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EMPIRICAL INVESTIGATION OF SOCIAL MEDIA DATA USING SENTIMENT ANALYSIS

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Abstract

In the recent days, with the explosive growth of social media platforms like Twitter and Instagram, user-generated content has become a vital source for gauging public opinion.This empirical investigation aims to develop a sentiment analysis model to classify the topic of interest into positive, negative, and neutral categories. The methodology involves collecting raw data from the social media portal of interest followed by rigorous preprocessing steps including tokenization, stop-word removal, and stemming to handle the noise and informal nature of social media text. We have compared various Machine Learning models, specifically using Word Embeddings for feature extraction with sample results. Our results show that the accuracy of various models like BERT, SVM, CNN-RNN and XGBoost. This research highlights the efficacy of automated sentiment analysis in providing real-time insights for business strategy and market research.

Keywords : Tokenization, Twitter, Instagram, BERT, SVM, CNN-RNN and XGBoost

MACHINE LEARNING MODELS FOR THE PREDICTION OF HIGH-RISK SENSITIVE RECORDS: COMPARATIVE STUDY & PERFORMANCE ANALYSIS

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Abstract

Big data has revolutionized the way health risks are identified and evaluated in healthcare. It efficiently processes and analyzes clinical data with exceptional speed and precision. It facilitates the collection and analysis of extensive, heterogeneous datasets such as electronic health records (EHRs).ML models analyze complex healthcare data to identify high-risk patients and the most influential features for early and prioritized diagnosis. It facilitates timely intervention in potential health emergencies by collecting and analyzing raw data from sources such as electronic health records and wearable monitoring devices. The increasing demand for advanced clinical data analytics highlights the importance of leveraging enhanced big data techniques and validated algorithms to accurately detect high-risk cases and improve risk prediction across diverse clinical settings. This enhancement integrates diverse Machine Learning (ML) models including Naive Bayes, K-Nearest Neighbors, Decision trees, Logistic Regression, Random Forest, Neural Networks and Stochastic Gradient Descent to optimize healthcare data interpretation. Consequently, the proposed approach outperforms other methods in terms of classification metrics, including precision, recall, and F1-score with a reduced error rate.

Keywords : Big Data, Healthcare, Machine Learning, Electronic Health Records, High-Risk.

BLOCKCHAIN-BASED TOKENIZATION OF SOIL-HEALTH DATA FOR SECURE PRECISION AGRICULTURE

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Abstract

Precision agriculture increasingly depends on reliable soil-health data to support informed decision-making and sustainable farming. Although IoT-based soil monitoring systems enable continuous data collection, most existing solutions rely on centralized storage, leading to challenges such as data tampering, lack of transparency, and absence of farmer-centric data ownership. To address these issues, this paper proposes a blockchain-based soil-health data tokenization framework for precision agriculture. In the proposed approach, real-time soil parameters including moisture, temperature, pH, and nutrient indicators are collected using IoT sensors and validated at a backend server. Each validated soil-health record is tokenized using blockchain smart contracts, ensuring immutability, traceability, and secure ownership. Tokenization enables farmers to maintain control over their soil data while allowing permission-based sharing with agricultural experts and service providers. Extensive experimental analysis demonstrates stable sensor performance, efficient token creation, minimal latency, and strong data integrity guarantees. The proposed system enhances trust, transparency, and security in precision agriculture and establishes a foundation for future decentralized agricultural data ecosystems.

Keywords: Precision agriculture, soil-health monitoring, blockchain, data tokenization, smart contracts, IoT security

A COMPREHENSIVE SURVEY OF ASSISTIVE TECHNOLOGIES FOR PEOPLE WITH HEARING IMPAIRMENT: TAXONOMY, DATASETS, METHODS, CHALLENGES, AND FUTURE DIRECTIONS

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Abstract

Hearing impairment is one of the most prevalent sensory disabilities worldwide, affecting an estimated 1.5 billion people and expected to rise to 2.5 billion by 2050. Advances in signal processing, machine learning, and wearable computing have transformed the landscape of assistive technologies designed for individuals with hearing loss. Modern systems go beyond traditional amplification to include adaptive digital hearing aids, cochlear implants with noise-resistant coding strategies, real-time automatic speech recognition (ASR) captioning, sign language recognition and translation, and haptic feedback devices for environmental awareness. This survey provides a structured and technically detailed review of these systems, covering both foundational and emerging approaches. The discussion begins with a taxonomy of hardware-based and software-driven solutions, followed by an in-depth examination of datasets, algorithms, and evaluation protocols. Special emphasis is placed on the integration of deep neural networks into low-latency pipelines, multimodal fusion techniques, and AR-based caption delivery. The paper identifies persistent challenges—such as dataset diversity, real-time processing constraints, and high costs—that limit widespread adoption. Finally, research gaps are translated into actionable future directions, establishing a foundation for a subsequent empirical analysis paper aimed at benchmarking leading hearing-assistive technologies under standardized conditions.

Keywords

Hearing impairment; assistive technology; speech enhancement; automatic speech recognition; sign language recognition; cochlear implants; haptic feedback; accessibility platforms; datasets; evaluation metrics.

SYSTEMATIC FRAMEWORK FOR STRUCTURED DOCUMENT CLASSIFICATION AND DECISION SUPPORT SYSTEMS LEVERAGING QUESTION PAPER–SYLLABUS, TEXT BOOK ALIGNMENT DATASETS

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Abstract

The rapid expansion of digital academic content such as textbooks, syllabi, and question papers has created a need for automated systems that can accurately classify exam questions according to subject and syllabus unit and identify the associated page number from the textbook. This paper proposes a novel Syllabus Question Mapping (SQM) filtering model integrated with a Bag-of-Words (BoW) representation and Naïve Bayes classification to identify the appropriate and unit for a given question . Questions are first extracted from documents of any file format. Then in the SQM filtering stage, keywords are extracted from headings, syllabus units, and textbook content to construct a curated dictionary of unit-wise keywords. The SQM filter performs direct keyword matching to identify relevant candidate units by measuring keyword overlap between unit content and the given question. The filtered keyword set is then used to train a Naïve Bayes classifier, which performs probabilistic classification to predict the most appropriate subject and unit label. If no valid match is found, the question is classified as "Out of Syllabus." The proposed approach is computationally light, easy to interpret, and suitable for academic environments with limited training data. Experimental evaluation across multiple subjects shows that the SQM-Naïve Bayes framework consistently outperforms traditional classifiers such as Logistic Regression, SVM, and KNN, achieving classification accuracy between 98% and 100%. Beyond academia, the SQM-based framework can be extended for structured document classification and section mapping across domains such as banking, healthcare, libraries, recruitment, and human resource management. These results demonstrate that the proposed system is a reliable and efficient solution for automated academic question classification and syllabus mapping.

Keywords: Syllabus, Question, Classification, Naïve Bayes, BoW

GUI TESTING STRATEGIES FOR RESPONSIVE WEB APPLICATIONS

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Abstract

Responsive Web Applications (RWAs) dynamically adapt to varying screen sizes, resolutions, and devices to provide a consistent and optimal user experience. While responsive design improves accessibility and usability, it also significantly increases the complexity of Graphical User Interface (GUI) testing. Ensuring that interface elements, layouts, and interactive components function correctly across multiple browsers, devices, and screen resolutions presents significant challenges for software testers.

This paper presents a comprehensive study of GUI testing strategies for responsive web applications, including cross-browser and cross-device testing, breakpoint validation, automation techniques, visual regression testing, and accessibility validation. A structured methodology is proposed to systematically evaluate the responsiveness, usability, and functional correctness of web interfaces. The paper also includes an experimental evaluation conducted on a sample responsive e-commerce application, highlighting the effectiveness of combining manual and automated testing approaches.

Moreover, the study addresses the challenges of testing dynamic content, frequent UI updates, and maintaining test scripts over time. Future directions, such as AI-driven automated test generation, self-healing scripts, and intelligent layout anomaly detection, are discussed to enhance the efficiency and accuracy of GUI testing. The results demonstrate that implementing structured GUI testing strategies significantly improves defect detection, reduces testing time, and ensures a consistent and high-quality user experience across multiple devices and platforms.

Keywords: GUI Testing, Responsive Web Applications, Cross-Browser Testing, Automation, Visual Regression Testing, Breakpoint Validation, Software Quality, AI-driven Testing

FROM TOOL TO CO-CREATOR: GENERATIVE AI AS A CATALYST FOR ACADEMIC INNOVATION

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Abstract

Generative Artificial Intelligence (AI) is rapidly emerging as one of the most disruptive forces in education, reshaping how knowledge is created, delivered, and consumed. Unlike earlier technological innovations that merely digitized content or streamlined communication, generative AI introduces a new paradigm: it produces original content—text, code, images, and interactive simulations—that can be adapted to the unique needs of learners, educators, and institutions. This paper explores the diverse opportunities that generative AI offers to the education sector, while also acknowledging the challenges and risks associated with its adoption. It examines how generative AI is already shaping learning experiences, from personalized pathways and automated feedback for students to curriculum design and administrative efficiency for institutions. The findings suggest that generative AI has the potential to democratize access to quality education by providing scalable virtual tutoring, empowering educators through automation of routine tasks and offering data-driven insights into student performance, and accelerating institutional research and innovation through intelligent content generation and interdisciplinary collaboration. However, the transformative power of AI also brings ethical concerns around bias, academic integrity, and data privacy that require careful consideration. The paper concludes by proposing a Responsible AI in Education Framework structured around three principles—Enable, Educate, and Evaluate—to guide the ethical integration of AI in education. Taken together, the analysis positions generative AI not as a replacement for human educators but as a powerful partner capable of enriching learning outcomes, fostering creativity, and shaping the future of education in equitable and responsible ways.

SOCIAL MEDIA–DRIVEN FLOOD CRISIS MANAGEMENT: AN AI APPROACH USING NLP AND MACHINE LEARNING FOR REAL-TIME DISASTER DETECTION AND RESPONSE

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Abstract

Floods are among the most destructive natural disasters, causing significant economic loss, infrastructure damage, and human casualties. Traditional flood monitoring and response systems rely heavily on sensor networks, satellite imagery, and official reports, which often have limitations in coverage, timeliness, and granularity. Meanwhile, social media platforms provide vast amounts of real-time, user-generated data, offering an opportunity to enhance situational awareness and disaster response. This paper proposes an AI-driven framework for flood crisis management that integrates Natural Language Processing (NLP) and Machine Learning (ML) to process social media data for real-time detection, severity classification, and response prioritization. The proposed system includes a data collection module for social media streams, pre-processing and feature extraction using NLP techniques, ML-based classification of flood events, and a decision-support layer for emergency response. Simulated experiments demonstrate the feasibility of this approach, showing high accuracy in flood detection and severity estimation. This framework provides a scalable and timely tool for authorities and disaster management agencies to improve flood preparedness and response.

Keywords: Flood Management, Social Media Analytics, NLP, Machine Learning, Crisis Management, Disaster Prediction

A NOVEL CHARACTERIZATION OF B^*_{CG} - CONTINUOUS FUNCTION

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Abstract

In this paper, we introduce a new structure in topological spaces, referred to as the closure grill, and develop an associated operator. In a grill topological space (X, t, G), we define a new class of sets, called B^*_{CG} open sets. Using this notion, we introduce the concepts of continuous functions and -open functions and investigate their fundamental properties. Several examples are provided to illustrate the definitions clearly. We study the properties of open sets, including results concerning arbitrary unions and finite intersections, together with appropriate counterexamples. In addition, we introduce the closure and interior operators also discussed with various type of continuous functions. This paper establishes several characterizations of the proposed concepts and examines their related properties.

Keywords and phrases: Grill, local function, local closure grill function, open sets, locally continuous function.

A DEEP CONVOLUTIONAL AFFECTIVE COMPUTING FRAMEWORK FOR CONTINUOUS STUDENT ENGAGEMENT INFERENCE FROM UNCONSTRAINED CLASSROOM FACIAL DYNAMICS

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Abstract — Student engagement is a surreal measure of learning performance, but it is rather difficult to measure objectively in actual classroom setting. The proposed paper is the creation of a Facial Expression Recognition (FER) system based on the Convolutional Neural Network (CNN) to provide automated student engagement monitoring. The system uses facial feedback of classroom video streams to categorize the state of the learners as engaged and disengaged. It uses a strong preprocessing pipeline with face recognition, face alignment, face normalization and face augmentation, to help it cope with pose variations, changes in illumination and occlusions. Transfer learning Deep CNN is applied to generate discriminative features over faces and improve the classification task. Cross-validation testing on standard evaluations in educational data indicates a high degree of accuracy and the capability of high generalization. The findings support the hypothesis that CNN-based FER can be used as a tool, which will be reliable and non-invasive in inspection of engagement. The suggested solution will be part of the intelligent educational systems because it will allow teachers to have instant feedback on how to amend their teaching strategies and learning outputs.

Keywords - Facial Expression Recognition, Student Engagement, Convolutional Neural Networks, Deep Learning, Educational Technology, Classroom Analytics, Affective Computing.

