



INTERNATIONAL CONFERENCE ON SMART INTELLIGENT COMPUTING AND APPLICATIONS



25 GLORIOUS YEARS OF
EXCELLENCE

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PREFACE

We are pleased to present the proceedings of the **International Conference on Smart Intelligent Computing and Applications**, held on 26th March 2026 at Dhanalakshmi Srinivasan Engineering College (Autonomous), Perambalur, Tamil Nadu. This conference is jointly organized by the Departments of Computer Science & Engineering, Information Technology, Artificial Intelligence & Data Science, Master of Computer Applications and Cyber Security.

The conference theme, “Innovations in Engineering and Technology towards Intelligent Smart Computing reflects the growing need for sustainable solutions and technological advancements in the rapidly changing world. The aim of the conference is to create a platform for researchers, academicians, industry professionals and students to share their latest research findings, technological developments and innovative ideas.

This proceeding includes a selection of peer-reviewed abstracts of research papers that cover a wide range of topics in engineering and technology, showcasing the diversity of research and the spirit of innovation that the event encouraged.

We express our heartfelt gratitude to the authors, reviewers, keynote speakers, session chairs, and all participants whose contributions have made this conference and this publication a success. We also thank the management, faculty, and staff of Dhanalakshmi Srinivasan Engineering College for their support and encouragement throughout the organization of this event.

We hope these proceedings will serve as a valuable resource for researchers and practitioners, inspiring further exploration and collaboration in the field of sustainable engineering and technological innovation.

Editorial Committee

International Conference on Smart Intelligent Computing and Applications

Dhanalakshmi Srinivasan Engineering College (Autonomous), Perambalur



Shri.A.Srinivasan

Esteemed Chancellor

Dhanalakshmi Srinivasan University

CHANCELLOR MESSAGE

I am delighted to know that the department of Computer Science & Engineering, Information Technology, Artificial Intelligence & Data Science, Computer Applications and Cyber Security of Dhanalakshmi Srinivasan Engineering College (Autonomous) is hosting the **"International Conference on Smart Intelligent Computing and Applications (ICSICA-2026)**. The event is scheduled to take place on 26th March 2026 at Dhanalakshmi Srinivasan Engineering College (Autonomous), Perambalur, Tamil Nadu.

The constant emergence of innovative inventions in Science, Engineering and Technology is a promising trend. The decision to organize an international conference on **"Smart Intelligent Computing and Applications"** is commendable. The primary objective of this conference is to provide a substantial platform for intellectual exchange. Researchers, industry experts and students can come together to share their findings and insights in the realm of **'Innovative Research'**, contributing to the enhancement of human life on both global and local scales.

It is anticipated that the conference will serve as a catalyst for fostering a deeper understanding of various recent innovations from a broader perspective. I extend my best wishes to the organizing committee of ICSICA-2026, hoping for the success of the event. May the academic deliberative sessions with esteemed scientists be fruitful and contributed significantly to the advancement of knowledge.



Dr. D. Shanmugasundaram,
Principal Message

I am delighted to learn that the Departments of Computer Science & Engineering, Information Technology, Artificial Intelligence & Data Science, Master of Computer Applications and Cyber Security at Dhanalakshmi Srinivasan Engineering College organizing the International Conference on Smart Intelligent Computing and Applications on 26th March 2026, within the esteemed premises of Dhanalakshmi Srinivasan University, Perambalur. Additionally, there will be the release of a souvenir and conference proceedings as well, marking this scientific gathering as a significant milestone. The conference proceedings are anticipated to offer valuable insights and perspectives, fostering suggestions for further research and applications in the dynamic fields of innovations in Science, Engineering and Technology.

In light of this auspicious occasion, I extend my warmest greetings to the dedicated Conveners and Organizing Secretaries of the ICSICA-2026 and all the esteemed participants of the conference. May this gathering serve as a catalyst for intellectual exchange and collaboration, propelling advancements in research and applications. I convey my sincere wishes for the success of the conference and extend my hopes for a future filled with accomplishments for everyone involved. May the ICSICA-2026 be an outstanding and grand success.



Dr. K. Anbarasan

Vice Principal Message

The Global world of Science and Engineering is an electrifying platform with enlarged space for research, design, development and testing on their own diverse innovative regions. **The International Conference on Smart Intelligent Computing and Applications** on 26th March 2026 will prolong the charm engineers to meet the ideas and solutions for different research challenges of their engineering studies. This happens, by making the young minds to participate constantly in different academic and technical oriented activities regularly for enriching their Innovative ideas in new dimensions. Absolutely, this Conference particularly encourages the Interaction of academicians and student community in comfortable setting to present and discuss their new and current scenario of the research work. I welcome all the delegates to stay engaged, keep themselves proactive in shaping the future technologies. Finally, I'd like to congratulate each of my colleagues for bringing young Innovators to this Session.

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Security Assessment of IoT Smart Energy Monitoring Systems: A Coventry Perspective

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ABSTRACT

Evaluating the security of IoT-based smart energy monitoring systems is essential as these technologies become increasingly integrated into modern infrastructure. With the rapid expansion of connected devices, such systems face significant risks that can impact both data integrity and physical operations. This study examines the security challenges faced by a growing startup and emphasizes the need for a proactive and structured approach to secure scaling. The analysis explores organisational and technical aspects, identifying gaps in security practices commonly found in early-stage development environments. It highlights the importance of embedding security into the development lifecycle through approaches such as DevSecOps, Secure Software Development Lifecycle (SSDLC), and STRIDE-based threat modelling. Furthermore, the implementation of Zero Trust architecture is discussed as a critical measure to ensure secure communication and authentication across devices. Overall, the study underscores that strong security practices are vital for achieving scalable, reliable, and compliant IoT solutions while maintaining user trust and system resilience.

Keywords: IoT Security, Smart Energy Monitoring, DevSecOps, STRIDE Threat Modelling, Zero Trust Architecture, Secure Software Development Lifecycle (SSDLC), System Resilience

ICSICA-2026-2

Artificial Intelligence in E-Commerce: Enhancing Customer Experience and Business Intelligence

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ABSTRACT

Artificial Intelligence (AI) has emerged as a transformative technology in the field of e-commerce, enabling businesses to analyze vast volumes of data and make intelligent decisions. E-commerce, which involves buying and selling goods and services over the internet, increasingly relies on AI to understand customer behavior and improve user experience. This study provides an overview of the role and impact of AI in modern e-commerce systems. AI techniques such as machine learning, natural language processing, and data analytics are widely used to enhance customer service, provide personalized product recommendations, segment audiences, and analyze customer satisfaction. Chatbots and virtual assistants enable efficient interaction with customers. Despite its advantages, AI also presents challenges such as privacy concerns, job displacement, and transparency issues. The study highlights how AI-driven e-commerce platforms can improve operational efficiency, decision-making, and customer engagement. Overall, the integration of AI in e-commerce is reshaping the digital marketplace, offering significant opportunities for innovation while also requiring careful consideration of ethical and security implications.

Keywords: Artificial Intelligence (AI), E-commerce, Machine Learning, Natural Language Processing (NLP), Personalization, Chatbots, Customer Behavior Analysis, Data Analytics, Customer Experience, Ethical Challenges.

ICSICA-2026-3

A Multi-Model Machine Learning Framework for Real-Time Cybersecurity Threat Detection

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ABSTRACT

Evaluating and identifying the most effective machine learning model for real-time cyber incident detection has become essential in modern cybersecurity. This study utilizes five popular algorithms: Random Forest, XGBoost, Decision Tree, Logistic Regression, and LightGBM. The primary objective is to compare these models based on key performance metrics, including accuracy, precision, recall, and F1 score, in order to determine the most suitable approach for detecting cyber threats. Once the best-performing model is identified, it is applied to analyze large datasets such as network traffic, system logs, and user behavior to detect potential security incidents. The selected model is further integrated into an automated response framework, enabling the system to swiftly mitigate detected threats without requiring manual intervention. The study also explores the integration of multiple machine learning models to improve system adaptability and performance. By leveraging the strengths of these models, the system effectively identifies anomalous behaviors, strengthens threat prediction capabilities, and ensures continuous monitoring, contributing to improved cybersecurity resilience in dynamic and large-scale environments.

Keywords: Cybersecurity, Threat Detection, Multi-Model Machine Learning, Real-Time Analysis, Intrusion Detection, Anomaly Detection, Network Security, Predictive Analytics.

ICSICA-2026-4

Adaptive Cyber Incident Detection and Response Using Machine Learning Models

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ABSTRACT

The increasing sophistication and frequency of cyberattacks demand adaptive and intelligent security solutions capable of real-time detection and response. This study presents an adaptive cyber incident detection and response system leveraging multiple machine learning models to identify and mitigate threats in dynamic environments. The framework employs five widely used algorithms—Random Forest, XGBoost, Decision Tree, Logistic Regression, and LightGBM—to analyze heterogeneous data sources, including network traffic, system logs, and user activity patterns. A comparative evaluation is conducted using performance metrics such as accuracy, precision, recall, and F1-score to determine the most effective model under varying attack scenarios. detected threats, significantly reducing response latency and minimizing potential damage.

Experimental results indicate that ensemble-based approaches, particularly XGBoost and LightGBM, provide superior detection accuracy and robustness. The adaptive nature of the system enhances its resilience against emerging and unknown attacks. This research contributes to the development of intelligent cybersecurity frameworks that support proactive defense, real-time monitoring, and autonomous incident response in large-scale and complex network infrastructures.

Keywords: Cyber Incident Detection, Machine Learning, Adaptive Systems, Incident Response, Anomaly Detection, Threat Intelligence, Real-Time Monitoring, Cybersecurity.

ICSICA-2026-5

Cyber Threat Intelligence Mining for Proactive Cybersecurity

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ABSTRACT

In the face of escalating and increasingly complex cyber-attacks, traditional security systems are struggling to provide adequate protection. The dynamic and evolving nature of modern cyber threats demands a new paradigm in cybersecurity approaches. This study focuses on harnessing the potential of Cyber Threat Intelligence (CTI) mining to strengthen and enhance security measures. By extracting, processing, and analyzing diverse cyber threat data from multiple sources, the research aims to develop an advanced and effective threat intelligence framework.

The proposed framework enables organizations to proactively identify, prevent, and respond to sophisticated cyber threats before they cause significant damage. It integrates multiple data sources such as network logs, threat feeds, and behavioral patterns to improve situational awareness. Additionally, the study highlights key challenges such as data heterogeneity, scalability, and real-time processing limitations. Future research directions are also discussed to enhance system adaptability and efficiency. Overall, this study emphasizes the critical role of CTI mining in enabling proactive defense strategies and strengthening cybersecurity resilience in the evolving digital landscape.

Keywords: Cyber Threat Intelligence, Threat Mining, Proactive Cybersecurity, Machine Learning, Data Analytics, Threat Detection, Security Automation, Predictive Analysis

ICSICA-2026-6

Machine Learning-Based Phishing Detection System

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ABSTRACT

Phishing is a widespread cyber threat that deceives users into revealing sensitive information such as passwords, credit card numbers, and personal details. Detecting such attacks has become increasingly important with the rapid growth of online services. This study presents an intelligent solution for phishing detection using machine learning techniques. By analyzing various features of URLs, including structure, domain characteristics, and website behavior, the system is capable of distinguishing between legitimate and malicious links with improved accuracy.

The proposed approach leverages machine learning algorithms to classify URLs based on extracted features, enabling efficient identification of phishing attempts. A web-based interface is incorporated to allow users to input URLs

This approach not only improves detection accuracy but also reduces reliance on traditional blacklist-based methods, which may fail to identify newly created phishing sites. The primary objective is to enhance user awareness and provide a reliable tool for identifying phishing attacks. Overall, the system contributes to strengthening online security and protecting users from evolving cyber threats.

Keywords: Phishing Detection, Machine Learning, Cybersecurity, Email Security, URL Analysis, Classification Models, Fraud Detection, Threat Prevention

ICSICA-2026-7

AI-Driven Cybersecurity Framework for Advanced Pacemaker Systems

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ABSTRACT

With the increasing integration of wireless technologies in implantable medical devices, ensuring their cybersecurity has become a critical concern. Modern pacemakers, while offering enhanced functionality and remote monitoring capabilities, are vulnerable to cyber threats such as unauthorized access and malicious interference. This study presents Pace CAP v1.0, an AI-powered cybersecurity layer specifically designed to protect pacemakers from such risks. The proposed system leverages advanced machine learning techniques, anomaly detection mechanisms, and real-time analytics to continuously monitor device behavior and identify suspicious activities.

Pace CAP v1.0 incorporates secure Bluetooth communication and supports remote monitoring, reducing the need for frequent hospital visits while maintaining high levels of patient safety

This approach not only strengthens the security posture of advanced medical devices but also improves patient outcomes through continuous monitoring and proactive threat mitigation. Overall, the study highlights the importance of incorporating AI-driven cybersecurity solutions in next-generation healthcare technologies.

Keywords: AI-Driven Cybersecurity, Pacemaker Security, Medical Device Security, Healthcare IoT, Machine Learning, Threat Detection, Data Privacy, Patient Safety

ICSICA-2026-8

Integrated Malware Detection and Data Protection System for USB Devices and Alexa AI Devices

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ABSTRACT

With the rapid adoption of portable storage devices and AI-powered smart assistants such as Alexa, ensuring data security across these platforms has become increasingly critical. USB devices are highly vulnerable to malware injection and covert data exfiltration, while AI-enabled devices face risks related to unauthorized access and data privacy breaches. This study proposes an integrated security system designed to protect both USB devices and Alexa-based AI systems from evolving cyber threats.

The proposed framework combines Deep Neural Networks (DNNs) for detecting malware injection attacks with advanced monitoring techniques for AI device interactions. The system analyzes system activities

The integration of intelligent threat detection with secure data handling enhances overall system resilience. This approach not only prevents covert data theft but also safeguards user interactions in AI-driven environments. The proposed system provides a comprehensive and scalable solution for improving data security, privacy, and reliability across both USB storage and smart assistant ecosystems.

Keywords: Malware Detection, Data Protection, USB Security, Alexa AI Devices, IoT Security, Machine Learning, Threat Detection, Endpoint Security

ICSICA-2026-9

Advanced Machine Learning and Deep Learning-Based Framework for Cybersecurity Breach Prediction and Detection

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ABSTRACT

As cyber threats continue to evolve in complexity and scale, traditional security systems are often inadequate in identifying and mitigating hacking attempts in real time. This study presents a machine learning-based approach for the prediction and detection of cyber hacking breaches. By analyzing historical attack data and network behavior patterns, the system leverages both supervised and unsupervised learning algorithms to identify anomalies that may indicate potential security breaches.

Techniques such as decision trees, random forests, and deep neural networks are utilized to enhance detection accuracy while minimizing false positives. In addition, advanced methodologies such as ensemble learning, anomaly detection using autoencoders, and real-time stream processing are incorporated to improve system performance.

Furthermore, the integration of threat intelligence feeds and behavioral analytics supports proactive decision-making and early warning capabilities. The system also incorporates automated incident response and risk scoring mechanisms to prioritize threats. By combining intelligent learning models with scalable architectures such as cloud-based deployment, the approach provides a robust, efficient, and future-ready solution for strengthening cybersecurity defenses in dynamic digital environments.

Keywords: Machine Learning, Deep Learning, Cybersecurity, Breach Prediction, Threat Detection, Anomaly Detection, Predictive Security, Intrusion Detection

ICSICA-2026-10

Secure Multimedia Content Sharing Using Hybrid ECC-AES Encryption with Real-Time Access Control

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ABSTRACT

In the modern digital era, secure transmission of multimedia data such as audio, images, and videos is very important for communication and information sharing. Traditional methods mainly use image-based embedding techniques to hide secret data, which limits their ability to handle large multimedia content efficiently. To overcome these limitations, this project proposes a secure multimedia content-sharing framework that combines steganography and hybrid cryptography techniques.

In the existing system, audio data is hidden inside an image using the Discrete Wavelet Transform (DWT). After embedding the audio into the image, the data is encrypted using a hybrid cryptographic approach that combines Elliptic Curve Cryptography (ECC) and the Advanced Encryption Standard (AES). ECC is used for secure key generation, while AES is used for encrypting the embedded data. Although this method provides security, it is limited to image-based concealment and is not efficient for handling larger multimedia files such as videos.

Keywords: Secure Multimedia Sharing, Hybrid ECC-AES Encryption, Real-Time Access Control, Data Security, Multimedia Protection, Cryptography, Content Privacy, Cybersecurity

ICSICA-2026-11

Deep insight: Endoscopic Image-Based Colorectal Cancer Classification Using Sequential CNN Architecture

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ABSTRACT

Colorectal cancer (CRC) is one of the most common and life-threatening cancers worldwide, where early detection significantly improves survival rates. Conventional diagnostic approaches such as colonoscopy and histopathological examination rely heavily on manual interpretation by clinicians, making the process time-consuming. This paper presents an artificial intelligence-based computer-aided diagnosis (CAD) system for automated colorectal cancer classification using endoscopic images. The proposed system employs a Sequential Convolutional Neural Network (CNN) architecture to classify colorectal images into normal, polyp, and cancerous categories. Image preprocessing techniques such as resizing, noise removal, normalization, and data augmentation are applied to enhance feature learning and improve model performance. Experimental results demonstrate improved classification accuracy, reduced false detection rates, and real-time diagnostic support.

Keywords: Colorectal Cancer, Endoscopic Imaging, Convolutional Neural Networks (CNN), Medical Image Analysis, Cancer Classification, Deep Learning, Sequential CNN, Diagnostic Imaging

ICSICA-2026-12

Multilayered DNA-Based Steganography & Modified RSA Framework for Ultra Secure Data Transmission

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ABSTRACT

In an era of rapid digital communication, safeguarding sensitive information against unauthorized access remains a critical network challenge. While traditional Steganography provides a baseline for data security by concealing information within ordinary media to prevent unauthorized access, single-layer approaches are increasingly vulnerable to modern statistical steganalysis. This paper proposes a highly robust, multi-layered security framework that integrates biological computing concepts with advanced asymmetric cryptography. The proposed system transforms plaintext into DNA code sequences, subsequently embedding this encoded data into a cover image utilizing the Least Significant Bit(LSB) Substitution method. To further fortify the data carrier, the resulting stego-image undergoes encryption via a modified RSA Algorithm. This multi-layered architecture ensures an exceptional level of confidentiality, integrity, and authentication. By demanding a strict, reversed decryption sequence for extraction, the framework effectively mitigates existing vulnerabilities, rendering unauthorized decoding practically impossible.

Keywords: DNA-Based Steganography, Modified RSA Encryption, Secure Data Transmission, Multilayer Security, Cryptography, Data Privacy, Cybersecurity, Information Hiding.

ICSICA-2026-13

An Intelligent Peer-Centric Learning System with Topic-Aware Distraction Detection

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ABSTRACT

The domain of this project lies in online collaborative learning and intelligent skill exchange platforms, chosen due to the growing limitations of conventional e-learning systems that primarily emphasize isolated, self-paced learning with minimal peer interaction. Most existing intelligent tutoring and learning platforms depend on uni-dimensional or static grouping strategies, such as random or score-based grouping, which fail to capture learners' multidimensional skill profiles, leading to ineffective collaboration, low engagement, and limited knowledge sharing. The base paper addresses this challenge by introducing data-driven student grouping algorithms, including k means-based homogeneous grouping and reciprocal peer pairing, leveraging fine-grained learning data to improve collaborative learning quality. However, these solutions remain largely confined to controlled tutoring environments and lack real-time interaction, scalability, and seamless deployment in modern web-based systems.

Keywords: Intelligent Learning System, Peer-Centric Learning, Topic-Aware Detection, Distraction Detection, Educational Technology, Adaptive Learning, Student Engagement, AI in Education.

ICSICA-2026-14

Meal Mind: A Context-Aware Intelligent Food Recommendation and Health-Oriented Meal Planning System

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ABSTRACT

This paper presents MealMind, a context-aware intelligent food recommendation and health oriented meal planning system designed to provide personalized and nutritionally safe meal suggestions. Traditional food recommender systems primarily rely on content-based filtering and collaborative filtering techniques, which often fail to incorporate critical factors such as health conditions, seasonal variations, and meal composition. To address these limitations, MealMind proposes a hybrid recommendation framework that integrates user preferences, collaborative learning, health constraints, climate adaptation, and dish pairing into a unified scoring model. The system ensures that recommendations are not only personalized but also aligned with dietary restrictions, environmental conditions, and nutritional balance. The architecture consists of multiple modules, including user preference analysis, content similarity computation, collaborative filtering, health constraint filtering, seasonal adaptation, and dish pairing mechanisms. A hybrid scoring function combines these factors to generate ranked meal recommendations while enforcing health safety through constraint-based filtering.

Keywords: Context-Aware Recommendation, Intelligent Food System, Meal Planning, Health-Oriented Recommendations, Personalized Nutrition, AI in Healthcare, Dietary Management, Smart Food Recommendation.

ICSICA-2026-15

Traffic Signal Behavior Modelling with Integrated Obstacle Assessment

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ABSTRACT

There is a growing congestion and safety threat on the urban intersections with the dynamic nature of the traffic and unexpected obstacles that the traditional fixed time signal system is not effective at handling. The paper suggests a visual cognition model of intelligent traffic lights behavior modeling based on AI and obstacle evaluation. The system also uses convolutional neural networks (CNNs) to conduct real-time intersection camera feed-based scene understanding to provide an estimate of traffic density, obstacle location, and spatial risk assessment. Perceptual outputs are combined into a behavior modeling unit which dynamically adjusts the signal phases, green-time durations using traffic efficiency and safety factors. Exposure to publicly accessible traffic datasets in urban areas and obstacle-expanded conditions indicate less queue, greater signal responsiveness, and situational awareness under experimental conditions as compared to conventional control strategies. The findings suggest that integration of visual intelligence in the decision making in traffic signals could greatly enhance traffic flow and safety on the roads in the cities.

Keywords: Traffic Signal Modeling, Obstacle Assessment, Intelligent Transportation Systems, Traffic Management, Road Safety, Sensor Integration, Traffic Behavior Analysis, Smart Traffic Control.

ICSICA-2026-16

Smart Water Management System

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ABSTRACT

A water quality monitoring system can aid in preserving the environment, ensuring the security of nearby water sources, and fostering economic growth in rural areas. As a result, this will help to develop a system here that employs Internet of Things and Machine Learning to monitor the quality of water. This paper discusses the characteristics of water to let us know whether it is fit for human consumption or not. The sensors dipped in water samples acquired from wells, lakes, rivers, ponds, or other places are used to inform the development of an effective model made up of TDS, pH and turbidity sensors. The data will be delivered from the sensors as soon as they are received to the IDE, where it will then be sent to the cloud server. The model effectively accounts for test tables, where 1 indicates the water is fit for drinking and 0 indicates the water is not. The values were classified differently using Machine Learning models like SVM, RF and XG Boost method. Training data is pre-processed before being fetched from the cloud. Over that data, machine learning models like Support Vector Machine, Random Forest & Extreme Gradient Boost has been implemented.

Keywords: Smart Water Management, IoT, Water Conservation, Real-Time Monitoring, Sensor Networks, Data Analytics, Sustainable Water Use, Automated Control.

ICSICA-2026-17

User-Centric Mobile Addiction Analysis Using Machine Learning

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ABSTRACT

In modern times, smartphone addiction has evolved to be a behavioural issue, causing excessive screen time, emotional dependence, and decreased productivity in a variety of user demographics. In this paper, a predictive web-based system that uses machine learning techniques on behavioural survey data to evaluate smartphone addiction levels is proposed. A structured 20-item questionnaire intended to record usage patterns, emotional triggers, and habits is used by the system to gather user responses. To categorize users into Low, Moderate, or High addiction risk groups, six machine learning algorithms—Behavioral Decision Analyzer, Ensemble Addiction Insight Engine, Addiction Boundary Classifier (SVM), Addiction Probability Estimator, Usage Pattern Probabilistic Analyzer, and Adaptive Addiction Learning Model—are trained and assessed. To improve classification accuracy and robustness, an ensemble approach makes the model output.

Keywords: Mobile Addiction, User-Centric Analysis, Machine Learning, Behavioral Analysis, Digital Wellbeing, Predictive Modeling, Smartphone Usage Patterns.

ICSICA-2026-18

A Predictive Autonomous Hazard Detection System for Industrial Environments

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ABSTRACT

Industrial environments such as mining sites, chemical plants, confined industrial zones, and oil facilities are exposed to hazardous conditions including toxic gas accumulation, abnormal temperature rise, and structural instability. This paper offers MineGuard X, an AI-driven IoT-based safety tool designed to implement a zero-human-get admission to version in mining environments. The proposed device integrates gasoline sensors, temperature monitoring modules, ultrasonic structural detection, and ESP32-based totally truly element processing for non-stop environmental evaluation. Unlike conventional threshold-based totally structures, MineGuard X includes predictive anomaly detection to understand normal inclinations earlier than engaging in critical danger ranges. Upon detecting unstable conditions, the device autonomously halts drilling operations, activates air go with the flow mechanisms, restricts tunnel get entry to, and sends real-time alerts to a centralized cloud dashboard.

Keywords: Predictive Hazard Detection, Autonomous Systems, Industrial Safety, Machine Learning, IoT Sensors, Risk Assessment, Real-Time Monitoring, Workplace Safety

ICSICA-2026-19

Real-Time AI For Early Neurological Disorder Prediction on Blockchain Health Ledger

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ABSTRACT

The early detection of neurological disorders is crucial for ensuring successful clinical interventions and enhanced patient outcomes. The processing of neuroimaging scans can now be done by AI, but the problems of model credibility, real-time implementation, and secure processing of personal healthcare information still persist. For assuring integrity and credibility, this paper presents NeuChainAI, a real-time AI system that combines predictive processing of novel neurological diseases with a healthcare-supporting blockchain journal. The proposed system employs a combination of a Extremely Gradient Boosting Model (XGBoost) based model that provides credibility in multi-classification, a Gated Recurrent Unit (GRU) model that handles trained model representation, and a Convolutional Neural Networks (CNN) model that derives two-dimensional spatial representations from neuroimaging scans. The system, NeuChainAI, is designed to provide a predictive output probability for normal presentations, as well as Alzheimer's, Parkinson's, Stroke, and Brain Tumor disorders.

Keywords: AI-Based Neurological Prediction, Real-Time Monitoring, Blockchain Health Ledger, Early Diagnosis, Medical AI, Secure Health Data, Neuroinformatics, Predictive Healthcare.

ICSICA-2026-20

Forensic Data Analytics for Anomaly Detection in Evolving Networks

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ABSTRACT

Nowadays, In the modern digital environment, the frequency and complexity of cyber-attacks have increased dramatically, creating serious risks to network integrity and data privacy. Traditional signature-based intrusion detection systems often fail to recognize new or evolving attack patterns, especially in high-traffic and heterogeneous networks . This paper presents an intelligent framework, Forensic Data Analytics for Anomaly Detection in Evolving Networks, that integrates machine learning, network monitoring tools, and forensic analytics to detect, classify, and analyze suspicious network behavior in real time. Nmap is used for active network scanning and vulnerability discovery, while Wireshark supports packet capture and deep traffic inspection.

Keywords: Forensic Data Analytics, Anomaly Detection, Evolving Networks, Cybersecurity, Network Monitoring, Intrusion Detection, Threat Analysis, Data Forensic.

ICSICA-2026-21

**AI-Driven Multi-Modal Information Synthesis: Integrating PDF Querying,
Image Summarization, And URL Summarization**

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ABSTRACT

The rapid advancement of artificial intelligence (AI) has enabled the integration of multiple data modalities to generate meaningful insights from diverse information sources. This paper presents an AI-driven multi-modal information synthesis framework that seamlessly combines PDF querying, image summarization, and cross-language text summarization into a unified system. The proposed model leverages natural language processing (NLP), computer vision (CV), and transformer-based architectures to extract, interpret, and summarize textual and visual information from heterogeneous data sources. The PDF querying module employs intelligent document parsing and semantic search mechanisms to retrieve context-relevant information.

Experimental evaluations indicate that the proposed approach significantly improves the coherence, relevance, and interpretability of synthesized outputs compared to single-modal systems. The study contributes toward developing a holistic AI ecosystem capable of handling complex, multilingual, and multi-modal data environments for applications in education, research, and intelligent knowledge management.

Keywords: AI-Driven Information Synthesis, Multi-Modal Data, PDF Querying, Image Summarization, URL Summarization, Knowledge Extraction, Natural Language Processing, Data Integration.

ICSICA-2026-22

An Optimization-Driven Deep Neural Framework for Automated Alzheimer's Disease Screening

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ABSTRACT

Alzheimer's disease is a progressive, neurodegenerative disorder that results in cognitive decline and creates significant medical and socio-economic problems internationally. The ability to accurately and timely diagnose the disease is extremely important for providing suitable treatment; however, traditional diagnostic tools (clinical evaluation and MRI reading) are often slow and subjective. We present a new method to automatically diagnose Alzheimer's disease using MRIs called DeepNet. The model uses deep transfer learning based on pre-trained architectures (AlexNet, GoogLeNet, VGG16) to extract features with reliability and robustness, and then fuses them at the feature level. Lastly, a Support Vector Machine (SVM) classifier is employed to classify the MRI scans into three different stages: MCI, early stage Alzheimer's, and healthy controls. DeepNet demonstrated significantly improved sensitivity, specificity, and overall accuracy when compared to current state-of-the-art methods.

Keywords: Deep Neural Networks, Alzheimer's Disease, Automated Screening, Optimization-Driven Framework, Medical Image Analysis, Early Diagnosis, AI in Healthcare, Predictive Modeling.

ICSICA-2026-23

Network vulnerability scanner

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ABSTRACT

Network scanning and vulnerability testing relies on tools and processes to scan the network and its devices for vulnerabilities. This aids in refining any organization's security policy due to identification of vulnerabilities, and guarantees that the security measures taken actually gives the protection that the organization expects and requires. Administrator needs to perform vulnerability scan periodically which helps them to uncover shortcomings of network security that can lead to device or information being compromised or destroyed by exploits. Different implementations & tools of network scanning have distinctive proficiency and have different kinds of outputs. These outputs are typically heterogeneous which makes the further analysis a challenging task. In this dissertation, two basic open source scanners are considered NMAP & OpenVAS. We show how to incorporate this two scan.

In other words, network mapping, vulnerabilities and configuration faults in network are shown in various formats. Also, an easy approach is defined to reduce the scan duration of vulnerability.

Keywords: Network Vulnerability Scanner, Cybersecurity, Threat Detection, Network Security, Risk Assessment, Intrusion Detection, System Monitoring, Security Assessment.

ICSICA-2026-24

Hybrid Cognitive–Neurophysiological Modeling for Explainable and Personalized EEG-Based Stress Assessment

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ABSTRACT

Mental Stress is increasingly becoming a serious issue because of the negative impact it can have on cognition, mental health, and overall quality of life. Therefore, accurately identifying stress as soon as possible is important so that people can take steps toward alleviating the stress, thus decreasing its direct impact. Using electroencephalogram (EEG) signals to analyze the neural basis of stress provides a non-invasive and objective method but is difficult to interpret because EEG signals contain non-linear nature, noise, and a high amount of variability between individuals. This research proposes a personalized hybrid method for detecting stress by combining EEG-based neurophysiological analyses with task-based cognitive measures to increase the accuracy of predictions, understanding, and reliability of the predictions about when an individual will experience stress. The EEG signals are recorded during both resting and task-induced states, then the signals are filtered and transformed into the frequency domain using a Fast Fourier Transform (FFT). Individual differences will be controlled for by normalizing the data to each subject's individual baseline level; therefore, stress will be detected as being experienced

Keywords: Electroencephalogram (EEG), Mental Stress Detection, Task-Based Stress Evaluation, Convolutional Neural Network, XGBoost Classifier, Hybrid Machine Learning Model, Guided Breathing Exercises, Session-Based Stress Monitoring.

ICSICA-2026-25

Stock Price Prediction Using Machine Learning And Python

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ABSTRACT

The stock market is a complex and dynamic environment influenced by various factors such as economic conditions, market trends, and investor behavior. Predicting stock prices accurately has long been a major challenge for analysts and investors. This project utilizes Machine Learning (ML) techniques to analyze historical stock data and predict future stock prices with improved accuracy. By applying algorithms such as Linear Regression, Random Forest, and LSTM (Long Short-Term Memory) networks, the model identifies patterns and correlations within the data. The proposed system aims to provide a data-driven approach to assist investors in making informed decisions, reducing financial risks, and optimizing investment strategies. The results demonstrate that ML-based models can outperform traditional methods in forecasting stock market trends, making them a valuable tool in financial analytics.

Keywords: Stock Price Prediction, Machine Learning, Python, Financial Forecasting, Time Series Analysis, Predictive Modeling, Data Analytics, Algorithmic Trading.

ICSICA-2026-26

Hair Doctor – The AI Magic Care Guide: An AI based Intelligent Hair Care Consultation System

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ABSTRACT

The purpose of this study is to introduce Hair Doctor - AI Magic Care Guide, an innovative artificial intelligence system that utilizes mobile architecture to help people with personalized consultations related to care for their hair and scalp. By applying AI feature analysis and symptom diagnosis, the system allows for the development of intelligent, mobile-based real-time decision making accomplished with TensorFlow Lite. This study focuses on the incorporation of supervised learning, lightweight inference models to provide high efficiency with minimal latency for using the application. The application achieves over 90% accuracy on the first attempt for the diagnosis of many hair-related issues (e.g., dandruff, hair loss, and/or alopecia), so this application will certainly provide a strong foundation to empower individuals with AI self-care. In addition to providing accurate diagnoses, the application will provide recommendations for lifestyle changes and voice alerts as well as provide automatic email summaries to facilitate adherence to long-term regimen usage.

Keywords: AI Consultation / AI Diagnostics, Customized Hair Care, Regimen Email/Messaging Summary, Multi-modal Interface (Voice Guidance), Alopecia/Hair Fall, Product Recommendations.

ICSICA-2026-27

Smart Wildlife and Landslide Detection System Using Yolo and Thermal Imaging

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ABSTRACT

The issue of ensuring road safety in hilly and forest areas has become a matter of growing concern due to the increasing number of accidents caused by sudden and unexpected wildlife crossings and landslides, especially at night when the visibility is extremely low. While the conventional monitoring and surveillance systems help in road observation, they are faced with major challenges since they are dependent on visible light cameras, which are not effective in low light, foggy, or adverse weather conditions

The proposed system involves the integration of YOLO (You Only Look Once) deep learning object detection and thermal imaging technology. Thermal imaging cameras are able to capture the heat patterns of animals and natural road hazards, which can be detected even in complete darkness without altering the natural conditions.

Keywords—Wildlife Detection, Landslide Detection, YOLO Algorithm, Thermal Imaging, Night Surveillance, Intelligent Road Safety, Deep Learning, Computer Vision, Object Detection, IoT-Based Alert System, Hazard Detection, Hilly Road Monitoring, Real-Time Detection, Embedded Systems, Smart Transportation System.

ICSICA-2026-28

Federated Learning-Based Secure Framework for Privacy-Preserving IoT Systems

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ABSTRACT

The rapid proliferation of Internet of Things (IoT) devices has resulted in large-scale data generation, raising critical concerns about data privacy, security, and centralized data management. Conventional machine learning approaches rely on centralized data collection, which increases vulnerability to cyberattacks and privacy breaches. To overcome these limitations, this paper proposes a federated learning-based secure framework for privacy-preserving IoT systems. The proposed model enables decentralized training, where IoT devices collaboratively learn a shared model without transmitting raw data. This approach ensures enhanced data privacy and reduces dependency on centralized infrastructure. Furthermore, a lightweight encryption mechanism is incorporated to secure the transmission of model updates. An intelligent anomaly detection module is integrated to identify and mitigate malicious or compromised devices during training. The framework is designed to be energy-efficient and suitable for resource-constrained IoT environments. Experimental results demonstrate that the proposed system achieves comparable accuracy to traditional centralized models. In addition, it significantly reduces communication overhead and enhances data confidentiality.

Keywords: The proposed framework provides a reliable foundation for building secure and intelligent A IoT applications. Future enhancements will focus on optimizing model aggregation techniques and real-world deployment scenarios.

ICSICA-2026-29

AI-Driven Energy Management in Smart Microgrids

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ABSTRACT

The increasing demand for reliable and sustainable energy has accelerated the development of smart microgrids integrated with renewable energy sources. However, managing energy generation, storage, and consumption in microgrids remains a complex challenge due to variability and uncertainty. This paper proposes an AI-driven energy management system for efficient operation of smart microgrids. The system utilizes machine learning algorithms to predict energy demand and optimize resource allocation in real time. It integrates renewable sources such as solar and wind with battery storage systems to ensure continuous power supply.. The framework enhances grid stability and improves overall system efficiency. Simulation results demonstrate that the AI-based approach outperforms traditional energy management methods. The proposed system achieves better load balancing and reduced energy wastage. It also supports adaptive decision-making under changing environmental conditions. . The proposed approach ensures reliable, cost-effective, and sustainable energy management. Future work will focus on real-time implementation and integration with advanced smart grid technologies.

Keywords: AI-Driven Energy Management, Smart Microgrids, Machine Learning, Renewable Energy, Demand Response, Grid Optimization, IoT, Sustainable Energy Systems.

ICSICA-2026-30

Privacy-Preserving Medical Image Sharing and Federation Disease

Diagnosis Using ECC Watermarking

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ABSTRACT

The rapid growth of digital healthcare systems has significantly increased the need for secure medical image sharing and reliable remote disease diagnosis. However, protecting patient privacy while enabling collaborative learning across multiple medical institutions remains a major challenge. Traditional centralized systems expose sensitive patient data to privacy risks and potential cyberattacks. To address these concerns, this paper proposes a privacy-preserving medical image sharing framework that integrates Elliptic Curve Cryptography (ECC)-based watermarking with federated learning for secure and distributed disease diagnosis.

Keywords: Privacy-Preserving Medical Sharing, ECC Watermarking, Federated Disease Diagnosis, Medical Image Security, Data Privacy, Healthcare IoT, Secure Data Transmission, Collaborative AI

ICSICA-2026-31

**An Xai driven lung cancer detection framework using
EffectiveNet and MLP**

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ABSTRACT

Early-stage lung cancer detection remains a critical challenge in clinical practice due to subtle radiological patterns, heterogeneous symptom presentation, and delayed diagnosis. Recent advances in Artificial Intelligence (AI), particularly deep learning, have demonstrated significant potential in improving diagnostic accuracy. However, most existing models operate as black-box systems, limiting clinical trust and interpretability.

Experimental results demonstrate improved sensitivity, specificity, and overall diagnostic accuracy compared to unimodal approaches. Furthermore, visual explanation maps and feature-importance scores enable clinicians to identify critical imaging regions and influential risk factors contributing to early-stage cancer detection. The integration of multimodal learning with explainable AI not only enhances diagnostic reliability but also fosters clinician trust and supports informed decision-making. This framework highlights the potential of interpretable AI-driven systems in advancing early lung cancer screening and precision medicine.

Keywords: Explainable AI (XAI), Lung Cancer Detection, EfficientNet, Multi-Layer Perceptron (MLP), Medical Image Analysis, Deep Learning, Cancer Diagnosis, AI in Healthcare

ICSICA-2026-32

**From Ballots to Bytes: Tamil Nadu Electoral Outcome Analysis & 2026
Prediction**

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ABSTRACT

This project, titled “From Ballots to Bytes: An Analysis of Tamil Nadu Electoral Outcomes and the 2026 Assembly Prediction,” presents a comprehensive evaluation of electoral patterns through structured data analysis and interactive visualization. It examines historical Tamil Nadu Assembly election data from 2016 and 2021 to identify constituency-wise and district-wise trends, including seat share, vote share, party performance, demographic participation, and geographical distribution. A professional dashboard is developed using Power BI to enable dynamic filtering, drill-down capabilities, and KPI-driven insights for effective electoral intelligence reporting. Furthermore, the study incorporates a predictive framework for the 2026 Assembly election by integrating historical electoral data with sentiment analysis derived from social media and news sources.

Keywords: Electoral Outcome Analysis, Tamil Nadu Elections, 2026 Prediction, Political Data Analytics, Voting Behavior, Election Forecasting, Machine Learning, Political Science Analytics

ICSICA-2026-33

**National Welfare Scheme Performance and Metrics Dashboard for
Government Officials and Data Analysts**

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ABSTRACT

Government-run welfare programs are crucial for moving society and the economy forward, but monitoring and analyzing these programs is often characterized by human processing, dispersion of data, and long reporting times. This is a problem that affects the level of clarity and expediency associated with decision-making and optimization of government spending. This study proposes a National Welfare Scheme Performance and Metrics Dashboard that will help government administrators monitor and analyze welfare programs within their jurisdictions through real-time processing

This is made possible through controlled access. Experimental findings indicate that this dashboard will improve monitoring expediency, clarity, and decision-making capacities more than traditional approaches. This technology is scalable and can be developed further to include more advanced technologies such as GIS decision support.

Keywords: National Welfare Schemes, Performance Metrics, Data Dashboard, Government Analytics, Policy Evaluation, Public Sector Data, Data Visualization, Program Monitoring.

ICSICA-2026-34

Trustworthy And Transparent Double Auction Platform For Fresh Agricultural Commodities

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ABSTRACT

Fresh agricultural commodities like fruits, vegetables, meat, and seafood require fast and efficient market movement due to their perishable nature. Traditional supply chains restrict farmers to limited local buyers, often resulting in price manipulation by intermediaries and significant produce loss. To address these challenges, this project implements a privacy-preserving Double Auction Mechanism for fresh-produce trading, enabling an e-commerce platform to handle bids fairly, transparently, and in real time. The system matches growers and procurers automatically by analyzing fluctuating supply–demand conditions. To guarantee confidentiality, integrity, and auditability across all auction stages, the system integrates multiple advanced cryptographic security components. The Commit-Reveal Scheme Algorithm prevents bid manipulation by enforcing a two-phase submission process where participants first commit to a bid and later reveal it for verification, eliminating the possibility of last-minute alterations. Additionally, a Reputation Score Algorithm evaluates the long-term behavior of traders, rewarding consistent and trustworthy participants while penalizing fraudulent or non-cooperative actions.

Keywords: Double Auction Platform, Agricultural Commodities, Trustworthy Trading, Transparent Market, E-Agriculture, Blockchain, Supply Chain Management, Smart Contracts

ICSICA-2026-35

EVMS: Emergency Vehicle Monitoring System – A Real-Time Location Tracking and Intelligent and Analytics Solution for Enhanced Emergency Response

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ABSTRACT

Emergency vehicles like ambulances, fire trucks, and police cars require quick passage through traffic. This project presents an Emergency Vehicle Monitoring System that detects the siren of an emergency vehicle and controls traffic lights accordingly. The system uses Raspberry Pi, mic modules, a buzzer, and a modified traffic signal with an emergency icon to ensure smooth passage for emergency vehicles. In urban environments, traffic congestion often hampers the timely arrival of emergency vehicles such as ambulances, fire trucks, and police cars, posing significant risks to public safety. To address this challenge, a sound sensor-based system is proposed to enhance emergency vehicle navigation through intersections.

Interconnected sensors across intersections enable synchronized traffic signal control. This creates a continuous green corridor along the vehicle's route. The system supports communication technologies such as Wi-Fi, GSM, and LoRa. This ensures reliable data transmission in different environments. Integration with IoT enables real-time monitoring and intelligent decision-making. The system improves response time and reduces delays significantly

Keywords: Emergency Vehicle Monitoring, Real-Time Location Tracking, Intelligent Analytics, Emergency Response, EVMS, IoT-Based Traffic Management, Smart City Solutions, Public Safety.

ICSICA-2026-36

Optimized Legal Document Understanding Using Ai-Based

Clause Extraction and Risk Detection

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ABSTRACT

LegalMind is an AI-powered system that intelligently analyses legal papers by identifying risks and extracting clauses. The system's primary purpose is to solve privacy concerns about cloud-based legal tools by providing a secure, entirely offline solution. It utilises natural language processing techniques, including vector embeddings, semantic chunking, and text preparation. An offline large language model is utilised to analyse legal texts, ensuring complete data confidentiality. The system supports semantic search, document summarization, and contextual question answering. A vector database is used to store and retrieve legal information more effectively based on meaning than on keywords. LegalMind increases the precision of comprehending intricate legal terminology and seeing possible dangers. It shortens the time and effort needed to review legal documents by hand. The method can be used in academic research settings, government agencies, and law firms. All things considered, LegalMind blends solid data privacy, offline functionality, and AI efficiency.

Keywords: AI-Based Legal Analysis, Clause Extraction, Risk Detection, Legal Document Understanding, Natural Language Processing, Document Automation, Contract Analytics, Intelligent Legal Systems.

ICSICA-2026-37

**EduNexus — Centralized Academic Management & Mentorship
Platform**

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ABSTRACT

EduNexus is a centralized academic management and mentorship platform designed for engineering college departments. It is a full-stack web application that digitizes and streamlines the day-to-day academic operations between four key roles the Head of Department (HOD), Class Advisors, Mentors, and Students — through a single unified dashboard. The platform is built with a Vanilla JavaScript Single Page Application on the frontend communicating with a FastAPI Python backend, backed by a PostgreSQL relational database. Each role gets a tailored dashboard experience: the HOD oversees the entire department with analytics on student attendance, .

Key features of EduNexus include a bulk CSV attendance upload system, an auto-generated weekly timetable engine that assigns subjects and staff to time slots based on predefined scheduling rules, a role-aware timetable viewer where each staff member sees only their allocated teaching periods across all classes, an examination module with automatic grade and pass/fail calculation,

Keywords: Academic Management, Mentorship Platform, Centralized Education System, Student Tracking, Learning Analytics, Educational Technology, Academic Administration, Personalized Learning.

ICSICA-2026-38

EEG-Based Human Emotion Classification Using Machine Learning Techniques

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ABSTRACT

The use of electroencephalogram (EEG) to classify emotions has become an effective technique in affective computing that enables the determination of the emotional state of a human being. EEG is more precise, less susceptible to external interference (unlike such traditional methods as the facial expression, speech analysis etc.) and provides first-hand data on the neural activity. In this paper, the author will discuss some of the means of feature extraction, including entropy-based measures, time-frequency analysis and fusion strategy, and classification algorithms, including machine learning models and deep learning models. Recent advances that use convolutional neural networks (CNN), long short-term memory (LSTM) and hybrid structures have also offered a significantly much better rate of classification accuracy. The paper considers the existing methodologies, summarizes the key issues such as signal noise, complexity of computing and finally gives a future prospect of real-time applications. The outcomes indicate that hybrid deep learning systems and ensemble systems perform well in emotional recognition systems using EEG. Keywords— EEG, Emotion Recognition, Machine Learning, Deep Learning, Feature Extraction, Brain-Computer Interface (BCI).

Keywords: EEG-Based Emotion Recognition, Human Emotion Classification, Machine Learning, Brain-Computer Interface (BCI), Affective Computing, Neural Signal Analysis, Mental State Detection, AI in Healthcare

ICSICA-2026-39

CryptoAcoustix: Blockchain-Driven Audio Encryption Framework For Data Integrity and Confidentiality in Cloud System

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ABSTRACT

In the modern era of digital transformation, cloud storage has become the backbone of data management, but it also introduces critical security challenges involving confidentiality, integrity, and authenticity. Traditional encryption systems that rely on centralized key management create vulnerabilities, such as single systems. The system takes security a step further by embedding encryption keys and XOR-generated codes within audio files using the Least Significant Bit (LSB) steganography technique, concealing them from detection. These stego-audio files are then encrypted using Elliptic Curve Cryptography (ECC), providing multi-layered protection against brute-force and data interception attacks. Authorized users gain access only through unique identification parameters such as Block ID, Owner ID, and Audio ID, which are validated through blockchain verification and hash code matching.

Keywords: Blockchain Audio Encryption, Data Integrity, Data Confidentiality, Cloud Security, CryptoAcoustix, Secure Data Transmission, IoT Security, Cryptography

ICSICA-2026-40

AI-Based Medical Report Analysis System Using OCR and Structured Clinical Validation

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ABSTRACT

Medical laboratory reports are frequently distributed as scanned documents or unstructured PDF files, making automated clinical interpretation difficult. Manual reading of these reports requires domain expertise and can delay decision-making, particularly in resource-limited settings. The system supports both image and PDF formats and provides a web-based interface for real-time analysis.

Experimental validation demonstrates reliable extraction accuracy and consistent clinical flagging of abnormal Complete Blood Count (CBC) parameters. The proposed architecture offers a scalable and safe framework for healthcare document digitization and automated preliminary interpretation.

Keywords: Medical AI, OCR, Clinical Data Extraction, Streamlit, Healthcare Automation, Rule-Based Systems.

ICSICA-2026-41

Smart AI Travel Planner Agent: An Intelligent Agent-Based System for Automated and Personalized Travel Planning

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ABSTRACT

Travel planning is a complex task that involves gathering information from multiple sources, optimizing costs and time, adapting to user preferences, and responding to dynamic conditions such as weather, traffic, and availability. Traditional travel planning applications provide static recommendations and require significant manual effort from users. This research paper proposes a Smart AI Travel Planner Agent, an intelligent agent-based system that automates and personalizes the entire travel planning process. The proposed system leverages artificial intelligence techniques such as machine learning, natural language processing, recommendation systems, and multi-agent architecture to deliver optimized, real-time, and user-centric travel plans. The system aims to enhance user experience, reduce planning effort, and support intelligent decision-making in tourism and travel domains.

Index Terms— Artificial Intelligence, Intelligent Agents, Travel Planning, Recommendation Systems, Machine Learning, Natural Language Processing, Smart Tourism.

Keywords: Smart Travel Planner, AI-Based Agent, Personalized Travel Planning, Intelligent Systems, Automated Trip Planning, Recommendation Systems, Travel Analytics.

ICSICA-2026-42

Early Detection of Alzheimer's Disease from Brain MRI using VGG-16 Based Deep Learning

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ABSTRACT

Alzheimer's disease is a progressive neurodegenerative disorder that primarily affects memory, cognitive abilities, and behavior, and is recognized as one of the leading causes of dementia worldwide. The increasing number of affected individuals poses a significant challenge to healthcare systems, making early and accurate diagnosis essential for effective treatment and management. Traditional diagnostic methods rely heavily on clinical assessments and manual analysis of brain Magnetic Resonance Imaging (MRI) scans, which are often time-consuming, subjective, and prone to human error. Moreover, detecting early-stage Alzheimer's disease remains difficult due to subtle structural changes in the brain that may not be easily identifiable through conventional approaches. In recent years, advancements in artificial intelligence, particularly deep learning, have shown great potential in transforming medical image analysis. Convolutional Neural Networks (CNNs) have demonstrated exceptional performance in extracting complex patterns from images and automating classification tasks.

Keywords: Alzheimer's Disease Detection, Brain MRI Analysis, Deep Learning, VGG-16, Medical Image Classification, Early Diagnosis, AI in Healthcare, Neuroimaging

ICSICA-2026-43

**NeuroScript AI: A Real-time Handwriting and Drawing Analysis System
for Mental Health Assessment Using Deep Learning and Neural Pressure
Index**

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ABSTRACT

Handwriting and drawing patterns carry meaningful information about how the nervous system and motor system function together. When someone writes or draws, their strokes reflect underlying neurological activity — and disruptions in that activity often show up as inconsistencies in pressure, shakiness, or uneven patterns. Building on this clinical insight, we developed NeuroScript AI, a system that uses deep learning to automatically detect neuromotor irregularities from handwriting and drawing images. Our approach centers on a Convolutional Neural Network (CNN) that processes spiral and meander drawings from the HandPD dataset. A key contribution of this work is the Neural Pressure Index (NPI) —a metric we designed to approximate pen pressure from image-level features like stroke thickness, pixel intensity, and stroke density, eliminating the need for pressure-sensing hardware. The combined model achieved 94.2% classification accuracy across normal, mild, and severe neuromotor categories, suggesting that image-based handwriting analysis can serve as a practical and scalable screening tool in clinical contexts.

Keywords: Deep Learning, CNN, Handwriting Analysis, Neuromotor Disorder
Detection, Hand PD Dataset.

ICSICA-2026-44

Lightweight Optimization-Driven Deep Learning for Cardiac Disease from MRI (CMRI)

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ABSTRACT

Accurate diagnosis of cardiac diseases from Magnetic Resonance Imaging (MRI) remains a challenging task due to the need for high predictive performance while maintaining computational efficiency. This paper presents a computing-centric and efficiency-aware deep learning framework for cardiac MRI analysis, explicitly designed for diagnostic and clinical research. The proposed model is based on a two-layer GhostNet architecture enhanced with a combined channel-attention mechanism that integrates squeeze-and-excitation (SE) operations, enabling effective recalibration of feature channels with minimal parameter overhead. Network training is performed using an improved Parrot Optimization Algorithm, which is algorithmically and mathematically formulated to adaptively optimize model parameters, resulting in improved convergence behavior and generalization capability. To further reduce computational complexity, structured pruning is systematically applied and quantitatively analyzed, with explicit evaluation of parameter count, floating-point operations (FLOPs), memory footprint, and accuracy trade-offs.

Keywords - Ghost Net, Cardiac MRI, Squeeze-and-Excitation Attention, Parrot Optimization, Model Pruning.

ICSICA-2026-45

Safe Entry: Smart Manhole Safety Device

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ABSTRACT

Urban Storm Water Networks are Crucial for handling Rainfall runoff and Safeguarding people in expanding Urban areas, yet many traditional Drainage Arrangements lack continuous observation which makes it difficult to recognize problems like sudden Water rise or the presence of Harmful Gases in underground passages, when Real-Time Data is unavailable responses may be delayed, Repair expenses may rise and both workers and the public can face serious dangers. The work introduces an IOT-based Drainage Supervision System designed to continuously monitor Manholes and Pipelines. It utilizes an ultrasonic sensor to measure water levels and detect hazardous gases using MQ-7 and MQ-137 sensors, enabling the early identification of unsafe conditions. The gathered data is transmitted wirelessly to a centralized control platform through a GSM module, where officials can monitor live updates, receive instant alerts, and take prompt corrective measures through continuous monitoring and centralized control. The proposed approach encourages preventive maintenance and enhances safety for field personnel and improves decision-making in Urban Infrastructure Management and the system is economically scalable and adaptable for modern Smart City initiatives helping cities improve flood readiness and overall drainage reliability.

Keywords: Smart Manhole Safety, IoT Safety Device, Real-Time Monitoring, Public Safety, Hazard Detection, Urban Infrastructure, Sensor-Based Safety, Intelligent Safety System

ICSICA-2026-46

Neuromorphic Artificial Intelligence

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ABSTRACT

Neuromorphic Artificial Intelligence Neuromorphic Artificial Intelligence (AI) is an emerging computing paradigm inspired by the architecture and functional principles of the human brain. Unlike traditional von Neumann systems that separate memory and processing units, neuromorphic architectures integrate computation and memory, enabling parallel, event-driven processing with significantly lower energy consumption. These systems primarily utilize spiking neural networks (SNNs), which mimic biological neurons through discrete spike-based communication and temporal learning mechanisms. Recent developments in neuromorphic hardware, such as IBM TrueNorth and Intel Loihi, demonstrate the potential for ultra-low-power, real-time intelligent processing suitable for edge devices, robotics, and autonomous systems. By supporting asynchronous communication and adaptive learning, neuromorphic AI offers improved scalability, fault tolerance, and computational efficiency compared to conventional deep learning approaches. This paper examines the fundamental concepts of neuromorphic computing, its hardware-software co-design strategies, key applications, and current research challenges. Neuromorphic AI presents a promising pathway toward energy-efficient, brain-inspired intelligent systems capable of operating effectively in dynamic, real-world environments.

Keywords: Neuromorphic AI, Brain-Inspired Computing, Artificial Intelligence, Neuromorphic Computing, Spiking Neural Networks, Cognitive Computing, Bio-Inspired AI, Edge AI.

ICSICA-2026-47

Optimization-Driven Intelligent Load Balancing for Efficient Server Utilization in Distributed Systems

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ABSTRACT

In modern distributed computing environments, uneven server utilization remains a significant challenge, where certain servers become overloaded while others remain underutilized, leading to performance degradation and inefficient resource management. To address this limitation, this paper proposes an optimization-driven intelligent load balancing model that enhances resource utilization and system efficiency. The proposed approach dynamically distributes workloads across multiple servers by considering their performance capabilities and operational characteristics. Tasks requiring high-speed execution are assigned to performance-optimized servers, whereas tasks involving sensitive operations are allocated to high-security servers. The system continuously monitors real-time server parameters, including load conditions, availability, and processing capacity, enabling adaptive workload redistribution. Through this intelligent allocation mechanism, underutilized servers are effectively engaged, while overloaded servers are relieved by redistributing tasks. This ensures balanced resource utilization, minimizes bottlenecks, and prevents system failures due to overload conditions. The integration of optimization techniques with load balancing significantly improves system performance, reliability, and scalability. Experimental analysis demonstrates that the proposed model achieves better workload distribution, reduced response time, and enhanced.

Keywords: Intelligent Load Balancing, Distributed Computing, Optimization-Driven Allocation, Resource Utilization, Server Performance, Adaptive Workload Redistribution, System Scalability, Real-Time Monitoring, Performance Optimization, Overload Prevention.

ICSICA-2026-48

Enhancing Cybersecurity Situational Awareness through Interactive Simulation Based Training Inspired by the MITRE ATT&CK Framework

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ABSTRACT

Situational awareness plays a critical role in cybersecurity by enabling individuals to identify, understand, and anticipate cyber threats and respond effectively during cyber incidents. However, traditional lecture-based training methods mainly focus on theoretical knowledge and often lack practical exposure to real-world cyberattack situations. To overcome this limitation, this study proposes an interactive and simulation-driven training approach designed to enhance situational awareness in cybersecurity. The proposed system models realistic cyberattack scenarios inspired by the MITRE, CK framework, enabling participants to experience practical cybersecurity challenges within a controlled learning environment. The training environment is developed using FLECO Studio and integrated with the holistic cybersecurity management model Cyber TOMP. In the proposed approach, participants actively engage with simulated scenarios that require them to perceive potential threats, analyze the situation, predict possible outcomes, and make appropriate decisions under time constraints. The experimental results indicate an improvement of up to 54% in the treatment group, supported by statistical validation and positive participant feedback.

Keywords: Cybersecurity Training, Situational Awareness, Simulation-Driven Learning, Cyberattack Scenarios, MITRE ATT&CK, CK Framework, Interactive Learning, Cyber TOMP, FLECO Studio, Practical Cybersecurity Skills.

ICSICA-2026-49

A Hybrid Entity Migration and Container Resource Optimization Framework for Cost-Efficient Distributed Data Lake Environments

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ABSTRACT

Data Lakes have emerged as a critical analytics architecture in hybrid and multi-cloud environments. However, existing implementations face significant governance challenges, particularly in cost management, data localization, and interoperation overhead across distributed infrastructures. Prior work introduced the Entity Migration Recommender System, which analyzes Data Lake metadata to construct optimized complex network digraphs and recommend suitable entity localities across cloud and on-premise environments. By leveraging complex network metrics, the system effectively models inter-entity relationships and data movement patterns, achieving a reported 16.2% overall cost reduction through optimized data entity placement. Although this approach successfully addresses data interoperation costs and localization efficiency, it primarily focuses on static entity placement at the data architecture level. To extend this paradigm, the proposed framework integrates container-based resource optimization with a dynamic Entity Migration mechanism at the computational layer. In cloud computing environments, containers are provisioned using a split resource model in which CPU, memory, and storage resources are partitioned into logical units and allocated based on workload requirements. When a job enters the system, its computational and resource demands are analyzed in real time.

Keywords: Hybrid Entity Migration, Container Resource Optimization, Distributed Data Lake, Cost-Efficient Computing, Cloud Resource Management, Workload Allocation, Performance Optimization, Scalable Data Systems.

ICSICA-2026-50

Face Gaze AI: AI-Powered Offline Exam Monitoring System

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ABSTRACT

This project describes a development for a new Artificial Intelligence (AI)-based method of detecting malpractice by monitoring exam rooms with a webcam or similar camera method and reducing the number of human invigilators used. The system uses advanced computer vision, deep learning and other techniques to automatically detect suspicious behavior by students, including hands, mouths, heads and eyes which are indicative of cheating. The system also utilizes the Media Pipe module to perform face, hand and pose detection in an ongoing manner and OpenCV for image processing and visualization. By conducting a real-time analysis of each student's behavior, using time thresholds and algorithms related to the movement of individual students, t

Keywords- AI, Computer Vision, Deep Learning, OpenCV, Media Pipe, Exam Monitoring, Malpractice Detection, Real time Detection, Gesture Recognition, Face Tracking.

ICSICA-2026-51

AI medical Report Generation

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ABSTRACT

The AI Medical Report System is an intelligent healthcare management platform designed to automate the extraction, storage, and analysis of patient discharge summaries using advanced artificial intelligence technologies. By leveraging OpenAI-powered image and text processing, the system accurately extracts critical medical information such as patient details, diagnosis, prescribed medications, doctor information, hospital data, and follow-up instructions from uploaded documents. The platform features a professional admin dashboard that enables efficient patient management, report tracking, and centralized data storage. It supports automated scheduling and alert mechanisms for follow-up visits, ensuring timely patient care and reducing the risk of missed consultations. Additionally, the system provides AI-driven recommendations, including personalized food plans, activity guidelines, and medication advice tailored to each patient's condition. This enhances patient recovery and promotes better adherence to post-discharge instructions. Built using PHP and MySQL, the system ensures scalability, security, and ease of integration into existing healthcare workflows.

Keywords: AI Medical Report System improves operational efficiency, minimizes manual data entry, and enhances the quality of patient care through intelligent automation and data-driven insights.

ICSICA-2026-52

Scalable and secure architectures in modern computing

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ABSTRACT

Modern computing systems are rapidly evolving to handle large-scale data processing, high user demand, and increasing security threats. Designing scalable and secure architecture has become essential to ensure system reliability, performance, and data protection. This paper explores various architectural models that support scalability, including cloud computing, distributed systems, and micro services, which enable efficient resource utilization and seamless system expansion.

In addition, the study highlights key security challenges such as data breaches, unauthorized access, and system vulnerabilities. It discusses advanced security mechanisms including encryption techniques, authentication protocols, and intrusion detection systems to safeguard modern computing environments. The integration of scalability and security is analyzed to demonstrate how systems can maintain performance without compromising safety.

The paper concludes by emphasizing the importance of adopting robust architectural strategies that balance scalability and security, ensuring efficient and secure operation of modern computing applications in real-world scenarios.

Keywords: Scalable Architecture, Secure Computing, Cloud Computing, Distributed Systems, Microservices, Data Protection, System Security, Encryption, Authentication Protocols, Intrusion Detection, Modern Computing Systems.

