS

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Agriculture, in India is heavily impacted by variables like temperature, soil pH and humidity, therefore, it greatly affects the choice of crops and total yield. Despite the importance of these variables, small and marginal farmers often face difficulties in getting timely decision support systems based on data analytics which could effectively guide them for improving farming methods. Addressing thisoment gap: The proposed system, KisanAI, can be considered as intelligence and real-time, voice integrated IoT sensor, ensemble machine learning, and natural language processing (NLP) based intelligent system for personalized crop recommendations and agricultural guidance. The IoT-based sensors set up in the field constantly monitor the important environmental parameters including temperature, humidity, and soil pH, which generates precise and up-to-date data. This data is then processed through a robust ensemble learning model using a South combination of Support Vector Machines (SVM) & Random Forest (RF) classifiers to ensure extremely accurate recommendations for best-suited crops given specific and environmental conditions. The ensemble methodology raises the both the accuracy and adaptability of the predictions to be developed for different agro-climatic regions. Furthermore, KisanAI has an advanced LSTM-based NLP chatbot, where farmers interact with it in a natural way by asking questions in their own language and smartly obtaining responses based on the context. In order to be inclusive and accessible, the platform provides speech-based outputs in several Indian regional languages using state-of-the-art text-to-speech (TTS) synthesis to support users with varying levels of literacy. By combining real- time environmental monitoring, the use of hybrid machine learning-based recommendations, and voice interaction available in various languages, KisanAI hopes to empower farmers to have localised, intelligent and user-friendly ag support that encourages better decision-making and farming practices.

435.MODERNIZING VEHICLE TO VEHICLE COMMUNICATION PROVIDING SECURE HIGHWAY AGAINST THE COLLISION

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The fast growth of road transport and the growing population of care have led to a high rate of highway accident are caused by bad road conditions hazards awareness, and lack of effectiveness vehicle to vehicle communication. Conventional safety system depends on driver observation and static to a great extent warning system, which tend to be inadequate in highspeed settings. In this paper, their Internet of Things(IoT) based vehicle-to-vehicle (V2V) communication systems, which together with wireless sensor. Highway safety improvement though networks (WSN). The proposed system makes use of ESP32 microcontroller, ultrasonic sensor, Zigbee communication modules and cloud connectivity to sense road obstacles like potholes and so on surface variations which are abnormal. Once a hazards is identified, a warning message is sent to the adjacent vehicle in live and presented in the form of audio-visual notification. Also, the identified data is saved on a cloud. Monitoring and future road maintenance platform analysis. The system is evaluated experimentally to show that it is operating effectively enhance driver awareness, decrease reaction time and to a considerable degree reduces the chances of collisions, thus as part of the creation of intelligent transportation system.

436.INTELLIGENT VOICE-ACTIVATED VIRTUAL AVATAR WITH REAL-TIME GENDER DETECTION

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The Voice-to-Avatar Generation Project aims to provide users with an intelligent avatar that will respond to their spoken words, changing its appearance according to the user's gender. With the Voice-to-Avatar Generation Project, we will provide users with the ability to create their own virtual persona based on the way they speak. Users will be able to upload or record their audio using the Voice Recognition program and convert it into printed out text.We will also analyze the audio for gender-specific characteristics, such as pitch, to determine which avatar to use. Using this information, we will create an avatar to match the user. The text file generated from the audio will then be combined with the recorded audio and an avatar to create a realistic video of the user's response to the audio. We will provide an option for the user to record and download the video to save as a file.This project also allows for the creation of an avatar using the Voice-to-Avatar Generation system for a variety of different industries, such as health care, education, and video gaming. In addition, this project provides a practical means of combining speech processing, audio analysis, and interactive avatar rendering to create a natural voice-based interaction between a user and an avatar.

437.CROSS-MODAL ATTENTION AND ADVERSARIAL AUGMENTATION FOR ROBUST BREAST TUMOR DIAGNOSIS USING DUAL-MODE ULTRASOUND IMAGING

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Dependable early breast cancer detection still hard since the images are not always readable and the modality is not always the same. The proposed paper introduces a transformer-based dual-mode framework, which simultaneously utilises B-mode and elastography ultrasound via a Dynamic Spatial-Channel Attention (DiSCA) mechanism and a Hierarchical Adversarial Augmentation Network (HAAN). DiSCA uses adaptive cross-modal fusion to ensure that it captures the complementary spatial and semantic information whereas HAANs apply modality-conscious perturbations using a two-branch adversarial model to be robust against artifact and acquisition noise. Multi-Objective Focal Tversky-Hybrid Loss (MOFT-HL) is a hybrid that completely satisfies segmentation and classification goals, so that their performance is balanced. BUSI-ELAST and UDIAT dataset evaluations recorded Dice = 93.8%, Sensitivity = 95.2, Specificity = 92.7, and Accuracy = 94.6 which is 2-4 points higher than the results of Dual-Attention U-Net and CrossMedGAN. The framework is found to have a uniform convergence stability on five independent folds indicating reproducibility and lower variance. The proposed method can precisely localize lesion boundaries, increase the discriminability, and create a clinically sufficient basis of AI-assisted diagnosis of breast cancer in the context of screening in real-world ultrasound to achieve better results.

438.ACCURATE CERVICAL CANCER DIAGNOSIS USING MULTIMODAL LARGE LANGUAGE MODELS

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Cervical cancer screening requires accurate interpretation of both visual and clinical data, posing challenges for conventional unimodal diagnostic systems. With recent advances in multimodal learning, Large Language Models (LLMs) have emerged as powerful tools for integrating heterogeneous clinical information. In this work, we present an LLM-driven multimodal framework for cervical cancer analysis that combines colposcopy image segmentation with patient-specific metadata. The pipeline employs Vision Transformer (ViT) and Medical Segment Anything Model (MedSAM) for lesion localization and heatmap generation, while Generative Pre-trained Transformer for Biomedical Text Generation and Mining (BioGPT) is utilized to process clinical records such as Swede scores, HPV status, and histopathology. Image and text embeddings are fused to improve classification and interpretability, enabling both lesion visualization and clinical context understanding. Experimental evaluation demonstrates that the multimodal LLM-based system achieves higher diagnostic accuracy, specificity, sensitivity and robustness compared to unimodal baselines. This study highlights the potential of LLM- integrated multimodal pipelines in advancing AI-assisted cervical cancer screening and precision oncology.

439.DOCBOT: INTELLIGENT DOCUMENT CHATBOT USING ARTIFICIAL INTELLIGENCE AND NATURAL LANGUAGE PROCESSING

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Understanding large PDF documents manually is time-consuming and inefficient. Existing document search systems mainly rely on keyword-based retrieval, which lacks contextual understanding and fails to answer user-specific queries accurately. This paper proposes DocBot, an intelligent document chatbot that enables users to interact with PDF documents using natural language queries. The system automatically extracts text from documents, converts it into semantic vector representations, and retrieves relevant information using similarity search. Context-aware question answering is achieved using Natural Language Processing techniques integrated with FAISS and transformer-based embeddings. In addition, DocBot supports multilingual translation and image or diagram explanation present in documents. Experimental evaluation shows that the proposed system significantly reduces information retrieval time while providing accurate and meaningful responses. The system is user-friendly, scalable, and suitable for educational and technical document analysis.

440.HUMAN ACTION RECOGNITION AND VIDEO CLASSIFICATION THROUGH TRANSFER LEARNING

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Human Activity Recognition (HAR) is a seasoned study field because of its broad usage in healthcare tracking, intelligent environments, and fitness watches, as well as human computer interaction. This paper introduces a Human Activity Recognition framework to use sensor-related data and machine learning/deep learning models to automatically detect and categorize the everyday human activities, including walking, sitting, standing, and running. The method proposed is to obtain data through wearable sensors and preprocess and extract features to minimize noise and boost discriminative patterns and then to train the model using the supervised learning algorithms. The system is effective in terms of real-time and scalable applications as experimental results show that the system is highly accurate and robust in identifying activities in different conditions. The findings reveal that smart HAR systems have the capability of providing a significant contribution to the process of activity monitoring, decision support, and personalized services to contemporary smart systems.

441.DEEP NEURAL NETWORK–DRIVEN SMALL UNMANNED AERIAL VEHICLE RECOGNITION FOR SECURITY APPLICATIONS

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The rapid growth of small unmanned aerial vehicles (sUAVs) present significant and growing challenges to global security, including threats to critical infrastructure, airport safety, and public spaces. The detection and classification of sUAVs are complicated by their low radar cross-section (RCS), high manoeuvrability, small visual signature, and similarity to biological targets like birds. This paper provides a comprehensive review and analysis of deep neural network (DNN)-based methodologies for sUAV recognition, encompassing visible, infrared (IR), radar, and multimodal sensor domains. We propose a novel, end-to-end system architecture for robust small UAV detection, supported by a detailed experimental framework using both real and synthetic data. The proposed system leverages modality-specific DNNs for feature extraction and a fusion network to integrate complementary sensor data, significantly enhancing detection reliability and reducing false alarms. Expanded results from our ablation studies demonstrate a mAP improvement of 8-15% over single-modality baselines. The paper concludes with a discussion of open challenges, including adversarial robustness and computational constraints on edge devices and provides recommendations for real-world deployment, supported by an extensive literature review.