REAL-TIME PHISHING DETECTION WITH ADAPTIVE DEEP LEARNING MODELS FOR ENHANCED AI-DRIVEN CYBER SECURITY

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ABSTRACT

The widespread growth of online communication has created an environment in which phishing attacks evolved into a persistent threat. The rapid shift toward complex and dynamic cyber-attack patterns has challenged conventional detection systems that relied on static rules and handcrafted features. This work addressed this gap by examining an adaptive deep learning approach tailored for real-time phishing identification.The problem arose because traditional filters often failed to respond to continuously changing phishing strategies, and many deployed models lacked the capability to update themselves while operating in live networks. As a result, phishing webpages and emails bypassed many standard defences, which exposed users to credential theft and financial loss.The need for a system that has adapted and has maintained strong accuracy under evolving threat conditions motivated this study.The proposed method has incorporated an adaptive deep learning architecture that has used a hybrid of convolutional and attention-based networks. An online feature updater has processed URL structures, lexical cues, metadata, and content signals without relying on manual engineering. The model has trained on a large, diverse stream of legitimate and phishing URLs and has adjusted itself gradually to new patterns without retraining from scratch. To support real-time deployment, the system included an incremental evaluator that has selected only the most informative features for rapid inference. The proposed method presents a clear improvement, as the accuracy rises to 94.8% compared with 87.8%, 86.0%, and 89.0% achieved by EANS, ELSAN, and ALO-Adaptive. The energy consumption decreases to 9.0 J, which remains lower than the 16.5 J, 15.8 J, and 15.1 J observed in the existing methods. The packet delivery ratio increases to 98.8%, outperforming the 93.8%, 92.3%, and 94.7% reported by the other techniques.These numerical gains confirm that the proposed technique presents stronger efficiency, stability, and reliability across large-scale wireless sensor network simulations.

Keywords: Phishing detection, adaptive deep which learning, cyber security, real-time analysis, threat intelligence

A CONCEPTUAL AI-DRIVEN FRAMEWORK FOR INSIDER THREAT DETECTION IN HEALTHCARE EHR SYSTEMS

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ABSTRACT

Insider threats pose a serious risk to healthcare information systems due to the presence of privileged users and the highly sensitive nature of Electronic Health Record (EHR) data. While artificial intelligence techniques have been increasingly applied to insider threat detection, existing solutions are often fragmented, implementation-centric, and insufficiently aligned with healthcare-specific requirements such as clinical workflows, regulatory compliance, and explainability. This paper presents a conceptual artificial intelligence–based framework for insider threat detection in healthcare EHR systems. The proposed framework integrates multiple layers, including data acquisition, AI-driven behavioral analysis, risk assessment, decision support, and compliance monitoring. By combining machine learning, deep learning, and contextual intelligence within a unified architectural model, the framework addresses key challenges such as temporal behavior analysis, role-based access deviation, false alarm reduction, and interpretability of security decisions. The framework also incorporates privacy and audit considerations to align with healthcare regulatory standards.This conceptual design provides a structured foundation for developing scalable, explainable, and domain-aware insider threat detection solutions in healthcare environments and highlights future research directions for AI-driven healthcare cybersecurity systems.

Keywords: Insider Threat Detection, Healthcare Cybersecurity, Conceptual AI Framework, Electronic Health Records, Explainable AI, Privacy and Compliance

ADAPTIVE HYBRID DENSITY-K ESTIMATION CLUSTERING (AKD-K MEANS)

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ABSTRACT

The Adaptive Hybrid Density-K Estimation Clustering (AHD-K Means) algorithm is proposed to overcome two major limitations of traditional K-Means: the need to pre-define the number of clusters (K) and its inability to handle clusters with irregular or non-spherical shapes. The AHD-K Means method integrates automatic K estimation using density variation analysis with a hybrid distance-shape adaptation mechanism that adjusts clustering decisions according to local point distribution patterns. By combining centroid-based grouping with density-aware neighborhood evaluation, the proposed algorithm can identify the natural number of clusters while accurately separating datasets containing circular, elongated, uneven, orcomplex shaped clusters. Experimental validation demonstrates that AHD-K Means delivers more stable clustering, improved accuracy, and enhanced adaptability compared to classical K- Means—especially on datasets with varying density or non-uniform geometric patterns. This makes the method suitable for real-world applications where cluster shapes and counts are unknown.

Keywords: AHD-K Means, Automatic K Estimation, Hybrid Density Clustering, Shape Adaptive Clustering, Unsupervised Learning, Cluster Irregularity Handling, and Centroid-Density Fusion Algorithm.

A FUZZY-WEIGHTED LOSS FUNCTION LIGHTGBM IN HEART DISEASE PREDICTION

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Abstract:

The performance of standard machine learning methods declines when clinical datasets for heart disease prediction contain uncertainty and noise along with overlapping class distributions. The work introduces a fuzzy membership–weighted LightGBM framework which utilizes fuzzy logic to enhance model optimization as a solution for this system constraint. The process of feature encoding and selection through Recursive Feature Elimination leads to the selection of features which Fuzzy C-Means clustering converts into membership degrees that indicate the uncertainty level for each sample. This evaluated the fuzzy-weighted LightGBM model using the Cleveland heart disease dataset by measuring accuracy and precision and recall and F1-score while comparing it to a standard LightGBM model. The experimental results demonstrated that fuzzy membership-based weighting leads to better classification performance and stronger system robustness when dealing with borderline and uncertain situations. The proposed approach demonstrates that integrating fuzzy uncertainty modelling into the LightGBM loss function is an effective strategy for enhancing heart disease prediction in real-world clinical settings.

Keyword: Lightgbm, Fuzyy, Heart disease prediction

A HYBRID MODEL FOR THE ANALYSIS OF SENTIMENTS IN MOBILE PHONE REVIEWS DATA USING DATA MINING TECHNIQUES

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Abstract:

Massive volumes of unstructured customer feedback, like product reviews, have been produced by the exponential growth of e-commerce platforms. These reviews offer important insights into the sentiment of consumers. Businesses need to accurately identify sentiment in order to improve customer experience, make better decisions, and create successful marketing campaigns. Conventional machine learning methods, like Logistic Regression (LR), are effective and have good interpretability for sparse text features, but they have trouble identifying intricate linguistic patterns. On the other hand, neural networks (NN) efficiently represent contextual and semantic data, but they are computationally costly and frequently uninterruptable. This study presents a hybrid framework called the Logistic Regression Neural Network (LRNN), which combines the advantages of LR and NN, in order to get around these restrictions. While the NN branch uses deep learning architectures to encode contextual representations, the LR branch makes use of sparse lexical features based on TF–IDF. The sentiments in Amazon mobile product reviews are categorized by fusing these complementary signals. In terms of accuracy, F1-score, and robustness across different sentiment categories, LRNN performs better than standalone NN baselines and traditional LR, according to experimental evaluation on a dataset of customer reviews. According to the results, LRNN offers a high-performing, interpretable, and scalable solution for practical sentiment analysis tasks in e-commerce. To further improve sentiment classification performance, future studies will investigate multimodal extensions that include star ratings, product metadata, and attention-based mechanisms.

Keywords: Sentiment Analysis, Logistic Regression (LR), Neural Networks (NN), Deep Learning Model, LRNN Framework, Text Mining

A PERFORMANCE EVALUATION OF PRIVACY-PRESERVING TECHNIQUES IN MENTAL HEALTH DATA ANALYTICS

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ABSTRACT

Data privacy has become an essential concern due to the widespread sharing and processing of data in everyday applications. When analysing data, sensitive information should be protected, especially in the healthcare industry, where medical records contain highly sensitive patient information. To overcome these challenges, this study examines a systematic empirical evaluation of five prominent privacy-preserving techniques: K-Anonymity, Data Perturbation, Differential Privacy (DP), Secure Multiparty Computation (SMC), and Homomorphic Encryption (HE). Using the DASS-21 mental health dataset, each technique is applied prior to logistic regression classification and evaluated based on predictive accuracy, runtime, CPU time, and memory consumption. According to the experimental results, cryptographic techniques such as HE and SMC provide strong confidentiality but incur significant computational overhead. Anonymization methods are computationally inexpensive but remain vulnerable to inference attacks. Differential privacy achieves formal privacy with minimal impact on model performances and moderate computational cost. These findings highlight Differential privacy as a scalable and practical solution for privacy-aware mental health machine learning approaches.

Keywords: Data Privacy, Privacy-Preserving Techniques, Differential Privacy, Medical Data Security, Data Perturbation, Secure Multiparty Computation, Homomorphic Encryption

COMPREHENSIVE ANALYSIS OF FUNGAL DISEASE DETECTION IN WHEAT CROP USING MACHINE LEARNING BASED ON KCC DATASET

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Abstract

Wheat (Triticum Aestivum) is one of India's most vital rabi (winter) crops, serving as a staple food for over 40% of the population. It is the second most-produced cereal after rice, contributing significantly to India's food security and agricultural economy. Fungal diseases significantly affect wheat productivity and pose a serious threat to food security, particularly in developing countries like India. Early and accurate detection of such diseases is essential to reduce yield loss and provide timely advisory support to farmers. This research proposes a machine learning–based approach for detecting and classifying wheat fungal diseases using textual symptom descriptions collected from the Kisan Call Center (KCC) dataset. The dataset contains over 50,000 symptom-based queries from farmers. The farmer queries are preprocessed using Natural Language Processing (NLP) techniques and transformed into numerical representations using TF-IDF vectorization. A Linear Support Vector Classifier (Linear SVC) is employed for multi-class disease classification. Experimental results demonstrate high classification accuracy of 93% confirming the effectiveness of text-based disease diagnosis without relying on image data. The proposed approach offers a scalable and low-cost solution for agricultural advisory systems and also support farmers without the need for visual diagnosis tools.

SAFETY PREDICTION USING MACHINE LEARNING ALGORITHM

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Abstract:

Mobile communication rapid development of Text and Smishing threats through SMS, which often include dangerous URLs, one of the most important cybersecurity challenges is formative if a URL included in an SMS is secure or harmful. Standard text-only detection methods are unable to completely identify the complete patterns that exits research to classify messages as spam or ham in these kinds of text. This study combines textual features, URL-based qualities, and sentiment features into a unified fusion dataset to provide a machine learning methodology for predicting the security of URLs found in SMS texts. SMS text is represented by Term Frequency–Inverse Document Frequency (TF-IDF), whereas sentiment polarity and subjectivity capture emotional indicators frequently employed in spam texts. Additional lexical characteristics like URL length, domain depth, special character counts, and protocol indicate of URL features. URLs are categorized as either safe or Unsafe used to train and assess two supervised machine learning models: Random Forest and Logistic Regression. While Random Forest captures non-linear correlations and feature interactions across modalities, Logistic Regression offers a robust baseline with understandable feature weights. According to experimental results, the multimodal fusion strategy achieves better accuracy, precision, recall, and F1-score than unimodal text-based models. The technique can be used in actual mobile security systems and successfully improves SMS-based URL safety prediction for real-world mobile communication.

Keywords: SMS , URL Prediction, Logistic Regression, Random Forest, TF-IDE, Cyber Security.

PERFORMANCEANALYSISOFAESANDCHACHA20INTRANSFORM DOMAIN STEGANOGRAPHY TECHNIQUES

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Abstract: In this insecure world, Steganography is an amazing strategy form asking hidden information in digital media. To boost security, encryption is frequently paired with transform-domain steganography techniques. This study compares the AES and ChaCha20 encryption algorithms in a DWT-DCT based image steganography architecture. The secret data is encrypted with AES or ChaCha20 before being incorporated in the cover image's frequency domain using the DWT (Discrete Wavelet Transform) and DCT (Discrete Cosine Transform). Both methods' performance is tested using criteria such as embedding time, extraction time, PSNR, SSIM, and accuracy. According to the experimental results, this research seeks to determine the greatest encryption algorithm for safe and effective transform-domain steganography, which may then be applied to advanced secure communication applications.

Keywords: Steganography, ChaCha20, AES, DWT, DCT.

A NON-INVASIVE DEEP LEARNING FRAMEWORK USING ENHANCED STYLE-BASED GAN AND EFFICIENTNET FOR EMBRYO PLOIDY ASSESSMENT IN IVF

ABSTRACT-

In assisted reproductive technology, single embryo transfer is commonly preferred to reduce the risk of multiple pregnancies. Therefore, identifying the most viable embryo from a group of embryos generated during an in vitro fertilization (IVF) cycle is a critical task. One of the major factors influencing embryo selection is the ploidy status, which is traditionally determined using Preimplantation Genetic Testing for Aneuploidy (PGT-A). Although effective, PGT-A is invasive, expensive, and may affect embryo viability. To overcome these limitations, non-invasive prediction methods based on deep learning have gained significant attention. Recent studies have explored the use of time-lapse embryo images for ploidy prediction; however, their performance is often limited by insufficient image quality, small datasets, and the absence of patient-specific clinical information. To address these challenges, this work proposes a novel deep learning framework that integrates a Content-Sensitive Style-based Generative Adversarial Network (CS-StyleGAN) with a multi-task Efficient NetB7 architecture for embryo ploidy prediction. The proposed GAN model enhances embryo image quality by generating high-resolution and realistic blastocyst-stage images using content-aware optimization strategies. The synthesized images are subsequently segmented using Mask-RCNN to isolate relevant embryonic regions. Feature extraction is performed using Efficient NetB7, and the extracted visual features are combined with patient clinical and demographic attributes to form a comprehensive feature representation. A softmax-based classifier is then employed to categorize embryos as euploid or aneuploid. Experimental evaluation on multiple datasets demonstrates that the proposed framework achieves superior prediction performance, attaining an accuracy of 95.87% compared to conventional deep learning approaches. The results indicate that the proposed non-invasive method can effectively support embryo selection decisions and improve IVF outcomes.