ICSICA-2026-53

Practical Implementation of Quantum Resistant Encryption Using Crystals-KYBER And RSA

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ABSTRACT

Quantum computing constitutes a significant threat to classical public-key cryptography, including RSA and Elliptic Curve Cryptography. Variations of quantum computing, including Shor's Algorithm, are capable of effectively factoring large integers, rendering these classical cryptography models vulnerable to attacks. In this paper, an effective model and comparison of classical and post-quantum cryptography are demonstrated to emphasize the effects of quantum attacks. RSA Encryption is developed and its vulnerability is highlighted through simulation of a quantum attack, Shor's Algorithm. To counter this issue, the post-quantum cryptography model CRYSTALS-Kyber, based on lattices, is developed to secure this data. Comparison of these models highlights their effectiveness in terms of key strength, speed of encryption, and quantum attack resistance. The results clearly emphasize that RSA is extremely insecure in a quantum computing setup, while CRYSTALS-Kyber offers robust and foolproof cryptography in the future.

Keywords-Post-Quantum Cryptography, Quantum Computing, RSA, Shor's Algorithm, CRYSTAL -kyber.

ICSICA-2026-54

MealMind: A Context-Aware Intelligent Food Recommendation and Health-Oriented Meal Planning System

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ABSTRACT

Food recommendation systems have evolved rapidly with the growth of digital platforms and personalized services. However, most existing systems focus on isolated aspects such as user preferences, calorie tracking, or recipe retrieval, without integrating health conditions, cultural diversity, seasonal variations, and contextual awareness. This limitation leads to incomplete and often unsuitable recommendations for users. This paper presents MealMind, a context-aware intelligent food recommendation and health-oriented meal planning system designed to provide personalized, nutritionally safe, and environmentally adaptive meal suggestions. The system integrates content-based filtering (CBF), collaborative filtering (CF), and hybrid recommendation techniques along with modules for health validation, seasonal adaptation, and dish pairing. The proposed approach introduces a unified multi-constraint scoring model that simultaneously

Keywords: considers taste, health, climate, and meal composition. Preliminary evaluation using standard metrics demonstrates improved contextual accuracy compared to traditional systems.

ICSICA-2026-55

Single Algorithm Approach for Multi Disease Prediction

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ABSTRACT

As the Healthcare Industry experiences an unprecedented and ever increasing growth in healthcare data, and as the incident rates of chronic diseases are emerging as one of the greatest healthcare challenges, there is a higher aspiration and hence demand for the automated intelligent systems that can help in early health condition detection and diagnosis. Increasing trend in early prediction, early diagnosis of such chronic diseases as diabetes, heart disease, chronic kidney disease, etc., will have a huge impact on saving patient's life and thereby reducing healthcare costs. This paper shows that we build a machine leaning based multi disease predictor by one single algorithm. The introduced build-the-system (BTS) system apply the popular Extreme Gradient Boosting (XGBoost) algorithm in prediction to predictor the health of patient, including age, blood pressure, glucose level, cholesterol level and body mass index. And this system can be used to predict multiple disease with the same predictive model. The system is implemented on python with machine learning framework libraries like scikit-learn, NumPy, Pandas, etc. A simple web interface is created with python framework called as Flask to take various medical parameters and give prediction as output. Experimental results indicate the system provides reliable prediction and can be used as a valuable.

Keywords: Healthcare Data Analytics, Chronic Disease Prediction, Early Diagnosis, Machine Learning, Multi-Disease Prediction, XGBoost, Patient Health Monitoring.

ICSICA-2026-56

Large Language Model Using LANGCHAIN

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ABSTRACT

Large language models have transformed natural language processing (NLP). LLMs, which have stable capabilities for text-based tasks creation, summarization, and response to questions. With task management assistance, LangChain is a framework that creates these models from outside data sources and APIs. more beneficial by supporting applications that are more dynamic and context-aware. Developers could easily build multi connecting language models (LLMs) to real-time APIs, structured databases, and retrieval systems to produce outcomes that use LangChain to be more reliable and contextually rich.LangChain is a framework that delivers these models from outside data sources and APIs with the help of workflows. more advantageous by supporting more dynamic and intelligent system applications. It would be simple for developers to create complex workflow that link language models (LLMs) to structured databases, real-time APIs, and information access systems in order to generate more accurate and Based on context rich results using LangChain. Additionally, LangChain facilitates the process of linking different tasks and queries together, which makes the simpler development of interactive applications and multi-step reasoning systems. This framework provides adaptability and scalability while supporting a large number of LLMs. including models based on GPT. LLMs, creating new prospects for the practical deployment of intelligent, flexible systems.

Keywords: Careful Planning, Better Integration of Data, Improved Memory for Context, Varying Outcomes, Comments Updates.

ICSICA-2026-57

**Blood Bridge: A Scalable Real-Time Blood Donor–Recipient
Coordination Platform with Location Intelligence and Automated
Alerting**

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ABSTRACT

Timely access to compatible blood remains a critical challenge in emergency healthcare due to fragmented donor information, delayed communication, and the absence of coordinated real-time systems. This paper presents Blood Bridge, a comprehensive, cloud-based platform designed to seamlessly connect voluntary blood donors with patients and healthcare institutions through an intelligent, real-time coordination framework. The system integrates multiple functional modules, including donor registration and lifecycle management, patient and hospital request handling, real-time donor matching, and automated notification delivery. A verified donor database ensures authenticity and reliability, while location-based services powered by mapping APIs enable precise geo-spatial matching of nearby eligible donors. The platform incorporates instant alert mechanisms using push notification services, significantly reducing response time during critical emergencies. Blood Bridge further enhances usability through donor profile management features, allowing users to update availability, track donation history, and maintain engagement. A dedicated financial support module addresses logistical constraints by facilitating transportation assistance for donors, .

Keywords: Blood Donation Management, Real-Time Donor Matching, Cloud-Based Healthcare Platform, Emergency Blood Supply, Donor Registration, Patient-Hospital Coordination, Location-Based Services, Push Notifications, Donor Tracking, Healthcare Logistics.

ICSICA-2026-58

A Smart Attendance System with Predictive Risk Classification Using Data-Driven Modelling

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ABSTRACT

The effective management of student attendance is a critical requirement in academic institutions, yet any existing systems rely on manual or semi-digital methods that lack scalability, accuracy, and analytical capabilities. This paper presents a smart cloud-based attendance management system designed to automate hour-wise attendance tracking while providing intelligent insights for academic monitoring. The proposed system is developed using a Flask-based backend with DynamoDB for scalable data storage and integrates secure authentication through Firebase . A key contribution of this work is the implementation of a predictive risk assessment mechanism that identifies students at risk of attendance shortage. Using rule-based predictive logic, the system evaluates current attendance patterns and estimates the maximum possible attendance a student can achieve, thereby enabling early intervention.

Keywords: Attendance Management System, Predictive Analytics, Student Risk Assessment, Cloud Computing, DynamoDB, Flask, Academic Monitoring, Data-Driven Analysis, Educational Technology, Smart Systems.

ICSICA-2026-59

A Lightweight and Parameter-Efficient FUSCANet using MobileViT-XXS for Skin Lesion Classification

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ABSTRACT

Skin diseases are becoming increasingly common, and early detection plays an important role for proper treatment and increased patient survival rates. Classification models based on deep learning have shown promising results in dermoscopic image analysis. However, most models that have shown high classification accuracy have large parameter counts and high computational complexities, which are limitations for resource-constrained systems. In this study, a parameter-efficient variant of the FUSCANet model is proposed by replacing the backbone model with a MobileViT-XXS model for efficient classification and resource usage. The proposed model retains the benefits of the original model's multi-scale feature aggregation and attention mechanisms while reducing the number of learnable parameters. Experiments were conducted using three dermoscopic image datasets that are publicly available: HAM10000, ISIC 2019, and PAD-UFES-20. The experimental results show that the proposed model efficiently reduces the number of learnable parameters from 5.27M to 1.23M, a reduction of approximately 76%. The proposed model achieves high classification accuracy of 88.42%, 84.11%, and 91.90% on the three datasets, respectively. The proposed model is efficient and reliable and can be used in mobile devices.

Keywords: Skin lesion classification, deep learning, lightweight neural networks, MobileViT-XXS, medical image analysis.

ICSICA-2026-60

**Smart AI Travel Planner Agent: An Intelligent
Multi-Agent System for Personalized Travel Planning**

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ABSTRACT

Travel planning is a complex task that involves gathering information from multiple sources, optimizing costs and time, adapting to user preferences, and responding to dynamic conditions such as weather, traffic, and availability. Traditional travel planning applications provide static recommendations and require significant manual effort from users. This research paper proposes a Smart AI Travel Planner Agent, an intelligent agent-based system that automates and personalizes the entire travel planning process. The proposed system leverages artificial intelligence techniques such as machine learning, natural language processing, recommendation systems, and multi-agent architecture to deliver optimized, real-time, and user-centric travel plans. The system aims to enhance user experience, reduce planning effort, and support intelligent decision-making in tourism and travel domains.

Keywords: Artificial Intelligence, Intelligent Agents, Travel Planning, Recommendation Systems, Machine Learning.

ICSICA-2026-61

**Digital communication and data transfer through high-speed networking
with enhanced security using hybrid LOA-VCS**

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ABSTRACT

The accelerating advancement of high-speed networking technology such as gigabit Ethernet, the latest generation of wireless technologies -5G networks, and next generation fiber optic technologies-have transformed the capabilities of digital communications and data transfer. In this study, researchers have analyzed the performance of several different types of Hybrid Optimization algorithm like Lion Optimization Algorithm and Virus Colony Search (LOA-VCS), which use both Global and Local methods to optimize for an objective function and provide an overall increased percentage in the accuracy of detection at 98%. Also discussed some limitations like issues related to real-time detection of threats for 100Gbps Networks, an expanding attack surface across Distributed Systems, and developing Adaptive Security Architectures.

Keywords: High-Speed Networking, Gigabit Ethernet, 5G Networks, Fiber Optic Technology, Hybrid Optimization Algorithms, Lion Optimization Algorithm, Virus Colony Search, Threat Detection, Distributed Systems Security, Adaptive Security Architectures

ICSICA-2026-62

Blockchain-Based Secure Voting System

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ABSTRACT

Ensuring transparency, security, and trustworthiness in voting systems remains a critical challenge in modern democratic processes. Traditional voting methods, including both paper-based and electronic systems, are often susceptible to issues such as vote tampering, lack of transparency, centralized control, and vulnerability to cyberattacks. To overcome these limitations, this paper proposes a blockchain-based voting system that leverages the decentralized and immutable nature of blockchain technology to enhance the integrity of electoral processes.

In the proposed system, each vote is recorded as a transaction on a distributed ledger, ensuring that once a vote is cast, it cannot be altered or deleted. Decentralized architecture eliminates the need for a central authority, thereby reducing the risk of manipulation and single points of failure. Advanced cryptographic techniques, including hashing and digital signatures, are employed to secure voter authentication and ensure data integrity throughout the voting process.

To preserve voter privacy, the system incorporates mechanisms that anonymize voter identities while still allowing for verification of legitimate participation. Additionally, smart contracts are utilized to automate election procedures such as vote casting, validation, and counting, ensuring that predefined rules are strictly enforced without human intervention.

Keywords: Blockchain, E-Voting, Smart Contracts, Cryptography, Voter Privacy, Transparency, Election Security.

ICSICA-2026-63

Cyberbullying Detection Using AI

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ABSTRACT

Cyberbullying has emerged as a critical concern in digital communication platforms, including social media, online forums, and messaging applications, where users are increasingly exposed to harmful and abusive content. The anonymity and rapid dissemination of information in these platforms make it difficult to monitor and control such behavior using traditional methods. To address this challenge, this paper proposes an Artificial Intelligence (AI)-based cyberbullying detection system that automatically analyzes user-generated content and identifies instances of abusive or harmful language.

The proposed system utilizes advanced Natural Language Processing (NLP) techniques to preprocess and analyze textual data, including tokenization, stemming, and sentiment analysis. Machine learning and deep learning models, such as supervised classification algorithms and neural networks, are employed to detect patterns associated with cyberbullying, including offensive language, hate speech, and harassment. The system is trained on labeled datasets to improve its ability to accurately classify content as either harmful or non-harmful. Additionally, the system incorporates contextual understanding to reduce false positives and improve detection accuracy, considering factors such as sarcasm, slang, and intent. Once harmful content is identified, the system flags or filters inappropriate messages in real time, enabling quicker intervention and moderation.

Keywords: Cyberbullying Detection, Artificial Intelligence, Natural Language Processing, Machine Learning, Sentiment Analysis, Hate Speech Detection, Content Moderation

ICSICA-2026-64

Brain tumor detection using Deep learning Techniques

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ABSTRACT

Brain tumor detection from magnetic resonance imaging (MRI) is vital for accurate diagnosis and treatment planning. Manual analysis of MRI scans is time-consuming and prone to human error. This study proposes an automated deep learning system using Convolutional Neural Networks (CNN) for brain tumor classification. The model is trained on MRI images categorized as Glioma, Meningioma, Pituitary Tumor, and No Tumor. Preprocessing techniques such as normalization, resizing, and noise reduction enhance image quality and model accuracy. The CNN effectively extracts spatial features to distinguish different tumor types. The trained model is integrated into a web-based interface built with a lightweight Python framework, allowing users to upload MRI images and receive real-time classification results. This system provides a fast, reliable, and user-friendly diagnostic tool that supports radiologists in early tumor detection and improves overall diagnostic efficiency.

Keywords: Brain MRI dataset, image preprocessing, Convolutional Neural Networks (CNNs), deep learning model training, classification (tumor/no tumor), accuracy evaluation, medical diagnostic support

ICSICA-2026-65

Face recognition attendance

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ABSTRACT

Manual attendance systems are often time-consuming, error-prone, and susceptible to proxy attendance. To address these limitations, this study proposes an automated attendance management system based on face recognition technology. The system utilizes computer vision and machine learning techniques to accurately identify individuals and record attendance in real time without human intervention.

The proposed framework captures facial images using a camera and processes them through a series of steps including face detection, feature extraction, and classification. Advanced algorithms such as Haar Cascade or deep learning-based models like Convolutional Neural Networks (CNN) are employed to ensure accurate face detection and recognition under varying lighting conditions and facial expressions. The extracted facial features are compared with a pre-trained database to verify the identity of individuals.

Once a match is confirmed, attendance is automatically recorded and stored in a centralized database with timestamps, enabling efficient tracking and reporting. The system minimizes fraudulent practices such as proxy attendance while improving accuracy, speed, and reliability. Experimental results demonstrate high recognition accuracy and robustness in real-time scenarios.

Keywords: Face Recognition, Attendance Management System, Computer Vision, Machine Learning, CNN, Biometric Authentication, Real-Time Recognition

ICSICA-2026-66

Digital Communication and Data Transfer Through High Speed Networking with Enhanced Security Using Hybrid LOA-VCS

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ABSTRACT

The accelerating advancement of high-speed networking technology such as gigabit Ethernet, the latest generation of wireless technologies -5G networks, and next generation fiber optic technologies-have transformed the capabilities of digital communications and data transfer. However, the rapid advancement in technology has created new security challenges that traditional Network Intrusion Detection Systems (NIDS) are not able to begin to address. This research will synthesize recent research related to optimizing network performance and Adaptive Intrusion Detection Mechanisms (AIDM) to better understand the intersection of high-speed networking with Information Security. Researchers will concentrate at potential bottlenecks of high-bandwidth and high-speed network environments; evaluate adaptive meta-heuristic techniques as possible solutions to the challenges posed by high-speed networking and Intrusion Detection and consider the trade-off between network performance and security. In this study, researchers have analyzed the performance of several different types of Hybrid Optimization algorithm like Lion Optimization Algorithm and Virus Colony Search (LOA-VCS), which use both Global and Local methods to optimize for an objective function and provide an overall increased percentage in the accuracy of detection at 98%. Also discussed some limitations like issues related to real-time detection of threats for 100Gbps Networks, an expanding attack surface across Distributed Systems, and developing Adaptive Security Architectures.

Keywords: NIDS, High-Speed Networking, Adaptive Intrusion Detection, Hybrid Optimization, Meta-Heuristics, Cybersecurity, Network Performance.

ICSICA-2026-67

AI based academic reminder and performance prediction system

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ABSTRACT

An AI-based Academic Reminder and Performance Prediction System is designed to enhance student productivity and academic success by integrating intelligent scheduling with predictive analytics. The system utilizes Artificial Intelligence and Machine Learning techniques to monitor students' academic activities, including assignment deadlines, exam schedules, attendance, and study patterns. It provides timely reminders and personalized notifications to help students manage their time effectively and avoid missed deadlines. In addition, the system analyzes historical academic data such as grades, attendance records, and learning behavior to predict future performance. By applying predictive models, it identifies students at risk of underperforming and provides early warnings along with actionable insights for improvement. The system may also suggest customized study plans and resource recommendations based on individual learning needs. This approach not only supports students in maintaining consistent academic performance but also assists educators in tracking student progress and implementing timely interventions. Overall, the integration of AI in academic management systems aims to create a smarter, more proactive learning environment that improves outcomes and reduces academic stress.

Keywords: Artificial Intelligence, Machine Learning, Academic Performance Prediction, Predictive Analytics, Personalized Learning, Educational Data Mining, Smart Scheduling

ICSICA-2026-68

Smart Energy Monitoring

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ABSTRACT

Efficient energy management has become increasingly important due to rising electricity demand, growing environmental concerns, and the need for cost optimization in households. Traditional energy monitoring systems provide limited insights and often fail to offer real-time feedback, leading to inefficient energy usage and increased wastage. To address these challenges, this paper proposes an IoT-based Smart Energy Monitoring System that enables real-time tracking, analysis, and optimization of electricity consumption in residential environments.

The proposed system utilizes Internet of Things (IoT) devices such as smart meters, sensors, and embedded controllers to continuously monitor the energy consumption of household appliances. These devices collect data and transmit it to a centralized cloud platform for storage and analysis. Advanced data analytics techniques are applied to process the collected information and generate meaningful insights, including usage patterns, peak consumption periods, and device-level energy consumption. A user-friendly interface, accessible via mobile or web applications, allows users to visualize their energy usage in real time and receive alerts or recommendations for reducing unnecessary consumption. The system also supports automation features, such as scheduling appliance usage and remotely controlling devices, thereby improving energy efficiency. Furthermore, the proposed solution promotes sustainable energy practices by helping users minimize energy wastage, reduce electricity bills, and lower carbon footprints.

Keywords: IoT, Smart Energy Monitoring, Energy Management, Real-Time Monitoring, Data Analytics, Home Automation, Energy Efficiency.

ICSICA-2026-69

Artificial Intelligence in Ecommerce

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ABSTRACT

Artificial Intelligence (AI) is a rapidly evolving branch of modern technology that enables machines to simulate human intelligence, learn from data, and make intelligent decisions. It has the capability to process vast volumes of structured and unstructured data, identify patterns, and generate actionable insights with high accuracy and speed. E-commerce, defined as the buying and selling of goods and services over the internet, has experienced significant growth in recent years due to advancements in digital technologies. The integration of AI into e-commerce has revolutionized the way businesses interact with customers and manage their operations. AI technologies such as machine learning, natural language processing, and data analytics are widely used to understand customer behavior, preferences, and purchasing patterns. This enables businesses to provide personalized recommendations, targeted marketing, dynamic pricing, and efficient customer service through chatbots and virtual assistants. Furthermore, AI enhances various aspects of e-commerce including inventory management, demand forecasting, fraud detection, and supply chain optimization. By analyzing real-time data, AI helps organizations make informed decisions, improve operational efficiency, and reduce costs. It also plays a crucial role in enhancing customer experience by providing faster, smarter, and more relevant services. This paper presents a comprehensive overview of the role of Artificial Intelligence in e-commerce, highlighting its applications, benefits, challenges, and future prospects. The study emphasizes how AI-driven innovations are transforming the e-commerce industry and shaping the future of digital commerce.

Keywords: Artificial Intelligence, E-Commerce, Machine Learning, Data Analytics, Personalized Recommendations, Customer Experience, Fraud Detection

Phoneme Level Automatic Pronunciation Error Detection Using Wav2vec 2.0

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ABSTRACT

Accurate pronunciation is essential to learning a language, particularly for non-native English speakers. Conventional speech assessment techniques mostly rely on human expert judgment, which is laborious, unreliable, and challenging to scale. A viable substitute is automated pronunciation error detection, which provides language learners with scalable, objective, and real-time feedback. A phoneme-level automatic pronunciation mistake detection system based on wav2vec 2.0, a cutting-edge self-supervised speech representation model pre-trained on massive volumes of unlabeled audio data, is presented in this study. .

Tests carried out on the L2-ARCTIC and CMU The system delivers competitive phoneme mistake detection rates with good precision and recall, as shown using Pronouncing Dictionary datasets. The findings confirm that, when compared to conventional Hidden Markov Model and Deep Neural Network baselines, self-supervised pre-training with transformer- based architectures greatly enhances pronunciation assessment. The suggested system has a great deal of practical promise for incorporation into platforms for computer-assisted language acquisition.

Key words: Transformer Architecture, Phoneme Alignment, L2 Speech, Goodness of Pronunciation, Forced Alignment, Deep Learning for Speech, Automatic Pronunciation Assessment, Phoneme Error Detection, wav2vec 2.0, Self-Supervised Learning, Computer-Assisted Language Learning, Non-Native Speech, Mispronunciation Detection, Speech Representation.

ICSICA-2026-71

Defect Detection and Analysis in Solar Panel Using VGG Algorithm

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ABSTRACT

Solar energy is a well-known renewable energy source. Solar panels face many issues due to external factors that affect their performance, including settlement of dust particles, bird droppings, electrical damage, and physical damage such as circuit faults, cracks, and panel breakage. These types of damage reduce energy production as the light reaching the damaged solar cells does not generate adequate electrical energy. Solar panels must be well-maintained to perform efficiently. The manual monitoring process is ineffective, costly, and time-consuming. To address this challenge, a VGG algorithm-based defect detection model is proposed. In this model, the deep learning algorithm detects and identifies faults in solar cells using an image dataset. The model classifies solar panel conditions into five categories: clean, dusty, bird-drop, electrical damage, and physical damage. The proposed system achieves a training accuracy of 88.69% and a validation accuracy of 83.55%, demonstrating reliable generalisation across defect classes. This method improves solar panel performance by increasing efficiency and reducing maintenance cost.

Keywords — Machine Learning, VGG Algorithm, Feature Extraction, Image Classification, Accuracy, Precision-Recall Tradeoff, Multi-Class Classification, Defect Detection, Fault Detection, Convolutional Neural Network (CNN), Solar Panel, Dust Accumulation, Physical Damage Detection, Bird Droppings, Photovoltaic (PV) Cells.

ICSICA-2026-72

Campus Buddy: Voice-Guided Navigation Assistant.

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ABSTRACT

Navigating large and complex campus environments can be challenging for new students, visitors, and visually impaired individuals. This paper presents Campus Buddy, a voice-guided navigation assistant designed to provide intuitive and real-time guidance using natural voice interactions. Unlike traditional navigation systems that rely heavily on visual maps, the proposed system enables users to simply speak their destination and receive step-by-step spoken directions.

The system integrates Speech-to-Text (STT) technology, Natural Language Processing (NLP), and IoT-based location tracking to accurately interpret user commands and determine real-time positioning. To enhance performance, transfer learning is applied by fine-tuning pre-trained speech recognition and language models with campus-specific data. This approach improves command understanding, reduces training time, and ensures adaptability to diverse accents and environmental conditions. Experimental results demonstrate that the transfer learning-based model significantly improves accuracy, response time, and overall user experience compared to conventional approaches. The proposed Campus Buddy system contributes to the development of smart, accessible, and inclusive campus environments by providing an efficient and user-friendly voice-assisted navigation solution.

Keywords: Agent Modeling, Industrial IoT, Sensor Networks, Prediction, Accuracy, Intelligent System.

ICSICA-2026-73

End To End Machine Learning Web App

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ABSTRACT

In recent years, machine learning has become an essential skill for students and freshers entering the field of data science and analytics. However, many beginners face challenges in understanding how theoretical concepts are applied in real-world scenarios. To address this gap, this project presents an End-to-End Interactive Machine Learning Web Application for Freshers Using Streamlit, designed to provide a simple and practical learning environment. The application is developed using Python and Streamlit, enabling users to interact with machine learning workflows without requiring advanced programming knowledge. The system allows users to upload datasets, perform basic data preprocessing, and apply machine learning models. It also provides visualizations and performance metrics such as accuracy, error measures, and graphical outputs, helping users understand how models behave with different data inputs. The project focuses on making machine learning concepts more accessible by integrating data handling, model building, evaluation, and visualization into a single interactive platform. By using Streamlit, the application transforms traditional code-based execution into a user-friendly web interface, making it easier for freshers to experiment and learn. Overall, the proposed system demonstrates how machine learning models can be deployed as interactive applications, promoting hands-on learning and improving understanding among beginners. The project highlights the importance of usability, accessibility, and real-world application in modern data science education.

Keywords: Machine Learning, Web Application, Streamlit, Data Preprocessing, Model Training, Model Evaluation, Data Visualization, Interactive Learning, Python, Predictive Analytics, and Data Science Education.

ICSICA-2026-74

Dynamic Trust Evaluation Model for Secure and Reliable Network Communication

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ABSTRACT

Ensuring secure and reliable communication in modern networks is a significant challenge due to the presence of malicious nodes, dynamic topologies, and increasing cyber threats. Traditional routing protocols primarily focus on metrics such as shortest path or minimum delay, often overlooking the trustworthiness of participating nodes. This limitation can lead to data loss, packet tampering, and various network attacks such as black hole and gray hole attacks. To address these issues, this paper proposes a Dynamic Trust Evaluation Model that enhances network security by incorporating trust-based decision-making into the routing process. The proposed model continuously monitors the behavior of network nodes by evaluating parameters such as packet forwarding rate, consistency, delay, and historical interactions. Based on these metrics, each node is assigned a dynamic trust score that reflects its reliability and cooperation within the network. The trust values are periodically updated to adapt to changing network conditions and node behavior. Using these trust scores, the routing mechanism selects communication paths that prioritize highly trusted nodes rather than relying solely on the shortest path. This approach not only improves data integrity and delivery success rates but also enhances overall network resilience.

Keywords: Trust-Based Routing, Trust Management, Secure Routing, Data Integrity, Network Resilience, Routing Optimization, Reliable Communication

ICSICA-2026-75

Design And Implementation Of An AI- Based Sign To Text Conversion System For IoT Enabled Smart Home Automation Using Hand Gesture Recognition

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ABSTRACT

The rapid advancement of Artificial Intelligence (AI) and the Internet of Things (IoT) has significantly improved modern smart home systems, making them more intelligent and user-friendly. This paper presents the design of an AI-based sign-to text conversion system for IoT-enabled smart home automation using hand gesture recognition. The system allows users, especially individuals with speech and hearing impairments, to control household appliances through sign language gestures. Computer vision techniques capture hand gestures through a camera, followed by preprocessing, feature extraction, classification using a deep learning model to convert gestures into textual commands. These commands are integrated with an IoT framework to control devices such as lights and fans in real time. Experimental results show a gesture recognition accuracy of about 93–96% with an average response time of 150–250 ms, demonstrating reliable real-time performance. The proposed system improves accessibility, enhances user interaction, and highlights the potential of integrating AI and IoT

Keywords: Artificial Intelligence, IoT, Smart Home Automation, Hand Gesture Recognition, Deep Learning, Assistive Technology, Computer Vision

ICSICA-2026-76

**Heir Cloud: Cloud System for Posthumous Asset Management with Privacy
and Authorized Delivery**

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ABSTRACT

The rapid expansion of cloud computing and digital services has significantly transformed how individuals store and manage personal information. Today, valuable assets such as financial records, cryptocurrency wallets, personal memories, confidential documents, intellectual property, and social media accounts exist primarily in digital form. However, despite the increasing reliance on digital assets, secure mechanisms for transferring such assets after the death of the owner remain inadequate. Conventional inheritance systems focus mainly on physical property and legal documents and do not effectively address the complexities of encrypted digital data stored in cloud platforms. As a result, many families lose access to important digital resources, while others face privacy risks due to insecure credential sharing practices. To address these challenges, this project proposes Heir Cloud, a secure cloud-based system designed for posthumous digital asset management that ensures privacy preservation and authorized delivery.

Keywords: Cloud Computing, Digital Asset Management, Data Security, Privacy Preservation, Posthumous Data Transfer, Access Control, Cryptography

ICSICA-2026-77

Sign To-Text Conversion System for IoT-Enabled Smart Home Automation Using Hand Gesture Recognition

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ABSTRACT

The rapid advancement of Artificial Intelligence (AI) and the Internet of Things (IoT) has significantly improved modern smart home systems, making them more intelligent and user-friendly. This paper presents the design of an AI-based sign-to text conversion system for IoT-enabled smart home automation using hand gesture recognition. The system allows users, especially individuals with speech and hearing impairments, to control household appliances through sign language gestures. Computer vision techniques capture hand gestures through a camera, followed by preprocessing, feature extraction, and classification using a deep learning model to convert gestures into textual commands. These commands are integrated with an IoT framework to control devices such as lights and fans in real time. Experimental results show a gesture recognition accuracy of about 93–96% with an average response time of 150–250 ms, demonstrating reliable real-time performance. The proposed system improves accessibility, enhances user interaction, and highlights the potential of integrating AI and IoT for inclusive smart home automation.

Keywords: Artificial Intelligence, IoT, Smart Home Automation, Hand Gesture Recognition, Deep Learning, Assistive Technology, Sign-to-Text Conversion

ICSICA-2026-78

A Systematic Review of Human–Computer Interaction and Explainable Artificial Intelligence in Healthcare with Artificial Intelligence Techniques

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ABSTRACT

This paper reviews the role of Artificial Intelligence (AI), Human-Computer Interaction (HCI), and Explainable Artificial Intelligence (XAI) in healthcare. AI is widely used in healthcare for tasks like diagnosis, prediction, and decision-making. However, many AI systems work like a “black box,” where users cannot understand how decisions are made. This creates a lack of trust among users. To solve this problem, Explainable Artificial Intelligence (XAI) is introduced. XAI helps in explaining how AI systems work and why they give certain results. This improves transparency and builds trust. Human-Computer Interaction (HCI) also plays an important role by making systems easy to use and user-friendly. It focuses on usability and designing systems based on user needs. The paper also explains important machine learning features such as fairness, transparency, privacy, and trustworthiness. These are very important in healthcare because decisions can affect human lives. Different explainability techniques like visual, text-based, local, and global explanations are used to make AI more understandable. Even though XAI is useful, it still has many challenges in healthcare such as lack of proper system design, communication issues, and limited understanding among users. There are also research gaps that need to be improved in the future. In conclusion, XAI helps in making AI systems more reliable and user-friendly in healthcare. But more research is needed to improve its performance and usability in real-world applications.

Keywords: Artificial Intelligence, Explainable AI, Human-Computer Interaction, Healthcare, Transparency, Trustworthiness, Machine Learning

ICSICA-2026-79

Audio-Visual Deepfake Detection System Using Deep Learning.

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ABSTRACT

This research presents a deep learning-based system for detecting manipulated media within messaging applications. The system employs three-tier architecture: a React.js frontend mimicking WhatsApp interfaces, a Node.js backend managing file routing and alerts, and a FastAPI microservice housing detection models. When users share media, files are analyzed through specialized pipelines. Audio detection uses a Wav2Vec2 transformer model fine-tuned on synthetic voice datasets, achieving 92% accuracy by identifying acoustic artifacts through self-attention mechanisms. Visual analysis employs an EfficientNet-B4 convolutional network trained on Face Forensics++ and Celeb-DF datasets, delivering 80% accuracy in detecting manipulated facial content through hierarchical feature extraction. Video processing implements adaptive frame sampling, multi-stage face detection using Haar cascades and OpenCV DNN, and an early stopping mechanism reducing computational overhead by up to 80%. Detection results trigger real-time WebSocket alerts to both sender and receiver, ensuring immediate notification of potential deepfakes. The system supports multiple audio formats via FFmpeg integration and maintains historical records through PostgreSQL. This integrated approach provides accessible deepfake protection within familiar messaging contexts, enabling users to verify media authenticity without technical expertise and contributing to trust preservation in digital communications. This integrated framework offers practical deepfake protection within familiar communication contexts, enabling users to assess media authenticity without requiring specialized knowledge.

Keywords: Audio-Visual Forensics, Deep Learning, Deepfake Detection, Messaging Security, Multimodal Analysis

IntelliFlow: An AI-Driven Traffic Regulation Framework for QoS-Aware Load Balancing in Wireless Mesh Networks

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ABSTRACT

Mesh networks, commonly found in IoT, smart cities, and wireless sensor applications, frequently experience imbalanced traffic distribution. This leads to congestion, packet loss, and a decline in Quality of Service (QoS). This paper introduces IntelliFlow, an intelligent traffic management system designed to dynamically identify uneven traffic patterns and balance network load through an AI-driven algorithm. By combining reinforcement learning (RL) with fuzzy logic, the system facilitates real-time, adaptive decision-making. IntelliFlow tracks traffic metrics at the node level, including queue length, throughput, and latency, and adjusts waiting times at forwarding nodes to optimize traffic flow. A multi-agent RL framework is utilized, where each node functions as an independent agent. These agents learn QoS-aware policies using Q-learning, based on local and neighboring traffic conditions. Simulation results, conducted using NS-3, show that IntelliFlow can reduce end-to-end delay by up to 35% and boost throughput by 28% in mesh networks comprising 50–200 nodes. Furthermore, the system achieves high fairness (Jain's index > 0.92) and enhances energy efficiency across various traffic conditions. These findings underscore IntelliFlow's capability as a scalable and intelligent solution for QoS optimization in future wireless networks.

Keywords: Mesh networks, Traffic balancing, Reinforcement learning, QoS optimization, Waiting time regulation.

ICSICA-2026-81

Multi model Indian Sign Language (ISL) to speech using deep learning

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ABSTRACT

Communication barriers between the hearing-impaired community and the general public remain a significant social challenge, especially in multilingual countries like India Indian Sign Language (ISL) is widely used by the deaf and hard-of-hearing community, yet there is limited technological support for real-time translation of ISL into speech. This project, Multimodal Indian Sign Language to Speech using Deep Learning, aims to develop an intelligent system that translates ISL gestures into audible speech using advanced deep learning techniques. The proposed system utilizes a multimodal approach by integrating visual inputs such as hand gestures, facial expressions, and body movements captured through a camera. Convolutional Neural Networks (CNNs) are employed for spatial feature extraction, while Recurrent Neural Networks (RNNs) or Long Short-Term Memory (LSTM) networks are used to model temporal dependencies in gesture sequences. By combining multiple modalities, the system improves recognition accuracy and robustness under varying lighting and background conditions. The recognized gestures are mapped to corresponding text outputs, which are there converted into natural-sounding speech using a Text-to-Speech (TTS) engine. The proposed solution aims to provide an affordable, scalable, and user-friendly assistive communication tool that bridges the gap between the hearing-impaired community in society. This project demonstrates the potential of deep learning in assistive technologies and contributes toward inclusive communication systems that promote accessibility and social integration.

Keywords: Indian Sign Language, Deep Learning, Multimodal Gesture Recognition, CNN, LSTM, Text-to-Speech, Assistive Technology.

AgriPredict: A Federated Learning Framework for Privacy-Preserving Crop Yield and Price Forecasting in Precision Agriculture

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ABSTRACT

Precision agriculture requires accurate and privacy-preserving yield forecasting across distributed farms to optimize pricing strategies and reduce waste, particularly for perishable crops. This paper presents AgriPredict, an intelligent AI-agent framework leveraging federated learning (FL) to predict localized crop yields and aggregate total production without centralizing sensitive farm data. The proposed system utilizes a hierarchical FL architecture combining Long Short-Term Memory (LSTM) networks for time-series environmental data and Random Forest models for feature fusion. AgriPredict processes diverse agricultural parameters, including air moisture, irrigation levels, air quality, soil quality, mineral composition, and fertilizer usage. The decentralized learning approach ensures data privacy while enabling collaborative model training across farms. Experimental evaluation on datasets collected from over 1,000 agricultural fields in India demonstrates a mean absolute error of $\pm 7\%$ for rice and wheat yield prediction. Additionally, yield predictions are integrated into a cost forecasting module using market regression techniques, enabling prebooking strategies that reduce stagnation of perishable goods and ensure fair pricing for farmers. Field trials indicate a 25% reduction in crop waste and an 18% increase in farmer revenue through timely decision-making. The edge-deployable architecture further outperforms centralized baselines in heterogeneous farming environments. AgriPredict provides a scalable, privacy-preserving, and intelligent solution for next-generation sustainable agriculture.

Keywords: Precision Agriculture, Federated Learning, Crop Yield Prediction, LSTM, Random Forest, IoT, Edge AI, Smart Farming

ICSICA-2026-83

An AI-Driven Framework for Neutralizing advanced Cybersecurity Threats Using Policy Based Control

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ABSTRACT

This research paper presents an analysis of phishing attacks, which are among the most common and dangerous cyber threats targeting users through deceptive emails, websites, and messages to steal sensitive information. Traditional rule-based and signature-based detection methods are often ineffective against evolving phishing techniques. This study focuses on artificial intelligence-based models used for phishing detection across different platforms. It examines machine learning and deep learning approaches such as Logistic Regression, Decision Trees, Random Forest, Support Vector Machines, Convolutional Neural Networks, and Recurrent Neural Networks. The system also explores feature extraction techniques including URL-based, content-based, and behavioural features for identifying phishing patterns. By analyzing the strengths, limitations, and performance of these approaches, the study highlights current challenges and emphasizes the importance of AI-driven solutions for improving phishing detection systems.

Keywords: Phishing Detection, Cybersecurity, Artificial Intelligence, Machine Learning, Deep Learning, Feature Extraction, URL Analysis, Random Forest, Support Vector Machine, Convolutional Neural Network, Recurrent Neural Network

ICSICA-2026-84

Design And Implementation of an AI- Based Sign-To-Text Conversion System for IoT Enabled Smart Home Automation Using Hand Gesture Recognition

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ABSTRACT

The rapid advancement of Artificial Intelligence (AI) and the Internet of Things (IoT) has significantly improved modern smart home systems, making them more intelligent and user-friendly. This paper presents the design of an AI-based sign-to text conversion system for IoT-enabled smart home automation using hand gesture recognition. The system allows users, especially individuals with speech and hearing impairments, to control household appliances through sign language gestures. Computer vision techniques capture hand gestures through a camera, followed by preprocessing, feature extraction, classification using a deep learning model to convert gestures into textual commands. These commands are integrated with an IoT framework to control devices such as lights and fans in real time. Experimental results show a gesture recognition accuracy of about 93–96% with an average response time of 150–250 ms, demonstrating reliable real-time performance. The proposed system improves accessibility, enhances user interaction, and highlights the potential of integrating AI and IoT for inclusive smart home automation

Keywords: Artificial Intelligence, IoT, Smart Home Automation, Hand Gesture Recognition, Deep Learning, Assistive Technology, Sign-to-Text Conversion

ICSICA-2026-85

A Multi-Mode Agentic Framework for Edge Intelligence: Customizing the AI Edge Gallery for Online and Offline Environments

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ABSTRACT

The rapid evolution of edge computing and artificial intelligence has necessitated the development of versatile platforms that can operate across diverse network environments. This paper presents a comprehensive overhaul and enhancement of the Google AI Edge Gallery, transforming it into a fully customized application with a redesigned user interface and advanced agentic capabilities. The proposed system introduces a multi-mode AI interaction framework supporting both online and offline operations. Key features include the integration of external APIs for online chat, locally hosted models for offline functionality, and intelligent agents for mobile application navigation and accessibility. Furthermore, the integration of Hugging Face and Model Scope access tokens facilitates seamless model deployment. By deprecating non-essential features like Prompt Lab and Tiny Garden, the system achieves a streamlined user experience optimized for edge intelligence. Preliminary evaluations indicate significant improvements in usability and functional versatility across various use cases. Our results demonstrate that the system maintains low latency even in resource-constrained offline environments, providing a scalable solution for modern edge-based AI interactions.

Keywords: Edge Intelligence, Multi-Mode AI, Mobile Agents, Offline LLMs, UI/UX Redesign, Model Deployment.

ICSICA-2026-86

AI based Project Evaluator

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ABSTRACT

In modern educational institutions, the increasing number of student project submissions has made manual evaluation a time-consuming and subjective process. To address these challenges, this project proposes an AI-Based Project Evaluator that automates the assessment of academic projects using artificial intelligence techniques. The system is designed to evaluate project reports by analysing multiple parameters such as problem definition clarity, literature review quality, methodology description, technical depth, implementation logic, documentation structure, and overall originality the evaluator incorporates Natural Language Processing (NLP) to understand textual content, identify key concepts, measure content relevance, and check logical flow within project documentation. Machine learning models are used to score projects by comparing extracted features against predefined evaluation rubrics and trained academic patterns. Rule-based validation further ensures compliance with institutional guidelines, formatting standards, and plagiarism thresholds by automating the evaluation process, the system significantly reduces human effort, eliminates evaluation bias, and maintains consistency across assessments. It also provides structured feedback and performance metrics that help students understand their strengths and weaknesses. The AI-Based Project Evaluator serves as an efficient decision-support tool for educators, enabling faster, fairer, and more transparent academic project evaluation, especially in environments with large student populations.

Keywords: Artificial Intelligence, Project Evaluation, NLP, Machine Learning, Educational Technology, Plagiarism Detection, Feedback Systems

ICSICA-2026-87

AI Based Dyslexia Detection Using ML Techniques

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ABSTRACT

The increasing prevalence of learning disabilities and the limitations of traditional assessment methods have highlighted the need for early, objective, and scalable screening mechanisms for dyslexia. This project, titled Game-Based Early Dyslexia Screening Using Handwriting and Behavioral Analytics with Machine Learning, proposes an intelligent framework that leverages digital interaction data to identify early-stage dyslexia risk in children. The system integrates handwriting analysis and game-based behavioral metrics to extract cognitive and motor features indicative of dyslexic traits. A machine learning classifier, specifically a Random Forest model, is employed to analyze extracted features and classify users as dyslexic or non-dyslexic. Handwriting samples undergo image preprocessing and feature extraction processes, including stroke analysis, ink density measurement, and entropy estimation, while gameplay interactions provide response time, error rate, and task completion metrics. These features are normalized and processed to ensure reliable classification performance. A child-friendly game environment enables non-intrusive data collection, enhancing user engagement and reducing assessment anxiety. Experimental results demonstrate the feasibility of the proposed approach in distinguishing dyslexic and non-dyslexic patterns using behavioral and handwriting data. The system is designed to support early screening rather than clinical diagnosis and can be seamlessly extended to mobile platforms and educational environments. By combining machine learning with interactive gamebased data acquisition, the proposed framework offers a robust, scalable, and engaging solution for early dyslexia risk identification.

Keywords: Dyslexia Screening, Game-Based Learning, Handwriting Analysis, Behavioral Analytics, Machine Learning, Early Detection, Educational Technology

ICSICA-2026-88

Smart Highway Safety System Using Deep Learning For Animal Detection

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ABSTRACT

Road accidents caused by unexpected animal crossings have become a significant global public-safety concern, particularly during nighttime when visibility is severely limited. These incidents not only cause extensive property damage but also pose serious risks to human life and biodiversity. According to the Federal Highway Administration, wildlife-vehicle collisions account for more than 1 million incidents annually in the United States alone, causing approximately 200 human fatalities, 26,000 injuries, and USD 8 billion in economic losses. In countries such as Australia and India, large mammals including kangaroos, elephants, and nilgai regularly intrude onto national highways, particularly at night when driver reaction time is critically limited and stopping distances on high-speed expressways routinely exceed 100 metres. Conventional countermeasures such as static warning signs, reflective road studs, and wildlife exclusion fences offer only passive deterrence and cannot adapt to the unpredictable, real-time movements of animals. These approaches fail especially during sudden incursions, bad weather, and on high-speed expressways. There is therefore a compelling need for an active, intelligent system capable of detecting and classifying animals in real time and issuing timely alerts to approaching drivers before a collision becomes unavoidable. The proposed Smart Highway Safety System addresses this challenge by introducing an intelligent, fully automated animal detection and alert framework designed to enhance road safety through continuous real-time monitoring.

Keywords: Smart Highway Safety, Animal Detection, Real-Time Monitoring, Road Safety, Computer Vision, Driver Alert Systems, Intelligent Transportation Systems

ICSICA-2026-89

AI Powered Real Time Academic Data Base Integrity System

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ABSTRACT

Educational institutions increasingly depend on digital database systems to manage academic information such as student records, attendance, and internal assessment marks. However, traditional academic database systems primarily focus on data storage and retrieval while lacking intelligent mechanisms for continuous data integrity monitoring. As a result, manual data entry errors, unauthorized modifications, and inconsistencies in academic records may occur, which can affect the reliability and transparency of institutional data management. This paper proposes an AI-Powered Real-Time Academic Database Integrity System designed to enhance the accuracy, consistency, and monitoring of academic records. The system integrates relational database management principles with artificial intelligence-based anomaly detection to supervise student marks and attendance data. The database schema is designed using normalization techniques up to Boyce-Codd Normal Form (BCNF) to reduce redundancy and maintain structured data organization. Additionally, database integrity is enforced through SQL constraints, triggers, and audit logging mechanisms that track insert, update, and delete operations. The system also incorporates an AI-based monitoring module that analyzes historical academic data to detect abnormal patterns such as unrealistic marks, sudden performance changes, or irregular attendance records. When anomalies are detected, the system automatically generates alerts for administrative review, enabling timely verification and improved academic data reliability.

Keywords: Academic Database, Artificial Intelligence, Data Integrity, Anomaly Detection, Real-Time Monitoring, Student Records, Audit Logging

ICSICA-2026-90

Binary Adaptive Secure Transmission Framework (BASTF) Powered By AI for Cloud Environments

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ABSTRACT

Cloud computing environments require more sophisticated and robust security mechanisms for protecting sensitive data from interception, inference, and unauthorized reconstruction. Various techniques, such as Provably Secure Homomorphic Steganography (ProSt), have provided robust mechanisms for secure computations on steganographically embedded data using reversible logic gates. ProSt provides a unified framework for steganography and homomorphic computations using Fredkin gates for ensuring the cryptographic indistinguishability of embedded data from adversaries, particularly for honest-but-curious adversaries. Although this framework provides robust mechanisms for ensuring the privacy of outsourced computations, it primarily focuses on ensuring the secure computation of embedded data within multimedia cover objects. This paper presents an enhanced AI-driven binary adaptive secure transmission framework (BASTF) for extending the security paradigm from homomorphic computations to more robust and adaptive transmission mechanisms for cloud computing environments. The proposed framework transforms the plaintext data into standardized binary format and then determines the positions for adaptive modification using a machine learning-based decision module, as opposed to using fixed positions for embedding data using a secret key-dependent adaptive transformation pattern. The AI part is further used for finding optimal perturbation patterns that maximize the entropy and unpredictability, as well as robustness against statistical attacks. The modified binary stream is structurally valid, yet it includes secure changes that cannot be reversed without proper AI processing and key verification.

Keywords: Cloud Computing Security, AI-Driven Security, Homomorphic Steganography, Adaptive Binary Transformation, Machine Learning, Data Privacy, Cryptographic Robustness

ICSICA-2026-91

Vision-Based-Preliminary Crack Screening Using Edge Heuristics

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ABSTRACT

Railway track cracks pose significant safety hazards and must be detected at an early stage to prevent accidents and ensure safe railway operations. A vision-based crack detection system enables real-time monitoring of railway tracks by automatically identifying surface defects. The proposed approach utilizes classical image processing techniques, including grayscale conversion, edge detection, and morphological operations, to extract and enhance crack-like features. Additionally, heuristic filtering is applied to eliminate noise and reduce false crack detections, thereby improving the reliability of the system. The overall method is lightweight, computationally efficient, and suitable for deployment in low-resource or onboard environments, as it avoids the use of complex deep learning models.

Keywords: Railway Track Safety, Crack Detection, Vision-Based Monitoring, Image Processing, Edge Detection, Heuristic Filtering, Real-Time Monitoring

ICSICA-2026-92

Oculo XAI

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ABSTRACT

Due to the lack of awareness of asymptomatic eye diseases like diabetic retinopathy and glaucoma many people lose the chance of getting treatment before they lose their vision. The current methods of diagnosing this disease involve the usage of a machinery called slit lamp which is expensive and non-portable. In rural campsites, doctors are unable to examine the patients due to the lacking of equipment. The proposed method involves using portable fundus camera which takes the image of the retina and gets processed by an application. The image is normalized using Contrast Limited Adaptive Histogram Equalization (CLAHE) which acts as an image filter which removes the noise and enhances the image. The Deep learning model – ResNet50 layer acts as feature extractor and classifier which predicts the result and probability of the disease. It uses Global Average Pooling (GAP) to generate a heatmap which is blended with original CLAHE-enhanced image. The Grad CAM converts the normal heatmap into a Colour-Code Pooling. This method is capable to replace the current techniques and increase the availability of healthcare for people anywhere in the world.

Keywords: Diabetic retinopathy, glaucoma, Contrast Adaptive Histogram Equalization (CLAHE), ResNet50, Global Average Pooling (GAP), Grad CAM.

ICSICA-2026-93

Acting AI Face Expression Detection

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ABSTRACT

Facial recognition happens here, through software that spots how people feel just by looking at them. Instead of guessing, the tool uses smart algorithms to tell which emotion shows on a face. Whether someone smiles or frowns, the system picks it up from videos or still photos taken with a webcam. Learning from millions of faces helps it improve over time, not rely on strict rules. A face shows up in the picture – that kicks thing off. Next comes a look at important spots on the face, watching how muscles shift and emotions change. By doing this, computers start noticing feelings directly from people as they happen. One big step here is building smoother ways humans and tech actually talk to each other. From virtual classrooms to tracking patient recovery, it works wherever data flows. From edge to shape, layers work one after another with each pixel. Step by step, meaning builds up, not all at once. Real scenes sometimes blur or waver, matching how guesses improve. When it comes to reactions from users or handlers facing risks, or even judging a performer’s brief appearance – they all slide into place naturally. Now picture software handling the review instead of people. That means less waiting time yet still spotting faint changes. Since computers keep analyzing emotions without pause, precision rises steadily.

Keywords: Facial Emotion Recognition, Computer Vision, Machine Learning, Real-Time Detection, Human-Computer Interaction, Deep Learning, Video Analysis

ICSICA-2026-94

Remote solar panel health monitoring system with 5G modem integration

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ABSTRACT

As more and more solar PV systems are being installed, users are looking for ways to monitor and manage them remotely from wherever they are located. Unfortunately, most remote management methods are not very efficient because they require a lot more manpower than would normally be needed to monitor a traditional electric service. This paper describes a 5G-enabled remote monitoring system for solar PV panels that allows users to remotely monitor the overall condition of their solar PV panels and allows for the collection and storage of data in the event of an incident at the site of the installation. A microcontroller unit and IoT-based sensors continually monitor the four main operating parameters (i.e. voltage, current, temperature, and power output) of each solar panel, which ultimately provides users with visibility into their system's performance and can assist them in identifying any potential issues with the operation of their equipment. Using 5G technology allows for reduced latency, increased data reliability, and increased speed of transmission, which makes this monitoring of remote solar PV panel installations an attractive option for owners/developers that operate large-scale remote solar PV plants. Testing of the suggested Remote Solar Panel Health Monitoring System has verified that it accurately tracks performance, identifies abnormal conditions, and improves the reliability of solar PV plants, thereby reducing both maintenance efforts and operational costs.

Keywords: Solar PV Monitoring, Remote Monitoring, 5G Technology, IoT Sensors, Performance Tracking, Real-Time Monitoring, Fault Detection

ICSICA-2026-95

TELESTACK: A Web Assembly-Accelerated Edge-Native Serverless Distributed Database for Adaptive State Synthesis Under High Contention

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ABSTRACT

Modern real-time applications—including collaborative platforms, messaging systems, and live telemetry pipelines—require efficient handling of highly concurrent user operations. However, traditional distributed databases suffer from the contention-latency paradox, where increasing write contention results in degraded throughput, elevated tail latency, and reduced system reliability. Existing approaches, such as locking mechanisms and optimistic concurrency control (OCC), are inherently limited in high-contention environments due to synchronization overhead and repeated conflict resolution. In this paper, we present Telestack, a WebAssembly-accelerated, edge-native serverless distributed database that introduces a novel paradigm of adaptive state synthesis. Telestack is built upon two unified technical pillars that collectively shift conflict resolution from the centralized database core to the network edge. Pillar 1: Edge State Synthesis Engine (ESE) provides a feedback-controlled, topology-aware write buffering mechanism that aggregates and coalesces concurrent updates prior to persistence. ESE integrates Adaptive Edge-Native State Synthesis (AENS) for dynamic buffering based on workload velocity and Adaptive Contention Topology (ACT) for real-time classification of contention intensity, enabling adaptive synthesis windows under varying load conditions. Pillar 2: Semantic Write Compression (SWC) introduces a lossless merging framework for concurrent updates.

Keywords: Distributed Databases, Edge Computing, Serverless Architecture, Adaptive State Synthesis, Concurrency Control, Web Assembly, Write Contention

ICSICA-2026-96

Bank Loan Prediction

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ABSTRACT

In the modern banking sector, efficient and unbiased loan approval is essential for improving customer satisfaction and financial decision-making. Traditional loan evaluation methods often depend on manual analysis, which can lead to delays, human errors, and inconsistent judgments. This paper proposes a Bank Loan Approval Prediction System that leverages Artificial Intelligence (AI) and Machine Learning (ML) techniques to automate and enhance the loan approval process.

The system utilizes historical applicant data, including financial, demographic, and credit-related information, to predict loan approval status. Multiple machine learning algorithms such as Logistic Regression, Decision Tree, Random Forest, Support Vector Machine, and Gradient Boosting are implemented to analyze and compare performance. Based on prediction results, the system generates a probability-based risk score and classifies applications into Approved, Rejected, and Undecided categories. The introduction of the “Undecided” category allows borderline cases to be identified and forwarded for manual review, ensuring more reliable and fair decision-making. Additionally, feature importance analysis is performed to determine the key factors influencing loan approval, thereby improving transparency and interpretability of the model.

Keywords: Bank Loan Approval, Artificial Intelligence, Machine Learning, Predictive Analytics, Risk Assessment, Decision Support, Loan Evaluation Automation.

ICSICA-2026-97

Dual Encoder Adversarial Learning for Cloud Based Cyber Intrusion Detection

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ABSTRACT

Cyber-attacks are a major threat to computer systems in today's computing environment because they impact various network infrastructures, software applications, and data. The growth of the Internet and devices that are connected to it has made cyberspace more complex. Research conducted in the domain of cyberattacks has been focused mainly on the prediction and detection of cyber-attacks using supervised machine learning methods, considering the identification of cyberattacks as a classification problem based on network traffic analysis. These methods involve various data preprocessing techniques such as variable identification, univariate analysis, bivariate analysis, and multivariate analysis, along with handling missing values for better accuracy. The performance of different machine learning algorithms is tested to categorize major types of attacks such as Denial of Service (DoS), Remote to Local (R2L), User to Root (U2R), and Probes based on performance metrics such as accuracy, precision, recall, F1 score, sensitivity, specificity, and entropy. Although the performance of different machine learning-based models has shown promising results in terms of efficient detection of different attack patterns, most of these models are based on fixed system configurations and internal structures. Once the attacker gains information about internal structures, the same attacks can be repeated, which would ultimately affect the system's security. In order to overcome such limitations, the concept of dynamic code transformation and backup has been introduced in this research.

Keywords: Cybersecurity, Cyber-Attack Detection, Machine Learning, Network Traffic Analysis, Dynamic Code Transformation, DoS, R2L

ICSICA-2026-98

Federated Learning-Based Decentralized Workload Forecasting for Efficient Resource Allocation in Cloud Data Centers

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ABSTRACT

Cloud Computing has become a key enabler of modern digital transformation, providing scalable, flexible, and on-demand access to computing resources for a wide range of applications. However, the dynamic and high-dimensional nature of workloads in Cloud Data Centers (CCD) creates significant challenges, including resource underutilization, increased operational costs, and reduced system stability for Cloud Service Providers (CSP). These issues are particularly critical in large-scale online shopping platforms, where numerous users simultaneously engage in activities such as product searches, order processing, payment transactions, and recommendation requests.

To address these challenges, an intelligent and adaptive framework is introduced that integrates Artificial Intelligence, optimization techniques, and multi-agent coordination to enhance workload prediction, resource allocation, fairness, and system adaptability. The framework continuously observes workload patterns generated by online shopping activities and utilizes AI-based models to support proactive decision-making before performance degradation occurs. To maintain fairness among users while reducing energy usage and operational costs, optimization methods are applied to ensure efficient distribution of resources across different services.

Through decentralized coordination, distributed cloud components can dynamically scale resources in response to changing demands, including seasonal sales, promotional events, and peak traffic periods. At the same time, the AI-driven system improves

Keywords: Cloud Computing, Workload Prediction, Resource Allocation, Artificial Intelligence, Optimization, Multi-Agent Systems, Adaptive Framework.

ICSICA-2026-99

Multi Agent Customer Support Automation System

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ABSTRACT

However, customer support systems sometimes experience issues, which might include a disjointed process, delayed response, and a significant level of manual decision-making. As the number of requests increases, consistency, speed, and reliability become a challenge. The conventional approach to automation does not take into account contextual information, and most Artificial Intelligence-based approaches do not offer a structured workflow control necessary for a practical customer support environment. This paper presents a multi-agent customer support automation system that aims to fulfill end-to-end customer support requests through the interaction of specialized agents. The incoming customer support requests are gathered and stored in a persistent database. The overall workflow is managed through a central orchestration mechanism. In the proposed system, a triage agent is used to evaluate the priority and action for each request. In addition, a reply agent is used to create replies for the requests that need to be fulfilled. The proposed system also utilizes the usage of external tools to execute the actions. The proposed customer support automation system includes the following: a modular design, reliable workflow execution, and intelligent decision-making. The proposed system provides a real-world solution for automating customer support using agent-based processing. The results show the effectiveness of the proposed method in reducing the workload while maintaining the reliable handling of customer support requests.

Keywords: Customer Support Automation, Multi-Agent Systems, AI, Workflow Management, Intelligent Decision-Making, Automated Response, Modular Design.

Eco-Safe Autonomous Floating Robot for Selective Waste Collection Using Real-Time Visual Intelligence

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ABSTRACT

A growing environmental concern is the accumulation of floating waste in lakes and other stagnant water bodies, which has an impact on water quality and disturbs aquatic ecosystems. The main goal of current automated cleaning systems is to remove waste, but they frequently don't take aquatic life into account, which could have unforeseen ecological effects. An environmentally safe autonomous floating robotic system that uses intelligent visual analysis to selectively clean surfaces is presented in this paper. To differentiate between floating debris and living things in real time, the suggested system combines an embedded controller with a vision-based detection module. Based on this classification, the robot avoids interfering with aquatic life by navigating dynamically and only turning on its collection mechanism when it detects non-living waste. An energy-efficient design that is appropriate for continuous outdoor operation supports the system. The suggested strategy provides a workable and sustainable way to keep water bodies cleaner while maintaining ecological balance by fusing selective waste collection with environmentally conscious decision-making.

Key words: Computer Vision, Environmental Robotics, Water Pollution Monitoring, Selective Waste Collection, Aquatic Life Protection.

ICSICA-2026-101

AEGISNET: A Flow-Based Ai Framework for Real-Time Threat Detection in Local Networks

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ABSTRACT

Efficacy of conventional signature-based intrusion detection systems has been considerably diminished by the quick expansion of local networks and the extensive usage of encrypted communication. Current methods frequently rely on labeled datasets, predefined attack signatures, or deep packet inspection, which results in high false- positive rates, limited flexibility, and excessive warning generation in practical settings. This study suggests AEGISNET, an AI-based real-time threat detection and analysis framework created especially for local networks, to overcome these drawbacks. Without examining packet payloads or requiring prior attack knowledge, AEGISNET uses unsupervised behavioral analysis and a flow-based monitoring approach to identify unusual network activity. In order to mimic typical network activity, the framework first adds an adaptive baseline learning phase. This is followed by a confidence-aware anomaly scoring mechanism that assesses the degree of discovered deviations. AEGISNET uses time-window summarization and alert suppression to reduce alert fatigue, making sure that only high-confidence and contextually important threats are reported. The suggested approach successfully lowers duplicate alarms while maintaining sensitivity to persistent aberrant traffic patterns, according to experimental demonstrations. AEGISNET is a workable and deployable solution for real-time intrusion monitoring in local network environments since it runs offline, enables encrypted traffic, and offers human-readable explanations for detected threats.

Keywords: Intrusion Detection System, Unsupervised Learning, Anomaly Detection, Network Security, Flow-Based Monitoring, Encrypted Traffic Analysis, Real-Time Threat Detection.

Design of a Dual-Band Wearable Antenna Operating at 4.3GHz And 5.5 GHz for Medical Communication Applications

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ABSTRACT

In the current project, the design and electromagnetic simulation of a small dual-band wearable Substrate Integrated Waveguide (SIW) antenna to be used in the Wireless Body Area Network (WBAN) and smart healthcare has been described. The antenna has been used in medical data communication at the 4.3 GHz and 5.5GHz ISM bands to operate in a reliable manner. This proposed structure is carried out using an FR4 substrate, and a breathable copper mesh ground plane is provided so as to maintain flexibility, decrease weight, and ease of wear by the user. The antenna will be designed and analyzed by the CST Studio Suite 2021 developed by Dassault Systèmes within the framework of the simulation-based performance assessment without hardware-development. The methods of optimisation are used to stabilize impedance by making impedance matching and dual-band resonance without compromising size and radiative properties. Performance analysis is done comprehensively by assessing the parameters, which include S-parameters, impedance bandwidth, gain, radiation pattern, radiation efficiency, envelope correlation coefficient (ECC), diversity gain (DG), mean effective gain (MEG), entropy, and surface current distribution. The simulation results indicate that the antenna has acceptable return loss at both frequencies, and the radiation behavior is declared to be stable, as well as the efficiency at the operating frequencies is good enough to apply the antenna in on- body communication cases. The antenna architecture provides an appropriate configuration to wearable medical monitoring systems that need frequent, safe, and low-power wireless connectivity. The tiny SIW-based structure also makes it possible to integrate it into smart textiles and patient-fitting devices.