442.QUERYLESS: A PRIVACY-PRESERVING AND REASONING-ENHANCED MULTI-AGENT FRAMEWORK FOR CLINICAL TEXT-TO-SQL GENERATION

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The duration of recovery in patients is hindered by the utilization of Electronic Health Records (EHR) as it has immense technical complexity for data-driven clinical decision-making. Better understanding of the history of a patient, current infection spread along with a user friendly platform will be a boon to all the healthcare professionals. So, this paper introduces QueryLess, a specialized web-based framework leveraging GPT-5 with a "System 2" reasoning architecture tailored for medical data. We propose a hybrid methodology integrating LinkAlign for schema linking with medical ontology mapping (SNOMED-CT/ICD-10), MAC-SQL for decomposing complex clinical logic, and a Differential Privacy (DP) layer using Smart Noise to ensure HIPAA compliance. Experimental results on the EHRSQL and MIMIC-IV benchmarks demonstrate that QueryLess achieves a state of the art Reliability Score (RS) of 81.05%. Thus, frontline clinicians to specialist physicians will be able to seamlessly handle patient data with better patient interpretation.

443.STRUCTURING GEN-AI IN AUTOMATED INTERVIEW ASSESSMENTS THROUGH A PHASE-SEPARATED SYSTEM ARCHITECTURE

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The exponential growth of Generative artificial intelligence made a rapid adoption of automated processes, which also introduced the hiring process to the area of automated interviews assessment using ai agents. This solves the significant challenges of the interview and adopts non-determinism, transparent, fairness, and also reduces the need of human interviewers. While the large language models are highly scalable and flexible, their unconstrained integration leads to an opaque decision-making and also makes it less auditable particularly in formal assessment. Thus, this paper presents a phase separated system architecture that conducts the interview in a structured manner while preserving the deterministic execution. The proposed architecture splits the interview lifecycle into isolated phases, including interview configuration, candidate intake, interview execution, post-interview evaluation, and decision support. The system adapts interview-scoped candidate authentication and authorization, resume-aware and controlled question generations, integrity monitoring mechanisms, and a sectional evaluation framework that enables explainable and auditable assessment results with detailed candidate performance analysis. The system implementation and testing demonstrated the accuracy of the architecture in real-world interview scenario. The result highlighted that Generative Artificial Intelligence can effectively been govern in an automated interview assessment.

444.AN INTELLIGENT ANN-BASED MPPT APPROACH FOR SEPIC CONVERTER-CONTROLLED PHOTOVOLTAIC BATTERY MANAGEMENT SYSTEMS

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The analysis develops a Maximum Power Point Tracking (MPPT) system of Photovoltaic Battery Management System in coordination of an Intelligent Artificial Neural Network and Single-Ended Primary Inductor Converter (SEPIC). ANN-based MPPT provides optimal duty cycles to achieve the highest possible power provided in various light and thermal conditions. This analysis produces superior results than other methods such as Perturb and Observe (P&O) and Incremental Conductance (INC). SEPIC converter provides a fixed voltage control to Battery Management System in storage of power in case of power applications. The simulation outcomes demonstrate that there is an increased accuracy of tracking with a decrease in oscillations and efficiency optimized by SEPIC converter. This shows the importance of intelligent control Photovoltaic Battery Management System.

445.ADVANCING OVARIAN CANCER DIAGNOSIS THROUGH DEEP LEARNING AND EXPLAINABLE AL: A MULTI CLASSIFICATION APPROCH

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Ovarian cysts are gynaecological diseases. They are often asymptomatic, but if they are not detected at the right time, they can cause severe problems later. To treat these conditions appropriately, ovarian cysts must be classified correctly and quickly after being evaluated. This article introduces an automated framework developed with the aid of deep learning technology to classify ovarian cysts through ultrasound and tissue images. The framework uses the DenseNet architecture to improve the flow of features through dense connections while decreasing the amount of information lost during the training process. Image collections for the medical classification of ovarian cysts included the normal ovaries and memories of various cyst types. The images were processed to improve their quality and consistency and underwent normalization. Additionally, a transfer- learning approach is used to retrain the DenseNet model to identify the defining features between the normal and cyst-affected ovaries. The model developed through transfer-learning was tested against standard metric evaluations to ensure its accuracy, dependability, capability to generalize, and classify cyst conditions from normal. The findings of this study demonstrate that the developed automated framework can classify medical images between cyst conditions and normal ovaries, which will reduce the amount of time spent on manual processing and improve the accuracy of diagnoses. By doing so, a reliable and efficient

446.NEXT-GENERATION DIGITAL FORENSIC SECURITY: AUTHENTICATION–DRIVEN SECURE STORAGE AND OPTIMIZED ENCRYPTION.

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In the contemporary cybercrime investigations, the digital evidence integrity and authenticity play a major role. In this paper, a Next-Generation Digital Forensic Security System is proposed, which incorporates SBVM-based two-factor authentication, AOKGE-MHE optimized encryption, and blockchain-supported ledger of immutable evidence. Here, the system is confidential in the transfer of files and detection of tampering through cryptographic hash and ledger validation. Admin, Investigator, and Verifier rolebased dashboards facilitate the work process in a non-disruptive manner and are highly transparent and accountable. The proposed framework will increase trust, traceability, and reliability in the process of forensic evidence processing in distributed environments through multi-layered authentication and blockchain immutability.

447. DEEP HYBRID MODEL INTEGRATING EFFICIENT NETB3 AND YOLOV10 FOR BONE TUMOR DETECTION AND SEGMENTATION

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Bone cancer can be fatal, and early detection is important to protect your metastasis and improve survival. Most malignancies are extremely dangerous, and many 1/3 of the population may spread the disease, regardless of age or lifestyle. Osteoporosis in particular poses a significant health risk as it often leads to patient death. It highlights the need for dependable and effective methods for early detection and treatment by highlighting the extensive and error-susceptible nature of conventional diagnostic strategies. To triumph over those demanding situations, the proposed model uses EfficientNet-B3 extraction abilities and YOLOv10 actual-time detection capabilities. With the diagnostic technique EfficientNet-B3, it's highly regarded for its capacity to offer immoderate accuracy for certain parameters, imparting capabilities from skeletal pictures that provide adequate

extraction accuracy and machine pace. YOLOv10 now enhances the energy of the model due to the fact those photos should consist of and classify most cancer regions. This two-chamber method enables disease robustness, removes the need for manual processing, and provides higher accuracy compared to standard strategies inclusive of help vector machines (SVMs), naive Bayes classifiers, and scientific photos. And tests model performance, with accuracy, keep in mind, and F1 scores. This greatly reduces diagnostic time and computational complexity. By integrating that deep mastering, the proposed hybrid model affords a unique, effective, and dependable tool for bone most cancer detection and type, commencing the possibility for diagnostic and most suitable techniques.

448.DESIGN AND IMPLEMENTATION OF AN EMBEDDED CONTROL SYSTEM FOR REAL-TIME DUST EXTRACTION AND AIR QUALITY MONITORING IN CEMENT INDUSTRIES

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Dust pollution is a major concern in industries such as cement manufacturing, mining, and material processing due to its harmful effects on human health and industrial equipment. Prolonged exposure to fine dust particles such as PM2.5 and PM10 can lead to serious respiratory disorders including asthma, silicosis, and chronic bronchitis. In addition, excessive dust accumulation reduces machine efficiency, causes frequent breakdowns, and increases maintenance costs.
This paper presents a real-time dust collector and monitoring system using an ESP32 microcontroller. The system integrates an MQ135 gas sensor to detect harmful air pollutants, an ultrasonic sensor to monitor dust bin levels, a high-speed vacuum motor for dust extraction, and a servo motor for automatic HEPA filter cleaning. The proposed system operates autonomously with minimal human intervention, improves energy efficiency using PWM-based motor control, and enhances workplace safety. The system also supports future cloud integration and machine learning-based analysis for predictive maintenance and intelligent industrial dust management.

449.AI SIGN LANGUAGE TRANSLATOR: REAL-TIME HAND GESTURE TO TEXT SYSTEM

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Communication barriers for the hearing-impaired pose significant challenges to social and professional integration. This paper presents an AI-driven system that translates hand gestures into text in real-time. By leveraging a hybrid framework combining Convolutional Neural Networks (CNN) for spatial feature extraction

and Long Short-Term Memory (LSTM) networks for temporal sequence recognition, the system provides continuous monitoring of human gestures. Experimental results demonstrate a detection accuracy of 98.7% with a response latency of 185ms.Communication barriers for the hearing impaired pose significant challenges to social, educational, and professional integration, often isolating individuals from essential public services and interpersonal interactions. Traditional translation mechanisms, which frequently rely on static rule-sets or cumbersome wearable sensors (such as data gloves), have proven inadequate for the fluid, dynamic, and non-linear nature of natural sign language. This paper presents a robust, AI-driven framework for real-time hand gesture-to-text translation that operates without the need for specialized hardware. By leveraging a hybrid deep learning architecture, the system utilizes Convolutional Neural Networks (CNN) for high- fidelity spatial feature extraction and Long Short-Term Memory (LSTM) networks to capture temporal sequence dependencies across a sliding window of 30 frames. The tool employs advanced feature engineering, including 21-point hand landmark tracking and coordinate normalization, to generate
63-dimensional feature vectors that ensure scale-invariance across varying user distances and lighting conditions. Experimental evaluation on a diverse dataset of 15,000 samples spanning static alphabets and complex dynamic phrases demonstrates a superior detection accuracy of 98.7

450.SIGN SENSE: AN AI-BASED SYSTEM TO HELP DEAF, DUMB, AND BLIND PEOPLE TO COMMUNICATE

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The Sign Language Recognition System converts hand gestures into understandable language. It captures gestures using a camera, processes them, and identifies the correct meaning using trained models. To bridge the communication gap between sign language users and non users, we present a novel system for real-time sign language detection using a standard web camera. This system aims to recognize sign language gestures performed in front of the camera, subsequently converting them into voice output and displaying the corresponding text on screen. For blind people, the system provides the output as audio (voice)or vibration feedback instead of text on a screen. This helps blind users understand sign language without needing to see it. Overall, the system makes communication easier and more accessible for everyone. It first identifies the signer’s hand recognizing key markers that represent signs. The voice output enables real-time interpretation for users who may not be familiar with sign language, while the on-screen text serves as a visual reference. This dual output mechanism ensures accessibility and inclusivity for a wider audience. By integrating this system into webcams and other devices with cameras, we aim to enhance the communication capabilities of the deaf/dumb and blind people, enabling them to interact more effectively with hearing individuals. Additionally, this technology can find applications in education, healthcare, and other domains, fostering better understanding and accessibility for sign language users.