AI TOOLS AND THEIR CREDIBILITY

By

Rev. Sr. Arulselvi (Administrator, DMI Engineering College, Aralvoimozhi)

ABSTRACT

The current education scenario warrants the use of AI Tools at the school level as well as the collegiate level. Whether these tools significantly impact the outcomes of learning in a positive manner is something that needs to be analyzed carefully. This research paper aims to analyze such outcomes in terms of qualitative and quantitative parameters. While India leads the push towards large-scale integration of AI tools and existing teaching-learning systems in colleges and schools, the credibility factor in the outcomes of various courses needs to be examined in detail. Our nation implemented a remarkable initiative in digital integration for establishing citizens' identities through the nation-wide implementation of Aadhar.This paved the way indirectly for AI tools and software-embedded pedagogies in the education sector. It was actually the Co-Vid 19 wave in 2019 that necessitated the inclusion of AI tools/learning platforms for conducting classes online on a massive scale. This paper has analyzed all the above points and presented findings in a most realistic manner.

Keywords: pedagogies, quantitative, qualitative, software, integration

AN ANALYSIS OF ARCHITECTURAL AND PERFORMANCE IMPROVEMENTS FROM YOLOV5 TO YOLOV8 IN REAL- TIME WASTE DETECTION

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Abstract

The advancement of object detection models has helped in the growth of waste detection systems, contributing directly to the balance between accuracy and computational efficiency. This analysis represents a comprehensive comparison of YOLOv5, YOLOv7, and YOLOv8 applied to a custom real-time trash detection task. Light weight variants were trained on the trashcan1.yamldataset to analyze changes such as anchor-free design and trainable bag-of-freebies. Results indicate that YOLOv8s outperformed in overall detection (mAP50-95 of 49.68%), while YOLOv5s achieved the highest precision (0.78), highlighting a fundamental trade-off in model evolution.

Index Terms

Object Detection, YOLO, Deep Learning, Edge AI, Waste Management, Real-Time Systems.

SURVEY PAPER: DISCUSSING THE COMMUTERS'TRANSPORTATION CHOOSING PATTERN IN URBAN CITIES

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ABSTRACT

Rapid urbanization has significantly improved the demand of the travel in metropolitan cities, increasing challenges connected to heavy traffic, environmental degradation, and reducing travel comfort. Reading the commuters choosing pattern in available transportation modes such as private vehicles, public vehicles, cycling, walking, and shared mobility services are important for planning he sustainable and perfect an transport systems. This survey paper browse the commuter behavior, refer the major factors influencing transportation mode choice, and summarizes the analytical methods used to model commuter decisions. This study highlights demanding trends in urban mobility, discusses policy decisions, and stressing the role of behavioral insights in shaping current and future transportation planning.

PERFORMANCE ANALYSIS OF AES AND CHACHA20 IN TRANSFORM DOMAIN STEGANOGRAPHY TECHNIQUES

Abstract:

In this insecure world, Steganography is an amazing strategy for masking hidden information in digital media. To boost security, encryption is frequently paired with transform-domain steganography techniques. This study compares the AES and ChaCha20 encryption algorithms in a DWT-DCT based image steganography architecture. The secret data is encrypted with AES or ChaCha20 before being incorporated in the cover image's frequency domain using the DWT (Discrete Wavelet Transform) and DCT (Discrete Cosine Transform). Both methods' performance is tested using criteria such as embedding time, extraction time, PSNR, SSIM, and accuracy. According to the experimental results, this research seeks to determine the greatest encryption algorithm for safe and effective transform-domain steganography, which may then be applied to advanced secure communication applications.

Keywords: Steganography, ChaCha20, AES, DWT, DCT.

AI TOOLS AND THEIR CREDIBILITY

By

Rev. Sr. Arulselvi (Administrator, DMI Engineering College, Aralvoimozhi)

ABSTRACT

The current education scenario warrants the use of AI Tools at the school level as well as the collegiate level. Whether these tools significantly impact the outcomes of learning in a positive manner is something that needs to be analyzed carefully. This research paper aims to analyze such outcomes in terms of qualitative and quantitative parameters. While India leads the push towards large-scale integration of AI tools and existing teaching-learning systems in colleges and schools, the credibility factor in the outcomes of various courses needs to be examined in detail. Our nation implemented a remarkable initiative in digital integration for establishing citizens' identities through the nation-wide implementation of Aadhar.This paved the way indirectly for AI tools and software-embedded pedagogies in the education sector. It was actually the Co-Vid 19 wave in 2019 that necessitated the inclusion of AI tools/learning platforms for conducting classes online on a massive scale. This paper has analyzed all the above points and presented findings in a most realistic manner. Keywords: pedagogies, quantitative, qualitative, software, integration

ENHANCING URBAN WASTE MANAGEMENT: A COMPARATIVE ANALYSIS OF IOT-BASED SMART GARBAGE MONITORING SYSTEMS

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ABSTRACT

Rapid urbanization over the last decade has led to a sharp rise in solid waste generation, exposing the inefficiencies of conventional and early IoT-based garbage monitoring systems. Existing systems discussed in prior studies mainly relied on fixed schedules, RFID tagging, or basic sensor-enabled bins with limited real-time responsiveness and poor scalability. These approaches often resulted in delayed waste collection, overflowing bins, increased fuel consumption, and higher operational costs. This paper presents a comparative analysis between such existing systems and a recent smart garbage monitoring approach using modern embedded components such as the HC-SR04 ultrasonic sensor, Arduino UNO, ESP8266 integrated Wi-Fi module, and alert/display devices including LED, buzzer, and LCD. The proposed system continuously monitors garbage fill levels and converts distance measurements into percentage values. When the waste level reaches predefined thresholds (80% and 90%), visual and audible alerts are triggered locally while real-time notifications are transmitted to centralized authorities through mobile applications or web dashboards. Compared to earlier implementations, the recent system improves accuracy, responsiveness, cost efficiency, and ease of deployment. The analysis highlights how advancements in low- cost sensors, wireless connectivity, and cloud integration significantly enhance waste collection efficiency and urban cleanliness. The findings demonstrate that modern IoT-based smart garbage monitoring systems provide a scalable and sustainable solution for smart-city waste management.

Keywords: Smart Garbage Monitoring, Internet of Things, Ultrasonic Sensor, ESP8266,Waste Management, Smart Cities

ANALYSIS OF RECENT ADVANCEMENTS IN MATRIX-DRIVEN NEGATIVE SELECTION ALGORITHM

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Abstract

Intrusion detection in network is primarily the identification of abnormality in network as human immune system identifies harmful pathogens from normal. In this sense, Artificial Immune System (AIS) inspired Negative Selection Algorithm (NSA) which works on the strong basis of self– nonself discrimination has been widely used as a tool for intrusion detection. Classical NSA faces many issues based on scalability, inefficiency of detector generation, performance in high-dimensional feature spaces etc. Since features are the key factors of NSA, the Matrix representation of features can make the decision making will be more easy. Recent studies related to NSA emphasizes the role of matrix in dimensionality reduction, feature extraction, and linear algebraic modeling. This paper is an exploratory study analyzes the potential of matrix-driven NSA frameworks in terms of research works after 2021. The study evaluates matrix-enabled NSA in view of accuracy, computational complexity, and adaptability in intrusion detection systems (IDS).

Keywords : Artificial Immune System, Classical NSA, Matrix-driven NSA, Intrusion Detection

CLOUD-INTEGRATED BLOCKCHAIN FRAMEWORK FOR SECURE COVERT COMMUNICATION USING STEGANOGRAPHY ON MICROSOFT AZURE

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The privacy-preserving communication in distributed and cloud environments is a growing demand which reveals inventive security architectures that obscure both data content and communication intent. The proposed work reveals a cloud-integrated block chain framework that combines stegano graphic data hiding techniques with decentralized ledger technology to enable secure and covert communication. The system is implemented using Microsoft Azure's Web3 ecosystem, integrating Azure Blockchain Services, Azure Confidential Ledger, smart contracts, and virtualized stega no graphy tools. The traditional approaches which exists rely exclusively on encryption technique, whereas the proposed methodology presents a double layer security mechanism. In the methodology steganography conceals sensitive information within digital media, on other end blockchain ensures tamper proof transaction management, immutability and transparency. Smart contracts systematize access control and impose secure data exchange policies, dropping human intervention and security risks.The proposed architecture was developed and tested in a cloud environment to evaluate the performance, security resilience and scalability. Results prove minimal computational overhead, high transaction reliability, and strong resistance to unauthorised access and basic steganalysis attacks. By incorporating blockchain and steganography within a scalable cloud infrastructure, the proposed system provides a robust and extensible solution for privacy-centric communication in distributed systems.

Keywords:

Blockchain, Steganography, Covert Communication, Web3, Microsoft Azure, Confidential Ledger, Data Security

A COMPREHENSIVE ANALYSIS OF EXPLOITABLE VULNERABILITIES IN RSA CRYPTO SYSTEM USING SIDE CHANNEL ATTACKS

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Abstract:

RSA is a public-key cryptography algorithm which is widely applied to ensure secure data transmission. However there exist many algorithms that infringe the protection of RSA algorithm. Most of these infringe methods are depends the technique of side channel attack. This paper is a comprehensive analysis of prominent RSA cracking algorithms depends on side- channel attack. In this study, the renowned side channel attacks - Fault Injection Attack (FIA), Differential Power Analysis (DPA), Timing Attack (TA) and Cache-Based Micro-architectural Attack (CMA) are evaluated in terms of CPU usage, execution time, memory usage, computational overhead and key recovery ratio.

Keywords: Cryptography, RSA, Side Channel attack, Fault Injection Attack, Differential Power Analysis, Timing Attack, Cache-Based Micro-architectural Attack.

DEEP LEARNING-BASED ASPECT-ORIENTED SENTIMENT ANALYSIS IN HEALTHCARE USING INTEGRATED TEXT FEATURE EXTRACTION

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Abstract

Aspect-Based Sentiment Analysis (ABSA) is designed to uncover opinions related to specific components within a text rather than assigning a single overall sentiment. In the healthcare sector, this detailed analysis is especially valuable because patient feedback often reflects varied experiences. A review may praise a doctor's communication skills while expressing dissatisfaction with waiting time or treatment cost. Capturing these aspect-specific opinions helps healthcare institutions better understand patient needs and improve service delivery. Traditional sentiment analysis techniques typically categorize text as positive, negative, or neutral at a general level. Although useful for broad insights, such methods do not adequately identify sentiments linked to individual aspects of care. This limitation reduces their effectiveness in complex domains like healthcare, where feedback is multifaceted and context-dependent. To overcome these challenges, this study presents a deep learning–based framework tailored for aspect-level sentiment analysis in healthcare data. The proposed system integrates multiple text feature extraction strategies to enhance the representation of linguistic and contextual information. The model is evaluated on a large dataset comprising over 250,000 patient reviews gathered from telemedicine platforms and healthcare applications. These reviews cover a range of critical aspects, including doctor–patient communication, treatment outcomes, service efficiency, affordability, and platform usability. Before analysis, the textual data undergo several preprocessing steps such as normalization, tokenization, removal of stop words, and lemmatization to ensure clarity and consistency. Aspect extraction is performed using contextual word representations to accurately identify relevant features within the reviews. For

sentiment classification at the aspect level, a Bidirectional Long Short-Term Memory (BiLSTM) network is employed to capture contextual dependencies in both forward and backward directions. To further strengthen semantic understanding, the framework combines feature extraction methods including TF-IDF, Word2Vec embeddings, and transformer-based representations such as BERT. Experimental evaluation shows that the proposed approach outperforms traditional machine learning models across key performance metrics, including accuracy, precision, recall, and F1-score. The results highlight the advantage of integrating deep learning techniques with diverse text representation methods for fine-grained sentiment analysis in healthcare. This framework can assist healthcare providers and digital health platforms in identifying specific areas of concern, enhancing patient satisfaction, and supporting informed, data-driven improvements in service quality.

Keywords

Aspect-Based Sentiment Analysis (ABSA), Healthcare Text Mining, Deep Learning Models (DL), Text Feature Extraction, BiLSTM, BERT, Telemedicine Reviews.

A SCALABLE AND EXPLAINABLE FEDERATED LEARNING FRAMEWORK FOR COMPREHENSIVE CHRONIC KIDNEY DISEASE LIFE-CYCLE PREDICTION AND RENAL TRANSPLANT OUTCOME ASSESSMENT

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Abstract

Chronic Kidney Disease (CKD) is a progressive condition that can quietly progress to end- stage renal disease (ESRD), requiring dialysis or a kidney transplant. Early detection, continuous monitoring, and precise predictions of post-transplant outcomes are rucial for improving patient survival and extending the lifespan of transplants. However, traditional machine learning models typically depend on centralized datasets, which raises privacy concerns and restricts their scalability across different healthcare settings. Furthermore, many of these models lack interpretability, which could undermine clinicians' confidence in their outcomes. This paper introduces a Scalable and Explainable Federated Learning Framework designed for comprehensive CKD life-cycle prediction and renal transplant outcome assessment. The framework enables collaborative training across multiple hospitals without the need to share raw patient data, thus preserving privacy. Its modular architecture employs ensemble learning and temporal deep learning models to enhance early CKD detection, stage classification (Stages 1–5), progression forecasting, ESRD risk assessment, and graft survival prediction. Moreover, the framework integrates explainable AI techniques to offer global feature importance and patient-specific insights, improving transparency and aiding clinical decision-making. Experimental results indicate enhanced

predictive accuracy, robustness, and interpretability compared to traditional centralized methods. The proposed system offers a privacy- conscious, scalable, and clinically interpretable solution for comprehensive CKD management.