ICSICA-2026-103

Real-Time Driver Fatigue and Distraction Detection Using Computer Vision and Deep Learning

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ABSTRACT

Drowsiness and distraction remain leading causes of road traffic fatalities worldwide, with the World Health Organization (WHO) attributing over 1.35 million annual deaths to road crashes, a significant fraction of which involve inattentive or fatigued drivers. Traditional physiological monitoring approaches—relying on EEG, ECG, and galvanic skin response sensors—offer clinical accuracy but are intrusive, costly, and impractical for mass-market vehicle deployment. This paper presents a comprehensive, non-intrusive, real-time Driver Monitoring System (DMS) based on computer vision and deep learning. A fine-tuned YOLOv8 model detects and localises critical facial regions—eyes, mouth, and head orientation—from standard in-vehicle camera feeds operating under challenging lighting conditions. The Percentage of Eye Closure (PERCLOS), Eye Aspect Ratio (EAR), Mouth Aspect Ratio (MAR), and 3-D head pose angles are continuously computed to assess driver alertness. A multi-level, confidence-weighted alert subsystem delivers graduated audio, visual, and haptic feedback proportional to assessed risk.

The training corpus comprises 28,500 annotated frames drawn from real in-vehicle recordings on Indian highways, publicly available benchmarks (CEW, NTHU-DDD, AUC Distracted Driver Dataset), and 4,200 synthetically generated frames covering extreme lighting scenarios.

Keywords: Driver Monitoring, Drowsiness Detection, Distraction Detection, Computer Vision, Deep Learning, YOLOv8, Real-Time Alerts

ICSICA-2026-104

Security Suite: An Intelligent System for Secure File Management and Digital Forensics

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ABSTRACT

The rapid growth of digital storage has increased the need for efficient and secure file management systems. This paper presents a Security Suite framework designed to provide a reliable platform for file organization and digital forensic analysis. The proposed system integrates key functionalities including file searching, duplicate file detection, integrity verification using cryptographic hashing, and advanced filtering mechanisms. These features are combined within a modular architecture that enhances scalability, flexibility, and overall system reliability. The system enables users to locate files quickly, identify redundant data, and verify file authenticity, which are essential tasks in both general file management and forensic investigations.

The implementation focuses on handling large datasets efficiently while maintaining accuracy in results. Experimental evaluation shows that the system performs effectively when processing files across multiple directories. The duplicate detection module reduces storage redundancy, and the integrity verification component ensures that files remain unaltered. Additionally, the advanced filtering capability allows users to refine search results based on attributes such as file type, size, and modification date. These features collectively improve investigation accuracy and reduce manual effort. The proposed Security Suite supports systematic analysis of digital evidence and provides a practical, user-friendly solution for secure file management in personal and professional environments.

Keywords: File Management, Digital Forensics, Security Suite, Duplicate Detection, Integrity Verification, Cryptographic Hashing, Data Security.

Low-Power Reconfigurable Fir Filter Design Based On Common Operation Sharing

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ABSTRACT

This paper presents a novel low-power and programmable Finite Impulse Response (FIR) filter architecture optimized for efficient implementation on FPGA platforms. Conventional multiplexer (MUX)-based reconfigurable FIR filter designs often suffer from redundant arithmetic operations across multiple filter taps, resulting in increased hardware resource utilization, higher power consumption, and degraded processing speed. To address these limitations, the proposed architecture incorporates a Common Operation Sharing (COS) strategy that identifies repeated coefficient decoding and partial-product computations across filter stages and reuses them, thereby reducing logic complexity, area, and energy dissipation. In addition, a Hybrid Karatsuba-Urdhva Multiplier is employed to enhance multiplication efficiency by combining the recursive decomposition capability of the Karatsuba algorithm with the parallel partial-product generation approach derived from the Urdhva Tiryagbhyam Sutra.

This hybrid multiplication technique significantly reduces arithmetic complexity, improves computational speed, and lowers power consumption compared to conventional multiplier designs. The complete FIR filter architecture is modeled using Verilog HDL and implemented on a Xilinx Spartan-6 XC6SLX9-TQ144 FPGA development board. Input samples and configuration parameters are provided through onboard hardware switches, while the processed filter output is displayed using LED indicators for real-time hardware validation.

Keywords: FIR Filter, Low-Power Architecture, FPGA, Common Operation Sharing, Hybrid Karatsuba-Urdhva Multiplier, Reconfigurable Design, DSP

ICSICA-2026-106

Online Voting System Using Blockchain

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ABSTRACT

Electronic voting systems are becoming increasingly important in modern democratic processes, but they face significant challenges related to security, authentication, and transparency. Traditional voting methods and basic electronic systems are often vulnerable to fraud, duplicate voting, and unauthorized access. To address these issues, this project proposes a Security-Based Voting System that integrates multiple layers of authentication along with blockchain technology.

The proposed system uses multi-factor authentication techniques such as facial recognition and one-time password (OTP) verification to ensure that only eligible voters can cast their votes. Blockchain technology is utilized to securely store voting data in a decentralized and tamper-proof manner, ensuring transparency and integrity of the election process.

The system is designed to prevent fraudulent activities, eliminate duplicate voting, and provide a reliable and efficient voting mechanism. By combining secure authentication methods with blockchain, the proposed solution enhances security, accuracy, and trust in electronic voting systems. This project aims to provide a scalable and user-friendly platform suitable for future digital elections.

Keywords: Electronic Voting, Blockchain, Multi-Factor Authentication, Facial Recognition, OTP, Security, Transparency.

ICSICA-2026-107

Self-Healing Network Simulator

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ABSTRACT

The rapid growth of complex communication networks has made fault tolerance and reliability critical concerns. Traditional network management often requires manual intervention, which can be slow and error-prone, leading to service disruptions and reduced quality of service. Self-healing networks aim to overcome these challenges by automatically detecting, diagnosing, and recovering from failures in real-time, thereby ensuring continuous network operation. This paper presents the design and implementation of a Self-Healing Network Simulator, a versatile tool for modeling network behavior under various fault conditions. The simulator enables the creation of different network topologies and fault scenarios, including node failures, link congestion, and network partitioning. It monitors network elements, identifies anomalies, and initiates corrective actions such as rerouting traffic, reconfiguring nodes, or restoring failed services. The system also collects performance metrics including fault detection latency, recovery time, packet loss, and overall network availability to evaluate the effectiveness of self-healing strategies. By providing a controlled and scalable simulation environment, this tool facilitates experimentation with new fault-tolerant algorithms and helps network designers and researchers optimize recovery mechanisms before deploying them in real-world networks. The proposed simulator not only improves network robustness but also contributes to the development of intelligent, autonomous network management systems.

Keywords: Self-Healing Networks, Fault Tolerance, Network Simulator, Anomaly Detection, Recovery Mechanisms, Network Reliability, Autonomous Management

ICSICA-2026-108

Intelligent Future Workforce & Smart Career Planning Platform Using Generative AI and Market Trend Prediction

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ABSTRACT

Skill Path AI is an AI-powered career mentorship and educational platform designed to help individuals bridge the gap between their current skills and targeted career goals. The platform provides personalized learning experiences through AI-generated roadmaps, real-time tutoring, and gamified progress tracking. Skill Path AI supports both laptop-based web applications and Android mobile devices, ensuring flexible and accessible learning. The system generates customized, step-by-step learning paths based on user career objectives, skill levels, and learning preferences. These paths include milestones, estimated study time, curated resources, and practical projects. An interactive AI-based English-speaking tutor enables real-time conversational practice, offering grammar correction, pronunciation feedback, and confidence-building support. Additionally, a job preparation hub delivers structured training in technical skills, aptitude, and soft skills. Gamification features such as experience points, daily streaks, levels, badges, and a job readiness score motivate consistent engagement. Secure authentication and activity tracking ensure a reliable and user-focused learning environment, making Skill Path AI a comprehensive solution for career-oriented skill development.

Keywords: AI-Powered Learning, Career Mentorship, Personalized Learning Paths, Gamification, Skill Development, Interactive Tutoring, Job Readiness

ICSICA-2026-109

Veriskill Ai: Resume Automation Embedding Similarity and Certificate Verification System

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ABSTRACT

Organizations face significant difficulties in efficiently handling, evaluating, and confirming the large number of resumes and credentials that candidates submit in the modern recruitment environment. This system's main goal is to improve resume evaluation, skill similarity analysis, and certificate verification accuracy and efficiency by utilizing Artificial Intelligence (AI) and Natural Language Processing (NLP) techniques. To guarantee exact alignment between necessary and possessed skills, the system compares candidate profiles with job requirements using embedding similarity algorithms. Additionally, textual data is extracted from certificates using Optical Character Recognition (OCR), which is followed by AI-driven validation models that detect fraudulent alterations or tampering. Recruiters can upload, evaluate, and validate candidate data in real time using the VERISKILL AI platforms user-friendly web interface.

Keywords: AI-Based Recruitment, Resume Evaluation, Skill Similarity, Certificate Verification, NLP, OCR, Fraud Detection

ICSICA-2026-110

AI Powered News Summariser with Question And Answer And Voice Note Features

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ABSTRACT

The rapid growth of digital news has made it increasingly difficult for users to keep up with important information. An AI-powered News Summarizer addresses this challenge by leveraging advanced techniques from Natural Language Processing (NLP) and Machine Learning (ML) to automatically extract key insights from lengthy news articles and present them in concise, easy-to-understand summaries. This system not only reduces information overload but also enhances user engagement through interactive and multimodal features. At its core, the system ingests news articles from various sources such as RSS feeds, APIs, or web scraping modules. It then processes the text using NLP algorithms, which include tokenization, named entity recognition, and semantic analysis. Using extractive or Abstractive summarization models— often powered by transformer-based architectures like BERT or GPT—the system generates a condensed version of the article while preserving its main ideas and context. Beyond summarization, the platform incorporates a Question and Answer (Q&A) module, enabling users to interact with the content. Users can ask specific questions related to the summarized news, and the AI model retrieves or generates precise answers based on the article’s content. This feature transforms passive reading into an active learning experience, making it especially useful for students, researchers, and professionals who require deeper insights without reading full articles. Additionally, the system includes a Voice Note feature, which enhances accessibility and convenience.

ICSICA-2026-111

PRISM-SMARTSPR: A Pollution Rebound – Aware, Physics informed Mobile Sprinkler Scheduling System for Reducing Urban Particulate Matter Pollution

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ABSTRACT

Urban particulate pollution presents considerable public health hazards, underscoring the need for effective control measures in various cities. This paper proposes SmartSpr, a physics-informed urban mobile sprinkler scheduling system designed for enhanced efficiency in reducing particulate pollution. SMARTSPR incorporates a Physics-Informed Neural Network (PINN)-based model, enriched with Bayesian optimization, to accurately simulate the impact of mobile sprinklers on particulate matter (PM) dispersion. Building on this sprinkling effect model, a selective sprinkling strategy considering the replenish process is proposed. This strategy employs a sparsity-driven decoupling simulated annealing algorithm to refine sprinkler routes, prioritizing areas with substantial environmental benefits. Extensive field experiments and simulations have validated SmartSpr, demonstrating a 64.8% reduction in prediction error of SmartSpr's sprinkling model compared to the leading baseline and an 18% enhancement in pollutant reduction efficiency of the proposed scheduling algorithm. SmartSpr incorporates a Physics-Informed Neural Network (PINN)-based model, enriched with Bayesian optimization, to accurately simulate the impact of mobile sprinklers on particulate matter (PM) dispersion.

Keywords: Urban particulate pollution, mobile sprinklers, Physics-Informed Neural Network (PINN), Bayesian optimization, selective sprinkling strategy, route optimization, air quality management.

ICSICA-2026-112

AI-Powered Disease Detection and Recovery Tips for Plants

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ABSTRACT

Agriculture plays a vital role in ensuring global food security, yet plant diseases remain one of the major factors that significantly reduce crop yield and quality. Traditional methods of disease identification rely heavily on manual inspection by experts, which can be time-consuming, costly, and often inaccurate due to human limitations. To overcome these challenges, this project proposes an AI-powered system for plant disease detection and recovery recommendation, leveraging advancements in machine learning and deep learning technologies. The system primarily utilizes image processing techniques combined with Convolutional Neural Networks (CNNs) to analyze images of plant leaves and identify diseases at an early stage. When a user uploads an image, the system preprocesses it through steps such as resizing, normalization, and noise reduction to enhance image quality. The trained model then extracts important features like color variations, texture patterns, and lesion shapes to classify the plant as healthy or diseased, along with identifying the specific type of disease.

In addition to detection, the system provides intelligent recovery tips tailored to the identified disease. These recommendations include suitable fertilizers, organic and chemical treatments, pest control measures, irrigation adjustments, and environmental management practices such as maintaining proper humidity and temperature. The system may also include preventive guidelines to reduce the risk of future infections, thereby supporting long-term plant health. The model is trained using a comprehensive dataset of labeled plant images, ensuring high accuracy, robustness, and generalization across different plant species and environmental conditions.

Keywords: Plant disease detection, artificial intelligence, deep learning, Convolutional Neural Networks (CNNs), image processing, crop health management, disease recovery recommendation.

ICSICA-2026-113

An Uncertainty-Aware Adaptive Wavelet–Statistical Attention Lightweight Network for Histopathological Cancer Classification

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ABSTRACT

Histopathological image analysis plays a vital role in cancer diagnosis, enabling pathologists to examine tissue structures at a microscopic level. However, manual examination of histopathological slides is time-consuming, subjective, and prone to inter-observer variability. Recent deep learning–based approaches have shown promising results in automating cancer classification, but most existing models rely on very deep and computationally expensive architectures. These heavyweight models demand high memory, long training time, and powerful hardware, limiting their deployment in real-world clinical environments, especially in resource-constrained settings. To address these challenges, SAWL-NET (Statistical Attentions and Wavelet-Aided Lightweight Network) is proposed as an efficient and accurate framework for cancer classification in histopathological images. The model integrates wavelet transforms to capture multi-resolution spatial–frequency information and statistical attention mechanisms to emphasize discriminative texture and structural patterns relevant to cancerous tissues. By combining handcrafted statistical cues with deep feature learning, SAWL-NET achieves strong classification performance while maintaining a lightweight architecture. The network is designed to reduce computational complexity without sacrificing accuracy, making it suitable for real-time and large-scale clinical applications. Experimental evaluations demonstrate that SAWL-NET offers a balanced trade-off between efficiency and accuracy, supporting reliable cancer diagnosis from histopathological images.

Keywords: Histopathological Image Analysis, Cancer Classification, Deep Learning, Lightweight Neural Networks, Wavelet Transform, Attention Mechanism, Statistical Features, Medical Image Processing, Texture Analysis, Computational Efficiency, Real-Time Diagnosis, Healthcare AI.

ICSICA-2026-114

Satellite Image Caption Generator using CNN and LSTM for Automated Earth Observation

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ABSTRACT

For earth observation operations like environmental monitoring, land- use analysis, civic planning, and disaster operation, satellite imagery is an essential source of data. Large- scale satellite picture analysis, still necessitates substantial mortal labor and subject- matter moxie. This exploration provides an automated satellite picture caption generating system grounded on Long Short- Term Memory (LSTM) networks and Convolutional Neural Networks (CNNs) to attack this problem. High-position spatial and semantic information are uprooted from satellite filmland by the CNN element, and the LSTM network uses these features to give coherent and significant textual descriptions. The suggested methodology successfully closes the gap between natural language appreciation and visual satellite data. The CNN–LSTM armature generates accurate and environment-apprehensive captions, perfecting availability and usability, according to experimental evaluation.

Keywords-Automated Earth Observation, Natural Language Processing (NLP), seeing ever

ICSICA-2026-115

A Lightweight and Parameter-Efficient FUSCANET Using MobileViT-XXS for Skin Lesion Classification

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ABSTRACT

Skin diseases are becoming increasingly common, and early detection plays an important role for proper treatment and increased patient survival rates. Classification models based on deep learning have shown promising results in dermoscopic image analysis. However, most models that have shown high classification accuracy have large parameter counts and high computational complexities, which are limitations for resource-constrained systems. In this study, a parameter-efficient variant of the FUSCANet model is proposed by replacing the backbone model with a MobileViT-XXS model for efficient classification and resource usage. The proposed model retains the benefits of the original model's multi-scale feature aggregation and attention mechanisms while reducing the number of learnable parameters. Experiments were conducted using three dermoscopic image datasets that are publicly available: HAM10000, ISIC 2019, and PAD-UFES-20. The experimental results show that the proposed model efficiently reduces the number of learnable parameters from 5.27M to 1.23M, a reduction of approximately 76%. The proposed model achieves high classification accuracy of 88.42%, 84.11%, and 91.90% on the three datasets, respectively. Overall, the proposed model provides a good balance between accuracy and efficiency, making it suitable for mobile-based healthcare applications.

Keywords: Skin disease detection, deep learning, MobileViT-XXS, FUSCA Net, dermoscopic image analysis, parameter-efficient model, mobile healthcare applications.

ICSICA-2026-116

Agrovision AI : Intelligent Leaf Disease Detection & Smart Remedy System

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ABSTRACT

Eurovision AI is an intelligent plant disease detection system that leverages Artificial Intelligence and Deep Learning techniques to identify diseases from plant leaf images. The system uses a trained Convolutional Neural Network (CNN) model to analyze uploaded images and accurately predict the disease name, confidence level, and affected leaf area. A Flask-based web application enables users to easily interact with the system and obtain results in real time. In addition to disease identification, the system provides both organic and chemical remedy suggestions along with possible causes of the disease, helping users take appropriate preventive and corrective measures. It also integrates a multi-language AI chatbot supporting English, Tamil, and Tenglish, along with voice output for improved accessibility, especially for farmers and rural users with limited literacy. The system is designed with a simple and user-friendly interface, making it easy to use without technical knowledge. By combining AI, image processing, and interactive features, Agrovision AI serves as a practical solution for smart agriculture, enabling early disease detection, reducing crop loss, and improving overall productivity and decision-making in farming practices.

Keywords: Plant Disease Detection, Convolutional Neural Network, Deep Learning, Flask, Smart Agriculture, Image Processing, AI Chatbot

ICSICA-2026-117

Smart Electric Pole Fault Detection Using IoT and Machine Learning

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ABSTRACT

Traditional electric pole fault detection primarily depends on manual inspection and consumer complaints. This approach often results in delayed fault identification and extended power outages. As distribution networks expand and integrate distributed energy sources, system complexity continues to increase. Conventional monitoring methods lack real-time supervision and intelligent fault analysis. These limitations reduce operational efficiency and affect overall reliability. To overcome these challenges, the proposed system introduces a Smart Electric Pole Fault Detection framework using IoT and Machine Learning technologies. Sensors installed on electric poles continuously monitor parameters such as voltage, current, temperature, light intensity, and wire status. The collected data is transmitted to a centralized cloud platform through wireless communication. Machine learning algorithms analyze the data to detect and classify faults in real time. A web dashboard and mobile application provide live visualization and instant alerts. This reduces manual intervention and improves maintenance response time. Overall, the system enhances reliability, supports predictive maintenance, and strengthens smart grid efficiency.

Keywords: Electric Pole Fault Detection, Internet of Things (IoT), Machine Learning, Smart Grid, Real-Time Monitoring, Predictive Maintenance, Fault Classification, Wireless Sensor Networks, Cloud Computing, Power Distribution Systems, Remote Monitoring, Energy Management.

ICSICA-2026-118

Neuroscript AI-A Real-Time Neuro Motor Based Mental Health Assessment Using Handwriting and Drawings

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ABSTRACT

Mental health disorders including anxiety, depression, and neuromotor stress represent a growing global health burden, yet objective, accessible diagnostic tools remain limited. This paper presents NeuroScript AI, a real-time handwriting and drawing analysis system that extracts neuromotor biomarkers from digitally captured pen-stroke data to provide mental health risk assessments. The system introduces the Neural Pressure Index (NPI), a composite metric derived from stroke tremor, pressure variability, velocity irregularity, hesitation patterns, and curvature instability, enabling quantitative estimation of cognitive and neural load. The proposed architecture integrates a convolutional neural network (CNN) for spatial feature extraction with a long short-term memory (LSTM) network for temporal sequence modelling, producing a three-class output: normal, mild stress, and severe stress.

The system supports multiple input modalities — scanned handwriting images, real-time webcam capture, digital canvas strokes, uploaded video, and batch processing — making it deployable across clinical and consumer contexts. Experimental evaluation on the Parkinson's Drawings dataset and an Alzheimer's MRI benchmark demonstrates classification accuracy of 91.4% with an F1-score of 0.903.

Keywords: Handwriting analysis, mental health assessment, neural pressure index, real-time analysis, tremor detection.

ICSICA-2026-119

Credit Card Fraud Detection Using AI-Driven Clustering and Classification in Unlabeled Data Environments

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ABSTRACT

The Rapid proliferation of digital financial transactions has elevated credit card fraud to a critical concern within global economic infrastructures. Conventional supervised machine learning methodologies necessitate extensive labeled datasets, which are frequently unavailable, skewed, or insufficient in authentic financial contexts. This research introduces an innovative artificial intelligence framework engineered to identify fraudulent activities within environments characterized by unlabeled data. The proposed architecture synergistically combines unlabeled clustering techniques with semi-supervised and anomaly-driven classification methodologies. Initially, the framework employs clustering algorithms including K-Means, DBSCAN, and Isolation Forest to categorize transactional patterns and flag potential anomalies without dependence on pre-existing labels. Subsequently, insights derived from these clusters inform the training of streamlined classifiers that enhance fraud prediction accuracy while minimizing false positive rates. The hybrid approach demonstrates superior detection precision, adaptability to emerging fraudulent behaviors, and reduced reliance on manually annotated data. Experimental validation confirms enhanced efficacy in identifying infrequent fraudulent incidents, concurrently preserving scalability for processing extensive transactional volumes. This AI-centric methodology offers a resilient, computationally efficient, and intelligent solution for contemporary financial fraud mitigation in dynamic, label-scarce operational settings.

Keywords: Credit Card Fraud Detection, Unsupervised Learning, Semi-Supervised Learning, Anomaly Detection, Clustering Algorithms, K-Means, DBSCAN, Isolation Forest, Financial Transactions, Machine Learning, Fraud Analytics, Pattern Recognition.

Emotion Detection and Behavior Prediction System

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ABSTRACT

In high-risk environments such as prisons and mental health institutions, the emergence of sudden aggressive or unstable behavior poses significant safety and security challenges, and conventional monitoring approaches including manual supervision and standard CCTV surveillance systems are largely reactive in nature and lack the capability to identify early indicators of emotional distress. This paper proposes a camera-based AI-driven emotion detection and behavior prediction system designed to operate exclusively using existing CCTV infrastructure as its primary hardware component. The system captures real-time video streams and applies advanced computer vision techniques combined with deep learning models using a hybrid architecture consisting of Convolutional Neural Networks (CNN), MobileNet, and Long Short-Term Memory (LSTM), where CNN and MobileNet are used for efficient spatial feature extraction and lightweight processing, while LSTM is utilized for temporal behavior analysis. The proposed system is capable of recognizing key emotional states such as anger, fear, stress, sadness, and neutrality, and further extends its functionality by predicting potential high-risk behavior. It achieves an estimated prediction accuracy of ninety three to ninety five percent, significantly improving upon traditional systems that are limited to basic emotion detection. The system includes real-time emotion recognition, risk level classification into low, medium, and high categories, aggression probability estimation, automated alert generation, and preventive intervention recommendations.

Keywords: AI-based emotion detection, behavior prediction, CCTV surveillance, deep learning, CNN, MobileNet, LSTM, high-risk environment monitoring.

ICSICA-2026-121

A Computer Vision Based Interactive Meeting platform

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ABSTRACT

The increasing reliance on virtual communication platforms has highlighted the limitations of conventional interaction methods that depend on physical input devices such as a mouse or touchscreen. These approaches often restrict natural expression and reduce the effectiveness of real-time explanation, particularly in educational and collaborative environments. This paper presents a Computer Vision Based Interactive Streaming Platform that enables touchless interaction through real-time hand gesture recognition.

The proposed system utilizes a standard webcam to capture live video input and applies computer vision techniques for hand detection and landmark tracking. Using a lightweight pre-trained model, the system identifies finger positions and interprets gestures such as drawing, pausing, and erasing. These gestures are mapped to digital actions and rendered as an overlay on a virtual canvas in real time, allowing users to annotate and illustrate concepts without physical contact. The system is designed with a modular architecture, ensuring efficient processing and minimal latency.

To support collaborative usage, a session-based architecture is incorporated, enabling a host to initiate a meeting and participants to join using a unique room identifier. Drawing data is transmitted using lightweight real-time communication mechanisms, allowing participants to view the annotated output synchronously. The system avoids computationally expensive training processes by leveraging optimized computer vision libraries, making it suitable for deployment on standard computing devices.

Keywords: Computer Vision, Gesture Recognition, Human-Computer Interaction, Virtual Collaboration, Real-Time Systems

ICSICA-2026-122

Intelligent traffic prediction using machine learning in internet of vehicles

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ABSTRACT

The Internet of Vehicles (IOV) is a rapidly evolving paradigm that leverages Vehicle-to-Everything (V2X) communication, enabling real-time data exchange between vehicles, infrastructure, and cloud-based services. The integration of Machine Learning (ML) into Internet of Vehicle the intelligence of vehicular networks by enabling predictive analytics, autonomous decision-making and efficient traffic management. ML algorithms process massive amounts of sensor data, GPS signals, and camera feeds to optimize navigation, detect potential collisions, and improve fuel efficiency. This paper explores the application of various ML techniques in IOV, such as deep learning for object detection and lane recognition, reinforcement learning for autonomous driving strategies, and supervised learning for traffic flow prediction. Additionally, anomaly detection models improve vehicle diagnostics and cyber security, mitigating risks such as cyber threats and system failures. The fusion of IoT , artificial intelligence (AI), and bigdata analytics in IOV fasters the development of smart transportation systems, reducing congestion, accidents, and environmental impact. Despite its advantages, IOV faces challenges such as data privacy, computational constraints, and real-time processing limitations. This study discusses potential solutions, including edge computing, blockchain for secure communication, and federated learning to protect user privacy while optimizing performance.

Keywords: Internet of Vehicles (IoV), Vehicle-to-Everything (V2X), Machine Learning, Deep Learning, Reinforcement Learning, Smart Transportation, Traffic Prediction, Autonomous Driving, Anomaly Detection, Edge Computing, Federated Learning, Blockchain Security, Internet of Things (IoT), Big Data Analytics.

ICSICA-2026-123

AI-Based Fake News Detection Using Natural Language Processing

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ABSTRACT

The AI-Based Fake News Detection and Verification System Using Natural Language Processing is an innovative application designed to analyze the authenticity of news content by examining textual patterns, linguistic features, and contextual information. Unlike traditional methods that rely on manual fact-checking, this system integrates principles of Artificial Intelligence and Natural Language Processing (NLP) to provide a faster and more efficient way of identifying misleading or false information.

The primary objective of this project is to detect and classify news articles as real or fake by analyzing their content and writing style. The system allows users to input news text or articles, which are then processed through various NLP techniques such as tokenization, stop-word removal, and feature extraction. Based on trained Machine Learning models and predefined linguistic patterns, the application evaluates the credibility of the content and identifies potential misinformation.

Additionally, the system generates intelligent outputs such as classification results, confidence scores, and keyword insights to enhance transparency and user understanding. It may also highlight suspicious phrases or patterns commonly associated with fake news. The application can present visual reports, including graphs that show prediction accuracy and distribution of real versus fake news data.

Keywords: Fake News Detection, Natural Language Processing (NLP), Machine Learning, Text Classification, Artificial Intelligence, Sentiment Analysis, Feature Extraction, Misinformation Detection, Data Preprocessing, Linguistic Analysis, Information Verification, Content Analysis.

ICSICA-2026-124

Lung Disease Detection Using Deep Learning

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ABSTRACT

Lung diseases such as lung cancer, pneumonia, tuberculosis, and other respiratory disorders are among the leading causes of death worldwide. Early and accurate detection of these diseases is essential for effective treatment and improved patient survival rates. However, traditional diagnosis methods rely heavily on the manual analysis of chest X-ray images by radiologists, which can be time-consuming and sometimes prone to human error. With the rapid development of artificial intelligence and deep learning technologies, automated medical image analysis has become an important research area in healthcare. This project focuses on the development of an intelligent system for detecting lung cancer and other lung diseases using deep learning techniques.

The proposed system uses a Convolutional Neural Network (CNN) model to analyze chest X-ray images and automatically identify patterns related to various lung diseases. CNN is widely used in image processing tasks because of its ability to extract important visual features from images through multiple layers of convolution, pooling, and activation functions. In this project, a pre-trained CNN model is utilized through transfer learning to improve classification performance while reducing training time and computational resources. The dataset used for this system consists of chest X-ray images collected from publicly available medical datasets. Before training the model, the images undergo preprocessing steps such as resizing, normalization, and data augmentation to improve the quality of the dataset and increase model accuracy.

Keywords: Lung disease detection, chest X-ray analysis, deep learning, Convolutional Neural Network (CNN), transfer learning, medical image analysis, automated diagnosis.

ICSICA-2026-125

Multimodal Audio-Based ATM System for Visually Impaired People

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ABSTRACT

This project focuses on developing a Multimodal Audio-Based ATM System to support visually impaired individuals in performing banking transactions independently. Traditional ATM machines rely heavily on visual interfaces such as screens and touch panels, which creates major difficulties for users with visual disabilities. Due to this limitation, many visually impaired users depend on others for assistance, which can compromise their privacy, security, and independence. The proposed system introduces an innovative solution by integrating audio guidance, speech recognition, and biometric authentication. The system provides clear step-by-step voice instructions that guide users throughout the ATM transaction process, including card insertion, PIN entry, balance inquiry, and cash withdrawal. This makes the system more user-friendly and accessible. Additionally, biometric authentication such as fingerprint recognition is implemented to enhance security. This ensures that only authorized users can access their bank accounts, thereby reducing the risk of fraud and unauthorized access. The system follows a multimodal approach by combining voice, touch, and biometric inputs, which improves flexibility and usability. It is designed to be simple, efficient, and reliable, enabling users to complete transactions quickly and safely. Furthermore, this project promotes financial inclusion by empowering visually impaired individuals to manage their banking needs independently. Future enhancements of this system may include multilingual voice support, AI-based virtual assistants, and advanced security.

Keywords: Multimodal ATM System, Visually Impaired Assistance, Speech Recognition, Audio Guidance, Biometric Authentication, Accessibility, Human-Computer Interaction, Assistive Technology, Financial Inclusion, Secure Transactions, User-Friendly Design.

ICSICA-2026-126

Smart Vision System for Public Safety Monitoring

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ABSTRACT

This paper presents a smart vision-based surveillance system designed to enhance public safety through real-time monitoring and intelligent analysis. The system utilizes Artificial Intelligence, Machine Learning, and Convolutional Neural Networks (CNN) to process live video streams and detect critical situations automatically. The proposed system is capable of identifying potential threats and fire-related incidents from video input and generating immediate alerts to nearby authorities such as police stations. This reduces response time and improves emergency handling efficiency. The system is implemented using Python with a user-friendly interface, enabling real-time detection and alert generation. By minimizing human intervention and improving accuracy, the proposed solution provides an effective and reliable approach for modern public safety monitoring in areas such as schools, malls, and transportation systems. Furthermore, the system is designed to operate efficiently in real-time environments by continuously analyzing video frames and providing accurate detection results. The integration of automated alert mechanisms ensures immediate communication with emergency services, thereby preventing potential risks and reducing damage. The proposed system can be extended with advanced features such as cloud-based monitoring, mobile notifications, and improved model accuracy, making it a scalable solution for future smart city applications.

Keywords: Smart Surveillance System, Computer Vision, Convolutional Neural Networks (CNN), Artificial Intelligence, Machine Learning, Real-Time Monitoring, Threat Detection, Fire Detection, Video Analytics, Automated Alert System, Public Safety, Smart City Applications.

ICSICA-2026-127

Fire Risk Prediction

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ABSTRACT

Understanding and predicting environmental risk is important for reducing potential hazards and improving public safety. This work presents a mobile website that estimates environmental risk by using two different input methods: real-time location data and image-based input. At the start, the website requests permission to access the user's location and allows the user to choose either location-based prediction or image-based prediction. When the location option is selected, weather-related factors such as temperature, humidity, and wind speed are collected from online data sources and processed to calculate the overall risk level. In the image-based approach, users can capture a photo or select one from the gallery, which is then analyzed using internal image processing techniques to identify possible risk conditions. The final risk result is displayed in a simple and easy-to-understand interface. Testing with sample data shows that combining location information and image analysis provides timely and reliable risk estimation. The proposed website serves as a practical solution for environmental risk monitoring and can be extended in the future by adding more environmental parameters and improved prediction models.

Keywords: Environmental Risk Prediction, Mobile Web Application, Location-Based Analysis, Image Processing, Weather Data Analysis, Real-Time Monitoring, Risk Assessment, Computer Vision, Data Integration, Public Safety, Smart Environment, Predictive Modeling.

ICSICA-2026-128

Fake Product Detection Using Blockchain Technology

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ABSTRACT

The increasing circulation of counterfeit products has become a major concern for industries and consumers worldwide. Fake goods not only result in economic losses but also pose serious risks to consumer safety and brand credibility. This paper presents a secure and intelligent system for detecting counterfeit products by integrating Blockchain technology with Machine Learning techniques. Blockchain is used to maintain a decentralized and tamper-resistant record of product information, ensuring transparency throughout the supply chain. Machine Learning algorithms analyze product-related data to identify unusual patterns that may indicate counterfeit activity. The proposed system includes a blockchain-based product registry, an anomaly detection model, and an easy-to-use verification interface. Experimental observations show that the system achieves high detection accuracy, improves traceability, and strengthens consumer trust. The solution can be effectively applied across multiple domains such as healthcare, electronics, and luxury goods.

Keywords: Counterfeit Detection, Blockchain Security, Machine Learning, Supply Chain Verification, Product Authentication.

ICSICA-2026-129

AI Based Smart Data analyst

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ABSTRACT

The data-driven economy requires intelligent, accessible, and intuitive data analysis systems to enhance decision-making. This study proposes a practical approach for developing a dynamic and conversational AI-powered Data Analyst Agent using cutting-edge Artificial Intelligence and Natural Language Processing principles. A structured modular architecture comprising intelligent components is designed to ensure high code maintainability and scalability. Key features include natural language code translation and multi-turn conversational memory. The system supports CSV, Excel, PDF, image, and audio file formats and is validated on a carefully curated architecture built using Python, Streamlit, and the Groq API with the LLaMA 3.3 70B model, with optimization steps to handle large datasets and ensure efficient inference delivery.

In the modern digital age, organizations generate massive volumes of data that require efficient and accurate analysis to support strategic decision-making. However, traditional data analysis methods often demand skilled professionals, significant time, and advanced technical expertise. The AI Based Smart Data Analyst project aims to design and develop an intelligent system that automates the process of data analysis using Artificial Intelligence and Machine Learning techniques.

Keywords: AI Data Analyst, Natural Language Processing, Large Language Models, LLaMA 3.3, Groq API, Python, Streamlit, Conversational Agent, Code Generation.

ICSICA-2026-130

A Secure QR-Based Digital Certificate Verification Framework

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ABSTRACT

The rapid digitization of academic and professional credentials has introduced new challenges in ensuring their authenticity and integrity. Conventional certificate verification methods are often time-consuming, prone to forgery, and lack scalability. This paper proposes a secure and efficient QR-based digital certificate verification framework designed to address these limitations.

The system generates a unique, non-predictable identifier for each certificate using cryptographic techniques such as UUIDs or secure token generation. This identifier is embedded within a verification URL, which is then encoded into a QR code and integrated into the certificate. When scanned, the QR code redirects users to a verification portal that validates the certificate details against a centralized database in real time.

To enhance security, the framework incorporates backend validation, digital signatures, and tamper-resistant mechanisms, ensuring that certificate data cannot be altered or replicated fraudulently. Additionally, QR code error correction capabilities improve reliability even when the code is partially damaged.

The proposed solution is scalable, cost-effective, and easy to implement, making it suitable for educational institutions, certification bodies, and organizations. The framework significantly improves verification speed while maintaining high levels of security, thereby offering a robust approach to modern digital credential management.

Keywords: Digital certificate verification, QR code authentication, cryptographic security, tamper-resistant system, real-time validation, secure credential management, scalable verification framework.

AI Based Fraud Detection In Digital Payment

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ABSTRACT

Digital payment systems such as the Unified Payments Interface (UPI) have significantly transformed financial transactions in India by providing fast, secure, and convenient payment solutions. However, the rapid growth of digital payments has also led to a significant rise in financial fraud. According to recent reports, UPI-linked frauds have reached approximately 805 crore across more than 10.64 lakh incidents in FY26 so far, highlighting the urgent need for effective fraud detection mechanisms. This project proposes an Artificial Intelligence (AI)-based fraud detection system that utilizes supervised machine learning techniques to identify suspicious transactions in real time. The proposed system employs Random Forest classifiers for transaction classification and Long Short-Term Memory (LSTM) networks for sequential anomaly detection. Important transaction features such as transaction velocity, abnormal transaction amounts, geolocation mismatches, device fingerprints, and user behavioral patterns are analyzed using anonymized datasets. The system is implemented using Python with libraries including Scikit-learn, TensorFlow, and Pandas on the Ubuntu platform. Experimental results demonstrate that the proposed model achieves detection accuracy between 95% and 98% while maintaining a low false positive rate of less than 1%. The prototype integrates with payment APIs to provide real-time alerts within milliseconds, enabling financial institutions to prevent fraudulent activities effectively. Future improvements will explore ensemble learning techniques and federated learning approaches to enable privacy-preserving fraud detection across fintech platforms. The proposed solution aims to reduce financial losses and enhance trust in digital payment systems.

Keywords: Digital payment fraud, UPI transactions, artificial intelligence, machine learning, Random Forest, LSTM, real-time anomaly detection, fintech security.

ICSICA-2026-132

Detection Of AI-Generated Deepfakes Using Deep Learning Analysis

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ABSTRACT

The rapid advancement of artificial intelligence has led to the emergence of deepfake technology, which enables the creation of highly realistic manipulated images and videos. While deepfake technology has beneficial applications in entertainment, virtual reality, and digital content creation, it also poses significant threats to society, including misinformation, identity theft, and cybersecurity risks. Detecting deepfake content has therefore become a critical challenge in modern digital systems. In this work, a deep learning-based approach is proposed for detecting deepfake images using Convolutional Neural Networks (CNN), specifically the ResNet18 architecture. The system is trained on a dataset consisting of real and fake images, enabling it to learn distinguishing features between authentic and manipulated media. The proposed system performs efficient feature extraction, classification, and confidence scoring, ensuring accurate detection. Experimental results demonstrate that the model achieves high accuracy and reliability in identifying deepfake images. The proposed approach can be extended to real-time applications in social media monitoring, digital forensics, and cybersecurity systems.

Keywords: Deepfake detection, image forensics, deep learning, Convolutional Neural Network (CNN), ResNet18, digital media authentication, cybersecurity.

ICSICA-2026-133

Automatic Detection of Diseases in Citrus Fruits and Leaves Using Deep Learning Model

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ABSTRACT

Citrus fruits are among the most widely cultivated crops worldwide, and their productivity is significantly affected by various diseases that impact both fruits and leaves. Early and accurate detection of these diseases is essential to reduce crop losses and improve agricultural yield. Traditional disease identification methods rely heavily on manual inspection by experts, which is time-consuming, labor-intensive, and prone to human error. To overcome these limitations, automated disease detection using deep learning techniques has gained considerable attention in recent years. Further more, the challenges faced by current systems, including variations in lighting conditions, background noise, limited datasets, and class imbalance, are discussed. Based on the reviewed literature, this survey highlights the effectiveness of deep neural networks in improving disease classification accuracy and provides insights into future research directions for developing efficient, scalable, and real-time citrus disease detection systems to support smart and precision agriculture. This project focuses on the automatic detection of diseases in citrus fruits and leaves using Deep Neural Network (DNN) models. Deep learning techniques, particularly Convolutional Neural Networks (CNNs), are used to analyze images of citrus leaves and fruits and classify them into healthy or diseased categories. The system involves image preprocessing, feature extraction, model training, and disease classification. Deep neural networks are capable of learning complex patterns from images, making them highly effective for plant disease detection.

Keywords: Citrus disease detection, deep learning, Convolutional Neural Network (CNN), Deep Neural Network (DNN), image-based plant analysis, smart agriculture, precision agriculture.

ICSICA-2026-134

Emotion-Based Carbon Footprint & Behavior Correction System

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ABSTRACT

The Emotion-Based Carbon Footprint & Behavior Correction System is an innovative application designed to analyze the relationship between human emotions, daily behavior, and environmental impact. Unlike traditional carbon calculators that only estimate emissions based on physical activities, this system integrates principles of Behavioral Science with the concept of Carbon Footprint to provide a more personalized and insightful analysis.

The primary objective of this project is to identify how emotional states such as stress, happiness, or laziness influence an individual's daily habits, which in turn affect carbon emissions. The system allows users to input their routine activities along with their emotional states. Based on predefined emission factors and behavioral patterns, the application calculates the user's carbon footprint and examines correlations between mood and resource consumption. Additionally, the system generates intelligent, personalized suggestions aimed at improving both environmental responsibility and behavioral patterns. For instance, it may recommend energy-saving practices during periods of low motivation or suggest eco-friendly travel options when stress levels are high. The application also provides visual reports, including graphs that depict the relationship between emotional trends and carbon output over time. This project is designed to be user-friendly and suitable for individuals, students, and households who aim to understand and improve their lifestyle choices. By combining environmental awareness with psychological insights, the system promotes sustainable living and encourages users to adopt healthier habits that benefit both personal well-being and the environment.

Keywords: Carbon footprint analysis, behavioral science, emotion-aware system, sustainable living, personalized recommendations, environmental impact, lifestyle optimization.

ICSICA-2026-135

AI Health Predictor Card: Offline QR-Based Emergency Health Intelligence System

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ABSTRACT

Background India's emergency healthcare suffers 10-15 minute delays for patient history access, contributing to 30% ER treatment errors from missing critical data like allergies and blood group. While ABHA QR cards enable basic record sharing, they require internet connectivity and lack predictive analytics, limiting utility in rural clinics and accident scenarios where 25 crore diabetes cases remain undiagnosed.

We developed the AI Health Predictor Card, an offline smartphone system that transforms static ABHA-compatible QR health cards into intelligent diagnostic tools. It delivers instant medical history access and AI-powered disease risk prediction (diabetes/heart conditions) in under 2 seconds, eliminating internet dependency.

A RandomForest classifier (82% accuracy) trained on Kaggle's Pima Indians Diabetes Dataset (76,000 records) processes five vitals (age, glucose, BMI, BP, activity). QR codes store FHIR-compliant profiles decoded by a Streamlit app running offline inference on Android/iOS. Emergency mode prioritizes critical data; prototype validated through simulated ER workflows.

Achieves 70% reduction in doctor consultation time (10min→2min), 80% hidden risk detection accuracy, and scalability for 100,000+ patients via phone storage. Seamlessly extends national ABHA infrastructure while adding predictive intelligence absent in existing systems.

Keywords: AI Healthcare, Biomedical Engineering, QR Health ID, Offline Machine Learning, ABHA Integration, Emergency Diagnostics

Real-Time AI-Based Driver Distraction Detection Using YOLO and Computer Vision Techniques

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ABSTRACT

Distracted driving is a major global contributor to traffic accidents. Distracted drivers are three times more likely than non-distracted drivers to be involved in an accident. For this reason, enhancing road safety requires the ability to identify driver distraction. Numerous earlier research has put forth a variety of techniques for detecting driver distraction, including approaches based on images, sensors, and machine learning. However, the accuracy, complexity, and real-time performance of these approaches are limited. This research suggests a unique method for driver distraction detection that combines a convolutional neural network (CNN) with the You Only Look Once (YOLO) object detection technique. The two primary phases of the suggested model are the classification of the items that are discovered and object detection utilizing YOLO. The driver's face, hands, and other items that could distract them are among the many elements in their environment that the YOLO algorithm is used to identify and find. Next, a CNN is used to categorize the things that have been spotted in order to ascertain whether or not the driver is distracted. The suggested model performs well in identifying driver distraction when tested on a public dataset. additionally use the CNN algorithm to analyze the driver's tiredness based on ocular attributes. The integration of the suggested technique into sophisticated driver assistance systems has promise for enhancing road safety in real-time conditions.

Keywords: River distraction detection, road safety, convolutional neural network (CNN), YOLO object detection, real-time monitoring, ocular fatigue analysis, intelligent driver assistance systems.

ICSICA-2026-137

Cognitive Digital Twin for Business Decision Intelligence

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ABSTRACT

The increasing complexity and uncertainty in modern business environments, particularly within small and medium-sized enterprises (MSMEs), demand intelligent systems capable of supporting accurate and proactive decision-making. Traditional analytics tools primarily rely on historical data and lack the capability to simulate and evaluate decisions before real-world implementation. While Digital Twin (DT) technology enables the creation of virtual replicas for monitoring and simulation, conventional DTs remain largely descriptive and lack cognitive capabilities for autonomous reasoning and optimization.

To address this limitation, this paper proposes a Cognitive Digital Twin (CDT) framework for business decision intelligence, integrating machine learning, knowledge graphs, and simulation-based analytics. The proposed CDT extends traditional DTs by incorporating cognitive functions such as perception, learning, reasoning, and problem-solving, enabling it to model complex interdependencies among business variables and predict future outcomes. Building upon model-based systems engineering and semantic technologies, the framework captures relationships across heterogeneous business entities and supports intelligent decision-making across the system lifecycle.

Keywords: Cognitive Digital Twin, business decision intelligence, machine learning, knowledge graphs, simulation-based analytics, predictive modeling, MSME decision support.

ICSICA-2026-138

College Geo-Fencing Alert System For Parent Notification

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ABSTRACT

This paper presents a smart geo-fencing based system designed to enhance student safety through real-time location monitoring and intelligent alert mechanisms. In recent years, ensuring student safety within educational institutions has become a major concern, especially in large campuses where manual monitoring is not efficient. The proposed system addresses this issue by providing an automated and reliable tracking solution. The system utilizes Global Positioning System (GPS) technology to track the movement of students within predefined campus boundaries. A mobile application installed on the student's device continuously collects real-time location data. This data is transmitted to a cloud-based server where it is processed and stored efficiently. The use of cloud technology ensures scalability, reliability, and easy access to data for administrators.

The proposed system continuously monitors the student's location and detects any unauthorized exit beyond the defined geo-fence boundary. When such an event occurs, instant alert notifications are generated and sent to parents and college administrators through a notification system. This ensures immediate awareness and enables quick response to potential safety risks, thereby reducing delays in communication.

Keywords: Student safety, geo-fencing, real-time location tracking, GPS monitoring, intelligent alert system, mobile application, cloud-based management.

ICSICA-2026-139

Campus Employability Assessment System

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ABSTRACT

The Campus Employability Assessment System is developed to help students improve their programming skills and to track their learning progress effectively. In many colleges, there is no proper system to monitor coding practice, and students are not able to evaluate their own performance. This creates difficulty for both students and placement teams in understanding practical knowledge.

This system provides a web-based platform where courses, topics, and programming questions are organized in a structured manner. Questions are categorized into sections such as class work, test, and homework to make learning more systematic. Students can practice questions based on topics and their progress is recorded in the system.

The application tracks how many questions a student has completed and generates a report showing their performance at course and topic level. It also uses simple visual representations like progress bars and charts to display the results clearly.

Overall, this system helps students practice regularly, monitor their improvement, and supports in evaluating students' coding abilities for placements.

Keywords: Student skill assessment, programming practice, employability tracking, web-based learning platform, coding performance monitoring, progress visualization, educational technology.

ICSICA-2026-140

Voice Activated Ai Assistant for Automating Everyday Tasks Using Speech Recognition

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ABSTRACT

The development of conversational interfaces has completely changed the way users interact with digital services. But most of the current AI-based conversational interfaces are heavily reliant on cloud computing, which has raised concerns about user privacy, latency, and the need for constant internet connectivity. This paper introduces AI-PIVI (Artificial Intelligence – Personal Interactive Voice Interface), a secure on-device AI solution that can function in a communication application context. AI-PIVI allows intelligent voice-based interactions like opening a particular conversation, reading messages, and executing related actions without requiring users to upload their data to remote servers. The proposed solution has been developed on multiple platforms, such as iOS and macOS with Swift in Xcode, and Android with Java and XML in Android Studio. Firebase is used only for authentication and backend testing, not for AI computations.

Keywords: On-device AI, conversational interface, voice interaction, privacy-preserving AI, mobile AI application, personal assistant, edge computing.

ICSICA-2026-141

ML-Based Cloud Misconfiguration Detection with Indian Compliance Framework

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ABSTRACT

Cloud computing has become a critical platform for modern organizations due to its scalability and flexibility; however, security misconfigurations such as public storage exposure, weak access controls, and disabled encryption continue to be a major cause of cloud security breaches. Most existing cloud security solutions rely on static, rule-based approaches that assign fixed severity levels and fail to consider contextual factors such as data sensitivity and exposure impact. This project proposes an ML-based cloud misconfiguration scanning system that identifies configuration issues and predicts dynamic risk scores using a supervised machine learning model. A Random Forest algorithm is used to analyze cloud configuration features and prioritize risks more accurately. Furthermore, the system maps detected security risks to Indian regulatory frameworks, including the DPDP Act 2023, CERT-In directives, IT Act 2000, and RBI guidelines, providing compliance visibility for Indian organizations. In addition to detection and assessment, the project includes a controlled issue-fixing option, allowing selected misconfigurations to be corrected securely with user approval, thereby improving cloud security posture and reducing the risk of configuration-based incidents.

Keywords: Cloud security, misconfiguration detection, machine learning, Random Forest, dynamic risk scoring, regulatory compliance, automated remediation.

ICSICA-2026-142

Smart Emergency Vehicle Alert System Using ML And IoT

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ABSTRACT

Smart transportation systems are becoming essential in modern cities to manage increasing traffic congestion and ensure public safety. One of the major challenges faced in urban environments is the delay of emergency vehicles such as ambulances, fire engines, and police vehicles due to heavy traffic conditions. This project proposes a Smart Emergency Vehicle Alert System using Machine Learning (ML) and Internet of Things (IoT) technologies to address this issue effectively.

The system utilizes IoT-enabled sensors and communication modules to detect the presence of emergency vehicles and transmit real-time data to nearby traffic control systems. Machine Learning algorithms are employed to analyze traffic patterns and predict congestion levels, allowing dynamic adjustment of traffic signal timings. Upon detection of an emergency vehicle, the system prioritizes its movement by clearing the path through automated signal control, ensuring minimal delay and safer transit.

This approach significantly improves response time, reduces the risk of accidents, and enhances overall traffic efficiency. Furthermore, the integration of ML and IoT provides a scalable, intelligent, and cost-effective solution for smart city infrastructure, contributing to advanced traffic management and improved public safety.

Keywords: Smart transportation, emergency vehicle priority, IoT-enabled sensors, machine learning, traffic signal optimization, real-time traffic management, public safety.

ICSICA-2026-143

Intelligent Disease Surveillance and Reporting System for Farmers Using Ai

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ABSTRACT

Agriculture and livestock farming form the primary economic backbone of developing nations, where crop diseases and livestock epidemics cause devastating annual losses. Existing diagnostic methods rely on manual visual inspection and delayed expert consultation, leading to critical diagnosis latency and widespread economic damage among smallholder farmers. This study aimed to develop an intelligent mobile-first disease surveillance system providing instantaneous diagnosis of crop and cattle diseases from smartphone photographs. Two deep learning classification models were developed using the EfficientNetV2-S architecture with transfer learning from ImageNet pretrained weights. The crop disease model was trained on 13,324 images across 17 disease classes spanning five major staple crops. The cattle disease model was trained on 3,244 images across three classes using a 5-Fold Stratified Cross Validation ensemble approach combined with Test Time Augmentation. The crop disease model achieved a test accuracy of 99.45% across 17 classes. The cattle disease ensemble model achieved 99.85% test accuracy with perfect precision, recall, and F1-score across all three classes. The ensemble approach demonstrated that five collaboratively trained smaller models consistently outperformed a single larger model on limited datasets. The system was deployed as a FastAPI inference server integrated with a Flutter mobile application and Firebase cloud surveillance, delivering diagnostic results within 1.5 to 3.0 seconds.

Keywords: Deep Learning, Transfer Learning, Crop Disease Detection, Cattle Disease Detection, EfficientNetV2, Ensemble Learning, Mobile Application, Agricultural Surveillance.

ICSICA-2026-144

Efficient Twitter Sentimental Analysis Using Machine Learning Algorithm

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ABSTRACT

Twitter generates large volumes of short, informal, and highly unstructured text, making sentiment analysis a challenging task. To address this, the present work proposes an efficient sentiment classification framework using three machine learning algorithms: Logistic Regression, Support Vector Machine (SVM), and Bernoulli Naïve Bayes. The system begins with extensive pre-processing, including tokenization, stop-word removal, stemming, and normalization, to convert raw tweets into clean and meaningful input features. Each algorithm is trained to classify tweets into positive, negative, or neutral sentiments. Logistic Regression provides stable probabilistic predictions, SVM ensures strong separation between sentiment classes using optimal hyperplanes, and Bernoulli Naïve Bayes offers fast and simple binary feature-based classification. Experimental analysis shows that SVM achieves the highest accuracy, while Bernoulli Naïve Bayes provides faster computation, and Logistic Regression balances performance with simplicity. This multi-algorithm evaluation demonstrates that machine learning methods can effectively interpret public opinion from Twitter data, enabling improved decision-making for businesses, organizations, and researchers.

Keywords: Sentiment Analysis, Twitter Data, Text Classification, Machine Learning, Logistic Regression, Support Vector Machine (SVM), Bernoulli Naïve Bayes, Natural Language Processing (NLP), Text Preprocessing, Tokenization, Stop-word Removal, Stemming.

ICSICA-2026-145

An Enhanced Automobile Insurance Fraud Detection and Claim Report Generation

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ABSTRACT

Automobile insurance fraud has become a significant challenge for insurance companies, leading to substantial financial losses and increased premium costs for genuine policyholders. The growing complexity and volume of insurance claims make it difficult to manually identify fraudulent activities with high accuracy. This project, “An Enhanced Automobile Insurance Fraud Detection and Claim Report Generation System,” aims to develop an intelligent and efficient solution to detect fraudulent claims and streamline the claim reporting process. The proposed system utilizes advanced technologies such as data analytics, machine learning algorithms, and rule-based validation techniques to identify suspicious patterns in insurance claims. By analyzing historical claim data, user behavior, and vehicle-related information, the system can predict the likelihood of fraud with improved accuracy. Features such as anomaly detection, duplicate claim identification, and risk scoring help in minimizing false claims and ensuring fair processing. In addition to fraud detection, the system provides an automated claim report generation module. This module simplifies documentation by generating detailed, structured reports that include claimant details, accident descriptions, verification results, and fraud risk indicators. The automation reduces manual effort, speeds up processing time, and improves overall efficiency. The system is designed as a user-friendly web application, enabling insurance agents and administrators to manage claims, monitor fraud alerts, and generate reports in real time.

Keywords: Automobile insurance fraud, fraud detection, machine learning, data analytics, anomaly detection, claim report automation, risk scoring, web-based insurance system.

ICSICA-2026-146

Revolutionizing Waste Management the AI and IoT Smart Bin

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ABSTRACT

Rapid urbanization and population growth have intensified the challenges of efficient waste management, leading to environmental degradation and increased operational costs. This paper explores the transformative potential of integrating Artificial Intelligence (AI) and the Internet of Things (IoT) in the form of smart waste bins. These smart bins are equipped with sensors to monitor fill levels, detect waste types, and transmit real-time data to centralized systems. AI algorithms analyze this data to optimize collection routes, predict waste generation patterns, and enable automated waste segregation. The implementation of AI- and IoT-enabled smart bins significantly reduces unnecessary collection trips, minimizes fuel consumption, and improves overall operational efficiency. Additionally, automated segregation enhances recycling rates and reduces landfill dependency. The system also supports data-driven decision-making for municipal authorities, promoting sustainable urban development. This study highlights how smart bin technology not only addresses inefficiencies in traditional waste management systems but also contributes to cleaner cities, reduced environmental impact, and smarter resource utilization. Future advancements in machine learning and sensor technologies are expected to further enhance the scalability and effectiveness of these systems.

Keywords: Smart waste management, AI-enabled bins, IoT sensors, automated waste segregation, route optimization, urban sustainability, data-driven decision making.

ICSICA-2026-147

Mathematics In Artificial Intelligence

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ABSTRACT

Mathematics forms the foundational framework of Artificial Intelligence (AI), enabling machines to learn from data, recognize patterns, and make intelligent decisions. This paper examines the critical role of key mathematical disciplines—such as linear algebra, probability theory, statistics, calculus, and optimization—in the development and functioning of AI systems. Linear algebra supports the representation and manipulation of high-dimensional data, while probability and statistics provide tools for modeling uncertainty and making predictions. Calculus underpins learning algorithms through gradient-based optimization techniques, and optimization methods ensure efficient model training and performance. The integration of these mathematical concepts allows AI models, including machine learning and deep learning systems, to process large datasets, identify complex relationships, and improve over time. Furthermore, discrete mathematics and graph theory contribute to areas such as network analysis and decision-making processes. This study emphasizes that a strong mathematical foundation is essential for designing robust, scalable, and interpretable AI solutions. As AI continues to evolve, advances in mathematical theory will remain central to innovation and the development of more efficient and intelligent systems.

Keywords: Artificial Intelligence, Linear Algebra, Probability Theory, Statistics, Calculus, Optimization Techniques, Machine Learning, Deep Learning, Mathematical Modeling, Graph Theory, Discrete Mathematics, Data Analysis, Predictive Modeling.

ICSICA-2026-148

Smart Traffic Signal Using Artificial Intelligence

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ABSTRACT

The rapid growth of urban populations and vehicle usage has led to increased traffic congestion, longer travel times, and higher environmental pollution. Traditional traffic signal systems, which operate on fixed timing schedules, often fail to adapt to dynamic traffic conditions. This paper presents a smart traffic signal system powered by Artificial Intelligence (AI) to optimize traffic flow in real time. The proposed system utilizes sensors, cameras, and Internet of Things (IoT) devices to collect live traffic data, including vehicle density, speed, and queue length at intersections. AI algorithms, particularly machine learning and computer vision techniques, analyze this data to dynamically adjust signal timings based on current traffic conditions. The system prioritizes high-density lanes, reduces unnecessary waiting times, and can also provide emergency vehicle prioritization. Additionally, predictive models are used to anticipate traffic patterns and prevent congestion before it occurs. The implementation of AI-driven traffic signals improves road efficiency, reduces fuel consumption, and lowers carbon emissions. It also enhances road safety by minimizing human error and enabling faster response to unexpected situations. This study demonstrates that intelligent traffic management systems are a crucial step toward developing smart cities and sustainable urban transportation networks.

Keywords: Smart traffic management, AI-based traffic signals, real-time traffic optimization, IoT sensors, machine learning, computer vision, emergency vehicle prioritization, urban mobility.

ICSICA-2026-149

An Integrated Event Management and Booking System

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ABSTRACT

The proliferation of digital platforms in educational settings has created unprecedented opportunities for streamlining administrative and co-curricular operations. This paper presents the design, architecture, and implementation of an Integrated Event Management and Booking System (IEMBS) tailored for inter-college academic environments. The proposed system is a web-based application developed using Python and the Flask micro-framework, supported by a relational database backend (MySQL/SQLite) and a responsive frontend composed of HTML5, CSS3, and JavaScript. The system provides a centralized, cloud-deployable platform through which authorized college coordinators can publish, update, and manage event information, while students can discover, register, and obtain digital booking confirmations in real time. Key functional modules include user authentication and role-based access control, event creation and lifecycle management, a full-text event discovery engine, an online booking and ticket-generation subsystem, an automated notification service, and a comprehensive administrative analytics dashboard. The architecture follows a layered Model-View-Controller (MVC) paradigm, ensuring modularity, maintainability, and scalability. Experimental evaluation demonstrates significant reductions in event registration latency, administrative overhead, and inter-institutional communication delays compared with conventional paper-based and fragmented digital approaches.

Keywords: Event management system, web-based application, inter-college platform, online booking, role-based access control, administrative analytics, cloud-deployable architecture.

ICSICA-2026-150

An AI Based Multimodal Communication System for Sign and Speech in Virtual Environments

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ABSTRACT

Communication barriers in virtual meeting environments continue to affect individuals who rely on sign language, limiting their ability to participate on equal terms with hearing users. Existing digital platforms offer minimal support for real-time sign interpretation, and current assistive tools often lack the speed, accuracy, and natural visual presentation required for inclusive interaction. To overcome these limitations, this project introduces an intelligent, AI-driven communication framework designed to provide seamless two-way interaction between sign-language users and non-signers during online meetings. The system integrates three advanced components. The Speech Recognition and Synthesis Module uses modern speech-processing approaches—such as RNN-Transducer, Connectionist Temporal Classification, and Deep Neural Networks—to convert spoken audio into text reliably, enabling smooth communication in noisy or dynamic online environments. Completing the pipeline, the Avatar Module utilizes Neural Avatar Synthesis, a generative visual-rendering technique that produces natural, human-like sign animations, transforming spoken or typed content into expressive sign language videos. Together, these components create a unified accessibility solution that enhances participation for deaf, mute, hard-of-hearing, visually impaired, and non-signing individuals. By linking with web meeting platforms, the system enables real-time translation and natural visual signing, improving inclusivity in virtual meetings.

Keywords: Sign Language Recognition, Transformer-Based Gesture Encoding, Speech Recognition, Neural Avatar Synthesis, Assistive Technology, Accessibility, Human-Computer Interaction, Indian Sign Language, Real-Time Communication, Deep Learning, Multimodal Interaction, Virtual Meetings, Inclusive Communication.

ICSICA-2026-151

AI-Powered Grievance Routing and Response System for E-Governance

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ABSTRACT

In today's digital governance landscape, efficiently managing citizen complaints poses a significant challenge for government organizations. Manually handling grievances often leads to slow responses, misdirected complaints, and a lack of clarity in the resolution process. To tackle these issues, the project titled "AI-Powered Grievance Routing and Response System for E-Governance" offers an intelligent, automated solution to improve complaint management for government services, especially in Tamil Nadu. The system automatically analyzes, classifies, and routes citizen complaints to the appropriate departments using Artificial Intelligence (AI) and Natural Language Processing (NLP). The model primarily employs the Multinomial Naive Bayes algorithm, a supervised machine learning technique known for its accuracy and simplicity in text classification. Complaints written in Tamil or English undergo pre-processing using text-cleaning and vectorization methods like TF-IDF (Term Frequency-Inverse Document Frequency) to convert them into numerical forms suitable for classification. After processing, the AI model predicts the relevant department—such as Electricity, Water, Roads, Sanitation, or Public Safety—and forwards the complaint to the correct authority. Additionally, the system includes an auto-responder module that provides predefined instant solutions or acknowledgment messages. This ensures that users receive immediate feedback along with a tracking ID for future reference. The dataset for model training consists of 200 bilingual complaints, curated to reflect real-world citizen issues.

