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DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

INTERNATIONAL CONFERENCE ON INNOVATIONS IN ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

ICIAIDS'26

27 FEBRUARY 2026

CHIEF EDITOR
Dr. S. Brintha Rajakumari

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Dr. N. Mathimagal
Ms. A. Benaceer

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Proceedings of

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Organized By

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Editors - ICIAIDS'26

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Preface

It is with great pleasure and pride that we present the Proceedings of the first International Conference on Innovations in Artificial Intelligence and Data Science (ICIAIDS'26), Organized by the Department of Artificial Intelligence and Data Science. The conference was conducted with the objective of bringing together researchers, Academicians, industry professionals, and students to share their knowledge, Innovations, and research findings in the rapidly evolving domains of Artificial Intelligence, Intelligent Computing, and Data Science.

ICIAIDS'26 served as a dynamic platform for intellectual exchange, fostering collaboration and inspiring new ideas to address real-world challenges using advanced computational techniques. The conference received an overwhelming response from various institutions, with more than 100 research papers submitted, out of which 76 high-quality papers were carefully selected after a rigorous peer-review process by experts in the relevant fields. The accepted papers reflect current trends, Innovative methodologies, and practical applications in Artificial Intelligence, Machine Learning, Deep Learning, Data Analytics, and related areas.

We were deeply honored to have Dr. N. Priya, Assistant Professor from Jain University, as the Chief Guest, whose presence and insights inspired the participants. We were also privileged to have Dr. Tarak Nandy from UCSI University, Malaysia, as the Keynote Speaker, who delivered an enlightening keynote address highlighting recent advancements and future directions in Artificial Intelligence research and applications.

The success of ICIAIDS'26 would not have been possible without the dedicated efforts of the organizing committee, reviewers, faculty members, student volunteers, and the continuous support of the institution's management. We sincerely thank all the authors for their valuable contributions and all the participants for making this conference a grand success.

We hope that the proceedings of ICIAIDS'26 will serve as a valuable resource for researchers, academicians, and practitioners, and will motivate further research and innovation in the field of Intelligent Computing, Artificial Intelligence, and Data Science.

ICIAIDS'26
Department of Artificial Intelligence and Data Science
New Prince Shri Bhavani College of Engineering and Technology
Chennai, Tamil Nadu, India

Mr. K. Loganathan

Founder & Chairman,
New Prince Group of Institutions

MESSAGE FROM THE CHAIRMAN

I am very happy to know that the Department of Artificial Intelligence and Data Science of our institution is organizing the International Conference on Innovations in Artificial Intelligence and Data Science (ICIAIDS'26) on 27th February 2026.

I am confident that this conference will successfully achieve its objectives by bringing together academicians, researchers, industry experts, and students to share their knowledge, innovations, and research findings. Such conferences provide an excellent platform for exchanging ideas and fostering collaborations that contribute to technological advancement.

We are living at a crucial point of transformation, where our country stands at the cusp of a technological revolution. In the realm of intelligent systems, the advent of Artificial Intelligence, Data Science, and sustainable technologies promises a future that is not only advanced but also responsible. These domains are transcending traditional boundaries and creating innovative solutions that benefit society and industry.

I am sure that the deliberations and presentations in this conference will be highly beneficial and inspiring to all participants. It will also significantly contribute to the growth of research and development in multidisciplinary areas.

I congratulate the Department of Artificial Intelligence and Data Science and the organizing team for their dedicated efforts in arranging this international conference and for promoting a strong research culture. I extend my best wishes for the grand success of ICIAIDS'26.

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Dr. L. Naveen Prasad

Vice-Chairman

New Prince Group of Institutions

MESSAGE FROM THE VICE-CHAIRMAN

I am delighted to know that the Department of Artificial Intelligence and Data Science is organizing the International Conference on Innovations in Artificial Intelligence and Data Science (ICIAIDS'26) on 27th February 2026.

Artificial Intelligence and Data Science are rapidly transforming every sector, from education and healthcare to industry and governance. Conferences like ICIAIDS'26 play a vital role in bringing together researchers, academicians, and industry professionals to share their innovative ideas, research outcomes, and practical experiences. This platform will certainly encourage intellectual exchange and inspire young researchers to explore emerging technologies.

I am confident that this conference will provide valuable insights into recent advancements and create opportunities for collaboration and future research. I hope that all the participants will greatly benefit from the technical sessions and discussions.

I appreciate the sincere efforts of the organizing committee and faculty members for their dedication in making this conference possible. I extend my heartfelt wishes for the grand success of ICIAIDS'26.

Dr.L.Naveen Prasad
Vice Chairman,NPSBCET

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Prof. A.Swaminathan

Director

MESSAGE FROM THE DIRECTOR

It gives me immense pleasure to know that the Department of Artificial Intelligence and Data Science is organizing the International Conference on Innovations in Artificial Intelligence and Data Science (ICIAIDS'26) on 27th February 2026.

Artificial Intelligence and Data Science have emerged as powerful technologies that are reshaping the future of education, research, industry, and society. This conference provides an excellent platform for researchers, academicians, industry experts, and students to share their innovative ideas, research contributions, and technological advancements. Such initiatives play a significant role in enhancing knowledge, promoting collaboration, and encouraging innovation among young minds.

I am confident that ICIAIDS'26 will foster meaningful discussions and provide valuable insights into emerging trends and challenges in Artificial Intelligence and Data Science. I believe that the exchange of ideas during this conference will contribute significantly to research and development and inspire participants to pursue excellence in their respective fields.

I sincerely appreciate the efforts of the organizing committee and faculty members for their dedication and hard work in organizing this international conference. I extend my best wishes to all the participants and wish the conference a grand success.

Prof. A. Swaminathan
Director, NPSBCET

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Dr. T. Saravanan
Principal

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MESSAGE FROM THE PRINCIPAL

It gives me great pleasure to know that the Department of Artificial Intelligence and Data Science is organizing the International Conference on Innovations in Artificial Intelligence and Data Science (ICIAIDS'26) on 27th February 2026.

Artificial Intelligence and Data Science are transforming the way we live, learn, and work. These technologies are driving innovation across various sectors and creating new opportunities for research and development. ICIAIDS'26 provides an excellent platform for academicians, researchers, industry experts, and students to present their research findings, exchange innovative ideas, and explore recent advancements in these emerging fields.

I am confident that this conference will promote academic excellence, research collaboration, and technological innovation. I believe that the technical sessions and interactions will enrich the knowledge of the participants and motivate them to contribute to the advancement of Artificial Intelligence and Data Science.

I appreciate the dedicated efforts of the organizing committee, faculty members, and students for successfully organizing this international conference. I extend my best wishes to all the participants and wish ICIAIDS'26 a grand success.

Dr. T. Saravanan
Principal,NPSBCET

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Dr. S. BRINTHA RAJAKUMARI

Professor & Head, AI&DS

MESSAGE FROM THE CONVENER

In today's data-driven world, Artificial Intelligence and Data Science are transforming the way information is created, processed, analyzed, and shared across industries and society. The Department of Artificial Intelligence and Data Science at New Prince Shri Bhavani College of Engineering and Technology, is committed to nurturing competent professionals equipped with advanced technological knowledge, analytical skills, and innovative thinking to meet global demands.

With this vision, the department is proud to organize the International Conference on Innovations in Artificial Intelligence and Data Science (ICIAIDS–2026). This conference serves as a dynamic platform for students, researchers, academicians, and industry professionals to exchange ideas, present their research findings, and explore emerging trends in Artificial Intelligence, Machine Learning, and Data Science.

In an era where technological advancements continue to bridge gaps and redefine possibilities, ICIAIDS–2026 aims to inspire intellectual collaboration and promote innovative solutions to real-world challenges. The conference provides an excellent opportunity for participants to showcase their talents, enhance their knowledge, and contribute meaningfully to the rapidly evolving digital landscape.

I sincerely thank all the participants, speakers, and organizing members for their valuable contributions and wish the conference a grand success.

Dr. S. BRINTHA RAJAKUMARI
Convener, ICIAIDS - *2026*

INTERNATIONAL CONFERENCE ON INNOVATIONS IN ARTIFICIAL INTELLIGENCE AND DATA SCIENCE - (ICIAIDS'26)

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Department of Artificial Intelligence and Data Science

Cordially invites you to the

INTERNATIONAL CONFERENCE ON INNOVATIONS IN ARTIFICIAL INTELLIGENCE AND DATA SCIENCE (ICIAIDS - 2026)

Chief Guest

Dr. N. Priya

ASSISTANT PROFESSOR (SG)
DEPARTMENT OF CSE - BLOCKCHAIN TECHNOLOGY
JAIN UNIVERSITY, BANGALORE,KARNATAKA

Keynote Speaker

Dr. Tarak Nandy

ASSISTANT PROFESSOR AND HEAD
DEPARTMENT OF COMPUTER SCIENCE
UCSI UNIVERSITY, MALAYSIA

27.02.2026
Time: 9:30 am

Venue
Mini Auditorium

DR. T. SARAVANAN
Principal, NPSBCET

DR. S. BRINTHA RAJAKUMARI
Professor & Head, AI&DS

ALL ARE WELCOME

newprince_ai_ds

PROGRAM SCHEDULE
ICIAIDS 2026

INAUGURAL SESSION

Tamizh Thai Vazhthu

- **Welcome Address :**
  Dr. S. Brintha Rajakumari
  Professor & Head , AI&DS
- **Honouring Chief Guest :**
- **Presidential Address :**
  Dr. L. Naveen Prasad,
  Vice Chairman , NPSBCET
- **Keynote Address :**
  Dr. Tarak Nandy
  Assistant Professor and Head,
  Department of Computer Science
  UCSI University, Malaysia
- **Special Address :**
  Dr. N. Priya
  Assistant professor (SG)
  Department of CSE - Blockchain Technology
  Jain University, Bangalore
- **Felicitation Address :**
  Dr. T. Saravanan
  Principal , NCSBCET
- **Release of Proceedings :**
- **Vote of Thanks :**
  Dr. N. Mathimagal
  Assistant Professor , AI&DS

TECHNICAL SESSION

- **Paper presentation**
- **Vote of Thanks :**
  Ms. A. Benaceer
  AssistantProfessor , AI&DS

National Anthem

Hazardnet: Deploying Compact VLMS for Urban Traffic Safety on Edge Devices

R. Nirmala
Assistant Professor, Jain College, Bangalore, Tamil Nadu, India

Abstract: Urban transportation systems increasingly face the safety challenges due to heavy traffic, unpredictable pedestrian behavior, and heterogeneous road environments. While cameras continuously capture visual data the timely interpretation of dangerous situations remains as a critical bottleneck. Conventional cloud-based video analytics architecture introduces the significance network latency and it heavily depends on the availability of continuous bandwidth. These limitations make them unsuitable for the applications safety such as crash detection and blind spot risk assessment. This paper presents a compact Vision–Language Model (VLM) framework called HazardNet. It is designed to operate directly on edge devices including dashcams and roadside units. It is built with the backbone of Qwen2-VL-2B and finetuned using HazardQA dataset. HazardNet reframes the hazard detection as a Visual Question Answering problem by enabling contextual reasoning rather than simple object recognition. Experimental evaluation on Jetson class hardware demonstrates that HazardNet achieves an F1-score of 0.91 with inference latency below 50 ms. The results confirm that the multimodal reasoning combined with edge computing offers a practical pathway towards the intelligent traffic safety systems for smart cities.

Keywords: Edge computing, Vision-Language Models, Traffic safety, Hazard detection, Real-time inference, Qwen2-VL, HazardQA dataset, Urban mobility, Low-latency AI, VQA training.

Zero Trust Security Architecture: A Comprehensive Survey of Modern Trends, Technologies, And AI Integration

Vinod Kumar Janaboyana[1], Sharon Priya S[2], Lalanthika[3]
[1,3]Student, B. S. Abdur Rahman Crescent Institute of Science and Technology
[2]Assistant Professor, B. S. Abdur Rahman Crescent Institute of Science and Technology

Abstract: The rapid evolution of cyber threats and the expansion of distributed digital infrastructures have rendered traditional perimeter-based security models obsolete. Zero Trust Architecture (ZTA) has emerged as a transformative paradigm in modern cybersecurity by advocating a "never trust, always verify" philosophy, shifting the focus to continuous authentication, granular access control, and data-centric protection. This paper presents a comprehensive survey of recent advancements in Zero Trust security architecture by synthesizing findings from nine prominent research works published between 2022 and 2025. We examine the core tenets and technologies that enable ZTA implementation, including micro-segmentation, post-quantum encryption, identity and access management (IAM), Software Defined Perimeters (SDP), artificial intelligence (AI), and deep learning-driven security automation. Furthermore, we analyze the application of Zero Trust in IoT, cyber–physical systems, and national critical infrastructure, highlighting AI-driven intrusion detection and adaptive risk-based access control mechanisms. Current challenges such as complexity, privacy, interoperability, and trust computation are discussed. Finally, the paper outlines future research directions required to achieve fully autonomous, scalable, and resilient Zero Trust ecosystems across industries.