Keywords: Chronic Kidney Disease (CKD); End-Stage Renal Disease (ESRD); Federated Learning; Explainable Artificial Intelligence (XAI); Privacy-Preserving Machine Learning; Disease

COMPARATIVE ANALYSIS OF SINGLE-STAGE AND TWO-STAGE DEEP LEARNING ARCHITECTURES FOR AUTOMATED FOLLICULAR LOCALIZATION IN POLYCYSTIC OVARY SYNDROME (PCOS)

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Abstract

Polycystic Ovary Syndrome (PCOS) is a common endocrine disorder affecting women of reproductive age, where ultrasound-based follicular assessment plays a crucial role in diagnosis. However, manual follicle localization is time-consuming and prone to observer variability, creating the need for automated detection systems. This study presents a comparative analysis of single-stage and two-stage deep learning architectures for automated follicular localization in ovarian ultrasound images. Single-stage detectors provide faster predictions by performing localization and classification in a single pipeline, making them suitable for real-time clinical applications. In contrast, two-stage detectors generate region proposals followed by refined detection, often achieving improved accuracy in identifying small or overlapping follicles. The models are evaluated using metrics such as precision, recall, mean average precision (mAP), and inference time. The study highlights the trade-off between computational efficiency and detection accuracy, offering insights into selecting appropriate deep learning frameworks for automated PCOS screening and clinical decision support systems.

Keywords: Polycystic Ovary Syndrome (PCOS), follicular localization, ovarian ultrasound, deep learning, single-stage detector, two-stage detector, automated diagnosis, medical image analysis computer-aided detection, mAP.

OPTIMIZING RETAIL EXPERIENCES USING BAYESIAN OPTIMIZATION-DRIVEN RANDOM FOREST FOR ADVANCED SENTIMENT ANALYSIS

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ABSTRACT

This study explores the enhancement of sentiment analysis in online shopping environments. It begins by discussing the fundamental challenges associated with sentiment analysis, particularly the difficulty of processing large amounts of unstructured text data and maintaining high accuracy despite noise and contextual complexity. To address these issues, the study proposes a Bayesian Optimization-inspired Random Forest (BO-RF) model.This approach is designed to improve both the accuracy and efficiency of sentiment analysis by integrating the strengths of Bayesian Optimization and the Random Forest algorithm. The core mechanism involves applying Bayesian Optimization to systematically fine-tune the hyper parameters of the Random Forest model. By optimizing these parameters, the overall performance of the model is significantly enhanced, leading to improved sentiment classification outcomes. Additionally, BO-RF demonstrates strong capability in feature selection, effectively identifying relevant textual features while minimizing the impact of noise. Extensive experiments and performance evaluations indicate that BO-RF outperforms conventional sentiment analysis techniques. The proposed model achieves higher accuracy and improved efficiency in sentiment classification, highlighting its potential to significantly advance sentiment analysis applications in online shopping contexts.

Keywords: Sentiment Analysis, Bayesian Optimization, Random Forest, Online Shopping, Accuracy

EARLY-STAGE DYSLEXIA DETECTION THROUGH HANDWRITING FEATURE MODELING USING SUPERVISED MACHINE LEARNING TECHNIQUES

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Abstract

Dyslexia is a learning disability with reading and writing impairments which can be noticed at the beginning of education. Detecting it on an early stage can help providing timely academic support for students. Since handwriting is related to cognitive and motor coordination skills, it can be made the indicator to detect writing related learning problems. This paper introduces an analysis of handwriting using machine learning to assist the screening of early dyslexia. Hand written samples were taken and processed to derive some important writing characteristics such as writing density, shape patterns and stroke distribution. These features have been used to train three types of supervised machine learning algorithms, namely, Linear Discriminant Analysis (LDA), Quadratic Discriminant Analysis (QDA) and Gradient Boosting. The models were used to identify corrected, normal and reversal handwriting patterns into three classes. Experimental results show that Gradient Boosting model has better result than the other models in terms of recognition of handwriting patterns. A binary classification experiment was also performed for the discrimination of dyslexic and non-dyslexic writing. The research shows that handwriting analysis based on machine learning has the potential to be used as an easy and supportive screening process in educational settings.

Keywords – Dyslexia; Handwriting; Machine Learning; Linear Discriminant Analysis; Quadratic Discriminant Analysis; Gradient Boosting

A REVIEW OF BIG DATA S DATA QUALITY ASPECTS

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Abstract

The swift development of Big Data technology has led to an unparalleled amount, speed, and diversity of data being produced and gathered by enterprises. Even while increasing the predictive models' accuracy and resilience is a top priority, the quality of the underlying data is frequently overlooked. As a result of this imbalance, analytical results are compromised by the well-known problem of trash in, garbage out. In order to handle the complexity brought about by Big Data environments, traditional data quality metrics—such as accuracy, consistency, completeness, and timeliness—are insufficient. In this study, a fresh taxonomy of Big Data quality dimensions is introduced in order to overcome these restrictions. The suggested approach offers a structured framework to handle new data quality issues in Big Data analytics by identifying 20 unique quality dimensions and methodically classifying them into four extensive categories.

Key words: big data, data management, data quality, and data quality dimension

A SMART INTERNET OF THINGS AND DEEP LEARNING BASED FRAMEWORK FOR AUTOMATED INSECT PEST MONITORING IN AGRICULTURE

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Abstract:

The stable and high-quality crop production requires continuous surveillance of field conditions and early identification of insect pests that threaten agricultural productivity. Diverse agriculture climatic regions support extensive cultivation of cereals, pulses, fruits, and vegetables making effective pest management a critical component of sustainable farming. However, conventional pest monitoring methods predominantly rely on manual field scouting, which is time consuming and often inconsistent

due to human error. Such limitations frequently result in delayed detection, indiscriminate pesticide application, increased production costs, and adverse environmental impacts. These challenges overcome to, this research presents the development of an intelligent pest monitoring framework that integrates Internet of Things (IoT) technology, deep learning based computer vision, and cloud computing to enable automated, real-time insect pest detection in open-field agricultural environments.The proposed system deploys a network of distributed smart sensor nodes strategically installed across farmland, with each node equipped with a high- resolution camera for periodic crop image acquisition and environmental sensors for measuring temperature, relative humidity, and soil moisture. These multimodal data streams provide continuous insight into both the visual health of crops and the microclimatic conditions that influence pest emergence and population dynamics. The captured images are processed using a trained deep learning based object detection model capable of detecting. The detection outcomes are integrated with corresponding environmental parameters and transmitted wirelessly to a centralized cloud platform, where data storage, advanced analytics and evaluation are performed. Farmers, agronomists and agricultural stakeholders can access real time pest status. In addition, automated notification mechanisms provide early warnings,enabling timely and targeted pest control interventions. the proposed system enhances operational efficiency, optimizes pesticide usage, reduces environmental impact and supports sustainable agricultural practices. Overall, this work demonstrates the practical applicability and scalability of combining IoT-enabled sensing, artificial intelligence to strengthen precision agriculture initiatives and smart farming systems.

Keywords: Internet of Things (IoT), Deep Learning, Intelligent Pest Detection, Artificial Intelligence, Precision Agriculture, Robotics.

AN EFFICIENT EDGE COMPUTING FRAMEWORK FOR NETWORK OPTIMIZATION IN DISTRIBUTED SYSTEMS

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Abstract:

The centralized cloud computing systems have seen an increase in network congestion, latency, and bandwidth usage due to the exponential expansion of Internet of Things (IoT) devices, real-time applications, and 5G networks. A promising paradigm that decentralizes computation by bringing processing power closer to data sources is edge computing. An effective framework for edge computing for network optimization in distributed systems is presented in this paper. The framework incorporates latency-aware routing, dynamic resource allocation, and intelligent job offloading to improve network performance. The suggested model seeks to enhance Quality of Service (QoS), minimize latency, and lower bandwidth consumption. Analytical testing shows that the framework outperforms traditional cloud-based systems in terms of performance and latency. The architecture can be scaled to meet the needs of next-generation communication networks, smart cities, and industrial IoT.

Keywords: Edge Computing, Network Optimization, Distributed Systems, Task Offloading, Resource Allocation, 5G Networks, IoT, Latency Reduction

EXPLAINABLE AI FOR REFRACTIVE SURGERY DECISION SUPPORT

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Abstract :

Refractive surgery planning is a complex process, and it is affected by corneal characteristics, individual healing response and other ocular measurements. Currently, the decision-making for the surgery mainly relies on clinical expertise and standardised guidelines, which may not be able to capture individual variability. This study proposes an explainable artificial intelligence framework that can be used to support planning for refractive surgery by analyzing images and clinical data. A deep learning model is integrated with explainable AI methods such as SHAP and Grad-CAM to provide insights into the predictions made by the model. These explanations help clinicians interpret AI recommendations and enhance trust in decision support systems. The pilot study presented in this paper uses publicly available datasets in ophthalmology to show the feasibility of the framework.

Keywords: Deep learning, Refractive surgery, XAI, SHAP, Grad-CAM.

A COMPARATIVE STUDY OF CNN AND TRANSFER LEARNING MODELS FOR CROP DISEASE CLASSIFICATION

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ABSTRACT

Crop diseases pose a serious threat to agricultural productivity and global food security, especially when they are not detected at an early stage. Traditional manual disease identification is time-consuming, subjective, and requires expert knowledge, which is often unavailable in rural farming areas. With the rapid advancement of artificial intelligence, deep learning techniques have become powerful tools for automating plant disease detection through image analysis. This study presents a comparative analysis of two deep learning approaches for crop disease classification: a custom-built Convolutional Neural Network (CNN) and a transfer learning–based model. The CNN is trained from scratch using crop leaf images, while the transfer learning model utilizes a pre-trained architecture that is fine-tuned on the same dataset. Both models are evaluated using a publicly available crop disease dataset to assess their performance. The experimental results show that the transfer learning model achieves higher accuracy and faster convergence compared to the traditional CNN. This comparison highlights the advantages of using pre-trained deep learning models, particularly when working with limited datasets. The findings of this study support the development of intelligent, efficient, and reliable systems for automated crop disease diagnosis in precision agriculture.

Keywords:

Crop Disease Detection, Convolutional Neural Network, Deep Learning, Image Classification, Precision Agriculture.

A Systematic Review of Deep Neural Network Architectures of Automated Kidney Stone Detection and Classification of Severity in Medical Imaging

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Abstract

Kidney stone disease is one of the major health problems in the world, as it has a large recurrence rate as an indicator of a disease that afflicts about 10 percent of the population globally. Rapid and prompt diagnosis is paramount in successful treatment planning and better patient outcomes. This survey will provide a detailed study on deep neural network (DNN) architecture in automated kidney stone detection and severity measurement using a variety of medical imaging modalities. Carefully examine the most advanced methods, including convolutional neural networks (CNNs), object detection systems, and architectures, hybrid systems, and recent transformer-based systems. They are going to analyze preprocessing methods, feature extraction methods, classification methods and clinical severity grading systems. In this review performance measures such as accuracy, sensitivity, specificity, and computational efficiency of 45 research articles that have been published in 2018-2025. Also, establish key research gaps such as data constraints, the problem of multi-modes integration, the constraint of real-time implementation, and the necessity of clinical validation. The survey can give researchers and practitioners an organized insight into the present-day capabilities, technological trends, and the paths in AI-driven kidney stone diagnostics, which eventually will lead to the creation of more robust, interpretable, and clinically useful automated diagnostic systems. The concepts that require keywords are Deep Neural Networks, Kidney Stone Detection, Medical Image Analysis, Convolutional Neural Networks, Computer-Aided Diagnosis, CT Imaging, Ultrasound Analysis, Transfer Learning, Clinical Decision Support, automated severity assessment.

AN INTELLIGENT VISION-BASED ASSISTIVE SYSTEM FOR EARLY DETECTION OF AUTISM SPECTRUM DISORDER: A SCALABLE APPROACH

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Abstract

Early screening of Autism Spectrum Disorder (ASD) is essential for initiating timely intervention however, existing diagnostic practices rely largely on expert-driven behavioural assessments that are often subjective, costly, and difficult to scale. This work presents an innovative implementation concept for an intelligent vision-based framework designed to support scalable and objective early ASD screening through automated analysis of children's visual attention patterns. The proposed framework integrates eye-tracking–inspired visual stimulus analysis with deep learning based perception models to capture atypical gaze responses associated with ASD. Instead of focusing solely on classification accuracy, the system emphasizes a complete implementation pipeline that includes adaptive visual stimulus presentation, automated gaze- pattern encoding, explainable feature extraction, and real-time screening support. The architecture is designed to be modular and deployable in educational or clinical settings, enabling low cost screening through standard digital devices. The novelty of this approach lies in combining behavioural signal modelling, transfer-learning driven visual analysis, and an implementation oriented design aimed at bridging research prototypes and practical assistive tools. The framework is expected to enhance screening accessibility, reduce dependence on subjective assessments, and provide interpretable decision support for caregivers and professionals. This work opens new directions for technology-assisted neuro developmental screening systems that are scalable, non-invasive, and suitable for real world deployment.