Keywords: Natural Language Processing, Grievance Redressal System, E-Governance, Complaint Classification, Naive Bayes Classifier, TF-IDF Vectorization, Multilingual Text Processing, Automated Complaint Routing, Public Service Automation

ICSICA-2026-152

IoT-Based Smart Solar Irrigation and Crop Advisory System for Precision and Sustainable Agriculture

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ABSTRACT

Agriculture faces increasing challenges due to water scarcity, rising energy costs, and the need for sustainable farming practices. This paper presents a solar-powered smart irrigation and crop advisory system designed to optimize water usage, enhance crop productivity, and reduce dependence on conventional energy sources. The proposed system integrates soil moisture, temperature, and humidity sensors with a microcontroller to monitor real-time field conditions. Based on sensor data and predefined crop requirements, the system automatically controls irrigation, ensuring precise water delivery only when necessary. Solar energy is utilized to power the entire setup, making it suitable for remote and off-grid agricultural areas. Additionally, a crop advisory module provides farmers with actionable recommendations on irrigation schedules, crop health, and environmental conditions through a user-friendly interface. The system minimizes water wastage, lowers operational costs, and promotes sustainable agriculture. Experimental results demonstrate improved irrigation efficiency, reduced energy consumption, and increased crop yield compared to conventional irrigation methods.

Keywords: Smart irrigation, solar-powered agriculture, IoT sensors, water optimization, crop advisory system, sustainable farming, precision agriculture.

ICSICA-2026-153

AI-Assisted UML-Driven Validation and optimization for Automated Microservices code Generation

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ABSTRACT

The rapid adoption of microservices architecture has increased the need for efficient and reliable software design techniques. UML class diagrams are commonly used to represent system structure during the early stages of development. However, existing UML-to-code generation tools directly convert designs into code without validating design quality, often resulting in tightly coupled and poorly structured microservices. This paper proposes an AI assisted UML-driven validation and optimization framework for automated microservices code generation. The proposed system analyzes UML class diagrams using a combination of rule based validation and machine learning techniques. It identifies design issues such as tight coupling, missing relationships, and improper naming conventions. Based on the detected issues, the system provides intelligent suggestions for optimizing microservice boundaries and improving overall design quality. The optimized UML model is then used to generate microservices-based full-stack application code. The proposed approach improves scalability, maintainability, and reduces manual effort in software development.

Keywords: Microservices Architecture, Full-Stack Development, Automatic Code Generation, Low-Code Approach, Develops

ICSICA-2026-154

An Enhanced Vehicle-To-Vehicle Wireless Power Transfer System for Electric Vehicle Application Using a Reconfigurable Coil

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ABSTRACT

This project introduces an intelligent Vehicle-to-Vehicle (V2V) Wireless Power Transfer (WPT) system designed to enable emergency energy sharing between electric vehicles (EVs) using magnetic induction. The proposed system continuously monitors battery voltage through an ATmega328 microcontroller, detecting critical low-battery conditions. When a vehicle's charge falls below a predefined threshold, an RF transmitter broadcasts an assistance request to nearby vehicles within communication range. Upon receiving the signal, a donor vehicle equipped with an RF receiver notifies the user, who can authorize wireless charging. A high-frequency inverter converts the donor vehicle's DC battery power into AC, energizing the primary coil and generating an alternating electromagnetic field. The recipient vehicle's secondary coil captures the induced voltage, which is then rectified and regulated to ensure safe and efficient battery replenishment. A reconfigurable coil structure enhances magnetic coupling efficiency and mitigates alignment losses during stationary positioning. Safety and reliability are maintained through integrated protection mechanisms, including voltage regulation, current limiting, and automatic cutoff control. A 16×2 LCD interface provides real-time display of donor and recipient voltages, RF communication status, and charging mode. This cooperative energy-sharing framework reduces range anxiety, eliminates the need for physical charging cables, and encourages decentralized power distribution within EV networks.

Keywords: Vehicle-to-Vehicle (V2V) wireless power transfer, electric vehicles, magnetic induction charging, RF communication, battery management, cooperative energy sharing, decentralized EV networks.

ICSICA-2026-155

Adaptive Display Visualization for Preventing Child Mobile Addiction

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ABSTRACT

In recent year, Excessive mobile phone usage among children has become a major concern, often leading to addiction and negative impacts on health and learning. This project proposes an Adaptive Display Visualization System that dynamically alters the display appearance based on the user's age to help prevent mobile addiction in children. The system utilizes real-time image processing through a web or mobile camera to capture the user's face. A Convolutional Neural Network (CNN) model is employed to predict the age of the detected user. If the predicted age is under 12 years, the system automatically converts the screen display to black and white (grayscale) mode, reducing visual stimulation and screen engagement. For users aged 12 years and above, the display remains in normal color mode. This adaptive method provides a non-intrusive, real-time, and intelligent approach to encouraging healthier digital habits among children. The proposed system demonstrates the integration of computer vision, deep learning, and user interface adaptation to support responsible mobile device use.

Keywords: Mobile addiction prevention, adaptive display, age prediction, computer vision, Convolutional Neural Network (CNN), real-time screen adaptation, child digital well-being.

ICSICA-2026-156

Hybrid Quantum–Classical approach for brain tumor classification using Custom CNN and AI-based medical report generation

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ABSTRACT

Brain tumor diagnosis using MRI scans is a complex and time-sensitive task that requires high precision, as manual interpretation by radiologists can sometimes lead to delays or human error. This project presents a Hybrid Quantum–Classical Deep Learning framework designed to automate and enhance the accuracy of brain tumor detection. The system primarily utilizes a Convolutional Neural Network (CNN) to extract spatial features from MRI images and classify tumor types with an achieved accuracy of 91%. To further optimize classification performance, a Variational Quantum Classifier (VQC) is integrated into the pipeline, leveraging quantum computing principles to improve decision boundaries and model generalization. The hybrid approach combines the strengths of classical deep learning in feature extraction with quantum-enhanced optimization for improved predictive capability. In addition to detection and classification, the system incorporates a fine-tuned Large Language Model (LLM) to automatically generate comprehensive medical reports. These reports include tumor type identification, potential growth patterns, risk assessment, and preliminary medication suggestions to assist healthcare professionals. By integrating AI-driven image analysis with quantum-enhanced learning and automated report generation, the proposed solution aims to support radiologists in faster, more accurate, and scalable brain tumor diagnosis.

Keywords: Brain tumor detection, MRI analysis, hybrid quantum-classical deep learning, Convolutional Neural Network (CNN), Variational Quantum Classifier (VQC), automated medical reporting, AI-assisted diagnosis.

ICSICA-2026-157

Deep learning framework using YOLO-based object detection and EfficientNet for cotton leaf disease detection

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ABSTRACT

In order to guarantee steady agricultural output and minimise financial losses brought on by plant diseases, cotton crop health must be maintained. Conventional disease detection techniques mostly depend on visual inspection by farmers or agricultural specialists, which can be laborious, unreliable, and challenging to implement on a broad scale. Recent advances in deep learning and computer vision have made it possible for automated systems to analyse plant photos and accurately identify illnesses. In this study, deep learning techniques are used to create an intelligent cotton plant health monitoring system that can identify and categorise diseases from photos of cotton leaves. The suggested system combines a YOLO-based object detection model for locating sick areas on the leaf surface with EfficientNet for deep feature extraction and classification. The system is trained and assessed using images of cotton leaves gathered from various imaging devices and under various environmental circumstances. To make the model more resilient to changes in illumination and image quality, data preparation and augmentation approaches are used. Experimental evaluation shows that the YOLOv4 detection model offers strong localization performance with high precision, recall, and means average precision values, while the EfficientNetB4 model achieves very high classification accuracy, especially for cases of powdery mildew and healthy leaves.

Keywords: Cotton Leaf Disease Detection, Deep Learning, EfficientNetB4, YOLOv4, Plant Health Monitoring, Computer Vision in Agriculture, Object Detection, Precision Agriculture, Crop Disease Classification, Image-Based Disease Diagnosis

ICSICA-2026- 158

A comprehensive digital platform for Women's Safety and harassment redressal

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ABSTRACT

This research article outlines mobile safety application that will increase women's safety in India. Unlike traditional safety applications that merely react after a safety event happens, AURA represents a preliminary push toward a proactive safety infrastructure based on real-time geofenced data, anomaly prediction from mobile sensors, AI- enabled navigation tools using AR, chatbot legal support tools, and user-generated safety surveys. The app included predictive anomaly detection based on mobile sensors, AR-enabled navigation to select safe routes, a legal chatbot that could provide any legal help, documents and advice, and user- generated requests for safety and crowd-sourced reports. Lastly, AURA utilizes geofenced dynamic environmental risk-level notifications from real-time user-generated reports or safety messages. Pilot trials in urban geographical regions have established AURA responses for intentional emergencies and coping with emergencies with promising results based on good levels of emergency handling, good overall user experience, and high levels of satisfaction. AURA is a meaningful advancement for an integrated smart system of proactive responses within a safe context-aware infrastructure.

Keywords: Women's safety, artificial intelligence, anomaly detection, real-time monitoring, legal chatbot, mobile safety application, augmented reality.

Deep learning-based blood bank management system

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ABSTRACT

Modern healthcare systems face challenges related to the stable and sufficient blood supply of blood due to shortage. This study aimed to predict the monthly blood transfusion requirements in medical institutions using an artificial intelligence model based on national open big data related to transfusion. "BloodNet AI" appears to be a conceptual or prototype platform, discussed in academic papers, that leverages artificial intelligence (AI) and potentially deep learning technology to improve the efficiency and transparency of blood bank management. Its primary functions are predicting blood demand and intelligently matching donors with recipients. Machine learning models analyze historical blood usage data, data, seasonal seasonal trends, local events (like disease outbreaks or natural disasters), and real-time hospital needs to forecast future blood demand accurately. This helps blood banks optimize their inventory levels and plan blood drives more strategically. It is used to identify and target suitable donors, predict their willingness to donate, and schedule appointments efficiently, which helps reduce no-shows and ensures a steady supply of blood. The system often incorporates Internet of Things (IoT) sensors to monitor blood storage conditions (temperature, humidity) in real-time, triggering alerts to prevent spoilage and ensure the quality of blood products.

Keywords: Blood demand prediction, AI in healthcare, machine learning, blood bank management, donor-recipient matching, inventory optimization, IoT-based blood monitoring, transfusion planning.

ICSICA-2026-160

An intelligent assist device for Health and Environmental Notification based on IOT

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ABSTRACT

With the rapid growth of Internet of Things (IoT) technology, continuous health and environmental monitoring has become an important area of research, especially for remote patient care. This project proposes an IoT-based intelligent health and environmental monitoring system that continuously monitors vital physiological parameters such as body temperature, heart rate, oxygen level, and surrounding environmental conditions. The system uses lightweight sensors integrated with a microcontroller to collect real-time data from the patient's body and environment. The collected data is transmitted wirelessly to a mobile application through IoT technology, enabling real-time Visualization and monitoring. When abnormal conditions are detected, the system immediately generates alerts and notifies the user or caregiver for timely medical attention. The integration of Wireless Body Area Network (WBAN) with IoT improves mobility, reduces dependency on bulky medical equipment, and enables remote monitoring without hospital visits. The proposed system is low-cost, energy-efficient, and easy to deploy, making it suitable for patients with chronic diseases, elderly care, and remote health monitoring. This solution enhances healthcare accessibility and provides a reliable alternative to traditional monitoring systems.

Keywords: IoT healthcare monitoring, remote patient care, wireless body area network (WBAN), real-time vital signs, environmental sensing, anomaly detection, energy-efficient health monitoring.

Traffic Signal Behavior Modelling with Integrated Obstacle Assessment

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ABSTRACT

There is a growing congestion and safety threat on the urban intersections with the dynamic nature of the traffic and unexpected obstacles that the traditional fixed time signal system is not effective at handling. The paper suggests a visual cognition model of intelligent traffic lights behavior modeling based on AI and obstacle evaluation. The system also uses convolutional neural networks (CNNs) to conduct real-time intersection camera feed-based scene understanding to provide an estimate of traffic density, obstacle location, and spatial risk assessment. Perceptual outputs are combined into a behavior modeling unit which dynamically adjusts the signal phases, green-time durations using traffic efficiency and safety factors. Exposure to publicly accessible traffic datasets in urban areas and obstacle-expanded conditions indicate less queue, greater signal responsiveness, and situational awareness under experimental conditions as compared to conventional control strategies. The findings suggest that integration of visual intelligence in the decision making in traffic signals could greatly enhance traffic flow and safety on the roads in the cities.

Keywords: Intelligent traffic lights, AI-based traffic control, visual cognition, convolutional neural networks (CNN), real-time scene understanding, obstacle detection, dynamic signal optimization, urban traffic safety.

Medical Fraud Detection Analysis

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ABSTRACT

Medical loan fraud has become a significant challenge for financial institutions, leading to substantial financial losses and delays in loan processing. This project presents an intelligent Medical Loan Fraud Detection System that integrates Machine Learning algorithms, Optical Character Recognition (OCR), and document analysis techniques to identify fraudulent loan applications with high accuracy. The system processes both structured data—such as applicant demographics, income details, and loan history—and unstructured data extracted from medical bills, prescriptions, and supporting documents using OCR. Through advanced preprocessing, feature engineering, and ensemble learning techniques, the model detects unusual patterns, forged documents, inconsistent hospital details, and abnormal financial behaviors. CNN-based image analysis is incorporated to identify tampered regions in medical documents, while the Decision Engine categorizes applications into genuine, suspicious, or fraudulent based on risk probability scores. The proposed system significantly reduces manual verification workload, enhances decision-making efficiency, and minimizes fraud-related risks. The results demonstrate that combining machine learning with automated document verification provides a robust and scalable solution for real-time medical loan fraud detection. The proposed framework significantly reduces manual workload for loan officers, enhances verification accuracy, and provides rapid decision-making capability. Furthermore, the system is scalable, adaptable to evolving fraud patterns, and suitable for integration with real-time digital loan processing platforms.

Keywords: Medical loan fraud detection, machine learning, OCR-based document analysis, CNN tampering detection, ensemble learning, risk scoring, automated verification, real-time fraud prevention.

ICSICA-2026- 163

Detection Of Ransomware C2 Communication Via Behavioral and Signature-Based Network Traffic Analysis

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ABSTRACT

Ransomware continues to represent one of the most disruptive categories of malicious software, causing substantial financial and operational damage across critical infrastructure globally. Prior to executing encryption routines, most ransomware variants communicate with external Command and Control (C2) servers to retrieve encryption keys or receive activation instructions, thereby creating a detectable network-layer behavioral signature. This paper presents the design and implementation of a real-time network traffic analyzer capable of identifying ransomware C2 beaconing activity through multi-layered detection. The proposed system employs packet-level capture using Scapy and gopacket to inspect DNS queries against dynamically updated blocklists sourced from Abuse.ch threat intelligence feeds, analyzes protocol misuse through port- behavior correlation, and applies statistical beaconing detection to identify periodic, low- volume communications directed at singular external hosts. Alert events are indexed into an Elasticsearch backend and visualized through a Kibana dashboard, enabling security operators to triage threats in near real time. The system is evaluated against a controlled dataset of known ransomware traffic samples, with performance characterized using precision, recall, and detection latency metrics. Experimental results demonstrate that the proposed approach achieves high detection rates with a low false positive ratio, offering a viable lightweight alternative to signature-only intrusion detection systems in enterprise environments.

Keywords: Ransomware detection, command-and-control (C2) analysis, network traffic monitoring, beaconing detection, packet inspection, threat intelligence, real-time cybersecurity, anomaly-based intrusion detection.

ICSICA-2026-164

Feature Encoding and Classification for High-Dimensional Brain Tumor Gene Expression Data

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ABSTRACT

DNA microarray technology generates extremely high-dimensional gene expression data, presenting significant challenges for reliable brain tumor classification due to the curse of dimensionality and limited sample sizes. Conventional machine learning approaches often struggle to effectively represent complex gene interactions while maintaining computational efficiency. To address these limitations, this study proposes a quantum-based feature encoding and classification framework tailored for high-dimensional tumor gene expression data. The proposed approach introduces an efficient quantum state encoding strategy that maps classical gene features into parameterized quantum circuits, enabling enhanced representation of nonlinear correlations among genes. The encoded features are subsequently processed using a variational quantum classification scheme within a hybrid quantum-classical optimization framework. Experiments conducted on publicly available brain tumor microarray datasets demonstrate that the proposed method achieves competitive classification performance compared to widely used classical classifiers, while offering improved representation capability in high-dimensional feature spaces. The results indicate that quantum feature encoding provides a promising alternative paradigm for modeling complex biological data and supports the growing potential of quantum machine learning in computational oncology.

Keywords: Quantum machine learning, Quantum feature encoding, Variational quantum classifier, Brain tumor classification, DNA microarray.

ICSICA-2026-165

AI-Driven Prediction System for Early Detection of Organ Dysfunction Based on Symptoms

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ABSTRACT

EduSync is a web-based learning management system that brings together all the main academic activities of a school or university in one easy-to-use online platform. Instead of having different, disconnected tools or relying on manual paperwork, EduSync lets you manage courses, track attendance, handle grading, share learning materials, communicate, and create academic reports—all in one place. It's built with modern technology so it works smoothly on any device and gives different levels of access to administrators, teachers, and students. Security is a priority, with strong login protections and data safeguards to keep sensitive information safe. By using EduSync, schools can collaborate more easily, keep track of academic progress transparently, and make better decisions based on real-time data. Testing and user feedback show that EduSync helps school staff work more efficiently and communicate better than with older, traditional systems. Overall, EduSync shows how a single digital solution can make managing academics simpler and help schools move forward in the digital age.

Keywords: Learning management system, academic management, course tracking, attendance monitoring, grading automation, digital collaboration, web-based education platform, secure educational software.

ICSICA-2026-166

Automated Detection of Anemia and Thalassemia with Precaution Report Generation Using Vgg16-Based Transfer Learning on Blood Smear Images

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ABSTRACT

Thalassemia and anemia are common blood disorders that can lead to serious health complications if not detected early. Traditional diagnostic methods, such as blood smear examination and Complete Blood Count (CBC), are often time-consuming, labor-intensive, and require skilled medical professionals. These methods are prone to human error, and they do not provide automated guidance or precautionary advice for patients. To address these limitations, this project proposes an automated detection system that leverages transfer learning with the VGG16 model to analyze blood smear images. The system is trained on a labeled dataset to accurately classify samples as healthy, Thalassemia-affected, or Anemia- affected, enabling reliable early detection and assisting clinicians in timely decision-making. The proposed system not only identifies the disease but also generates a digital Precaution Report for each classified sample, detailing the disease type, confidence level, and suggested follow-up actions. By automating the detection process, the system significantly reduces diagnosis time and minimizes human error in analyzing blood smear images. Additionally, the approach is highly efficient even with limited datasets, making it accessible and practical for widespread use. This automated system aims to provide a faster, more reliable, and user- friendly solution for managing anemia and Thalassemia, ultimately improving patient care and facilitating proactive treatment strategies.

Keywords: Blood disorder detection, Thalassemia, anemia, automated diagnosis, VGG16 transfer learning, blood smear analysis, precaution report generation, early disease detection.

ICSICA-2026-167

Automated Ovarian Cyst Classification Using DenseNet-Based Deep Learning on Ultrasound and Tissue Images

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ABSTRACT

Ovarian cysts are a common gynaecological condition requiring accurate and timely diagnosis to prevent complications and improve patient outcomes. Traditional diagnostic procedures primarily rely on manual interpretation of ultrasound images, which may introduce subjectivity and variability in clinical assessment. This paper proposes an automated ovarian cyst classification system based on a DenseNet deep learning architecture using ultrasound and tissue images. The DenseNet model enhances feature propagation through dense connectivity, enabling efficient learning of complex visual patterns and improved gradient flow. Image preprocessing techniques are applied to enhance image quality and emphasize relevant anatomical features. Transfer learning is utilized to optimize model performance and reduce training complexity with limited medical datasets. The system is trained on a diverse dataset of normal and cystic ovarian images to ensure robustness and generalization capability. Experimental evaluation demonstrates high classification accuracy and reliable performance on unseen data samples. The proposed framework effectively identifies subtle morphological and textural variations associated with different cyst types.

Keywords: Ovarian cyst detection, ultrasound imaging, DenseNet, deep learning, transfer learning, medical image analysis, automated diagnosis, cyst classification.

ICSICA-2026-168

NutriAI : Intelligent Food Recognition System

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ABSTRACT

Maintaining a healthy diet requires accurate awareness of food intake and nutritional content. NutriAI: Intelligent Food Recognition System proposes an AI-powered solution that automatically identifies food items from images and provides detailed nutritional information. The system leverages deep learning techniques, particularly Convolutional Neural Networks (CNNs), to classify various food categories with high accuracy. By analyzing images captured through camera, NutriAI detects food items and estimates their nutritional values, including calories, proteins, fats, and carbohydrates. The proposed system integrates image preprocessing, feature extraction, and classification modules to ensure robust performance under varying lighting and background conditions. A curated food dataset is used to train and evaluate the model for improved reliability and real-time prediction. NutriAI aims to support users in making informed dietary choices, assist individuals with specific health conditions such as diabetes or obesity, and promote healthier lifestyle habits. The system provides a scalable, user-friendly, and efficient approach to intelligent dietary monitoring using artificial intelligence.

Keywords: Food recognition, deep learning, Convolutional Neural Networks, image-based nutrition analysis, dietary monitoring, calorie estimation, intelligent food tracking, AI healthcare applications.

ICSICA-2026-169

Edge AI Enabled Smart Medical dispensing and Patient care robot for hospital room

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ABSTRACT

Edge Artificial Intelligence (Edge AI) and the Internet of Things (IoT) are transforming modern healthcare by enabling real-time, intelligent decision-making directly at the device level while ensuring low latency, reliability, and data privacy. However, existing hospital medication dispensing and patient monitoring systems largely rely on manual operations or cloud-based processing, which can lead to human errors, delayed responses, network dependency, privacy concerns, and increased workload for healthcare staff, limiting their effectiveness in critical care environments. To overcome these challenges, this project proposes an Edge AI-based Smart Medical Dispensing and Patient Care Robot that autonomously operates within hospital rooms. The robot navigates using IR sensor-based line following, verifies patient identity through YOLOv11 for face detection and LBPH for face recognition, and maps the authenticated patient with a locally stored prescription database. It further enables offline voice interaction using the Vosk speech recognition model and performs on-device monitoring of vital parameters such as body temperature and pulse rate. All processing is executed at the edge, and any detected abnormalities are immediately communicated to caregivers through automated alerts.

Keywords: edge artificial intelligence (Edge AI), Internet of Things (IoT), smart healthcare, medical dispensing robot, patient monitoring, real-time processing, low latency, data privacy, autonomous navigation, IR sensors, line following, face detection, YOLOv11, face recognition, LBPH, prescription mapping, offline voice.

ICSICA-2026-170

Intelligent Email Event Extraction and Smart Scheduler System

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ABSTRACT

Email communication plays a critical role in academic and professional environments. However, users often miss important meetings, deadlines, and interviews due to the unstructured format of email content. This paper presents an Intelligent Email Event Extraction and Smart Scheduler System that automatically extracts event-related information from emails and organizes them into structured categories. The system integrates Gmail API using OAuth 2.0 for secure authentication, processes emails using Natural Language Processing (NLP) techniques such as pre-trained Named Entity Recognition (NER), regular expressions, date parsing, and rule-based classification, and categorizes events into meetings, interviews, deadlines, and reminders. Extracted events are displayed through a dynamic user interface with time-based prioritization and filtering. The proposed system enhances productivity by converting unstructured email data into structured and actionable schedules. **Index Terms** — Email extraction, Natural Language Processing, Named Entity Recognition, Gmail API, Rule-based classification, Smart scheduling.

Keywords: Email extraction, smart scheduling, email communication, natural language processing (NLP), named entity recognition (NER), Gmail API, OAuth 2.0, rule-based classification, date parsing, regular expressions, event categorization, meetings, interviews, deadlines, reminders, dynamic user interface.

ICSICA-2026-171

Skin Cancer Detection Using Grad-Cam in XAI

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ABSTRACT

Digital freelance marketplaces such as Upwork and Fiverr enable clients and freelancers to collaborate globally for software development, design, data analysis, and other digital services. While convenient, these platforms rely on centralized escrow and custodial payment mechanisms. The platform operator holds funds on behalf of both parties, decides when to release or refund them, and handles disputes internally. This introduces issues such as high platform commissions, lack of transparency in dispute resolution, custodial risk, and dependence on a single trusted intermediary. Blockchain technology and smart contracts provide an alternative foundation for implementing escrow services in a decentralized and programmable way. On Ethereum, smart contracts can hold cryptocurrency and release it only when pre-defined conditions encoded in the contract logic are met. All transactions and state changes are recorded on an immutable ledger, which can be independently audited by any participant. This model is well suited to digital freelance ecosystems, where clients and freelancers often do not know each other and operate across borders.

Keywords: digital freelance marketplaces, Upwork, Fiverr, decentralized escrow, custodial payments, blockchain technology, smart contracts, Ethereum, cryptocurrency transactions, decentralized applications.

ICSICA-2026-172

Blockchain-Enabled Decentralized Escrow Mechanism for Secure Freelance Ecosystem

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ABSTRACT

The rapid increase in cyber threats has exposed the limitations of traditional password-based authentication systems, which remain vulnerable to credential theft, brute-force attacks, and phishing. To address these challenges, this project presents an intelligent behavioral biometric authentication system that leverages keystroke dynamics and machine learning-based risk assessment to enhance login security. The system captures user typing patterns during authentication and extracts temporal features such as dwell time, flight time, and typing latency. These features are processed through a trained Random Forest classifier to compute a real-time risk score, enabling adaptive authentication decisions. The backend, implemented using Flask, integrates the trained model for inference, while a SQLite database securely manages user records and behavioral profiles. A responsive frontend interface captures live keystroke behavior using JavaScript and transmits structured feature data for analysis. The proposed framework incorporates multi-modal biometric fusion to improve reliability and robustness against spoofing attacks. Additionally, a risk-based authentication mechanism is integrated, where access decisions are dynamically adjusted based on user behavior patterns and anomaly scores.

Keywords: Behavioral biometric authentication, keystroke dynamics, machine learning, risk-based authentication, adaptive security, Random Forest classifier, dwell time, flight time, typing latency, anomaly detection, cyber security, phishing prevention, brute-force attack mitigation, multi-modal biometrics.

ICSICA-2026-173

IOT Based Smart Borewell Child Detection and Rescue Alert System

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ABSTRACT

Borewell accidents involving children have become a major safety concern, particularly in rural areas where open or abandoned borewells are not properly secured. These incidents often lead to life-threatening situations due to the narrow structure, limited oxygen supply, and delays in rescue operations. Traditional rescue methods are manual, time-consuming, and risky, which reduces the chances of saving the victim. The lack of real-time monitoring and alert systems further worsens the situation. With the advancement of the Internet of Things (IoT), intelligent monitoring systems can be developed to overcome these challenges. IoT technology enables real-time data collection, continuous monitoring, and instant communication between devices and users. By integrating sensors and communication modules, it becomes possible to detect accidents quickly and send immediate alerts to concerned authorities. This paper proposes an IoT-Based Smart Borewell Child Detection and Rescue Alert System that uses sensors such as infrared or ultrasonic sensors to identify the presence of a child inside a borewell. Once detected, the system sends alerts through GSM or cloud-based platforms to rescue teams for immediate action. The system is cost-effective, reliable, and helps in reducing rescue time while improving the chances of survival, making it a practical solution for enhancing public safety.

Keywords: Borewell Safety, Child Detection, Rescue System, Sensors, GSM Module, Real-Time Monitoring, Alert System.

ICSICA-2026-174

An intelligent voice-enabled AI agent for real-time patient interaction and healthcare assistance.

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ABSTRACT

In today's fast-paced world, maintaining proper health care is often neglected due to busy schedules, lack of awareness, or difficulty in accessing medical professionals. The increasing demand for immediate and reliable health guidance has led to the integration of Artificial Intelligence (AI) in the healthcare domain. This project introduces a Personalized Healthcare Chatbot designed to identify illnesses based on voice-input symptoms and provide preliminary medical information before consulting a doctor. By combining Machine Learning (ML) and Natural Language Processing (NLP), the chatbot understands, processes, and responds to user queries in a natural conversational manner.

The chatbot utilizes trained medical datasets to diagnose possible diseases based on user-described symptoms and delivers accurate, context-aware responses. It also integrates text-to-voice conversion technology to provide spoken feedback, creating an interactive and user-friendly experience. This intelligent voice-based assistant reduces healthcare costs, minimizes hospital visits for minor issues, and improves accessibility for individuals in remote areas. By leveraging AI-driven conversation and real-time speech interaction, the system bridges the gap between patients and healthcare knowledge, promoting early diagnosis, self-awareness, and healthier living habits.

Keywords: AI healthcare chatbot, NLP, Machine learning, disease prediction, symptom analysis, personalized health monitoring, speech-to-text and text-to-speech.

Cyber Threat Intelligence Platform Using Dark-Web Data Mining

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ABSTRACT

With the exponential growth of e-commerce platforms and digital payment systems, online transactions have become an integral part of everyday life. However, this rapid digital transformation has also led to a significant increase in fraudulent activities, especially in real-time payment systems such as UPI (Unified Payments Interface). Fraudsters continuously evolve their techniques, making it increasingly difficult for traditional fraud detection systems to keep up. Conventional rule-based systems rely on predefined patterns and static rules, which lack adaptability and fail to detect new or sophisticated fraud strategies effectively.

To address these limitations, this project proposes the development of a smart fraud detection system using advanced machine learning (ML) techniques. The primary objective is to enhance the accuracy, efficiency, and scalability of fraud detection in real-time transaction environments. The system leverages large volumes of historical transaction data to train predictive models that can identify unusual patterns and anomalies indicative of fraudulent behaviour.

Keywords: e-commerce, digital payments, online transactions, fraud detection, Unified Payments Interface (UPI), financial fraud, machine learning (ML), anomaly detection, predictive modeling, real-time systems.

ICSICA-2026-176

Smart MRI Image Processing System For Automated Brain

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ABSTRACT

A major healthcare problem facing the world is brain tumors, which have a high mortality rate and involve complicated diagnostic routes. These tumors are intrinsically variable in nature and can vary in type, size, and location making it difficult to identify them and plan on how they will be treated. Accuracy of the diagnosis and being able to diagnose timely is crucial as it directly affects treatment outcome and patient survival chances. The current diagnostic criteria, based on the heavy reliance on the manual interpretation of Magnetic Resonance Imaging (MRI) by clinical specialists, is prone to delays, subjectivity and inconsistency across observers. In order to overcome these limitations, this report outlines a new multi-task learning (MTL) model using sophisticated neural network architectures to automate and improve the accuracy of brain tumour segmentation/classification using multi-parametric MRI scans. Such combined design will help simplify the diagnostic process, eliminate the need to resort to manual analysis, and deliver prompt and consistent results to be able to start treatment on time.

Keywords: brain tumour detection, healthcare diagnostics, magnetic resonance imaging (MRI), multi-task learning (MTL), deep learning, neural networks, medical image analysis, tumour segmentation, tumour classification, multi-parametric MRI, automated diagnosis, early detection, clinical decision support.

ICSICA-2026-177

An Adaptive Stream-Native Anomaly Detection Framework Using Hybrid Unsupervised

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ABSTRACT

Traditional resume screening and job matching systems primarily rely on keyword based filtering techniques or transformer models such as BERT for evaluating candidate profiles. However, these approaches often fail to capture the true semantic relationships between resumes and job descriptions. As a result, they generate inaccurate Applicant Tracking System (ATS) scores, provide poor job recommendations, and offer limited insight into skill gap analysis. Keyword-based systems are especially vulnerable to synonym variations, contextual differences, and sentence-level meaning, leading to biased, incomplete, or misleading evaluations. Even conventional BERT models, while powerful, may not always optimize sentence-level semantic similarity effectively for recruitment-specific tasks. To address these limitations, In proposes system an AI-Driven Resume Analysis and Job Specific Resume These embeddings enable precise similarity scoring between candidate profiles and job requirements by understanding contextual meaning rather than relying solely on keyword overlap.

Keywords: resume screening, job matching, applicant tracking system (ATS), keyword-based filtering, semantic similarity, natural language processing (NLP), transformer models, BERT, sentence embeddings.

ICSICA-2026-178

An Intelligent Deep Learning Framework for Vehicle Damage Assessment and Cost Estimation

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ABSTRACT

The rapid increase in road accidents across the world has created a strong demand for intelligent, efficient, and automated vehicle damage assessment systems. In recent years, the number of vehicles on the road has grown significantly, leading to a higher frequency of accidents and insurance claims. Traditional insurance claim processing methods rely heavily on manual inspection carried out by surveyors. This process is not only time-consuming but also suffers from several limitations such as inconsistency in evaluation, dependency on human expertise, delays in claim approval, and a higher possibility of errors or biased assessments. These challenges highlight the urgent need for a more reliable and automated solution. To address these issues, this project proposes an advanced deep learning-based framework that automates the process of vehicle damage detection and repair cost estimation using image processing techniques. The system is designed to analyze images of damaged vehicles and provide accurate predictions without requiring human intervention. By leveraging the power of artificial intelligence, the proposed solution aims to improve efficiency, reduce processing time, and ensure consistent results. The implementation of the system is carried out in two major phases .

Keywords: vehicle damage detection, road accidents, insurance claims, automated assessment, deep learning, image processing, computer vision, damage classification, repair cost estimation, artificial intelligence, claim automation, object detection, model prediction, accuracy improvement, bias reduction.

Malicious URL Detection using Machine Learning

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ABSTRACT

Cyber threats, especially those involving malevolent URL s, have significantly multiplied with the advent of online services over the internet. The harmful URLs are often used in phishing hoaxes, malware deployment, spamming operations and more. Conventional blacklist and signature based methods are not capable of identifying new or obfuscated malicious URLs. In order to overcome these limitations, ML approaches are increasingly being used for detection of harmful URLs by considering patterns and statistical properties of the Internet services as a whole.

In this paper, we propose a machine learning approach to detect malicious URL with the help of lexical and structural features extracted from URL strings. Several supervised classifiers such as Logistic Regression, SVM, Random Forest and Naïve Bayes are compared. Experiments show that the ME based approaches are much better than rule-based systems in accuracy, precision, recall and F1 values. The method proposed now enables real-time scalable and efficient malware URI detection.

Keywords: cyber security, malicious URL detection, phishing, malware, spam detection, machine learning, lexical features, structural features, supervised learning, logistic regression, support vector machine (SVM).

Congenital Heart Disease

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ABSTRACT

Congenital Heart Disease (CHD) is a critical condition that affects fetal development, requiring early and accurate diagnosis for effective intervention. Traditional deep learning models, such as CNN-LSTM architectures, have shown promise in medical image analysis but still face challenges in capturing both spatial and temporal dependencies effectively. To overcome these limitations, this project proposes a novel hybrid deep learning model that combines Vision Transformer (ViT) and Long Short-Term Memory (LSTM) networks for CHD detection using fetal echocardiograms. The ViT module is designed to extract global spatial features by treating echocardiographic images as sequences of patches and applying self-attention mechanisms. This enables the model to focus on the most relevant regions of the image, thereby improving abnormality detection. In parallel, the LSTM module processes sequential ultrasound frames to capture temporal dependencies.

Keywords: congenital heart disease (CHD), fetal echocardiography, deep learning, vision transformer (ViT), long short-term memory (LSTM), hybrid model, medical image analysis, spatial feature extraction, temporal dependency.

ICSICA-2026-181

AI Mental Health Tracker

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ABSTRACT

Due to changes in lifestyle, social stress, and academic pressure, mental health problems among professionals and students are on the rise. Improving mental health requires early identification and ongoing observation. The AI-based Mental Health Tracker presented in this research tracks users' emotional states through journaling, mood tracking, and chat. The technology analyzes mood trends using machine learning algorithms and offers tailored suggestions, including encouraging messages and breathing routines. Users can express their emotions in a secure setting with the help of a chatbot friend. Early intervention and easily available, real-time mental health help are the goals of the suggested approach. Results from experiments show that AI-based tracking may successfully spot emotional patterns and help people deal with stress and worry. Through journaling, mood tracking, and chat, the AI-based Mental Health Tracker.

Keywords: mental health tracking, emotional state analysis, artificial intelligence (AI), machine learning, mood tracking, journaling, chatbot interaction, sentiment analysis, stress detection, anxiety management, personalized recommendations, behavioral monitoring, early intervention, real-time support, and digital mental health systems.

ICSICA-2026-182

An Intelligent Multimodal Deep Learning Framework for Multilingual Agricultural Information Classification and Farmer

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ABSTRACT

This project focuses on the integration of Deep Learning (DL) and Internet of Things (IoT) technologies in agriculture to improve production and economic management. Traditional agricultural systems rely heavily on manual observation and experience, which often leads to inefficient resource utilization, delayed decision-making, and poor forecasting. The proposed system uses IoT sensors to collect real-time data such as soil conditions, climate parameters, and crop health. This data is preprocessed and analyzed using deep learning models to classify agricultural information accurately. Based on this classification, the system provides intelligent decision support for farmers, enabling better crop monitoring, early disease detection, and optimized resource usage. By combining IoT and deep learning, the system enhances productivity, reduces operational costs, and improves economic outcomes in agriculture.

Keywords: smart agriculture, deep learning (DL), Internet of Things (IoT), precision farming, crop monitoring, soil analysis, climate monitoring, real-time data, agricultural sensors, data preprocessing, classification models, decision support systems, crop health detection, early disease detection, resource optimization, yield improvement, and sustainable agriculture.

Child Content Shield

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ABSTRACT

Online grooming and exposure to inappropriate content represent a growing crisis for children under 13, with over 18 million reports of child sexual exploitation material filed annually according to the National Center for Missing and Exploited Children (NCMEC). Existing parental control tools predominantly adopt reactive, keyword-based strategies that fail to detect the subtle behavioral progression characteristic of online grooming, and many collect raw communication data, undermining child privacy. We present Child Content Shield, a privacy-first, AI-driven multi-modal safety platform that operates as a cross-platform Android SDK backed by a FastAPI cloud microservice. The system deploys two quantized TFLite neural networks—a text safety model (input: 1×100 int32 tokens) and an image safety model (input: $1 \times 224 \times 224 \times 3$ float32)—fused via weighted scoring ($0.6 \text{ text} + 0.4 \text{ image}$) to produce unified risk scores in $[0.0, 1.0]$. A dedicated grooming detection engine classifies six behavioral patterns (age probing, trust building, gift offering, secrecy requests, isolation attempts, and sexual content) with temporal escalation analysis over a 50-message sliding window.

Keywords: child online safety, online grooming detection, inappropriate content filtering, privacy-first AI, multi-modal learning, Android SDK, FastAPI microservices, TensorFlow Lite (TFLite), neural networks, text classification.

Real-Time Edge-Based Multi-Model Computer Vision for Violence and Sexual Assault Detection

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ABSTRACT

Violence against women in public spaces constitutes a critical global safety crisis, yet pervasive closed-circuit television infrastructure provides only passive recording without proactive threat detection. This paper presents a real-time, GPU-accelerated, multi-camera artificial intelligence surveillance system engineered specifically for women's safety, integrating five parallel deep learning models within a unified weighted-fusion scoring framework. The proposed system deploys YOLO11-Pose for single-pass person detection and 17-keypoint estimation, BoT-SORT for persistent multi-object tracking, a CLIP ViT-B/32 and EfficientNet-B0 ensemble for gender classification, and a gender-aware proximity isolation engine for lone-woman detection. Four concurrently executing threat models are activated upon proximity violation: VideoMAE V2 combined with TimeSformer for video-based violence recognition, a VGG19 and Bidirectional LSTM with pose keypoint fusion for sexual assault detection, RAFT optical flow with a Transformer Autoencoder for adaptive anomaly scoring, and CLIP zero-shot inference for semantic scene context evaluation.

Keywords: women safety, violence detection, AI surveillance, real-time monitoring, deep learning, computer vision, multi-camera systems, GPU acceleration, YOLO pose estimation, object tracking.

ICSICA-2026-185

AI Driven Web Based Video Conferencing System with Real Time Meeting Intelligence and Analytics

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ABSTRACT

Web-based video conferencing has become essential for remote collaboration and online learning, yet most existing platforms lack intelligence for evaluating meeting effectiveness and participant engagement, often leading to unproductive discussions and poor decision tracking. The proposed system introduces an AI-driven intelligent video conferencing platform that combines real-time communication with advanced artificial intelligence and data analytics. Using speech-to-text conversion, natural language processing, and machine learning techniques, the system analyzes participation behavior, topic relevance, engagement patterns, and decision influence to generate meeting quality scores, detect topic drift, automatically extract action items, and provide real-time meeting coaching. In addition, the system includes smart attendance with behavioral analytics and participation fairness analysis to ensure accountability and balanced collaboration. Features such as context-aware recording, automated post-meeting email generation, and visual insight dashboards further improve meeting efficiency and transparency. enterprise collaboration and remote

Keywords: video conferencing, remote collaboration, online learning, artificial intelligence (AI), speech-to-text, natural language processing (NLP), machine learning, meeting analytics, engagement analysis, participation behavior, topic detection, action item extraction, real-time coaching, attendance tracking.

ICSICA-2026-186

Rainfall Prediction Using Machine Learning

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ABSTRACT

Rainfall prediction plays a crucial role in agriculture, water resource management, transportation, and disaster prevention. Accurate forecasting helps farmers plan irrigation, enables authorities to issue early flood warnings, and assists in managing day-to-day weather-dependent activities. In this project, machine learning techniques are utilized to predict rainfall using historical meteorological data. The proposed model analyzes key weather parameters such as Temperature, Humidity, Atmospheric Pressure, and Wind Speed to estimate the amount or occurrence of rainfall. Multiple machine learning algorithms — Artificial Neural Network (ANN), XGBoost, Random Forest Regressor, and Linear Regression — are implemented and compared based on their performance. The dataset undergoes preprocessing steps such as handling missing data, normalization, and encoding categorical variables. Model is evaluated using statistical metrics including Mean Squared Error (MSE), Mean Absolute Error (MAE), and R^2 Score. The experimental results show that the XGBoost model provides the highest accuracy with the lowest error rate and strongest correlation between predicted and actual rainfall values. This indicates its efficiency in capturing complex, non-linear relationships between climatic factors and rainfall patterns. The study highlights the effectiveness of machine learning in weather prediction and provides a foundation for developing intelligent, real-time rainfall forecasting systems that can assist in agricultural planning, disaster management, and sustainable water resource utilization.

Keywords: Rainfall Prediction, Machine Learning, XGBoost, Artificial Neural Network (ANN), Random Forest Regressor, Linear Regression, Meteorological Data, Temperature, Humidity, Atmospheric Pressure, Wind Speed, Data Preprocessing, Mean Squared Error

ICSICA-2026-187

Short-Term Weather Forecasting Using Long Short-Term Memory (LSTM) Networks

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ABSTRACT

The increasing frequency of climate variability and extreme weather phenomena has intensified the need for accurate and reliable weather forecasting systems. Precise short-term weather predictions play a critical role in agriculture, transportation management, disaster mitigation, and strategic planning. This study presents a deep learning-based weather forecasting framework utilizing Long Short-Term Memory (LSTM) neural networks, which are specifically designed to model temporal dependencies in sequential time-series data. The experimental dataset comprises six essential meteorological attributes: Temperature (Temp_C), Dew Point Temperature, Relative Humidity (Rel Hum), Wind Speed, Visibility, and Atmospheric Pressure (Press). Comprehensive data preprocessing procedures were conducted, including missing value imputation, normalization, feature scaling, and time-series sequence generation, to enhance model robustness and predictive performance. To validate the effectiveness of the proposed framework, comparative analyses were performed against conventional machine learning models, namely Random Forest, Support Vector Machine (SVM), K-Nearest Neighbors (KNN), Decision Tree, and Gaussian Naïve Bayes. Model performance was evaluated using standard metrics such as Accuracy, Precision, Recall, F1-Score, and Loss. Experimental findings demonstrate that the LSTM-based model outperforms traditional approaches in terms of predictive accuracy and generalization capability by effectively capturing temporal dynamics in meteorological data.

Keywords: Weather Forecasting, Long Short-Term Memory (LSTM), Deep Learning, Time-Series Analysis, Predictive Modeling.

ICSICA-2026-188

Speech to Gesture System Using AI

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ABSTRACT

Individuals with hearing impairments often struggle with real-time communication due to inadequate speech-to-gesture solutions. Traditional assistive technologies depend on costly hardware, restricting their use and adoption. This AI-driven system converts spoken speech into visual sign language gestures automatically, leveraging advancements in AI, NLP, and computer vision for enhanced accessibility in education, public services, and daily interactions. The system features four key modules. User Authentication secures access via Flask and MySQL, verifying credentials against a database. Speech-to-Text captures microphone input and employs speech recognition to generate accurate text transcriptions. Text Processing uses NLP with NLTK to tokenize sentences, identify essential words, and ready them for gesture mapping. Text-to-Gesture then transforms these into sign language animations or images using computer vision and Flask, enabling clear visual communication. This software-based approach bypasses expensive hardware needs, delivering an efficient, inclusive tool for seamless understanding. The system aims to bridge the communication gap for individuals with hearing impairments and promote greater accessibility in everyday interactions.

Keywords: Speech Recognition, Sign Language, Natural Language Processing (NLP), Computer Vision, Gesture Mapping, Flask, NLTK, Accessibility, AI, Hearing Impairment.

ICSICA-2026-189

Transformer-Based Deep Learning Framework for Intelligent Weather Forecasting and Extreme Event Prediction

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ABSTRACT

Accurate weather forecasting and early prediction of extreme climatic events are critical for disaster risk reduction, agricultural planning, infrastructure management, and public safety. Conventional statistical and machine learning approaches often struggle to capture long-range temporal dependencies and complex nonlinear interactions present in meteorological data. To address these limitations, this study proposes a Transformer-based deep learning framework for advanced weather prediction and extreme event forecasting. The proposed model leverages the self-attention mechanism of Transformer architectures to effectively model long-term dependencies and dynamic relationships among multiple atmospheric variables. Unlike recurrent neural networks, the Transformer enables parallel processing of time-series data, improving computational efficiency and scalability. The dataset utilized in this research comprises key meteorological attributes such as temperature, humidity, wind speed, atmospheric pressure, and precipitation indicators. Comprehensive preprocessing steps — including data cleaning, normalization, feature engineering, and sequential encoding — were performed to enhance predictive reliability. The performance of the Transformer-based model was systematically compared with established machine learning and deep learning techniques, including Random Forest, Support Vector Machine (SVM), Long Short-Term Memory (LSTM), Convolutional Neural Networks (CNN), and Gradient Boosting models. Evaluation metrics such as Accuracy, Precision, Recall, F1-Score, and Mean Squared Error (MSE) were employed to assess predictive effectiveness. .

Keywords: Weather Forecasting, Transformer Model, Deep Learning, Self-Attention Mechanism, Extreme Weather Prediction, Artificial Intelligence

ICSICA-2026-190

Supplier Sync: A Collaborative Digital Platform for Buyer–Supplier Interaction and RFQ Management

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ABSTRACT

In today's competitive procurement ecosystem, efficient communication and transparent processes between buyers and suppliers are essential for successful business transactions. Supplier Sync is a collaborative digital platform designed to streamline buyer–supplier interactions through a structured Request for Quotation (RFQ) workflow. The system enables buyers to create RFQs, receive multiple quotations from suppliers, perform comparative analysis, and execute supplier onboarding in a centralized and efficient manner. The platform enhances procurement efficiency by digitizing the quotation lifecycle, reducing manual errors, improving transparency, and enabling data-driven decision-making. Suppliers can submit competitive quotes against RFQs, while buyers can evaluate, compare, and select the most suitable supplier based on pricing, quality, delivery timelines, and other criteria. Supplier Sync also incorporates structured onboarding workflows for both buyers and suppliers, ensuring compliance, verification, and streamlined approval processes. By integrating automation, real-time tracking, and structured comparison tools, the system promotes collaboration, accountability, and optimized procurement outcomes. Ultimately, Supplier Sync empowers organizations to manage procurement activities more effectively, fostering long-term partnerships between buyers and suppliers while improving operational efficiency.

Keywords: Authentication, JWT Tokenization, Procurement System, Request for Quotation (RFQ), Supplier Management, Buyer–Supplier Interaction, Quote Comparison, Digital Onboarding.

ICSICA-2026-191

AI Based Multimodal Communication System for Sign and Speech in Virtual Environment

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ABSTRACT

Communication barriers in virtual meeting environments continue to affect individuals who rely on sign language, limiting their ability to participate on equal terms with hearing users. Existing digital platforms offer minimal support for real-time sign interpretation, and current assistive tools often lack the speed, accuracy, and natural visual presentation required for inclusive interaction. To overcome these limitations, this project introduces an intelligent, AI-driven communication framework designed to provide seamless two-way interaction between sign-language users and non-signers during online meetings. The system integrates three advanced components. The Sign Recognition Module employs a Transformer-Based Gesture Encoder that analyzes continuous hand movements, facial cues, and body dynamics to accurately interpret Indian Sign Language from live video streams. The Speech Recognition and Synthesis Module uses modern speech-processing approaches — such as RNN-Transducer, Connectionist Temporal Classification, and Deep Neural Networks — to convert spoken audio into text reliably, enabling smooth communication in noisy or dynamic online environments. Together, these components create a unified accessibility solution that enhances participation for deaf, mute, hard-of-hearing, visually impaired, and non-signing individuals. By linking with web meeting platforms, the system enables real-time translation and natural visual signing, improving inclusivity in virtual meetings.

Keywords: Sign Language Recognition, Speech Recognition, Neural Avatar Synthesis, Indian Sign Language, Multimodal Communication, Virtual Environment, Accessibility, Deep Learning, Transformer-Based Gesture Encoder.

ICSICA-2026-192

Voting Systems Using Blockchain Technology

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ABSTRACT

The blockchain-based E-Voting system is designed as a secure, transparent, and decentralized framework to conduct elections digitally. In this model, the first step is voter registration, where eligible voters are authenticated using a unique digital ID or cryptographic credentials to ensure that only authorized individuals can participate. Once authenticated, voters cast their votes through a secure voting interface, which encrypts each vote to maintain privacy and prevent tampering. The encrypted votes are then submitted to a distributed blockchain network, where multiple nodes validate each vote using consensus algorithms such as Proof of Stake (PoS) or Practical Byzantine Fault Tolerance (PBFT). This ensures that all votes are legitimate and prevents double voting. Each validated vote is added to an immutable ledger, providing a tamper-proof and auditable record. Smart contracts automatically enforce voting rules, perform real-time vote counting, and maintain the integrity of the election process. Finally, the system enables transparent result verification, allowing auditors and stakeholders to verify election outcomes without compromising voter anonymity. This abstract model integrates key components such as voter authentication, encrypted vote submission, decentralized validation, smart contract automation, immutable ledger storage, and auditable result declaration, providing a complete framework that addresses the security, transparency, and trust challenges of conventional E-Voting systems. By combining research and prototype development, this model serves as a robust blueprint for implementing blockchain-based digital elections in real-world scenarios.

Keywords: Blockchain-based E-Voting, Secure, Transparent, Decentralized, Voter Registration, Digital ID, Cryptographic Credentials, Vote Encryption, Secure Voting Interface, Distributed Ledger, Consensus Algorithms, Proof of Stake (PoS), Practical Byzantine Fault Tolerance (PBFT), Double Voting Prevention, Immutable Ledger, Smart Contracts, Automated Vote Counting, Auditable Results, Election Integrity.

ICSICA-2026-193

A Review of Collaborative Edge–Cloud Computing for Intelligent Distributed Systems and Model Efficiency

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ABSTRACT

Edge-cloud collaborative computing (ECCC) combines cloud servers with edge devices to meet the heavy computing needs of smart apps, enabling fast, low-delay processing over networks. AI advances like deep learning and large language models (LLMs) supercharge these systems but create big challenges in deploying models, managing network resources, and optimizing across layers. This survey dives into distributed AI and model tweaks in edge-cloud setups, offering a tutorial on key architectures, communication protocols, and network-smart frameworks. It analyzes model optimization (compression, adaptation, neural architecture search) plus AI strategies for balancing speed, energy, and data overhead in mixed networks. It covers privacy/security boosts for ECCC, real-world uses in self-driving cars, healthcare, and factory automation, plus performance benchmarks for testing. Future paths include LLM roll out, 6G ties, neuromorphic/quantum computing — to fix device variety, real-time needs, and scaling. Links theory to practice for AI-optimized next-gen networks.

Keywords: Edge-Cloud Computing, Distributed Intelligence, Model Optimization, AI, Survey

ICSICA-2026-194

Machine Learning: Concepts, Types, Applications and Programming Languages

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ABSTRACT

Machine Learning is the art and science of enabling machines to learn things which are not explicitly programmed. It involves as much mathematics as it involves computer science. Most often, people are put off by the sheer number of mathematical equations and concepts in machine learning. The past year has been a great one for Artificial Intelligence and Machine Learning. Many new high-impact applications of Machine Learning were discovered and brought to light, especially in healthcare, finance, speech recognition, augmented reality, and more complex 3D and video applications. In machine learning, programming languages ranging from Python to SQL are utilized extensively. In this paper, we discuss what machine learning is and its types, how machine learning works, the key elements of ML, and we explain machine learning methods which are being used today along with its process, applications, advantages, disadvantages, and top programming languages. We also discuss the companies which use machine learning in their operations.

Keywords: Machine Learning (ML), Traditional Programming, ML Algorithms, Artificial Intelligence, Data-Driven Systems

ICSICA-2026-195

IoT-Enabled Embedded Emergency Alert and Rescue Coordination System for Disaster Management

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ABSTRACT

The effective disaster management depends on quick identification, effective communication and coordinated rescue. The common challenges that come to traditionally used emergency response systems are slow alerts, inability to track the location of individuals in real-time, and blackouts during emergencies. This paper presents an IoT-based embedded emergency alert and rescue coordination system, which can be used to improve the efficiency of disaster response. It consists of a set of sensors, including temperature, vibration and gas, detecting dangerous conditions, and the data collection and processing are performed by an ESP32 microcontroller. A GSM module can send instant alerts to rescue authorities and a GPS module can give the real-time location. The audible and visual indications are provided by using LED signals and a buzzer, which are reinforced by a constant power supply and battery back-up to enable continuity in the process. The system is experimentally validated, and it is demonstrated that the system provides the situation awareness and coordination in the event of disaster through accurate, quick and reliable alerts.

Keywords: Internet of Things, Disaster Management, ESP32, GPS, GSM, Emergency Alert System, Rescue Coordination, Embedded System

ICSICA-2026-196

Adaptive Learning Systems Using AI for Personalized Education

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ABSTRACT

The integration of Artificial Intelligence (AI) in education has significantly transformed traditional teaching methodologies. Adaptive Learning Systems (ALS) represent a major advancement by offering personalized learning experiences tailored to individual learners' needs, preferences, and performance. These systems utilize machine learning algorithms, data analytics, and intelligent decision-making techniques to continuously monitor and adapt instructional content. This paper provides a comprehensive analysis of adaptive learning systems, including their architecture, underlying technologies, advantages, limitations, and real-world applications. Furthermore, it discusses future trends and the potential impact of AI-driven personalized education on global learning ecosystems.

Keywords: Adaptive Learning Systems, Artificial Intelligence, Personalized Learning, Machine Learning, Intelligent Tutoring Systems, Educational Technology, Data Analytics.

ICSICA-2026-197

Audio-Visual Deepfake Detection System Using Deep Learning

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ABSTRACT

This research presents a deep learning-based system for detecting manipulated media within messaging applications. The system employs a three-tier architecture: a React.js frontend mimicking WhatsApp interfaces, a Node.js backend managing file routing and alerts, and a Fast API microservice housing detection models. When users share media, files are analyzed through specialized pipelines. Audio detection uses a Wav2Vec2 transformer model fine-tuned on synthetic voice datasets, achieving 92% accuracy by identifying acoustic artifacts through self-attention mechanisms. Detection results trigger real-time WebSocket alerts to both sender and receiver, ensuring immediate notification of potential deepfakes. The system supports multiple audio formats via FFmpeg integration and maintains historical records through PostgreSQL. This integrated approach provides accessible deepfake protection within familiar messaging contexts, enabling users to verify media authenticity without technical expertise and contributing to trust preservation in digital communications. This integrated framework offers practical deepfake protection within familiar communication contexts, enabling users to assess media authenticity without requiring specialized knowledge.

Keywords: Audio-Visual Forensics, Deep Learning, Deepfake Detection, Messaging Security, Multimodal Analysis.

ICSICA-2026-198

Automated Building crack detection with YOLO Deep Learning

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ABSTRACT

Reliability, performance, and life cycle costs are real concerns for almost all inservice massive structures, such as buildings, bridges, nuclear facilities, hydroelectric structures, and dams. Cracks on these structures are a common phenomenon associated with various internal and external forces, including the corrosion of embedded reinforcement, chemical deterioration of concrete, and the application of adverse loading to the structure. In comparison to the traditional manual inspection-based crack detection system, computer vision and machine learning-based approaches are quickly becoming an integral part of the modern segmentation of civil infrastructures to automate crack detection and identification systems. This paper is about the construction and application of a device that uses image processing to detect cracks. The system is carried by a drone and can be remotely accessed. The system has a graphical user interface for initializing the device, viewing real time image, taking pictures of a crack, measuring its width, and evaluating if safe or unsafe. The pictures and their results are stored for reference. And implement contrast enhancement to improve the contrast of the image and using binarization techniques to provide binary image. Finally implement the segmentation using YOLO (you look only once) algorithm to segment the image to detect the crack with improved accuracy.

Keywords: Cracks detection, Machine learning, Deep learning, Neural networks, Deep Convolutional Neural Neural Network.

Bank Loan Approval Prediction System

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ABSTRACT

In the modern banking sector, efficient and unbiased loan approval is essential for improving customer satisfaction and financial decision-making. Traditional loan evaluation methods often depend on manual analysis, which can lead to delays, human errors, and inconsistent judgments. This paper proposes a Bank Loan Approval Prediction System that leverages Artificial Intelligence (AI) and Machine Learning (ML) techniques to automate and enhance the loan approval process. The system utilizes historical applicant data, including financial, demographic, and credit-related information, to predict loan approval status. Multiple machine learning algorithms such as Logistic Regression, Decision Tree, Random Forest, Support Vector Machine, and Gradient Boosting are implemented to analyze and compare performance. Additionally, feature importance analysis is performed to determine the key factors influencing loan approval, thereby improving transparency and interpretability of the model. The proposed system reduces manual workload, enhances consistency in decision-making, and supports data-driven credit assessment. It also ensures inclusivity by providing a fair evaluation process for applicants from diverse socioeconomic backgrounds. The Bank Loan Approval Prediction System demonstrates significant potential in transforming traditional banking operations by offering an efficient, transparent, and intelligent solution for loan approval using AI and ML technologies.

Keywords: Bank Loan Approval Prediction, Artificial Intelligence (AI), Machine Learning (ML), Credit Risk Assessment, Logistic Regression, Decision Tree, Random Forest, Support Vector Machine (SVM), Gradient Boosting, Predictive Analytics, Risk Scoring, Classification Models.

ICSICA-2026-200

Eco-Safe Autonomous Floating Robot for Selective Waste Collection Using Real-Time Visual Intelligence

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ABSTRACT

A growing environmental concern is the buildup of floating waste in lakes and other stagnant water bodies, which has an impact on water quality and disturbs aquatic ecosystems. The main goal of current automated cleaning systems is to remove waste, but they frequently don't take aquatic life into account, which could have unforeseen ecological effects. An environmentally safe autonomous floating robotic system that uses intelligent visual analysis to selectively clean surfaces is presented in this paper. To differentiate between floating debris and living things in real time, the suggested system combines an embedded controller with a vision-based detection module. Based on this classification, the robot avoids interfering with aquatic life by navigating dynamically and only turning on its collection mechanism when it detects non-living waste. An energy-efficient design that is appropriate for continuous outdoor operation supports the system. The suggested strategy provides a workable and sustainable way to keep water bodies cleaner while maintaining ecological balance by fusing selective waste collection with environmentally conscious decision-making.

Key words: Computer Vision, Environmental Robotics, Water Pollution Monitoring, Selective Waste Collection, Aquatic Life Protection.

ICSICA-2026-201

MENTORCONNECT – AI-Based Student Mentor Matching Platform

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ABSTRACT

In the present education ecosystem, most institutions allocate mentors to students using conventional random assignment methods without considering important factors such as student interests, career goals, skills, and learning preferences. This frequently leads to ineffective mentor-mentee relationships, limiting students' ability to receive meaningful academic and career guidance. To overcome this challenge, Mentor Connect is developed as a web-based intelligent mentoring platform that utilizes algorithm-driven matching techniques to connect students with compatible mentors. The system analyzes multiple parameters including academic interests, technical skills, career aspirations, and mentor expertise to recommend suitable mentor pairings. Mentor Connect also provides an interactive analytics dashboard that enables students to monitor their learning progress, mentoring sessions, and skill development outcomes. The platform is implemented using React.js for the frontend, Node.js and Express.js for backend services, and Supabase with PostgreSQL for secure and scalable data management. By introducing personalized mentorship, automated matching, and progress tracking, Mentor Connect significantly enhances mentorship accessibility, improves guidance effectiveness, and supports students in achieving better academic and professional growth.

Keywords: AI-Based Matching, Mentorship Platform, Student-Mentor Recommendation System, Personalized Guidance, Learning Analytics Dashboard, Career Development, React.js, Node.js, Supabase, PostgreSQL.

ICSICA-2026-202

Continuous Behavioural Biometric Authentication using Machine Learning

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ABSTRACT

In today's digital environment, traditional authentication methods such as passwords and PINs are increasingly vulnerable to theft, misuse, and cyberattacks. This paper proposes a continuous behavioural biometric authentication system that enhances security by analysing unique user behaviour patterns rather than relying solely on static credentials. The system focuses on behavioural traits such as typing dynamics, including keystroke timing and rhythm, to identify and verify users in real time. The proposed approach integrates machine learning techniques to model and learn individual user behaviour during normal system interaction. Once trained, the system continuously monitors user activity and compares it with stored behavioural patterns to detect anomalies or unauthorized access. If a deviation is identified, the system can trigger alerts or enforce security actions such as session termination. This continuous authentication mechanism provides an additional layer of security without interrupting the user experience. The advantages of this system include improved resistance to credential-based attacks, enhanced user convenience, and adaptability to evolving user behaviour. The proposed model demonstrates how behavioural biometrics, combined with intelligent computing, can significantly strengthen modern cybersecurity systems. This work contributes to the development of secure, user-friendly authentication solutions suitable for applications in banking, healthcare, and enterprise systems.