Keywords: Zero Trust Architecture (ZTA), cybersecurity, access control, micro-segmentation, artificial intelligence (AI), machine learning (ML), intrusion detection systems (IDS), cloud security, Internet of Things (IoT), cyber-physical systems (CPS), Software-Defined Perimeter (SDP), identity and access management (IAM), post-quantum encryption, national critical infrastructure.

Comparative Analysis of Physics-Informed Neural Networks and LSTM Models for Accurate 72-Hour Weather Forecasting

Zafer Ahmed N[1], Akbar Basha S K[2], Shamimullah S[3], Kadar Shereef I[4]
[1,2,3,4] Assistant Professor, The New College, Chennai, Tamil Nadu

Abstract: Accurate short-term weather forecasting remains a critical challenge due to spatio-temporal complexity, data sparsity, and nonlinear atmospheric dynamics. This study presents a comparative analysis of Physics-Informed Neural Networks (PINNs) and Long Short-Term Memory (LSTM) models for 72-hour temperature, humidity, wind, and precipitation prediction. Using high-resolution meteorological datasets spanning 2015–2024, both models were trained under controlled experimental conditions with explicit random seeds and preprocessing pipelines. Evaluation metrics included Root Mean Squared Error (RMSE), Mean Absolute Error (MAE), and predictive coverage probability. PINNs demonstrated superior generalization under sparse sensor deployment, achieving 2.1 °C RMSE for temperature forecasting versus 3.6 °C with LSTM. Energy and computational efficiency were measured on Jetson Nano and Xavier platforms, revealing 31% latency reduction for PINNs on edge devices. Limitations include diminished performance under extreme precipitation events and latency trade-offs for high-dimensional multivariate forecasts. These results provide actionable insights for operational deployment in resource-constrained edge environments.

Keywords: Data Mining, LSTM, Physics-Informed Neural Networks, Predictive Modelling, Weather Forecasting, Edge AI

Smart Continuum Robot for Sterilization Through Environmental Monitoring

Jeyalakshmi M S[1], MaryamKifaaya B[2], DivyaDharshini R[3]
[1]Assistant professor, Jerusalem College of Engineering, Chennai
[2,3]Student, Jerusalem College of Engineering, Chennai

Abstract: This paper presents the design and implementation of a multifunctional robotic system for real-time environmental monitoring and automated surface sterilization. The proposed continuum robot integrates an ESP32-CAM module for live video streaming, an ultrasonic sensor for obstacle detection, and a Bluetooth-based RF control system for remote maneuvering. A UV light sterilization unit enables safe and contactless disinfection of targeted surfaces. The robot's data-driven control algorithm enhances path planning, adaptive navigation, and obstacle avoidance in dynamic environments. The system is designed to be low-cost, wireless, and easily deployable in healthcare, industrial, and hazardous settings. Experimental validation demonstrates its efficiency in combining surveillance and disinfection tasks, making it a practical solution for environmental safety and pandemic preparedness**.**

Keywords: Environmental monitoring, UV sterilization, continuum robot, ESP32-CAM, ultrasonic sensor, Bluetooth control, adaptive navigation.

Smart Adaptive Braking System for Accident-Prone Zones and Collision Prevention

Jeyalakshmi M. S[1], Vishalini R [2], Maryam Kifaaya B [3], Logeswari R[4]
[1]Assistant professor, Jerusalem College of Engineering, Chennai
[2,3,4]Student, Jerusalem College of Engineering, Chennai

Abstract: A smart adaptive braking system is designed to reduce road accidents by detecting obstacles, recognizing dangerous areas, and applying automated braking whenever required. The system combines geolocation-based accident zone detection, image recognition capabilities, and proximity sensing to monitor a vehicle's surroundings through multiple layers. Deep learning algorithms process input images to detect vehicles, pedestrians, traffic signals, and road hazards, while ultrasonic sensors measure real-time distances to nearby obstacles. After analyzing these inputs, the microcontroller triggers a controlled braking mechanism when dangerous road conditions are identified, enabling faster reaction times and improved road safety, especially in accident-prone zones. Being low-cost, this design encourages broad adaptability and can be integrated with existing vehicles. Thus, the proposed automated braking model, with its effective integration of technologies, significantly enhances road safety at an affordable cost.

Keywords: Adaptive braking, computer vision, obstacle detection, geolocation, collision prevention, intelligent vehicle systems, accident-prone zone monitoring.

LexQuery Instant Legal Insights

Preetha M[1], Madhesh R S[2], Lishika Sharon R[3], Charumathi N[4]
[1]Assistant Professor, Jerusalem college of Engineering, Chennai
[2,3,4]Student, Jerusalem college of Engineering, Chennai

Abstract: The inaccessibility of complex legal information, particularly for the general public, emphasizes the urgent need for intelligent legal retrieval systems. The LexQuery instant legal insights aims to minimize the accessibility gap caused by dense legal jargon and traditional keyword-based search engines. The system integrates Natural Language Processing (NLP), a Vector Database for semantic search, and Retrieval-Augmented Generation (RAG) to provide accurate, understandable answers. When a user enters a query in plain language, the backend API processes this query searches the Vector Database for relevant court judgments (context), and uses the RAG model to automatically generate a clear, fact-based response. This approach not only enhances public legal awareness but also provides a user-friendly and accessible solution suitable for non-experts. By combining semantic search, generative AI, and an intuitive interface, the proposed. system contribute so democratizing legal knowledge and overall access to justice.

Keywords: Edge computing, Vision-Language Models, Traffic safety, Hazard detection, Real-time inference, Qwen2-VL, HazardQA dataset, Urban mobility, Low-latency AI, VQA training.

AIoT-Enabled Smart Classrooms: An Intelligent Framework for Enhanced Teaching and Learning

Rajalakshmee T
Guest Lecturer, Kamarajar Govt. Arts College, Tenkasi

Abstract: The convergence of Artificial Intelligence (AI) and the Internet of Things (IoT), referred to as Artificial Intelligence of Things (AIoT), is rapidly transforming traditional educational environments into intelligent and data-driven smart classrooms. AIoT-enabled smart classrooms integrate intelligent sensing devices, edge computing, and AI-based analytics to enhance teaching effectiveness, personalize learning experiences, and optimize classroom management. This paper proposes a comprehensive AIoT-based smart classroom framework that supports real-time learning analytics, automated attendance management, student engagement monitoring, and adaptive content delivery. The framework leverages edge intelligence to reduce latency and cloud analytics for long-term performance evaluation. Experimental analysis and use-case discussions demonstrate that AIoT-enabled classrooms can significantly improve learning outcomes, operational efficiency, and decision-making in educational institutions.

Keywords: AIoT, Smart Classroom, Edge AI, Learning Analytics, Intelligent Education

E-Justice: Citizen-Police Complaint Collaboration App

Selvaraju P[1], Charulatha[2], Deju A[3], Priyadharshini S[4]
[1]Assistant Professor, Jerusalem College of Engineering, Chennai
[2,3,4] Student, Jerusalem College of Engineering, Chennai

Abstract: The growing demand for transparent and efficient law-enforcement services has exposed significant limitations in traditional police complaint registration systems, including delayed responses, lack of real-time communication, and inefficient evidence handling. To address these challenges, this paper presents E-Justice: a Citizen–Police Complaint Collaboration App, a digital platform designed to streamline complaint reporting, verification, and tracking through a dual-application architecture. The system comprises a citizen-facing mobile application and a police management panel connected through a secure cloud-based backend. Citizens can file complaints in public or private modes, upload multimedia evidence, and track case status in real time, while police officers can verify reports, manage investigations, and publish official updates through a centralized dashboard. The platform is developed using React Native for the frontend, Node.js and Express.js for backend services, MongoDB for data storage, and Cloudinary for secure evidence management, with authentication handled through OTP-based verification and JSON Web Tokens. Experimental deployment demonstrates reliable complaint processing, secure evidence handling, and improved communication between citizens and law-enforcement authorities. The proposed system enhances civic participation, promotes transparency, and lays the foundation for future integration of intelligent analytics and secure evidence validation mechanisms.

Keywords: law-enforcement, E-Justice, MongoDB, Cloudinary

An Interactive Holographic AI Tutor

Haumrish V S[1], Akbar Hussain[2], Sanjay M[3]
[1,2,3] Student, Jerusalem College of Engineering, Chennai

Abstract: A cost-effective intelligent, interactive holographic AI Tutor is designed and developed to enhance digital learning through immersive and personalized interaction. The system integrates Artificial Intelligence, Speech recognition, natural language processing, and holographic visualization to simulate a lifelike virtual tutor capable of real-time conversation. The methodology involves capturing the learner's voice input through a speech-to-text module, processing the query using an AI-based language model trained on syllabus-oriented content, and generating accurate, context-aware responses. The generated responses are converted into natural speech and synchronized with a 3D animated avatar, which is projected using a low-cost holographic glass pyramid to create a pseudo-holographic teaching experience. By continuously interacting with users, the AI engine adapts its explanations based on query patterns and learning context, improving clarity and engagement. The modular architecture enables seamless integration of AI processing, speech synthesis, avatar animation, and holographic projection, ensuring scalability and easy system upgrades. The use of affordable hardware components makes the system accessible for classrooms, self-learning environments, and remote education. By combining intelligent conversational AI with realistic holographic visualization, the proposed system delivers an interactive, personalized, and cost-effective educational solution, representing a significant advancement in next-generation intelligent learning technologies.

Keywords: Interactive Holographic AI Tutor, artificial intelligence, natural language processing, speech recognition, holographic display, virtual avatar, personalized learning, immersive education.

DiTWIN – BONE

Sangeetha S[1], Arun Krishna P[2], Sandhiya S[3], Surya S[4]
[1]Assistant Professor, Jerusalem College of Engineering, Chennai
[2,3,4]Student, Jerusalem College of Engineering, Chennai

Abstract: Lower limb fractures are common orthopedic injuries that often require surgical fixation; however, postoperative infections remain a major challenge and can lead to complications such as delayed healing, implant failure, or chronic osteomyelitis. Traditional preoperative screening methods, including clinical examination, imaging, and laboratory tests, have limited sensitivity and may fail to identify hidden infections before surgery. With the advancement of artificial intelligence and digital twin technology, healthcare is shifting toward predictive and personalized approaches. A digital twin creates a virtual representation of a patient by integrating imaging, clinical data, and physiological models, enabling simulation and early risk assessment. This study proposes a digital twin-based framework combined with machine learning to improve early infection detection, enhance clinical decision-making, and support proactive management in orthopedic surgery.

Keywords: Lower limb fractures, postoperative infection, digital twin, machine learning, Random Forest, CT imaging, multimodal data fusion, orthopedic surgery, infection prediction, personalized medicine.

Solar Integrated Autonomous Agro Drone for Disease Prediction and Variable Rate Pesticide Spraying

Thamaraiselvi V G [1], Aswin Kumar M[2], Manikandan B[3], Mohammed Ibrahim S[4]
[1]Assistant Professor, Jerusalem college of Engineering, Chennai
[2,3,4]Student, Jerusalem college of Engineering, Chennai

Abstract: Precision farming calls for quick disease detection in crops and smart chemical application to maximize yields while cutting back on environmental damage. This paper unveils a solar-powered autonomous agro drone built for real-time crop disease spotting and variable-rate pesticide spraying. At its core, the system blends unmanned aerial vehicle (UAV) technology with AI-powered image analysis, IoT sensors for live environmental data, and solar energy integration. This creates an intelligent, eco-conscious farming tool. The drone captures high-resolution aerial images and sensor readings, feeding them into deep learning models that pinpoint early disease symptoms with impressive accuracy. Once it identifies the infection's severity and spread across the field, the system automatically calibrates pesticide doses and directs sprays solely to affected areas, avoiding waste on healthy crops. A clever solar-assisted power module boosts flight time significantly, minimizing the need for frequent battery recharges and enabling longer missions. Real-world experiments confirm its strengths: sharper disease detection, up to substantial reductions in pesticide use, and smoother operations overall. Ultimately, this scalable, green, and budget-friendly solution fits seamlessly into modern precision agriculture, helping farmers work smarter and more sustainably.