451.REAL-TIME EV BATTERY HEALTH MONITORING AND BALANCING SYSTEM

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Battery Management Systems (BMS) are essential for ensuring the safety, effectiveness, and durability of lithium-ion battery packs employed in Electric Vehicles (EVs) and hybrid energy systems. Multi-cell battery packs can experience voltage imbalances, inaccurate state-of-charge (SOC) estimation, and irregular ageing, potentially compromising performance and increasing safety risks. Moreover, numerous existing BMS solutions

depend on intricate algorithms or expensive hardware, making them inadequate for small EV systems and budget-friendly prototyping applications.

This study introduces a real-time battery health-monitoring and passive cell-balancing method tailored for small-scale EV battery packs which employs an Arduino Uno EK R4 as the primary controller, incorporating voltage divider circuits for sensing the voltage of each cell, an ACS712 Hall-effect current sensor for measuring current, and a 3-cell 18650 lithium-ion battery pack. SOC is calculated using the Coulomb counting technique, and passive cell balancing is achieved with IRFZ44N Mosfets along with 10W thermistors, featuring a real-time monitoring displayed on an OLED screen. Moreover, comprehensive MATLAB Simulink models were created for 3-cell, 4-cell and 8-cell battery pack setups to examine charging and discharging performance. The hardware-based discharging model for a 3-cell battery pack was used to verify the simulation results. Experimental findings reveal successful voltage equilibrium and enhanced pack stability, addressing the disparity between expensive commercial BMS options and cost- effective prototyping requirements for small EV applications.

452.ENHANCING ANDROID SECURITY THROUGH PERMISSION BASED MALWARE DETECTION USING MACHINE LEARNING

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The widespread adoption of Android smartphones has greatly enhanced digital connectivity but has also introduced new avenues for Cyber threats, particularly through malicious applications. Conventional malware detection approaches, such as signature-based and heuristic methods, have grown progressively inadequate in the face of advanced and swiftly changing threats, including zero-day and polymorphic malware. To tackle these issues, this research introduces a permission-based framework for detecting Android malware that employs various supervised machine learning algorithms. The system analyzes the permissions requested by applications to identify behavioral patterns indicative of malicious intent. By training classification models on labeled datasets, the framework effectively distinguishes between benign and malicious applications. The proposed approach leverages the strengths of both permission-based analysis and machine learning to develop a scalable, adaptive, and lightweight detection system. Since permissions are readily available and computationally efficient features, the model achieves high detection accuracy while maintaining real-time performance. This framework improves the security of Android devices by helping both users and developers recognize applications that may pose a threat, thus fostering a safer and more secure mobile environment.

453.A RENEWABLE ENERGY POWERED LONG-RANGE EMERGENCY COMMUNICATION SYSTEM USING LoRa TECHNOLOGY

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In many rural areas and highways, people face serious problems due to poor mobile network coverage, especially during emergencies such as accidents, sudden illness, or vehicle breakdowns. To overcome this, a wind turbine-powered LoRa communication system using Arduino is proposed. The system uses renewable wind energy for continuous power and long-range LoRa technology for sending emergency messages over several kilometers at very low cost and power consumption. At the press of a button, alerts can be sent to hospitals, mechanics, or police stations, ensuring quick response even in areas without electricity or mobile networks. This makes the system reliable, eco-friendly, and suitable for rural communities and highways where communication is most needed.

454.GIS DRIVEN TRANSFORMER HEALTH MONITORING SYSTEM

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Power transformers are essential to the stability of power distribution networks, and their unplanned failure can result in extensive outages, equipment stress, and expensive maintenance. Conventional monitoring methods rely on manual evaluation and periodic inspection, which frequently miss early signs of malfunction. This paper presents an improved GIS-driven Transformer Health Monitoring System that incorporates anomaly detection, IoT-based sensing, Random Forest machine learning, and a Weather Integrated Stress Index (WISI) for intelligent condition assessment. Transformer health score, anomaly score, and short-term risk prediction can be calculated using multi-parameter sensor data in conjunction with environmental stress indicators. Transformer conditions are categorised by the system into Low, Medium, and Critical groups, and an interactive GIS dashboard is used to display the results. Proactive maintenance and effective resource allocation are supported by the spatial mapping of health predictions, WISI effects, and Remaining Useful Life (RUL) estimates. The outcomes show how the suggested system can improve field decision-making processes and transformer reliability.

455.SOLAR POWER GENERATION FORECASTING - A COMPARATIVE ANALYSIS OF ML APPROACHES

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The potential of solar energy is immense in solving the energy issues of the world and reducing the use of fossil fuels. However, it is hard to predict with any degree of accuracy; generation depends on varying environmental conditions, such as weather etc. This paper will discuss the usage of machine learning tools in predicting the generation of solar energy as a function of environmental factors and sky cover. The findings show that all the models were determined to be of predictive value, with Gradient Boosting Regression giving the best balance between accuracy and minimum error. The findings advance the development of machine learning approaches to renewable energy prediction, which enables efficient solar power forecasting

456.CRIME RATE PREDICTION AND GEO VISUALIZATION

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The crime data is increasingly flooding and there is an emergent need for intelligent tools that can predict the pattern and map it in space to facilitate proactive public safety planning. This research presents a Crime Rate Prediction and Geo-visualization System that integrates machine learning with spatio temporal analysis for detecting criminal trends and hotspot prediction. We consider historical crime records, augmented with geographic coordinates and time relevant features and feed them into a Random Forest based model that calculates the likelihood of crime at any given location and time. The system is powered by a FastAPI backend that provides secure data management, analytics and prediction services through RESTful APIs. Additionally, it extracts summarized statistics on crime and insights related to hotspots to facilitate geo-visualization and hotspot trend tracking. The research demonstrate that this approach captures when and where crime tends to take place, returning solid predictive performance and better identification of risky areas. In essence, this system represents a scalable data driven framework that strengthens crime analysis and supports informed decision-making for smart city safety initiatives.

457.SMART INVENTORY MANAGEMENT SYSTEM WITH PREDICTIVE ALERTS AND AUTOMATED PROCUREMENT

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One of the biggest challenges for retail companies is to manage their current inventory effectively while forecasting their future needs. The challenge is compounded by rapidly changing consumer buying behaviour and continuously evolving market conditions. This paper describes a new system called the Intelligent Inventory Control System with Predictive Alerts and Automatic Purchasing. Using AI and machine learning technologies, the proposed system will assist managers with sales forecasting and inventory management based on expected product demand.

A proposal for a future systematic way to anticipate demand incorporates an evaluation of historical sales transactions together with contextual information (e.g. seasonality, promotions, weather patterns, regionally relevant events), which combine to determine future demand patterns. This investigative information will help forecast demand changes, resulting in timely alerts for the need to adjust inventory levels or buy new stock - all prior to experiencing stock imbalances. In so doing, this proposal will help to maintain adequate inventory levels, reduce the likelihood of encountering stock outs, and reduce the potential for excess inventory.

This framework has been designed to be scalable and makes extensive use of data, thus providing a relevant way to apply this system in the retail sector. This proposal will provide retailers with an improved ability to plan for future demand and respond quickly to changes in demand; as well as to enhance the overall performance of their businesses. The findings demonstrate how predictive analytics can support the creation of more adaptive and automated inventory management practices in retail businesses.

458.CLOUD-BASED INTRUSION DETECTION SYSTEM USING EXPLAINABLE AI

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With the rapid adoption of cloud computing and the exponential growth of network traffic, traditional intrusion detection systems (IDS) face limitations in scalability, adaptability, and transparency. Machine learning–based IDS solutions improve detection accuracy but often behave as black-box models, making their decisions difficult to trust in security-critical environments. This paper proposes a Cloud-Based Intrusion Detection System (CB-IDS) integrated with Explainable Artificial Intelligence (XAI) techniques to provide both high detection performance and interpretability. Using the CICIDS2017 dataset, the proposed system employs Random Forest and XGBoost classifiers to detect malicious network traffic and leverages SHAP (SHapley Additive exPlanations) to explain model predictions at both global and local levels. Experimental results demonstrate high accuracy, precision, recall, and F1-score while offering meaningful explanations of detected intrusions, thereby increasing trust and usability of IDS in cloud environments.

459.STORY CRAFTER AI: A GENERATIVE AI STORYTELLING COMPANION

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Recent advances in large language models have significantly improved the fluency and stylistic diversity of AI-generated narratives, leading to increased interest in automated and interactive storytelling systems. Despite these developments, existing AI storytelling approaches continue to face fundamental limitations in maintaining long-form narrative coherence, sup- porting real-time user interaction, and enabling controlled multi-perspective narration. These challenges restrict the ability of current systems to function as effective storytelling companions for immersive and collaborative narrative creation.