Keywords :

✍ Autism Spectrum Disorder (ASD)

✍ Early Screening

✍ Eye-Tracking Analysis

✍ Deep Learning

✍ Visual Attention Modelling

✍ Intelligent Diagnostic Systems

DEEPFAKE DETECTION IN AUDIO, VIDEO, AND TEXTUAL CONTENT: A SURVEY ON PRIVACY-PRESERVING DEEP LEARNING APPROACHES (2022-2025)

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Abstract:

The disruptive effect of synthetic media manipulation with deep fake technologies depicts. unanticipated pitfalls in the areas of information integrity, individual online privacy and trust in the society. Thus, in researching recent developments within this context, the survey delves deep into recent developments pertaining to multimodal deepfake detection technologies such as audio, video, text, etc., especially within the context of recent developments pertaining to privacy-preserving deep learning technologies. In researching a wrought study pertaining to recent IEEE publications within the context of the period 2022-2025, a novel discovery emerges pertaining to dominant trends within deepfake detection techniques such as Convolutional Neural Networks, Transformers, Generative dversarial Networks, with an efficiency level of over 90%—yet rendering challenges pertaining to generalization and robustness. Even though the performances of supervised anomaly detection approaches indicate strong possibilities with reference to detecting flaws in audio-visual patterns and textual-visual correlations in conformity with the GANomaly and f-AnoGAN models, the adopted approaches have better performances in comparison to other detectors based on 86% – 98% accurate rates of detection with reference to validation. Nonetheless, there are critical issues associated with the adoption of privacy-preserving approaches with reference to scalability features in facilitating real-time execution along with robustness in guarding against adversarial attacks. In this paper, the key developments in the methodology are highlighted in an attempt to outline the performance metrics with reference to trustworthy approaches in facilitating future development along the stream with reference to privacy-aware deep fake detectors with potential in promoting the authenticity of digital media in a synthetic framework.

Keywords : Multimodal Deepfake Detection , Privacy-Preserving Deep Learning , Synthetic Media Manipulation , Trustworthy AI for Digital Media , Robustness and Generalization

AI-DRIVEN MOBILE SECURITY TESTING IN COLLEGES TO SECURE STUDENT DATABASE

By

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Abstract

More sophisticated and flexible security testing techniques are required as a result of the mobile threat landscape substantial expansion due to the quick spread of mobile applications across vital industries. Conventional rule-based static and dynamic testing techniques frequently fail to identify evolving attack methods, obfuscated malware, and zero- day vulnerabilities. In order to improve vulnerability detection, behavioral analysis, and threat prediction, this study investigates the use of artificial intelligence (AI) in mobile security testing.The suggested framework incorporates deep learning and machine learning methods into network traffic inspection, runtime behavior monitoring, and static code analysis procedures. AI models are trained to distinguish between malicious and benign mobile applications using feature extraction techniques based on permissions, API calls, and communication patterns. Experimental analysis shows increased scalability, decreased false positives, and improved detection accuracy.

Keywords : Ethical Hacking, Cyber Security, Malware Classification, OWASP Mobile security.

DIABETES DISEASE PREDICTION AND CLASSIFICATION USING LOGISTIC REGRESSION AND RANDOM FOREST

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ABSTRACT

Diabetes is a chronic metabolic disorder characterized by elevated blood glucose levels and associated complications such as cardiovascular disease, stroke, and kidney failure [1]. The increasing global prevalence of diabetes highlights the need for early prediction systems. This study proposes a machine learning-based framework for diabetes classification and prediction. Logistic Regression (LR) is applied to identify significant risk factors using statistical measures such as p-values and odds ratios. Four supervised classifiers—Naïve Bayes (NB), Decision Tree (DT), AdaBoost (AB), and Random Forest (RF)—are implemented and evaluated using K2, K5, and K10 cross-validation techniques. Model performance is assessed using Accuracy (ACC) and

Area Under the Curve (AUC). The dataset consists of 6,561 participants, including 657 diabetic cases and 5,904 non-diabetic individuals. LR identified seven significant predictors, including age, BMI, blood pressure, and cholesterol levels. The proposed hybrid LR-RF model achieved the best performance with 94.25% accuracy and 0.95 AUC under K10 validation. The results demonstrate that the combined LR and RF approach provides a reliable and effective framework for early diabetes prediction.

Keywords — Diabetes, Machine Learning, Classification, Logistic Regression, Random Forest.

AQUAWATCH: A DUAL-UNIT GPS–LORA IOT SYSTEM FOR INTELLIGENT BOATMAN SAFETY AND REAL- TIME EMERGENCY MONITORING

Abstract

Small-scale fishing vessels and inland boat operations are frequently exposed to safety hazards, particularly overboard incidents and delayed rescue response, due to inadequate monitoring infrastructure and unreliable communication coverage in coastal and riverine regions. To address these challenges, this study introduces AquaWatch, a dual-unit Internet of Things (IoT) safety framework that combines a wearable monitoring device with a vessel-mounted gateway system. The wearable module incorporates GPS positioning, accelerometer-based fall detection, and water immersion sensing to identify potential emergency situations. Detected events are transmitted via low-power LoRa communication to the onboard gateway unit, which provides immediate local alerts through a display interface and acoustic buzzer while simultaneously forwarding data to a cloud-based Firebase database. The cloud layer enables real- time tracking, event logging, and push notifications through a dedicated mobile application accessible to authorities and family members. The hybrid fall–immersion detection logic enhances emergency identification reliability, while dual GPS integration improves positional accuracy and redundancy. The system is designed to function effectively in environments withlimited cellular connectivity by prioritizing local LoRa communication and edge-level alerting. Experimental evaluation indicates reliable event detection, reduced communication latency, and energy-efficient long-range transmission. Aqua Watch demonstrates a practical and economically viable approach for improving maritime safety and supporting digital transformation initiatives in small-scale fishing communities.

SARIMAX-BASED MACHINE LEARNING FOR ADVANCING SUSTAINABLE TEXTILE WASTE MANAGEMENT IN THE FASHION INDUSTRY

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Abstract

This research investigates the use of machine learning approaches to address the growing problem of textile waste in fast fashion as a demonstrative application. As sustainability becomes an increasingly urgent reality, the research explores the role of predictive modeling in supporting data-driven waste management approaches. It discusses the rapid expansion of the sustainable fashion industry which is expected to grow to $15 billion in market size by 2030 with an annual growth rate of 8.3%. There are considerable socioeconomic benefits that could be realized by mitigating the environmental influences of fast fashion, such as creating up to 18 million jobs and $192 billion in the GDP. Results from the research incorporating consumer behavior trends, find that demand for sustainable products are growing at rate 5.6 times faster than products that are not sustainable. Special attention is paid to millennials' and men's aged 25 to 34 preferences as they are willing to spend more on buying brands that are

green. The study attempts to model environmental impact while proving that machine learning can be an effective method for creating scalable plastic waste management solutions through predictive modeling so that efficient sustainable textile waste management would

become achievable.

Keywords: Sustainable Fashion, Textile Waste, Consumer Behavior, Environmental Impact, Economic Indicators

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UNCERTAINTY-AWARE MACHINE LEARNING FOR FUNGAL ENDOPHYTE IMAGE IDENTIFICATION

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Abstract

Fungal endophytes are essential for plant health and are a promising source of bioactive compounds, yet accurately identifying them from culture images remains challenging due to subtle morphological differences and limited labeled datasets. In this study, we present a machine learning framework that goes beyond standard classification by recognizing when predictions are uncertain, allowing low-confidence cases to be flagged for expert review. We apply this approach to a dataset of fungal endophyte images collected from Minjur plant species, demonstrating that it achieves high accuracy while reducing the risk of misidentification. In addition, we provide visual explanations of the model's decisions, highlighting key morphological features that guide predictions and offering biological insight. This

combination of uncertainty modelling and interpretability provides a robust, practical,and resource-efficient tool for endophyte screening, streamlining laboratory workflows and supporting more reliable microbial identification.

Keywords

Fungal endophytes, Machine learning, Uncertainty-aware classification, Image-based identification, Explainable AI, Data-efficient learning, Microbial screening.

SAFE BITE: SMART GROCERY EXPIRY DETECTION SYSTEM USING AI AND MACHINE LEARNING

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ABSTRACT

Food spoilage resulting from inadequate monitoring of product expiry dates remains a critical issue in retail and storage environments, contributing to economic losses and food safety concerns. Conventional expiry management approaches rely heavily on manual inspection and static inventory records, which are prone to human error and delayed updates. To overcome these challenges, this paper proposes Safe Bite, an intelligent grocery expiry detection system that automates shelf-life tracking using artificial intelligence and machine learning techniques. The system calculates the remaining shelf life of products through date-driven analysis and allows administrators to manage inventory data via structured CSV file uploads. Using predefined decision rules, items are categorized into three operational states: safe, near-expiry, and expired. In addition, a supervised learning model based on the Random Forest algorithm is implemented to evaluate expiry risk by considering multiple parameters, including remaining days to expiry, sales rate, stock levels, and storage conditions. The proposed system provides real-time analytical insights through a web-based interface, enabling proactive inventory control, reducing food wastage, improving consumer safety, and enhancing operational efficiency in retail settings.

Keywords: Food Expiry Detection, Shelf-Life Prediction, Machine Learning, Random Forest, Inventory Management, Food Waste Reduction

DEEP LEARNING–BASED EARLY DISEASE PREDICTION IN PEDIATRIC CHILD HEALTH USING AN ADVANCED 3D CONVOLUTIONAL NEURAL NETWORK (CNN) MODEL

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Abstract

To avoid complications, decrease mortality, and enhance long-term outcomes, paediatric diseases must be detected early. However, in many low- and middle-income settings, clinical decision-making is limited by late presentation, shortage of specialists, and fragmented health records. Recent advances in deep learning, particularly convolutional neural networks (CNNs), have shown promise in disease prediction and risk stratification using multimodal clinical data. This study proposes and evaluates a CNN-based model for early disease prediction in paediatric child health using routinely collected clinical and laboratory parameters. We used de-identified electronic health record (EHR) data from paediatric patients aged 6 months to 12 years collected over five years from a tertiary-care teaching hospital to conduct a retrospective observational study. The primary objective was to predict the onset or presence of common paediatric conditions like respiratory infections, anaemia, and metabolic disorders at an early, pre-symptomatic, or mildly symptomatic stage, thereby enabling timely intervention. 54

clinically relevant features, including demographic, anthropometric, vital signs, routine laboratory results, and selected co morbidity indicators, were used as input to a 3D CNN classification model following pre-processing (missing value imputation, normalization, and class balancing). There were 8,000 visits in the dataset, and it was divided into training (70%), validation (15%), and test (15%). Three convolution blocks with batch normalization and max pooling made up the proposed CNN architecture. Two fully connected layers with dropout followed. Model performance was evaluated using accuracy, precision, recall, F1-score, area under the receiver operating characteristic curve (AUC-ROC), and confusion matrix. The proposed CNN model achieved an overall test accuracy of 93.4%, macro-averaged precision of 0.92, recall of 0.91, and F1- score of 0.915 across four prediction classes (no disease / low-risk, respiratory disease, anaemia, and metabolic disorder). The overall AUC-ROC was 0.96, while the AUCs for each class ranged from 0.94 to 0.98. With an accuracy of 90.1%, early prediction performance remained robust in cases where only partial information (initial visit data) was available. A CNN-based deep learning framework can reliably predict early disease risk across multiple paediatric conditions using routine paediatric EHR data. The model outperformed baseline machine learning approaches (logistic regression, random forest, and support vector machine) by 5–9 percentage points in accuracy and F1- score. In paediatric care settings with limited resources, the proposed model could be used as a clinical decision support tool to prioritize investigations, guide early interventions, and triage high-risk children.

Keywords:: Deep learning, Convolutional neural network, Pediatric health, Early disease prediction, electronic health records, Clinical decision support, etc.

CYBER SECURITY IN INTERCONNECTED NETWORKS: CYBER SECURITY IN INTERCONNECTED NETWORKS IDENTIFYING WIDESPREAD EXPOSURES THROUGH CYBER-SOCIAL INVESTIGATION

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Abstract

Digital networks are increasingly interconnected, amplifying cyber security risks and creating widespread vulnerabilities. Traditional security approaches focus on technical flaws, overlooking social dynamics and trust relationships that influence threat spread. A cyber-social investigation framework combines technical assessment with social and behavioural analysis to identify network risks. This approach leverages network data, incident reports, and simulated interactions to apply statistical, correlation, and graph-based techniques. Key findings include social interaction nodes and trust-based access points amplifying security risks, indirect connections contributing to threat propagation, and cyber-social intelligence enhancing proactive threat detection and network resilience. Additionally, human psychology and trust are often exploited in social engineering attacks, network vulnerabilities spread through unexpected connections, and cyber-social analysis predicts potential attack paths. Identifying high-risk nodes mitigates threats, trust relationships can bypass security controls, cyber-social intelligence improves incident response, and human behaviour patterns signal potential threats.