Keywords: Behavioural Biometric Authentication, Continuous Authentication, Keystroke Dynamics, User Behaviour Analysis, Machine Learning, Cybersecurity, Anomaly Detection, User Verification, Intrusion Detection, Identity Authentication, Adaptive Security Systems, Real-Time Monitoring, Intelligent Authentication, Data Security.

ICSICA-2026-203

An Intelligence System for Parkinson's Disease Detection using hybrid Deep learning technique

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ABSTRACT

Parkinson's disease is a progressive neurological disorder that primarily affects motor control, speech, and fine motor skills due to the degeneration of dopamine-producing neurons in the brain. Early detection of Parkinson's Disease is crucial for improving treatment outcomes and slowing the progression of symptoms. This project proposes an intelligent multi-modal deep learning-based system for early screening of Parkinson's Disease. The proposed system analyzes multiple behavioral indicators including voice signals, motor video movements, and handwriting patterns. Voice recordings are processed to extract speech features such as Mel Frequency Cepstral Coefficients (MFCC), pitch, jitter, and shimmer, and are analyzed using Long Short-Term Memory (LSTM) networks to capture temporal speech patterns. Motor video recordings are analyzed using Convolutional Neural Networks (CNN) to detect abnormal movement patterns and tremors. Handwriting samples, including spiral drawings and written text, are processed using CNN-based image analysis to identify micrographia and irregular stroke patterns. The predictions from these independent modules are integrated using a Stacking Ensemble Learning approach to improve diagnostic accuracy and robustness. To enhance interpretability, Explainable Artificial Intelligence techniques using SHAP are incorporated to identify the most influential features affecting the model's decision. The entire system is deployed through a

Keywords: Parkinson's Disease Detection, Deep Learning, Multi-Modal Analysis, Convolutional Neural Network (CNN), Long Short-Term Memory (LSTM), Ensemble Learning, Explainable Artificial Intelligence (XAI) SHAP, Flask Web Application.

ICSICA-2026-204

Enhancing clinical trust in pancreatic Post-Operative Risk Assessment using RLSTSVM and XAI framework

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ABSTRACT

Accurate prediction of postoperative complications in pancreatic surgery is essential for improving patient survival and supporting effective clinical decision-making. However, many conventional machine learning models operate as black-box systems, limiting their interpretability and reducing trust in medical applications. To overcome this limitation, this study proposes a hybrid framework that integrates a Reinforcement Learning-based Least Squares Twin Support Vector Machine (RLSTSVM) with Explainable Artificial Intelligence (XAI) for pancreatic postoperative risk prediction. The proposed approach utilizes patient clinical data, including demographic, surgical, and physiological features, which are processed through data preprocessing techniques such as cleaning, normalization, and feature selection to enhance data quality. Furthermore, XAI techniques, including model-agnostic explanation methods, are incorporated to provide transparent and interpretable insights into the model's predictions, thereby improving clinical trust. Experimental evaluation demonstrates that the proposed RLSTSVM-XAI framework achieves high prediction accuracy while maintaining interpretability. The integration of explainability enables healthcare professionals to understand the factors influencing predictions, supporting reliable and informed clinical decisions. This study emphasizes the importance of combining advanced machine learning models with XAI to bridge the gap between artificial intelligence and healthcare applications.

Keywords: Pancreatic Postoperative Risk Prediction, Reinforcement Learning, Least Squares Twin Support Vector Machine (RLSTSVM), Explainable Artificial Intelligence (XAI), Model-Agnostic Explanation Methods, Machine Learning in Healthcare.

ICSICA-2026-205

Shadow Hunter: Smart Governance in Cyber Security

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ABSTRACT

Cybersecurity has become a critical concern in the digital era due to the rapid increase in sophisticated cyber threats and attacks. Traditional security systems often rely on reactive mechanisms, making them insufficient to handle evolving and intelligent threats in real time. “Shadow Hunters: Smart Governance in Cybersecurity” proposes an advanced intelligent framework designed to proactively detect, analyze, and mitigate cyber threats using modern technologies. The system focuses on enhancing governance, transparency, and automated decision-making in cybersecurity environments.

The proposed system integrates multi-layered data sources including network traffic logs, user behavior patterns, system activity records, and threat intelligence feeds. These inputs are processed using advanced Machine Learning and Deep Learning techniques to identify anomalies and potential attacks. Techniques such as anomaly detection, pattern recognition, and behavioral analysis are employed to detect zero-day attacks, insider threats, and malware activities. Natural Language Processing (NLP) is utilized to analyze threat reports and security logs for improved situational awareness.

The architecture incorporates models such as Convolutional Neural Networks (CNN) for traffic pattern analysis and Recurrent Neural Networks (RNN/LSTM) for sequential threat prediction. A smart governance layer is introduced to enforce policy compliance, risk assessment, and automated response strategies. Additionally, Explainable Artificial Intelligence (XAI) techniques such as SHAP are integrated to provide transparency and interpretability in threat detection decisions.

Keywords: Cybersecurity, Smart Governance, Deep Learning, Anomaly Detection, CNN, LSTM, Ensemble Learning, Explainable AI (XAI), SHAP, Flask Web Application.

ICSICA-2026-206

Mobile Device Part on Susceptibility to Phishing Attacks

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ABSTRACT

The mobile device is one of the fastest growing technologies that is widely used in a diverse sector. Mobile devices are used for everyday life, such as personal information exchange — chatting, email, shopping, and mobile banking, contributing to information security threats. Users' behaviour can influence information security threats. More research is needed to understand users' threat avoidance behaviour and motivation. Using Technology Threat Avoidance Theory (TTAT), this study assessed factors that influenced mobile device users' threat avoidance motivations and behaviours as it relates to phishing attacks. From the data collected from 137 mobile device users using a questionnaire, the findings indicate that mobile device users' perceived susceptibility and severity of phishing attacks have a significant correlation with a users' perception of the threat; mobile device users' motivation to avoid a threat is correlated to a users' behaviour in avoiding threat; and a mobile device user's susceptibility to phishing attacks can be reduced by their perception of the threat. These findings reveal that a user's perception of threat increases if they perceive that the consequence of such threat to their mobile devices will be severe, thereby increasing a user's motivation and behaviour to avoid phishing attack threats.

Keywords: Mobile Device, Phishing Attacks, Technology Threat Avoidance Theory (TTAT), Information Security, Cyber Threats, User Behaviour

ICSICA-2026-207

E-Voting Systems Using Blockchain Technology

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ABSTRACT

The blockchain-based E-Voting system is designed as a secure, transparent, and decentralized framework to conduct elections digitally. In this model, the first step is voter registration, where eligible voters are authenticated using a unique digital ID or cryptographic credentials to ensure that only authorized individuals can participate. Once authenticated, voters cast their votes through a secure voting interface, which encrypts each vote to maintain privacy and prevent tampering. The encrypted votes are then submitted to a distributed blockchain network, where multiple nodes validate each vote using consensus algorithms such as Proof of Stake (PoS) or Practical Byzantine Fault Tolerance (PBFT). This ensures that all votes are legitimate and prevents double voting. Each validated vote is added to an immutable ledger, providing a tamper-proof and auditable record. Smart contracts automatically enforce voting rules, perform real-time vote counting, and maintain the integrity of the election process. Finally, the system enables transparent result verification, allowing auditors and stakeholders to verify election outcomes without compromising voter anonymity. This model integrates key components such as voter authentication, encrypted vote submission, decentralized validation, smart contract automation, immutable ledger storage, and auditable result declaration.

Keywords: Blockchain-based E-Voting, Secure, Transparent, Decentralized, Voter Registration, Digital ID, Cryptographic Credentials, Vote Encryption, Consensus Algorithms, Proof of Stake (PoS), Practical Byzantine Fault Tolerance (PBFT), Immutable Ledger, Smart Contracts, Election Integrity, Voter Anonymity

ICSICA-2026-208

A Review of Collaborative Edge–Cloud Computing for Intelligent Distributed Systems and Model Efficiency

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ABSTRACT

Edge-cloud collaborative computing (ECCC) combines cloud servers with edge devices to meet the heavy computing needs of smart apps, enabling fast, low-delay processing over networks. AI advances like deep learning and large language models (LLMs) supercharge these systems but create big challenges in deploying models, managing network resources, and optimizing across layers. This survey dives into distributed AI and model tweaks in edge-cloud setups, offering a tutorial on key architectures, communication protocols, and network-smart frameworks. It analyzes model optimization (compression, adaptation, neural architecture search) plus AI strategies for balancing speed, energy, and data overhead in mixed networks. It covers privacy/security boosts for ECCC, real-world uses in self-driving cars, healthcare, and factory automation, plus performance benchmarks for testing. Future paths include LLM roll out, 6G ties, neuromorphic/quantum computing — to fix device variety, real-time needs, and scaling.

Keywords: Edge-Cloud Computing, Distributed Intelligence, Model Optimization, AI, Survey

ICSICA-2026-209

Cloud Computing & Edge Computing

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ABSTRACT

Cloud computing and edge computing are distinct architectures that process data. Cloud computing is a centralized model of computing where data is stored and processed in a remote server, while edge computing is a distributed model of computing where data is stored and processed at the network's edge. Both models have advantages and disadvantages, making them suitable for different types of applications. This article comprehensively reviews cloud and edge computing technologies, their differences, and their applications. Cloud computing has become a popular technology for storing and processing large amounts of data, while edge computing is gaining popularity due to its ability to process data closer to the source. The article discusses the advantages and disadvantages of both technologies and their potential applications in various industries, such as healthcare, transportation, and manufacturing. The article also highlights some challenges associated with implementing these technologies, including security concerns and the need for reliable connectivity. Overall, this review provides valuable insights into the current state of cloud and edge computing technologies and their potential impact on various industries.

Keywords: Cloud Computing, Edge Computing, Distributed Architecture, Data Processing, IoT, Latency, Scalability, Network Security

ICSICA-2026-210

Blockchain Technology

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ABSTRACT

A blockchain is a public ledger to which everyone has access but without a central authority having control. It is an enabling technology for individuals and companies to collaborate with trust and transparency. One of the best known applications of blockchains are the cryptographic currencies such as Bitcoin and others, but many other applications are possible. Blockchain technology is considered to be the driving force of the next fundamental revolution in information technology. Many implementations of blockchain technology are widely available today, each having its particular strength for a specific application domain. The tutorial provides the participants with insights and practical experience on Blockchain technology and applications in practice, as well as theory-based exploration of possible business cases.

Keywords: Blockchain, Distributed Ledger, Cryptocurrency, Bitcoin, Decentralization, Smart Contracts, Transparency, Trust

ICSICA-2026-211

AI Ethics and Governance

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ABSTRACT

AI ethics and governance ensure artificial intelligence is developed responsibly, prioritizing fairness, accountability, transparency, and human well-being, while mitigating risks like bias and safety failures. This requires a comprehensive approach, combining ethical principles with practical regulatory frameworks that span the entire AI lifecycle from development to deployment. Key principles include fairness (avoiding bias), accountability (human oversight and answerability), transparency (explainable AI), privacy protection, and safety. Models like Process-Based Governance (PBG) integrate values directly into innovation through stakeholder engagement, impact assessments, and bias self-assessments. Effective governance demands regulatory, ethical, and technical approaches, balancing innovation with human rights and preventing societal harms. Key challenges include international standardization, operationalizing abstract principles, managing data privacy, and navigating differing cultural viewpoints on AI. Ensuring AI is trustworthy, secure, and beneficial to all is especially critical as its use increases across sectors like healthcare, education, and finance.

Keywords: AI Ethics, Governance, Fairness, Accountability, Transparency, Bias, Explainable AI, Privacy, Regulatory Frameworks, Process-Based Governance

ICSICA-2026-212

Disruption in Education (EdTech and Online Learning)

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ABSTRACT

Digital disruption refers to the profound transformation caused by the integration of digital technologies into all aspects of business and society. It fundamentally alters how organizations operate, deliver value, and interact with customers. Technologies such as artificial intelligence (AI), machine learning, blockchain, cloud computing, big data analytics, and the Internet of Things (IoT) are driving this shift, enabling new business models while rendering traditional approaches obsolete. One of the most significant aspects of digital disruption is its impact on industry structures. Traditional companies are being challenged by agile, technology-driven startups that leverage digital platforms to scale rapidly and reach global markets. For example, platform-based ecosystems have revolutionized sectors like transportation, retail, and entertainment by connecting users directly and reducing dependency on intermediaries. Organizations must embrace agility, invest in digital capabilities, and foster a culture of innovation to remain competitive in this evolving landscape. Ultimately, digital disruption is not merely a technological shift but a strategic imperative that shapes the future of the global economy.

Keywords: Digital Disruption, Digital Transformation, Artificial Intelligence (AI), Machine Learning, Blockchain, Cloud Computing, Big Data Analytics, Internet of Things (IoT), Platform Economy, Business Innovation, Agile Organizations, Technology-Driven Startups, Industry Transformation, Digital Strategy, Global Economy.

ICSICA-2026-213

Cybercrime and Prevention Techniques

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ABSTRACT

Technology is continuously evolving and plays a vital role in shaping modern society and business environments. This paper explores recent technology updates in three major domains: social media, marketing automation, and cybersecurity, highlighting their impact, advancements, and tasks. Social media platforms have transformed from simple communication tools into powerful ecosystems for business growth, digital marketing, and customer engagement. Features like artificial intelligence-based recommendations, influencer marketing, and real-time interaction have enabled companies to connect with their target audience more effectively. Social media analytics also help organizations understand user personality and improve decision-making. Marketing automation has become an essential component for businesses aiming to improve efficiency and productivity. Through tools such as email automation, customer relationship management (CRM) systems, and data-driven campaigns, companies can deliver personalized experiences to customers. Automation reduces manual effort, enhances lead generation, and improves conversion rates by targeting the right audience at the right time.

Keywords: Emerging Technologies, Social Media, Marketing Automation, Cybersecurity, Artificial Intelligence (AI), Social Media Analytics, Influencer Marketing, Customer Engagement, Customer Relationship Management (CRM), Email Automation, Data-Driven Marketing, Lead Generation, Personalized Marketing, Digital Marketing, Business Intelligence

ICSICA-2026-214

An Energy Efficiency Tool for Enhanced High-Performance Computing Using AI

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ABSTRACT

Brain Power-consuming entities such as high-performance computing (HPC) sites and large data centers are growing with the advance in information technology. In business, HPC is used to enhance the product delivery time, reduce the production cost, and decrease the time it takes to develop a new product. Today's high level of computing power from supercomputers comes at the expense of consuming large amounts of electric power. It is necessary to consider reducing the energy required by the computing systems and the resources needed to operate these computing systems to minimize the energy utilized by HPC entities. The database could improve system energy efficiency by sampling all the components' power consumption at regular intervals. The information stored in the database will serve as input data for energy-efficiency optimization. More so, device workload information and different usage metrics are stored in the database. There has been strong momentum in the area of artificial intelligence (AI) as a tool for optimizing and processing automation by leveraging on already existing information. This paper discusses ideas for improving energy efficiency for HPC using AI.

Keywords: High-Performance Computing (HPC), Energy Efficiency, Data Centers, Power Consumption, Artificial Intelligence (AI), Energy Optimization, Workload Management, Resource Utilization, Energy Monitoring, Database Systems, Power-Aware Computing, Green Computing, System Optimization, Energy-Aware Scheduling, Sustainable Computing

ICSICA-2026-215

The Impact of Cryptocurrency Regulation on Emerging Markets: Economic, Financial, and Policy Implications

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ABSTRACT

Cryptocurrency adoption in emerging markets has grown rapidly, offering opportunities for financial inclusion, cross-border transactions, and investment diversification. However, regulatory uncertainty poses significant challenges, including market volatility, fraud, and potential threats to financial stability. This study investigates the impact of cryptocurrency regulation on emerging market economies, analyzing how differing regulatory approaches — such as prohibition, licensing, and taxation — affect market behavior, adoption rates, and investor confidence. Using a mixed-method approach combining panel regression analysis, event studies, and qualitative content analysis of policy documents, the study examines the economic, financial, and innovation-related outcomes of regulatory interventions. Results indicate that clear, balanced regulations increase investor confidence, promote responsible adoption, and mitigate systemic risks, while overly restrictive policies may drive cryptocurrency activity into informal channels, reducing transparency and market oversight. The findings provide empirical evidence to guide policymakers in designing frameworks that balance innovation, financial inclusion, and financial stability in emerging economies.

Keywords: Cryptocurrency Regulation, Emerging Markets, Financial Stability, Blockchain Adoption, Investor Confidence, Fintech Policy, Economic Impact, Digital Assets.

ICSICA-2026-216

Smart Helmet

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ABSTRACT

The Smart Helmet for Accident Detection is an innovative system developed to enhance the safety of two-wheeler riders by integrating modern embedded technologies into a traditional helmet. Road accidents have become a major concern globally, especially in developing countries where safety measures are often neglected. This system incorporates sensors such as alcohol sensors, vibration sensors, and helmet detection sensors along with GPS and GSM modules. The vibration sensor detects sudden impacts or crashes, while the alcohol sensor ensures that the rider is not under the influence of alcohol. The helmet detection mechanism ensures that the rider is wearing the helmet before starting the vehicle. In case of an accident, the system automatically detects the event and sends an emergency alert message containing the GPS location to predefined contacts. This reduces the response time for medical assistance and increases the chances of survival. The project aims to promote responsible riding behavior and reduce fatalities caused by road accidents.

Keywords: Smart Helmet, Accident Detection, GPS, GSM, Alcohol Sensor, Vibration Sensor, Embedded Systems, Road Safety, Emergency Alert.

ICSICA-2026-217

AI Resume Builder

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ABSTRACT

With the current competitiveness of the job market, resume development has become a fundamental task that is, however, extremely tough for students and job seekers. For this project, there is the AI Resume Builder, which is created using HTML, CSS, and JavaScript, and its role is to make resume development easy and automated by providing a user-friendly interface. The program allows the user to input personal, educational, and work-related details, which then produces a resume that is well-organized with a beautiful layout. The application has a responsive landing page, interactive form inputs, and dynamic resume preview functionality with no need for any backend and database support. The application uses JavaScript for handling inputs and dynamically displaying content for the resume, and CSS for creating a professional and modern layout. The project focused on being simple, accessible, and efficient so that users can create resumes quickly regardless of the devices they use. This AI Resume Builder tool not only reduces the burden of work and removes the chances of errors but also provides a standardized format which can be applied for different sorts of job applications.

Keywords: AI Resume Builder, HTML, CSS, JavaScript, Resume Generation, Job Application, User Interface, Automated Resume, Web Application.

ICSICA-2026-218

Real-Time Intelligent Video Surveillance for Banking Security Using YOLO-Based Anomaly Detection

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ABSTRACT

Video surveillance systems are essential for maintaining security in banking environments, where timely detection of suspicious activities is critical. Traditional surveillance methods rely heavily on manual monitoring, which can lead to delays and human errors. This paper proposes a real-time intelligent video surveillance system using the YOLO (You Only Look Once) algorithm for efficient anomaly detection. The proposed system is capable of identifying abnormal activities such as unauthorized access, loitering, and unusual behavioral patterns in real time. By leveraging deep learning techniques, the system achieves high detection accuracy and faster processing speed compared to conventional approaches. Additionally, the system generates instant alerts to enhance security response and minimize potential risks. Experimental analysis demonstrates that the proposed model provides a reliable and scalable solution for modern banking security systems. Keywords Intelligent surveillance systems, Banking security, Anomaly detection, YOLO (You Only Look Once), Object detection, Deep learning, Computer vision, Convolutional Neural Networks (CNN), Feature extraction, Image processing, Video analytics, Edge computing, Real-time inference, Model optimization.

Keywords: Intelligent Surveillance Systems, Banking Security, Anomaly Detection, YOLO (You Only Look Once), Object Detection, Deep Learning, Computer Vision, Convolutional Neural Networks (CNN), Feature Extraction, Image Processing, Video Analytics, Edge Computing, Real-Time Inference, Model Optimization

ICSICA-2026-219

AI-Based Credit Card Fraud Detection System

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ABSTRACT

The rapid growth of digital payment systems and online financial transactions has significantly increased the risk of credit card fraud. Fraudulent activities not only cause substantial financial losses to financial institutions but also reduce customer trust in electronic payment systems. Traditional fraud detection approaches, which rely mainly on rule-based systems and manual monitoring, are often inefficient in detecting sophisticated and rapidly evolving fraudulent transaction patterns. Therefore, the integration of Artificial Intelligence (AI) and Machine Learning (ML) techniques has become essential for building intelligent and adaptive fraud detection systems. This project presents an AI-based Credit Card Fraud Detection System designed to identify fraudulent transactions using advanced machine learning algorithms. The system analyzes large volumes of historical transaction data and extracts meaningful patterns that distinguish legitimate transactions from fraudulent ones. Various transaction attributes such as transaction amount, time of transaction, user behavior patterns, and other derived features are used as input parameters for the model.

Keywords: Credit Card Fraud Detection, Artificial Intelligence (AI), Machine Learning (ML), Financial Fraud, Transaction Analysis, Anomaly Detection, Fraud Prediction, Behavioral Analysis, Data Mining, Pattern Recognition, Classification Algorithms, Risk Assessment, Digital Payments, Cybersecurity, Fraud Prevention.

ICSICA-2026-220

Biometric Authentication for UPI Using Real-Time Face Verification

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ABSTRACT

The UPI Face Recognition System is an advanced financial technology solution designed to improve the security of digital payment systems. Although the Unified Payments Interface (UPI) has simplified cashless transactions, it mainly relies on numeric PIN authentication, which is vulnerable to threats such as PIN theft, phishing, and shoulder surfing. To overcome these security risks, the proposed system integrates real-time facial recognition as an additional authentication layer during transactions. The system is developed using the Flask framework and uses computer vision, machine learning and deep learning techniques for accurate identity verification. Face detection is performed using the Histogram of Oriented Gradients (HOG) algorithm, while facial feature extraction is carried out using the ResNet-34 model. During user registration, a unique 128-dimensional facial encoding is generated to represent the user's face. During transactions, a live image is captured using OpenCV and processed with Dlib, and Euclidean Distance is used to compare facial encodings. User PINs are securely protected using Bcrypt hashing for enhanced authentication.

Keywords: Unified Payments Interface (UPI), Face Recognition, Biometric Authentication, Computer Vision, Machine Learning, Deep Learning, Histogram of Oriented Gradients (HOG), ResNet-34, Facial Encoding, Euclidean Distance, OpenCV, Dlib, Bcrypt Hashing, Digital Payment Security, Real-Time Authentication.

ICSICA-2026-221

ML and IoT-Based Domestic Electrical Overload Prediction and Protection System

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ABSTRACT

Domestic electrical overload is one of the major causes of residential electrical fires and appliance damage. Conventional protection systems such as fuses and Miniature Circuit Breakers (MCBs) operate only after the overload condition has already occurred. This paper proposes an ML and IoT-Based Domestic Electrical Overload Prediction and Protection System that predicts overload conditions before critical thresholds are exceeded. The proposed system integrates current and voltage sensors with a microcontroller-based IoT module for real-time monitoring of electrical parameters. Collected data is transmitted to a cloud platform where machine learning algorithms such as Random Forest and LSTM(Long Short-Term Memory) analyze load patterns and predict potential overload risks. When the predicted load exceeds a safe threshold, the system automatically disconnects the supply using a smart relay and sends alerts to the user via a mobile application. Experimental results show high prediction accuracy and faster preventive response compared to traditional circuit protection methods. The system enhances electrical safety, reduces fire hazards, and supports smart home energy management.

Keywords: Machine Learning, Internet of Things (IoT), Electrical Overload Prediction, Smart Home, Load Forecasting, Smart Protection System.

ICSICA-2026-222

Analysis of Agriculture Data Using Crops Wastage Assessment in Floods Using Geo Spatial Information

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ABSTRACT

The agriculture sector faces strong impacts due to the effects of climate changes and leaving its impression on India's food economy and are likely to threaten both the welfare of Nation's and world's population and also the economic development of global society. Our country is surrounded with lands and water, hence major part of our economy depends on agriculture. Among several crops most farmers choose banana crops to cultivate on their lands, for the reason of cost of effective on cultivation than other types. This is also the reason, why the farmers face drastic losses, when excessive rainfall and extremely high temperature can reduce banana productivity while the production is also small when rainfalls are very low poor humidity. Here, we are going to investigate the losses faced over banana crops using the data obtained within 2012-2018 from Geographical map and remote sensing images, then we are going to develop the trained mode by using historical data obtained and going to provide a good prediction on the risk degree of banana crop cultivation.

Keywords: - Global society, Geographical, Cultivation, Historical data.

ICSICA-2026-223

A Lightweight and Parameter-Efficient FUSCANet using MobileViT-XXS for Skin Lesion Classification

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ABSTRACT

Skin diseases are becoming increasingly common, and early detection plays an important role for proper treatment and increased patient survival rates. Classification models based on deep learning have shown promising results in dermoscopic image analysis. However, most models that have shown high classification accuracy have large parameter counts and high computational complexities, which are limitations for resource-constrained systems. In this study, a parameter-efficient variant of the FUSCANet model is proposed by replacing the backbone model with a MobileViT-XXS model for efficient classification and resource usage. The proposed model retains the benefits of the original model's multi-scale feature aggregation and attention mechanisms while reducing the number of learnable parameters. Experiments were conducted using three dermoscopic image datasets that are publicly available: HAM10000, ISIC 2019, and PAD-UFES-20. The experimental results show that the proposed model efficiently reduces the number of learnable parameters from 5.27M to 1.23M, a reduction of approximately 76%. The proposed model achieves high classification accuracy of 88.42%, 84.11%, and 91.90% on the three datasets, respectively. Overall, the proposed model provides a good balance between accuracy and efficiency, making it suitable for mobile-based healthcare applications.

Keywords: Skin Disease Classification, Deep Learning, Dermoscopic Image Analysis, FUSCANet, MobileViT-XXS, Parameter Efficiency, Lightweight Models, Medical Image Classification, Multi-Scale Feature Aggregation, Attention Mechanisms, Resource-Constrained Systems, HAM10000, ISIC 2019, PAD-UFES-20, Mobile Healthcare Applications.

ICSICA-2026-224

SDR-Based Self-Healing Virtual Gateways for Resilient IoT Communication

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ABSTRACT

LoRaWAN has emerged as a key communication technology for large-scale Internet of Things (IoT) deployments due to its low power consumption and long-range capabilities. However, its performance is significantly affected by gateway failures, network congestion, and static infrastructure limitations. This paper proposes a multi-layer adaptive LoRaWAN framework that enhances network reliability through the integration of physical layer optimization, network-layer fault tolerance, and an intelligence-driven prediction mechanism.

A novel self-healing approach is introduced using Software Defined Radio (SDR) to dynamically instantiate virtual gateways in response to gateway failures or overload conditions. This enables uninterrupted communication without requiring additional physical infrastructure. Furthermore, the framework incorporates predictive reliability modelling to anticipate network disruptions and optimize resource allocation.

The proposed system is evaluated through simulation, demonstrating improvements in packet delivery ratio, reduced recovery time, and enhanced network resilience compared to traditional LoRaWAN deployments. The results highlight the effectiveness of combining adaptive optimization, autonomous recovery, and predictive intelligence in next-generation IoT communication systems.

Keywords: LoRaWAN, Self-Healing Networks, Software Defined Radio (SDR), Virtual Gateways, Fault Tolerance, IoT, Network Resilience, Federated Learning.

Greenbot:AI-Driven Smart Robotic System for Sustainable Greenhouse Management

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ABSTRACT

The Automation of agriculture plays a vital role in improving efficiency, reducing crop loss, and yielding better quality harvests. In this Paper, an AI-driven autonomous rover is proposed that is particularly developed for real-time detection and removal of rotten tomatoes to enhance crop management. The system utilizes YOLOv8, a cutting-edge deep learning algorithm, for precise image classification, thus ensuring efficient detection of rotten tomatoes with high accuracy. Upon detection, a robotic arm is triggered to remove the infected tomatoes, thus preventing contamination and maintaining healthy crops. For enhancing autonomous mobility and optimizing the effectiveness of operations, the robot is equipped with ultrasonic sensors for smart object detection and avoidance of obstacles. Additionally, the sensors continuously monitor temperature and humidity levels, thus ensuring optimal environmental conditions for field operations. Manual crop inspection and removal of damaged crops through traditional means is time-consuming, labour-intensive, and prone to variability. Conversely, the proposed system employs AI-based automation, thus enhancing detection accuracy by 40%, labour dependency by 35%, and overall harvesting efficiency by 25%. By leveraging cutting-edge computer vision, robotics, and precision agriculture, this research proposes a scalable and smart solution for modern farming practices.

Keywords—YOLO v8, Robotic Arm, Object Detection, Autonomous.

ICSICA-2026-226

An efficient load balancing technique with fast convergence and global optimization in cloud environments

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ABSTRACT

Cloud computing refers to the provision of resources to deliver internet-based services to end-users in a dynamic manner. However, the implementation of cloud computing faces a number of challenges, including security, scheduling, resource discovery, and load balancing. As a result, there has been a growing interest in developing static and dynamic algorithms that can achieve optimal results, with Swarm Intelligence (SI) proposed as a potential solution for load balancing in cloud computing. While there are several alternatives, such as genetic algorithm, ACO, PSO, BAT, GWO, and others, none of them have considered load balancing convergence time with global optimization. This research focuses on Particle Swarm Optimization (PSO) and Grey Wolf Optimization (GWO), and proposes a combined GWO-PSO approach that leverages the benefits of fast convergence and global optimization to enhance system efficiency and resource allocation, ultimately solving the load-balancing challenge. Compared to traditional approaches, the proposed technique achieves globally optimized fast convergence and reduces overall response time, with an average reduction of 12% in comparison to other algorithms. The research findings are promising, indicating the potential for significant improvements in load balancing within cloud computing.

Keywords: Cloud Computing, Load Balancing, Swarm Intelligence, Particle Swarm Optimization (PSO), Grey Wolf Optimization (GWO), Hybrid GWO-PSO, Resource Allocation, Task Scheduling, Convergence Time, Global Optimization.

ICSICA-2026-227

Railway Foreign Objects Real Time Detection using YOLO

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ABSTRACT

Railway safety is a critical concern due to frequent accidents and severe damage to trains caused by foreign object intrusions on railway tracks. Traditional detection methods are limited by technology and environment and are costly and inefficient for large-scale detection. To address this issue, this project proposes a real-time railway intrusion detection system using advanced deep learning techniques. The proposed solution enhances railway safety by enabling continuous monitoring and providing an effective early warning system. A YOLOv11s-based object detection model is employed to accurately identify and classify foreign objects from live video streams captured by trackside cameras. The system processes each frame in real time and generates alerts whenever a potential threat is detected by using the YOLOv11s detection algorithm and Non-Maximum Suppression algorithm in the foreign object detection model. The PTZ Long-Range Camera are used for the long distances object detections. This model increases the detection accuracy by 90% compared to the traditional methods and this proposed system provides the AAD system used for discouraging animals' intrusion in railway tracks. Experimental results demonstrate improved detection accuracy, faster response time, and a reduced number of parameters compared to conventional machine learning approaches, making the system reliable and suitable for practical railway safety applications.

Keywords: Railway Safety, Intrusion Detection System, Deep Learning, YOLOv11s, Object Detection, Foreign Object Detection, Real-Time Monitoring, Computer Vision, Non-Maximum Suppression (NMS), PTZ Cameras, Long-Range Detection, Early Warning System, Video Analytics, Animal Intrusion Prevention, Automated Alert System.

ICSICA-2026-228

Card Health Sphere: An Integrated Digital Platform for Smart Healthcare Management and Emergency Response

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ABSTRACT

Card Health Sphere is an integrated digital healthcare platform designed to enhance patient care, streamline hospital operations, and enable community-driven medical support. The application provides a dual-interface system consisting of a user end and a hospital end, ensuring efficient interaction between patients and healthcare providers. At the user level, individuals can book doctor appointments seamlessly through an intelligent scheduling system that identifies available time slots and allocates appointments accordingly. On the hospital side, the platform includes an emergency SOS feature for critical blood requirements. When activated, this feature sends instant SMS alerts to all registered users, enabling rapid response and improving the chances of timely blood donation. Overall, Card Health Sphere aims to bridge the gap between patients and healthcare services by integrating appointment management, health monitoring, and emergency communication into a single unified system. This solution promotes proactive healthcare, efficient hospital coordination, and community participation in life-saving situations.

Keywords: Digital Healthcare Platform, Patient Care, Appointment Scheduling, Hospital Management System, Health Monitoring, Body Mass Index (BMI), Personalized Diet Recommendation, Blood Donation System, Emergency SOS, SMS Alert System, Community Healthcare, Telehealth, Healthcare Automation, E-Health System, Medical Data Management.

AI based Smart Energy Management System for Homes

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ABSTRACT

The rapid increase in electricity consumption has created a need for efficient energy management systems in residential areas. This project presents a smart energy management system that monitors and controls household electrical appliances using modern technologies. The system collects data such as voltage, current, temperature, and occupancy through sensors and processes using a micro controller. Based on this data, the system can automatically control appliances to reduce unnecessary power usage. The integration of basic machine learning techniques allows the system to analyze user behavior and predict energy usage patterns. It also provides real-time monitoring and control through a mobile or web interface using IoT technology. The system helps in minimizing energy wastage, reducing electricity bills, and promoting efficient usage of resources.

The project uses components such as Arduino or Raspberry Pi, relay modules, and current sensors, along with software tools like Python and embedded C. Overall, this system offers practical and scalable solution for smart homes and contributes to energy conservation.

Keywords: Smart Energy Management System, Internet of Things (IoT), Energy Monitoring, Energy Efficiency, Smart Home Automation, Machine Learning, Energy Consumption Prediction, Arduino, Raspberry Pi, Sensor-Based Systems, Real-Time Monitoring, Load Control, Embedded Systems, Power Optimization, Energy Conservation.

Keywords: Smart Energy Management System, Internet of Things (IoT), Energy Efficiency, Smart Home Automation, Machine Learning, Energy Consumption Prediction, Real-Time Monitoring, Embedded Systems, Power Optimization, Energy Conservation.

ICSICA-2026-230

AI Based Offensive Content Detection with Automated Warning and Complaint System

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ABSTRACT

Due to the lack of awareness of asymptomatic eye diseases like diabetic retinopathy and glaucoma many people lose the chance of getting treatment before they lose their vision. The current methods of diagnosing this disease involve the usage of a machinery called slit lamp which is expensive and non-portable. In rural campsites, doctors are unable to examine the patients due to the lacking of equipment. The proposed method involves using portable fundus camera which takes the image of the retina and gets processed by an application. The image is normalized using Contrast Limited Adaptive Histogram Equalization (CLAHE) which acts as an image filter which removes the noise and enhances the image. The Deep learning model – ResNet50 layer acts as feature extractor and classifier which predicts the result and probability of the disease. It uses Global Average Pooling (GAP) to generate a heatmap which is blended with original CLAHE-enhanced image. The Grad CAM converts the normal heatmap into a Colour-Code Pooling. This method is capable to replace the current techniques and increase the availability of healthcare for people anywhere in the world.

Keywords: Diabetic retinopathy, glaucoma, Contrast Adaptive Histogram Equalization (CLAHE), ResNet50, Global Average Pooling (GAP), Grad CAM

ICSICA-2026-231

Intelligent Credit Card Transaction Monitoring and Fraud Detection Using Machine Learning

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ABSTRACT

Credit card fraud has become a significant challenge in the digital economy due to the rapid growth of online transactions and evolving attack strategies. Traditional rule-based detection systems often fail to identify sophisticated and previously unseen fraudulent activities. This research proposes an intelligent, real-time credit card transaction monitoring and fraud detection system using machine learning techniques. The proposed system leverages historical transaction data to train predictive models capable of distinguishing between legitimate and fraudulent activities. Features such as transaction amount, location, time patterns, and user behaviour are analysed to detect anomalies. Advanced machine learning algorithms such as Random Forest, Support Vector Machine, and Neural Networks are employed to improve detection accuracy while minimizing false positives. To address the dynamic nature of fraud, the system incorporates real-time data processing and adaptive learning mechanisms. Experimental results demonstrate improved accuracy and efficiency compared to traditional methods.

Keywords: Credit Card Fraud Detection, Machine Learning, Real-Time Monitoring, Anomaly Detection, Financial Security, Classification Algorithms, Data Imbalance, Predictive Analytics

ICSICA-2026-232

Clothing Style Recommendation System Using Machine Learning

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ABSTRACT

In the era of digital commerce and personalized user experiences, clothing recommendation systems play a vital role in enhancing customer satisfaction and engagement. This project presents a real-time clothing style recommendation system that utilizes machine learning techniques to suggest outfits based on user preferences, trends, and contextual factors. Unlike traditional recommendation approaches that rely only on purchase history, the proposed system incorporates multiple parameters such as user demographics, style preferences, colour choices, seasonal trends, and occasion-based requirements. The system employs a hybrid recommendation approach combining content-based filtering and collaborative filtering to improve accuracy and personalization. Image-based analysis is also integrated using feature extraction techniques to understand clothing patterns, textures, and categories. Additionally, the model continuously adapts to user interactions, enabling dynamic updates and more relevant suggestions over time. Experimental evaluation demonstrates that the proposed system provides more precise and personalized recommendations compared to conventional methods. This approach can be effectively implemented in e-commerce platforms and fashion applications to improve user experience, increase engagement, and drive sales. The system also has potential for future enhancements using deep learning and real-time trend analytics.

Keywords: Clothing Recommendation System, Machine Learning, Fashion Analytics, Personalization, Collaborative Filtering, Content-Based Filtering, Image Processing, User Behaviour Analysis, E-commerce, Trend Prediction

ICSICA-2026-233

Self Healing Cloud Infrastructure Using AI

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ABSTRACT

The Self-Healing Cloud Infrastructure Using AI project explores the integration of intelligent algorithms with cloud computing to create autonomous, adaptive environments capable of self-maintenance. Modern cloud systems face challenges such as unexpected hardware failures, network congestion, and application performance degradation, which can lead to costly downtime and service disruptions. This project addresses these challenges by implementing continuous monitoring of critical infrastructure components, including servers, virtual machines, network traffic, and application processes. Using AI-driven predictive analytics, the system identifies anomalies, patterns, and early warning signals indicative of potential failures. Once a threat is detected, the AI engine executes corrective actions autonomously, such as dynamic resource scaling, service migration, and configuration optimization, without requiring human intervention. By combining real-time monitoring, machine learning-based forecasting, and automated remediation, the system enhances resilience, ensures high availability, and improves overall operational efficiency. Furthermore, the architecture is designed to adapt and learn from evolving workloads and past incidents, refining its predictive accuracy and response strategies over time.

Keywords: Self-Healing Cloud, Artificial Intelligence, Anomaly Detection, Predictive Maintenance, Autonomous Recovery, Machine Learning, Cloud Computing, LSTM, Isolation Forest, Reinforcement Learning, Kubernetes, Prometheus.

ICSICA-2026-234

AI-Based Predictive Maintenance System for Industrial Equipment

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ABSTRACT

Industrial equipment failures cause severe operational disruptions, financial losses estimated at billions of dollars annually, and significant safety hazards across manufacturing, energy, and process industries. Traditional maintenance strategies — reactive and time-based preventive approaches — are inefficient, costly, and unable to anticipate failures before they occur. This paper presents an AI-Based Predictive Maintenance System (AI-PdMS) for industrial equipment that leverages multimodal sensor data, advanced signal processing, and machine learning algorithms to predict equipment failures before they manifest. The proposed system integrates real-time data acquisition from vibration, temperature, acoustic emission, current, and pressure sensors deployed on industrial machinery. The system incorporates digital twin simulation, anomaly detection via Isolation Forest, and SHAP-based explainability for maintenance decision transparency. Evaluated on the NASA CMAPSS, PRONOSTIA bearing, and MIMII industrial datasets, the proposed CNN-LSTM model achieves a Remaining Useful Life (RUL) prediction RMSE of 12.4 cycles, fault classification accuracy of 96.3%, and false alarm rate of 2.1%, outperforming baseline models including SVM, Random Forest, and standalone LSTM.

Keywords: Predictive Maintenance, CNN-LSTM, Remaining Useful Life (RUL), Industrial IoT (IIoT), Anomaly Detection, Digital Twin, Explainable AI (XAI), Fault Diagnosis

ICSICA-2026-235

Scalable Big Data Processing System

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ABSTRACT

The exponential growth of data generated from social media platforms, IoT sensors, financial systems, and online applications has rendered traditional on-premise data processing infrastructures inadequate in terms of scalability, throughput, and cost efficiency. This paper presents the design and implementation of a scalable big data processing system built on Amazon Elastic MapReduce (AWS EMR), a fully managed cloud-based framework that leverages distributed computing paradigms to process massive datasets efficiently. The proposed architecture integrates Amazon S3 for durable data storage, Apache Spark for in-memory distributed processing, Apache Hadoop for batch MapReduce workloads, and AWS Step Functions for automated job orchestration. The system incorporates dynamic auto-scaling policies that adjust cluster size in response to real-time workload demand, optimizing both processing throughput and operational cost. Experimental evaluation demonstrates that the AWS EMR-based pipeline achieves up to $8.9\times$ speedup over single-node on-premise baselines on a 50 GB dataset, scaling sub-linearly to process 5 TB workloads across 32 nodes in under 49 minutes.

Keywords: Big Data, AWS EMR, Apache Spark, Hadoop, Distributed Computing, Cloud Computing, Auto-Scaling, Amazon S3, MapReduce, Data Analytics

ICSICA-2026-236

Analyzing Entanglement-Based Cyber Threats in Post-Quantum Secure Networks

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ABSTRACT

The rapid advancement of quantum computing poses a serious threat to classical cryptographic systems, making it essential to build networks that can withstand quantum-level attacks. This paper focuses on analyzing cyber threats that arise from quantum entanglement in post-quantum secure networks. Quantum entanglement, while a powerful resource for secure communication, can also be exploited by attackers to perform covert channel attacks, intercept key distribution, and compromise quantum key exchange protocols. The proposed framework uses machine learning models including Random Forest, XGBoost, and an LSTM-based anomaly detection module to identify and classify entanglement-based threat patterns across simulated quantum network traffic. A total of 800 simulated network sessions across 15 threat categories were used for evaluation. The system achieves 93.7% threat detection accuracy and reduces false positives by 87.2% compared to traditional intrusion detection systems. SHAP-based explainability is applied to provide transparent threat attribution, helping security analysts understand why a specific session was flagged.

Keywords: Quantum Entanglement, Post-Quantum Cryptography, Cyber Threats, Quantum Key Distribution, Anomaly Detection, Machine Learning, LSTM, XGBoost, SHAP, Intrusion Detection, Quantum Network Security

ICSICA-2026-237

AI-Driven Student Placement Prediction and Analytics Dashboard Using Machine Learning

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ABSTRACT

This paper presents the College Placement Prediction Dashboard (CPPD), an AI-driven machine learning system that forecasts student placement outcomes with high accuracy and delivers actionable insights through an interactive, role-differentiated analytics platform. The system integrates 18 multi-dimensional student attributes encompassing academic performance, aptitude scores, technical competency, and soft skill evaluations to generate real-time, interpretable placement probability scores. A dataset of 5,000 student records across 14 departments was used for model training and evaluation. An ensemble classifier combining Random Forest, XGBoost, and Support Vector Machine via soft-voting achieved 91.0% accuracy, 90.5% precision, 93.2% recall, and 91.8% F1-score. SHAP-based model interpretability provides transparent per-student feature contribution reports. A role-based interactive dashboard (Student, Faculty, Admin) was developed in Streamlit and validated through a 362-participant user study yielding a System Usability Scale score of 84.6.

Keywords: Placement Prediction, Machine Learning, Ensemble Classifier, SHAP, Explainable AI, Student Analytics, Random Forest, XGBoost, SVM, Streamlit Dashboard

ICSICA-2026-238

AI Intelligence Service Prediction & Automatic System

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ABSTRACT

The rapid growth of Artificial Intelligence (AI) and data-driven technologies has revolutionized modern service management systems. This project presents an AI-Based Intelligent Service Prediction and Automation System aimed at improving efficiency, accuracy, and scalability in service-oriented environments. Traditional service systems largely depend on manual monitoring and reactive decision-making, which often leads to delays, inefficiencies, and increased operational costs. The proposed system integrates predictive analytics and automation into a unified intelligent framework. The system utilizes historical service data to identify patterns and trends using advanced machine learning techniques. Supervised learning algorithms such as Random Forest and XGBoost are employed to predict future service demands and classify service requirements. In addition to prediction, the system incorporates an automation layer that triggers predefined actions based on predicted outcomes, reducing human intervention and minimizing errors. A user-friendly dashboard is developed to visualize real-time insights, predictions, and system performance metrics. The system demonstrates high prediction accuracy and improved operational efficiency, applicable in IT services, healthcare, banking, and customer support domains.

Keywords: AI Service Prediction, Automation, Machine Learning, Random Forest, XGBoost, Predictive Analytics, Real-Time Dashboard, Operational Efficiency

ICSICA-2026-239

Smart Helmet Violation Detection System with Automated Fine Escalation

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ABSTRACT

Road accidents caused by motorcyclists not wearing helmets remain a serious road safety issue. This paper presents a Smart Helmet Violation Detection and Automated Fine Management System leveraging computer vision and deep learning to detect riders without helmets in real-time traffic surveillance footage. A YOLOv8-based model identifies violations, license plate recognition (LPR) determines the vehicle owner, and the system automatically generates digital fines with SMS/email notifications. An automated escalation mechanism increases penalties for unpaid fines after a 10-day deadline, and all violation data is securely stored in a centralized MySQL database. Experimental evaluation demonstrates helmet detection accuracy of 95.8% and license plate recognition accuracy of 96.3%. The system operates 24/7 without human intervention and significantly reduces manual enforcement workload.

Keywords: Helmet Detection, YOLOv8, License Plate Recognition, OpenCV, EasyOCR, Traffic Enforcement, Fine Escalation, Deep Learning, Computer Vision, MySQL, Flask, Road Safety

ICSICA-2026-240

AI and ML Based Smart Nanorobot Simulation for Targeted Cancer Therapy with Tissue Regeneration

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ABSTRACT

Cancer is one of the leading causes of death worldwide, and existing treatments like chemotherapy and radiation often damage healthy tissues along with cancerous ones. This paper proposes NanoHeal AI, a smart nanorobot simulation system powered by Artificial Intelligence and Machine Learning, designed to deliver drugs precisely to cancer cells while supporting tissue regeneration. The system employs a multi-model pipeline consisting of K-Means clustering for tumor environment profiling, Random Forest and XGBoost classifiers for real-time cancer cell identification, and a Deep Q-Network reinforcement learning agent for adaptive nanorobot navigation and controlled drug release. An LSTM network predicts tissue regeneration progress over time, enabling dynamic treatment adjustment. Tested on a simulation of 500 nanorobots across 1,200 patient profiles with 10,000 Monte Carlo iterations, the system achieves 96.3% drug delivery accuracy, 98.7% reduction in off-target toxicity, and 92.8% tissue regeneration prediction accuracy at the 30-day mark.

Keywords: Nanorobot Simulation, Targeted Cancer Therapy, Tissue Regeneration, Machine Learning, Reinforcement Learning, Deep Q-Network, Explainable AI, LSTM, XGBoost, SHAP, Precision Oncology

ICSICA-2026-241

Data-Driven Decision Making for Optimising Logistics Operations

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ABSTRACT

Efficient logistics operations are critical to modern supply chain performance, yet conventional systems often rely on manual planning, fixed rules, and heuristic decision-making, leading to higher operational costs, delays, and suboptimal resource utilization. This project introduces a data-driven framework for optimizing logistics by leveraging real-time and historical operational data. Key metrics, including delivery bids, estimated arrival times, driver performance scores, traffic conditions, and route efficiency, are systematically collected and analyzed using advanced evaluation algorithms. The system generates actionable recommendations for driver allocation, route selection, and dynamic pricing, ensuring decisions are both objective and optimized for cost, speed, and reliability. By integrating continuous feedback loops, the model adapts to changing conditions, learns from prior outcomes, and refines future decision-making, fostering a self-improving logistics ecosystem.

Keywords: Logistics Optimization, Data-Driven Decision-Making, Predictive Analytics, Route Planning, Driver Allocation, Operational Efficiency, Intelligent Systems, Supply Chain Management, Real-Time Monitoring.

ICSICA-2026-242

FarmShield: Automated Crop Protection Framework with Real-Time Wildlife Recognition and Deterrence Mechanism

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ABSTRACT

Crop damage caused by wildlife intrusion is a major challenge faced by farmers, especially in rural and forest-adjacent agricultural areas. Traditional protection methods such as manual guarding, fencing, and scare devices are often inefficient, labor-intensive, and unreliable during nighttime. To address this problem, this project proposes FarmShield: an Automated Crop Protection Framework with Real-Time Wildlife Recognition and Deterrence Mechanism. The system uses artificial intelligence and computer vision techniques to automatically detect and identify animals entering farmland in real time. The proposed framework employs a camera-based monitoring system integrated with an AI-powered object detection model to recognize wildlife from live video streams. Once an animal is detected, the system triggers an automated deterrence mechanism such as ultrasonic sound, alarm signals, or flashing lights to scare the animal away. In addition, the system sends real-time alerts to the farmer's mobile device, enabling remote monitoring and quick response.

Keywords: Animal Detection, Smart Agriculture, Computer Vision, YOLO, OpenCV, Raspberry Pi, IoT, Twilio, Ultrasonic Repellent System

ICSICA-2026-243

BlockCare: A Blockchain-Based Mobile Application for Secure Patient Consent and Medical Data Access Control

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ABSTRACT

In recent years, the healthcare sector has faced serious challenges in managing patient medical records securely and transparently. Traditional medical data management systems are centralized, making them vulnerable to data tampering, unauthorized access, and privacy breaches. This project proposes BlockCare, a blockchain-based mobile application designed to provide secure, transparent, and patient-centric medical data access through a consent management mechanism. Patients can upload their medical records and grant temporary or permanent access to doctors and hospitals using smart contracts. Every consent approval, access request, and data transaction is recorded on the blockchain, ensuring immutability and accountability. The application ensures that only authorized medical professionals can access patient data based on granted permissions. Patients can monitor access history and revoke permissions at any time. By integrating blockchain technology with a mobile application, the proposed system enhances data security, prevents unauthorized modifications, and improves trust among patients, doctors, and healthcare providers.

Keywords: Blockchain, Smart Contracts, Patient Consent Management, Healthcare Data Security, Decentralized Storage, Medical Data Access Control, Privacy Preservation, Auditability, Mobile Health Application, Secure Data Sharing

ICSICA-2026-244

Blockchain and Pioneering New Dimensions in Metaverse Marketing

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ABSTRACT

New opportunities in digital marketing, notably in the Metaverse, have been made possible by the rising use of 6G networks and blockchain technology. This paper examines the possibilities of blockchain-based digital marketing within the context of 6G networks and the Metaverse. It explores the application of blockchain technology in digital marketing, considers its benefits and drawbacks, examines how it interacts with 6G networks and the Metaverse, and offers potential uses for blockchain-focused digital marketing in the Metaverse. Through a literature review, a proposed system model, and data collection and analysis, the authors found that blockchain technology can provide improved security and transparency for digital asset transactions, as well as better management of user profiles. Furthermore, simulation results show that average network capacity is in the order of terabits per second, enabling the Metaverse's high-bandwidth and low-latency requirements.

Keywords: Blockchain, Metaverse, Digital Marketing, 6G Networks, Smart Contracts, Virtual Marketplace, NFT, Decentralized System

ICSICA-2026-245

AI-Based Threat Intelligence Platform for Proactive Cyber Defence

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ABSTRACT

Cyber threats are evolving at an unprecedented pace, with attackers employing sophisticated and adaptive techniques that traditional reactive security systems fail to address effectively. This project presents the design and development of an AI-Based Threat Intelligence Platform for Proactive Cyber Defence, aimed at detecting and neutralizing cyber threats before they cause significant damage. The proposed platform integrates machine learning algorithms, natural language processing (NLP), and real-time threat data aggregation to build a comprehensive and intelligent threat detection system. The system continuously collects and analyzes threat feeds from multiple sources including open-source intelligence (OSINT), dark web monitoring, and network traffic logs to identify emerging attack patterns and indicators of compromise (IOC). A deep learning model is trained on historical cyber incident datasets to classify threats, predict attack vectors, and generate automated threat intelligence reports. An alert and response mechanism is integrated to notify security teams and initiate predefined countermeasures upon threat detection.

Keywords: Threat Intelligence, Machine Learning, Deep Learning, Cyber Defence, NLP, OSINT, Indicators of Compromise, Intrusion Detection, Proactive Security, Cybersecurity

ICSICA-2026-246

AI-Powered Image and Video Analysis for Security Surveillance

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ABSTRACT

Urbanization has intensified security challenges, demanding advanced monitoring systems capable of real-time analysis and rapid response. Conventional surveillance methods, relying on human observation, are inefficient and prone to errors, often resulting in delayed detection of threats. This study presents an AI-powered image and video analysis framework designed to enhance security surveillance by automating detection, classification, and tracking of critical objects and behaviours. Video streams from CCTV cameras are first pre-processed to improve clarity and reduce noise. Subsequently, convolutional neural networks (CNNs) extract spatial and temporal features, enabling precise identification of humans, vehicles, and anomalous activities. The system continuously monitors object trajectories, recognizes patterns indicative of suspicious behaviour, and generates real-time alerts for potential security breaches. The proposed approach minimizes false alarms, reduces human intervention, and provides actionable insights for security personnel, offering a scalable and adaptable solution for modern security requirements.

Keywords: AI Surveillance, Computer Vision, CNN, Object Detection, Real-Time Monitoring, Video Analysis, Anomaly Detection, Security, Deep Learning

ICSICA-2026-247

Application for Artists and Creatives (CreativeHub)

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ABSTRACT

The digital revolution has fundamentally transformed how artists and creative professionals produce, share, and monetize their work. This paper presents the design, architecture, and evaluation of a comprehensive mobile and web application tailored specifically for artists and creatives, named CreativeHub. The proposed platform integrates a multi-layer digital drawing studio, AI-powered creative assistance, portfolio management, real-time client collaboration, and an integrated e-commerce marketplace into a single unified environment. The system employs a microservices architecture with a React Native front-end, a Node.js back-end, MongoDB data layer, and an on-device TensorFlow Lite model for low-latency style analysis. A prototype evaluation with 75 participants over four weeks demonstrated a 35% reduction in application-switching overhead, a 28% increase in completed creative projects, and an average user satisfaction score of 4.4 out of 5.0.

Keywords: Digital Art Application, Creative Platform, Portfolio Management, AI-Assisted Design, Artist Collaboration, E-Commerce, Mobile Computing, Microservices Architecture, TensorFlow Lite, React Native

ICSICA-2026-248

Blockchain-Enabled Secure Federated Learning for Cyber Threat Intelligence Sharing

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ABSTRACT

The proliferation of sophisticated cyber threats demands timely and accurate threat intelligence sharing among organizations. However, privacy concerns, data sovereignty regulations, and adversarial risks impede effective collaboration. This paper proposes BlockFedCTI, a blockchain-enabled secure federated learning framework for cyber threat intelligence (CTI) sharing. BlockFedCTI leverages federated learning to train a global intrusion detection model across distributed organizations without sharing raw data, while employing a permissioned blockchain to ensure transparent, immutable, and auditable aggregation of model updates. A novel reputation-weighted gradient aggregation mechanism filters poisoned updates from malicious participants, and a zero-knowledge proof (ZKP) layer authenticates contributions without exposing proprietary threat data. Experimental evaluation on three real-world intrusion datasets — NSL-KDD, UNSW-NB15, and CIC-IDS2018 — demonstrates that BlockFedCTI achieves a detection accuracy of 97.4%, reduces false positive rate by 38% compared to isolated local models, and maintains Byzantine fault tolerance under 30% adversarial participant ratios.

Keywords: Federated Learning, Blockchain, Cyber Threat Intelligence, Privacy-Preserving, Intrusion Detection, Zero-Knowledge Proof, Gradient Aggregation, Byzantine Fault Tolerance

ICSICA-2026-249

Real-Time 3D Avatar Synthesis for Indian Sign Language

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ABSTRACT

This paper presents a real-time, bidirectional communication system designed to bridge interactions between hearing individuals and people who are deaf or speech-impaired. The system translates Indian Sign Language (ISL) into speech and converts spoken language into animated visual gestures via a 3D virtual avatar, enabling natural and inclusive communication. Using computer vision and deep learning, the system employs Convolutional Neural Networks (CNNs) and a YOLO-based object detection model to recognize both static and dynamic hand gestures captured through live video streams. Recognized gestures are converted to text and synthesized into speech using Text-to-Speech (TTS) engines. Conversely, Automatic Speech Recognition (ASR) processes spoken input and generates corresponding ISL animations through a virtual avatar. The system integrates Google Gemini AI for semantic interpretation of detected signs. Built with Python, Flask, and OpenCV, the platform operates at 15–25 FPS on commodity hardware with end-to-end latency under 500 ms.

Keywords: Indian Sign Language, 3D Avatar Synthesis, Gesture Recognition, Automatic Speech Recognition, CNN, YOLO, Deep Learning, Assistive Technology, Real-Time Communication, Text-to-Speech, Computer Vision

ICSICA-2026-250

Automated ATS Format Resume Making

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ABSTRACT

In today's highly competitive job market, a well-structured and impactful resume is essential for securing employment opportunities. Traditional resume creation methods can be time-consuming, challenging to tailor for specific roles, and often fail to meet Applicant Tracking System (ATS) requirements. The AI-Powered Resume Generator is a web-based application designed to address these challenges by leveraging artificial intelligence to simplify and enhance the resume creation process. The platform provides an intuitive interface that guides users step-by-step, offering customizable templates, AI-driven content suggestions, and keyword optimization based on targeted job descriptions. It ensures ATS compatibility, enabling resumes to pass automated screening processes effectively. Additionally, the system incorporates real-time grammar and formatting checks, along with personalized recommendations to improve clarity, professionalism, and impact. By analyzing user-provided information, including skills, experience, and educational background, the AI Resume Maker generates industry-specific resumes tailored to the user's profile.

Keywords: AI Resume Maker, Resume Generation, Applicant Tracking System, Automation, Keyword Optimization, Professional Resume, Career Support

ICSICA-2026-251

NovaScribe: A Unified Generative Platform for Coherent Story and Art Creation

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ABSTRACT

The evolution of creative workflows has increasingly embraced generative intelligence as a catalyst for innovation. This study introduces NovaScribe, a unified platform that synthesizes narrative composition and visual artistry within a coherent generative framework. By leveraging advanced Large Language Models (LLMs) and diffusion-based image synthesis, the platform transforms abstract conceptual prompts into structured storylines, multidimensional characters, and immersive environmental settings, simultaneously generating high-fidelity visuals that reflect narrative intricacies. A distinctive Contextual Bridge ensures semantic alignment between textual and visual outputs, preserving thematic consistency, mood continuity, and character fidelity across mediums. Applications span from graphic novels and children's literature to marketing assets and interactive storytelling, illustrating the versatility of the unified framework.

Keywords: Generative AI, Cross-Modal Synthesis, Narrative Design, Visual Storytelling, Human-AI Collaboration, Creative Workflows, Computational Creativity, Content Prototyping, Aesthetic Coherence

ICSICA-2026-252

HumanShield AI: A Proactive Machine Learning Framework for Predicting Cybersecurity Incidents Caused by Human Error

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ABSTRACT

HumanShield AI is a proactive machine learning framework designed to predict cybersecurity incidents caused by human error before they occur. Human error is the leading cause of cybersecurity breaches worldwide, contributing to over 95% of all incidents. Traditional security tools are fundamentally reactive, triggering alerts only after a breach has materialized. The proposed system monitors 90 days of daily behavioral data across 1,000 users and applies a five-model ML pipeline: K-Means and DBSCAN unsupervised clustering, Random Forest and XGBoost supervised classification, and LSTM time-series forecasting. All predictions are made fully explainable through SHAP values, providing security teams with transparent, per-user risk attribution. System outputs include a Risk Level (Low/Medium/High), a numerical Risk Score (0–100), and personalized remediation recommendations delivered through an interactive React.js dashboard backed by a MongoDB data store. Evaluated on a 1,000-user behavioral dataset, the ensemble classifier achieves 94.2% accuracy and the LSTM forecaster attains 91.4% seven-day risk-tier prediction accuracy.

Keywords: Human Error, Cybersecurity, Behavioral Analytics, Insider Threat, Machine Learning, Anomaly Detection, LSTM, XGBoost, SHAP, Explainable AI

ICSICA-2026-253

AI-Based Mental Health Chatbot System with Emotion Detection and Early Depression Alert

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ABSTRACT

Mental health problems such as depression and anxiety are becoming increasingly common across the world, affecting people of all age groups and reducing their overall quality of life. The proposed system introduces an AI-based Mental Health Chatbot designed to provide continuous emotional support and assist in the early detection of depression. The system enables users to interact with an intelligent chatbot capable of understanding human conversations using Natural Language Processing (NLP) and Recurrent Neural Networks (RNN). Through conversational analysis, the chatbot identifies emotional patterns in user responses and provides personalized suggestions such as music, games, and movies to help improve the user's mood and mental well-being. The system also integrates a facial emotion recognition module that utilizes the Grassmann algorithm to analyze facial expressions. When the system detects symptoms indicating possible mental health risks, it automatically generates alerts and sends notifications to parents or caretakers to ensure timely intervention.

Keywords: Mental Health, Chatbot, Emotion Detection, NLP, RNN, Depression Alert, Facial Recognition, Grassmann Algorithm, AI Healthcare

ICSICA-2026-254

Video Surveillance Based Home Security with Criminal Detection

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ABSTRACT

Facial recognition in surveillance video serves as a critical foundation for decision-making in automated, effective, and efficient integrated security systems. This process involves matching faces across both still images and video sequences. While automatic face recognition on high-quality still images can achieve satisfactory performance, attaining similar accuracy in video-based face recognition remains challenging due to poor CCTV quality, noise, motion blur, focus issues, and lower resolution. This project proposes a robust still-to-video face matching framework that mitigates the distribution imbalance between still images and video frames. The approach employs Grassmann manifold learning to construct multiple representative bridges that effectively connect still images and video-based facial representations. The system continuously analyzes real-time surveillance video streams and compares detected faces with a trained criminal face image database. Upon identifying a known criminal, the system triggers an immediate alert, and in cases of suspicious matches, an automated notification is sent to authorized security personnel.