This paper presents Story Crafter AI, a conceptual framework for an AI-driven storytelling companion designed to address these limitations. Grounded in a comprehensive review of recent lit- erature (2023–2025), the proposed framework treats storytelling as a structured, multi-stage process rather than a single-step text generation task. Story Crafter AI introduces a modular architecture that integrates narrative planning, memory-aware coherence management, character-centric perspective modeling, and mediated user interaction. By explicitly separating high- level narrative reasoning from surface-level text generation, the framework aims to support coherent long-form storytelling while allowing users to influence narrative development in real time.

Rather than proposing new language models, this work focuses on orchestrating existing large language models through an agent-based and interaction-aware design. A conceptual evalu- ation suggests that the proposed framework offers advantages over existing approaches in terms of adaptability, narrative consistency, and perspective control. This study lays a foundation for future implementation and empirical evaluation of more co-herent, interactive, and character-driven AI storytelling systems.

460.A DUAL-MODE MACHINE LEARNING SYSTEM FOR SHOPLIFTING AND INTRUSION DETECTION IN RETAIL STORES

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Retailers around the world lose a substantial amount of money due to shoplifting, with global estimates exceeding 94 billion dollars each year [26]. However, many small and medium-sized retail businesses find it hard to use modern surveillance solutions that rely on large datasets and intensive deep learning models [21]. To address this issue, this paper presents a dual-mode retail security system. It combines appearance-based recognition and behavior-based analysis, using traditional machine learning techniques that run well on standard computers. The proposed system has three complementary modules. First, an appearance classification uses a Support Vector Machine (SVM) [11] along with HOG [5], LBP [6], and Sobel features for real-time person classification. Second, an intrusion detection module uses Mixture of Gaussians (MOG2) background subtraction and region-of-interest masking to identify unauthorized movement. Finally, a behavior analysis module applies multi-object tracking [16] and trajectory-level motion heuristics, with a Random Forest model [12], to classify and detect unusual movement patterns. Experimental results on real retail surveillance video demonstrate the robustness of the system to detect shoplifting behavior. It reaches an 88% accuracy with balanced precision and recall for appearance-based classification, as well as an 83% accuracy with a ROC AUC of 0.86 for behavior analysis. End-to-end test on sequences of videos leads to an overall detection at video level rated 80%, with a precision of 67% in alert and 20% in false-alarm. Performing cross validation on the datasets, the appearance classification algorithm performed at an average accuracy of 86 ± 4%, and the behavioral classification algorithm performed at an average accuracy of 82 ± 5%. Additionally, the system performed at 21.7 frames per second, indicating that the system can perform in real-time.

461.Machine Learning-Assisted Passive Cell Balancing Performance Under Variable Charging Rates

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Cell voltage imbalance is a common issue in series- connected lithium-ion battery packs and can adversely affect performance and lifetime. Passive cell balancing is widely used in battery management systems (BMS), but its effectiveness under different charging conditions remains unclear. This work evalu- ates passive cell balancing using a three-cell lithium-ion battery pack modelled with a 3RC equivalent circuit and compares no balancing, rule-based balancing, and machine learning-based balancing strategies across charging C-rates from 0.2C to 3C with multiple initial imbalance levels and resistor configurations. Simulation results show that effective imbalance correction oc- curs primarily at low to moderate C-rates (0.5C and 1C), where passive balancing leads to sustained reduction in voltage spread below 15 mV threshold. At higher C-rates (2C and 3C), voltage convergence occurs independently of balancing action, indicat- ing that charging dynamics dominate cell behaviour and limit the contribution of passive balancing.A simple backpropagation neural network proves sufficient for threshold-based activation decisions, achieving $R^2 = 0.9936$ compared to negative R^2 values from LSTM and GRU networks. This confirms that balancing decisions are predominantly static and threshold-driven, requir- ing no temporal modeling. The ML approach optimises selective activation of bleed resistors, utilizing a parallel 15 Ω 30 Ω configuration to balance speed and energy efficiency. The study emphasises the importance of distinguishing voltage convergence from true imbalance correction and provides practical guidance for condition-aware balancing strategies in electric vehicle (EV) BMS design.

462.AI INTEGRATED NOISE COMPRESSION DEVICE

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In many applications, including telephony, music playback, and assisted hearing devices, ambient noise significantly affects audio quality. Traditional noise cancellation techniques either completely eliminate noise or require complex filtering procedures that may distort the primary signals. This study presents an AI-integrated noise reduction device that selectively reduces background noise while preserving important audio elements. The system uses Bluetooth connectivity, real-time machine learning algorithms, and an ESP32 microcontroller to process and transmit better audio signals. Unlike traditional noise cancellation, which muffles all background sounds, this technique compresses high-range noise levels (90 dB to 40 dB) into an audible but non-intrusive range, ensuring a natural listening experience. The primary innovation is the AI-driven adaptive noise compression method, which dynamically separates voice signals from background noise. This method enables effective noise control in a number of contexts, such as public spaces, industrial sites, and personal audio applications. The device's ergonomic, 3D-printed earphone housing makes it both portable and energy-efficient. Audacity-based trial results, which show a significant improvement in audio clarity and noise reduction without compromising speech intelligibility, validate the system's efficacy. This invention provides an affordable, low-power, real-time noise compression system in response to the increasing need for intelligent audio enhancement solutions. Future improvements include expanding into healthcare applications like treatment devices and hearing aids, improving the AI model for better noise classification, and integrating with the Internet of Things for remote control.

463.GREEN CLOUD COMPUTING: AI-DRIVEN CARBON-AWARE ENERGY OPTIMIZATION IN DATA CENTERS

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It has become imperative for cloud workload optimization to be carbon-aware, as the rising energy demand of modern cloud data centers has increased carbon emissions. However, existing scheduling mechanisms cannot model workload dynamics, carbon-intensity fluctuations, and energyefficiency constraints simultaneously and hence arrive at a suboptimal solution. In this paper, we present CARBON-AI, a hybrid forecasting-reinforcement learning-based framework that minimizes carbon-intensive energy consumption while preserving service performance. Our CARBON-AI designs integrate a multi-task Temporal Convolution NetworkBiLSTM forecasting module with an A2C scheduling agent, trained using the Google 2019 Cluster Workload Traces dataset to predict both workload demand and grid carbon intensity. Experimental evaluations reveal that the proposed model significantly outperforms classical baselines, reaching as high as a reduction of RMSE to 0.093, increasing accuracy to 95.2%, and a decrease in energy usage and CO emissions to 115.3 kWh and 74.6 kg, respectively. Ablation studies confirm that forecasting, carbon-aware decision logic, and consolidation mechanisms are all integral parts in developing optimal efficiency. This work presents a unified, adaptive, and practical AI-driven solution that significantly enhances carbon-aware energy optimization in next-generation green cloud computing environments.

464.A COMPREHENSIVE REVIEW ON SMART MANAGEMENT SYSTEM FOR MAHAKUMBH 2027

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As the size of public events like Maha Kumbh 2027 is exceeding, the traditional techniques of crowd management are not efficient to ensure the safety, navigation, and real-time decision-making. This paper proposes a Smart Management System that integrates state-of-the-art GIS and computer vision technologies to effectively manage huge gatherings. Using Yolov8 for object detection, CSRNet for density estimation, and DeepSORT for tracking, the proposed framework incorporates a multi-model detection pipeline into a zone-based monitoring system Heatmaps, alerts, and safe route planning are all made possible by a GIS-based module that processes real-time detections. The system also supports offline maps using IndexedDB caching and MBTiles ensuring the continuous operation even in low-network environment. The proposed model aims to enhance the safety of pilgrims, reduce the traffic hazards and boost situational awareness during significant religious events like Maha Kumbh 2027 by combining Intelligent video analytics with spatial data processing.

465.A REVIEW ON EPILEPSY SEIZURE DISEASE DETECTION AND PREDICTION USING EEG SIGNALS WITH HYBRID KNN-CNN MODEL

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Epilepsy is a brain disease in which sudden seizures will occur, it is very hard to predict when the seizures will occur. EEG signals are utilized to gain an understanding of brain activities, it is easy to study seizures from these signals. As it is very hard to check these signals manually because it takes a lot of time and there might be some mistakes. Due to such reason researchers use machine learning and deep learning methods to check these signals for seizures detection and prediction. In this report we discussed 18 of our research works which are survey papers and reference papers of these works. These papers revealed that classical methods like KNN have a high level of simplicity, but their accuracy is low. Deep learning methods like CNN and LSTM are giving better accuracy but for this we need a lot of data and computation power. Another drawback of these methods are that the models work only on a specific dataset and it is very hard to explain about these models to doctors.In order to overcome these challenges the approach propose a hybrid model based on KNN and CNN. The model KNN is applied on statistical features and CNN is applied on spectrogram images. The output of both will be combined to give the final output. The approach expect that the accuracy of this model will be around 98-99% and this model will be lighter than deep CNN models. The use of a hybrid model in our work has demonstrated the ability to achieve a balance between accuracy, efficiency, and interpretability, which will benefit doctors.

466.AN IOT INTEGRATED SYSTEM FOR GENERATING ELECTRICAL ENERGY FROM DOWNWARD MOVING ESCALATORS

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Escalators are very common in our circumstances but they often lack potential energy especially from moving downward. This project suggests to integrate Internet Of Things in-order to regenerate the potential energy. It basically converts the kinetic energy obtained from the descending escalators into electrical energy with a gear driven DC generator. The collected electrical energy can be stored in rechargeable batteries and it can be utilized for varied systems like lighting etc. IOT sensors are embedded to monitor load, speed and energy output in real

time, which helps us to track the performance and ensure safety. Safety features includes automatic braking and emergency detention which increases the reliability. This project literally promotes sustainable energy use in urban settings along with the amalgamation of mechatronics and IOT for the smart urban settings.