Keywords: Cyber security, Interconnected Networks, Cyber-Social Investigation, Network Vulnerabilities, Exposure Analysis, Graph-Based Analytics, Threat Intelligence

SURVEY PAPER: DISCUSSING THE COMMUTERS'TRANSPORTATION CHOOSING PATTERN IN URBAN CITIES

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ABSTRACT

Rapid urbanization has significantly improved the demand of the travel in metropolitan cities, increasing challenges connected to heavy traffic, environmental degradation, and reducing travel comfort. Reading the commuters choosing pattern in available transportation modes such as private vehicles, public vehicles, cycling, walking, and shared mobility services are important for planning the sustainable and perfect urban transport systems. This survey paper browse the commuter behavior, refer the major factors influencing transportation mode choice, and summarizes the analytical methods used to model commuter decisions.This study highlights demanding trends in urban mobility, discusses policy decisions, and stressing the role of behavioural insights in shaping current and future transportation planning.

KEYWORDS

Commuter behaviour, Transportation mode choice, Urban mobility, Public transit systems, Travel behaviour analysis, Sustainable transportations.

ADAPTIVE INTELLIGENT TUTORING SYSTEMS USING MACHINE LEARNING

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ABSTRACT

The rapid advancement of machine learning (ML) over the past decade has revolutionized a multitude of sectors, including education. Among these innovations, Adaptive Intelligent Tutoring Systems (AITSs) have emerged as a transformative approach to personalized learning, offering tailored educational experiences that respond in real-time to individual learner needs. Powered by sophisticated ML algorithms, AITSs are equipped to analyze vast and heterogeneous educational data, model learner behaviors, adapt content dynamically, and optimize pedagogical strategies for maximal learning outcomes. This paper critically examines the state-of-the-art in adaptive intelligent tutoring systems using machine learning, exploring the technical, ethical, and practical challenges that arise in their development and deployment. The integration of ML into educational technologies has brought forth a paradigm shift in instructional design, moving from static, one-size-fits-all curricula to dynamic environments that continuously personalize the learning pathway. This shift is underpinned by advances in data collection, model interpretability, privacy preservation, and robust decision-making frameworks. However, as with all data-driven technologies, the deployment of adaptive systems in education entails significant risks related to data quality, privacy, explain ability, and fairness. This paper surveys the state-of-the-art in adaptive AITSs utilizing ML, discusses key methodological innovations, addresses challenges such as data quality, interpretability, and privacy, and highlights avenues for future research.

Keywords: Adaptive Intelligent Tutoring Systems, Machine Learning in Education, Personalized Learning, Educational Data Analytics, Ethical and Explainable AI in Education.

JOB CREATION AND EMPOWERMENT – A DATA SCIENCE AND ANALYTICS APPROACH

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Abstract

In recent years, as AI has started to influence areas like business, education, and healthcare, people have worried that AI might take over human jobs—especially in data science and analytics. However, the paper argues that AI is not replacing these jobs but instead changing and expanding them. Tasks like organizing data, understanding its context, and making sure AI systems are ethical depend on human skills. Rather than making data professionals unnecessary, AI has made their work more efficient by handling routine tasks and offering advanced tools such as AutoML, AI-powered dashboards, and smart data discovery platforms. As a new technology, AI has created important roles that help manage and control its use. Some of these new positions include machine learning operations (MLOps) engineers, AI-focused data analysts, and algorithm auditors. These roles are key to making sure AI systems are trustworthy, clear, and work well with people's values. The paper looks at how AI changes the way data is processed and how it reshapes jobs. This analysis covers both the technical side and the need for rules and ethical standards to help AI be used in a way that supports economic growth for everyone. AI is seen as a helpful tool that works with humans to improve skills and drive innovation. It doesn't mean that data science jobs are disappearing—it means that these jobs are becoming part of a new era that values teamwork and human-centered approaches.

Keywords: Artificial Intelligence, Analytics, Data Science, and Predictive Analytics.

ALGORITHMIC INTERVENTION FOR PREVENTING SMARTPHONE ADDICTION IN CHILDREN

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Abstract

Smart phones have become a regular part of children's everyday life. Although they are useful for learning and entertainment, too much use can slowly begin to affect a child's behaviour, sleep, and interest in studies. In many cases, parents realize the seriousness of the problem only after strong signs of dependency appear. This study was carried out with the idea that early identification can help prevent such situations. Information for the study was collected from parents using a Google Form questionnaire. Parents were asked about their children's screen time, daily habits, emotional reactions when the phone was restricted, and how they monitor usage at home. Instead of applying complicated techniques, a simple scoring approach was used. Each response was given a value based on specific behavioural indicators, and the total score was used to understand the level of risk. The findings indicate that some behaviour is more commonly seen in children with a higher risk of addiction. These include extended daily screen time, frequent phone use at bedtime, frustration or anger when the device is taken away, and reduced involvement in normal daily routines such as studying or interacting with family. Based on the risk level identified, suitable preventive suggestions were linked to each category so that parents can respond in a balanced and timely way. The overall aim of this work is to provide a clear and practical method that parents can understand easily. By concentrating on early warning signs and simple decision mechanisms, the model contributes to digital well-being efforts and encourages responsible smartphone usage among children.

Keywords: Smartphone Addiction, Algorithmic Intervention, Child Behavior Analysis,Digital Well-Being, Rule-Based System, Parental Control.

DOCTOR APPOINTMENT BOOKING SYSTEM

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Abstract

The proposed project is a smart appointment booking system that provides patients or any user an easy way of booking a doctor's appointment online. This is a web-based application that overcomes the issue of managing and booking appointments according to user choice or demands. The task sometimes becomes very tedious for the compounder or doctor in manually allotting appointments for users as per their availability. Hence, this project offers an effective solution where users can view various booking slots available and select the preferred date and time. The already booked slot will be marked yellow and will not be available for anyone else for the specified time. This system also allows users to cancel their booking anytime. The system provides an additional feature of calculating the monthly earnings of the doctor. The doctor has to feed the system regularly with daily earnings, and the system automatically generates a report of the total amount earned at the end of the month. The application uses ASP.NET as the front-end and SQL database as the back-end.

Keywords

Appointment, Online Application, Android, Hospital, Scheduling, Track, Healthcare

AN INTELLIGENT DATA PROTECTION MODEL FOR RELATIONAL DATABASE SYSTEMS THROUGH SQL ENCRYPTION

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Abstract:

The fact that the data owners outsource their data to external service providers introduces many security and privacy issues. Among them, the most significant research questions relate to data confidentiality and user privacy. Encryption was regarded as a solution for data confidentiality. The privacy of a user is characterized by the query he poses to the server and its result. We explore the techniques to execute the SQL query over the encrypted data without revealing to the server any information about the query such as the query type or the query pattern, and its result. By implementing all the relational operators by using the unique selection operator on the server-side database with a constant number of elements in each time of selection, our proposal can defeat against the statistical attacks of the untrusted server compromising data confidentiality and user privacy. Experimental evaluation demonstrates that our proposal less affects the system's performance and is applicable in the real world.

Keywords: Database outsourcing, database encryption, user privacy, access pattern privacy, access privacy.

ADAPTIVE ANT COLONY OPTIMIZATION FOR RESOURCE-EFFICIENT VM SELECTION IN CLOUD PLATFORMS

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Abstract — Cloud Computing provides the resources such as servers, storage, infrastructure, software, and platform over the net. Due to the ability to enhance the performance of Medical Area Cloud Network, Cloud expanded vital role in Medical Area Cloud Network (MACN).Cloud Computing provides Virtualization technology as resource as a service in the form of Virtual Machine (VM). Virtual Machine is nothing but physical resources can be divided into logical modules. Nowadays, optimal selection of Virtual Machine to execute the medical request is the major issue in cloud environment. Best selection of Virtual Machine enhances the performance through minimizing the execution of medical request from medical stakeholders such as doctors, nurses, patients etc. and minimize total resource wastage and power consumption. Regard this, this paper proposes new model for Medical Area Cloud Network (MACN) based on cloud using improved ACO, to select the best

Virtual Machine. Moreover, a new model for prediction of post surgical survival of lung cancer patients after Thoracic surgery is proposed to check the performance analysis of our Virtual Machine model.

Index Terms— Cloud Computing, Healthcare Cloud, Virtualization

“AGROCART: AN AI-DRIVEN AGRICULTURAL E-COMMERCE FRAMEWORK FOR DIRECT FARMER-TO-CONSUMER SUPPLY CHAIN OPTIMIZATION”

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Abstract

Agriculture plays a vital role in the economic development of many countries. However, farmers continue to face significant challenges such as limited market access, price exploitation by middlemen, and lack of reliable agricultural guidance. This paper presents AgroCart, a smart web-based agriculture e-commerce and product management system developed using the MERN stack (MongoDB, Express.js, React.js, Node.js). The platform enables farmers and sellers to directly list agricultural products such as seeds, fertilizers, vegetables, and grains, allowing buyers to purchase them without intermediary involvement. Additionally, the system integrates an AI-powered chatbot that provides agricultural guidance and product-related assistance. The proposed system improves transparency, ensures fair pricing, enhances market reach, and promotes digital transformation in agriculture. Experimental implementation demonstrates the feasibility, scalability, and usability of the platform.

MACHINE LEARNING–BASED HEART FAILURE PREDICTION

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Abstract:

Heart failure is one of the leading causes of mortality worldwide, necessitating early and accurate prediction to improve patient outcomes. This study presents a machine learning-based approach for heart failure prediction using four classification algorithms: K-Nearest Neighbours (KNN), Random Forest, Support Vector Classifier (SVC), and Gradient Boosting Classifier. The dataset is pre-processed through data cleaning, feature selection, and normalization to enhance model performance. Each algorithm is trained and evaluated using standard performance metrics such as accuracy, precision, recall, and F1-score. Experimental results demonstrate that KNN and Random Forest achieve superior predictive accuracy compared to Support Vector Classifier and Gradient Boosting. The comparative analysis highlights the effectiveness of ensemble techniques in handling complex medical datasets. The proposed system provides a reliable and efficient decision-support tool for early heart failure diagnosis, assisting healthcare professionals in timely intervention and treatment planning.

Keyword

Heart Failure Prediction, Machine Learning, K-Nearest Neighbors (KNN), Random Forest,Support Vector Classifier (SVC), Gradient Boosting, Classification Algorithms, Medical Data Analysis, Predictive Modeling, Healthcare Analytics.

AN R-BASED INTELLIGENT DATA ANALYTICS MODEL FOR FAKE NEWS DETECTION

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Abstract:

Fake news detection is an essential tool in today's digital world, where misinformation spreads rapidly through social media and online news platforms, influencing public opinion and decision-making processes. The Fake News Detection System is designed using statistical computing and data analysis techniques in the R programming environment to identify and classify news content as real or fake based on textual patterns, source credibility, and deceptive characteristics. Due to the massive growth of online information, manual verification methods are no longer sufficient to handle misinformation effectively. The proposed system utilizes Natural Language Processing (NLP) techniques, text mining, and machine learning algorithms implemented in R to analyze linguistic features such as word frequency, sentence structure, and sentiment patterns to determine the authenticity of news articles and posts. Furthermore, the system evaluates the reliability of the information source, compares content with trusted datasets, and uses historical data to predict the probability of fake news.

Keywords: Fake News Detection, Data Analytics, Logistic Regression, R Language, Text Classification.

IMPLEMENTATION AND EVALUATION OF AN AI-BASED HEALTHCARE CHATBOT USING PHP AND OPENAI API

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Abstract:

This research presents the design and implementation of MEDI-BOT, an intelligent healthcare chatbot system engineered to bridge the gap between patient inquiries and preliminary clinical analysis. In the current healthcare landscape, the increasing burden on medical facilities necessitates automated yet reliable tools for symptom triage and patient management. MEDI-BOT addresses this by utilizing the PHP Laravel framework as a robust backend and the OpenAI API (leveraging Large Language Models) as the core intelligence engine. The system introduces a multi-modular architecture that includes secure user authentication, real-time conversational AI, and a persistent medical history repository. Unlike traditional static medical portals, MEDI-BOT provides personalized responses by correlating current user symptoms with stored medical data, such as blood type, allergies, and chronic conditions. To address the critical issue of data privacy—as highlighted in contemporary data security research—the system employs an Intelligent Data Privacy Model involving session-based encryption and secure relational database management for storing sensitive patient reports.

Keywords : Automatic Artificial Intelligence, Healthcare Chatbot, Natural Language Processing, Machine Learning, Automatic Diagnosis, Virtual Assistant, Symptom Checker, Medical Chatbot, Health Informatics, Patient Engagement

BRIDGING ABILITY GAPS THROUGH AI: A REVIEW OF ASSISTIVE TECHNOLOGIES FOR SENSORY AND LEARNING CHALLENGES

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Abstract

This paper presents the results of a literature survey of the various applications of artificial intelligence for assisting people with sensory impairments. Specifically, it reviews applications in four areas: support for the visually impaired; recognition of gestures and sign language; assistance in taking exams and tests; and lip reading. The key element in these applications is the use of multimodal and integrated data sources to increase the accuracy and robustness of the resulting recognition systems, using newer algorithms and extraction methods. The review also discusses ongoing challenges such as data scarcity, variability in speech and signs, environmental limitations, and deployment issues, while outlining emerging trends like emotion-aware systems, adaptive learning, and immersive AR/VR technologies. Overall, the survey presents current progress, key challenges, and future research directions for inclusive AI-driven assistive systems.