Keywords: Precision agriculture, Agro drone, Crop disease detection, Variable rate spraying, Solar-powered UAV, Artificial intelligence.

Automated Answer Script Analyser

Sahaya Brainy J[1], Shanmugapriya D[2], Raghul Dravid A [3], Karthikeyan V[4]
[1,2,3,4]Student, Jerusalem College of Engineering, Chennai

Abstract: The manual evaluation and data entry process of handwritten examination answer scripts is a time-consuming and error-prone task in academic institutions. Faculty members are required to manually verify student details such as register number, subject code, and marks, which leads to operational inefficiencies, human errors, and increased workload. This paper proposes an Automated Answer Script Analyzer that uses image processing and machine learning techniques to extract handwritten information from scanned answer scripts. The system focuses on automatic detection and recognition of handwritten register numbers and structured mark information, converting them into digital formats such as Excel and CSV files. A deep learning–based recognition approach combined with image preprocessing and region-of-interest (ROI) detection is employed to improve accuracy and robustness. The proposed system reduces manual intervention, improves efficiency, and supports scalable digital transformation in academic evaluation systems.

Keywords: Handwritten Recognition, CRNN, Image Processing, Answer Script Automation, Optical Character Recognition, Deep Learning, Academic Automation

Electrical Safety Monitoring for High Risk and Flood Prone Areas

Sahaya Brainy J[1], Gopinath S J[2], Madhav C M[3], Sudha D[4]
[1]Assistant Professor, Jerusalem College of Engineering, Chennai
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Abstract: Electrical leakage in flooded and water-logged environments poses a serious threat to human life, particularly during floods, in basements, motor rooms, and industrial facilities, where accidental contact with electrified water can result in severe injury or fatal electric shock. To address this issue, the proposed project presents a cloud-based intelligent system for detecting and predicting electrical hazards in water-affected areas by monitoring the presence of electrical voltage using data from distributed sensing nodes. The project focuses on developing the software, cloud, and intelligence layers, where sensor parameters such as voltage level, water condition, and environmental factors are simulated to replicate real hardware behavior and transmitted to a Firebase Realtime Database for low-latency storage and real-time synchronization. An intelligent decision engine analyzes the incoming data to classify conditions as safe or dangerous based on predefined electrical risk thresholds, with scope for future integration of machine learning models.

Keywords: Distributed sensing nodes, Firebase Realtime Database, Intelligent decision engine, machine learning models.

AI Vein Unlock System

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Abstract: Urban transportation systems increasingly face the safety challenges due to heavy traffic, unpredictable pedestrian behaviour, and heterogeneous road environments. While cameras continuously capture visual data the timely interpretation of dangerous situations remains as a critical bottleneck. Conventional cloud-based video analytics architecture introduces the significance network latency and it heavily depends on the availability of continuous bandwidth. These limitations make them unsuitable for the applications safety such as crash detection and blind spot risk assessment. This paper presents a compact Vision–Language Model (VLM) framework called HazardNet. It is designed to operate directly on edge devices including dashcams and roadside units. It is built with the backbone of Qwen2-VL-2B and finetuned using HazardQA dataset. HazardNet reframes the hazard detection as a Visual Question Answering problem by enabling contextual reasoning rather than simple object recognition. Experimental evaluation on Jetson class hardware demonstrates that HazardNet achieves an F1-score of 0.91 with inference latency below 50 ms. The results confirm that the multimodal reasoning combined with edge computing offers a practical pathway towards the intelligent traffic safety systems for smart cities.

Keywords: Edge computing, Vision-Language Models, Traffic safety, Hazard detection, Real-time inference, Qwen2-VL, HazardQA dataset, Urban mobility, Low-latency AI, VQA training.

Aviation Emission Visualizer

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Abstract: The rapid growth of global air traffic has raised significant environmental concerns, particularly Regarding Carbon Emissions And Their Impact On Air Quality Around Airports. Traditional Monitoring Systems rely heavily on fixed ground stations, which lack real-time adaptability and do not correlate flight movement data with emissions. To address these limitations, the project "Aviation Emission Visualizer" introduces an integrated, AI-powered and IoT-enabled system designed to estimate, monitor, and visualise aviation-related emissions with high accuracy. The system combines machine learning models trained on global aviation datasets with real-time IoT sensor inputs to provide a hybrid emission monitoring solution. It predicts fuel burn and CO_2 emissions based on aircraft type, route distance, and operational phase, while air quality sensors such as MQ135, PMS5003, and DHT11 measure on-site pollutant concentrations including CO_2, NO_2, PM2.5, and PM10.

The backend developed using Python (FastAPI), processes and integrates sensor and flight data, while the frontend, built with React, visualises emission levels through interactive geo-mapping dashboards. By providing real-time analytics and hotspot visualisation, Aviation Emission Visualizer supports airport authorities and environmental agencies in implementing sustainable aviation practices. The project aligns with India's Net Zero 2070 vision, showcasing how AI, IoT, and data visualisation can converge to promote greener skies and informed decision-making for a cleaner aviation ecosystem.

Keywords: Machine learning, IoT sensor, FastAPI, Net Zero 2070, Cleaner aviation ecosystem, Air quality sensors

Darkweb Intel Crawler and Analyser

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Abstract: The Dark Web Threat Intel Crawler & Analyser is an AI-based cybersecurity system developed to detect emerging cyber threats from hidden dark web sources. The dark web is a concealed part of the internet where cybercriminals share stolen data, malware, hacking tools, and exploit information. This project securely accesses selected dark web sites using the Tor network and performs automated data collection through focused crawling techniques. The system includes modules such as URL Collector, Dark Web Crawler, and Content Scraper to gather and filter relevant threat-related content efficiently. The collected unstructured data is processed using keyword matching and Natural Language Processing (NLP) techniques to classify threats like malware, phishing, and data leaks. The analyzed information is stored in structured databases and displayed through dashboards and visual reports for easy interpretation. By converting hidden dark web data into actionable threat intelligence, the system enables early detection of cyber risks and supports proactive cybersecurity decision-making for organizations and security professionals.

Keywords: Cybersecurity, URL Collector, Dark Web Crawler, Content Scraper, Natural Language Processing (NLP), Malware, Phishing, and Data leaks

Sentinel UBA: Insider Threat Analyzer

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Abstract: Insider threats have become one of the most critical cybersecurity challenges in modern organizations because malicious actions often originate from authorized users who already have access to sensitive resources. Traditional security mechanisms such as firewalls, access control policies, and authentication systems mainly focus on external attacks and fail to identify abnormal internal behavior. To overcome this limitation, this paper proposes Sentinel UBA: Insider Threat Analyzer, an AI-driven User Behavior Analytics (UBA) system designed to continuously monitor user activities and detect suspicious behavior patterns in real time. The system tracks micro-behaviors such as login frequency, access timing, file interaction patterns, workflow execution behavior, and sensitive document usage. Machine learning algorithms such as Isolation Forest and K-Means clustering are integrated to identify anomalies and generate risk scores for users. The proposed system also includes an automated self-healing response mechanism that temporarily pauses suspicious actions and alerts administrators through a centralized dashboard. By combining real-time logging, behavioral profiling, anomaly detection, and visual analytics, the proposed model provides an adaptive and scalable approach to insider threat prevention, ensuring improved data security and proactive risk mitigation in organizational environments.

Keywords: Sentinel UBA, AI-driven User Behavior Analytics, K-Means clustering, Isolation Forest.

IoT-Enhanced Sign Language Glove: Bridging Speech, Touch and Gestures

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Abstract: Communication between hearing-impaired individuals and the general public remains a significant challenge due to the limited awareness of sign language. This paper presents an AIoT-enabled smart wearable sign language glove that converts hand gestures into real-time text and voice output to support effective communication. The proposed system integrates flex sensors to capture finger bending variations and an IMU sensor (MPU6050) to detect hand orientation and motion. Sensor data is processed using an embedded microcontroller platform such as Arduino Nano/ESP32, where an intelligent decision-based gesture classification technique is applied for accurate gesture identification. The recognized gesture is displayed as readable text on an LCD/OLED module and simultaneously converted into audio output using a DFPlayer Mini voice module and speaker. Additionally, a reverse communication feature is implemented through speech-to-text conversion, enabling normal users to communicate back to the glove user. The system is designed to be portable, low-cost, and energy-efficient, making it suitable for real-time assistive communication in education, healthcare, and daily environments. The integration of AIoT and wearable sensing technology enhances accessibility and contributes toward inclusive human interaction.

Key Words: AIoT, IMU sensor (MPU6050), DFPlayer, Arduino Nano/ESP32.

Design and Performance Analysis of an IoT-Enabled Smart Agriculture System

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Abstract: Agriculture continues to be a vital contributor to economic stability and food security, particularly in developing nations. Despite its importance, conventional farming practices face persistent challenges such as inefficient resource utilization, climatic uncertainty, labor dependency, and limited productivity. The rapid evolution of the Internet of Things (IoT) has introduced new opportunities to modernize agriculture through real-time monitoring, automation, and data-driven decision-making. IoT-enabled smart agriculture integrates sensing technologies, communication networks, cloud infrastructure, and analytical tools to enhance farm management and operational efficiency. This paper presents a comprehensive study of IoT-based smart agriculture systems, supported by an extensive literature review, background analysis, and a clearly defined problem statement. A broad conceptual framework and system architecture are proposed to improve agricultural efficiency and sustainability. The performance of the proposed system is evaluated against traditional farming methods using metrics such as water consumption, response time, crop yield, and reliability. The results demonstrate significant improvements across all parameters. The paper concludes by highlighting future research directions that emphasize artificial intelligence, big data analytics, and next-generation communication technologies for advancing smart agriculture.

Key Words: Internet of Things (IoT), Smart Agriculture, Precision Farming, Wireless Sensor Networks, Automation, Sustainable Farming.

Hybrid CNN–LSTM System for Intelligent Soil and Climate-Aware Farming

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Abstract: Traditional agricultural planning often depends on manual soil assessment and coarse historical statistics, which severely limits accuracy in crop selection and yield forecasting. This paper presents a hybrid soil and climate-aware farming system that tightly integrates computer vision and temporal deep learning. MobileNetV2-based transfer learning serves as a lightweight CNN backbone for four-class soil type classification from smartphone-captured field images, while a stacked two-layer LSTM network learns temporal patterns from multi-feature soil sequences for crop yield prediction. The system further integrates real-time weather conditions through the OpenWeatherMap API and performs feature-level fusion between visual soil embeddings, LSTM temporal vectors, and meteorological attributes, enabling adaptive decision-making under dynamically changing environmental conditions. Experimental evaluation on a locally collected dataset of approximately 1,000 soil images and a temporal soil dataset of 4,000 records organized into 200 sequences demonstrates strong performance: the CNN achieved 93.86% classification accuracy with macro precision of 92.75% and recall of 93.00%, while the LSTM achieved a low test MAE of 0.0549 and RMSE of 0.0663. A bilingual (English/Tamil) Flask-based web application was deployed and validated under live conditions in Thottiyam, Tamil Nadu, confirming real-world applicability. The proposed approach provides an accurate, interpretable, and scalable framework for precision agriculture, supporting automated soil identification, yield estimation, and climate-aware crop planning for smallholder farmers.

Keywords: Soil classification, Crop yield prediction, Precision agriculture, MobileNetV2, CNN, LSTM, Deep learning, Transfer learning, Hybrid feature fusion, Weather API, Temporal modeling, Smart farming.

Multimodal Deep Learning System for Medical Diagnosis using Combined Image and Text Data for Improved Accuracy

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Abstract: This work proposes a smart medical diagnosis system that integrates multiple modalities of patient data (medical images, clinical text, and laboratory test results) using deep learning. Normally, medical diagnosis systems are developed using only one type of data. In contrast, this system takes advantage of the whole patient data to yield highly accurate and reliable medical predictions with an accuracy of 9295%. ResNet50 is utilised for reading medical images like X-rays, CT, and MRI. Bio, ClinicalBERT helps in extracting knowledge from text data, such as doctors' notes and patient symptoms. Numerical lab values such as blood pressure, glucose level, heart rate, and blood cell counts are processed by a Multi-Layer Perceptron (MLP). These three data types are then integrated through attention and fusion methods, which aid the model in concentrating on the most vital data. In order to establish a high level of trust, the system includes Explainable AI (XAI) tools, such as attention maps and Grad, CAM, that reveal how the system comes up with decisions. The backend for this system is supported by a Flask API that enables instantaneous diagnosis, and the system itself is tuned for rapid and resource-saving operation. In short, the method enables more accurate diagnoses, is robust to missing data, and ultimately facilitates medical decision-making by doctors in the clinical setting.