467.CROSS-MODAL TRANSFORMER NETWORKS FOR EXPLAINABLE DEEPFAKE VIDEO DETECTION IN SOCIAL MEDIA SECURITY

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In recent years Deepfake technology has developed significantly. The advanced deep learning models are producing highly realistic fake videos, audios and facial expressions. These manufactured media items were brought into question the trustworthiness over digital platforms regarding public safety as well as truthfulness all over the platforms. Detecting that kind of fabricated materials many of the techniques were existed, and the task ended with one type of data, visual , audio, that makes low effective over HD deepfake which matches to the personality, giving back the normal face structure as well as closely mimic people voice.
To solve this task we propose CMT-Net, which is a unique and multimodal deepfake identification technique. It analyze audio as well as video information with the help of transformer depended structure. One of the technique is it captures various images, textable mistakes which depends on Wav2Vec2.0, that analyze the basic voice as well as signal with their strength. A hybrid mechanism which combines the characteristics which improves the quality among textual and facial expressions, audio quality like voice mismatch will be the one of the major advancement in identifying deepfake.
Another key feature of CMT-Net is its explainability. Its heat map visualizations enable through Grad-CAM; it provides the clear indications of which facial regions have been manipulated. By this feature, the model will be more transparent, interpretable, and trust worthy for forensic applications. This framework will be designed to suit for real-world applications.
In the recent experiments it is revealed that CMT-Net has higher accuracy and better robustness on benchmark datasets FACEForensics++ and FakeAVCeleb while compared to using single type of data. So, this proposed framework helps with digital forensics tasks and also advancing deep fake detection by identifying audio-visual mismatches with the comprehensible results.

468.A BIBLIOMETRIC ANALYSIS FOR GETTING AN INSIGHT ON CLOUD COMPUTING IN IIOT: BLUEPRINT FOR FUTUSTIC RESEARCH IN INDIA

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This paper presents a thorough bibliometric study of cloud computing research in the context of IIoT applications, framed within the larger Industry 4.0 paradigm. Cloud computing is described as a key enabling technology for scalable computation, efficient data management, and collaborative industrial intelligence in the Industrial Internet of Things. In light of the rapidly increasing number of interconnected smart manufacturing systems, it is necessary to clarify the trends, contributions, and collaboration patterns in this area. The study relies on publications indexed in the Scopus® and Web of Science® databases between 2015 and 2025. After removing the duplicate and retracted publications, 3,205 unique documents were left for analysis, using the Bibliometrix package in RStudio®. The research work explores publication trends, document types, citation patterns, top authors, top countries, institutional contributions, and global collaboration networks. The outcome of the study shows the annual growth rate in this field, with major contributions from China, the United States of America, and India, and an increasing level of global collaboration. The study also outlines the major trends and gaps in this area of research.

469.MARKET ANALYSIS OF INVESTORS: ANALYSIS THROUGH MACHINE LEARNING

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The complexity and growth of financial markets and the increasing diversity of investors have presented a demand for market analysis based on data, with intelligent data-driven approaches to market analysis. Different conventional techniques of analysis are usually ineffective to include the nonlinearity between financial performance indicators and behavioural features of the performance of investors. This paper will address a machine-learning-based system to understand investor market behaviour and categorize investor performance by a structured set of 6, 000 investor records with demographic, financial, and behavioural data. The main characteristics are age, annual income, size of investment, its past return percentage, diversification of the given portfolio, type of investor and risk profile. Four controlled machine learning classifiers used include Logistic Regression, Decision Tree, random Forest and grade boosting which were implemented and tested to classify investor performance based on the high, moderate, and low return. The findings of the experiment indicate that Logistic Regression excelled the highest classification (99 percent) which was followed by Gradient Boosting (95.08 percent), Random Forest (94.17 percent) and Decision Tree (88.67 percent). That analysis also determined the high level of discrimination of the Logistic Regression and Gradient Boosting as they achieved close to perfect scores of nearly 1.00. The results indicate the efficiency of the combination of financial and behavioural characteristics towards predicting investor performance and prove the efficiency of ensemble and linear models as algorithms to deal with complex investor data. The suggested framework can give investors, financial analysts, and decision-makers a lot of insights because it allows classifying performance correctly and then makes informed investment decisions.

470.HYPERLOCAL FASHION MARKETPLACE AI:
A SURVEY ON ARTIFICIAL INTELLIGENCE TECHNIQUES FOR UPLIFTING LOCAL CLOTHING VENDORS, REAL-TIME MARKETPLACE MANAGEMENT AND OPEN CHALLENGES

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The rapid growth of digital commerce has transformed the fashion retail ecosystem. However, small and local clothing vendors such as tailors, boutique owners and neighbourhood garment sellers continue to face limited digital visibility, poor online reach and lack of real-time operational support. Most existing fashion e-commerce platforms primarily focus on large brands and centralized sellers, which restricts the participation of small clothing businesses.

The concept of hyperlocal fashion marketplace ai focuses exclusively on the local clothes market and aims to uplift local clothing vendors by enabling real-time selling, intelligent customer discovery and vendor-centric operational management. This survey reviews recent research on artificial intelligence techniques applicable to hyperlocal clothing marketplaces, with a specific emphasis on vendor empowerment and real-time management systems. The study analyses advances in clothing recommendation, location-aware personalization, computer vision based clothing search and localized demand forecasting. In addition, the survey identifies key limitations and open challenges faced by such platforms.

471.SMART WIRELESS SYSTEM FOR MONITORING AND COMMUNICATION OF CONSTRUCTION MACHINERY

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The smooth functioning of the construction projects highly depends on the reliability of the heavy machinery. In many construction sites, maintenance activities are still executed either after a breakdown occurs or at fixed intervals, which in many cases does not identify internal issues at an early stage. Such practices result in unexpected equipment failure, increased downtime, and increased maintenance costs. This paper introduces a smart wireless monitoring and communication system for continuous observation of the working condition of construction machinery. Sensor nodes are installed directly on machines and are used to measure important parameters such as temperature, vibration, pressure, fuel level, and location. The data collected is sent wirelessly to a cloud platform where the data is stored and analyzed. Machine learning techniques are used to detect abnormal patterns in the sensor data and to predict potential equipment failures before they happen. A centralized web-based dashboard allows for real-time visualization of machine health and location to make timely maintenance decisions. Experimental results show that the proposed system improves the reliability of equipment, reduces the occurrence of unexpected breakdowns and supports condition-based maintenance, which is suitable for large-scale construction site management.

472.Text-to-SQL for Enterprise Data Analytics: A knowledge Graph and Agent-Based Approach

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Recent advances in large language models (LLMs) have significantly improved performance on Text-to-SQL benchmarks. However, deploying these systems in real-world enterprise environments remains challenging due to large and evolving schemas, domain-specific semantics, and the need for high reliability. This paper presents the design and implementation of an enterprise Text-to-SQL chatbot that enables non-technical users to self-serve data insights from a large, dynamic data lake. Our system integrates a continuously updated knowledge graph, a multi-stage Text-to-SQL agent with automatic error correction, and an interactive chatbot interface. Experimental evaluation and expert review demonstrate that the proposed approach improves semantic understanding, reduces hallucinations, and delivers practical value in enterprise data analytics workflows.

473.AI –ENHANCED MARITIME MONITORING AND PREDICTIVE SAFETY ALERTS

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Coastal countries must prioritize maritime security because of the many threats posed by smuggling, unlawful border crossings, and environmental dangers. When it comes to accurately tracking large maritime boundaries in real time and anticipating possible security breaches, traditional surveillance techniques are limited. Furthermore, because they have less access to timely information, fishermen working in these locations are frequently at risk from things like bad weather and maritime hazards. Therefore, for maritime authorities and stakeholders to improve border monitoring, communication, and coordination, creative technological solutions are desperately needed. The project's goal is to create a solution that addresses the drawbacks of conventional border monitoring systems in response to these difficulties

474.EVALUATING AI MODELS FOR ROTATING MACHINERY FAULT DETECTION USING MULTI-CRITERIA DECISION MAKING

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Rotating machinery is the essential component of the many industrial processes, and early detection of faults is required for minimizing downtime and maintenance costs. Artificial intelligence (AI) models provide diagnostic capabilities by using complex vibration signal patterns that correlate with distinct fault signatures. However, selecting an appropriate AI model remains a challenge due to inconsistent performance reporting, mixed evaluation metrics, and deployment constraints. This paper introduces a Multi-Criteria Decision Making (MCDM) framework that evaluates AI models using seven criteria related to accuracy, diagnostic consistency, computational efficiency, and robustness. The framework assigns weights to criteria based on industrial priorities and ranks AI models using normalized performance values. Additionally, sensitivity analysis is conducted to assess ranking stability under changes in weights of the criteria. Results indicate that ANFIS, DBN, AE, LSTM, and Fuzzy Logic consistently outperform alternative approaches in achieving balanced diagnostic performance.

475.HYBRID VISION SYSTEM FOR TRUCK LOAD ESTIMATION AND GATE AUTOMATION

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In logistics, mining, and construction fields, truck load monitoring is given high priorities because overloading may lead to safety risks, damage to the infrastructure, and breaches of regulations. Traditional practice The most common ways of measuring loads include weighbridges or sensor-based measurements. Although these are acceptable, these methods are not suitable in flexible or high throughput industrial with fixed installations, frequent maintenance, and vehicle halt.