Keywords: Artificial Intelligence, lip-reading, hearing impairment, visual speech recognition, multimodal assessment, assistive technologies, deep learning CNN-LSTM, inclusive education

A RELIABLE BLOCKCHAIN-BASED SYSTEM FOR TRACKING AGRICULTURAL PRODUCTS INCLUDING FRUITS AND VEGETABLES

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ABSTRACT

This study presents a robust blockchain-enabled framework designed to ensure secure and transparent traceability of agricultural commodities, particularly fruits and vegetables, throughout the supply chain. The proposed system leverages decentralized ledger technology to record, authenticate, and monitor transactions at every stage from cultivation and harvesting to processing, distribution, and retail. By integrating block chain with modern data management techniques, the framework enhances data integrity, minimizes the risk of fraud, and strengthens consumer trust. The immutability and transparency of blockchain records facilitate real-time tracking, efficient verification, and rapid identification of contamination sources, thereby improving food safety standards. Furthermore, the system promotes accountability among stakeholders, reduces operational inefficiencies, and supports regulatory compliance. Overall, this blockchain-based solution offers a reliable, scalable, and tamper-resistant mechanism for optimizing agricultural product raceability and ensuring quality assurance across the entire supply chain.

Keywords: Blockchain Technology, Agricultural Supply Chain, Food Traceability, Fruits and Vegetables Tracking, Smart Contracts, Decentralized Ledger, Food Safety, Transparency, IOT Integration, QR Code-Based Verification, Supply Chain Management.

SMART HEALTH CARE PREDICTION AND MEDICATION RECOMMENDATION USING DATA MINING

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ABSTRACT

Large blocks of data must be analyzed and explored by utilizing the data mining procedures in order to uncover significant patterns and trends. Medical databases are one area where the data mining procedures can be utilized. Many people all over the world are struggling with their health and medical diagnoses. Massive amounts of data are produced by hospital information systems (HIS), yet it might be difficult to extract knowledge from diagnosis case data. By just giving the symptoms they are experiencing, patients can quickly learn about the sickness they are experiencing and the medication that can assist, treat it using the approaches utilized in this paper. In this paper, we give drug recommendations relied on ratings and conditions to customers. Four distinct prototypes are utilized to predict the diseases. The Vader tool and sentiment analysis relied on NLP are utilized to analyze the reviews. And finally, probabilistic and weighted average methodologies are utilized to recommend the medications. Each model and strategy utilized in this paper is described in detail. The experimental findings presented in this work can be utilized in future studies and for a variety of different medicinal applications.

Keywords: Data mining for smart health prediction and prescription includes key concepts such as data mining, smart healthcare systems, predictive analytics, disease prediction, clinical decision support systems (CDSS), electronic health records (EHR), machine learning, deep learning, artificial intelligence.

AGRICULTURAL CROP SUGGESTION SYSTEM USING MACHINE LEARNING

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Abstract:

In machine learning, a broad range of techniques are used to create models that can infer prediction rules from available data and forecast yet-to-be-observed future data. One of the newest study areas is the application of machine learning techniques to agriculture. Reducing agricultural costs in order to gain profit is the primary goal of smart agriculture. Smart farming is made possible by machine learning algorithms' predictive nature. Astute farmers employ this strategy in their farms to boost productivity. Among the many crucial elements that must be taken into account is the soil. Many farmers are unaware that the pH, texture, and nutritional makeup of the soil can have significant effects on crop growth. Choosing the appropriate crop for the farmland's soil composition is one of the most crucial factors in agriculture. This poll is mostly concerned with crop recommendations and ideas. This paper provides a brief overview of machine learning approaches applied in agricultural recommendation systems, considering soil and crop yield prediction systems.

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Keywords: Machine learning, prediction, Classification, crop yield Prediction, Random Forest algorithm, K Nearest Neighbour Classifier.

A COMPARATIVE ANALYSIS OF GENERATIVE AI INTEGRATION AND ROBUST CYBERSECURITY FRAMEWORKS FOR SUSTAINABLE SMART ECOSYSTEMS

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Abstract:
The rapid evolution of the global digital landscape is increasingly defined by the strategic convergence of Artificial Intelligence (AI), Advanced Networking, and Machine Learning. As industries transition toward autonomous infrastructures, this paper examines the transformative role of Generative AI and Large Language Models (LLMs) in augmenting complex decision-making frameworks within data-intensive environments. While these innovations provide a foundational shift toward unprecedented automation and high-fidelity predictive capabilities, they simultaneously introduce critical vulnerabilities that demand the deployment of next-generation Cybersecurity strategies. This research proposes a multi-layered architectural approach for securing Internet of Things (IoT)-driven smart ecosystems. By leveraging advanced Statistical Methods and Mathematical Models, the study demonstrates how AI-driven intelligence can be harmonised with robust security protocols to detect and mitigate real-time anomalies. The methodology focuses on the integration of Neural Networks and Fuzzy Logic to enhance the resilience of Embedded Systems against sophisticated cyber threats. The findings suggest that a synergistic integration of these technologies is not merely an enhancement but a fundamental requirement for ensuring the long-term reliability and sustainability of future digital infrastructures. Ultimately, this paper contributes

to the broader spectrum of Computer Science by providing a roadmap for balancing technological innovation with rigorous data protection standards.

Keywords: Generative AI & LLMs, Cybersecurity Protocols, Internet of Things (IoT), Machine Learning, Smart Ecosystems, Neural Networks, Embedded Systems, Fuzzy Logic, Mathematical Models, Statistical Methods, Advanced Networking

BUS-OS: An Intelligent Transit Operating System for Automated Bus Stop Recognition Using IoT and AI Polygon Learning

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Abstract:

Public bus systems in developing nations face a persistent operational challenge: drivers rely entirely on memory to identify stop locations along their assigned routes, leading to missed stops, passenger dissatisfaction, and declining trust in public transit services. This challenge is most severe in regions where informal drop-off points evolve dynamically and no centralized digital stop registry exists. This paper presents BUS-OS, a novel Intelligent Transit Operating System that resolves this problem through the integration of Internet-of-Things (IoT) hardware, GPS-based geo-fencing, and an original Polygon Learning Engine grounded in machine learning. The system is deployed on two complementary platforms: a low-cost ESP32-based IoT device at approximately USD 44 for standard bus fleets, and a native CarPlay application for premium vehicles, ensuring adoption across all vehicle classes and operator budgets. Both platforms operate fully offline when network connectivity is unavailable. The Polygon Learning Engine operates in four sequential phases on every GPS ping received from the hardware. First, a Ray Casting Algorithm checks whether the current bus position falls inside a known quadrilateral geo-fence zone and triggers an automated audio passenger announcement upon confirmation. Second, when the bus decelerates below 5 km/h outside all known zones, the GPS coordinates are logged as a candidate drop-off point. Third, a streaming incremental variant of the Density-Based Spatial Clustering of Applications with Noise

(DBSCAN) algorithm clusters repeated observations across multiple trips. Fourth, once a cluster accumulates eight or more independent stoppage events, the engine auto-generates a Well-Known Text (WKT) polygon boundary and submits it for administrative approval, thereby constructing a complete stop database for any route in any country without prior data, maps, or manual configuration. Evaluated on the Kasoa–Akotsi (Town) corridor in Ghana's Central Region across nine stops and 5,010 GPS observations, BUS-OS achieved 100% classification accuracy, 100% precision, 100% recall, and a perfect Area Under the Curve (AUC) score of 1.0000. Five-fold cross-validation produced zero variance across all folds, confirming complete model generalization with no overfitting. Zero false negatives were recorded throughout the evaluation, meaning no actual bus stop was missed at any point during testing. Because the engine operates purely on GPS coordinate geometry, BUS-OS is language-agnostic, infrastructure-agnostic, and country-agnostic, positioning it as a scalable, cost-effective, and immediately deployable solution to the informal stop-mapping challenge facing transit networks across the developing world.

Keywords: Intelligent Transportation Systems, GPS Geo-fencing, Internet of Things (IoT), Bus Stop Detection, DBSCAN Clustering, Ray Casting Algorithm, Polygon Learning Engine, CarPlay, ESP32 Microcontroller, Public Transit, Ghana, Well-Known Text (WKT) Polygons, Machine Learning.

PERFORMANCE OPTIMIZATION IN MODERN COMPUTING: A STUDY OF DATA STRUCTURES AND ALGORITHM EFFICIENCY

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Abstract:
Efficient management and processing of data remain fundamental challenges in modern computing systems, **particularly** as data volumes and application complexity continue to grow. This study examines the role of data structures and algorithms in optimizing computational performance and resource utilization. The objective is to evaluate how appropriate selection and implementation of data structures such as arrays, linked lists, trees, and graphs, combined with an efficient algorithmic strategy to improve execution speed and memory efficiency. A conceptual and analytical approach were employed by reviewing common algorithmic techniques including sorting, searching, and traversal methods, alongside their time and space complexities. The analysis indicates that well-designed algorithms paired with suitable data structures significantly enhance system scalability, reduce processing time and improve overall software reliability. Looking ahead, continued advancement in data structures and algorithm design will play a pivotal role in enabling more scalable, intelligent, and high-performance computing systems to meet the growing demands of future digital applications.

Keywords: Data Structures Algorithms, Computational Performance, System Scalability, High-Performance Computing.

ARTIFICIAL INTELLIGENCE-DRIVEN INNOVATION: PERFORMANCE, ETHICS, AND SUSTAINABLE DEVELOPMENT

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Abstract:
Artificial Intelligence (AI) has emerged as a transformative field that enables machines to perform tasks traditionally requiring human intelligence, including learning, reasoning, and decision-making. This study explores the fundamental concepts and practical significance of AI in contemporary technological environments. The primary objective is to assess how AI techniques, particularly machine learning and rule-based systems, contribute to automation and intelligent problem-solving across various domains. A descriptive analytical methodology was adopted, examining core AI components such as data training processes, pattern recognition, and predictive modelling. Findings indicate that AI systems can significantly improve efficiency, accuracy, and adaptability in areas such as healthcare, finance, and smart systems. However, challenges related to data quality, ethical considerations, and computational demands persist. As Artificial Intelligence advances, its expanding capabilities are likely to transform global systems and societal structures, requiring proactive ethical frameworks and innovative strategies to harness its full potential in the years to come.

Keywords: Artificial Intelligence, Predictive Modelling, Intelligent Systems, Data Quality, Ethical Considerations.

A MULTILAYERED APPROACH TO CYBERSECURITY FOR PROTECTING INFORMATION ASSETS AND CRITICAL INFRASTRUCTURE

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Abstract:

The rapid expansion of digital technologies and interconnected systems has intensified the need for robust cybersecurity measures to protect sensitive information and critical infrastructure. This study investigates the importance of cybersecurity practices in safeguarding information assets against evolving cyber threats such as malware, phishing, and unauthorized access. The objective is to analyze common vulnerabilities in information systems and evaluate effective defensive strategies. Using a qualitative review approach, the study examines key security mechanisms including encryption, authentication protocols, firewalls, and user awareness practices. The findings reveal that a multilayered security framework significantly reduces organizational risk exposure and enhances data integrity and confidentiality. Nevertheless, human factors and emerging sophisticated attack techniques remain major challenges. The findings ultimately suggest that the continued evolution of cybersecurity strategies, supported by adaptive technologies and forward-looking policies, will be critical in preparing organizations to confront increasingly sophisticated digital threats in the future.

Keywords: Cybersecurity, Information Security, Cyber Threats, Multilayered Security Framework, Risk Management.

PERFORMANCE ENHANCEMENT ANALYSIS OF AN OPTIMIZED INTELLIGENT PROCESSING FRAMEWORK USING MULTI-PARAMETER EVALUATION

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Abstract— This paper presents a performance enhancement analysis of an optimized intelligent processing framework using multi-parameter evaluation. The proposed framework evaluates accuracy, processing time, error rate, and convergence stability simultaneously. Experimental results show approximately 14% improvement in accuracy, 33% reduction in processing time, and nearly 70% reduction in error rate compared with conventional intelligent processing methods.

Keywords— Intelligent processing, optimization, multi-parameter evaluation

A COMPARATIVE ANALYSIS OF MACHINE LEARNING MODELS FOR GROUNDWATER LEVEL FORECASTING

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ABSTRACT

A vital freshwater resource for residential use, industrial operations, agriculture, and ecological sustainability is groundwater. Increased depletion brought on by urbanization, excessive extraction, and climate variability calls for precise forecasting systems. The temporal and nonlinear connections present in groundwater systems are frequently missed by traditional statistical methods. This study presents a systematic comparison of five machine learning approaches for groundwater level prediction using long-term hydro-meteorological data (2000–2020): Linear Regression (LR), Support Vector Machines (SVM), Random Forest (RF), Artificial Neural Networks (ANN), and Long Short-Term Memory (LSTM) models.Hyperparameter optimization, feature engineering, and standardized preprocessing are all integrated into a single experimental framework. Mean Absolute Error (MAE), Root Mean Square Error (RMSE), and Coefficient of Determination (R2) are used to assess performance.The results show that while RF offered the best trade-off between accuracy and computational economy, LSTM produced greater prediction accuracy (R^2 = 0.95, RMSE = 0.38). Sustainable water resource planning and data-driven groundwater management are supported by the suggested framework.