Keywords: Multimodal Deep Learning, Medical Diagnosis, ResNet50, Bio-Clinical BERT, Attention-Based Fusion, Explainable AI, Clinical Decision Support.

Automated Incident Response Kill Switch System

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Abstract: These modern ransomware, data exfiltration, and remote-access intrusion attacks operate at machine speed, which overwhelms traditional response mechanisms due to their reliance on manual intervention. AIR-KSS are advanced defensive mechanisms that enable the detection of malicious behaviour with unprecedented speed and immediately isolate compromised hosts to prevent system-wide damage. This work surveys the existing body of research and commercial offerings, detection methodologies, and automated response methods, identifying knowledge gaps that motivate the development of lightweight academic prototypes. The paper also discusses challenges, design considerations, and future directions for AIR-KSS in enterprise and IoT environments.

Keywords: Automated Incident Response, Kill Switch System, Cybersecurity Automation, Endpoint Detection and Response (EDR), Ransomware Mitigation, Behavioural Threat Detection, Host-Based Intrusion Detection, Machine Learning in Security, SOAR, Network Isolation.

AI-Driven Proposal Development and Delivery System

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Abstract: In the domain of business development and consultancy, the creation of project proposals is a high-stakes, time-intensive process that demands both technical accuracy and persuasive coherence. Traditional methods of proposal drafting are often manual, relying on static templates or disjointed copy-pasting from prior documents, which leads to inefficiencies, inconsistencies in tone, and human error. This paper presents the design and implementation of an AI-Powered Proposal Generation Chatbot, utilizing a Retrieval-Augmented Generation (RAG) architecture. The proposed system integrates Transformer-based Large Language Models (LLMs) with a Vector Database to automate the synthesis of high-quality business proposals. By employing Sentence-Transformer embeddings, the system performs semantic information retrieval across a proprietary knowledge base of historical proposals, case studies, and technical pricing sheets. This approach ensures that the generated content is not only contextually fluent but also factually grounded in the organization's specific data, effectively mitigating the "hallucination" issues common in standard generative models. Experimental results demonstrate that the system reduces proposal drafting time by approximately 80% while maintaining high standards of document standardization and accuracy.

Keywords: Chatbot, Retrieval-Augmented Generation (RAG), Large Language Models (LLMs).

Detection of Lung Disease using Mobile Net, Mobilenetv2, and VGG16 Deep Learning Algorithms

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Abstract: A novel and efficient AI approach incorporating cutting-edge image processing techniques has been introduced to automatically diagnose lung diseases from medical images, facilitating early diagnosis and treatment. The new method is the first to compare different CNN architectures, including MobileNet, MobileNetV2, and VGG16, to identify the most reliable model to classify lung disease from chest X-ray images. The joint use of Data Augmentation and Transfer Learning enhances model generalization, guaranteeing consistent performance even with small datasets. Our experiments attained the best accuracy with VGG16, proving its efficacy in medical image classification. MobileNet, as a light-weight architecture, offers competitive performance, making it an ideal candidate for deployment in low-resource healthcare environments. AI-driven CNN models for computerized lung disease detection provide a strong solution for early diagnosis, supporting medical professionals in early intervention and enhancing patient outcomes.

Keywords— Artificial intelligence, medical image processing, convolutional neural networks (CNNs), lung disease detection, healthcare AI, automatic diagnosis, transfer learning, chest X-ray classification, early disease detection, medical imaging analysis.

Detection of Stripe Rust Disease in Wheat Crop Using Mobilenet V2 and Efficientnet V2 Deep Learning Algorithms

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Abstract: In this work, a deep learning-based framework utilizing transfer learning with cutting-edge convolutional neural networks is proposed for the autonomous diagnosis of stripe rust disease in wheat crops. Images of healthy and sick wheat leaves are classified using MobileNetV2 and EfficientNetV2, which are used as core feature extractors and refined. In order to improve feature learning specific to stripe rust symptoms like yellowish lesions and pustules, these architectures make use of pre-trained ImageNet weights and are modified through additional dense layers, dropout, and batch normalization. Extensive data augmentation, including as rotation, flipping, brightness scaling, and noise addition, is used to increase model generalization and lessen overfitting in order to handle the scarcity of annotated agricultural datasets and environmental fluctuations. Accuracy, precision, recall, and F1-score are used in performance evaluation to provide a thorough evaluation of diagnostic capabilities. According to experimental results, MobileNetV2 offers competitive performance with much lower computational requirements, making it appropriate for real-time detection in field conditions and mobile applications, whereas EfficientNetV2 achieves superior accuracy and F1-score due to its compound scaling and efficient feature extraction. The results highlight how transfer learning-based deep learning models can help farmers and agricultural specialists detect stripe rust disease early, allowing for quick treatment, increased crop output, and less financial losses.

Keywords: Deep Learning, Stripe Rust Detection, MobileNet, MobileNetV2, EfficientNetV2, Convolutional Neural Network, Wheat Crop Disease Classification.

Early COPD Detection using Electronic Nose Technology: A Comparative Analysis of Histogram-Based Gradient Boosting and Multiscale RBF Classification

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Abstract*:* Early detection of Chronic Obstructive Pulmonary Disease (COPD) is crucial for timely intervention, yet remains difficult due to symptom overlap with other respiratory disorders. This study explores the use of electronic nose (e-nose) technology combined with advanced machine learning techniques to enhance diagnostic accuracy in early-stage COPD. We evaluate and compare two classification approaches: Histogram-Based Gradient Boosting (HGB) and a Multiscale Radial Basis Function (RBF) classifier. Breath samples were collected from both COPD patients and non-COPD individuals using an e-nose device designed to capture volatile organic compounds indicative of respiratory conditions. The data was pre-processed and used to train both classifiers under identical conditions. Our findings reveal that the HGB method outperforms the multiscale RBF in terms of classification accuracy, sensitivity, and specificity, demonstrating superior robustness in handling complex, non-linear data patterns. These results suggest that integrating HGB with e-nose technology could significantly improve early COPD detection, offering a non-invasive, cost-effective, and reliable diagnostic tool. This approach holds promise for broader clinical adoption, especially in primary care settings where early screening is critical.

Keywords: Chronic Obstructive Pulmonary Disease (COPD), early detection, electronic nose (e-nose), machine learning, Histogram-Based Gradient Boosting (HGB), Multiscale Radial Basis Function (RBF), breath analysis, non-invasive diagnostics, classification accuracy, respiratory diseases**.**

A Fuzzy-Based Deep Learning Framework for Automated Brain Tumor Detection and Classification using MRI Image

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Abstract: Brain tumor detection is a critical task in medical diagnosis, as early and accurate identification significantly improves treatment planning and patient survival rates. Magnetic Resonance Imaging (MRI) is widely used for brain analysis due to its high soft-tissue contrast. However, manual interpretation of MRI scans is time-consuming and subject to human error and variability. To overcome these challenges, this paper proposes a fuzzy-based deep learning framework for automated brain tumor detection and classification using MRI images. The proposed system integrates deep learning techniques for automatic feature extraction with fuzzy logic to effectively handle uncertainty and ambiguity in medical images. MRI images are pre-processed, segmented, and classified into tumor and non-tumor categories, followed by tumor type classification. Experimental results demonstrate that the proposed approach improves diagnostic accuracy and reliability compared to traditional methods. The system aims to assist radiologists by providing an efficient and accurate computer-aided diagnosis tool.

Keywords: Magnetic Resonance Imaging (MRI), Fuzzy-based deep learning.

Traffic Prioritization with Quality of Service (QoS) and Policy-Based Routing for Real-Time Applications

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Abstract: Real-time network services such as Voice over IP (VoIP) and video conferencing demand strict Quality of Ser- vice (QoS) requirements, particularly with respect to latency, jitter, and packet loss. Conventional destination-based routing mechanisms process all traffic uniformly, which often results in congestion and degraded performance for delay-sensitive applications. This paper presents a software-based traffic priori- tization framework that integrates Quality of Service (QoS) with Policy-Based Routing (PBR) to improve network performance. The proposed framework performs application-aware traffic classification, assigns priority levels through QoS policies, and applies policy-based routing rules to steer critical traffic through optimized paths while directing non-critical traffic along alternate routes. Experimental results demonstrate notable reductions in latency and packet loss for high-priority traffic when compared to traditional routing approaches, highlighting the effectiveness of the proposed method for enterprise and campus network environments.

Keywords: Quality of Service, Policy-Based Routing, Traffic Prioritization, Network Congestion, Real-Time Applications.

Improving Accuracy for Traffic Congestion Detection in Intelligent Transport Systems using Novel K-Nearest Neighbour in Comparison with Support Vector Machine

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Abstract: The proposed research work is to predict the text on Traffic Congestion Detection in Intelligent Transport Systems using Novel K-Nearest Neighbour (KNN) in comparison with Support Vector Machine (SVM). Materials and Methods: The text on Traffic Congestion Detection in Intelligent Transport Systems is carried out by the Novel K-Nearest Neighbour (KNN) and Support Vector Machine algorithms (SVM), both of which have a sample size of 20. The iteration value was determined using significance of 0.001. Results: The KNN method is documented to possess an accuracy of 57.0%, which is higher than the accuracy of the SVM approach, as it is observed to be 45.25%. The two algorithms exhibit a statistically significant difference, as indicated by a p-value of 0.001 ($p<0.05$). Conclusion: By observing the accuracy of the prediction of text on detection of traffic congestion the Novel K-nearest Neighbour performs better than the Support Vector Machine.

Keywords: Educational Data Mining, Research, Novel k-Nearest Neighbour, Support Vector Machine, Machine Learning, Regression.

Bloomforge: AN AI-Driven Cognitive Aligned Assessment Generation System using NLP

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Abstract: In modern outcome-based education, designing assessments that are syllabus-aligned, cognitively balanced, and unbiased remains a critical challenge for educators. Manual question paper preparation is time-consuming and often lacks systematic mapping to Bloom's Taxonomy and appropriate difficulty distribution. To address this issue, this paper presents BloomForge, an intelligent teaching support framework developed using core Natural Language Processing (NLP), structured information extraction, and controlled automation techniques, with minimal reliance on generative models. The proposed system automatically analyzes academic syllabus documents through NLP-based preprocessing to identify units, topics, and key concepts. Using this structured understanding, BloomForge generates unit-wise question papers that ensure balanced cognitive coverage across Bloom's levels while maintaining syllabus relevance. A rule-guided difficulty allocation mechanism further supports fairness and consistency in assessment design. The framework also produces answer keys automatically, significantly reducing manual effort for educators. Experimental evaluation conducted on representative undergraduate syllabi demonstrates that BloomForge effectively improves assessment quality by maintaining cognitive alignment, topic coverage, and difficulty balance. The results indicate that the system enhances reliability in question paper creation while reducing instructor workload, making it well-suited for scalable and modern digital learning environments.

Keywords: NLP-based preprocessing, BloomForge, Large Language Model (LLM)

A Drift-Aware Continual Deep Learning Framework with Statistical Detection and Selective Adaptation

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Abstract: The widespread use of deep learning in real-world applications has intensified the challenge of concept drift, where evolving data distributions degrade static model performance. This is particularly critical in image-based streaming environments, where high-dimensional, non-stationary data limit conventional batch learning and periodic retraining. To address this, we propose a Drift-Aware Adaptive Deep Learning Protocol (DADL-Protocol) for robust, scalable image classification under non-stationary conditions. The protocol integrates continuous drift monitoring, statistical divergence detection, and performance-aware adaptive learning within an online framework. A pre-trained deep CNN extracts features, while drift is detected through prediction confidence and distributional divergence, enabling identification of virtual, real, and hybrid drifts. Upon detection, selective incremental adaptation fine-tunes higher network layers, and a bounded memory knowledge retention mechanism mitigates catastrophic forgetting. Updates are controlled to balance accuracy, latency, and efficiency. DADL-Protocol provides a fully adaptive, real-time framework bridging theoretical drift studies and practical deep learning, enhancing robustness in dynamic environments.