The system initially identifies the truck loading area with the help of an object detection model based on YOLOv8 and then removes it in the form of a region of interest. Another YOLOv8 object detection model to give the material and identifies the material in the region of interest. After identifying the material, the density of the identified material is obtained by using stored value. The relative depth information is then generated and a monocular depth estimation is applied on the image. Load height is calculated with references to relative depth disparities among structural reference areas, e.g. the ground. Lastly, the volume of the load is estimated by the pixel-area analysis method, according to which the volume of the load is determined through the geometric relationship.

All the computation is performed by the BeagleY-ai edge device itself to prevent the reliance on the cloud computing. In experimental testing, depth-based height estimation and uniform detection results were realized in controlled environments, which implies that the suggested strategy is a feasible and low-cost alternative to the current truck load estimation system.

476.AI –DRIVEN SYSTEM FOR DOCUMENT SUMMARIZATION AND QUIZ GENERATION

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The rapidly expanding digital information has made it difficult for learners, teachers, and researchers to store and retrieve important information. This is the point of the current paper which puts forward a single system integrating three main operations of Natural Language Processing (NLP): document summarization, question generation, and text, to, audio conversion. Initially, the system, employs transformer, based abstractive summarization techniques to convert long documents into short summaries of the documents. The system also,

by using the summary content, generates quizzes for the purpose of active recall and knowledge testing. Output is then converted to audio through the assistance of neural text-to-speech models to make it more accessible, particularly to the visually impaired and sound learners. Experimental testing shows the system has a substantial ability to alleviate information overload, generates pedagogically pertinent quizzes, and provides natural-sounding audio, thus facilitating contemporary e-learning systems and accessibility tools.

477.EMOCNN-4: A DEEP LEARNING FRAMEWORK FOR REAL-TIME STUDENT ENGAGEMENT ANALYSIS

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Student engagement is a key determinant of learning effectiveness, yet traditional assessment methods are often subjective and labor-intensive. This paper presents a real-time automated Student Engagement System that integrates facial emotion recognition, eye-tracking–based attentiveness detection, and face validation within a secure web-based analytics platform. A custom convolutional neural network, EmoCNN-4, is trained on four engagement-related classes—happy, neutral, sad, and surprise—selected from the FER2013 dataset, comprising 18,976 images augmented to enhance robustness. EmoCNN-4 achieves a test accuracy of 78.47%, with high precision for engagement-indicative emotions. Haar-cascade–based eye tracking monitors eye presence and gaze consistency to determine attentiveness. The system includes a face validation mechanism that ensures only authenticated users are analyzed, preventing unauthorized individuals from affecting engagement metrics. Live video analysis, session-wise engagement scoring, and emotion distribution visualization are supported, with persistent metrics capturing total, attentive, and distracted durations per session. Administrative dashboards enable performance monitoring and data-driven insights. Real-time deployment demonstrates accurate detection of attentive and distracted states, reliable emotion recognition, and secure user validation, validating the framework's capability to provide interpretable, scalable, and secure engagement analysis for intelligent educational environments.

478.EMOCHAT: A MENTAL HEALTH ANALYSIS ASSISTANT

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In this project, a web-based application was implemented that employs sentiment analysis, stress prediction, and artificial intelligence (AI) based chat assistant to assist student mental health. Our system is created using Python and Flask framework and allows users to analyze their emotional state and receive emotional feedback conversationally. VADER NLTK sentiment analyzer is applied to identify sentiment (positive, negative, or neutral) given by the user sentence and the Decision Tree model is implemented to either find the stress level (No Stress or Moderate and High) of the user based on a short questionnaire. Empathy-based reactions: The TinyLLaMA-based integrated Chatbot, run on Ollama API, offers empathetic and pertinent answers in regard to the emotions of the users. Moreover, the platform offers the students a digital platform where they can safely and supportively express concerns about their mental health and request assistance before it is too late. It cannot replace professional counselling, but it raises awareness and makes people think of themselves. It demonstrates the ways in which technology can be employed to enhance mental health by applying natural language

processing and machine learning. Accessible and lightweight, easily scalable to meet the needs of diverse students and integrate innovativeness and empathy to offer proactive emotional support.

479.SMART BATTERY MANAGEMENT SYSTEM WITH CHARGING POINT RECOGNITION

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Electric bikes are gaining popularity as a sustainable mode of transport, but riders often face uncertainty about how far their bike can travel before the battery runs out. Most EV bikes only display the percentage of charge left, which does not consider real conditions such as traffic, road type, or riding speed. This leads to “range anxiety,” where riders fear being stranded without power. To address this issue, we propose a Smart Battery Management System (BMS) with Charging Point Recognition. The system continuously monitors the State of Charge (SoC) and predicts the actual distance the bike can travel under current conditions. When the battery level is low, it recommends nearby charging stations that can be safely reached and provides route guidance through a mobile or dashboard application. For example, if a bike has only 20% charge, the system will guide the rider to a charging station 2 km away instead of one 6 km away, ensuring safety and convenience. By reducing range anxiety and saving time, this Smart BMS improves the riding experience and encourages wider adoption of electric bikes as part of the transition toward sustainable mobility.

480.MACHINE LEARNING–BASED PREDICTIVE MAINTENANCE SYSTEM USING ESP32 FOR SERVER FAULT DETECTION

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Server infrastructure is prone to failures caused by environmental and electrical anomalies, leading to downtime and operational losses. The proposed solution continuously observes key environmental and electrical factors such as temperature, humidity, voltage, current, smoke, and vibration levels to identify abnormal operating patterns. The sensor readings are processed onboard to generate threshold-level alerts and are simultaneously sent to a Python-based machine learning platform for predictive fault analysis. A Random Forest classifier was trained using labeled experimental sensor data representing normal and faulty operating states. Experimental evaluation using a real-time dataset consisting of approximately 10,000 samples demonstrates that the proposed Random Forest–based model achieves an accuracy of 89%, outperforming conventional threshold-based server monitoring approaches. The system enables early failure prediction and reduces response time in on-premises and private server environments.

481.COMPUTING THE CRITICAL WAVE HEIGHT FROM THE EXPERIMENTS USING ARTIFICIAL NEURAL NETWORK ALONG THE NAGAPATTINAM COAST OF TAMIL NADU, INDIA

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Wave height is the most common parameter observed routinely for understanding the climate. However, critical wave height is very significant in pulling the physical oceanographers to evaluate the turbulence.
Measuring the height under natural conditions that too using altimeter in rough sea conditions is much complicated, expensive and erroneous. The time series data were trained under multi-layer approach. The preliminary data were obtained from the actual measurements and compared with satellite pass. Doing the model, there are multi-way, but on account of the merit ANN was utilized. The results are reflecting the importance of the critical wave heights in such a way without that no redistribution of sediments can take place in the littoral zone. The results (Ave. 1.085 m) critical wave height and (Ave. 1.1332m) wave heights which are noticed to be in close fit to earlier observations and network trainings. In the present approach minimizes human-error.

482.INTELLIGENT BATTERY SAFETY MONITORING IN ELECTRIC VEHICLES USING MACHINE LEARNING-BASED EXPLOSION RISK PREDICTION MODEL AND MITIGATION STRATEGY

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Electric Vehicles (EV) are widely adopted across the world in recent years due to its environmental and sustainable benefits. In spite of these benefits, there exists safety issues related to battery circuits and Battery Management Systems (BMS). This research focuses on solving this problem by developing a machine learning model for early prediction of battery explosion risk. A detailed data visualization and analysis have been conducted and it is found that internal (State of Charge) SoC deviation between battery cells is contributing to thermal instability and eventually thermal run away. A logistic regression model has been developed for prediction of battery explosion conditions and obtained comparatively good accuracy. At the later part of the study, an inductor based multi cell equalization topology is developed which ensures fast equalization of cells compared to conventional passive equalization topologies, thus avoiding the risk of thermal instability and run away.

483.MACHINE LEARNING APPROACHES FOR REAL-TIME CROP HEALTH MONITORING AND DISEASE PREDICTION

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The conventional crop surveillance systems are not very efficient and are time consuming and manual company-labour intensive and can be easily compromised by human errors and mistakes. Late detection of plant diseases, deficiency of nutrients and environmental stresses usually lead to low crop production and wastage of resources like water and fertilizers. In order to overcome these shortcomings, this paper introduces a smart crop monitoring system based on artificial intelligence (AI) which combines Internet of Things (IoT)-based environmental sensing and artificial intelligence-based image analysis in order to provide real-time crop health monitoring services.The proposed system will use various sensors, such as soil moisture, soil pH, temperature, humidity sensor and gas sensor, connected to ESP8266 microcontroller to constantly observe the conditions of the field. Simultaneously, a camera with ESP32-CAM is used to take pictures of crop leaves and the images are processed with a modified Convolutional Neural Network (CNN) to detect early disease and stress. The CatBoost machine learning algorithm is used to process environmental sensor data to determine the fertility of the soil and predict the general condition of the crop. Image-based and sensor-based models are combined to produce a complete Crop Health Index to determine the correct classification of crop health and then make informed decisions.