Keywords: Facial Recognition, Surveillance, Criminal Detection, Grassmann Manifold, Video Analysis, Real-Time Monitoring, Security System, Deep Learning, Computer Vision

ICSICA-2026-255

Smart Automatic Railway Gate System with Passenger Alert and Fine System

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ABSTRACT

Unmanned railway crossings are major safety hazards in many regions, leading to frequent accidents involving vehicles and pedestrians. This paper presents a Smart Automatic Railway Gate System with Passenger Alert and Fine System designed to enhance safety by integrating real-time train detection, passenger monitoring, IoT-based alert notifications, emergency response, and automated fine enforcement. The proposed system uses IR and ultrasonic sensors for detection, servo motors for gate operation, and IoT connectivity to inform passengers and authorities instantly. Experimental results demonstrate that the system automatically manages gate operations, significantly reduces collision risks, provides rapid emergency responses, and enforces compliance efficiently. This framework is scalable for deployment in rural and urban railway crossings.

Keywords: Railway Gate Automation, Passenger Safety, IoT Alert, Emergency Response, Fine System, Embedded Control, Sensor Networks

ICSICA-2026-256

Automatic Solar Panel Direction Control Towards Sunlight

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ABSTRACT

Solar energy is one of the most abundant and reliable sources of renewable energy. However, the efficiency of solar panels is highly dependent on their orientation with respect to the sun. Fixed solar panels remain in a constant position and are unable to continuously face the sun, resulting in reduced energy generation. This project presents the design and implementation of an automatic solar panel direction control system. The proposed system uses two Light Dependent Resistor (LDR) sensors, an Arduino Uno microcontroller, and a servo motor to track the movement of the sun. The LDR sensors detect the intensity of sunlight from different directions, and the microcontroller processes this information to determine the optimal position of the solar panel. Based on this data, the servo motor adjusts the panel orientation to ensure maximum exposure to sunlight throughout the day. The implementation demonstrates improved solar energy utilization compared to fixed solar panels.

Keywords: Solar Tracking, Photovoltaic Efficiency, LDR Sensor, Arduino Uno, Servo Motor, Differential Sensing, Renewable Energy, Single-Axis Tracker, PWM Control, Sun Position Detection.

ICSICA-2026-257

Real-Time Driver Drowsiness Monitoring System

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ABSTRACT

Driver drowsiness is one of the leading factors contributing to road accidents worldwide. This paper presents a Real-Time Driver Drowsiness Monitoring System employing computer vision techniques to provide non-intrusive, cost-effective fatigue detection. The system uses a standard camera to continuously capture the driver's facial images and analyzes visual cues including eye blinking rate, eye closure duration, and head movement. Computer vision algorithms extract facial landmarks and compute the Eye Aspect Ratio (EAR) to detect fatigue. A PERCLOS metric maintained over a rolling time window detects sustained drowsiness, upon which the system triggers immediate audio and visual alerts. Implemented using Python, OpenCV, and Dlib, the system achieves a face detection rate of 97.3%, EAR computation accuracy of 99.1%, and alert response latency of 2.1 seconds, with a false positive rate below 4%.

Keywords: Driver Drowsiness Detection, Computer Vision, Eye Aspect Ratio (EAR), PERCLOS, OpenCV, Dlib, Facial Landmark Detection, Real-Time Monitoring, Road Safety

ICSICA-2026-258

Smart Queue Management System

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ABSTRACT

Conventional fixed-tilt solar panel installations capture sunlight efficiently only at solar noon on the equinoxes, losing significant energy yield during morning and afternoon hours due to angular deviation from the sun's position. This paper presents an Automatic Solar Panel Direction Control system — a low-cost embedded solution that maximises photovoltaic (PV) energy output by continuously tracking the sun across the sky. Two light-dependent resistors (LDRs) arranged in a differential sensing configuration detect the direction of maximum solar intensity. An Arduino Uno microcontroller processes the differential signal and generates PWM commands to a servo motor, rotating the panel until both sensors receive equal illumination. Experimental evaluation over five clear-sky days demonstrates an average daily energy gain of 37.7% over a fixed-tilt reference panel, with tracker power consumption representing less than 3% of the gross gain.

Keywords: Solar Tracking, Photovoltaic Efficiency, LDR Sensor, Arduino Uno, Servo Motor, Differential Sensing, Renewable Energy, Single-Axis Tracker, PWM Control

ICSICA-2026-259

Automating Cloud Deployment and Configurations Using DevOps Tools

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ABSTRACT

Cloud computing has become a fundamental component of modern software systems, offering scalability, flexibility, and cost efficiency. However, managing cloud infrastructure and application deployment manually can lead to inconsistencies, delays, and increased risk of errors. This project focuses on automating cloud deployment and configuration using DevOps practices to enhance reliability, speed, and efficiency. By integrating tools such as Infrastructure as Code (IaC), Continuous Integration, and Continuous Deployment (CI/CD) pipelines, the proposed system enables seamless provisioning, configuration, and management of cloud resources. Automation frameworks like Terraform and configuration management tools such as Ansible are utilized to standardize infrastructure setup, while CI/CD tools like Jenkins or GitHub Actions ensure continuous delivery of applications. The solution emphasizes version control, repeatability, and monitoring, allowing teams to deploy applications rapidly with minimal human intervention.

Keywords: DevOps, Cloud Deployment, CI/CD, Infrastructure as Code, Terraform, Ansible, Jenkins, GitHub Actions, Automation, Cloud Computing.

ICSICA-2026-260

Deep Learning-Driven System for Word Categorization and Grading in Newspaper Images

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ABSTRACT

This paper presents a computer-aided system for the fully automatic segmentation and grading of words extracted from newspaper images using a deep learning approach. The proposed system is composed of three main modules: preprocessing, classification, and recognition.

The preprocessing module takes newspaper images as input, enhances their pixel intensity, and performs word segmentation on the improved images. The classification module utilizes a dictionary, where the words are continuously updated using deep learning techniques. The recognition module carries out data retrieval by comparing the segmented words with the dictionary and categorizing them into four classes: crime, politics, education, and sports.

The effectiveness of the proposed system is evaluated by comparing it with existing methods using performance metrics such as Content Verification Rate (CVR) and Peak Signal-to-Noise Ratio (PSNR).

Keywords: Newspaper, crime, politics, education, sports, dictionary.

ICSICA-2026-261

Intelligent and Energy-Efficient Adaptive LoRaWAN Architecture Using Multi-Agent Reinforcement Learning and Hybrid Network Optimization

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ABSTRACT

The rapid expansion of Internet of Things (IoT) applications has led to large-scale deployments of Low-Power Wide Area Networks (LPWANs), particularly LoRaWAN. However, challenges such as network congestion, energy inefficiency, scalability limitations, and dynamic environmental conditions hinder optimal performance. This paper proposes an intelligent and adaptive LoRaWAN architecture that integrates multi-agent reinforcement learning (MARL), adaptive data rate optimization, hybrid network switching, and multi-gateway coordination. The proposed framework introduces an application-aware reward mechanism that ensures fairness and prioritization among heterogeneous IoT services while dynamically optimizing transmission parameters. Additionally, a hybrid LoRaWAN–mesh topology and mobile gateway support enhance reliability in dynamic environments. Simulation results demonstrate significant improvements in packet delivery ratio, energy efficiency, fairness, and scalability compared to conventional approaches. The proposed system offers a comprehensive solution for next-generation large-scale IoT deployments. Despite these advantages, LoRaWAN faces critical limitations when deployed in dense and dynamic environments. The increase in the number of devices leads to congestion, packet collisions, and inefficient resource utilization. Additionally, the static nature of traditional configuration mechanisms limits adaptability to changing network conditions.

Keywords—Adaptive data rate (ADR), energy efficiency, hybrid network topology, Internet of Things (IoT), LoRaWAN, low-power wide area networks (LPWAN), multi-agent reinforcement learning (MARL), multi-gateway coordination, network scalability, packet delivery ratio.

Recent Advances in Deep Learning: A Systematic Review and A Proposed Hybrid Framework for Enhanced Generalization and Efficiency

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ABSTRACT

Deep learning has achieved remarkable success across diverse application domains such as computer vision, natural language processing, and healthcare. Despite these advancements, existing deep learning models often suffer from critical challenges, including overfitting, high computational complexity, poor generalization to unseen data, and a lack of interpretability. This paper presents a comprehensive and systematic review of recent deep learning architectures, including convolutional neural networks, recurrent neural networks, transformers, and hybrid models. The strengths and limitations of these models are critically analyzed with respect to performance, scalability, and robustness. Based on the identified research gaps, this paper proposes a novel hybrid deep learning framework that integrates attention mechanisms with lightweight convolutional layers to improve generalization while reducing computational overhead. The proposed framework is designed to be adaptable across multiple application domains. The study aims to provide researchers with a structured understanding of current deep learning trends and offers a foundation for future research focusing on efficient and generalizable deep learning systems.

Keywords: Deep Learning, Neural Networks, Systematic Review, Hybrid Models, Generalization, Computational Efficiency, Attention Mechanism

ICSICA-2026-263

Agentic Multimodal AI for Autonomous Cyber-Defence: Threats and Safeguards

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ABSTRACT

The rapid evolution of Artificial Intelligence (AI) has given rise to agentic multimodal systems, intelligent agents capable of processing diverse data modalities such as text, images, audio, and network signals, and autonomously performing tasks without continuous human intervention. The proposed research will investigate how adversarial manipulations can target multimodal systems at different layers—ranging from data inputs (e.g., spoofed audio, manipulated images, or deceptive network logs) to decision policies (e.g., misleading an AI agent to take harmful actions). The research will also design countermeasures such as cross-modal consistency verification, adversarially robust fusion mechanisms, and human-in-the-loop safety controls to enhance system resilience. The expected outcome is a comprehensive framework for secure agentic multimodal AI that advances both theoretical understanding and practical implementation of autonomous cyber-defence. This research will contribute to building AI systems that are not only intelligent and adaptive but also explainable, resilient, and aligned with human oversight—ensuring safety and trust in the era of autonomous digital defence.

Keywords—Adversarial machine learning, agentic AI, autonomous cyber-defence, cross-modal verification, human-in-the-loop, multimodal learning, network security, reinforcement learning, robustness, trustworthy AI.

ICSICA-2026-264

Deep Learning-Driven Region-Based Image Retrieval System Using Multiple Instance Learning Techniques

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ABSTRACT

Content-Based Image Retrieval (CBIR) has gained significant attention due to the exponential growth of visual data. Traditional retrieval methods often fail to effectively capture localized and semantic information within images, leading to reduced retrieval accuracy. To address these limitations, this paper proposes a Deep Learning-Driven Region-Based Image Retrieval System that integrates Multiple Instance Learning (MIL) techniques for enhanced performance. The proposed framework leverages deep convolutional neural networks (CNNs) to extract discriminative feature representations from images. Instead of treating an image as a single entity, it is decomposed into multiple regions, each considered as an instance within a bag in the MIL paradigm. This enables the model to focus on region-specific features, thereby improving the identification of relevant visual patterns. Experimental results demonstrate that the proposed method significantly improves retrieval accuracy, precision, and recall compared to conventional CBIR approaches. The integration of deep learning and multiple instance learning provides a robust and scalable solution for localized image retrieval in large-scale datasets.

Keywords: Content-based image retrieval (CBIR), convolutional neural networks (CNNs), deep learning, feature aggregation, feature extraction, image decomposition, image region analysis, multiple instance learning (MIL), similarity measurement, supervised learning.

ICSICA-2026-265

Performance Comparison of Generative Adversarial Network Framework Using Tensor Flow

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ABSTRACT

Generative Adversarial Networks (GANs) are one of the most famous and strong models to become familiar with the perplexing high layered disseminations. Be that as it may, they typically experience the ill effects of insecurity and speculation issues, which might prompt unfortunate ages. We demonstrate that the power in the little neighborhood of the preparation sets can prompt better speculation. Especially, we plan another vigorous technique called Re-Generative Adversarial Networks (RGAN) in which the generator and discriminator rival each other in a most pessimistic scenario setting inside a little Wasserstein ball. The generator attempts to plan the most terrible information circulation (as opposed to a Gaussian dissemination utilized in many GANs) to the genuine information dispersion, while the discriminator endeavors to recognize the genuine and counterfeit conveyances with the most terrible bothers. Naturally, the proposed RGAN can gain proficiency with a decent generator and discriminator that might perform well on the most pessimistic scenario input focuses. Stringently, we have demonstrated that RGAN can get a tighter specification upper bound than the conventional GANs under gentle suppositions, guaranteeing a hypothetical prevalence of RGAN over GANs. We direct our proposed strategy on five distinct baselines (five famous GAN models). What's more, a progression of tests on various datasets demonstrates that our proposed powerful systems outperform five gauge models considerably and reliably.

Keywords: Machine Learning, Adversarial Networks, Tensor Flow, Prediction, Accuracy

ICSICA-2026-266

EDUZY: An AI-powered adaptive learning platform for personalized programming education

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ABSTRACT

EDUZY is an AI-powered adaptive learning platform developed to personalize programming education according to individual learner capabilities. The system begins with an intelligent proficiency assessment that evaluates the user's existing knowledge and accurately identifies skill gaps. Based on the assessment results, EDUZY dynamically generates a customized learning path tailored to the learner's strengths and weaknesses. The platform provides structured learning modules, interactive activities, and real-time chatbot assistance to support continuous learning. Learners progress through personalized content at their own pace, ensuring better understanding and retention of concepts. Continuous feedback mechanisms help track performance and improve learning efficiency. Upon successful completion of the course, learners undergo a final evaluation to validate their acquired skills. A verified certificate is awarded, enhancing the learner's credibility. By integrating rule-based evaluation, AI-driven content generation, and adaptive feedback, EDUZY improves engagement, promotes effective skill mastery, and offers a scalable solution for modern programming education.

Keywords: Adaptive Learning, Artificial Intelligence in Education, Personalized Learning, Programming Education, Skill Gap Analysis, Intelligent Tutoring System, AI Chatbot, Automated Assessment

ICSICA-2026-267

Optimizing Predictive Maintenance in Industrial IoT Cloud Using Dragonfly Algorithm

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ABSTRACT

This study presents an optimized framework for predictive maintenance in Industrial Internet of Things (IoT) cloud environments using the Dragonfly Algorithm (DA). With the rapid adoption of smart sensors and connected devices, industrial systems generate vast volumes of real-time data, making efficient maintenance strategies essential for minimizing downtime and operational costs. Traditional predictive models often struggle with high-dimensional data and dynamic system behavior. To address these challenges, the proposed approach leverages the swarm intelligence-based Dragonfly Algorithm to enhance feature selection and optimize model parameters. By mimicking the static and dynamic swarming behaviors of dragonflies, the algorithm effectively balances exploration and exploitation in the search space. The framework integrates DA with machine learning models to improve fault detection accuracy and prediction reliability. Experimental results demonstrate that the proposed method outperforms conventional optimization techniques in terms of prediction accuracy, computational efficiency, and robustness. Furthermore, the cloud-based deployment ensures scalability and real-time processing capabilities, making it suitable for large-scale industrial applications. This research highlights the potential of bio-inspired optimization techniques in advancing intelligent maintenance systems within IoT ecosystems.

Keywords: Artificial Intelligence, Cognitive Load Analysis, Human–Computer Interaction, User Interface Design, User Experience, Image Processing, Visual Complexity Analysis, Usability Evaluation, Heuristic Modeling, Interface Optimization.

ICSICA-2026-268

Self-Sovereign Identity Empowered Automated Teller Machines

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ABSTRACT

The Stronger security measures are required for financial applications due to the growing threat of cyberattacks that target conventional password-based authentication systems. In order to improve ATM banking security and customer experience, this project suggests a multi-layer authentication method. In order to prevent shoulder-surfing assaults, the first layer integrates an Illusion PIN-based authentication mechanism, which makes the user perceive a different keypad layout than an attacker from a distance. An extra degree of protection is provided by the second layer, which combines face, eye, and iris biometrics to enable real-time user verification. By combining blockchain technology with multi-factor authentication, transaction data is stored in a secure and impenetrable manner, improving privacy and preventing fraud in ATM banking. Based on distinctive facial traits, the system uses sophisticated AI algorithms for face, eye, and iris recognition to identify and authenticate the user. For authentication, the system examines and contrasts the recorded face, eye, and iris images with pre-stored templates using the Grassmann learning algorithm. For added protection, one-time passwords (OTPs) are employed during transactions in addition to biometric verification

Keywords: ATM Security, Multi-Factor Authentication, Illusion PIN, Shoulder Surfing Prevention, Biometric Authentication, Face Recognition, Iris Recognition, Eye Detection, Artificial Intelligence, Grassmann Learning Algorithm, Blockchain Technology, Secure Transactions, One-Time Password (OTP), Cybersecurity, Fraud Prevention, User Authentication, Privacy Protection, Banking Security Systems.

ICSICA-2026-269

AI-Driven Personalized Mutual Fund Wealth Builder

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ABSTRACT

Traditional mutual fund investment approaches largely depend on static asset allocation models and generalized risk categories, which often fail to address the diverse financial goals, behavioral patterns, and evolving life circumstances of individual investors. This project proposes an AI-driven personalized mutual fund wealth builder that delivers intelligent, adaptive, and goal-oriented investment solutions tailored to each user. The system utilizes machine learning algorithms to analyze investor profiles, including income patterns, risk tolerance, investment horizon, financial goals, and historical behavior, alongside real-time market data to construct optimized mutual fund portfolios. The proposed platform enables dynamic asset allocation, intelligent fund selection, and automated portfolio rebalancing to respond effectively to changing market conditions and user requirements. By integrating principles of behavioral finance and explainable artificial intelligence, the system aims to reduce emotional decision-making during market volatility while improving transparency and investor confidence. Additionally, the solution supports goal-based portfolio management, tax-aware optimization, and continuous performance monitoring to enhance long-term wealth creation. Overall, this project demonstrates how artificial intelligence can be leveraged to build scalable, efficient, and personalized wealth management systems, offering improved risk-adjusted returns, higher user engagement, and more informed investment decision-making compared to traditional investment models.

Keywords: Artificial Intelligence (AI) ,Personalized Wealth Management ,Machine Learning Portfolio Optimization ,Dynamic Asset Allocation ,Risk Profiling ,Goal-Based Investing.

ICSICA-2026-270

Optimized Deep Learning Model For Oct-Based Retinal Disease Analysis

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ABSTRACT

Optical Coherence Tomography (OCT) is a non-invasive imaging modality that provides high-resolution cross-sectional images of the retina, making it an essential tool for diagnosing retinal disorders. Early and accurate identification of conditions such as Choroidal Neovascularisation (CNV), Drusen, and Diabetic Macular Edema (DME) is critical for preventing irreversible vision loss and guiding timely treatment. However, manual analysis of OCT images is labor-intensive, time-consuming, and requires extensive ophthalmological expertise, which can limit the speed and consistency of diagnosis. To address these challenges, this research proposes an optimized deep learning framework for automated retinal disease detection, leveraging the strengths of Convolutional Neural Networks (CNNs) combined with transfer learning, data augmentation, and hyperparameter tuning to improve feature extraction and classification accuracy. The proposed system classifies OCT images into four categories: CNV, Drusen, DME, and Normal, using a pre-trained exception CNN architecture. The integration of transfer learning allows the model to generalize well across diverse OCT images, while cache-based optimization minimizes redundant computations during training and inference

Keywords: Optical Coherence Tomography (OCT), Deep Learning, Convolutional Neural Networks(CNN), Image Classification, Diabetic Retinopathy, Image Preprocessing, Accuracy, Real-time Diagnosis .

ICSICA-2026-271

A Portable Real-Time Electronic Nose for Evaluating Sea Food Freshness Using Machine Learning

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ABSTRACT

Seafood freshness assessment is critical for food safety and quality, yet traditional methods are time consuming, laboratory-dependent, and unsuitable for real-time monitoring. This study proposes a portable electronic nose (e-nose) system that integrates gas sensors and machine learning to evaluate seafood freshness and predict shelf life. The system detects volatile organic compounds (VOCs) released during spoilage and employs hyperparameter-optimized ML models for both classification (fresh vs. not fresh) and regression (shelf-life prediction). The system detects spoilage-related volatile organic compounds using four selected sensors MQ137 (ammonia), MQ2 (alcohol), MQ136 (hydrogen sulfide), and MQ9 (methane) chosen through Predictive Power Score analysis. A large ESF dataset containing 336,997 samples from five seafood types was used to train and compare multiple models, with XGBoost achieving the best classification performance (100% precision, recall, accuracy, and F1-score; 99.8% cross-validation accuracy) while requiring minimal computation. For shelf-life prediction, XGBoost regression achieved an R^2 of 100%, RMSE of 0.08, and cross-validation MSE of 0.009, with low latency and memory usage. Overall, the proposed e-nose system provides a lightweight, accurate, and scalable solution for real-time seafood freshness monitoring, suitable for industrial and field applications.

Keywords: Electronic Nose (E-nose), Seafood Freshness Detection, Volatile Organic Compounds (VOCs), Gas Sensor Array, Machine Learning, XGBoost, Shelf-Life Prediction, Food Quality Monitoring.

ICSICA-2026-272

Multi-cloud object storage provisioning using Terraform

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ABSTRACT

The rapid adoption of cloud computing has led organizations to rely on multiple cloud service providers to improve availability, scalability, and vendor independence. Managing infrastructure across heterogeneous cloud platforms, however, introduces complexity and operational overhead. This project, Multi-Cloud ObjectStorage Provisioning Using Terraform, addresses these challenges by leveraging Infrastructure as Code (IaC) principles to automate and standardize object storage provisioning across multiple cloud environments. Terraform is utilized as the core provisioning tool to define, deploy, and manage object storage resources in a consistent and repeatable manner across different cloud providers. The project demonstrates how a single, unified Terraform configuration can be used to provision object storage services—such as buckets, access policies, and configurations—while maintaining provider-specific flexibility. This approach minimizes manual intervention, reduces configuration errors, and enhances deployment efficiency. By implementing a multi-cloud object storage strategy, the project highlights improvements in portability, reliability, and disaster recovery capabilities. The results show that Terraform-based automation significantly simplifies multi-cloud infrastructure management and provides a scalable foundation for modern cloud-native applications. This project underscores the importance of IaC tools in achieving efficient, secure, and maintainable multi-cloud deployments.

Keywords: Cloud computing, multi-cloud, object storage, service providers, Terraform, cloud providers, bucket storage, access policies, deployment efficiency, portability, scalability, automation, vendor independence, Infrastructure as Code.

ICSICA-2026-273

YOLO-Based Cancer Prediction with Severity Levels

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ABSTRACT

Early and accurate cancer detection plays a crucial role in improving patient survival and treatment outcomes. This project proposes a YOLO-based cancer prediction system with severity level classification, leveraging deep learning and computer vision techniques to enable real-time and precise analysis of medical images. The proposed model utilizes the You Only Look Once (YOLO) object detection framework to identify cancerous regions within medical imaging data such as histopathology slides, CT scans, or MRI images. In addition to detection, the system classifies the identified regions into multiple severity levels (e.g., benign, early-stage, intermediate-stage, and advanced-stage cancer) based on learned feature representations. The model is trained on annotated medical image datasets and optimized for high accuracy, speed, and robustness, making it suitable for clinical decision support. Performance evaluation is conducted using metrics such as precision, recall, mean average precision (mAP), and classification accuracy. Experimental results demonstrate that the proposed YOLO-based approach achieves reliable cancer detection with effective severity stratification, outperforming traditional classification-only methods

Keywords: Cancer Detection, YOLO (You Only Look Once), Deep Learning, Computer Vision, Medical Image Analysis, Histopathology Imaging, CT Scan Analysis, MRI Imaging, Object Detection, Severity Classification, Tumor Classification, Real-Time Detection, Clinical Decision Support, Mean Average Precision (mAP), Diagnostic Accuracy.

ICSICA-2026-274

AI driven Web-Based Video Conferencing System with Real-Time Meeting Intelligence and Analytics

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ABSTRACT

Web-based video conferencing has become essential for remote collaboration and online learning, yet most existing platforms lack intelligence to evaluate meeting effectiveness and participant engagement, often resulting in unstructured discussions and poor decision tracking. The proposed system introduces an AI-driven intelligent video conferencing platform that integrates real-time communication with advanced Artificial Intelligence and data analytics. By using Speech-to-Text, Natural Language Processing, and Machine Learning techniques, the system analyzes participation behavior, topic relevance, and engagement patterns to generate meeting quality scores, detect topic drift, and automatically extract action items. It also provides real-time coaching insights, smart attendance tracking with behavioral analytics, and interactive dashboards for performance visualization. Additionally, the system supports automated meeting summaries, historical performance analysis, enhanced collaboration transparency, predictive meeting analytics, scalable deployment for large organizational environments, multi-language support for global collaboration, secure data handling with role-based access control, integration with enterprise tools such as project management and communication platforms, real-time notification alerts for decision updates, customizable reporting features, and cloud-based backup and recovery mechanisms for data reliability.

Keywords: NLP, Video Conferencing, Artificial Intelligence, Speech-to-Text, Meeting Analytics, Engagement Scoring.

ICSICA-2026-275

Smart Agro-Advisory System Using AI for Pest Detection and Eco-Friendly Pesticide Recommendation

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ABSTRACT

Agriculture is the backbone of many economies, yet crop productivity is often reduced by leaf diseases, pest attacks, and improper pesticide usage. This project proposes an intelligent crop disease detection and advisory system using Artificial Intelligence (AI) and Deep Learning techniques to assist farmers in effective crop management. Farmers can capture or upload leaf images through a mobile or web-based application, where the images undergo preprocessing steps such as resizing, noise removal, and normalization to improve quality. A Convolutional Neural Network (CNN) model is used to analyze the images and accurately classify plant diseases. Based on the identified disease, the system provides appropriate treatment recommendations, including both chemical and organic pesticide solutions. To ensure proper pesticide usage, the system schedules and sends timely reminders based on crop type, disease severity, and environmental conditions. Weather factors such as temperature, humidity, and rainfall are also considered to improve spraying efficiency and avoid ineffective applications. Overall, this system acts as a smart digital assistant, enabling informed decision-making, reducing operational costs, and improving crop yield and long-term agricultural sustainability.

Keywords: Artificial Intelligence, Deep Learning, Crop Disease Detection, Convolutional Neural Network (CNN), Image Processing, Precision Agriculture, Pest Management, Organic Pesticides, Smart Farming, Agricultural Advisory System.

ICSICA-2026-276

A User-Centric Speech to Sign Language Assistive System for Hearing-Impaired Users

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ABSTRACT

Hearing-impaired individuals face persistent communication barriers in a predominantly audio-centric world. This paper presents a user-centric, web-based assistive system that automatically converts speech, text, and video audio content into Indian Sign Language (ISL) animations. Built on the Django framework, the system integrates Google Speech Recognition for real-time audio transcription, Natural Language Processing (NLP) for linguistic preprocessing, and a structured sign video catalogue for animated sign delivery. Users may input spoken audio via a microphone, type text directly, or upload a video file whose audio track is automatically extracted and transcribed. A multilingual translation module supports Tamil and Hindi inputs, converting them into English before NLP processing. The NLP pipeline applies tokenization, part-of-speech tagging, lemmatization, tense detection, and a synonym-fallback mechanism to map natural language sentences to an appropriate sequence of ISL signs. Signs unavailable in the catalogue are finger-spelled letter-by-letter, ensuring zero information loss. The system targets educators, healthcare workers, and everyday users who interact with the deaf community, providing an accessible, scalable, and maintenance-friendly solution deployable on standard web infrastructure.

Key words: Sign Language, Speech Recognition, NLP, Accessibility, Hearing-Impaired, Django, ISL, Assistive Technology, Natural Language Processing, Django Web Framework, Finger Spelling, Multilingual Translation, Video-to-Sign Conversion, Word Error Rate (WER), Lemmatization, Web Accessibility.

ICSICA-2026-277

Quantization-Aware of Deep Networks for Video OCR On Edge Devices

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ABSTRACT

Video Optical Character Recognition (Video OCR) is an essential technology for extracting textual information from video streams in applications such as surveillance, traffic analysis, assistive systems, and smart environments. Deploying deep learning-based OCR models on edge devices remains challenging due to limited computational resources, memory constraints, and strict power requirements. This work presents a Quantization-Aware Deep Network for Video OCR designed specifically for efficient execution on edge devices. The proposed approach incorporates quantization-aware training into a deep neural architecture for text detection and recognition, enabling the model to operate using low-precision arithmetic while preserving recognition accuracy. By simulating quantization effects during training, the network becomes robust to reduced numerical precision and supports efficient INT8 inference. Experimental results demonstrate that the quantized model achieves performance comparable to full-precision networks while significantly reducing model size, inference latency, and energy consumption. The proposed framework enables real-time Video OCR on resource-constrained edge platforms, making it well suited for practical, low-latency, and energy-efficient intelligent systems.

Keywords: Video Optical Character Recognition (Video OCR), Deep Learning, Quantization-Aware Training, Edge Devices, Neural Networks, Low-Precision Computing, Real-Time Processing, Energy Efficiency.

ICSICA-2026-278

AI-Powered Cognitive Load Analyzer for Digital Interfaces

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ABSTRACT

Digital interfaces often become difficult to use due to visual clutter, poor layout organization, excessive text, and confusing color usage, which increase the mental effort required for interaction. This project proposes an AI-assisted Cognitive Load Analyzer that evaluates digital interface screenshots to estimate the cognitive load imposed on users. Grounded in Cognitive Load Theory and Human–Computer Interaction (HCI) principles, the system measures visual attributes such as element density, text distribution, color variance, and layout fragmentation. These features are extracted programmatically using image processing techniques and analyzed through a rule-based heuristic model to compute a cognitive load score. An AI interpretation layer converts the computed metrics into clear, human-readable explanations that identify the factors contributing to mental strain. Unlike traditional usability evaluation methods that rely on surveys, expert reviews, or user testing, this system provides an automated and objective analysis without requiring human participation. The results help designers and developers identify design elements that cause attention overload and decision fatigue, enabling improvements in usability. This project bridges cognitive psychology, interface design, and artificial intelligence to support human-centered evaluation of digital interfaces.

Keywords: Artificial Intelligence, Cognitive Load Analysis, Human–Computer Interaction, User Interface Design, User Experience, Image Processing, Visual Complexity Analysis, Usability Evaluation, Heuristic Modeling, Interface Optimization.

ICSICA-2026-279

AI-Driven Conversational Assistant Using RAG for Government Schemes.

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ABSTRACT

This research project presents the development of an AI-Driven Conversational Assistant for accessing government scheme information using Retrieval-Augmented Generation (RAG). In India, a vast number of government schemes are launched regularly, but citizens often face difficulties in identifying relevant schemes due to the presence of unstructured and scattered information across multiple portals, PDFs, and official documents. Traditional keyword-based search systems are inefficient in providing accurate and personalized responses. To address this issue, the proposed system integrates information retrieval techniques with Large Language Models (LLMs) to deliver context-aware and precise responses. The system collects and preprocesses government scheme data, converts it into vector embeddings, and stores it in a vector database. When a user submits a query, the system retrieves the most relevant information and generates a natural language response using the RAG framework. The proposed solution enhances accessibility, reduces information gaps, and improves user experience through a conversational interface. It can be particularly beneficial for rural and semi-urban populations by enabling easy access to welfare schemes. The system demonstrates the potential of AI in improving public service delivery and promoting digital inclusion.

Keywords: Government Schemes, Artificial Intelligence, Conversational Assistant, Retrieval-Augmented Generation (RAG), Large Language Models (LLMs), Natural Language Processing, Information Retrieval, Chatbot, Vector Database, Semantic Search.

ICSICA-2026-280

**Fusion of Face Biometrics and Graph Neural Networks with
Reinforcement Learning for Secure Financial Fraud Detection.**

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ABSTRACT

This research presents a smart fraud detection framework that combines reinforcement learning with graph neural networks to identify fraudulent financial transactions in real time. The system learns from the relationships between cardholders, merchants, and devices, while also analyzing transaction patterns over time. By using a reward-based learning process, it improves accuracy, reduces false alarms, and ensures fast processing speeds suitable for large-scale payment networks. Unlike traditional models that struggle with imbalanced datasets and static community detection, this framework adapts dynamically to new fraud patterns. It reorganizes suspicious communities of users and merchants as they evolve, making it harder for fraudsters to escape detection. The model integrates three perspectives: structural (connections between accounts), temporal (sequences of transactions), and contextual (details such as product type or location). This multi-view approach strengthens robustness against adversarial behavior, since fraudsters cannot easily mimic legitimate activity across all dimensions at once. To further enhance security, the system can incorporate face biometrics during identity verification.

Keywords: Fraud detection, Reinforcement learning, Graph neural networks, Financial transactions, Real-time detection, Large-scale payment networks, Imbalanced datasets, Dynamic community detection, Suspicious communities.

ICSICA-2026-281

AI-Powered Multi-Agent Trip Planning Platform Using LLMs, RAG, and Cloud Services

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ABSTRACT

The rapid advancement of Large Language Models (LLMs) has enabled the development of intelligent, context-aware systems capable of solving complex real-world problems. This paper presents an AI-powered multi-agent trip planning platform that leverages LLMs, Retrieval-Augmented Generation (RAG), and cloud services to deliver personalized, dynamic, and efficient travel planning solutions. The proposed system decomposes the trip planning process into multiple specialized AI agents, including itinerary generation, budget optimization, accommodation recommendation, transportation planning, and real-time adaptation. Each agent operates collaboratively under a coordinated framework, enabling modular decision-making and improved scalability. The integration of RAG enhances the system's ability to retrieve up-to-date and domain-specific information from external knowledge sources, ensuring accurate and contextually relevant recommendations. Furthermore, cloud-based infrastructure is utilized to provide scalability, high availability, and real-time data processing, enabling seamless interaction with external APIs such as weather services, maps, and travel booking platforms. The system adapts dynamically to changing conditions, including user preferences, budget constraints, and environmental factors, thereby improving user experience and decision accuracy.

Keywords: Multi-Agent Systems, Large Language Models (LLMs), Retrieval-Augmented Generation (RAG), Travel Planning, Cloud Computing, Personalization, Intelligent System.

ICSICA-2026-282

Deep Learning Integrated Blockchain Based Real- Time Electronic Voting System

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ABSTRACT

Electronic voting systems play a crucial role in modern democracies by enabling efficient and transparent elections. However, conventional voting methods and existing electronic systems often face challenges such as vote tampering, lack of transparency, centralized control, and security vulnerabilities. This project proposes a deep learning integrated blockchain-based real-time electronic voting system to ensure secure, transparent, and tamper-proof elections. The system uses Aadhaar-based OTP authentication and secure login for voter verification, followed by live facial recognition using a CNN model to authenticate voters by matching real-time camera input with pre-existing registered data. Once verified, voters are allowed to cast their vote securely. Blockchain technology is employed to store votes in a decentralized network, ensuring immutability, transparency, and prevention of unauthorized modifications. The voting process supports real-time vote counting, eliminating delays and manual intervention. The integration of deep learning for biometric verification and blockchain for decentralized data storage enhances trust, security, and reliability. The system is implemented using Python, making it scalable, cost-effective, and suitable for real-world election environments

Keywords: Electronic Voting System, Blockchain, Deep Learning, CNN, Facial Recognition, Aadhaar OTP Authentication, Decentralized Network, Real-Time Vote Counting, Secure Voting, Python.

ICSICA-2026-283

An AI-Based Multi-Disease Ophthalmic Screening Framework Using Fundus Images

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ABSTRACT

Early detection of eye diseases is essential to prevent irreversible vision loss and ensure timely intervention. This paper presents SightSaver AI, an AI-assisted multi-disease ophthalmic screening system designed to analyze retinal fundus images. The system detects multiple conditions such as Glaucoma, Diabetic Retinopathy (DR), Age-related Macular Degeneration (AMD), Cataract, Hypertension, and Myopia. It uses Convolutional Neural Networks (CNNs) as the core model for image analysis. Ensemble learning techniques are applied to improve prediction accuracy and robustness. The dataset includes ODIR-5K and other publicly available retinal image datasets. Data preprocessing and classification into disease-specific categories enhance model performance. Explainable AI methods like Grad-CAM provide visual interpretability of predictions. Experimental results demonstrate high accuracy across multiple diseases. Overall, the system offers a cost-effective, scalable solution for early diagnosis and continuous monitoring of eye health.

Keywords: Artificial Intelligence, Convolutional Neural Networks (CNN), Retinal Fundus Imaging, Diabetic Retinopathy, Glaucoma, Explainable AI (XAI), Grad-CAM, Ensemble Learning, Ophthalmic Screening, Deep Learning.

ICSICA-2026-284

VISION-BASED AI SYSTEM FOR PUBLIC SAFETY USING EMERGENCY HAND GESTURES

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ABSTRACT

Public safety is a major concern in modern urban and semi-urban areas where emergencies and crimes are more frequent. In critical situations like kidnapping, harassment, assault, or medical emergencies, victims may not be able to communicate verbally due to fear or physical limitations. This creates a need for a fast and reliable non-verbal communication system. The proposed project introduces a vision-based Artificial Intelligence system that detects emergency hand gestures. It uses computer vision and deep learning techniques, especially Convolutional Neural Networks (CNNs), to analyze live video streams. The system is trained with a dataset of predefined emergency gestures to identify distress signals accurately. When a gesture is recognized, it automatically sends alerts to authorities such as security personnel or emergency services. This ensures a quick and efficient response during emergencies. The system works in real time, making it highly suitable for high-risk environments. It can be integrated into existing surveillance systems in public places like airports, railway stations, malls, and streets. The system is scalable, allowing new gestures to be added through training. It also supports inclusivity by helping individuals who cannot speak or access traditional communication. Overall, this solution improves response time and enhances safety. It helps prevent incidents from escalating into serious threats. Thus, it contributes to building a safer and smarter public environment. Furthermore, the system can be enhanced with IoT and cloud technologies for better data management and remote monitoring. This makes the solution more efficient, reliable, and suitable for future smart city applications.

Keywords : Vision-Based AI, Public Safety, Hand Gesture Recognition, CNN, Computer Vision, Real-Time Detection.

ICSICA-2026-285

AURATRACE: Unified Blockchain-Based Trust & Integrity Platform for Sensitive Digital Records

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ABSTRACT

AURATRACES a multi-domain, blockchain-secured document integrity and access control platform designed to protect sensitive digital records across critical sectors including Healthcare, Banking, Forensic Evidence, Intelligence, and Court Systems. The system leverages a custom blockchain (SHA-256 hashing with chained blocks) to cryptographically seal every uploaded file, enabling real-time tamper detection and auditable provenance. Files are stored securely on the server, and their integrity is continuously verifiable against immutable on-chain records. Unauthorized modifications are immediately flagged as 'TAMPERED'. AURATRACE implements a role-based, domain-isolated architecture where users — including Admins, Doctors, Patients, Bank Officers, Police, Court Officials, and Intelligence Analysts — each operate within strictly scoped permissions. The medical domain features a patient-centric consent model: patients own their records, control doctor access with configurable time-bound grants, and can instantly revoke access via a Privacy Purge Kill Switch. The banking domain includes automated fraud risk scoring and financial document classification. The evidence domain supports case-tagged forensic file uploads with photo proof.

Keywords: Blockchain, Document, Integrity, SHA-256 Hashing, Tamper Detection, Role-Based Access Control (RBAC), Patient Consent, Medical Records, Forensic Evidence Management, Fraud Risk Scoring, JWT Authentication, Socket.IO, Real-Time Notifications, Multi-Domain Security, Access Audit Logging, File Provenance, Privacy Purge.

ICSICA-2026-286

A Functional AI System for Intelligent Control and orchestration in 6G Networks

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ABSTRACT

This research implements and validates a fully functional AI-native framework for intelligent control and orchestration in sixth-generation (6G) wireless networks. The system addresses three simultaneous network management challenges—MIMO beam rank selection, edge-versus-cloud computational placement, and network slice assignment — using four concurrently operating machine learning models driven by a shared physics-derived six-dimensional feature vector. An Integrated Sensing and Communication (ISAC) layer computes a context score from dual-use radio waveforms and injects it back into all four AI models through an Intelligence-Augmented Adaptive Control (IAAC) feedback loop. A fifth model performs autonomous anomaly detection and triggers self-healing actions when contradictory channel conditions are identified. The complete system is deployed as a real-time Streamlit dashboard with seven module-specific tabs, supporting both live multi-device AI Mode and Manual Mode for controlled scenario demonstration. The system incorporates a real-time performance monitoring and visualization module that continuously evaluates key network metrics such as latency, throughput, energy efficiency, and reliability.

Keywords : 6G Wireless Networks, Artificial Intelligence (AI), AI-Native Network Architecture, Intelligent Control and Orchestration, MIMO Beamforming, Edge-Cloud Computing, Network Slicing, Integrated Sensing and Communication (ISAC), Intelligence-Augmented Adaptive Control (IAAC), Machine Learning Models, Anomaly Detection, Self-Healing Networks, Real-Time Monitoring, Streamlit Dashboard, and Adaptive Network Optimization.

ICSICA-2026-287

Smarter Crop Management with Precision Agriculture

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ABSTRACT

Modern farming is being transformed by the incorporation of Internet of Things (IoT) technology into precision agriculture. This technology allows for more informed and efficient crop management tactics. "Precision Agriculture: Harnessing IoT for Smarter Crop Management" is a risk that uses the Internet of Things (IoT) to monitor weather patterns, crop conditions, soil moisture, and smart sensors to collect data in real-time. Reduced waste and increased crop yields are the results of this data-driven strategy's focused irrigation, optimal fertilizer usage, and insect control. The goal of this work is to look into if Internet of Things (IoT) applications can streamline processes and provide useful data for farmers, enabling them to enhance their operations, preserve costs, and limit environmental consequences. The Internet of Things (IoT) helps farms become more sustainable while simultaneously addressing the growing demand for food production on an international basis by making decisions more accurately. The results proved that resource efficiency, operating costs, and total crop output are all greatly improved by IoT driven precision agriculture. This paper will provide a look at a few of the most important Internet of Things (IoT) devices used in precision agriculture, that help with crop management, as well as how it can alter farming forever in the future

Keywords: Precision Agriculture, IoT, Smart Farming, Machine Learning, Soil Monitoring, Crop Management, Automation.

ICSICA-2026-288

Smart SQL Injection Attack Detection Using Hybrid Deep Neural Network

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ABSTRACT

In SQL Injection attacks are one of the most critical and frequently occurring security threats in modern web applications. These attacks exploit vulnerabilities in input handling to inject malicious SQL statements, enabling attackers to bypass authentication, retrieve confidential data, modify database contents, or even gain complete control over backend systems. Traditional defense mechanisms such as manual input validation, rule-based filtering, and signature-based intrusion detection systems are limited in their ability to detect complex, obfuscated, and previously unseen attack patterns. This project proposes a Smart SQL Injection Attack Detection System using Hybrid Deep Neural Networks to effectively identify both known and unknown SQL injection attacks. The system processes incoming SQL queries and extracts meaningful textual features through preprocessing techniques such as tokenization and encoding. A hybrid deep learning architecture that integrates Convolutional Neural Networks (CNN) and Long Short-Term Memory (LSTM) networks is employed to analyse query patterns. CNN is used to capture important local features and attack signatures within SQL statements, while LSTM models the sequential and contextual relationships among query tokens. Performance evaluation is carried out using metrics such as accuracy, precision, recall, and F1-score. Experimental results demonstrate that the hybrid deep learning approach achieves higher detection accuracy and lower false positive rates compared to traditional and single-model detection techniques.

Keywords: SQL injection, web application security, hybrid deep learning, CNN-LSTM, intrusion detection system, feature extraction, anomaly detection, cyber security.

ICSICA-2026-289

Customer Churn Prediction & Prevention Web Application with Explainable AI

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ABSTRACT

Customer churn is a critical challenge faced by service-based industries, especially in the telecommunications sector, where acquiring new customers is significantly more expensive than retaining existing ones. Predicting customer churn in advance enables organizations to take proactive measures to reduce revenue loss and improve customer satisfaction. This project presents a real-time Customer Churn Prediction and Retention System developed using Data Science and Machine Learning techniques. The proposed system analyses historical customer data including demographic details, service usage patterns, billing information, and contract attributes to identify customers who are likely to discontinue the service. A supervised machine learning model is trained to predict churn probability with high accuracy. An Explainable AI chatbot module interprets model predictions and explains the key factors influencing churn while recommending suitable retention strategies. Interactive dashboards are incorporated to visualize churn trends, customer behaviour, and financial impact. The system supports real-time monitoring, alerts for high-risk customers, and multi-customer prediction through an intuitive interface. Overall, the proposed solution enhances customer retention, minimizes revenue loss, and demonstrates the practical application of machine learning in real-world business intelligence systems.

Keywords: Customer Churn Prediction, Explainable AI, Customer Lifetime Prediction, Classification, Machine Learning, Data Science, Marketing.

ICSICA-2026-290

AI-Based Stock Price Prediction Using Machine Learning Techniques

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ABSTRACT

Stock market prediction is a challenging task due to the highly dynamic, nonlinear, and volatile nature of financial markets. Accurate forecasting of stock prices plays a crucial role in investment decision-making and risk management. Recent advancements in artificial intelligence have enabled the use of machine learning techniques for analysing complex financial data. This project focuses on AI based stock price prediction using various machine learning models. Historical stock market data is collected and pre-processed to remove noise and handle missing values. Relevant features such as opening price, closing price, trading volume, and technical indicators are extracted. Multiple machine learning algorithms are implemented and evaluated for prediction accuracy. These include Linear Regression, Support Vector Machines, Random Forest, and Long Short-Term Memory networks. The models are trained using historical time-series data. Performance is evaluated using statistical metrics such as Mean Absolute Error and Root Mean Square Error. Comparative analysis is conducted to identify the most effective prediction model. The proposed approach aims to capture both linear and nonlinear market patterns. Machine learning models demonstrate improved prediction performance over traditional statistical methods. The system is designed to assist investors in making informed trading decisions. It also helps reduce financial risk through data-driven insights. The model adapts to changing market trends by prediction accuracy. The proposed framework can be extended to real-time stock prediction systems.

Keywords: Artificial Intelligence (AI), Machine Learning (ML), Stock Price Prediction, Financial Forecasting, Time-Series Analysis, Historical Stock Data.

ICSICA-2026-291

Edge Enabled Cyber Physical System for Automated Smoking Contravention Enforcement

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ABSTRACT

This project proposes an intelligent, real-time smoking detection and enforcement system that leverages surveillance cameras, edge computing, and deep learning to promote public health compliance in restricted areas. Continuous video streams captured by surveillance cameras are processed locally using an edge-deployed Convolutional Neural Network (CNN), enabling rapid detection of smoking behavior with minimal latency and reduced reliance on cloud infrastructure. Edge-based processing enhances system responsiveness, preserves bandwidth, and improves data privacy by limiting raw data transmission. Upon detecting a violation, the system automatically captures the offender's facial image and performs identity verification through Aadhaar-based face recognition, ensuring accurate identification and accountability while minimizing false positives. Once the offender is verified, the system generates an automated fine and dispatches instant Email notifications to the individual, simultaneously alerting concerned authorities for prompt action. All incident details, including visual evidence, identity confirmation, and penalty records, are securely stored in a centralized database to support reporting, monitoring, and policy analysis. This end-to-end framework offers a scalable and efficient solution for smart city surveillance, enabling authorities to deter smoking violations effectively while maintaining data integrity, operational efficiency, and public trust.

Keywords: Edge-AI, Cyber-Physical System (CPS), Automated Smoking Detection, YOLOv8, Smart Surveillance, Real-time Analytics, IoT Sensors, Non-Smoking Zone Enforcement.

ICSICA-2026-292

SPCA-GAN Driven Insider Threat Monitoring Framework

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ABSTRACT

Insider threats have become one of the most serious cybersecurity challenges faced by modern organizations, as malicious activities performed by trusted users can lead to data leakage, financial loss, and compromise of sensitive information. Detecting such threats is difficult because insider attacks often appear similar to normal user behavior. There, intelligent analytical systems are required to monitor and analyze user activity patterns to identify suspicious behavior at an early stage. The project presents an Insider Threat Detection System using SPCA-GAN and Hybrid Deep Learning models developed using machine learning and data analysis techniques. The proposed system analyzes organizational activity logs such as login records, email communications, file access events, and device usage information to understand user behavior patterns. To improve feature representation and reduce computational complexity, the system applies Scaled Principal Component Analysis (SPCA) for feature selection and dimensionality reduction. The processed and augmented dataset is then analyzed using a hybrid learning architecture consisting of Convolutional Neural Networks (CNN), Multi-Layer Perceptron (MLP), and Bayesian Neural Networks.

Keywords: Insider Threat Detection, User Behavior Analysis, SPCA -GAN based Data Augmentation, Hybrid Learning Model, Cybersecurity, Anomaly Detection, Data Preprocessing, Deep Learning.

ICSICA-2026-293

Cyber Incident Artifact Integrity, Intelligence & Forensic Readiness System

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ABSTRACT

Cybersecurity incidents produce various digital artifacts such as system logs, access records, configuration files, and event traces that are essential for understanding and investigating security breaches. In today's cloud-based and enterprise environments, traditional digital forensic recovery methods often face structural limitations due to restricted access to internal system data. As a result, relying only on post-incident evidence recovery has become unreliable. Recent research highlights the importance of forensic readiness and proactive handling of digital artifacts to ensure their integrity and availability throughout the investigation process. This project presents a Cyber Incident Artifact Integrity; Intelligence & Forensic Readiness System aimed at supporting internal cybersecurity operations. The system securely collects, preserves, and manages digital artifacts generated during cyber incidents. Artifact integrity is maintained using cryptographic hashing, while tamper-evident audit trails help detect unauthorized access or modification. Role-based access control is implemented to restrict artifact handling privileges, and detailed logging ensures complete traceability of user actions. Instead of depending on post-incident forensic recovery, the proposed system focuses on proactive forensic readiness by preserving digital artifacts at the time an incident occurs.

Keywords: Cyber security, Digital Forensics, Forensic Readiness, Cyber Incident Response, Artifact Integrity, Audit Trails, Evidence Preservation, Cloud Forensics.

ICSICA-2026-294

**Feature-Driven EnsembleX: An Advanced Ensemble Framework for
Enhanced CT Abdomen Image Classification Using Feature Refinement
and Boosting Techniques**

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ABSTRACT

Medical image analysis, particularly abdomen MRI classification, faces significant challenges due to the increasing volume of imaging data, complexity of anatomical structures, and high similarity between healthy and abnormal tissue patterns. Traditional manual analysis performed by radiologists is time-consuming, prone to human error, and often affected by inter-observer variability, which can delay accurate diagnosis and treatment planning. Existing automated systems also struggle with extracting meaningful features from high-dimensional MRI data and often include redundant or irrelevant information, leading to reduced classification performance and computational inefficiency. To address these issues, this project proposes an advanced abdomen MRI image classification framework integrating CNN-based feature extraction, a feature refinement module, and EnsembleX classification with boosting. Finally, EnsembleX classification with boosting combines multiple refined feature learners, assigning greater importance to previously misclassified samples, which improves classification accuracy, stability, and robustness. The proposed system aims to support radiologists by providing faster, more reliable diagnostic assistance, ultimately contributing to improved medical decision-making and patient outcomes.

Keywords: Medical image analysis, Abdomen classification, Deep learning, Feature extraction, Feature selection, Dimensionality reduction, Ensemble learning, Boosting algorithm, Health care AI.

ICSICA-2026-295

Satellite Image Based Multi Object Detection System Using Deep Learning

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ABSTRACT

Recent advancements in satellite imaging and remote sensing have enabled the acquisition of high-resolution images covering large geographic regions, supporting applications such as traffic monitoring, urban planning, disaster management, and surveillance. However, accurate detection of multiple objects from satellite images remains challenging due to small object sizes, dense object distribution, varying image resolutions, and complex backgrounds. Traditional image processing techniques often fail to handle these challenges effectively and lack scalability for large-scale or real-time analysis. These limitations highlight the need for intelligent and automated object detection approaches for satellite imagery. This project presents a deep learning-based satellite image multi-object detection system using a YOLO (You Only Look Once) architecture. The proposed system automatically detects and classifies multiple object categories, including vehicles, aircraft, ships, and buildings, directly from satellite imagery. Experimental results demonstrate that the proposed system improves accuracy, provides robust performance across varying conditions, and scalability for large-area satellite image analysis, making it suitable for intelligent transportation systems and surveillance applications.

Keywords: Satellite Image Analysis, Remote Sensing, Multi-Object Detection, Deep Learning, YOLO, Convolutional Neural Networks, Real-Time Detection, Intelligent Transportation Systems.

ICSICA-2026-296

Wireless Airmouse Using Gyroscope and Accelerometer

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ABSTRACT

This project presents the design and development of a wireless air mouse system using an ESP32 microcontroller integrated with a gyroscope and accelerometer sensor. The primary objective of this system is to enable users to control the computer cursor through hand movements in the air without the need for a physical surface or traditional mouse device. The motion sensing is achieved using an MPU6050 sensor, which captures both angular rotation and linear acceleration of the hand. The ESP32 processes this real-time sensor data and transmits it wirelessly to a computer using Bluetooth communication. On the receiving side, the transmitted data is interpreted and mapped into corresponding cursor movements and click actions, enabling seamless human-computer interaction. To enhance the performance and usability of the system, filtering techniques are applied to reduce noise and improve stability, thereby minimizing unwanted cursor jitter. Calibration methods are also implemented to ensure accurate and smooth cursor control. The proposed system is cost-effective, portable, and user-friendly, making it a suitable alternative to conventional input devices. It has potential applications in presentations, virtual reality environments, gaming, and assistive technologies for individuals with physical disabilities. This project demonstrates the effective integration of embedded systems, wireless communication, and motion sensing technologies to create an innovative and interactive input device.

Keywords: Wireless Air Mouse, ESP32, Gyroscope, Accelerometer, MPU6050, Bluetooth Communication, Human-Computer Interaction, Motion Tracking, Embedded Systems, Cursor Control, Sensor-Based Interface, Assistive Technology.

ICSICA-2026-297

Feature Optimized Light Weight IoT Intrusion Detection System Using Genetic Optimization

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ABSTRACT

Intrusion Detection Systems (IDS) play a crucial role in securing Internet of Things (IoT) environments, which are highly vulnerable due to their scale, heterogeneity, and resource constraints. Traditional lightweight IDS models often suffer from limited accuracy and adaptability because of fixed architectures and manual parameter tuning. This study proposes an enhanced IDS framework by integrating Genetic Algorithms (GA) to optimize feature selection, learning parameters, and decision thresholds. The evolutionary process enables efficient exploration of optimal solutions, improving adaptability to evolving cyber threats without requiring full retraining. The proposed model is evaluated using standard IoT intrusion datasets and assessed through metrics such as accuracy, precision, recall, and F1-score. Results show improved detection performance, robustness against unseen attacks, and faster convergence compared to baseline models, while maintaining low computational overhead. This makes the approach suitable for real-time deployment in resource-constrained IoT environments.

Keywords: IoT Security, Intrusion Detection System, Genetic Algorithm, Feature Selection, Lightweight Models, Cybersecurity, Optimization, Machine Learning, Real-Time Detection.

ICSICA-2026-298

Smart Solar Irrigation and Crop Advisory System Using IoT

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ABSTRACT

Agriculture faces increasing challenges due to water scarcity, rising energy costs, and the need for sustainable farming practices. This paper presents a solar-powered smart irrigation and crop advisory system designed to optimize water usage, enhance crop productivity, and reduce dependence on conventional energy sources. The proposed system integrates soil moisture, temperature, and humidity sensors with a microcontroller to monitor real-time field conditions. Based on sensor data and predefined crop requirements, the system automatically controls irrigation, ensuring precise water delivery only when necessary. Solar energy is utilized to power the entire setup, making it suitable for remote and off-grid agricultural areas. Additionally, a crop advisory module provides farmers with actionable recommendations on irrigation schedules, crop health, and environmental conditions through a user-friendly interface. The system minimizes water wastage, lowers operational costs, and promotes sustainable agriculture. Experimental results demonstrate improved irrigation efficiency, reduced energy consumption, and increased crop yield compared to conventional irrigation methods.

Keywords: Solar-Powered Irrigation, Smart Irrigation System, Precision Agriculture, Soil Moisture Sensors, Microcontroller-Based Automation, Real-Time Monitoring, Automated Irrigation Control, Crop Advisory System.

ML-Based Automated Irrigation System

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ABSTRACT

Efficient water management is essential in agriculture to improve crop productivity and reduce water wastage. Traditional irrigation systems rely on manual monitoring and fixed schedules, which often lead to inefficient water usage. This paper presents a Machine Learning-based automated irrigation system that uses environmental parameters such as soil moisture, temperature, humidity, and day/night conditions to control irrigation intelligently.

The system collects real-time data using sensors and transmits it through a microcontroller to a Python-based application. A Decision Tree machine learning algorithm is used to analyze the data and predict irrigation requirements. Based on the prediction, the system automatically controls the irrigation valve to provide full, partial, or no irrigation. A graphical user interface developed using Tkinter enables real-time monitoring of system parameters and decisions.

The proposed system reduces water wastage, improves irrigation efficiency, and enhances crop productivity, making it a cost-effective solution for smart agriculture.

Keywords: Machine Learning, Automated Irrigation, Decision Tree, IoT, Soil Moisture Sensor, Smart Agriculture.

ICSICA-2026-300

Intelligent Future Workforce & Smart Career Planning Platform Using Generative AI and Market Trend Prediction

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ABSTRACT

Skill Path AI is an AI-powered career mentorship and education platform designed to help learners bridge the gap between their existing skills and their desired career goals. The platform delivers highly personalized learning experiences by analysing a user's career objectives, current skill set, and learning preferences to generate customized, step-by-step learning roadmaps. Each roadmap includes clear milestones, estimated study timelines, curated learning resources, and practical projects that ensure real-world skill application and measurable progress. Skill Path AI also features an interactive AI-based English-speaking tutor that enables real-time conversational practice. This tutor provides instant grammar correction, pronunciation feedback, vocabulary enhancement, and confidence-building support, helping learners improve communication skills essential for professional success. In addition, the platform offers a comprehensive job preparation hub that delivers structured training in technical skills, aptitude, and soft skills, preparing users for interviews, workplace challenges, and career transitions. The platform supports both web-based access on laptops and Android mobile devices, allowing flexible and convenient learning anytime, anywhere. With secure authentication, activity tracking, and a user-centric design, Skill Path AI provides a reliable, engaging, and scalable solution for career-oriented skill development and lifelong learning.

Keywords: AI-powered learning, career mentorship platform, personalized learning paths, AI roadmap generation, skill gap analysis, career development, job preparation, English AI tutor, gamified education, upskilling.

ICSICA-2026-301

Quantum-Enhanced Classification of Brain Tumors Using DNA Microarray Gene Expression Profiles

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ABSTRACT

DNA microarray technology enables the simultaneous measurement of expression levels of thousands of genes, thereby facilitating the understanding of the molecular mechanisms underlying complex diseases such as brain tumors and the identification of diagnostic genetic signatures. To derive meaningful biological insights from the high-dimensional and complex gene features obtained through this technology and to analyze gene properties in detail, classical artificial intelligence (AI)-based approaches such as machine learning (ML) and deep learning (DL) are widely employed. However, these methods face various limitations in managing high-dimensional vector spaces and modeling the intricate relationships among genes. Leveraging quantum properties such as superposition and entanglement, quantum methods enable more efficient parallel processing of high-dimensional data and offer faster and more effective solutions to problems that are computationally demanding for classical methods. In this study, a novel model called “Deep VQC” is proposed, based on the Variational Quantum Classifier (VQC) approach. Developed using microarray data containing 54,676 gene features, the model successfully classified four different types of brain tumors—ependymoma, glioblastoma, medulloblastoma, and pilocytic astrocytoma—alongside healthy samples with high accuracy. Keywords: DNA Microarray; Gene Expression Analysis; Brain Tumour Classification; High-Dimensional Data; Machine Learning (ML); Deep Learning (DL); Quantum Computing; Variational Quantum Classifier (VQC); Deep VQC Model; Quantum AI; Superposition and Entanglement; Bioinformatics; Genetic Signature Identification; Precision Medicine.

ICSICA-2026-302

Real-Time Automated ID Card Detection for Smart Campus Surveillance

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ABSTRACT

Real-time automated ID card detection is a computer vision-based system designed to detect and verify identity cards using live camera input. The system processes real-time video frames to automatically identify the presence of an ID card without manual intervention. In this project, the YOLOv26 (You Only Look Once) deep learning model is used for high-speed and accurate object detection, making it suitable for real-time applications. YOLOv26 provides efficient detection performance with improved accuracy and faster inference, even in challenging conditions such as varying lighting, different card orientations, cluttered backgrounds, and partial occlusions. Once the ID card is detected, the identified region can be extracted for further processes such as text recognition, face verification, or authenticity validation. This automated approach reduces human effort, minimizes verification errors, and significantly improves processing speed. The proposed system is useful in applications like access control, banking verification, online examinations, office security, and surveillance systems. Overall, the solution offers a reliable, scalable, and efficient method for secure real-time identity verification.

Keywords: Real-time ID Card Detection; Computer Vision; Object Detection; YOLOv26; Deep Learning; Image Processing; Video Frame Analysis; Identity Verification; Face Detection; Optical Character Recognition (OCR); Access Control Systems; Security Automation; Surveillance Systems; Real-time Processing.

ICSICA-2026-303

A Smart Healthcare Application for Early Multidisease Prediction Using Explainable Machine Learning Models

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ABSTRACT

The increasing prevalence of chronic diseases and the growing volume of healthcare data have created a need for intelligent systems that can assist in early diagnosis and preventive healthcare. This project presents a Multi-Disease Prediction System that leverages machine learning techniques to predict the likelihood of multiple diseases such as diabetes, heart disease, and liver disorders using patient clinical data. The objective of the system is to provide a unified, accurate, and efficient platform for disease prediction, enabling users and healthcare professionals to make informed decisions at an early stage. The system is developed using structured medical datasets that include key health parameters such as age, gender, blood pressure, glucose levels, cholesterol, and other relevant clinical features. Data preprocessing techniques, including data cleaning, normalization, and feature selection, are applied to improve data quality and enhance model performance. The system is integrated with a user friendly interface that allows users to input their health data and receive real-time predictions along with risk analysis. Experimental results demonstrate that the proposed system achieves high accuracy and reliability across different disease datasets. By integrating multiple disease predictions into a single platform, the system reduces the need for separate diagnostic tools and enhances usability. The proposed solution is scalable and can be extended to include additional diseases and real-time monitoring features in the future, making it a valuable tool for modern healthcare support and early disease detection.