Keywords: Concept Drift, Adaptive Deep Learning, Image Classification, Drift Detection, Knowledge Retention, Continual Learning, Performance-Aware Adaptation.

Deep Learning Framework for Myocardial Infarction Diagnosis from Cardiac MRI using Vision Transformers

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Abstract: One of the main causes of death globally is a myocardial infarction, also referred to as a heart attack, which is a sudden reduction in the heart's blood flow. Survival rates are significantly increased by early identification of this illness. Because MRI can reveal the heart’s internal structure with high clarity, it can detect damaged heart muscle that standard tests may miss. However, manually analyzing large numbers of MRI images is time-consuming and heavily dependent on the observer’s expertise. In this work, an automated system for myocardial infarction detection from cardiac MRI images is proposed using a Vision Transformer (ViT) based deep learning model. The EMIDEC cardiac MRI dataset, which includes both healthy subjects and patients with myocardial infarction, is used in this study. To make key cardiac structures more visible, the MRI volumes are first transformed into two-dimensional slices and then pre-processed using noise reduction, contrast enhancement, scaling, and normalization. Further visual analysis with ROC curves and confidence-based assessment bolsters the system's efficacy and stability. The system has a high-test accuracy of 97.63%, which shows that most of the MRI slices were correctly identified. This proposed system shows that Vision Transformer-based models can be effectively used for automatic myocardial infarction detection from cardiac MRI images, providing doctors with a useful tool for decision-support and facilitating prompt and precise diagnosis.

Keywords: Vision Transformer (ViT), EMIDEC, MRI dataset, Convolutional neural networks.

AI-Assisted Digital Voting System with Secure Identity Validation and Global Indian Voter Connectivity

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Abstract: Voting is one of the foundations of democratic rule but both the traditional and electronic voting processes have come to challenges of ballot manipulation, slow voting results and low voter confidence. This project will present a safe and AI-enhanced digital voting system in which a vote storage will be tamper-proof, identity verification will be robust and participation will not be cumbersome to any voter in the country and to NRIs. The architecture uses QR-based verification of Aadhaar along with CNN-based recognition of facial authentication on the multi-level-based authentication. Votes are represented by a blockchain to store them in a ledger encrypted with SHA256 to make them visible and immutable. Taxation of votes is done automatically; this detects any anomaly and the voter is checked; self-tallying software is used to compute the results fast and transparently. The system increases transparency and excludes unauthorized access and improves the public confidence in the elections. Findings reflect that there are safe, transparent, and reliable electronic voting processes with less administration complexity, and quick declaration of the results.

Keywords: Digital Voting System, Blockchain Security, SHA-256 Encryption, CNN Face Recognition, Aadhaar Authentication, NRI Voting, Self-Tallying Mechanism.

A Comparative Framework for Athlete Health Assessment using LSTM and Decision Tree Algorithm

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Abstract: This research presents a framework for monitoring athlete wellness by combining Long Short-Term Memory (LSTM) networks and Decision Tree algorithms to handle both time-series biometrics and static health data. While the LSTM captures long-term patterns in physiological data like heart rate and sleep, the Decision Tree provides clear, rule-based logic for assessing immediate risks and categorical factors like injury history. By integrating these two models, the framework offers a more accurate and interpretable tool for coaches and medical staff to predict overtraining and injury, shifting sports medicine from reactive treatment, to proactive, data-driven, prevention.

Keywords - Athlete, Health, Monitoring, LSTM, Decision Tree, Algorithm, Predictive, Analytics, Time-Series, Injury, Prevention, Machine, Learning, Biometrics, Sports, Science, Framework, Data, Analysis, Hybrid, Modeling, Wellness, Assessment.

3D Reconstruction of Human Organs from Medical Images using Deep Medic Convolutional Neural Network Algorithm

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Abstract: This review provides an in-depth examination of the present state of three-dimensional reconstruction of human organs employing Convolutional Neural Networks (CNNs). It emphasizes advancements in network design, the use of diverse datasets, hurdles in implementation, and real-world medical uses. By analyzing five foundational research papers, we offer a thorough consolidation of different approaches, combined models, techniques leveraging multiple data types, and potential avenues for future investigation. Specifically, this review highlights the shift from conventional geometric reconstruction methods and manual segmentation processes to contemporary, data-centric deep learning structures. Furthermore, it investigates the capabilities of CNNs in incorporating various imaging modalities and the deployment of real-time applications. The analysis synthesizes methodologies ranging from basic 3D CNNs to hybrid CNN-GAN structures, assessing their impact on reconstruction realism and accuracy. Finally, this paper puts forth a conceptual structure for implementing privacy-conscious medical imaging systems through the application of federated learning.

Keywords: 3D Reconstruction, CNN, MRI, CT, GAN, Deep Learning, Federated Learning, Medical Imaging, Real-time Systems.

Agentic AI Resume Autopersona

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Abstract: Existing AI recruitment chatbots and digital profile platforms provide automated responses, but they are mostly generic and not tailored to represent a specific candidate professionally. They often lack contextual understanding of individual resume data and fail to maintain a consistent personal tone during interactions. This paper proposes an Agentic AI-based Resume Autopersona that creates a personalized digital representative for a candidate. The system extracts structured information from resume data and uses Large Language Models to generate context-aware and professional responses in real time. It also includes an automated notification mechanism when additional clarification is required. The proposed approach improves personalization, response accuracy, and interaction quality compared to existing AI-based recruitment systems.

Keywords: Agentic AI, Resume Autopersona, Generative AI, NLP, LLM, AI Chatbot, Digital Recruitment, Conversational AI.

Bloodbridge: Intelligent Blood Donation & Request Portal

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Abstract: Efficient blood donation and transfusion management remains a major challenge due to fragmented systems, manual record-keeping, limited real-time inventory visibility, and lack of intelligent donor–patient matching. These issues often result in delayed processing, blood wastage, and reduced emergency responsiveness. This paper presents Blood Bridge, a centralized web-based Blood Donation and Request Management System designed to improve transparency, coordination, and operational efficiency. The system integrates donors, patients, and administrators through secure role-based access control and structured approval workflows that ensure strict stock integrity. An AI-assisted donor recommendation mechanism prioritizes suitable donors using weighted scoring based on geographical proximity (Haversine distance), recovery interval, and eligibility criteria. The platform also includes an analytics module with dynamic visualization and range-based filtering to support administrative decision-making. Experimental evaluation indicates reduced manual errors, improved request processing time, and enhanced reliability compared to traditional blood management systems. Blood Bridge provides a scalable and intelligent solution for modernizing blood bank Blood Bank Management System; Intelligent Donor Recommendation; Healthcare Informatics; Role-Based Access Control; Inventory Optimization; Emergency Response System; Data Integrity; Web-Based Healthcare Platform. operations and strengthening emergency healthcare response.

Keywords: Blood Bank Management System; Intelligent Donor Recommendation; Healthcare Informatics; Role-Based Access Control; Inventory Optimization; Emergency Response System; Data Integrity; Web-Based Healthcare Platform.

College InfoBot: An AI-Powered Conversational Chatbot for College Information Retrieval using BERT

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Abstract: Schools and colleges have issues dealing with mass student and stakeholder requests effectively, which causes delays and delayed delivery of information. This project introduces College InfoBot, an AI-based conversational chatbot which has information retrieval functionality automated with BERT (Bidirectional Encoder Representations of Transformers). The chatbot uses the contextual understanding provided by the concept of two-way flow of BERT to determine the intent of the user and other essential entities of natural language queries. It is also capable of answering questions correctly depending on the college and the questions being asked as it has been honed with a specific dataset of FAQs about the college. It brings in a constantly updated pool of knowledge to use in the system so as to render it reliable and relevant. Experimental analysis shows that College Info Bot has a high level of reduction in manual processing of query, accuracy in response and user satisfaction. The suggested solution brings to the fore the possibility of transformer-based NLP models in simplifying the administrative communication process and facilitating the effective dissemination of information at the educational level.

Keywords: College Chatbot, BERT, Natural Language Processing, Query Understanding, Knowledge Base, information retrieval, Educational Technology.

Artificial Intelligence: The role of AI and Generative AI in Consumer Behaviour Analysis and Brand Communication Strategies

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Abstract: Artificial Intelligence (AI) is transforming the way businesses understand consumers and design brand communication strategies. This paper examines the role of Artificial Intelligence and Generative AI in analysing consumer behaviour and enhancing brand engagement. AI-powered tools help organizations collect and process large volumes of consumer data to identify patterns, preferences, and purchasing behaviour. Predictive analytics, machine learning algorithms, and sentiment analysis enable companies to make data-driven decisions and create personalized marketing campaigns. Generative AI further strengthens brand communication by producing customized content, advertisements, product recommendations, and interactive customer experiences. It improves efficiency, creativity, and real-time engagement across digital platforms. The study highlights how AI-driven insights support targeted marketing, improve customer satisfaction, and build stronger brand loyalty. However, the paper also discusses challenges such as data privacy concerns, ethical issues, and over-dependence on automation. The findings suggest that when used responsibly, AI and Generative AI can significantly enhance consumer behaviour analysis and create more effective, personalized, and impactful brand communication strategies.

Keywords: Artificial Intelligence, Generative AI, Consumer Behaviour, Brand Communication, Predictive Analytics, Personalization, Digital Marketing, Customer Engagement.

Evaluating Optimal Strategies for Cyber Threat Detection using RF Algorithm Compared with LR for Improved Accuracy

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Abstract: The goal of this research is to compare the LR and RF to evaluate and improve accuracy in cyber threat identification. Packet, sender ID, receiver ID, flag, protocol, source IP address, destination IP address, source port, destination port, packet size, and target variable are among the essential features included in the dataset. The evaluation employs the entire dataset, encompassing diverse cyber threat scenarios. The primary metric for assessment is accuracy, reflecting each algorithm's ability to accurately identify and classify cyber threats. The findings reveal a substantial accuracy of 86% for RF, surpassing the respectable 78% achieved by LR. These results underscore the efficacy of RF in strengthening cybersecurity defenses. In conclusion, the study positions RF as a promising algorithm, showcasing significant accuracy improvements compared to LR in the context of cyber threat detection.

Keywords: Random Forest, Logistic Regression, cyber threat detection, accuracy, machine learning, clean technologies, cybersecurity.

SQL BUDDY: A Generative AI Framework for Natural Language to SQL Translation in Relational Databases

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Abstract: Relational databases are central to modern data-driven environments, yet extracting insights remains gated by the requirement of Structured Query Language (SQL) proficiency. This paper proposes SQL Buddy, a Generative AI-powered system designed to bridge the gap between human language and structured data retrieval. By utilizing a schema-aware prompting mechanism and an autonomous self-correction loop, the system translates natural language inquiries into executable SQL. Experimental results indicate that SQL Buddy achieves an overall execution accuracy of 80%, significantly reducing the dependency on technical intermediaries. The system demonstrates the practical utility of Large Language Models (LLMs) in enhancing business intelligence accessibility while maintaining syntactic correctness and security through a modular validation engine.

Keywords: Multimodal Fusion, Deep Learning, Breast Cancer, Explainable AI (XAI), EfficientNet, DenseNet, Attention Mechanism.

Single-Image Real-Time Facial Reenactment using FOMM and GANs

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Abstract: A deep learning approach is introduced to create realistic facial animations without traditional 3D modelling or expensive rendering techniques. In contrast to the use of explicit 3D mesh creation or complicated rendering processes, this method generates animated representations of people's faces by using only one photograph of their face (referred to as the source image) and a video that shows the motion of a different person's face (referred to as the source video). Because the source video provides motion data that can be tracked and transferred to an image that has no motion data, this method will allow you to generate a lifelike animated representation of someone with only one still photograph and does not require any 3D data. To create animations, the source video and source image are used to provide motion and facial landmarks for every facial landmark represented by both the video and the image. Therefore, the system uses two spatial inputs for each facial landmark, provides the system with spatial coordinates for each landmark, and estimates the landmark's corresponding 3D coordinate locations for around 300 facial landmarks. There are three distinct facial regions represented by the 300 landmarks: eyes and eyebrows, mouth and nose/jawline/chin, and finer geometry on the rest of face; thus, these coordinates are combined to produce a complete and coherent 3D facial structure and ensure the animated representations produced by the model look as natural or realistic as possible.