The findings of the experiment indicate that the presented system is highly accurate in detecting the disease and evaluating the environmental conditions and minimizes the number of people who have to monitor the situation manually. The combination of AI and IoT will allow providing timely irrigation, fertilizer application, and pest management which will lead to the higher efficiency of the resources and agricultural productivity. The system is a low cost and scalable model of precision farming and sustainable agriculture

484.DEVELOPMENT OF AN IOT-INTEGRATED IMAGE PROCESSING SYSTEM FOR AUTOMATIC SILKWORM EGG QUANTIFICATION IN SERICULTURE

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This paper presents the development of an IoT-integrated image pro-cessing system, named Silksage, for automatic quantification of silkworm eggs in sericulture. The system combines a multi-layer sensing and actuation architecture with a dedicated image processing pipeline encompassing preprocessing, deep learning–based segmentation, and automated counting logic. High-resolution im-ages captured by a camera and auxiliary sensors are processed on an embedded platform and transmitted via IoT connectivity for monitoring and decision sup-port. Experimental results show that Silksage achieves egg-counting accuracy greater than 95%, reduces average counting time from about 300 seconds to near-ly 8 seconds per batch, and drastically lowers user effort compared with manual methods. These outcomes demonstrate the potential of Silksage to enhance seed quality assurance, scalability, and transparency in modern sericulture.

485.AI-ENABLED PREDICTIVE ACADEMIC DECISION SUPPORT SYSTEM WITH EXPLAINABLE ANALYTICS AND CONVERSATIONAL INTELLIGENCE

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The rapid advancement of Artificial Intelligence (AI) and Internet of Things (IoT) technologies has significantly transformed modern educational environments by enabling intelligent, data-driven academic monitoring and decision-making. This paper presents an AI-Enabled Predictive Academic Decision Support System (PDSS) that integrates biometric attendance data, behavioral analytics, and academic performance records to support proactive and transparent student performance management. The proposed system leverages IoT-based biometric sensors for real-time data acquisition and employs a hybrid predictive modeling approach combining

ensemble machine learning algorithms—Random Forest and Gradient Boosting—with deep learning techniques using Long Short-Term Memory (LSTM) networks to capture both static and temporal learning patterns.

486.CHATGPT-DRIVEN AI FRAMEWORK FOR AUTOMATED STUDENT PERFORMANCE AND BEHAVIORAL ANALYTICS IN SMART EDUCATIONAL ENVIRONMENTS

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The rapid advancement of Artificial Intelligence (AI) and the Internet of Things (IoT) has enabled the development of smart educational environments that facilitate data-driven decision-making. This paper introduces a ChatGPT-driven AI framework for automated student performance assessment and behavioral analytics in educational settings. The proposed system integrates biometric attendance data, IoT-based classroom sensing, and AI-driven predictive models to analyze student engagement, learning behavior, and academic performance. Machine learning and deep learning algorithms—including Random Forest, Support Vector Machine (SVM), and Long Short-Term Memory (LSTM) networks—are employed to predict academic risk levels, absenteeism patterns, and behavioral deviations.
A key contribution of this research is the integration of ChatGPT as a natural language analytics engine, which translates complex analytical results into human-readable insights and personalized recommendations for teachers, students, and parents. The framework enables real-time academic monitoring and early warning mechanisms to identify at-risk students at an early stage. Explainable AI techniques are incorporated to ensure transparency, interpretability, and trust in predictive decision-making. The proposed system is designed to be scalable and adaptable across diverse educational institutions with minimal infrastructure changes. Furthermore, the framework enhances collaborative decision-making by supporting data-driven communication among educators, administrators, students, and parents.
Experimental evaluation using real classroom data demonstrates improved prediction accuracy, enhanced transparency through Explainable AI (XAI), and increased efficiency in academic monitoring. The framework supports proactive intervention, personalized learning, and intelligent academic management in smart educational ecosystems.

487.GARDENPRO: ADAPTIVE IOT-ENABLED SMART GARDENING SYSTEM WITH ENERGY-EFFICIENT AUTOMATION AND PLANT CARE MANAGEMENT

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GardenPro presents an innovative automated smart gardening and plant care system that integrates a comprehensive set of precision sensors includ-ing soil moisture, ambient temperature, humidity, and light intensity, interfaced with a microcontroller based processing unit designed for real-time environmental monitoring. Utilizing advanced IoT communication protocols optimized for low power consumption and reliable data transmission, GardenPro enables seamless remote control and continuous plant care management. The system employs adap-tive control algorithms that dynamically adjust irrigation schedules in response to real-time sensor data, optimizing water usage and promoting healthier plant growth. The design emphasizes an energy efficient hardware architecture and ro-bust firmware capable of accurate signal acquisition despite noisy

environmental conditions. Experimental evaluation validates the system's enhanced communica-tion reliability and reduced latency compared to traditional threshold based meth-ods, demonstrating substantial resource savings and improved operational effi-ciency. This research contributes to the development of intelligent and scalable environmental sensing and actuation platforms, supporting sustainable urban gar-dening through sophisticated sensing, control, and communication technologies.

488.REAL-TIME HEARTBEAT MONITORING FOR CARDIAC EMERGENCY DETECTION

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Conditions related to the cardiovascular system have become one of the top causes of deaths globally, which accentuates the importance of health monitor systems being in constant use for early detection and prophylactic care. Fast paced lifestyles, stress, physical inactivity, and distance from medical facilities have become important factors leading to the rising cases of health conditions related to the heart. Various health conditions occur without early signs and symptoms, which emphasize the need for long-term health monitoring.
The proposed idea for this project is the development and implementation of an IoT-based wearable health monitoring system with the objective of performing the Real-Time Surveillance of the physiological health of the individual using the vital functions such as Heartbeat, Body Temperature, Level of Stress using the GSR sensor, and Respiratory rate by using the biomedical sensors with the Arduino microcontroller board. The entire process acquires the data and determines the irregular state by comparing the values with the predetermined threshold values.
As soon as the abnormal values are identified, the system helps raise awareness with real-time data visualization and wireless transmission capability using the NodeMCU module. Access to healthcare information is possible remotely with the use of IoT platforms, which helps caregivers and healthcare professionals track the user's health status from a distant area. The proposed system is affordable and can work efficiently in home healthcare, senior care, and remote healthcare supervision. Results have proven reliability, efficiency of the system, which proves applicability of IoT technology in preventive healthcare monitoring.

489.HIGH-EFFICIENCY VLSI ARCHITECTURES AND SYSTEM DESIGNS FOR UHDTV: A COMPREHENSIVE SURVEY

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The emergence of Ultra-High Definition Television (UHDTV) and 8K broadcasting has driven significant advancements in video coding standards and system architectures. This paper presents a comprehensive survey of state-of-the-art VLSI architectures for HEVC/H.265 CABAC encoders and system-level designs for 8K UHDTV broadcast networks. We critically review recent research in highly pipelined and parallel VLSI implementations, focusing on throughput enhancement, latency reduction, and power efficiency. Simultaneously, we analyze broadcast system challenges, including multi-format file preparation, all-IP shallow compression networks, and robustness in real-time switching. The survey synthesizes architectural innovations, system integration strategies, and performance benchmarks, while identifying open research challenges and future directions. This work serves as a reference for researchers and engineers working on next-generation UHDTV technologies.

490.EPILEPTIC SEIZURE DETECTION USING BILSTM AND PCA

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The brain is affected by epilepsy through the presence of random, uncontrolled electrical impulses (seizures) which occur frequently and without warning. The best way to ensure a person's continued health, safety and proper treatment/monitoring is to identify the presence of seizure activity early, especially in remote communities. Electroencephalograms (EEGs) are the most widely used tool for identifying unusual brain activity due to epilepsy; however EEG results can be complicated, high dimensional and often contain background interference. Manual interpretation of EEG data is a laborious task that often requires extensive training. The project described here proposes an automated method to recognise when someone has had a seizure through the use of deep learning techniques involving Bidirectional Long Short Term Memory (BiLSTM) networks and Principal Component Analysis (PCA). Initially the project's EEGs will be prepared and scaled, after which PCA will be performed to reduce the overall dimensionality of the data and extract the crucial data points necessary to provide useful calculations for the training of the deep learning model and improve its ability to learn from experience. The training of the BiLSTM model will occur on these prepared EEG inputs to learn to model temporal relationships of the data going forward (long term learning) and in reverse (short term learning), which, will give the model the ability to generalise the complex patterns between brainwaves and seizures, thus, allowing model to be trained to detect a broader spectrum of seizure types. When compared to conventional machine learning techniques, the suggested PCA–BiLSTM architecture shows a high

classification efficiency in the seizure or non-seizure EEG state. In order to provide the end user with an accurate and user-friendly solution for clinical and remote monitoring
usage, the trained model is implemented as a highly interactive Stream lit web application that enables seizure prediction, visualization, and user interaction capabilities.

491.COMPREHENSIVE LITERATURE REVIEW: MECHANICAL PROPERTY CHARACTERIZATION METHODS FOR AMYGDALOIDAL BASALT

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This comprehensive literature review examines the numerical calibration of rock mass deformability in amygdaloidal basalt formations, with particular emphasis on Indian research contributions and case studies from the Deccan Traps region. Amygdaloidal basalt, characterized by gas-filled cavities (vesicles) later filled with secondary minerals, poses unique geotechnical challenges for underground excavation because of its heterogeneity and reduced mechanical properties relative to massive basalt. Indian researchers have made significant contributions to understanding these formations through integrated approaches combining laboratory testing (uniaxial compressive strength, triaxial compression, and direct shear tests), field characterization (rock mass classification systems including RMR and Q-system, in-situ deformation tests), and advanced numerical modeling techniques (finite element method, discrete element method, synthetic rock mass approaches, and back-analysis).
The most important results showed that through their reduction of rock mass strength and stiffness, amygdales introduce pronounced anisotropy, and change the failure mechanisms from simple brittle fracture to complex mixed-mode failures. Indian case studies from Maharashtra—including the Maroshi-Vakola TBM tunnel beneath Mumbai Airport, Kurduwadi-Latur railway tunnels, and the Sardar Sarovar Dam—demonstrate practical applications of calibration methodologies in Deccan Trap basalts. These projects reveal that amygdaloidal zones require adjusted support designs and careful calibration of deformation modulus through convergence monitoring and back-analysis. The review synthesizes methodological approaches, quantitative findings, and identifies critical knowledge gaps regarding depth-dependent behavior and standardized calibration protocols for Indian basaltic formations.