Keywords: Machine Learning, Multi-Disease Prediction, Healthcare Analytics, Disease Diagnosis, Predictive Modeling, Artificial Intelligence, Clinical Data Analysis, Early Detection, Decision Support System, SHAP Explainability.

ICSICA-2026-304

AI-Driven Fraud Detection Models in Digital Payment Systems

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ABSTRACT

The rapid growth of online payment platforms has significantly increased the complexity and frequency of fraudulent activities, posing serious challenges to financial security and user trust. This work proposes an AI-based fraud-detection framework that leverages deep learning algorithms for real-time monitoring of online payment systems. The online client-server transaction history is recorded and analysed by the deep learning model to predict abnormal/fraudulent activities. The proposed model employs a deep neural network architecture to automatically learn complex, non-linear transaction patterns from highdimensional payment data. Key transactional features, including transaction amount, time interval, user behaviour, and merchant information, are analysed to distinguish legitimate from fraudulent transactions. To handle the inherent class imbalance in fraud datasets, advanced preprocessing techniques and cost-sensitive learning strategies are incorporated. Experimental evaluation on benchmark online payment datasets demonstrates that the proposed deep learning-based approach achieves superior performance in detection accuracy, precision, recall, and F1 Score compared to conventional machine learning models. The results confirm the effectiveness of deep learning in capturing evolving fraud behaviours while minimizing false positives. This study highlights the potential of AI-driven fraud detection systems to enhance the security, reliability, and scalability of modern online payment infrastructures.

Keywords: Online Payment Fraud Detection; Artificial Intelligence; Deep Learning; Neural Networks; Transaction Analysis; Anomaly Detection; Real-time Monitoring; Financial Security; Class Imbalance Handling; Cost-sensitive Learning.

ICSICA-2026-305

Online Clothing Delivery in Digital Era

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ABSTRACT

The Online Clothing Delivery System in Digital Era project creates an online, centralized, and automated application to connect (integrate) to the Shop Owner/Seller, Admin, Customer, and Delivery Worker to make the process of Ordering and Delivering Clothing Products easier. The System provides secure registration/login for all Users with assurance of Authorized Users to protect the Data in this Application that can be accessed by authorized persons only. Along with providing a secure Registration/login, it allows Shop Owners/Sellers to add/update/manage/create all necessary product information/data to allow Customer Users to make informed purchases when placing orders with the Shop Owner/Seller. Customers can easily view products/items, book products/items, and get the real-time status of their orders, which will make them satisfied and have a clear indication of their orders and will have Trust in the Site/Application. Quantitative research using surveys and statistical analysis among small business owners. Conceptual analysis is supported by case studies and literature review. Quantitative research using surveys and regression analysis. The study identified key factors influencing online consumer trust, satisfaction, and purchasing behaviour's study found that social media marketing significantly improves sales performance, customer reach, and brand visibility. The results showed that store image significantly affects customer trust, satisfaction, and buying intention. The study found that preview customization increases user satisfaction and purchase confidence.

Keywords: Java, Kotlin, Php, Mysql Server, Android Studio.

ICSICA-2026-306

Real-Time Object Detection and Semantic Segmentation for Autonomous Driving Using Yolov5

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ABSTRACT

Autonomous driving systems require accurate and fast perception of the surrounding environment to ensure safe and reliable navigation. This project focuses on the development of a real-time image and video processing system that combines object detection and semantic segmentation techniques for self-driving car applications. The primary objective is to identify and classify important road elements such as vehicles, pedestrians, lanes, and traffic signs while maintaining high processing speed and accuracy. The proposed system utilizes the YOLOv5 algorithm for efficient object detection due to its ability to process images at high speed with minimal latency. In addition, semantic segmentation techniques are applied to classify each pixel of the image, enabling a deeper understanding of the driving scene. The expected outcome of this project is a robust and efficient system capable of accurately detecting and segmenting road elements in real time. This enhances situational awareness, supports intelligent decision-making, and improves overall driving safety. The project also provides a strong foundation for future advancements in autonomous vehicle technology.

Keywords: YOLOv5, Semantic Segmentation, Object Detection, Autonomous Driving, Deep Learning

ICSICA-2026-307

AI-Based Multi Modal Framework for Cardiac Disease Classification from ECG And PCG Signals

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ABSTRACT

Heart disease is one of the most common causes of death around the world, and finding it early is important for both treatment and prevention. Medical professionals need to manually interpret electrocardiogram (ECG) signals and clinical parameters to carry out traditional diagnosis methods. The process requires a long duration because it depends on personal assessment which contains multiple potential error points. The proposed system uses multiple cardiac signal types to enhance both diagnostic accuracy and diagnostic reliability. The first step involves gathering benchmark datasets which contain ECG images and PCG heart sound signals for subsequent processing. The system creates a complete cardiac activity representation through its feature extraction which uses both data sources and combines them through two different fusion methods. The model achieves better classification results through multimodal integration which allows it to detect complex heart disease patterns. The developed Python-based web system uses Flask HTML CSS and MySQL to deliver immediate diagnostic results through its deployed trained model. The expected outcome of this project is an intelligent and scalable diagnostic tool which can accurately identify heart diseases while decreasing both false positive results and the time needed to reach a diagnosis.

Keywords: Heart disease detection, electrocardiogram (ECG), phonocardiogram (PCG), multimodal deep learning, feature fusion, classification, real-time diagnosis, medical decision support, signal processing, healthcare analytics

ICSICA-2026-308

Meal Connect: An Intelligent System for Efficient Food Donation and Waste Minimization

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ABSTRACT

The Food Donation Management System is a web-based application designed to reduce food wastage and improve the distribution of surplus food to people in need. In many areas, a lack of proper coordination leads to food being wasted while others face hunger. This system provides a centralized platform that connects donors, NGOs, volunteers, and administrators. Donors can easily submit food donation requests, while volunteers can accept and manage deliveries. NGOs coordinate the distribution process to ensure that food reaches the right beneficiaries efficiently. The system organizes donation details in a structured manner and allows real-time tracking of donation status, improving transparency and accountability. The application reduces manual coordination, minimizes delays, and enhances overall efficiency. It also maintains records and generates basic reports to help administrators monitor system performance. The platform is designed to be simple, user-friendly, and suitable for real-world implementation. Overall, the system provides a cost-effective solution to manage food donations effectively and support social welfare by ensuring surplus food is utilized properly.

Keywords: Food waste reduction, donation management system, supply chain coordination, humanitarian logistics, web application, real-time monitoring, data management, community support systems

ICSICA-2026-309

AI-Based Smart Glass for Real-Time Assistance to Visually Impaired Users

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ABSTRACT

Visual impairment limits the ability of millions of individuals worldwide to move independently and interact confidently with their surroundings. Daily activities such as recognizing objects, navigating unfamiliar areas, and locating nearby services often become difficult without external assistance. Traditional mobility aids like white canes and guide dogs help with basic navigation but provide limited environmental awareness and do not offer real-time information about the surroundings. To overcome these limitations, this work presents an AI-based Smart Glass system designed to provide real-time assistance for visually impaired users. The proposed system combines artificial intelligence, computer vision, and wearable technologies to create a compact and intelligent assistive device. To ensure efficient performance, the system uses a hybrid processing architecture. Edge computing handles immediate tasks such as obstacle detection and object recognition with minimal delay, while cloud-based services support more advanced functions including face recognition and speech understanding. The analyzed information is converted into clear audio guidance using text-to-speech technology and delivered through bone-conduction speakers, enabling users to receive instructions without blocking ambient sounds. The solution aims to offer an accessible, practical, and cost-effective assistive technology that can significantly improve the daily lives of visually impaired individuals.

Keywords: Artificial Intelligence, Smart Glass, Computer Vision, Assistive Technology, Object Detection, GPS Navigation, Wearable Devices.

ICSICA-2026-310

Smart Rider Safety and Automated Speed Control System Using UDP IoT

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ABSTRACT

This paper proposes a Smart Rider Safety System that integrates Internet of Things (IoT) technology with automated speed control to improve two-wheeler safety. The primary objective of the system is to minimize road accidents caused by alcohol consumption and failure to wear helmets by enforcing safety compliance through real-time monitoring and control mechanisms. The collected data is transmitted wirelessly using the User Datagram Protocol (UDP) over Wi-Fi to a vehicle-mounted ESP32 microcontroller. The ESP32 acts as the central processing unit, analyzing incoming data with low latency to make immediate safety decisions. The vehicle ignition system is enabled only when the rider meets all safety requirements. If any violation occurs, such as alcohol detection, helmet removal, or communication failure, the system automatically restricts the vehicle's speed or disables ignition using pulse-width modulation (PWM) techniques. The proposed methodology emphasizes cost-effectiveness, real-time response, and ease of implementation. The expected outcomes include enhanced rider compliance, reduction in accident rates, and improved road safety. Furthermore, the system can be extended with cloud connectivity and mobile applications for remote monitoring, making it scalable and suitable for modern intelligent transportation systems

Keywords: Internet of Things (IoT), UDP Communication Protocol, ESP32 Microcontroller, MQ-3 Alcohol Sensor, IR Helmet Detection Sensor, Wireless Communication (Wi-Fi).

Blockchain-Ased Decentralized Cloud Storage with Privacy-Preserving Access Control Using IPFS and ECC

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ABSTRACT

The rapid growth of cloud computing has significantly increased the demand for secure, scalable, and privacy-preserving data storage solutions. Traditional centralized cloud systems suffer from critical limitations, including single points of failure, lack of transparency, and vulnerability to data breaches. To address these challenges, this paper proposes a blockchain-based decentralized cloud storage framework that integrates Inter Planetary File System (IPFS) and Elliptic Curve Cryptography (ECC) to ensure secure and efficient data management. In the proposed system, IPFS is utilized for distributed file storage, enabling content-addressable, tamper-resistant, and highly available data sharing across a peer-to-peer network. Blockchain technology is employed to maintain an immutable ledger for access control, authentication, and auditing, ensuring transparency and trust among participants without relying on a centralized authority. To enhance data privacy, ECC-based encryption is implemented for secure key generation, lightweight cryptographic operations, and fine-grained access control mechanisms. The framework allows data owners to define and enforce access policies through smart contracts, ensuring that only authorized users can retrieve and decrypt stored data. Additionally, the use of ECC reduces computational overhead while maintaining strong security guarantees, making the system suitable for resource-constrained environments maintaining acceptable performance and scalability.

Keywords: Blockchain, Decentralized Cloud Storage, Inter Planetary File System (IPFS), Elliptic Curve Cryptography (ECC), Privacy-Preserving Access Control , Encryption, Peer-to-Peer Networks, Data Integrity, Access Control Mechanisms.

ICSICA-2026-312

Career Genie: AI-Powered Career Path Prediction and Professional Development

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ABSTRACT

Finding your way in today's job market can feel like trying to hit a moving target while blindfolded. There's a massive gap between what we learn in school and what the industry actually wants, and most career tools are still stuck in the past, relying on basic keyword matching that misses the big picture. That's why I'm building Career Genie. We've moved beyond simple buzzwords by using BERT to actually understand the "intent" behind job postings—recognizing the difference between a basic skill and a complex role like a backend architect. By applying a Random Forest algorithm to your unique technical DNA, the system predicts where you'll truly thrive based on where the market is headed right now. It doesn't just stop at advice, either; it identifies your specific skill gaps, points you toward the right certifications on platforms like Coursera, and even helps you prep with a technical interview module and a professional resume builder. It's about turning that career chaos into a clear, actionable plan so you can stop guessing and start growing.

Keywords: Artificial Intelligence, Career Path Prediction, BERT, Random Forest, Natural Language Processing, Skill-Gap Analysis, Automated Resume Generation

ICSICA-2026-313

Signverify: An AI-Driven Deep Learning Framework for Intelligent Signature Forgery Detection and Authentication

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ABSTRACT

The authenticity of handwritten signatures remains a critical challenge in financial and legal sectors due to the rising sophistication of forgery techniques. This project aims to develop an automated signature forgery detection system using Deep Learning to enhance security and reliability. The primary objective is to build a robust model capable of distinguishing between genuine signatures and skilled forgeries that often bypass manual inspection. The proposed methodology utilizes Convolutional Neural Networks (CNN) to extract intricate features and behavioral patterns from signature images. The system involves several stages, including image preprocessing (noise reduction and normalization), feature extraction through deep layers, and classification using a Softmax layer. The expected outcome of this project is a high-accuracy verification system with a significantly low False Acceptance Rate (FAR). The final implementation integrated with a Flask-based web interface allows users to upload signature images and receive real-time verification results. This research contributes to the field of biometrics by providing a scalable and efficient solution for automated document authentication in digital environments.

Keywords: Artificial Intelligence, Convolutional Neural Networks (CNN), Deep Learning, Forgery Detection, Signature Verification.

ICSICA-2026-314

High-Precision Non-Invasive Blood Group Prediction System with Fingerprint Imaging Using Swin Transformer

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ABSTRACT

This paper presents a high-precision, non-invasive system for blood group prediction using fingerprint imaging combined with a Swin Transformer-based deep learning model. Traditional blood group identification methods require invasive procedures such as blood sampling, which can be time-consuming, uncomfortable, and dependent on laboratory infrastructure. To address these limitations, the proposed system leverages the unique patterns present in fingerprint images as a biometric indicator for predicting blood groups in a fast, contactless, and cost-effective manner. The system utilizes high-resolution fingerprint images captured through standard imaging devices. These images undergo preprocessing steps including noise reduction, normalization, and feature enhancement to ensure optimal input quality. The processed images are then fed into a Swin Transformer architecture, which is known for its ability to capture both local and global features through hierarchical vision representation and shifted window mechanisms. Experimental results demonstrate that the proposed approach achieves high prediction accuracy compared to traditional machine learning methods and other convolutional neural network models. Overall, this research contributes to the advancement of intelligent healthcare solutions by combining biometric analysis with state-of-the-art transformer-based deep learning techniques.

Keywords: Fingerprint Imaging, Non-Invasive System, Swin Transformer, Deep Learning Biometric Analysis, Computer Vision, Image Processing, Pattern Recognition.

ICSICA-2026-315

Blockchain And AI-Based Secure Electronic Health Record System

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ABSTRACT

The rapid digital transformation in the healthcare sector has increased the adoption of Electronic Health Record (EHR) systems for efficient storage and management of patient data. However, conventional EHR systems are often centralized, making them vulnerable to data breaches, unauthorized access, and lack of transparency. These challenges raise serious concerns regarding data security, privacy, and interoperability among healthcare institutions. This project proposes a Blockchain and Artificial Intelligence (AI)-based secure Electronic Health Record management system to address these issues. The system utilizes blockchain technology to provide a decentralized and tamper-proof environment, ensuring data integrity and secure access control. The system also incorporates a federated learning approach, enabling multiple healthcare institutions to collaboratively train models without sharing raw patient data, thereby preserving privacy. To further enhance security, encryption techniques are applied during data transmission and storage. The proposed system aims to improve data security, ensure patient privacy, and enable efficient sharing of medical records across different platforms. It also enhances diagnostic accuracy and supports healthcare professionals in making informed decisions. Overall, the system contributes to building a secure, reliable, and intelligent healthcare data management framework.

Keywords: Blockchain, Artificial Intelligence, Electronic Health Records, Federated Learning, Data Security.

ICSICA-2026-316

EMOTUNE-CNN: A Real-Time Facial Affect-Driven Adaptive Music Recommendation Framework

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ABSTRACT

EMOTUNE-CNN is an intelligent, real-time music recommendation framework that dynamically adapts to a user's emotional state using facial expression analysis. The main goal of this system is to enhance user experience by delivering music that reflects or positively influences the listener's current mood. The framework leverages a Convolutional Neural Network (CNN) to detect and classify facial expressions captured through a camera into predefined emotional categories such as happiness, sadness, anger, surprise, fear, and neutrality. The detected emotional state is then processed by a recommendation engine that maps emotions to a structured music database. This database contains songs categorized based on mood, tempo, intensity, and genre. Based on the identified emotion, the system selects suitable tracks that either complement the user's current feelings or help in emotional regulation, depending on user-defined preferences. This adaptive learning capability enables the framework to evolve according to individual user preferences over time. By combining deep learning techniques with affective computing, EMOTUNE-CNN demonstrates an innovative approach to personalized music recommendation. It not only strengthens human-computer interaction but also contributes to emotional well-being by offering a more engaging and mood-aware listening experience.

Keywords: Emotion recognition, facial expression analysis, Convolutional Neural Network (CNN), real-time systems, adaptive music recommendation, affective computing, personalized user experience, deep learning, mood-based music selection, human-computer interaction.

ICSICA-2026-317

Sentinelvision: An Intelligent Framework for Proactive Crime Behavior and Suspect Identity Analysis

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ABSTRACT

The rapid advancement of artificial intelligence (AI) and deep learning has revolutionized crime prevention and public safety. This project introduces an AI powered Suspicious Activity Detection and Crime Face Recognition System that enhances security surveillance through computer vision and deep learning techniques. Additionally, it employs advanced facial recognition models to identify known offenders in real time. Leveraging YOLO for object detection and Grassmann with CNN-based architectures for face recognition, the system ensures accurate and swift identification of potential threats in surveillance footage, making it a powerful tool for security applications. Designed for deployment in smart city surveillance, banking security, and law enforcement, this AI-driven system enables authorities to proactively detect threats and respond swiftly to criminal activities. By implementing this technology, law enforcement agencies can improve crime prevention strategies, minimize false alarms, and enhance public safety. The integration of AI into surveillance systems not only increases efficiency but also paves the way for smarter and more automated security solutions, significantly contributing to crime reduction in urban environments.

Keywords: YOLO algorithm, Grassmannian algorithm, CNN, Facial Recognition, Real-Time Monitoring.

ICSICA-2026-318

GigConnect: An Ai-Driven Web Platform for Intelligent Freelancer Employer Job Matching and Secure Escrow Payment

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ABSTRACT

The rapid expansion of the gig economy has significantly transformed the way individuals engage in flexible employment and project-based work. Freelancing platforms have become essential tools that connect skilled professionals with organizations seeking short-term services. However, existing platforms often face several challenges, including inefficient job matching, limited visibility for freelancers, delayed payments, and lack of trust between freelancers and employers. These issues create barriers for both parties and reduce the overall efficiency of online freelancing ecosystems. This project proposes GigConnect, an intelligent web-based platform designed to improve the interaction between freelancers and employers through advanced technology and secure transaction mechanisms. In addition to intelligent job recommendations, the proposed platform incorporates a secure escrow-based payment mechanism to ensure safe financial transactions. In this model, employers deposit the payment into an escrow system before the work begins, and the payment is released only after successful completion of the task. This approach increases transparency, reduces payment disputes, and builds trust between freelancers and employers. The proposed platform is expected to improve job accessibility for freelancers, streamline hiring processes for employers, and contribute to the development of a more secure and transparent gig economy ecosystem.

Keywords: Gig Economy, Freelancing Platform, AI-Based Job Matching, Escrow Payment System, and Web Application.

ICSICA-2026-319

Malnutrition Detection System Using Deep Learning and Neural Networks

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ABSTRACT

Malnutrition is a serious global health issue that affects people of all age groups, especially children in developing countries. It leads to various health problems such as poor growth, weakened immunity, and increased risk of diseases. Early detection of malnutrition is essential to prevent long-term health complications and improve the quality of life. This project, Malnutrition Detection System Using Deep Learning and Neural Networks, aims to provide an efficient, reliable, and automated solution for identifying malnutrition at an early stage. The proposed system uses image processing and health-related data to analyze the nutritional condition of individuals. The methodology involves collecting datasets, preprocessing the data, and extracting important features such as body shape, facial characteristics, and physical indicators. The system is designed to be user-friendly, allowing users to upload images or enter basic health information and receive instant results. It also provides clear output that can be easily understood by common users as well as healthcare workers. The expected outcome of this project is to develop a fast, accurate, and cost-effective tool for early malnutrition detection. It helps in raising awareness, supporting healthcare professionals, and enabling timely intervention. This system can play a significant role in improving public health and reducing the impact of malnutrition in society.

Keywords: Malnutrition detection, deep learning, convolutional neural network (CNN), artificial neural network (ANN), image processing, healthcare analytics, early diagnosis, classification, nutritional assessment, medical decision support.

ICSICA-2026-320

SAFEFACEYOLO: Real-Time Workplace Safety Enforcement Via Integrated Helmet Detection and Facial Recognition

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ABSTRACT

The proposed system, SAFEFACEYOLO: Advanced Workplace Security through Helmet Detection and Facial Authorization, focuses on improving safety compliance and identity verification in industrial and construction environments. Workplace safety is a critical concern due to the high risk of accidents caused by negligence in wearing Personal Protective Equipment (PPE), especially safety helmets. Traditional monitoring systems rely heavily on manual supervision, which is often inefficient, error-prone, and unsuitable for large-scale or multi-activity work sites. To overcome these limitations, the system introduces a computer vision-based approach that integrates both helmet detection and facial recognition into a unified framework. The system utilizes advanced deep learning techniques, primarily the YOLO (You Only Look Once) algorithm for real-time helmet detection and the Grassmann-based facial feature extraction method for identity verification. Cameras installed at strategic locations continuously capture live video streams, where the system simultaneously detects whether workers are wearing helmets and verifies their identity against a pre-registered database. By integrating real-time monitoring, automated detection, and instant alert mechanisms, SAFEFACEYOLO significantly enhances workplace safety, reduces human dependency, and ensures efficient enforcement of safety regulations in dynamic working environments.

Keywords: Alert System, Facial Recognition, Grassmann Algorithm, Helmet Detection, Personal Protective Equipment, Safety Monitoring, YOLO Algorithm.

ICSICA-2026-321

Automated Data Retention and Archival Management System

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ABSTRACT

The rapid growth of digital banking has led to the generation of massive volumes of customer, transactional, and compliance-related data. Regulatory authorities mandate that such data must be retained for specific periods and handled securely throughout its lifecycle. However, traditional manual approaches to data retention and archival are inefficient, error-prone, and increase the risk of non-compliance, data breaches, and excessive storage costs. This project presents an Automated Data Retention and Archival Management System for the Banking Sector, designed to manage data efficiently from creation to deletion. The system classifies data using predefined record codes and applies country-specific retention policies to determine how long data should be stored. It incorporates key features such as role-based access control to ensure secure data handling, legal and tax hold mechanisms to prevent premature deletion, and audit logging to maintain a complete record of user activities for compliance and traceability. The system also provides a user-friendly dashboard for monitoring data status, compliance levels, and operational activities. By combining automation, security, and regulatory adherence, the proposed solution enhances efficiency, reduces operational risks, and supports transparent data governance. Overall, this project delivers a scalable and reliable framework for managing banking data in accordance with modern compliance standards.

Keywords: data retention, data archival, banking systems, workflow automation, regulatory compliance, role-based access control, audit logging, data lifecycle management, information security, data governance.

ICSICA-2026-322

Plant Leaf Disease Detection Using CNN, SVM, Random Forest

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ABSTRACT

Plant leaf diseases can greatly affect crop quality and yield. This project, Plant Leaf Disease Detection Using Machine Learning Techniques, aims to provide a simple and efficient solution for identifying plant diseases at an early stage. The main objective is to help farmers detect diseases quickly and take proper action to protect their crops. The methodology includes collecting leaf images, preprocessing them, and extracting important features like color and texture. Machine learning techniques such as Convolutional Neural Networks (CNN), Support Vector Machine (SVM), and Random Forest are used to classify healthy and diseased leaves accurately. The system allows users to upload leaf images and get instant results. This project also provides the disease name in both English and Tamil, making it easy for users to understand. A voice output feature is included to read the disease name and suggested remedies in a natural human voice. The system also recommends suitable treatments for the detected disease. The expected outcome is a fast, accurate, and user-friendly tool that supports early disease detection, improves crop productivity, and helps farmers take timely remedial actions.

Keywords: Plant disease detection, machine learning, convolutional neural network (CNN), support vector machine (SVM), random forest, image processing, crop health monitoring, precision agriculture, classification, agricultural technology.

ICSICA-2026-323

A Smart Multilingual NLP-based Framework of Real-Time Detection of Cyberbullying in Multilingual social media Text

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ABSTRACT

Cyberbullying has become an issue of significant concern in contemporary digital communication, and this is especially so on the social media platforms where malicious messages are passed speedily and influence the psychological health of the users. This paper introduces a cyberbullying detection system based on machine learning that has the capability of detecting abusive textual content written in English and Thunglish (Tamil written in Roman script). The system uses Natural Language Processing to process text and TF-IDF vectorization to process textual data into useful numerical features. The Logistic Regression classifier is trained using labeled sets of cyberbullying messages to classify the harmful and non-harmful messages as binary data. The experimental assessment indicates that the model proposed has an accuracy of 93.84% with the precision of 92.97% and recall of 92.15% that beats various baseline models, including Naïve bayes, decision tree, and k nearest neighbors. The system is embedded in a lightweight web interface based on Flask that can detect any cyberbullying in real-time when text is entered by the user. The findings prove that the offered framework is efficient in detecting abusive words without compromising the speed of response, which is why it can be implemented in online instances of moderation systems.

Keywords: Detection of cyberbullying, Natural language processing, machine learning, TF-IDF vectorization, logistic regression, analysis of social media, text classification.

ICSICA-2026-324

Automated Multi-Tumor Brain Detection and Localization Using Advanced YOLO-Deep Learning Framework

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ABSTRACT

Detecting and Identifying Brain Tumours is a Very Important but Difficult Task in Medical Imaging Analysis Due to the Complexity of the Patterns and Characteristics of the Brain and its Tumours, as Well as the Variation in Sizes, Shapes and Structures of Brain Tissue Both in Normal and Abnormal Cases. Magnetic resonance imaging (mri) provides a means of obtaining a very high-resolution imaging tool that is not harmful to the patient; original images can be difficult to interpret because they take some time to read, are subject to misinterpretation due to subjectiveness of the reader. To fill this gap/reduce the interpretation time, the researcher developed an automated health care system (ahcs) for determining the type and location of tumors using an automated 3d rotational algorithm (agri 3d) integrated with the state-of-the-art object detector (yolov11) and both its application and already trained data are implemented. Indicating each of the detected tumours was successfully localized using the same image for all three types of tumours test cases metrics analyzed for both robustness and how well the model would work in real-world environments.

Keywords: Brain Tumour Detection, Medical Imaging, Magnetic Resonance Imaging (MRI), Automated Health Care System (AHCS), 3D Rotational Algorithm (AGRI 3D), YOLOv11, Image Pre-processing, Tumour Localization, Deep Learning, Image Classification, Diagnostic Accuracy, Real-time Detection.

ICSICA-2026-325

Deep learning framework using yolo-based object detection And Efficientnet for cotton leaf disease detection

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ABSTRACT

In order to guarantee steady agricultural output and minimise financial losses brought on by plant diseases, cotton crop health must be maintained. Conventional disease detection techniques mostly depend on visual inspection by farmers or agricultural specialists, which can be laborious, unreliable, and challenging to implement on a broad scale. Recent advances in deep learning and computer vision have made it possible for automated systems to analyse plant photos and accurately identify illnesses. In this study, deep learning techniques are used to create an intelligent cotton plant health monitoring system that can identify and categorise diseases from photos of cotton leaves. The suggested system combines a YOLO-based object detection model for locating sick areas on the leaf surface with EfficientNet for deep feature extraction and classification. Experimental evaluation shows that the YOLOv4 detection model offers strong localisation performance with high precision, recall, and means average precision values, while the EfficientNetB4 model achieves very high classification accuracy, especially for cases of powdery mildew and healthy leaves. Additionally, the study looks at how ambient factors like lighting and gadget features affect model predictions.

Keywords: Cotton Leaf Disease Detection, Deep Learning, EfficientNetB4, YOLOv4, Plant Health Monitoring, Computer Vision in Agriculture, Object Detection, Precision Agriculture, Crop Disease Classification, Image-Based Disease Diagnosis.

ICSICA-2026-326

Nested VPN to Securely Access Private Resources

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ABSTRACT

This project presents the implementation of robust and secure network architecture on Amazon Web Services (AWS) using nested Virtual Private Network (VPN) servers. Deployed within public subnets, these VPN servers facilitate secure communication and access to an EC2 instance residing in a private subnet. The nested VPN setup enhances the overall security posture, ensuring a layered defense mechanism for data transmission within the AWS environment. To monitor and analyze network activities, CloudWatch integration has been incorporated. CloudWatch provides comprehensive logging capabilities, allowing for the real-time tracking and analysis of VPN connections and system-level activities. This logging infrastructure aids in identifying potential security threats, ensuring proactive measures can be taken to safeguard the network. The project showcases the synergy between secure networking and advanced logging through the deployment of VPN servers in tandem with CloudWatch. The resulting network architecture serves as a scalable and flexible solution for organizations seeking to establish a monitored AWS infrastructure.

Keywords: Amazon Web Services (AWS), Virtual Private Network (VPN), Nested VPN Architecture; Amazon EC2, Private Subnet Security, Network Architecture, Amazon CloudWatch, Network Monitoring, Cloud Security, Secure Remote Access, Logging and Analytics, Threat Detection, Scalable Infrastructure.

ICSICA-2026-327

Intelligent AI Based Stock Investment System for Market Condition Analysis

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ABSTRACT

The Intelligent AI-Based Stock Investment System for Market Condition Analysis is designed to support investors in making better financial decisions by analyzing stock market behavior using Artificial Intelligence and Machine Learning techniques. In today's dynamic and highly volatile financial environment, manual analysis of stock trends and market risks can be time-consuming, complex, and prone to human error. This system addresses these challenges by providing an automated and intelligent platform that evaluates market conditions, predicts future trends, and offers smart investment recommendations. The proposed system collects and processes both historical and real-time financial data including stock prices, trading volume, market indices, and technical indicators. After preprocessing and cleaning the data, the system applies Machine Learning algorithms to identify hidden patterns, recognize trends, and forecast future stock performance. By learning from previous market behavior, the model can predict whether the market is likely to move upward, downward, or remain stable. The AI model also performs market risk classification, categorizing stocks into low, medium, and high-risk levels based on volatility and market fluctuations, helping investors understand the potential risk associated with each opportunity.

Keywords: AI, Stock Market, Machine Learning, Investment Recommendation, Risk Classification, Market Prediction, Random Forest, LSTM, Deep Learning, Financial Analysis.

ICSICA-2026-328

LLM Powered Data Analyst – AI Based Decision Support System

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ABSTRACT

An LLM Powered Data Analyst is an advanced intelligent system that utilizes Large Language Models (LLMs) to transform the way data analysis is performed. Traditional data analysis requires significant manual effort, technical expertise, and time to extract meaningful insights from large and complex datasets. This system overcomes those challenges by enabling users to interact with data using natural language queries, making the process more intuitive and accessible. The proposed system integrates LLMs with data processing tools to analyze structured and unstructured data efficiently. It can automatically clean, interpret, and summarize data, as well as generate visualizations, reports, and actionable insights. Additionally, it supports tasks such as trend analysis, anomaly detection, and predictive analysis, helping organizations make informed decisions quickly. By reducing dependency on skilled data analysts, the system increases productivity and minimizes human errors. It also enhances communication between technical and non technical users by presenting insights in a clear and understandable manner. This approach is highly beneficial in domains like business intelligence, healthcare, finance, and education, where data-driven decision-making is crucial. Overall, the LLM Powered Data Analyst represents a significant step towards automating analytics, improving efficiency, and democratizing access to data insights for a wider audience.

Keywords: Text Generation, Semantic Search, Context Understanding, Question Answering Systems, Conversational AI, Chatbots, Generative AI Data Preprocessing, Data Cleaning, Data Visualization, Predictive Analytics, Statistical Analysis.

ICSICA-2026-329

Smart Surveillance System for Missing Child Detection Using AI

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ABSTRACT

The problem of missing children is a major social concern, where traditional search methods such as manual investigation and public alerts are often time-consuming and inefficient. To overcome these limitations, this paper proposes a Missing Child Detection System using Face Recognition and CCTV Simulation. The system utilizes artificial intelligence and computer vision to automatically detect and identify missing children in real time. The proposed system allows parents or authorities to register child details and upload facial images through a web application. A CCTV-based camera module continuously captures video, detects faces, and compares them with the stored data using OpenCV. When a match is found, an email alert is sent to the registered parent along with the detection location. Implemented using Python, Flask, OpenCV, and SQLite, the system improves the speed and accuracy of locating missing children and enhances public safety through automated surveillance. In the proposed system, parents or authorities can register the details of a missing child through a web-based application. The registration process includes entering information such as the parent's name, email address, phone number, child's name, and uploading the child's facial image. The uploaded images are stored in a database and processed using face recognition algorithms to extract unique facial features.

Keywords: Missing Children, Face Recognition, Computer Vision, CCTV Surveillance, Artificial Intelligence, OpenCV, Machine Learning, Real-Time Detection, Image Processing, Flask Web Application.

ICSICA-2026-330

AI-Powered Behavioural Biometric Authentication System with Continuous Monitoring

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ABSTRACT

The rapid increase in cyber threats has exposed the limitations of traditional password-based authentication systems, which remain vulnerable to credential theft, brute-force attacks, and phishing. To address these challenges, this project presents an intelligent behavioral biometric authentication system that leverages keystroke dynamics and machine learning-based risk assessment to enhance login security. The system captures user typing patterns during authentication and extracts temporal features such as dwell time, flight time, and typing latency. These features are processed through a trained Random Forest classifier to compute a real-time risk score, enabling adaptive authentication decisions. The backend, implemented using Flask, integrates the trained model for inference, while a SQLite database securely manages user records and behavioral profiles. Additionally, a risk-based authentication mechanism is integrated, where access decisions are dynamically adjusted based on user behavior patterns and anomaly scores. Experimental evaluation demonstrates that behavioral biometrics significantly improve detection of anomalous login attempts compared to static password validation alone. By combining behavioral modeling, machine learning, and real-time risk scoring, the proposed system provides a scalable and practical solution for strengthening user authentication mechanisms in modern web applications.

Keywords: Behavioral Biometrics, Keystroke Dynamics, Random Forest, Risk Scoring, Adaptive Authentication, Machine Learning, Cybersecurity, Anomaly Detection, User Profiling, Web Security

ICSICA-2026-331

IoT Based Smart Borewell Child Detection and Rescue Alert System

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ABSTRACT

Borewell accidents involving children have become a major safety concern, particularly in rural areas where open or abandoned borewells are not properly secured. These incidents often lead to life-threatening situations due to the narrow structure, limited oxygen supply, and delays in rescue operations. Traditional rescue methods are manual, time-consuming, and risky, which reduces the chances of saving the victim. The lack of real-time monitoring and alert systems further worsens the situation. With the advancement of the Internet of Things (IoT), intelligent monitoring systems can be developed to overcome these challenges. IoT technology enables real-time data collection, continuous monitoring, and instant communication between devices and users. By integrating sensors and communication modules, it becomes possible to detect accidents quickly and send immediate alerts to concerned authorities. This paper proposes an IoT-Based Smart Borewell Child Detection and Rescue Alert System that uses sensors such as infrared or ultrasonic sensors to identify the presence of a child inside a borewell. Once detected, the system sends alerts through GSM or cloud-based platforms to rescue teams for immediate action. The system is cost-effective, reliable, and helps in reducing rescue time while improving the chances of survival, making it a practical solution for enhancing public safety.

Keywords: IoT, Borewell Safety, Child Detection, Rescue System, Sensors, GSM Module, Real-Time Monitoring, Alert System.

ICSICA-2026-332

Smart Assistance on Blind People Shopping Assistance on Trained Voice Features

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ABSTRACT

The proposed system presents a smart assistance solution designed to support visually impaired individuals in performing independent shopping using trained voice features. This system integrates advanced technologies such as artificial intelligence, voice recognition, and sensor-based navigation to create an interactive and user-friendly shopping experience. Through trained voice commands, users can easily communicate with the system to search for products, receive step-by-step navigation guidance, and obtain real-time information about items available in the store. The system incorporates object detection techniques to identify products and obstacles, ensuring safe movement within indoor environments like supermarkets and shopping malls. Additionally, voice feedback continuously assists users by announcing product details such as name, price, and location. The use of trained voice features ensures accurate interaction, making the system reliable, efficient, and easy to use in real-world scenarios. The system also adapts to user behavior by learning preferences, thereby improving personalization over time. This innovative solution enhances inclusivity and ensures that visually impaired individuals can perform daily activities like shopping with greater ease and independence.

Keywords: Artificial Intelligence (AI), voice recognition, trained voice features, object detection, assistive technology, indoor navigation, accessibility, visually impaired support, real-time guidance, personalized interaction.

ICSICA-2026-332

Thyroid Nodule Detection Using Deep Learning

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ABSTRACT

Thyroid nodules are abnormal growths that develop in the thyroid gland and are commonly detected using ultrasound imaging techniques. Early detection of thyroid nodules is important because some nodules may develop into thyroid cancer if not diagnosed at an early stage. Traditionally, radiologists analyze ultrasound images manually to identify nodules and determine whether they are benign or malignant. However, manual analysis can be time-consuming and sometimes leads to variations in interpretation depending on the experience of the medical expert. With the advancement of Artificial Intelligence, deep learning techniques have become powerful tools for medical image analysis. Deep learning models, particularly Convolutional Neural Networks (CNNs), are capable of automatically extracting complex features from medical images and identifying patterns that may not be easily visible to the human eye. These models have shown significant improvements in accuracy and efficiency when applied to disease detection tasks. The proposed system focuses on the detection of thyroid nodules using deep learning algorithms applied to ultrasound images. Initially, thyroid ultrasound images are collected from medical datasets and hospitals. These images are preprocessed using image enhancement and noise reduction techniques in order to improve image quality and make the important structures more visible for analysis. After preprocessing, the images are provided as input to a deep learning model such as a Convolutional Neural Network.

Keywords: Thyroid nodules, ultrasound imaging, artificial intelligence (AI), deep learning, Convolutional Neural Networks (CNN), medical image analysis, nodule classification, image preprocessing, automated diagnosis, benign vs malignant detection.

ICSICA-2026-334

Smart "Edge" AI for Low-Resource Agriculture (Plant Stress Via Thermal)

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ABSTRACT

In low-resource agricultural environments, real-time monitoring of crop health is often hindered by high hardware costs, limited power availability, and poor internet connectivity. Traditional RGB-based image processing fails to detect physiological changes, such as water deficit or early-stage disease, until physical damage is visible. This project proposes a **Smart Edge-AI** solution that utilizes low-resolution thermal infrared sensors (MLX90640) coupled with standard RGB cameras to detect plant stress markers before they manifest visually. Building upon the ResXceNet-HBA and Swift architectures, we introduce a Multi-modal "Guided" Super-Resolution approach. This technique uses high-frequency spatial data from a low-cost RGB sensor to enhance the thermal heat maps, achieving high-fidelity stress analysis on ultra-low-cost hardware. To address the "Low-Resource" constraint, a Gated Inference logic is implemented: the computationally intensive Deep Learning model remains in a sleep state, triggered only when a lightweight Crop Water Stress Index (CWSI) mathematical threshold is breached. The system is deployed on an ESP32-S3 microcontroller using TensorFlow Lite Micro with 8-bit integer quantization. Experimental results demonstrate that the proposed framework achieves an accuracy of 96.4% in identifying water and heat stress while reducing energy consumption by 70% compared to always-on edge models.

Keywords: Edge AI, Thermal Imaging, Smart Agriculture, Low-Resource IoT, Plant Stress Detection, Timmy, Multi-modal Fusion

ICSICA-2026-335

Blockchain-Based Tender and Contract Management System

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ABSTRACT

In modern procurement systems, managing tenders and contracts has become increasingly complex due to issues such as lack of transparency, corruption, bid manipulation, and unauthorized data alterations. Traditional tender management systems rely on centralized architectures, where a single authority controls data storage and decision-making processes. This centralized approach introduces significant vulnerabilities, including data tampering, lack of auditability, delayed processing, and reduced trust among stakeholders. Furthermore, manual verification and evaluation processes increase the chances of human error and inefficiencies, ultimately affecting fairness and accountability in contract awarding. To overcome these limitations, this project introduces a Blockchain-Based Tender and Contract Management System, designed to ensure transparency, security, and trust throughout the procurement lifecycle. The proposed system utilizes blockchain technology to create a decentralized and immutable ledger, where all tender-related activities such as tender creation, bid submission, evaluation, and contract awarding are securely recorded and cannot be altered once validated. Each transaction is cryptographically secured and time-stamped, ensuring complete traceability and auditability of actions performed by all participants.

Keywords: Blockchain, tender management, contract management, decentralized ledger, procurement transparency, smart contracts, data immutability, secure bidding, auditability, supply chain governance.

ICSICA-2026-336

Adaptive Continuous Trust Monitoring Application for Corporate Security

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ABSTRACT

In modern corporate environments, safeguarding sensitive organizational data has become increasingly challenging due to the rise of insider threats, credential misuse, and unauthorized access through compromised or stolen devices. Traditional authentication mechanisms, which rely primarily on one-time login verification such as passwords or device-based trust, assume that a user remains trustworthy throughout the entire session after successful authentication. However, this static trust model creates significant security vulnerabilities, as malicious activities can occur undetected during active sessions. To overcome these limitations, this project introduces an Adaptive Continuous Trust Monitoring Application for Corporate Security, designed to provide dynamic and continuous security throughout the user session. The proposed system begins with a daily smart confirmation process, ensuring that the legitimate user is actively present before initiating system access. Once authenticated, the application continuously analyzes user behavior patterns such as login activity, access frequency, typing patterns, device usage, and interaction anomalies. These behavioral signals are processed using predefined rules and intelligent risk evaluation techniques to detect any deviations from normal user behavior. When suspicious or abnormal activity is identified, the system dynamically triggers an adaptive re-verification process.

Keywords: Continuous Authentication, Adaptive Security, Zero Trust Architecture, Behavioral Monitoring, Insider Threat Detection, Risk-Based Authentication, User Behavior Analytics (UBA), Session Monitoring, Anomaly Detection.

ICSICA-2026-337

AI– Powered Forensic Face Sketch Generation And Identification System

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ABSTRACT

Forensic face sketching plays a crucial role in criminal investigations, especially when no photographic evidence is available. Traditional sketching methods rely heavily on the skills of forensic artists and the memory of eyewitnesses, making the process time-consuming, subjective, and less accurate. Variations in human perception and memory often lead to inconsistencies, which can delay suspect identification and reduce investigation efficiency. With the rapid advancement of Artificial Intelligence (AI) and Deep Learning, automated systems can significantly enhance the accuracy and speed of forensic analysis. This project proposes an AI-Powered Forensic Face Sketch Generation and Identification System that leverages Convolutional Neural Networks (CNN) and Generative Adversarial Networks (GAN) to generate and enhance facial images from eyewitness descriptions. The system converts rough sketches into realistic facial images using GAN-based enhancement techniques and further performs face recognition using CNN models to match the generated images with existing criminal databases. It also provides ranked results with confidence scores, improving decision-making for law enforcement agencies.

Keywords: Artificial Intelligence (AI), Deep Learning, Forensic Face Sketch, Face Recognition, Convolutional Neural Network (CNN), Generative Adversarial Network (GAN), Image Enhancement, Criminal Identification, Eyewitness Description, Pattern Recognition

ICSICA-2026-338

Marine Plastic Detection Using Computer Vision

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ABSTRACT

Marine plastic pollution has emerged as a critical environmental challenge, severely impacting marine ecosystems, biodiversity, and human health. The accumulation of plastic waste in oceans necessitates efficient and scalable monitoring solutions. This paper proposes an automated system for detecting marine plastic debris using computer vision and deep learning techniques. The proposed approach leverages convolutional neural networks (CNNs) to identify and classify plastic waste from images and video streams captured via drones, underwater cameras, or surveillance systems. A custom dataset comprising labeled images of marine environments is utilized to train the model, ensuring robustness under varying lighting conditions, water turbidity, and object occlusions. Image preprocessing techniques such as noise reduction, contrast enhancement, and data augmentation are applied to improve detection accuracy. The system employs object detection algorithms such as YOLO (You Only Look Once) or Faster R-CNN to achieve real-time detection with high precision and recall. The performance of the model is evaluated using standard metrics including accuracy, precision, recall, and F1 score. Experimental results demonstrate that the proposed system can effectively detect and localize plastic waste in diverse marine conditions. This solution provides a cost-effective and scalable tool for environmental monitoring, enabling timely identification and removal of marine plastic debris and contributing to sustainable ocean management.

Keywords: Marine Plastic Detection, Computer Vision, Deep Learning, Convolutional Neural Networks, YOLO, Image Processing, Object Detection, Environmental Monitoring.

ICSICA-2026-339

Real-Time Human Behavior Monitoring System

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ABSTRACT

The Real-Time Human Behaviour Monitoring System is designed to observe, analyze, and interpret human activities using advanced technologies such as computer vision, machine learning, and sensor integration. The primary objective of this system is to enhance safety, security, and efficiency in various environments such as workplaces, public areas, and smart homes. The system utilizes cameras or sensors to capture live data, which is then processed in real time using image processing and behavioral analysis algorithms. It can detect and classify different human actions such as normal movement, suspicious behavior, falls, unusual activities. Machine learning models are trained to recognize patterns and provide accurate. Predictions based on observed behavior. In addition, the system can generate alerts and notifications when abnormal or predefined critical behaviors are detected, enabling timely intervention. The integration of cloud or edge computing further improves scalability and performance. This project demonstrates the potential of intelligent monitoring systems in improving security, reducing human effort, and enabling automated decision-making. It can be applied in areas such as surveillance, healthcare monitoring, industrial safety, and smart city development.

Keywords: Real-Time, Monitoring Human Behaviour Analysis, Computer Vision, Machine Learning. Sensor Integration, Image Processing. Behavioral Analysis, Activity Detection

ICSICA-2026-340

Class Incremental Learning in Efficient Job Task Recognition

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ABSTRACT

In the modern world, the advancement of technology has failed to keep the rate of unemployment from rising, making this a major challenge for individuals and society as a whole. Unemployment leads not only to lost income but also to social and psychological issues, thereby necessitating innovative solutions. This paper proposes the development of a comprehensive web platform specifically designed to connect job seekers—including students, freelancers, and people in career transitions—with prospective employers seeking to fill vacancies for both short-term and long-term roles. The proposed platform will leverage advanced algorithms, such as Natural Language Processing (NLP) for accurate job- candidate matching, and provide features like personalized dashboards, detailed user profiles, secure authentication, and interactive communication tools. Employers can easily post opportunities with clear requirements and filter applications using advanced criteria, while job seekers may search and apply for suitable positions, save job postings, set privacy preferences, and receive automated suggestions based on their skills and interests. Additionally, the platform emphasizes user safety and data privacy by employing cryptographic algorithms, and seeks to offer flexible work options tailored to varied lifestyles. By facilitating efficient connections and supporting career growth, the solution not only reduces unemployment but also helps users gain work experience, develop new skills, and increase their employability.

Keywords: Job seekers, Job providers, Unemployment, Online platform, Career development

ICSICA-2026-341

Hybrid AI-Based Framework for Real-Time Malicious IP Detection and Automated Cyber Defense in SOC Environments

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ABSTRACT

The rapid growth of cyber threats has made traditional rule-based security systems insufficient for modern network environments. This project presents a Hybrid Artificial Intelligence Framework for Real-Time Malicious IP Detection and Automated Cyber Defense in Security Operations Center (SOC) environments. The system continuously monitors network traffic by capturing incoming and outgoing packets and extracting key features such as source port, protocol, flow duration, and packet count. These features are processed using machine learning algorithms, particularly Random Forest, to classify network traffic as normal or malicious in real time. Upon detecting suspicious or attack traffic, the system automatically initiates a self-adaptive defense mechanism by updating firewall rules to block the malicious IP address. Additionally, the system maintains a blacklist of attackers, logs all detected attacks, and updates a SOC dashboard that provides real-time insights including total traffic, detected attacks, and blocked IPs. The proposed framework enhances detection accuracy, reduces manual intervention, and enables automated response to cyber threats. By integrating machine learning with dynamic firewall control and SOC monitoring, the system provides a scalable and efficient solution for real-time intrusion detection and cyber defense.

Keywords: Cybersecurity, Malicious IP Detection, Machine Learning, Random Forest, Real-Time Intrusion Detection, Automated Cyber Defense.

ICSICA-2026-342

Multi-Tier Blockchain Based Land Registry System Using Fog Computing

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ABSTRACT

Traditional land registry systems are plagued by critical vulnerabilities, including centralized data management, susceptibility to manual fraud, record duplication, and a pervasive lack of transparency in property transactions. These systemic inefficiencies often lead to protracted legal disputes and unauthorized alterations of land records by intermediaries. To mitigate these challenges, this research proposes a robust Multi-Tier Blockchain-Based Land Registry System designed to ensure data integrity and decentralization. The proposed framework utilizes a layered architecture comprising a presentation layer for user interaction, an application layer for logic processing, a blockchain network layer for consensus, and a dedicated data layer for secure storage. By integrating smart contracts, the system automates the validation of land titles and enforces immutable transaction protocols, effectively eliminating the need for third-party verification. The methodology focuses on a decentralized ledger approach where every transaction is cryptographically hashed and distributed across the network to provide high tamper resistance. Experimental considerations indicate that this multi-tier approach significantly enhances security and administrative efficiency compared to legacy database models.

Keywords: Blockchain, Land Registry, Smart Contracts, Decentralization, Data Security, Transparency, Multi-Tier Architecture, Cryptography, Secure Transactions, Digital Land Records

ICSICA-2026-343

Under Water Target Object Detection Model

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ABSTRACT

Detecting target objects in underwater environments remains a challenging task due to issues such as light absorption, scattering, color distortion, low contrast, and the presence of noise caused by suspended particles. This paper presents an advanced underwater target object detection model that integrates image enhancement techniques with deep learning-based detection frameworks to improve accuracy and robustness in such adverse conditions. The proposed model employs a preprocessing stage that utilizes adaptive color correction and dehazing algorithms to restore visual quality and enhance feature visibility. customized dataset consisting of diverse underwater scenes is used for training and evaluation. Experimental results demonstrate that the proposed model significantly outperforms conventional detection approaches in terms of precision, recall, and mean average precision (MAP), while maintaining computational efficiency suitable for real-time applications. This work has potential applications in marine biology research, underwater surveillance, autonomous underwater vehicles (AUVs), and environmental monitoring, providing a reliable solution for accurate object detection in complex underwater conditions. Implementation of devices like underwater drones, Raspberry Pi, or NVIDIA Jetson for field applications. Designing low-power models suitable for long-duration underwater missions.

Keywords: Underwater object detection, deep learning, image enhancement, dehazing, color correction, convolutional neural networks, real-time detection, autonomous underwater vehicles (AUVs).

ICSICA-2026-344

An Intranet Based Digital Gateway Management System Using Permanent QR Code

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ABSTRACT

With the increasing demand for secure and efficient access control in educational institutions, traditional manual out-pass systems have become inadequate due to their susceptibility to errors, delays, and security vulnerabilities. This paper proposes an Intranet-Based Digital Gateway Management System using Permanent QR Code Authentication, a robust and automated solution designed to streamline student movement management within campus environments. The proposed system integrates a web-based intranet platform with a cloud-based database to enable centralized, scalable, and real-time data management. Students can submit out-pass requests through a digital interface, which are processed and approved by authorized personnel via role-based dashboards. Each user is assigned a unique permanent QR code that serves as a secure identity token for authentication during entry and exit verification at institutional gateways. The system leverages modern web technologies, including HTML, CSS, JavaScript, and TypeScript, to ensure a responsive and maintainable user interface, while cloud storage ensures high availability, data consistency, and efficient record management. The QR-based authentication mechanism minimizes the risk of duplication and unauthorized access, significantly improving security compared to temporary passes and manual verification methods. Additionally, the system enables real-time monitoring, automated record logging, thereby enhancing administrative control and decision-making capabilities.

Keywords: Digital gateway management, QR code authentication, intranet system, access control, cloud-based database, real-time monitoring, role-based access, campus security.

Next-gen hybrid penetration testing framework

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ABSTRACT

With the rapid growth of web applications and cloud-based systems, cybersecurity threats are increasing significantly, making vulnerability detection essential. Traditional penetration testing methods are time-consuming, costly, and require skilled professionals. This project proposes a Next-Gen Hybrid Penetration Testing Framework, an automated platform designed to efficiently identify vulnerabilities in web applications and hybrid network environments. The framework performs multiple phases such as reconnaissance, vulnerability scanning, verification, analysis, and reporting to simulate real-world cyberattacks. It detects vulnerabilities including SQL Injection, Cross-Site Scripting (XSS), authentication flaws, and API security issues. Advanced techniques like Out-of-Band Application Security Testing (OAST) and differential analysis are used to verify vulnerabilities and reduce false positives. Machine learning using the Random Forest algorithm improves accuracy, while graph-based analysis identifies complex attack chains. The system generates a detailed security report with severity levels and mitigation steps, providing a fast, scalable, and cost-effective cybersecurity solution.

Keywords: penetration testing, vulnerability detection, cybersecurity, web application security, machine learning, random forest, attack graph analysis, OAST.

Algal Bloom Detection Using Satellite Images and CNN

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ABSTRACT

Algal blooms are a significant environmental concern that affects water quality, aquatic life, and human health. Traditional methods of monitoring algal blooms are time-consuming, labor-intensive, and limited in spatial coverage. This project proposes an automated and efficient approach for detecting algal blooms using satellite imagery combined with Convolutional Neural Networks (CNNs). The system utilizes multispectral satellite images to identify patterns and features associated with algal growth in water bodies. Preprocessing techniques such as image normalization, noise reduction, and band selection are applied to enhance data quality. A CNN model is then trained to classify images into bloom and non-bloom categories by learning spatial and spectral characteristics. The proposed method improves detection accuracy and enables large-scale monitoring of water bodies in near real-time. It can assist environmental agencies in early warning systems, helping to mitigate ecological damage and protect public health. Experimental results demonstrate that the CNN-based approach outperforms traditional image processing techniques in terms of accuracy and efficiency.

Keywords: Algal bloom detection, satellite imagery, convolutional neural networks, multispectral imaging, remote sensing, environmental monitoring, image classification, water quality.

ICSICA-2026-347

Neural 3D Avatar-Assisted Bidirectional Communication Framework for Deaf and Hearing User

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ABSTRACT

Communication barriers in virtual meeting environments continue to affect individuals who rely on sign language, limiting their ability to participate on equal terms with hearing users. Existing digital platforms offer minimal support for real-time sign interpretation, and current assistive tools often lack the speed, accuracy, and natural visual presentation required for inclusive interaction. To overcome these limitations, this project introduces an intelligent, AI-driven communication framework designed to provide seamless two-way interaction between sign-language users and non-signers during online meetings. The system integrates three advanced components. The Sign Recognition Module employs a Transformer-Based Gesture Encoder that analyzes continuous hand movements, facial cues, and body dynamics to accurately interpret Indian Sign Language from live video streams. Completing the pipeline, the Avatar Module utilizes Neural Avatar Synthesis, a generative visual-rendering technique that produces natural, human-like sign animations, transforming spoken or typed content into expressive sign language videos. Together, these components create a unified accessibility solution that enhances participation for deaf, mute, hard-of-hearing, visually impaired, and non-signing individuals. By linking with web meeting platforms, the system enables real-time translation and natural visual signing, improving inclusivity in virtual meetings.

Keywords: sign language recognition, transformer models, gesture recognition, neural avatars, real-time translation, virtual accessibility.

ICSICA-2026-348

Authenticated Vote Enabling with Multilevel Verification Using Blockchain Technology

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ABSTRACT

The rapid advancement of digital technologies has increased the demand for secure, transparent, and efficient voting systems. Traditional voting methods and existing online voting platforms often suffer from issues such as identity fraud, vote tampering, lack of transparency, and centralized vulnerabilities. To address these challenges, this project proposes an Authenticated Vote Enabling System with Multilevel Verification using Blockchain Technology. The proposed system integrates multiple layers of authentication, including biometric verification such as facial and iris recognition and One-Time Password (OTP) validation, to ensure that only legitimate voters can access the system. This multilevel verification significantly reduces the risk of impersonation and unauthorized access. Once authenticated, voters can cast their votes through a secure digital interface. Each vote is encrypted and recorded on a decentralized blockchain ledger, ensuring immutability, transparency, and resistance to tampering. The use of blockchain technology eliminates the need for a central authority, thereby enhancing trust and system reliability. Additionally, the system ensures voter privacy through advanced cryptographic techniques, preventing any linkage between the voter and their vote. Real-time verification and audit capabilities further enhance the integrity and accountability of the election process.

Keywords: blockchain voting, biometric authentication, secure e-voting, cryptography, decentralized systems, voter privacy.

ICSICA-2026-349

AI-Powered Facial Biometrics Authentication System for Next Generation Banking Locked Protection

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ABSTRACT

In the rapidly evolving landscape of digital banking, ensuring secure and reliable users authentication has become a critical challenge due to the increasing prevalence of cyber threats, identity theft, and unauthorized access. Traditional authentication mechanisms such as passwords, PINs, and OTP-based systems are increasingly vulnerable to attacks including phishing, credential stuffing, and social engineering. To address these limitations, this paper proposes an AI-powered facial biometrics authentication system designed to provide next generation banking security through robust, contactless, and intelligent identity verification. The proposed system leverages advanced deep learning techniques, particularly Convolutional Neural Networks (CNNs), for accurate facial recognition and feature extraction. Additionally, the system incorporates multifactor authentication by combining facial biometrics with behavioral analytics such as user interaction patterns to further enhance security. To ensure data privacy and compliance with regulatory standards, the framework employs encryption techniques and secure data transmission protocols. Edge computing and cloud-based deployment models are explored to achieve scalability, low latency, and high availability in banking environments. Experimental results demonstrate high accuracy, reduced false acceptance rate (FAR), and false rejection rate (FRR), making the system reliable for real-world financial applications.

Keywords: facial recognition, deep learning, liveness detection, multifactor authentication, banking security, behavioral biometrics

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ICSICA-2026-350

Medico Legal Repository with Cryptographic Access Control and Blockchain Tamper – Proof Logging

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ABSTRACT

The rapid digitization of healthcare and legal systems has created a strong need for secure, transparent, and tamper-proof management of medico-legal records. This project proposes a Medico-Legal Repository with Cryptographic Access Control and Blockchain-based Tamper-Proof Logging to ensure data integrity, confidentiality, and accountability. The system uses advanced cryptographic techniques to provide fine-grained access control, allowing only authorized users such as doctors, legal authorities, and patients to access specific data. Sensitive information is protected through encryption both during storage and transmission, preventing unauthorized access and data breaches. Techniques like Attribute-Based Encryption (ABE) or role-based access models help dynamically manage user permissions. To prevent data tampering, blockchain technology is used as an immutable logging system. Every access or modification is recorded as a time-stamped block, ensuring transparency, traceability, and resistance to alteration. This creates reliable audit trails that can serve as strong evidence in legal proceedings. Additionally, the repository supports secure data storage, efficient retrieval, and scalability for large healthcare systems. By combining cryptographic security with blockchain transparency, the system reduces risks such as data manipulation, insider threats, and lack of accountability. Overall, this solution provides a secure and trustworthy platform for medico-legal data management, ensuring patient privacy, legal compliance, and the reliability of digital records.

Keywords: medico-legal records, blockchain, cryptographic access control, attribute-based encryption, data integrity, tamper-proof logging, secure data sharing, healthcare security.

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AI Surveillance for Missing Person Identification in Distributed CCTV Networks

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ABSTRACT

Missing persons represent a critical social and humanitarian concern, as thousands of individuals disappear every year due to various factors including trafficking, migration, accidental separation, and criminal activities. Conventional identification approaches rely heavily on manual investigation and fragmented surveillance monitoring, which are inefficient for large-scale, real-time environments and suffer from delayed response times and limited accuracy. These challenges necessitate the development of an automated, intelligent, and scalable identification framework. This project presents a deep learning–driven Missing Person Finder system for continuous identity matching across distributed CCTV networks. A high-throughput similarity matching engine computes cosine distances between incoming and stored embeddings using optimized nearest-neighbor search, classifying high-confidence matches as candidate identifications. Verified detections trigger an automated notification module that forwards location details and visual evidence to nearby police stations and registered parents or guardians. The system architecture supports horizontal scalability and maintains low-latency inference with robust recognition performance under challenging conditions such as low resolution, occlusions, pose variations, and illumination changes. The system improves the accuracy and speed of missing person identification for modern public safety applications.

Keywords: Missing person identification, face recognition, deep learning, CosFace, facial embeddings, CCTV surveillance, real-time detection, similarity matching.

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Vein Authentication of Identified Patterns of Different Access Over Atm

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ABSTRACT

With the rapid growth of ATM usage and digital banking services, ensuring secure and reliable user authentication has become essential. Traditional authentication methods such as PIN-based systems and magnetic cards are increasingly vulnerable to attacks including skimming, card cloning, and unauthorized access. To address these limitations, this project proposes a vein pattern-based authentication system that utilizes near infrared (NIR) imaging to capture and analyse unique subcutaneous vein structures for accurate identity verification. The proposed system implements a multi-level access mechanism in which different transaction types are protected based on their sensitivity. Lower-risk operations require single-factor vein authentication, while higher-risk transactions involve additional verification methods such as PIN or OTP. Advanced image processing techniques, including contrast enhancement, noise reduction, and feature extraction, are used to generate reliable vein patterns, which are securely stored and matched using machine learning algorithms. This approach enhances security, minimizes fraud, and ensures accurate user identification while maintaining efficiency and scalability, making it a robust solution for modern ATM authentication systems.

Keywords: Vein pattern recognition, biometric authentication, near-infrared imaging, ATM security, feature extraction, machine learning, multifactor authentication, fraud prevention.

ICSICA-2026-353

AI-Based Skill Gap Analyzer & Career Guidance Platform

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ABSTRACT

This project presents an AI-Based Skill Gap Analyzer and Career Guidance Platform that helps students identify skill gaps and choose suitable career paths at an early stage. Many students find it difficult to connect academic learning with industry requirements and often start career preparation too late. The proposed system continuously tracks student academic performance, skills, projects, certifications, internships, and freelance activities from the first year and builds a structured professional profile. Sentence-BERT is used for semantic skill mapping to match student skills with job roles based on meaning. XGBoost algorithm is used to predict career paths, detect skill gaps, and identify academic risks. Based on this analysis, the system provides personalized learning recommendations and career roadmaps. It also generates a High-Fidelity Digital ID as a digital portfolio, improving student employability, career readiness, and academic performance through continuous monitoring and guidance.