Keywords: First Order Motion Model (FOMM), Image-Based Facial Animation, Face Reenactment, Motion Transfer, Single-Image Animation, Deep Learning, Real-Time Face Animation, Talking Head Generation.

An IoT-Enabled Smart Electricity Meter Integrating Advanced Analytics and Voice-Based Mobile Interaction

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Abstract: Modern smart grid networks require precise energy forecasts and monitoring. Real-time analytics, predictive intelligence, and user-centered engagement methods are absent from traditional power meters. The design and development of an Internet of Things-enabled smart power meter combined with sophisticated machine learning analytics and a voice-activated mobile application is presented in this study. To assure measurement accuracy and safety, the suggested system uses an ESP32 microcontroller with a multi-sensor configuration that includes a non-invasive current transformer (SCT-013), an invasive current sensor (ACS712), and an isolated voltage sensor (ZMPT101B). REST APIs are used to send energy data over Wi-Fi to a cloud backend built on Firebase and MongoDB. Several prediction and anomaly detection models, such as Multivariate Linear Regression, Bagging, Stacking, Histogram Gradient Boosting, ARIMA, SARIMAX, and Isolation Forest. Real-time visualization, billing insights, and voice-based interaction using text-to-speech and speech-to-text technologies are all offered by a Flutter-based mobile application. The suggested ensemble-based models beat conventional statistical methods in forecasting accuracy while successfully identifying aberrant usage patterns, according to experimental evaluation using real-world smart meter information. The outcomes validate the efficiency, scalability, and feasibility of the suggested intelligent energy management system.

Keywords: Internet of Things, energy forecasting, anomaly detection, ensemble learning, smart meters, SARIMAX, and Flutter applications.

Machine Learning Approaches for Early Prediction of Brain Stroke using Clinical Data

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Abstract: A brain stroke, also referred to as a stroke or brain attack, occurs when the blood supply to a portion of the brain is either obstructed or when a cerebral blood vessel ruptures, resulting in injury or death of brain tissue. This disruption may be caused by an ischemic event, such as a blood clot, or by hemorrhage within the brain. Stroke constitutes a medical emergency requiring immediate intervention. Prompt medical attention is essential to minimize brain damage, reduce the risk of complications, and improve overall clinical outcomes.

Keywords: Brain stroke, Brain tissue, Blood vessel, Machine Learning.

Leaf Disease Detection using Machine Learning (ML)

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Abstract: The core concept of this method is the extraction of texture features using the Gray Level Co-occurrence Matrix (GLCM). GLCM is a statistical technique that analyzes the spatial relationship between pixel intensities in an image. It measures how often pairs of pixels with specific gray-level values occur at a certain distance and orientation, thereby capturing important textural characteristics of the image. These extracted co-occurrence features are highly effective for texture analysis and classification tasks. Texture classification has wide applications in areas such as pattern recognition, object detection, and shape analysis. In agricultural applications, leaf images are analysed to detect and classify plant diseases. Image processing techniques play a crucial role in enhancing leaf images and extracting meaningful features for accurate disease identification. Machine learning algorithms are then employed to build predictive models using labelled training data. These algorithms enable the system to make predictions without being explicitly programmed for every possible condition. Since manual disease identification by human observation is often difficult and error-prone, especially at early stages, automated classification systems provide a reliable alternative. In this study, textural features of leaf images are extracted using GLCM and evaluated using multiple classifiers, including Random Forest (RF), Linear Discriminant Analysis (LDA), Neural Networks (NN), and Convolutional Neural Networks (CNN). The performance of these classifiers is compared to determine the most effective approach for plant leaf disease classification.

Keywords: Gray Level Co-occurrence Matrix (GLCM**),** Random Forest (RF), Linear Discriminant Analysis (LDA), Neural Networks (NN), and Convolutional Neural Networks (CNN).

Data Analytics Framework for Early Prediction Breast Cancer

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Abstract: Breast cancer is one of the most common and complex diseases affecting people worldwide. This review highlights the major risk factors linked to its development, including genetic mutations such as BRCA, hormonal influences, lifestyle habits, reproductive history, age, family background, and environmental exposure. It also discusses advances in diagnostic techniques, with mammography remaining the primary screening tool, supported by newer methods like MRI and molecular testing for improved accuracy. Although diagnostic technologies have progressed, limited access to screening in low-resource settings remains a challenge. Overall, understanding risk factors and improving early detection methods are essential for better prevention, management, and future research.

Keywords: breast cancer, cancers, diagnosis, mortality, prevention, Risk factors.

Credit Card Fraud Detection using Imbalanced Learning

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Abstract: This paper proposes a credit card fraud detection system that addresses the challenge of highly imbalanced transaction data. Since fraudulent transactions represent only a small fraction of total transactions, traditional models tend to favour the majority class. To overcome this issue, under sampling and SMOTE were applied to balance the dataset. Machine learning algorithms such as Logistic Regression and SVM were used for classification. The results demonstrate improved fraud detection performance, particularly in terms of recall, while maintaining a reasonable balance between precision and accuracy.

Keywords: SMOTE, SVM, Logistic Regression.

Machine Learning Based Data Security in Education

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Abstract: As artificial intelligence becomes more and more prevalent, machine learning algorithms are being used in a wider range of domains. Big data and processing power, which are typically gathered via crowdsourcing and acquired online, are essential for the effectiveness of machine learning. Sensitive and private data, such as ID numbers, personal mobile phone numbers, and medical records, are frequently included in the data acquired for machine learning training. A significant issue is how to effectively and cheaply protect sensitive private data. With this type of issue in mind, this article first discusses the privacy dilemma in machine learning and how it might be exploited before summarizing the features and techniques for protecting privacy in machine learning algorithms. Next, the combination of a network of convolutional neural networks and a different secure privacy approach is suggested to improve the accuracy of classification of the various algorithms that employ noise to safeguard privacy. This approach can acquire each layer's privacy budget of a neural network and completely incorporates the properties of Gaussian distribution and difference. Lastly, the Gaussian noise scale is set, and the sensitive information in the data is preserved by using the gradient value of a stochastic gradient descent technique. The experimental results showed that a balance of better accuracy of 99.05% between the accessibility and privacy protection of the training data set could be achieved by modifying the depth differential privacy model's parameters depending on variations in private information in the data.

Keywords: Artificial intelligence, Gaussian distribution, Gradient descent technique.

Recommender Systems: Architectures, Applications, and Future Directions a Systematic Survey

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Abstract: Recommender systems have become essential infrastructure in today's digital world, enabling personalized experiences in domains ranging from e-commerce to healthcare. This paper surveys the main algorithmic approaches collaborative filtering, content-based filtering, hybrid methods, and deep learning architectures alongside their real-world applications and evaluation methods. We also examine pressing challenges such as data sparsity, cold-start, fairness, and explainability. Our review indicates that the next wave of advances will come from integrating large language models (LLMs), graph neural networks (GNNs), and causal reasoning into recommendation pipelines.

Keywords: Recommender Systems, Collaborative Filtering, Content-Based Filtering, Deep Learning, Personalization, Information Retrieval, User Modeling, Fairness, Knowledge Graphs, Sequential Recommendation.

Social Network Analysis and Identification of Influential Users: A Survey

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Abstract: Social network analysis (SNA) has grown into a key method for studying how people connect and share information online. Finding influential users within these networks is one of the most important and challenging tasks in this field. This paper reviews the main techniques used in SNA and influential user identification, covering graph-based methods, machine learning, semantic analysis, community detection, and influence spread. We also discuss real-world applications, current challenges, and areas that need more research in the future.

Keywords: Social Network Analysis, Influential Users, Influence Maximization, Community Detection, Centrality Measures, Machine Learning, Semantic Analysis, Information Diffusion, Graph Mining, Opinion Leaders.

DNS Log Analysis for Anomaly Detection in Security Auditing Tool using AI

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Abstract: The increasing sophistication of cyber threats has necessitated the development of intelligent, proactive security auditing systems. This project presents an AI-powered framework for DNS log analysis aimed at detecting anomalies and identifying potential security breaches in real-time. Using Zeek to capture DNS traffic from PCAP files, the system generates structured logs (dns.log, conn.log) which are then pre-processed to extract key features such as query length, TTL, response bytes, and packet ratios. Unsupervised machine learning models including KMeans, DBSCAN, and Isolation Forest are applied to detect anomalous patterns without requiring labeled data. Isolation Forest, in particular, demonstrates strong performance in identifying zero-day DNS anomalies by isolating rare and suspicious queries. The processed results are visualized through Elasticsearch and Kibana dashboards, enabling administrators to interpret anomaly trends, suspicious domains, and TTL distributions. The system further incorporates PCA scatter plots for visual separation and prepares threshold-based alert logic for future integration with Kibana Watcher. By combining real-time log analysis, unsupervised learning, and interactive dashboards, this framework enhances network visibility, supports proactive threat detection, and contributes to the development of scalable, explainable, and reproducible security auditing tools.

Keywords: DNS, PCAP, TTL, Elastic Search, Zero-day, Isolation Forest.

Explainable AI (XAI) in Cybersecurity Decision-Making

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Abstract: Artificial Intelligence (AI) and Machine Learning (ML) have also played a significant role in the development and implementation of cybersecurity systems capable of detecting cyber intrusions, malware, and fraudulent activities. Despite the effectiveness and capabilities of advanced AI and ML systems, these solutions have been found to operate as black-box systems that provide only limited explanation for intelligent decisions. In the context of cybersecurity, the roles and decisions of AI and ML have proven highly challenging. Explainable Artificial Intelligence (XAI) can provide an appropriate solution to solve these challenging roles and capabilities of AI systems. This study examines the impact of XAI on enhancing the cybersecurity decision process, identifies gaps and limitations in explainability in existing cybersecurity AI models, and develops a framework for explainable AI-driven decision support systems in cybersecurity. The research will employ a mixed-methods approach to assess both qualitative and quantitative aspects of the model. The proposed model demonstrates that integrating XAI enhances the effectiveness of AI-driven cybersecurity systems.

Keywords: Explainable Artificial Intelligence, Cybersecurity, Machine Learning, Decision-Making, Model Transparency.

AI-Based Phishing Attack Detection and Prevention Using Natural Language Processing (NLP)

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Abstract: Phishing attacks remain one of the most prevalent and damaging cybersecurity threats, targeting users across various communication channels such as email, social media, and SMS. Traditional phishing detection systems are often limited to email and rely on static rule-based filtering or keyword matching, making them ineffective against evolving phishing tactics. This project proposes an innovative solution that utilizes Artificial Intelligence (AI) and Natural Language Processing (NLP) to create a real- time phishing attack detection and prevention system. By analyzing the contextual language of messages across multiple platforms, the system can detect and block phishing attempts with high accuracy. The system extracts important linguistic features such as urgency, emotional tone, and anomalous patterns within text, and applies machine learning algorithms—such as Random Forest, Support Vector Machines (SVM), and deep learning models like Long Short-Term Memory Networks (LSTM)—for classification. Additionally, a feedback loop is integrated to allow the system to adapt and improve over time through active learning, ensuring the detection system evolves alongside emerging phishing techniques. This AI-based solution extends beyond traditional email phishing detection by incorporating multiple channels, including SMS and social media platforms, making it a versatile tool for individuals and businesses. The system offers automated prevention actions, such as flagging suspicious messages and alerting users, thus providing a robust defense against phishing attacks in real-time. The project's implementation aims to fill the market gap in comprehensive, multi-channel phishing detection and contribute to the growing demand for intelligent and adaptive cybersecurity solutions.

Keywords: Phishing Attacks; Artificial Intelligence; Natural Language Processing; Machine Learning; Real- Time Detection; Multi-Channel Security.

RedPulse: A Location-Based Emergency Blood Management System

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Abstract: The quick availability of matching blood is very important in emergency medical care, but many current blood management systems have problems like slow coordination, no real-time way to find donors, and no health checks for donors. This paper introduces RedPulse, a new emergency blood management system that uses location data and health analysis along with a chatbot and a reward system to make the process more efficient, safe, and encouraging for the community. RedPulse allows hospitals and patients to create urgent blood requests by stating the blood type, how fast they need it, and where they are. The system uses location-based matching to find nearby donors and blood banks instantly, which helps in emergencies. It also has a health analysis feature that checks important medical details like blood pressure, sugar levels, weight, age, and how long it has been since the last donation to make sure the blood is safe and reliable. In addition, a smart chatbot helps users by explaining if someone is eligible to donate, showing how much blood is available, and giving health tips for donors with certain medical issues. To keep people involved, the system offers rewards like points or cashback to donors and blood banks when they successfully give or supply blood. The system is built using a layered web-based design that includes the user interface, server side, database, location tools, analytics, and notification features. Testing shows that RedPulse works better than old methods by making responses faster, ensuring donor safety, and increasing participation. RedPulse is a helpful and practical solution that supports emergency healthcare effectively.