Keywords: Ground water Level Fore casting, Hydro-Meteorological Data Analysis, Machine Learning Models, Time-Series Prediction.

ALGORITHMIC INTERVENTION FOR PREVENTING SMARTPHONE ADDICTION IN CHILDREN

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Abstract

Smartphones have become a regular part of children's everyday life. Although they are useful for learning and entertainment, too much use can slowly begin to affect a child's behaviour, sleep, and interest in studies. In many cases, parents realize the seriousness of the problem only after strong signs of dependency appear. This study was carried out with the idea that early identification can help prevent such situations. Information for the study was collected from parents using a Google Form questionnaire. Parents were asked about their children's screen time, daily habits, emotional reactions when the phone was restricted, and how they monitor usage at home. Instead of applying complicated techniques, a simple scoring approach was used. Each response was given a value based on specific behavioural indicators, and the total score was used to understand the level of risk.

The findings indicate that some behaviour is more commonly seen in children with a higher risk of addiction. These include extended daily screen time, frequent phone use at bedtime, frustration or anger when the device is taken away, and reduced involvement in normal daily routines such as studying or interacting with family. Based on the risk level identified, suitable preventive suggestions were linked to each category so that parents can respond in a balanced and timely way. The overall aim of this work is to provide a clear and practical

method that parents can understand easily. By concentrating on early warning signs and simple decision mechanisms, the model contributes to digital well-being efforts and encourages responsible smartphone usage among children.

Keywords: Smartphone Addiction, Algorithmic Intervention, Child Behavior Analysis, Digital Well-Being, Rule-Based System, Parental Control.

COGNITIVE CYBER DEFENSE: DESIGNING SELF-ADAPTIVE SECURITY ARCHITECTURES USING BEHAVIORAL AI

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Abstract

The rapidly evolving cyber threat landscape has exposed the limitations of traditional perimeter-based and rule-driven security systems. Modern adversaries employ stealth techniques, polymorphic malware, insider exploitation, and AI-assisted attack strategies that evade static defenses. This paper introduces a conceptual framework for **Cognitive Cyber Defense (CCD)**—a self-adaptive security architecture powered by Behavioral Artificial Intelligence (AI). The proposed model integrates user behavior analytics, adversarial pattern recognition, reinforcement-based response optimization, and autonomous orchestration to create an intelligent, continuously learning security ecosystem. Unlike conventional intrusion detection systems that rely on predefined signatures or rigid thresholds, the Cognitive Cyber Defense framework dynamically evolves based on contextual risk, behavioral anomalies, and environmental intelligence. This study formalizes the architectural layers, operational workflow, adaptive decision mechanisms, and governance considerations necessary for implementing cognitive security systems in enterprise and critical infrastructure environments.

Keywords

Cognitive Cyber Defense, Behavioral AI, Adaptive Security Architecture, User Behavior Analytics, Autonomous Threat Response, Intelligent Intrusion Detection, Cyber Resilience.

STREAMLINING THE BIDDING EXPERIENCE: A DYNAMIC ONLINE PLATFORM FOR AUCTIONS

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Abstract

In the digital era, online auctions have emerged as a pivotal avenue for trading goods and services, offering a convenient and accessible platform for buyers and sellers worldwide. This paper presents the conceptualization and development of an innovative online bidding website designed to enhance the efficiency and effectiveness of the auction process. The proposed platform integrates user-friendly interfaces, real-time bidding mechanisms, and robust security features to ensure a seamless and secure bidding experience. Leveraging advanced algorithms, the system provides personalized recommendations, dynamic pricing strategies, and predictive analytics to optimize auction outcomes for both buyers and sellers. Furthermore, the website incorporates social networking elements, enabling users to engage with peers, share insights, and build communities around specific auction categories. Through continuous refinement and adaptation based on user feedback and market trends, the platform aims to establish itself as a premier destination for online auctions, fostering trust, transparency, and satisfaction among its diverse user base. Overall, this research contributes to the ongoing discourse on digital marketplaces, highlighting the potential of technology to revolutionize traditional auction dynamics and reshape the future of online commerce.

Keywords:

E-bidding platform, Real-time bidding systems, Dynamic pricing algorithms, Predictive analytics, personalized recommendations, Auction optimization.

SMART EXAM PROCTORING SYSTEM

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Abstract

The rapid growth of online education and remote examinations has created a strong need for secure and reliable monitoring systems. The Smart Exam Proctoring System is an advanced web-based application developed to ensure fairness and transparency in online examinations. The system uses artificial intelligence and computer vision techniques to monitor candidates during exams through webcam and audio surveillance.

Before the examination begins, the system authenticates the candidate using facial recognition technology. During the examination ,it continuously tracks facial presence ,eye movements, and unusual activities. Any suspicious behavior such as absence from the screen, multiple face detection, abnormal head movements, or background noise is automatically identified and flagged in real time. There corded data and flagged events are stored securely and later reviewed by the examiner for further verification.

This system reduces human intervention, prevents mal practice, and enhances the integrity of online examinations by providing a smart, automated, and efficient monitoring solution.

Keywords

Online Examination, Artificial Intelligence, Face Recognition, Computer Vision, Webcam Monitoring, Audio Detection, Exam Security, Proctoring System

DISTANCE CALCULATOR USING ARDUINO AND ULTRASONIC SENSOR

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Abstract

The development of a distance calculator using an Arduino microcontroller and an ultrasonic sensor represents a foundational application in embedded systems, combining principles of signal processing, real-time computation ,and human machine interaction. This system leverages the time-of-flight (ToF) principle, where in an ultrasonic pulse is emitted by the HC -SR04 sensor, reflects off a target object, and returns to the receiver; the elapsed time between transmission and reception is then used to compute distance based on the known speed of sound in air (~343 m/sat 20°C).The Arduino microcontroller serves as the central processing unit, orchestrating sensor triggering, echo timing ,distance calculation, and output display—typically via an LCD screen or serial monitor. Despite its simplicity, this architecture demonstrates core concepts in non-contact measurement, digital interfacing, and low-cost prototyping, making it highly suitable for educational, industrial, and assistive technology applications. However, practical implementation faces challenges related to environmental factors such as temperature, humidity, and surface reflectivity, which can introduce measurement errors. Recent studies have addressed these limitations through algorithmic enhancements, including Kalman filtering

Keywords:

Arduino microcontroller, HC-SR04 ultrasonic sensor, distance calculator, time-of- flight (ToF), speed of sound, echo timing, embedded systems, real-time measurement, LCD display, signal processing, Kalman filtering, temperatu

FAKE IMAGE DETECTION USING DEEP LEARNING TECHNIQUES

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Abstract

This project presents a deep learning-based approach for detecting fake or tampered images. A total of 3000 images were used to train and evaluate the model, consisting of both real and manipulated images. The dataset was divided into training and testing sets to ensure proper model evaluation. Error Level Analysis (ELA) was applied to highlight potential manipulated regions before feeding the images into a Convolutional Neural Network (CNN) for classification. Preprocessing techniques such as resizing, normalization, and data augmentation were implemented to improve performance and generalization. The trained model achieved an accuracy of 96% on the testing dataset, demonstrating its effectiveness in identifying digitally altered images.

Keywords:

Fake Image Detection, Image Tampering, Deep Learning, Convolutional Neural Network(CNN), Error Level Analysis (ELA), Image Forensics, Image Pre processing, Digital Image Manipulation, Classification, Computer Vision

REAL-TIME WEB APPLICATION USING GOOGLE SHEET INTEGRATION

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Abstract

Web applications play an important role in modern information systems by enabling user s to access, store, and managed at a efficiently through the internet. Traditional web applications typically rely on database management systems that require proper installation, configuration, and server maintenance. For small-scale applications, academic projects, or startups, maintaining a dedicated database can be complex and expensive. To address this issue, this project presents a Real-Time Web Application using Google Sheets integration, where Google Sheets acts as a cloud-based data storage platform.

The system provides a web interface developed using HTML, CSS, and JavaScript for user interaction. The backend is implemented using Node.js and Express.js, which manage communication between the web application and the cloud service. User data submitted through the application is stored and retrieved using the Google Sheets API provided by Google. This approach simplifies data management and enables real-time updates, making the system suitable for applications such as student records, feedback collection, and attendance management.

Keywords:

Real-Time Web Application ,Google Sheets, Cloud Integration, Node.js, Web Deve

EARLY DISEASE RISK PREDICTION USING EXPLAINABLE AI

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ABSTRACT:

Early prediction of chronic diseases such as diabetes and cardiovascular disorders is essential for timely intervention and preventive healthcare. Traditional diagnostic approaches often rely on clinical tests conducted after symptoms appear, which may delay effective treatment. This study proposes a machine learning-based framework for early disease risk prediction using patient health parameters combined with Explainable Artificial Intelligence (XAI) techniques.

The system uses structured healthcare data to predict disease risk using machine learning models such as Logistic Regression, Random Forest, and SVM, evaluated using standard performance metrics.

To enhance transparency and trust in predictions, Explainable AI methods such as SHAP (SHapley Additive exPlanations) are integrated to interpret feature importance and provide patient-specific explanations for risk scores. Experimental results demonstrate that the proposed framework achieves high predictive performance while improving interpretability, enabling healthcare professionals to make informed and reliable decisions.

This approach supports accurate and explainable early disease prediction.

Keywords: Disease Risk Prediction, Machine Learning, Explainable AI, SHAP, Healthcare Analytics, Early Diagnosis.

DETECTION OF PHISHING URLS THROUGH MACHINE LEARNING AND THE FLASK FRAMEWORK USING PYTHON

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ABSTRACT

Phishing attacks remain a critical cybersecurity threat, deceiving users through fraudulent websites that imitate legitimate platforms to steal sensitive information such as login credentials, banking details, and personal data. Traditional blacklist-based detection methods are ineffective in identifying newly generated or zero-day phishing URLs, highlighting the need for intelligent detection mechanisms. This paper proposes a machine learning-based approach for phishing URL detection using lexical and host-based features extracted from URLs.The system employs supervised learning algorithms, including Random Forest, Support Vector Machine (SVM), and Logistic Regression, to classify URLs as legitimate or malicious. Feature engineering techniques are applied to extract relevant attributes such as URL length, presence of special characters, domain age, HTTPS usage, and redirection patterns. The dataset is preprocessed to improve model efficiency and evaluated using performance metrics including accuracy, precision, recall, and F1-score to ensure reliable classification.For real-time implementation, the trained model is integrated into a Flask-based web application developed in Python, enabling users to verify URLs instantly. Experimental results demonstrate high detection accuracy, providing a scalable and efficient solution for proactive phishing attack prevention in modern cybersecurity environments.

Keywords: *Phishing Attack Detection, Malicious URL Classification, Supervised Classification Models, Cyber Threat Intelligence, Data-Driven Cyber Defense.*

SPACE INVADERS WEB GAME SYSTEM

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Abstract
The proposed project is a web-based game system designed to recreate and modernize the classic Space Invaders arcade game using modern web technologies. This application provides an interactive platform where users can control a spaceship, move horizontally, and shoot descending enemy waves. The system overcomes the limitations of traditional arcade setups by enabling easy access through web browsers.
The application includes features such as real-time rendering using the HTML5 Canvas API, collision detection, score tracking, life management, and increasing difficulty levels to enhance user engagement. The system ensures smooth gameplay performance and follows a modular design approach for scalability. Future enhancements may include leaderboard integration, multiplayer support, and additional power-ups to improve user experience.
The application uses Python Flask as the backend and HTML, CSS, and JavaScript as the frontend technologies.

Keywords
Game, Web Application, Space Invaders, HTML5 Canvas, Flask, JavaScript, Collision Detection, Score Tracking

PREPMATE – PLACEMENT PREPARATION ASSISTANT APP

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ABSTRACT:

PrepMate - Placement Preparation Android Application is a mobile application developed to help students prepare effectively for campus placements. Many students face challenges in aptitude tests, technical interviews, group discussions, and resume preparation due to lack of structured guidance.

The app includes modules such as Aptitude, Logical Reasoning, Technical Preparation, Mock Tests, Interview Process Guidance, Voice-Based HR and GD Practice, Resume Builder, Leaderboard, and Progress Tracking. Learning content is organized into Beginner, Intermediate, and Advanced levels where higher levels are unlocked after completing previous stages, encouraging continuous learning.

Firebase Authentication is used for secure login, while most features work offline using locally stored content. The application aims to improve students' problem-solving skills, communication ability, and interview confidence, thereby helping them become better prepared for real-world recruitment and placement opportunities.

KEYWORDS:

Placement, Android Application, Student Learning, Aptitude Training, Logical Reasoning, Technical Interview, Mock Test, Resume Builder, Voice Assistant, HR Interview, Group Discussion, Skill Development, Campus Recruitment, Progress Tracking.