492.MEDIFUSION: BRIDGING CLINICAL INSIGHTS THROUGH MULTI-MODAL AI

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Cardiovascular diseases (CVDs) continue to pose a major global health challenge, requiring reliable clinical decision support systems capable of integrating heterogeneous diagnostic evidence. While recent artificial intelligence approaches have demonstrated strong performance in cardiovascular assessment, most rely on a single data modality, limiting robustness in real-world clinical settings where multimodal data availability varies. This work proposes MediFusion, a modular multi-modal clinical decision support framework designed for cardiovascular disease detection and severity assessment. The proposed system integrates chest X-ray images, electrocardiogram (ECG) signals, phonocardiogram (PCG) recordings, and structured clinical data using a feature-level late-fusion strategy. Modality-specific encoders are employed, including an EfficientNet-based convolutional network for chest radiographs, CNN–BiLSTM and CNN architectures for ECG and PCG signal modeling, and an XGBoost-based classifier for clinical risk representation. Latent embeddings from each modality are fused through a multi-layer perceptron to generate severity predictions and associated confidence scores. Experimental evaluation on multiple publicly available cardiovascular datasets demonstrates that MediFusion consistently outperforms unimodal baselines, achieving a weighted F1-score of 0.91 with improved abnormal-class recall. Owing to its modular design, the framework supports flexible inference under partial modality availability while enabling modality-wise contribution analysis, highlighting its applicability in real-world clinical environments.

493.OPTIMIZED CERVICAL CANCER DIAGNOSIS USING ENSEMBLE DEEP LEARNING AND VOTING CLASSIFIER MECHANISM

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At the localities where no contemporary medical centers are available, it is essential to detect cervical cancer early to prevent it besides saving lives. Deep learning algorithms have been demonstrated to be encouraging in the sphere of medical image analysis to conduct automatic medical diagnosis. The researchers in this paper come up with deep learning and ensemble learning models that assist in enhancing cervical cancer classification. In the categorization of the malignancy, the authors used CNN, DenseNet and Xception to extract low and high level out of cervical pictures. This was followed by training these images to SVM, KNN, Bayesian Network, Decision Tree and Multilayer Perceptron classifier. In order to make it more general and sound, this paper will employ a methodology of ensemble learning that will be carried out by weighting the prediction of multiple underlying classifiers with a Voting Classifier. The enhancement in the diagnostic reliability and classification accuracy of the individual classifiers is anticipated to be increased through ensemble learning as it reduces bias and variation of classifiers. It is experimentally demonstrated that the ensemble-based system is richer in accuracy and consistency in predicting various samples than the individual classifiers. The framework will expedite the diagnostic and treatment planning since it will offer a quick and easy decision support system to the medical staff. The suggested solution will result in the reduction of a large number of cases and deaths of the poor of cervical cancer due to the large-scale screening.

494.AN AI-POWERED RAG-DRIVEN PLATFORM FOR HYPERLOCAL MARKET INTELLIGENCE IN INDIAN SMBS

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Artificial Intelligence (AI) has emerged as a transformative force in enabling data-driven decision-making for Small and Medium Enterprises (SMEs). Despite its potential to enhance productivity, forecasting and operational efficiency, SMEs face barriers such as infrastructure limitations, lack of technical expertise and high implementation costs.

This paper proposes an AI-powered business location decision support system that integrates geospatial analytics, competitor intelligence, demographic assessment and Large Language Model (LLM)-based strategic insight generation. The system employs Retrieval-Augmented Generation (RAG), review compression and feature-engineered scoring to evaluate business feasibility and recommend actionable strategies. Experimental evaluation demonstrates that AI-driven analytics significantly improve evidence-based planning, competitiveness and sustainability in SME ecosystems.

495.DECENTRALIZED BLOCKCHAIN-BASED MEDICAL RECORD STORAGE AND TRACKING SYSTEM

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Securing the management of medical records is a difficult task, as information systems frequently lack preventative elements such as data loss prevention tools, deduplication techniques and instead patients are usually unaware about where their data flows. In the current state of affairs, medical data is frequently held by hospitals or third parties, and it can be challenging for patients to be their own source and distributor of health records in a secure manner. This paper proposes to create a decentralized records history and file-exchange system based on an anonymous P2P network, a medical blockchain, a way to hide patient identity from parties involved in the exchange of encrypted personal data. General user, hospital and administrative information is stored in a regular database as well. With this method, patients and hospitals can easily and safely store their medical data in order to access or share it. This model will improve healthcare decision making, simplify administrative burden and ensure a stable long-term medical record repository.

496.JOB RADAR: A REAL-TIME LOCATION-AWARE JOB DISCOVERY AND SKILL MATCHING SYSTEM

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The rapid growth of digital hiring platforms has expanded employment opportunities across corporate portals, recruitment systems, and local job networks. Despite this ex- pansion, job discovery remains fragmented due to

delayed listing updates, separation between local and professional opportunities, and limitations of keyword-based matching approaches.

This paper proposes Job Radar, a real-time, location-aware job discovery and skill-matching framework that unifies micro-level local jobs and professional IT positions within a single interactive map-based interface. The system integrates GPS-based geolo- cation, GIS-enabled spatial querying through PostGIS, natural language processing (NLP) techniques for skill extraction and matching, and WebSocket-based real-time communication for dynamic updates.

In contrast to conventional job portals that rely on static data retrieval mechanisms, the proposed framework supports proximity-aware job visualization and relevance-driven recom- mendations based on spatial distance and extracted skill similar- ity. The architecture is implemented using FastAPI for backend services, PostgreSQL with PostGIS for spatial data management, and a React-based frontend for interactive user visualization.

Experimental evaluation indicates reduced search latency and improved recommendation relevance compared to traditional keyword-based retrieval methods. The results demonstrate the scalability and extensibility of the proposed framework for modern real-time recruitment ecosystems.

497. AN AI-BASED CHATBOT FOR EARLY MENTAL HEALTH RISK SCREENING

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Mental health disorders often remain undetected due to social stigma, lack of awareness, and limited access to mental healthcare professionals. This paper presents the design and development of an AI-based conversational chatbot for early mental health risk screening and supportive guidance. Natural language processing techniques were employed to preprocess user input, while machine learning models were utilized to classify responses into different mental health risk levels. The proposed system provides preliminary assessment and psychoeducational support without performing medical diagnosis or treatment. Experimental evaluation on sample datasets demonstrated satisfactory classification performance, indicating the feasibility of the proposed approach. The system aims to assist in early intervention and mental health awareness.

498.HYBRID CLASSICAL-QUANTUM MACHINE LEARNING FOR LUNG DISEASE DETECTION AND PNEUMONIA SEVERITY CLASSIFICATION

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Lung diseases such as pneumonia, tuberculosis, and COVID-19 continue to pose a serious threat to global public health, and chest X-ray imaging remains one of the most widely used diagnostic tools due to its accessibility and cost-effectiveness; however, manual interpretation is time-consuming and subject to inter-observer variability among radiologists. Although deep learning models have shown promising performance in automat- ing chest X-ray analysis, most existing approaches are limited to binary classification and fail to effectively address multi-disease differentiation and pneumonia severity assessment. In this work, a hybrid classical–quantum machine learning framework is proposed for automated lung disease detection and pneumonia severity classification using chest X-ray images through a two- stage architecture. In the first stage, a hybrid model integrating EfficientNet-B0 with a Variational Quantum Circuit (VQC) is employed to classify chest X-ray images into five categories - Normal, Viral Pneumonia, Bacterial Pneumonia, Tuberculosis, and COVID-19 - achieving an overall classification accuracy of 95%. In the second stage, pneumonia-positive cases are further analyzed using a hybrid classical-quantum severity classification model to categorize severity levels into Mild, Moderate, and Severe, attaining an accuracy of 93.8%. The experimental results demonstrate that quantum-enhanced feature transformation im- proves classification performance and generalization, highlighting the effectiveness and practical potential of hybrid classical- quantum learning frameworks for advanced medical image analysis and clinical decision support systems.

499.YOLO-BASED DETECTION, LOCALIZATION, AND CLASSIFICATION OF KIDNEY STONES FROM CT SCAN IMAGES

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Introduction Kidney stone disease is a common urological disease that may cause debilitating pain and cause a life-threatening systemic complication when diagnosed at an advanced stage. Computed tomography (CT) is the most preferable examination in the diagnosis of kidney stones due to its sensitivity, specificity and the ability to show anatomical features. Nevertheless, the process of evaluation of CT images through manual evaluation is time-consuming and depends on radiologists experience. The current paper introduces an idea of detection, segmentation and classification of kidney stone based on a single 2 D image by incorporating deep learning (Convolutional Neural Network) and image processing techniques. It uses a YOLO-based detection model to obtain the possible regions of stones and then performs an adaptive segmentation with the Otsu threshold method and the morphological operations. The identified stones are further analysed to determine the size of those stones using equivalent diameter and also pixel calibration and transformed to a clinically useful unit. In addition, the structure assigns to stones an anatomical location and subdivides stones based on size groups of clinical relevance. The experimental findings depict the ability of the system to achieve kidney stones detection and analysis with less manual overhead. The model suggestion enables creation of an effective and powerful predictive decision-support system to be applied in medical diagnosis.