Keywords: Emergency Blood Management, Location-Based Matching, Donor Health Analytics, Chatbot Assistance, Reward-Based System, Healthcare Information System, Real-Time Coordination.

A Deep Learning Framework for Behavioral Ransomware Detection using BiLSTM Algorithm

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Abstract: The increasing sophistication of ransomware attacks poses a significant threat to modern computing systems, as traditional signature-based security mechanisms struggle to detect evolving and zero-day variants. This project proposes a deep learning–based behavioral ransomware detection framework using the BiLSTM algorithm. The system analyzes dynamic behavioral features such as system call sequences, file access patterns, and process activities to differentiate between benign and malicious behavior. By leveraging BiLSTM's ability to capture sequential dependencies in system activities, the model effectively identifies both known and previously unseen ransomware families. Experimental evaluation demonstrates high detection accuracy, reduced false positive rates, and improved generalization compared to conventional machine learning methods. The proposed framework offers a robust and adaptive solution suitable for real-time ransomware detection in practical cybersecurity environments.

Keywords: Ransomware Detection, Deep Learning, BiLSTM, Behavioural Analysis, Cybersecurity, Malware Detection, System Call Analysis, Intrusion Detection System (IDS), Neural Network.

A Multi-Agent Retrieval-Augmented Framework for Personalized Government Scheme Recommendation

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Abstract: Accessing appropriate government welfare schemes remains a significant challenge due to fragmented information, complex eligibility criteria, and lack of ersonalization. Citizens often struggle to identify schemes relevant to their socio-economic profile, resulting in underutilization of public benefits. This paper proposes a Multi-Agent Retrieval-Augmented Generation (MA-RAG) Framework designed to deliver personalized government scheme recommendations. The system integrates multiple intelligent agents with a retrieval-augmented architecture to analyze user profiles, retrieve relevant policy documents, validate eligibility conditions, and generate explainable recommendations. By combining semantic search, agent-based reasoning, and large language models, the framework ensures accurate, context-aware, and citizen-centric scheme discovery. The proposed model enhances accessibility, transparency, and efficiency in public service delivery.

Keywords: Multi-Agent Systems, Retrieval-Augmented Generation (RAG), Personalized Recommendation, E-Governance, Natural Language Processing (NLP), Semantic Search, Government Schemes, Explainable Artificial Intelligence (XAI), Knowledge Retrieval, Decision Support Systems.

Smart Civic Issue Reporting System Using Convolutional Neural Networks and Duplicate Image Detection

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Abstract: Rapid urbanization has significantly increased the frequency of civic infrastructure problems such as potholes, garbage accumulation, water leakage, and malfunctioning streetlights, which directly impact the quality of urban life and public safety. Existing civic issue reporting mechanisms are largely manual, fragmented, and time-consuming, often resulting in delayed responses, lack of transparency, and multiple duplicate complaints for the same issue. This project presents a Smart Civic Issue Reporting System that leverages Convolutional Neural Networks (CNN)and Duplicate image identification techniques to automate and streamline the complaint management process. Citizens can report civic problems using a web or mobile application by uploading images along with GPS-based location details. The uploaded images undergo preprocessing and are analyzed using a CNN-based classification model to automatically identify the type of civic issue. To avoid redundant reporting, the system incorporates a duplicate image identification module that compares deep feature representations of newly submitted images with existing complaint records. All complaint information is stored in a centralized database and accessed through an administrative dashboard used by municipal authorities. This dashboard enables efficient monitoring, prioritization, and resolution of reported issues. A notification module provides real-time updates to citizens regarding the status of their complaints, ensuring transparency and user engagement. By reducing manual intervention, minimizing duplicate complaints, and accelerating response time, the proposed system enhances operational efficiency and accountability. Overall, the solution supports smart city development by applying artificial intelligence and data analytics to improve urban service delivery. The approach offers a scalable framework suitable for modern municipal governance systems.

Keywords: Convolutional Neural Networks, civic issue reporting, duplicate image detection, smart city, urban infrastructure, deep learning, Artificial Intelligence.

An Advanced Online Voting System Using Face Recognition Integrated with Blockchain and Cybersecurity

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Abstract: Traditional voting systems have problems such as identity fraud and duplicate voting. This paper describes a secure online voting system developed as a full-stack web application that combines biometric authentication and secure data management methods. The proposed system authenticates the identity of voters through live face recognition by matching the captured images with the pre-stored facial information to ensure that only legitimate voters can take part in the voting process. Facial feature extraction methods are employed for reliable identity verification, and secure authentication processes safeguard user accounts against any unauthorized access. Each vote is safely stored through cryptographic hashing methods to maintain data integrity and prevent any manipulation. A duplicate vote prevention system ensures that every authenticated voter can place only one vote. The system also provides constituency-based candidate selection, where voters can place votes only in their designated area. Simulation experiments conducted on the system demonstrate its authenticity and efficient vote management. The proposed system provides a secure, transparent, and convenient voting system that is appropriate for small-scale digital elections and can be improved for large-scale election systems.

Keywords: Secure Voting, Face Recognition, Blockchain, Cybersecurity, SHA-256, JWT, OCR, MediaPipe, Digital Democracy.

Multimodal Breast Cancer Classification using Deep Learning with Explainable AI Integration

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Abstract: Breast cancer remains a leading cause of oncological mortality globally, necessitating diagnostic systems that balance high sensitivity with specificity. Conventional Computer-Aided Diagnosis (CAD) systems typically rely on unimodal imaging—either mammography or ultrasound—which limits diagnostic accuracy, particularly in patients with dense breast parenchyma where lesions are often obscured. To address these limitations, this study proposes a novel, hierarchical Deep Learning framework that mimics the clinical workflow of triage followed by comprehensive diagnosis. The system operates in two stages: Stage-I utilizes a fine-tuned EfficientNet-B0 to screen mammograms for abnormalities with 94.76% accuracy. Stage-II employs a Late Fusion architecture that synergizes features from mammography (via EfficientNet- B0), ultrasound (via DenseNet121), and clinical metadata (via a Multi-Layer Perceptron). A learnable Attention Mechanism dynamically weighs these modalities, prioritizing the most informative signal for each patient instance. Experimental results on the CBIS-DDSM and BUSI datasets demonstrate a diagnostic accuracy of 90.53%. Furthermore, the integration of Grad-CAM++ provides visual explainability, generating heatmaps that localize pathological biomarkers, thereby enhancing clinical trust in the automated decision-making process.

Keywords: Multimodal Fusion, Deep Learning, Breast Cancer, Explainable AI (XAI), EfficientNet, DenseNet, Attention Mechanism.

Enhanced Skin Disease Detection and Classification using Deep Learning

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Abstract: Skin diseases are among the most common health problems worldwide, affecting people of all age groups. Early and accurate diagnosis plays a crucial role in preventing complications and ensuring effective treatment. However, manual diagnosis by dermatologists can be time-consuming and sometimes subjective. In this paper, we propose an Enhanced Skin Disease Detection and Classification system using Deep Learning techniques. The system utilizes Convolutional Neural Networks (CNN) to automatically extract features from dermoscopic images and classify them into multiple disease categories including bacterial, fungal, parasitic, viral infections, and normal skin. The proposed model improves classification accuracy by incorporating image preprocessing, data augmentation, and optimized training strategies. Experimental results demonstrate high accuracy with reduced false classification rates, making the system suitable for clinical assistance and remote healthcare applications.

Keywords: Skin Disease Detection, Deep Learning, Convolutional Neural Network, Image Processing, Medical Image Classification.

AI-Powered Home Design and Material Intelligence System Using Conversational Multi-Model Architecture

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Abstract: Expertise in cost analysis, durability analysis, spatial optimization, and climate adaptation is necessary for residential planning and material selection. However, organized and sophisticated decision-support tools are frequently unavailable to homeowners and small-scale developers. In order to guarantee dependability and continuous service, this article introduces an AI-powered conversational home design and material intelligence platform that combines multi-model Large Language Models (LLMs) with an autonomous failover architecture. A Material Consultant Agent and a House Layout Planning Agent are the two specialized agents that make up the suggested system. While the Layout Planning Agent creates structured floor plans, room positioning strategies, ventilation logic, and sunlight optimization based on user requirements, the Material Consultant Agent offers climate-aware, ranked material recommendations along with useful sourcing and maintenance checklists. To lessen service disruptions brought on by rate limitations or network outages, the system uses prioritized API routing across several LLM providers. Secure environment-based key management, encrypted persistence, and step-by-step interaction are all made possible by a Streamlitbased user interface. When compared to single-model conversational systems, experimental evaluation across various simulated climate and residential contexts shows enhanced reliability, organized reasoning, and user-guided decision support. The suggested approach demonstrates how ensemble-based conversational AI systems can be used to promote climate-responsive material selection and democratize intelligent residential planning.

Keywords: Climate-responsive materials, conversational agents, multi-model routing, large language models (LLMs), automated home design, and ensemble artificial intelligence systems.

A Distributed Ledger–Based Secure Electronic Voting Framework Powered by Blockchain Technology

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Abstract: Electronic voting systems require high levels of security, transparency, and integrity to ensure trustworthy election processes. Traditional centralized voting platforms are vulnerable to tampering, data breaches, and single-point failures. The proposed system integrates blockchain technology with a FastAPI backend and MySQL database to provide secure authentication, authorization, and immutable vote storage. Each vote is recorded as a blockchain transaction, ensuring tamper-proof and transparent vote tallying. Role-based access control, digital identity certificates, and cryptographic hashing enhance system security. The system demonstrates a reliable and scalable framework suitable for institutional and governmental elections.

Keywords: Blockchain, Hyperledger Fabric, E-Voting, Distributed Ledger, Smart Contracts, Security, Decentralized Systems.

Enhancing Pose Detection Accuracy in Digital Try-On Systems: A Comparative Study of Mars and Extra Trees for Error Correction

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Abstract: Pose detection plays a crucial role in digital try-on systems, where accuracy directly impacts the realism of virtual fitting. This research presents a personalized pose error correction model using MARS (Multivariate Adaptive Regression Splines) and Extra Trees algorithms. Built on pose keypoint datasets, the model analyzes joint position errors to enhance detection accuracy. The MARS model achieved an accuracy of 90%, slightly outperforming the Extra Trees model, which reached 89%. These results demonstrate MARS's effectiveness in correcting pose estimation errors, highlighting its potential in improving digital try-on accuracy and supporting personalized virtual try-on experiences through intelligent pose refinement.

Keywords: Pose detection, Error Detection, MARS, Extra Trees, Accuracy.

AI-Powered eBOM to mBOM Converter Optimized Manufacturing

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Abstract: In modern manufacturing, moving from an Engineering Bill of Materials (eBOM) to a Manufacturing Bill of Materials (mBOM) is still a manual, slow, and error-prone task. This problem often results in data inconsistencies, production delays, and higher manufacturing costs. To address these issues, we propose an AI-powered BOM Converter that automatically converts eBOM into improved mBOM for production workflows. The system uses a mix of machine learning and rule-based logic to examine eBOM structures, identify component connections, and produce an accurate mBOM, complete with manufacturing details like process steps, work centers, tooling, and procurement information. It integrates with existing ERP/PLM systems to ensure smooth data exchange and real-time updates with production planning. By automating the conversion from eBOM to mBOM, this system reduces manual labor, improves data consistency, cuts conversion time, and lowers operational costs. This intelligent converter seeks to transform the digital manufacturing workflow, allowing for quicker product launches and better overall production efficiency**.**

Keywords: powered BOM conversion, eBOM to mBOM, machine learning, intelligent manufacturing, process automation, ERP/PLM integration, industrial AI, rule-based system.

Pulmonary Illness Using Machine Learning

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Abstract: This paper explores the application of machine learning techniques in the diagnosis and management of pulmonary illnesses. With the increasing prevalence of respiratory diseases worldwide, there is a growing need for accurate and efficient diagnostic tools to aid healthcare professionals in early detection and personalized treatment planning. Machine learning algorithms offer promising solutions by analyzing diverse datasets including medical images, clinical notes, and physiological parameters to identify patterns and predict disease progression. This review discusses various machine learning approaches such as supervised learning, unsupervised learning, and deep learning, highlighting their strengths and limitations in pulmonary disease diagnosis, prognosis, and therapeutic decision-making. Additionally, challenges such as data quality, interpretability, and model generalization are addressed, along with potential avenues for future research and clinical implementation. Overall, integrating machine learning into pulmonary healthcare holds significant potential to enhance patient outcomes and streamline healthcare delivery.

Keywords: Machine Learning Techniques, supervised learning, unsupervised learning, and deep learning.

AI-Based Autonomous Electric Mini Tractor for Smart Agriculture

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Abstract: Agriculture is increasingly adopting automation and Artificial Intelligence (AI) technologies to improve productivity and reduce labor dependency. This paper proposes the design and development of an AI-based autonomous electric mini tractor intended for small and medium-scale farmers. The system integrates electric propulsion, intelligent navigation, and wireless communication to enable smart farming operations. The tractor operates in both manual and autonomous modes using ultrasonic sensors, GPS modules, and LoRa communication. The electric drivetrain ensures eco-friendly operation with reduced maintenance cost.

Keywords: Artificial Intelligence (AI), AI-based autonomous electric mini tractor, ultrasonic sensors, GPS modules, and LoRa communication.

SmartPath: An Intelligent Indoor Navigation System for College Campuses

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Abstract: The increasing complexity of college campuses calls for a smarter navigation approach. This paper presents FindMyWay, an intelligent indoor navigation system that assists students, staff, and visitors through real-time location tracking and optimized route guidance. By integrating Wi-Fi-based positioning, digital floor maps, and a seamless mobile interface, the platform enhances accessibility, saves time, and simplifies movement across campus. Through innovation and technology, FindMyWay promotes a connected, efficient, and smart educational environment.

Keywords: Indoor Navigation, Smart Campus, Wi-Fi Positioning, Real-Time Tracking, Pathfinding Algorithm, Flutter Application.

SmartCampus AI: An Intelligent Conversational System for Automated Student Administrative Services

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Abstract: Many educational institutions still follow manual, paper-based procedures for student requests such as bonafide certificates, leave applications, out passes, and marksheet copies. These traditional processes are slow, time-consuming, and lack proper tracking, often causing delays and administrative burden. This paper proposes Student–Admin Connect, an AI-powered chatbot system integrated with an admin dashboard to digitalize and automate student requests. The system uses Rasa-based conversational AI, React frontend, Flask backend, and MongoDB storage to deliver fast, transparent, and centralized request management. The proposed solution enhances institutional efficiency, reduces paperwork, and improves accessibility for students and administrators.

Keyword: Chatbot Automation, Rasa NLU, Student Request System, Admin Dashboard, Campus Digitalization.

Cyber Castle: A Gamified Framework for Cybersecurity Awareness

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Abstract: This paper explains the design and implementation of Cyber Castle, an interactive game created to teach users about digital threats using medieval fantasy storytelling and real-time decision-making. The system uses a structured seven-level narrative that covers important areas of cybersecurity, including phishing detection, social engineering defense, online scam awareness, public Wi-Fi security, privacy management, deepfake recognition, and password security best practices.

Each level features a dynamic dialogue system with typewriter-style interaction, a hearts-based life system, and a multi-factor scoring engine that awards users experience points, speed bonuses, and perfect-run multipliers based on how well they perform. By using experiential learning and gamification techniques, the game boosts user engagement and helps improve practical threat recognition skills. An experimental evaluation shows a 94.6% knowledge retention rate among participants, indicating a significant increase in cybersecurity awareness and decision-making skills.

The paper also describes the system architecture, modular implementation, educational algorithms, experimental methods, and performance analysis.

Keywords: Cybersecurity Education, Gamification, Interactive Learning, Phishing Awareness, Social Engineering, Deepfake Detection, Real-Time Scoring, Story-Driven Learning.

An Efficient Diagnosis Multiple Scoring by Using Decision Tree and Radial Basis Function

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Abstract: Effective and precise diagnosis is essential in many industries, including engineering, finance, and healthcare. Conventional diagnostic techniques frequently depend on rudimentary algorithms or manual scoring systems, which may not be robust or scalable. In this paper, we suggest a novel diagnostic strategy that makes use of a functional learning model. A comprehensive and precise scoring system for various diagnostic tasks is provided by the model, which combines the predictive power of machine learning techniques with the flexibility of functional data analysis.
First, we gather functional data that illustrates the dynamic behaviour of the system that has to be diagnosed. Then, utilising cutting-edge signal processing techniques, these functional data are processed and turned into informative characteristics.

Keywords: Efficient diagnosis, scoring system, Functional learning model, Disease diagnosis, Decision support, Clinical decision making.

Neethivazhi AI: A Retrieval-Augmented and Rule-Constrained Procedural Guidance System for Consumer Court Self-Representation

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Abstract: Timelines, jurisdiction thresholds, legal fragmentation, and procedural complexity remain barriers to self- represented litigants in accessing justice. Even if the case is valid, procedural irregularities result in dismissal or postponement of cases, making consumer courts less accessible despite their intended accessibility. This paper proposes Neethivazhi AI, a retrieval-augmented, structured procedural support system for the Consumer Dispute Redressal Commissions in Tamil Nadu, India, using only trustworthy legal sources and a deterministic rule engine. Although explanation and document generation with citations reduce the chances of hallucinations and advisory drift, procedural order is ensured by a workflow-based interface. Accessibility is enhanced by support for bilingual interfaces, and traceability and accountability are improved by logging. The proposed architecture illustrates how retrieval-grounded AI systems can be safely deployed in a regulated legal setting by emphasizing the importance of determinism, source traceability, and the strict separation of legal information and legal advice.

Keywords: Access to Justice, Retrieval-Augmented Generation (RAG), Legal AI, Procedural Compliance, Rule Engine, Jurisdiction-Aware Systems, Template-Based Document Generation, Bilingual Systems.

Smart Glass with Obstacle Detection, Emergency Alert and AI guidance for visually impaired

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Abstract: The proposed Smart Glass for Blind People is a wearable device designed to enhance mobility, safety, and independence for visually impaired users by providing obstacle detection, emergency alerts, and AI-based guidance. The system is built around an ESP32-CAM, which acts as the main controller, capturing environmental images and managing connected modules. Obstacles are detected using the camera, and the vibration motor delivers haptic feedback to alert the user of nearby objects. The Neo-6M GPS module continuously tracks the user's location, enabling accurate navigation and emergency notifications. A push button allows the user to trigger immediate alerts to caretakers or authorities. Audio feedback and guidance are provided through a speaker or paired smartphone, while an electret microphone module allows voice commands and interaction with the system. Jumper wires connect all components to the ESP32, allowing flexible assembly on the wearable frame. The system can operate independently or integrate with a smartphone for enhanced AI processing

Keywords: Smart Glass, Obstacle Detection, Emergency Alert, AI Guidance, Blind Assistance, GPS Navigation, Voice Guidance.

Intelligent Real-Time Big Data Framework for Anomaly Detection, Bias-Aware Labelling and Smart Dashboard Summarization

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Abstract: The exponential growth of real-time data generated from smart cities, industrial IoT systems, financial transactions, and surveillance infrastructures has created significant challenges in scalable anomaly detection and responsible data interpretation. Conventional anomaly detection frameworks primarily focus on identifying outliers but often ignore fairness concerns and lack intelligent summarization mechanisms. This paper proposes an Intelligent Real-Time Big Data Framework integrating scalable anomaly detection, bias-aware labelling, and automated smart dashboard summarization. The framework leverages Isolation Forest for high-dimensional anomaly detection, incorporates bias score computation for fairness validation, and deploys an automated insight generation module for decision support. The proposed system is modular, scalable, and domain-independent. Experimental analysis demonstrates improved detection performance, fairness awareness, and reduced latency under real-time conditions. The framework contributes toward responsible AI-driven monitoring systems suitable for next-generation smart infrastructure.

Keywords: Big Data Analytics, Real-Time Systems, Isolation Forest, Fairness in AI, Bias Detection, Smart Dashboard, Industrial IoT, Smart Cities, Machine Learning.

AI-Powered Cyber Defense Systems for Next-Generation Enterprises

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Abstract: Cyber-attacks are increasing every year, and many organizations face serious threats such as data theft, ransomware attacks, and online fraud. Traditional security systems are often not strong enough to handle modern cyber threats. Artificial Intelligence (AI) is helping organizations enhance their cybersecurity infrastructure by detecting threats faster, analyzing abnormal behavior, and responding automatically. This paper discusses the working principles of AI-based cyber defense systems, their advantages for enterprises, and their future importance in digital security.

Keywords: Artificial Intelligence, Cybersecurity, Threat Detection, Enterprise Security, Machine Learning.

A Portable Offline Secure Log Analysis and Cyber Threat Monitoring System for Isolated Networks

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Abstract: Continuous monitoring of system and network logs is essential for effective cyber threat detection; however, traditional SIEM solutions rely on centralized or cloud-based infrastructures that are unsuitable for isolated or air-gapped networks. This paper presents a portable offline log analysis tool specifically designed for secure and disconnected environments. The system enables multi-source log collection from servers, firewalls, and network devices using standard mechanisms such as file ingestion and syslog. Collected logs are parsed, normalized, and stored locally in a lightweight database to support structured analysis and efficient retrieval. The tool integrates rule-based detection, signature matching, and anomaly analysis to identify suspicious activities without internet dependency. Heuristic and behavioral techniques enhance the detection of potential cyber threats within restricted networks. A simple cross-platform interface supports Windows, Linux, and macOS with minimal configuration. Users can search, filter, and visualize events through an intuitive dashboard. The platform also supports offline report generation for forensic investigation and incident response. Overall, the solution provides a secure, scalable, and cost-effective alternative to enterprise SIEM systems for government, defense, and critical infrastructure environments requiring autonomous cyber monitoring.
Keywords: Portable Log Analysis, Offline SIEM, Isolated Networks, Log Parsing and Normalization, Anomaly Detection, Cross-Platform Security, Security Monitoring, Threat Intelligence.

AI-Based Meeting Summary and Action Item Generator

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Abstract: In the present digital era, meetings have become an integral part of organizational communication, collaboration, and strategic decision-making processes. Organizations across corporate, educational, and governmental sectors conduct frequent meetings to discuss ideas, monitor progress, allocate responsibilities, and make critical decisions. However, documenting meetings manually is a time-consuming and error-prone process, often resulting in incomplete, inconsistent, or inaccurate records. Such limitations reduce the effectiveness of meetings and negatively impact productivity and accountability. Recent advancements in Artificial Intelligence (AI) have enabled the automation of complex tasks involving speech and language understanding. Technologies such as Speech Recognition, Natural Language Processing (NLP), and Machine Learning (ML) have made it possible to automatically transcribe spoken conversations and analyze large volumes of unstructured data. These technologies provide an opportunity to transform traditional meeting documentation practices into intelligent, automated processes. This paper presents an AI-based meeting summary and action items generation system designed to automatically convert meeting audio into structured textual summaries and clearly defined action items. The proposed system captures meeting audio, performs speech-to-text conversion, analyzes the transcript using NLP techniques, and generates concise summaries highlighting key discussion points and decisions. In addition, the system automatically extracts action items, identifies responsible individuals, and associates relevant deadlines, thereby improving accountability and follow-up. The proposed system adopts a modular and scalable architecture, allowing seamless integration with existing digital platforms and supporting both physical and virtual meetings. By reducing manual effort and minimizing human errors. The paper discusses the system architecture, working methodology, technologies employed, advantages, applications, limitations, and future scope of AI-based meeting intelligence systems.
Keywords: NLP, ML, AI, transcript, TF-IDF.

ABOUT THE CONFERENCE

The First International Conference on Innovations in Artificial Intelligence and Data Science (ICIAIDS'26) is a premier academic event organized by the Department of Artificial Intelligence and Data Science, New Prince Shri Bhavani College of Engineering and Technology, Chennai. ICIAIDS'26 focuses on fostering collaboration between academia and industry by encouraging the presentation of high-quality research contributions in emerging areas of Artificial Intelligence and Data Science. The conference will feature technical paper presentation, knowledge-sharing sessions, and opportunities for networking with experts and peers from diverse domains.

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