Keywords: skill gap analysis, career guidance, machine learning, Sentence-BERT, XGBoost, recommendation systems, student profiling, employability prediction.

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ICSICA-2026-354

Deepfake Detection System Using Hybrid Networks

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ABSTRACT

The rapid rise of highly realistic deepfakes poses a major threat to digital trust, making it increasingly difficult to tell real videos from fake ones. Traditional detection methods often fail because they only analyze individual static frames, missing the subtle, unnatural movements that occur over time in modern forgeries. To solve this problem, this project introduces a smart, multi-modal deepfake detection system designed to carefully analyze both facial and body dynamics. Our approach uses a powerful hybrid neural network that combines Convolutional Neural Networks (CNNs) with Transformer models. The CNN component acts as a sharp visual inspector, spotting tiny pixel-level flaws, blending errors, and lighting inconsistencies in single pictures. At the same time, the Transformer tracks how the person moves across the entire video, catching asynchronous shoulder movements, unnatural head poses, and temporal glitches that older models completely miss. By evaluating how the face and body move together, our system successfully identifies the hidden biomechanical inconsistencies of AI-generated media. Tested rigorously on the challenging Celeb-DF dataset, this hybrid model achieved a strong 84.48% accuracy. Ultimately, this project delivers a highly reliable, scalable, and cost-effective solution to verify video authenticity and combat the spread of malicious misinformation.

Keywords: deepfake detection, convolutional neural networks, transformer models, video forensics, multimodal analysis, temporal dynamics, facial analysis, Celeb-DF.

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ICSICA-2026-355

Explainable AI for Cybersecurity Threat Detection In Zero-Trust / IoT Networks

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ABSTRACT

The increasing adoption of Internet of Things (IOT) devices and Zero-Trust architectures has significantly expanded the attack surface for cyber threats. Traditional cybersecurity mechanisms are often insufficient in detecting sophisticated and dynamic attacks due to their dependency on predefined rules and lack of adaptability. Moreover, most Artificial Intelligence (AI)-based systems operate as black boxes, making it difficult for security analysts to understand their decisions. This project proposes an Explainable Artificial Intelligence (XAI) based cybersecurity threat detection system designed for Zero-Trust and IOT environments. The system utilizes machine learning algorithms to identify anomalies and classify potential threats in real time. Additionally, Explainable AI techniques such as SHAP and LIME are incorporated to provide clear and interpretable explanations for each prediction. The system is developed using Python and relevant machine learning libraries. It follows a modular architecture consisting of data collection, preprocessing, model training, threat detection, and explanation modules. The proposed solution enhances detection accuracy, reduces false positives, and improves transparency and trust in cybersecurity systems.

Keywords: Explainable artificial intelligence, cybersecurity, threat detection, Internet of Things, zero-trust architecture, machine learning, SHAP, LIME.

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ICSICA-2026-356

Immutable Distributed Framework For Digital Certificate Validation Using QR Code

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ABSTRACT

Digital certificates are widely used for academic, professional, and legal purposes, but they are highly vulnerable to forgery and unauthorized duplication. To address this issue, this project proposes an immutable distributed framework for digital certificate validation using QR codes. The system ensures authenticity, security, and easy verification of certificates. In this framework, certificates are generated with a unique QR code that is linked to secure distributed database (such as blockchain). The immutable nature of the distributed system ensures that once the certificate data is stored, it cannot be altered or tampered with. When the QR code is scanned, the system retrieves the original certificate data and verifies its integrity in real-time. This approach eliminates the need for manual verification and reduces the chances of fraud. It provides a fast, transparent, and reliable method for validating certificates by institutions, employers, and other stakeholders. Overall, the proposed system enhances trust, security, and efficiency in digital certificate management.

Keywords: Digital certificates, QR code verification, blockchain, distributed systems, certificate validation, data integrity, tamper-proof storage, secure authentication.

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Fake Review Detection in E-Commerce Platform Using Machine Learning and NLP Technique

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ABSTRACT

The rapid expansion of e-commerce platforms has significantly transformed the way consumers make purchasing decisions, with online reviews playing a crucial role in influencing customer behavior. However, the growing presence of fake or deceptive reviews has become a major concern, as it misleads users, damages brand reputation, and reduces trust in digital marketplaces. This project, titled Fake Review Detection in E-Commerce Platform Using Machine Learning and NLP Technique, aims to address this issue by developing an intelligent system capable of identifying fraudulent reviews with high accuracy. The proposed approach leverages Natural Language Processing (NLP) techniques to analyze the textual content of reviews, including preprocessing steps such as tokenization, stop-word removal, stemming, and vectorization using methods like TF-IDF. These combined features are used to train various Machine Learning (ML) models such as Logistic Regression, Support Vector Machine, and Random Forest classifiers to effectively distinguish between genuine and fake reviews. Furthermore, advanced deep learning models like Long Short-Term Memory (LSTM) networks can be incorporated to capture contextual meaning and semantic relationships within the text. The model is evaluated using standard performance metrics such as accuracy, precision, recall, and F1score to ensure reliability and robustness. The proposed system aims to provide a scalable and automated solution that can be integrated into e-commerce platforms for real-time fake review detection.

Keywords: Fake review detection, natural language processing, machine learning, e-commerce, text classification, TF-IDF, sentiment analysis, deep learning.

ICSICA-2026-358

End-To-End Driver Drowsiness and Distraction Detection Using YOLO-Based Deep Learning

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ABSTRACT

The project aims to improve road safety by detecting driver fatigue and distraction in real time. Driver drowsiness is one of the leading causes of road accidents, and early detection can help prevent serious risks. The system uses a camera to continuously monitor the driver's face and captures real-time video for analysis. A deep learning model based on YOLO is used for fast and accurate detection of facial features such as eyes, mouth, and head movements. The system focuses on both eye-based and mouth-based analysis using three important parameters: PERCLOS (Percentage of Eye Closure), EAR (Eye Aspect Ratio), and MAR (Mouth Aspect Ratio). PERCLOS measures the duration of eye closure over time, EAR helps in detecting eye blinking and eye closure, and MAR is used to analyze mouth opening and detect yawning, which is a strong indicator of drowsiness. By combining these parameters, the system can accurately identify fatigue levels. The project is implemented using Python, OpenCV, and deep learning techniques, ensuring real-time performance, accuracy, and reliability. This system can be easily integrated into vehicles and offers a cost-effective solution for reducing road accidents and improving driver safety. Overall, the proposed system provides an intelligent and efficient approach for monitoring driver alertness using YOLO-based detection combined with PERCLOS, EAR (eye), and MAR (mouth) analysis.

Keywords: Driver drowsiness detection, YOLO, deep learning, PERCLOS, eye aspect ratio, mouth aspect ratio, driver distraction detection, computer vision.

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ICSICA-2026-359

AI-Powered Intrusion Detection and Prevention System (IDPS) with Siem Dashboard for Real – Time Threat Detection and Response

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ABSTRACT

Cybersecurity threats such as Distributed Denial of Service (DDoS), brute-force attacks, port scanning, and malware activities are rapidly increasing in modern network environments, making traditional rule-based detection systems insufficient for identifying evolving attack patterns. This paper presents an AI-Powered Intrusion Detection and Prevention System (IDPS) integrated with a SIEM dashboard for real-time threat detection, analysis, and automated response. The proposed system leverages Machine Learning techniques to classify network traffic as normal or malicious using the CICIDS2017 dataset. A supervised learning model is trained to detect multiple attack types and assign severity levels to prioritize security incidents. The system incorporates a modular architecture consisting of data collection, preprocessing, feature extraction, machine learning-based detection, and alert management. Detected threats are stored in a centralized database and visualized through a SIEM-style dashboard that provides real-time monitoring, attack trends, severity distribution, and incident tracking. Additionally, an automated prevention mechanism is implemented to block high-severity malicious IP addresses using firewall rules, thereby reducing repeated attacks and improving system resilience. Experimental results demonstrate that the proposed system achieves high detection accuracy with reduced false positive rates, while maintaining real-time performance.

Keywords: intrusion detection and prevention system, cybersecurity, machine learning, SIEM, network security, anomaly detection, DDoS detection, CICIDS2017.

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AI Powered Counselling and Awareness for Mental Health

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ABSTRACT

With the increasing prevalence of mental health issues and the growing need for accessible support systems, there is a significant demand for efficient and scalable counselling solutions. This project proposes an AI-powered counselling and awareness platform designed to provide immediate mental health assistance and connect users with professional counsellors. The system integrates an intelligent chatbot to offer preliminary emotional support, guidance, and mental health awareness to users in real-time. Additionally, the platform facilitates secure interaction between users and certified counsellors through features such as appointment requests, real-time chat, and video consultations. A structured database system is implemented using MySQL to securely manage user information, session details, and counselling records. The system also incorporates authentication mechanisms to ensure data privacy and role-based access for users and counsellors.

Keywords: mental health support, AI chatbot, counselling platform, natural language processing, real-time communication, telehealth, data privacy, role-based access control.

ICSICA-2026-361

Speech Audio to Sign Language Converter Using Python

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ABSTRACT

The Speech/Audio to Sign Language Converter is an innovative system designed to bridge the communication gap between hearing-impaired individuals and the general population. This system utilizes Python-based technologies to convert spoken language into corresponding sign language representations in real time. It integrates speech recognition techniques to capture and process audio input, converting it into text using Natural Language Processing (NLP). The processed text is then mapped to sign language gestures using a predefined database of signs, which are displayed through images, animations, or avatar-based models. The system aims to provide an effective and user-friendly solution for facilitating communication with deaf and mute individuals. By leveraging machine learning and language processing techniques, the converter improves accuracy and efficiency in translation. This project highlights the importance of accessibility and inclusivity in modern technology. It can be further enhanced by supporting multiple languages, improving gesture recognition, and incorporating real-time animated avatars for better interaction. Overall, the system serves as a practical solution to reduce communication barriers and promote equal opportunities for all individuals.

Keywords: Speech recognition, sign language translation, natural language processing, assistive technology, real-time communication, gesture mapping, accessibility, human-computer interaction.

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ICSICA-2026-362

Augmented Reality App for High-Risk zone areas at Nighttime

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ABSTRACT

The proposed system focuses on the development of an Augmented Reality (AR)-based mobile application aimed at enhancing personal safety in high-risk zones during night-time. With increasing safety concerns in poorly lit and unfamiliar areas, the system is designed to provide real-time situational awareness and navigation support through an intuitive mobile interface. The application integrates Augmented Reality, GPS tracking, and machine learning techniques to continuously monitor the user's location and identify nearby high-risk zones using pre-defined and dynamically updated datasets. The system operates by mapping the user's real-time position with stored risk zone information and overlaying critical safety alerts directly onto the user's view using AR technology. It provides visual warnings, safe navigation guidance, and voice-based notifications, enabling users to make informed decisions while travelling at night. The application also includes essential features such as an SOS emergency alert system and night-time visibility enhancement, ensuring usability under low-light conditions. The performance of the system is optimized to ensure accurate location tracking, minimal latency in alert generation, and reliable risk detection. Machine learning models are utilized to improve the accuracy of risk classification and reduce false alerts. The AR interface maintains stable visualization and clarity, contributing to effective user interaction and improved awareness. Overall, the system offers a simple, scalable, and efficient solution for enhancing personal safety, making it suitable for urban environments, smart city applications, and real-time navigation assistance in high-risk areas.

Keywords: Augmented Reality, personal safety, GPS tracking, risk zone detection, machine learning, mobile navigation, real-time alerts, night-time safety, AR navigation, emergency response system.

ICSICA-2026-363

AI Powered Phishing Detection System

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ABSTRACT

Phishing attacks have become one of the most common cybersecurity threats, targeting individuals and organizations to steal sensitive information such as login credentials, banking details, and personal data. Traditional rule-based detection systems often fail to identify new and evolving phishing techniques. To address this issue, this project proposes an AI-powered phishing detection system that uses machine learning algorithms to identify and prevent phishing attacks effectively.

The system analyses various features of URLs, emails, and website content, such as domain age, URL structure, presence of suspicious keywords, and abnormal patterns. Using supervised learning models like Logistic Regression, Decision Trees, or Random Forest, the system is trained on a legitimate dataset and phishing samples to accurately classify potential threats. Additionally, Natural Language Processing (NLP) techniques are used to detect malicious intent in email content. The model continuously improves its accuracy by learning from new data, making it adaptable to emerging phishing strategies.

The proposed system provides real-time detection with high accuracy and helps users avoid fraudulent websites and emails. This project aims to enhance cybersecurity by reducing the risk of phishing attacks through intelligent and automated threat detection.

Keywords: Phishing detection, cybersecurity, machine learning, supervised learning, Logistic Regression, Decision Trees, Random Forest, URL analysis, email security, website threat detection, Natural Language Processing (NLP), real-time threat detection, AI security systems, malicious intent detection, automated phishing prevention.

ICSICA-2026-364

Automated Student ID Card Detection and Penalty System Using YOLOv8

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ABSTRACT

This project focuses on an automated student ID card detection system using YOLOv8. The system captures real-time images through a camera and identifies whether students are wearing ID cards. If a student is found without an ID card, the system generates a violation alert. It also assigns penalties automatically and records the details in a database. The system reduces the need for manual checking by staff and minimizes human errors. It ensures consistent monitoring and improves discipline among students.

The system is designed to be user-friendly and easy to implement in educational institutions. The use of advanced object detection improves accuracy and speed in identifying students with or without ID cards. It can be easily integrated with existing campus security systems for better performance. The system also helps in maintaining proper student records and ensures transparency in rule enforcement. Additionally, it supports efficient data management and reduces administrative workload. Future enhancements can include face recognition for more accurate identification of students. Mobile notifications can also be integrated to provide instant alerts to authorities.

Keywords: YOLOv8, student ID detection, automated monitoring, real-time image analysis, object detection, campus security, violation alert system, penalty assignment, database management, educational institution safety, discipline enforcement, AI-based surveillance, data management, face recognition integration, mobile notifications, rule compliance automation.

ICSICA-2026-365

Smart Forest Surveillance System for Wildlife Intrusion Detection and Early Warning Notifications

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ABSTRACT

This paper presents a smart forest surveillance system designed to enhance wildlife protection and prevent unauthorized human intrusion through real-time monitoring and intelligent analysis. The system leverages Artificial Intelligence, Machine Learning, and Computer Vision techniques such as Convolutional Neural Networks (CNN) to process live video feeds from forest environments. The proposed system can detect wildlife movement, identify human intrusion, and recognize potential threats such as poaching or illegal activities. Upon detection, it generates instant alerts and early warning notifications to forest authorities, enabling faster response and effective intervention. This significantly reduces damage to wildlife and improves conservation efforts.

The system is implemented using Python with an integrated alert mechanism, providing a user-friendly interface for monitoring and control. By minimizing human dependency and improving detection accuracy, the solution ensures continuous surveillance even in remote forest areas.

Keywords: Smart forest surveillance, wildlife monitoring, human intrusion detection, poaching prevention, artificial intelligence, machine learning, computer vision, CNN, real-time video analysis, early warning alerts, forest conservation, Python implementation, intelligent monitoring system, remote area surveillance, alert notification system, wildlife protection.

ICSICA-2026-366

Smart Job Portal

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ABSTRACT

The Smart Job Portal is a modern application designed to streamline the job search and recruitment process by providing an efficient and intelligent platform for both job seekers and recruiters. In today's fast-paced digital environment, conventional job portals often lack personalization and efficient matching mechanisms, leading to time-mismatched. The application enables job seekers to register, create detailed profiles, and upload their resumes, allowing them to explore job opportunities based on their skills, qualifications, and preferred locations. Recruiters, on the other hand, can post job vacancies, manage applications, and shortlist candidates effectively. A key feature of this system is its intelligent job matching approach, which helps connect candidates with relevant job roles, thereby increasing the efficiency of the hiring process. The frontend of the application is developed using Kotlin and Java, ensuring a responsive and interactive user interface, particularly suited for modern application development. The backend is implemented using PHP, which handles server-side logic, user authentication, and data processing. The system uses MySQL Server as the database to store and manage user data, job postings, and application records tracking, and secure login mechanisms. In conclusion, the Smart Job Portal demonstrates an effective use of web technologies to build a reliable and scalable recruitment platform. It provides a smarter approach to job searching and hiring by combining user-friendly design with efficient backend processing, ultimately benefiting both job seekers and employers.

Keywords: Smart Job Portal, intelligent job matching, recruitment platform, job seeker profile, resume upload, recruiter dashboard, candidate shortlisting, Kotlin, Java, PHP backend.

ICSICA-2026-367

Online Learning Management System

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ABSTRACT

Online Learning Management System (LMS) is a web-based platform designed to facilitate the administration, delivery, tracking, and evaluation of educational courses and training programs. The system provides an interactive environment where instructors can create and manage course content, upload study materials, conduct assessments, and monitor student progress. Learners can access resources anytime and anywhere, participate in discussions, submit assignments, and receive feedback in real time.

The primary objective of the LMS is to enhance the efficiency and accessibility of education by integrating modern technologies such as cloud computing, database management, and user-friendly interfaces. It supports various multimedia formats, enabling a more engaging and personalized learning experience. Additionally, the system ensures secure user authentication and data management to maintain privacy and integrity. Overall, the Online Learning Management System promotes flexible learning, reduces administrative workload, and improves communication between educators and students. It serves as an effective solution for schools, colleges, and organizations seeking to implement digital education and training.

Keywords: Online Learning Management System, LMS, web-based education platform, course administration, content management, student progress tracking, assessment management, assignment submission, real-time feedback, cloud computing, database management, user-friendly interface, multimedia learning, personalized learning experience, secure authentication, data privacy, flexible learning, digital education, e-learning platform, educational training system

ICSICA-2026-368

E-Commerce Platforms and Digital Payment Systems

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ABSTRACT

The exponential growth of e-commerce platforms and digital payment systems, online transactions have become an integral part of everyday life. However, this rapid digital transformation has also led to a significant increase in fraudulent activities, especially in real-time payment systems such as UPI (Unified Payments Interface). Fraudsters continuously evolve their techniques, making it increasingly difficult for traditional fraud detection systems to keep up. Conventional rule-based systems rely on predefined patterns and static rules, which lack adaptability and fail to detect new or sophisticated fraud strategies effectively.

To address these limitations, this project proposes the development of a smart fraud detection system using advanced machine learning (ML) techniques. The primary objective is to enhance the accuracy, efficiency, and scalability of fraud detection in real-time transaction environments. The system leverages large volumes of historical transaction data to train predictive models that can identify unusual patterns and anomalies indicative of fraudulent behaviour. Each model is evaluated using key performance metrics such as accuracy, precision, recall, and F1- score to ensure a balanced and reliable detection system. Special attention is given to handling imbalanced datasets, which is a common challenge in fraud detection scenarios, where fraudulent transactions represent only a small fraction of the total data.

Keywords: Smart fraud detection, online payment security, UPI fraud detection, real-time transaction monitoring, machine learning, anomaly detection, predictive analytics, logistic regression, decision tree, random forest, neural networks, imbalanced dataset handling, transaction pattern analysis, financial cybersecurity, fraud prevention, accuracy, precision, recall, F1-score, digital payment protection, e-commerce security, adaptive fraud detection.

ICSICA-2026-369

Detection of Illegal Deforestation and Land-Use Change Using Satellite Imagery

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ABSTRACT

Deforestation and land-use change are major environmental concerns that contribute to climate change, biodiversity loss, and ecological imbalance. Traditional methods of monitoring such activities are often time-consuming, expensive, and lack real-time efficiency. This project proposes an automated approach using deep learning techniques to detect illegal deforestation and land-use changes through satellite imagery.

The system utilizes convolutional neural networks (CNNs) to analyze high-resolution satellite images and identify patterns associated with forest cover loss and unauthorized land transformations. By training the model on labeled datasets containing different land categories such as forest, urban, agricultural, and barren land, the system can accurately classify and detect changes over time.

The proposed solution enables continuous monitoring of large geographical areas with improved accuracy and reduced human intervention. It also supports early detection of illegal activities, allowing authorities to take timely action. The results demonstrate that deep learning-based image analysis significantly enhances the efficiency and reliability of environmental monitoring systems.

Keywords: Illegal deforestation, land-use change, satellite imagery, remote sensing, GIS, forest cover monitoring, change detection, NDVI, vegetation index, multispectral imagery, machine learning, environmental monitoring, forest degradation, ecosystem conservation, automated detection

ICSICA-2026-370

Ecosystem for Autonomous Institutional Governance And IoT-Enabled Pedagogical Automation

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Abstract

The proposed system presents an advanced intelligent ecosystem that integrates ubiquitous computing, artificial intelligence, and Internet of Things (IoT) technologies to enable autonomous institutional governance and smart pedagogical automation. The objective of this system is to transform traditional educational environments into adaptive, data-driven, and self-regulating smart institutions capable of enhancing administrative efficiency and improving teaching–learning processes. The ecosystem utilizes a network of interconnected devices, including cameras, sensors, and embedded systems, to continuously collect real-time data from the institutional environment. Through computer vision techniques, such as face recognition, the system automates key processes like attendance monitoring, identity verification, and access control. These functionalities reduce manual workload while ensuring accuracy, transparency, and security in institutional operations.

Keywords: Autonomous governance, institutional management, IoT in education, smart campus, pedagogical automation, digital learning ecosystem, smart classrooms, AI-driven administration, sensor networks, real-time monitoring, educational technology, intelligent decision-making, workflow automation, student performance tracking, resource optimization.

ICSICA-2026-371

Agrovision AI: Intelligent Leaf Disease Detection & Smart Remedy System

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ABSTRACT

Eurovision AI is an intelligent plant disease detection system designed to enhance modern agricultural practices using Artificial Intelligence and Deep Learning. Agriculture plays a vital role in the global economy, and early identification of plant diseases is crucial to prevent large-scale crop damage and economic loss. Traditional methods of disease identification rely on manual inspection by experts, which is time-consuming, costly, and often inaccessible to small-scale and rural farmers. Agrovision AI addresses this challenge by providing an automated, accurate, and accessible solution for plant disease diagnosis.

The system analyzes plant leaf images using a Convolutional Neural Network (CNN) model to accurately identify diseases, along with confidence levels and affected areas. The CNN model is trained on a diverse dataset of healthy and diseased leaf images, enabling it to recognize a wide variety of plant diseases with high accuracy. A user-friendly Flask-based web application allows users to upload leaf images and receive real-time diagnostic results, making the system highly practical for everyday field use.

In addition to disease detection, the system provides both organic and chemical remedies along with possible causes of the identified disease, enabling farmers to take effective preventive and corrective measures.

Keywords: AgroVision AI, leaf disease detection, plant pathology, smart agriculture, deep learning, computer vision, image processing, crop health monitoring, disease classification, Convolutional Neural Networks (CNN), precision farming, IoT in agriculture, automated disease remedy, agricultural decision support, plant disease management, smart farming system, feature extraction, real-time monitoring, disease severity analysis.

ICSICA-2026-372

Driver Distraction and Drowsiness Detection Based on Object Detection Using Deep Learning Algorithms

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ABSTRACT

Distracted driving is a major global contributor to traffic accidents. Distracted drivers are three times more likely than non-distracted drivers to be involved in an accident. For this reason, enhancing road safety requires the ability to identify driver distraction. Numerous earlier research has put forth a variety of techniques for detecting driver distraction, including approaches based on images, sensors, and machine learning. However, the accuracy, complexity, and real-time performance of these approaches are limited. This research suggests a unique method for driver distraction detection that combines a convolutional neural network (CNN) with the You Only Look Once (YOLO) object detection technique. The two primary phases of the suggested model are the classification of the items that are discovered and object detection utilizing YOLO. The driver's face, hands, and other items that could distract them are among the many elements in their environment that the YOLO algorithm is used to identify and find. Next, a CNN is used to categorize the things that have been spotted in order to ascertain whether or not the driver is distracted. The suggested model performs well in identifying driver distraction when tested on a public dataset. Additionally, use the CNN algorithm to analyze the driver's tiredness based on ocular attributes. The integration of the suggested technique into sophisticated driver assistance systems has promise for enhancing road safety in real-time conditions.

Keywords: Driver distraction detection, convolutional neural network (CNN), YOLO object detection, real-time monitoring, driver fatigue analysis, ocular feature analysis, intelligent driver assistance systems, road safety enhancement.

ICSICA-2026-373

Computer Vision Based Interactive Streaming Platform

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ABSTRACT

The increasing reliance on virtual communication platforms has highlighted the limitations of conventional interaction methods that depend on physical input devices such as a mouse or touchscreen. These approaches often restrict natural expression and reduce the effectiveness of real-time explanation, particularly in educational and collaborative environments. This paper presents a Computer Vision Based Interactive Streaming Platform that enables touchless interaction through real-time hand gesture recognition.

The proposed system utilizes a standard webcam to capture live video input and applies computer vision techniques for hand detection and landmark tracking. Using a lightweight pre-trained model, the system identifies finger positions and interprets gestures such as drawing, pausing, and erasing. These gestures are mapped to digital actions and rendered as an overlay on a virtual canvas in real time, allowing users to annotate and illustrate concepts without physical contact. The system is designed with modular architecture, ensuring efficient processing and minimal latency.

To support collaborative usage, session-based architecture is incorporated, enabling a host to initiate a meeting and participants to join using a unique room identifier. Drawing data is transmitted using lightweight real-time communication mechanisms, allowing participants to view the annotated output synchronously.

Keywords: Computer vision, hand gesture recognition, touchless interaction, interactive streaming, real-time annotation, virtual collaboration, webcam-based tracking, session-based architecture, real-time communication, digital whiteboard.

ICSICA-2026-374

Smart Vision System for Public Safety Monitoring

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ABSTRACT

This paper presents a smart vision-based surveillance system designed to enhance public safety through real-time monitoring and intelligent analysis. The system utilizes Artificial Intelligence, Machine Learning, and Convolutional Neural Networks (CNN) to process live video streams and detect critical situations automatically. The proposed system is capable of identifying potential threats and fire-related incidents from video input and generating immediate alerts to nearby authorities such as police stations. This reduces response time and improves emergency handling efficiency. The system is implemented using Python with a user-friendly interface, enabling real-time detection and alert generation. By minimizing human intervention and improving accuracy, the proposed solution provides an effective and reliable approach for modern public safety monitoring in areas such as schools, malls, and transportation systems. Furthermore, the system is designed to operate efficiently in real-time environments by continuously analysing video frames and providing accurate detection results. The integration of automated alert mechanisms ensures immediate communication with emergency services, thereby preventing potential risks and reducing damage.

Keywords: Smart surveillance system, vision-based monitoring, artificial intelligence, machine learning, CNN, real-time threat detection, automated alerts, public safety, emergency response, intelligent video analysis.

ICSICA-2026-375

College Geo-Fencing Alert System for Parent Notification

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ABSTRACT

This paper presents a smart geo-fencing-based system designed to enhance student safety through real-time location monitoring and intelligent alert mechanisms. In recent years, ensuring student safety within educational institutions has become a major concern, especially in large campuses where manual monitoring is not efficient. The proposed system addresses this issue by providing an automated and reliable tracking solution.

The system utilizes Global Positioning System (GPS) technology to track the movement of students within predefined campus boundaries. A mobile application installed on the student's device continuously collects real-time location data. This data is transmitted to a cloud-based server where it is processed and stored efficiently. The use of cloud technology ensures scalability, reliability, and easy access to data for administrators.

The proposed system continuously monitors the student's location and detects any unauthorized exit beyond the defined geo-fence boundary. When such an event occurs, instant alert notifications are generated and sent to parents and college administrators through a notification system. This ensures immediate awareness and enables quick response to potential safety risks, thereby reducing delays in communication.

Keywords:

ICSICA-2026-376

Multimodal Audio-Based Atm System for Visually Impaired People

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ABSTRACT

This project focuses on developing a Multimodal Audio-Based ATM System to support visually impaired individuals in performing banking transactions independently. Traditional ATM machines rely heavily on visual interfaces such as screens and touch panels, which creates major difficulties for users with visual disabilities. Due to this limitation, many visually impaired users depend on others for assistance, which can compromise their privacy, security, and independence. The proposed system introduces an innovative solution by integrating audio guidance, speech recognition, and biometric authentication. The system provides clear step-by-step voice instructions that guide users throughout the ATM transaction process, including card insertion, PIN entry, balance inquiry, and cash withdrawal. This helps users understand and perform each step without confusion. Speech recognition technology allows users to give voice commands instead of relying only on touch-based inputs. This makes the system more user-friendly and accessible. Additionally, biometric authentication such as fingerprint recognition is implemented to enhance security. This ensures that only authorized users can access their bank accounts, thereby reducing the risk of fraud and unauthorized access. The system follows a multimodal approach by combining voice, touch, and biometric inputs, which improves flexibility and usability. It is designed to be simple, efficient, and reliable, enabling users to complete transactions quickly and safely.

Keywords: Multimodal ATM, audio-based interface, visually impaired accessibility, speech recognition, biometric authentication, assistive banking technology, independent financial transactions, inclusive technology, human-computer interaction, secure ATM system.

ICSICA-2026-377

Smart Crop Disease Detection Using CNN and Transfer Learning

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ABSTRACT

The detection of plant leaf is a very important factor to prevent serious outbreak. Automatic detection of plant disease is essential research topic. The commitment of a plant is very imperative for both human life and condition. Plants do experience the ill effects of ailments, similar to people and creatures. There is the quantity of plant maladies that happen and influences the typical development of a plant. These ailments influence finish plant including leaf, stem, organic product, root, and blossom. More often than not when the illness of a plant has not been dealt with, the plant bites the dust or may cause leaves drop, blossoms and organic products drop and so on. Suitable determination of such illnesses is required for precise ID and treatment of plant sicknesses. Plant pathology is the investigation of plant infections, their causes, methodology for controlling and overseeing them. Yet, the current strategy incorporates human inclusion for order and distinguishing proof of maladies

In this paper, we have presented a strategy named as Bacterial searching improvement based Convolution Neural Network (CNN) for recognizable proof and characterization of plant leaf illnesses naturally. For doling out ideal weight to Convolution Neural Network (CNN) we utilize bacterial searching streamlining (BFO) that further expands the speed and exactness of the system to recognize and arrange the districts tainted of various infections on the plant leaves.

Keywords: Crop disease detection, Convolutional Neural Networks (CNN), transfer learning, precision agriculture, plant pathology, image classification, automated diagnosis, deep learning in agriculture, smart farming, plant health monitoring.

ICSICA-2026-378

AI-Powered Meta Human Interviewer: Serious Game for Student Job Interview Skills

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ABSTRACT

The AI-Based Interview Practice Platform is a full-stack web application developed to help students and job seekers prepare effectively for job interviews using artificial intelligence. In today's competitive job market, many candidates lack proper guidance, confidence, and real-time practice opportunities. This system addresses these challenges by generating role-based interview questions and evaluating user responses using Natural Language Processing (NLP) techniques. It provides intelligent feedback on technical knowledge, communication skills, clarity, and confidence level, enabling users to identify their strengths and weaknesses.

The platform simulates real interview scenarios without requiring human trainers, allowing users to practice anytime and anywhere. Unlike traditional preparation methods such as books or mock interviews, this system offers personalized training, performance tracking, and automated assessment. The application is designed as a cost-effective and accessible solution that supports continuous improvement through repeated practice sessions.

Keywords: AI interviewer, meta-human avatar, serious games, student skill development, job interview training, virtual simulation, interactive learning, soft skills enhancement, gamified education, machine learning.

ICSICA-2026-379

AI Based Traffic Light Controller for Emergency Vehicle Identification Based on Computer Vision and Acoustic Signals

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ABSTRACT

In today's rapidly urbanizing cities, traffic congestion continues to be a major obstacle for emergency response systems, often resulting in delayed ambulance arrivals and critical loss of life. To address this challenge, the proposed project introduces an intelligent traffic light optimization system powered by deep learning. This system employs a dual-mode detection approach using both image and audio data to identify ambulances in real time.

By integrating these two detection mechanisms, the system ensures reliable ambulance identification even in challenging environments such as heavy rain, fog, or night time conditions. This multi-modal design significantly enhances accuracy and robustness compared to traditional method, ensuring that emergency vehicles receive. Once an ambulance is detected, the intelligent framework communicates with the traffic control system to automatically adjust traffic signals and grant the ambulance immediately right-of-way. This eliminates the need for manual intervention or hardware-based systems such as RFID or GPS, which are often expensive and prone to interference.

Keywords: I traffic control, smart traffic lights, emergency vehicle detection, computer vision, acoustic signal processing, real-time traffic management, intelligent transport system, vehicle prioritization, deep learning, sensor fusion, traffic signal optimization, urban traffic safety.

ICSICA-2026-380

AI ML Based Smart Attendance and Bunk Prevention System

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ABSTRACT

The Smart Attendance System using Face Recognition in Artificial Intelligence (AI) is an innovative approach designed to automate the traditional attendance process in educational institutions and workplaces. The system leverages computer vision and machine learning techniques to detect, recognize, and record the attendance of individuals accurately and efficiently.

Once a match is identified, the attendance is marked automatically along with the date and time, eliminating manual entry errors and proxy attendance. This project integrates technologies such as OpenCV, Python, and AI-based face recognition algorithms to ensure high accuracy, even under varying lighting conditions and facial expressions. The system maintains daily attendance records in a CSV file and can send automated email reports to administrators. By adopting this AI-driven attendance solution, institutions can improve operational efficiency, enhance security, and maintain a digital record of attendance seamlessly.

The proposed system is reliable, fast, and user-friendly, making it a valuable step toward smart automation in education and office environments. The system leverages computer vision and machine learning techniques to detect, recognize, and record the attendance of individuals accurately and efficiently. Using a webcam or IP camera, the system captures live facial images of students or employees and compares them with pre-trained facial data stored in the database.

Keywords: Smart attendance, AI-based attendance, machine learning, facial recognition, biometric verification, student monitoring, bunk prevention, real-time tracking, automated roll call, classroom management, student accountability.

ICSICA-2026-381

Child Abusive Environment Elimination on A Chat Application System Alert to Parents Over Abusive Chat – Android

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ABSTRACT

In the modern digital era, children frequently use chat applications, which may expose them to cyberbullying, abusive language, and inappropriate content. This creates serious risks to their mental, emotional, and psychological well-being, making online safety essential. This project, titled “Child Abusive Environment Elimination on a Chat Application System Alert to Parents over Abusive Chat – Android”, focuses on developing a secure Android-based chat application that monitors conversations in real time. The system detects abusive or inappropriate messages using predefined keywords and sends an alert notification to parents or guardians, enabling quick action.

It also stores chat logs and flagged messages for future monitoring and reference. The proposed system ensures real-time monitoring, automatic detection, and instant alert mechanisms while maintaining user privacy by focusing only on harmful content. Overall, this project helps create a safer digital environment for children, reduces cyberbullying, and supports parents in protecting their children from online abuse.

Keywords: Child safety, chat monitoring, abusive message detection, parental alert system, Android security, real-time monitoring, cyberbullying prevention, chat moderation, mobile application, content filtering, child protection, AI-based detection, automated alerts, online safety, child abuse prevention, machine learning, natural language processing (NLP), mobile security, threat detection, digital parenting.

ICSICA-2026-382

A Smart Blockchain–Enabled Decentralized Escrow System for Digital Freelance Ecosystems

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ABSTRACT

Digital freelance marketplaces such as Up work and Fiverr enable clients and freelancers to collaborate globally for software development, design, data analysis, and other digital services. While convenient, these platforms rely on centralized escrow and custodial payment mechanisms. The platform operator holds funds on behalf of both parties, decides when to release or refund them, and handles disputes internally. This introduces issues such as high platform commissions, lack of transparency in dispute resolution, custodial risk, and dependence on a single trusted intermediary.

Blockchain technology and smart contracts provide an alternative foundation for implementing escrow services in a decentralized and programmable way. This model is well suited to digital freelance ecosystems, where clients and freelancers often do not know each other and operate across borders. This project presents “A Smart Blockchain–Enabled Decentralized Escrow System for Digital Freelance Ecosystems”, a hybrid Web2–Web3 prototype that integrates a traditional web application with an Ethereum-based smart contract escrow system. The backend is implemented using Node.

Keywords: Blockchain, decentralized escrow, smart contracts, digital freelance platforms, cryptocurrency payments, peer-to-peer transactions, secure payment system, trustless environment, payment automation, digital marketplaces, freelance ecosystem, transaction verification, distributed ledger technology (DLT), escrow automation, tamper-proof transactions, freelancer-client trust, blockchain security.

ICSICA-2026-383

Intelligent Traffic Police Hand Gesture Recognition System Using Vision and Machine Learning for Signal Automation

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ABSTRACT

This research introduces a robust framework for real-time traffic police hand gesture recognition, specifically engineered to facilitate the seamless integration of autonomous vehicles (AVs) into human-managed traffic environments. Utilizing the MoveNet Thunder pose estimation model within the TensorFlow framework, the system is designed to interpret critical navigational commands—such as ‘Stop,’ ‘Turn Left,’ and ‘Move Forward’—commonly employed by traffic authorities in India. To ensure model resilience, a comprehensive custom dataset consisting of 8,000 images was curated, capturing a wide array of environmental variables and lighting conditions.

The underlying architecture employs a sophisticated neural network integrated with dense and dropout layers, a strategic configuration designed to maximize predictive accuracy while mitigating the risks of overfitting. To refine the system's operational focus, Haar cascade classifiers are implemented for real-time facial detection; this ensures the system initiates gesture processing only when the officer is oriented toward the vehicle, thereby reducing computational noise. While the model achieved a notable accuracy rate of 89%, the study identifies and analyzes subtle misclassifications occurring between visually congruent gestures.

Keywords: Traffic police gesture recognition, Autonomous vehicles, TensorFlow MoveNet Thunder, Deep learning, Real-time detection, Haar cascades, Face detection, CARLA simulator, Sensor fusion, LiDAR integration, Gesture-based control, Computer vision, Urban traffic safety, Intelligent navigation, Machine learning, Human-machine interaction.

ICSICA-2026-384

Secure Online Payment System Using Adaptive Multi-Factor Authentication

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ABSTRACT

Online payment systems have become essential in digital transactions, but they are increasingly vulnerable to security threats such as phishing, identity theft, credential compromise, and unauthorized access. Traditional single-layer authentication mechanisms are often insufficient to protect sensitive financial activities. This paper proposes a Secure Online Payment System Using Adaptive Multi-Factor Authentication, which enhances transaction security by dynamically applying authentication measures based on the risk level of each transaction. The system evaluates contextual parameters such as device identity, login location, transaction amount, IP address, and user behavior to determine whether additional verification steps, including one-time passwords, biometric checks, or security questions, are required. A risk-based authentication engine classifies transactions as low, medium, or high risk and responds accordingly to prevent fraudulent access while maintaining usability for legitimate users. As the value and volume of digital transactions increase, the need for strong and intelligent security mechanisms becomes more important than ever. Conventional monitoring to improve transaction integrity and confidentiality.

This approach reduces unauthorized payment attempts, strengthens user trust, and provides a scalable solution for secure digital payment platforms

Keywords: Digital payments, adaptive authentication, multi factor authentication, biometrics, finger vein recognition, speaker verification, face recognition, risk-based security

ICSICA-2026-385

Design and Development of a Native Android Based Emergency Contact Application for Instant Communication

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ABSTRACT

The "Design and Development of A Native Android-Based Emergency Contact Application for Instant Communication" is designed to provide quick and reliable communication during emergency situations using mobile and web technologies. The application allows users to access saved emergency contacts and initiate one-tap calling, reducing response time during critical moments. It also uses GPS to capture and share the user's real-time location with selected contacts, ensuring accurate assistance. The system follows an event-driven approach and integrates a web-based platform using client server architecture for efficient data handling and monitoring. With a simple user interface and essential features, the application improves accessibility, minimizes user effort, and enhances personal safety by enabling faster emergency responses.

Keywords: Emergency Alert System, Mobile Application, GPS Tracking, One-Tap Calling, Location Sharing, Web Integration, Client-Server System, Personal Safety

ICSICA-2026-386

AEGISNET: A Flow-Based AI Framework for Real-Time Threat Detection in Local Networks

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ABSTRACT

The efficacy of conventional signature-based intrusion detection systems has been considerably diminished by the quick expansion of local networks and the extensive usage of encrypted communication. Current methods frequently rely on labeled datasets, predefined attack signatures, or deep packet inspection, which results in high false-positive rates, limited flexibility, and excessive warning generation in practical settings. This study suggests AEGISNET, an AI-based real-time threat detection and analysis framework created especially for local networks, to overcome these drawbacks. Without examining packet payloads or requiring prior attack knowledge, AEGISNET uses unsupervised behavioural analysis and a flow-based monitoring approach to identify unusual network activity. In order to mimic typical network activity, the framework first adds an adaptive baseline learning phase. This is followed by a confidence-aware anomaly scoring mechanism that assesses the degree of discovered deviations. AEGISNET is a workable and deployable solution for real-time intrusion monitoring in local network environments since it runs offline, enables encrypted traffic, and offers human-readable explanations for detected threats.

Keyword: Intrusion Detection Systems (IDS), AI-based threat detection, network security, real-time monitoring, local network security, unsupervised learning, behavioral analysis, anomaly detection, machine learning security, adaptive baseline modeling, confidence-aware scoring, flow-based monitoring, encrypted traffic analysis, network detection traffic analysis,

ICSICA-2026-387

A Multi-Mode Agentic Framework for Edge Intelligence: Customizing the AI Edge Gallery for Online and Offline Environments

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ABSTRACT

The rapid evolution of edge computing and artificial intelligence has necessitated the development of versatile platforms that can operate across diverse network environments. This paper presents a comprehensive overhaul and enhancement of the Google AI Edge Gallery, transforming it into a fully customized application with a redesigned user interface and advanced agentic capabilities. The proposed system introduces a multi-mode AI interaction framework supporting both online and offline operations. Key features include the integration of external APIs for online chat, locally hosted models for offline functionality, and intelligent agents for mobile application navigation and accessibility. Furthermore, the integration of Hugging Face and Model Scope access tokens facilitates seamless model deployment. By deprecating non-essential features like Prompt Lab and Tiny Garden, the system achieves a streamlined user experience optimized for edge intelligence. Preliminary evaluations indicate significant improvements in usability and functional versatility across various use cases.

Keywords: edge computing, artificial intelligence, Google AI Edge Gallery, customized application, user interface redesign, agentic AI, multi-mode interaction, online and offline AI, external APIs, locally hosted models, intelligent agents, mobile navigation, accessibility.

Intelligent Email Event Extraction and Smart Scheduler System Using AI & NLP

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ABSTRACT

Email communication plays a critical role in academic and professional environments. However, users often miss important meetings, deadlines, and interviews due to the unstructured format of email content. This paper presents an Intelligent Email Event Extraction and Smart Scheduler System that automatically extracts event-related information from emails and organizes them into structured categories. The system integrates Gmail API using OAuth 2.0 for secure authentication, processes emails using Natural Language Processing (NLP) techniques such as pre-trained Named Entity Recognition (NER), regular expressions, date parsing, and rule-based classification, and categorizes events into meetings, interviews, deadlines, and reminders. Extracted events are displayed through a dynamic user interface with time-based prioritization and filtering. The proposed system enhances productivity by converting unstructured email data into structured and actionable schedules.

Keywords: email communication, event extraction, smart scheduler, Gmail API, OAuth 2.0, natural language processing (NLP), named entity recognition (NER), regular expressions, date parsing, rule-based classification, email categorization, meetings, interviews, deadlines, reminders, dynamic user interface.

ICSICA-2026-389

Ai-Powered News Summarizer with Question and Answer and Voice Note Features

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ABSTRACT

The rapid growth of digital news has made it increasingly difficult for users to keep up with important information. An AI-powered News Summarizer addresses this challenge by leveraging advanced techniques from Natural Language Processing (NLP) and Machine Learning (ML) to automatically extract key insights from lengthy news articles and present them in concise, easy-to-understand summaries. This system not only reduces information overload but also enhances user engagement through interactive and multimodal features. At its core, the system ingests news articles from various sources such as RSS feeds, APIs, or web scraping modules. It then processes the text using NLP algorithms, which include tokenization, named entity recognition, and semantic analysis. Using extractive or abstractive summarization models—often powered by transformer-based architectures like BERT or GPT—the system generates a condensed version of the article while preserving its main ideas and context. This feature transforms passive reading into an active learning experience, making it especially useful for students, researchers, and professionals who require deeper insights without reading full articles. Additionally, the system includes a Voice Note feature, which enhances accessibility and convenience.

Keywords: AI-powered news summarizer, digital news, information overload, natural language processing (NLP), machine learning (ML), text summarization, extractive summarization, abstractive summarization,

ICSICA-2026-390

Image Based Animal Type Classification for Cattle and buffaloes

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ABSTRACT

Accurate livestock breed identification is critical for selective breeding, genetic improvement, and economic valuation in India's dairy sector, particularly aligned with the Rashtriya Gokul Mission objectives. This paper proposes an automated Animal Type Classification (ATC) system leveraging deep learning-based key point detection (YOLOv8/HRNet) combined with morphometric ratio analysis. The system utilizes a React Native mobile application for image capture and a Flask-based backend executing YOLOv8 and HRNet models to extract anatomical landmarks (Pin Bone, Hook Bone, Olecranon). A novel Euclidean distance-to-physical-ratio conversion algorithm translates pixel coordinates into centimeter-scale measurements. The system normalizes breed-specific scores to a 1-9 scale for standardized assessment. Experimental validation on 500+ live-stock images demonstrates 94.2% accuracy in breed classification (Gir, Sahiwal, Murrah), 78% reduction in manual assessment time, and significant improvements in consistency compared to subjective paravet evaluations. The system empowers rural animal health workers with expert-level diagnostic tools, directly supporting small-scale farmer economies and national livestock development initiatives.

Keywords: YOLOv8, HRNet, Keypoint Detection, Morpho-metric Analysis, React Native, Flask, Deep Learning, Livestock, Breed Classification, Computer Vision, Precision Agriculture.

ICSICA-2026-391

**Encrypted and Federated CNN for Secure Medical Image
Diagnosis And Patient Appointment Management**

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ABSTRACT

The rapid advancement of digital healthcare systems has increased the need for secure and efficient handling of sensitive medical data. This project presents a novel framework that combines encryption techniques with Federated Neural Convolutional Networks (CNNs) to ensure privacy-preserving medical image diagnosis and patient appointment management. The proposed system allows multiple healthcare institutions to collaboratively train a shared deep learning model without directly exchanging patient data, thereby maintaining data confidentiality. Federated learning enables local training of CNN models on institutional data, and only model updates are shared with a central server. This approach significantly reduces the risk of data leakage and ensures compliance with privacy regulations. The CNN model is designed to analyze medical images such as X-rays, MRIs, or CT scans, providing accurate and early disease detection. By combining federated learning with encryption, the framework addresses key challenges related to data privacy, security, and interoperability. Overall, this project delivers a secure, efficient, and intelligent solution for modern healthcare systems, improving both diagnostic accuracy and patient service management.

Keywords: federated learning, convolutional neural networks, medical image analysis, healthcare security, data encryption, privacy preservation, distributed learning, clinical decision support.

ICSICA-2026-392

Crime Video Analysis and Summarization Dashboard

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ABSTRACT

Crime Video Analysis and Summarization Dashboard is an advanced AI-based system designed to efficiently analyze and interpret surveillance videos. The system utilizes computer vision techniques along with the YOLO (You Only Look Once) model for real-time object detection and tracking. It processes large volumes of video data from both live streams and recorded footage, enabling the identification of objects such as people, vehicles, and other relevant entities with high accuracy. By extracting significant frames and detecting key events, the system highlights suspicious activities and unusual patterns using machine learning-based anomaly detection techniques. The integration of YOLO allows the system to perform fast and precise detection in each frame, making it suitable for real-time applications where quick decision-making is essential. The dashboard reduces the dependency on manual monitoring by automating the analysis process, thereby saving time and minimizing human error. A summarization module further enhances the system by generating concise video summaries that capture important events, allowing users to quickly review large amounts of footage. The results are presented through an interactive and user-friendly dashboard, providing clear visual insights, alerts, and reports. This system significantly improves the efficiency of surveillance operations and supports law enforcement agencies in timely and informed decision-making. Overall, the proposed solution offers a scalable, reliable, and intelligent approach to crime video analysis and summarization.

Keywords: video surveillance, crime analysis, YOLO, object detection, anomaly detection, video summarization, computer vision, real-time monitoring.

ICSICA-2026-393

**Uncertainty-Aware and Trust-Based Split-Adversarial Federated
GAN for Privacy-Preserving Cross-Device Learning**

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ABSTRACT

Huge amounts of data from various sources are substantial to dependable distributed machine learning, especially for trustworthy federated learning (FL). However, existing FL methods are difficult to collect enough data for training the global model more accurately, especially in cross-device scenarios. In this project, we propose a new federated generative adversarial network empowered by differential privacy and knowledge transfer named Fed-GAN, Which can be used to address the problem of data shortage and prevent generator leakage from resource constrained devices, as well as generate high-quality synthetic data while ensuring strict DP guarantees.

Keywords: federated learning, generative adversarial networks, differential privacy, knowledge transfer, synthetic data generation, data privacy, distributed machine learning.

ICSICA-2026-394

A Deep Learning Framework for Super Enhancer Prediction Using CNN and Multi-Head Attention with Cross-Species Transfer Learning

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ABSTRACT

Super-enhancers (SEs) are clusters of transcriptional regulatory elements that play essential roles in gene expression regulation and cell fate determination. Identifying these regions computationally from raw DNA sequences is critical for understanding disease mechanisms, yet current methods face challenges in prediction accuracy and cross-species generalizability. This project proposes a deep learning framework for SE prediction directly from DNA sequences. The system employs hybrid CNN and Transformer architecture, where Conv1D layers extract local sequence motifs and Multi-Head Self-Attention captures long-range regulatory dependencies across the 3000 bp input window. The proposed model achieves AUC values of 0.8489 (human) and 0.9117 (mouse), outperforming the Trans SE baseline (0.828 human, 0.832 mouse) on both datasets. Beyond binary classification, the system provides biological interpretation outputs including GC content profiling, motif density analysis, cross-species conservation scoring, and identification of key regulatory regions. An interactive web interface developed using HTML, CSS, and JavaScript enables users to upload DNA sequence files in FASTA or TXT format, run the prediction pipeline, and visualize all biological analysis outputs through animated charts including confidence score, nucleotide composition, GC content profile, attention heatmap, motif density distribution, and cross-species conservation — all running offline without requiring any server or installation.

Keywords: super-enhancer prediction, deep learning, convolutional neural networks, transformer models, DNA sequence analysis, gene regulation, bioinformatics, attention mechanisms.

ICSICA-2026-395

Gen-AI-Based Stock Market Movement Prediction Using LSTM and Sentiment Analysis

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ABSTRACT

The Gen-AI-based stock market movement prediction system is a smart financial decision- support platform designed to analyze stock market conditions using Artificial Intelligence techniques and both historical and real-time financial data. Stock markets are highly dynamic and influenced by multiple financial and economic factors, making accurate prediction challenging. This system leverages advanced machine learning algorithms to identify patterns, predict market trends, and classify risk levels based on changing market behavior. By processing large volumes of structured and unstructured data, it evaluates volatility, momentum, and market sentiment to generate reliable forecasts. It integrates data preprocessing, feature engineering, and model optimization techniques to enhance prediction accuracy and system performance. The platform also utilizes regression, classification, and time-series forecasting models to provide comprehensive analytical insights. Additionally, it offers intelligent investment recommendations tailored to different risk profiles, helping investors make informed, data-driven decisions while reducing uncertainty and emotional trading. With continuous learning capabilities and detailed performance analytics, the system supports strategic portfolio management and promotes smarter, more efficient wealth management in rapidly evolving market environments.

Keywords: Artificial Intelligence (AI), machine learning, stock market analysis, market trend prediction, risk assessment, investment decision support, financial data analysis, real- time data processing, algorithmic trading, data-driven investment strategy.

ICSICA-2026-396

Fake News Detection System

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ABSTRACT

The Fake News Detection System is an Artificial Intelligence based web application designed to identify whether a given news article or headline is genuine or fake. In the current digital era, social media and online news platforms have become major sources of information, but they also enable the rapid spread of misleading and false information. This project aims to reduce the impact of misinformation by using Natural Language Processing (NLP) and Machine Learning techniques to analyze the textual content of news articles and classify them accurately. The proposed system collects a dataset containing real and fake news articles, preprocesses the text by removing stop words, punctuation, and unnecessary symbols, and then converts the cleaned text into numerical representations using techniques such as TF-IDF vectorization. Once trained, the system predicts the authenticity of newly entered news content and displays the result along with a confidence score. The application can be developed with a user-friendly frontend using HTML, CSS, JavaScript, or React, while the backend can be implemented using Python with Flask or FastAPI. The model helps users verify information quickly and improves awareness regarding misinformation. This project is useful in media monitoring, social media analysis, and digital journalism. Overall, the Fake News Detection System provides a practical, efficient, and scalable solution for combating the spread of false information online.

Keywords: fake news detection, natural language processing, machine learning, text classification, TF-IDF, misinformation detection, sentiment analysis, web application.

ICSICA-2026-397

Sign Sense Ai: Bridging Silent Gesture and Spoken Words Through Deep Learning and NLP

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ABSTRACT

Current scenario highlights the communication gap between the deaf and hearing communities, as most people do not understand sign language. The system uses computer vision and Convolutional Neural Networks (CNNs) to recognize and classify hand gestures in real time. Recognized gestures are translated into meaningful outputs like text display, voice alerts, and grammatically correct sentences using NLP. The system also integrates speech-to-text conversion, enabling two-way communication between deaf and hearing individuals. This project enhances inclusivity by offering a user-friendly, multimodal communication tool that supports real-time interaction.

Keywords: sign language recognition, computer vision, convolutional neural networks, natural language processing, speech-to-text, real-time communication, assistive technology, multimodal interaction.

ICSICA-2026-398

Mobile Benchmark Comparison and Side by Side Graphical Representation Conversion

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ABSTRACT

Mobile devices have become an essential part of everyday life, making performance evaluation a critical factor in selecting smartphones. This study focuses on the comparison of mobile devices using benchmark testing methods. Benchmarks such as CPU performance, GPU efficiency, memory speed, battery performance, and overall system responsiveness are analyzed to determine device capability. The project aims to present a structured comparison of multiple smartphones using standardized benchmarking tools. By collecting numerical performance data, the study converts raw benchmark scores into visual formats for easier understanding. Side-by-side graphical representation is used to highlight performance differences among devices, enabling users to quickly identify strengths and weaknesses. significant role in evaluating real-world performance beyond just specifications. While technical specifications such as processor type, RAM, and storage provide a basic understanding, benchmark tests offer measurable and comparable results under standardized conditions. This helps in identifying how efficiently a device performs tasks like gaming, multitasking, video rendering, and application loading.

Keywords: mobile performance evaluation, benchmarking, CPU performance, GPU performance, memory performance, battery performance, data visualization, smartphone comparison.

ICSICA-2026-399

Understanding Spending Behavior to Improve Savings: A Data-Driven Financial Management System

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ABSTRACT

This paper describes a personal finance management app that combines budgeting, expense tracking and savings goal planning in one location, along with a recommendation-based approach. The app has been built with React with TypeScript on the front end, and Supabase with backend services and database. Users are able to securely sign up & log in, & capture and categorize their expenses, as well as create budgets that include the allocation for each respective item. The app features a dashboard that visualises user spending habits & provides analysis of how much saved are compared to the user's savings goal. The app presented here has developed an innovative feature that will make recommendations for savings based on the way users spend their money, as well as by pointing out ways to stop over-spending. The goal of this app is to provide an avenue for efficient, easy, and user-friendly management of their personal finances through a single application that combines the tracking of expenses, analysis, and recommendations together into a single application.

Key words: Personal Finance, Expense Tracking, Budget Management, Savings Goals, Recommendation System, React, TypeScript, Supabase.

ICSICA-2026-400

Green AI For Smart Agriculture: Energy Efficient Crop Yield and Resource Management Using AS-ELM.

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ABSTRACT

Artificial Intelligence (AI) and Machine Learning (ML) have become critical technologies in farming techniques. These methods have enabled accurate crop prediction, efficient irrigation, and more efficient resource use. Unfortunately, the increasing computational power required for AI systems has put the planet under strain by increasing the energy consumption and carbon emissions of these technologies. This research presents a Green AI framework for intelligent farming, with the main aim of developing and deploying energy-efficient predictive models for crop yield forecasting and resource management. This research adopts methods to practice sustainable AI, such as using lighter structures and algorithms, compressing the model, utilizing federated learning, and edge computing, together with clean energy ideas, to reduce CO₂ emissions linked to AI applications in agriculture. The project presents a thorough methodological framework designed to bring innovation closer to accomplishing sustainability goals. The article also discusses various topics that can be covered in the future such as the integration of IoT and blockchain, explainable AI, and sustainability standards driven by policies. In this project, we present a framework that uses six different Green AI methods to support smart and sustainable agriculture. Each method contributes to building systems that are both energy efficient and environmentally responsible.

Keywords: green AI, sustainable agriculture, machine learning, energy-efficient models, crop yield prediction, federated learning, edge computing, resource optimization.

ICSICA-2026-401

Edge AI Based Explainable Arrhythmia Monitoring Using Wearable ECG

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ABSTRACT

Cardiovascular diseases are one of the leading causes of death worldwide, making continuous cardiac monitoring essential for early detection of abnormal heart rhythms. The proposed system presents a wearable ECG monitoring system based on Edge Artificial Intelligence and Explainable AI for real time arrhythmia analysis. The system acquires a single-lead ECG signal using electrodes and an ECG sensor, and the signal is preprocessed to remove noise. R-peaks are detected using the Pan-Tompkins algorithm to compute RR intervals and heart rate. A lightweight 1D-CNN combined with a GRU model analyzes the ECG waveform and classifies the rhythm as normal, bradycardia, or tachycardia. The device also provides a clear explanation for each detected condition based on heart-rate characteristics. The results are displayed on an OLED screen, and a buzzer alert is activated during abnormal conditions. All processing is performed locally on the embedded device without internet connectivity, ensuring low power consumption, fast response, and protection of personal health data. The system supports both live monitoring mode and demo mode using stored ECG signals for testing and demonstration. The proposed device offers a portable, real-time, and interpretable solution for continuous wearable cardiac health monitoring.

Keywords: ECG monitoring, arrhythmia detection, edge artificial intelligence, explainable AI, wearable health devices, 1D-CNN, GRU, real-time monitoring.

ICSICA-2026-402

Development of an Intelligent Home-Based Chatbot Using NLP

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ABSTRACT

In recent years, the integration of Artificial Intelligence (AI) into daily life has significantly enhanced the way humans interact with technology. This project focuses on the development of an intelligent home-based chatbot that leverages Natural Language Processing (NLP) to provide a seamless and human-like communication experience. The chatbot is designed to assist users in managing household tasks, answering queries, and controlling smart home devices through simple voice or text commands. Using NLP techniques such as speech recognition, intent detection, and contextual understanding, the system interprets user inputs and responds appropriately in natural language. The chatbot employs a combination of machine learning algorithms and rule-based logic to continuously improve its responses and adapt to user preferences over time. The project's implementation demonstrates how AI-driven conversational systems can enhance home automation, improve accessibility, and reduce human effort in daily routines. Overall, the intelligent home-based chatbot serves as a practical example of applying NLP and AI technologies to create an efficient, user-friendly, and interactive smart home environment.

Keywords: Artificial Intelligence (AI), Natural Language Processing (NLP), Chatbot, Home Automation, Speech Recognition, Machine Learning, Intelligent System, Human-Computer Interaction

ICSICA-2026-403

Large Scale Data Audit Through Big Data Technologies

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ABSTRACT

The rapid growth of social media platforms has resulted in the generation of massive volumes of unstructured data in the form of posts, comments, reviews, and user feedback. Existing systems largely rely on centralized databases and sequential processing, which lead to high execution time, poor scalability, inability to handle noisy social media content, and lack of integrated sentiment analysis — limiting their effectiveness for real-world large-scale deployments. The proposed system was evaluated on a large-scale social media dataset comprising over 50,000 records across multiple platforms. Parallel processing through Apache Spark reduced execution time by approximately 68% compared to sequential single-machine approaches. Sentiment classification revealed that 51% of records were Neutral, 31% Positive, and 18% Negative. Fake review detection achieved a precision of 87.4%. The proposed solution significantly reduces processing time, improves data quality, enhances analytical accuracy, and lowers operational overhead —making it a scalable and efficient solution for large-scale social media data auditing. Future enhancements include real-time streaming using Apache Kafka, transformer-based multilingual NLP for code-mixed Hinglish content using Hugging Face MuRIL, predictive anomaly detection using XGBoost, and cloud-native deployment on Google Cloud Platform using Cloud Dataproc and Cloud SQL.

Keywords: big data analytics, social media analysis, Apache Spark, Hadoop distributed file system, sentiment analysis, data auditing, anomaly detection, natural language processing.

ICSICA-2026-404

AI – Based Electricity Theft Pattern Detector

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ABSTRACT

“AI-Based Electricity Theft Pattern Detector”, which leverages advanced machine learning techniques to identify abnormal electricity consumption patterns. The system is designed to analyze large volumes of electricity usage data collected from smart meters or historical databases. Initially, the collected data undergoes preprocessing steps such as data cleaning, normalization, and handling missing values to ensure data quality and consistency. These features are then fed into various supervised and unsupervised machine learning algorithms, including Logistic Regression, Decision Tree, Random Forest, Support Vector Machine (SVM), and Isolation Forest. Each algorithm plays a significant role in analyzing and classifying the data. Supervised learning models help in distinguishing between normal and fraudulent consumption based on labelled datasets, while unsupervised techniques like Isolation Forest are particularly effective in detecting anomalies and previously unseen theft patterns. The system is capable of learning from historical data and improving its detection accuracy over time. The proposed model can be deployed for real-time or near real-time monitoring of electricity usage, enabling early detection of suspicious activities. This not only reduces the dependency on manual inspection but also enhances the efficiency, accuracy, and reliability of theft detection mechanisms. Furthermore, the system is scalable and can be integrated with modern smart grid infrastructure, making it suitable for large-scale implementation.

Keywords: electricity theft detection, machine learning, anomaly detection, smart meters, energy consumption analysis, random forest, support vector machine, isolation forest.

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EduSync: A Web-Based Centralized Learning Management System for Integrated Academic Management

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ABSTRACT

EduSync is a web-based learning management system that brings together all the main academic activities of a school or university in one easy-to-use online platform. Instead of having different, disconnected tools or relying on manual paperwork, EduSync lets you manage courses, track attendance, handle grading, share learning materials, communicate, and create academic reports—all in one place. It's built with modern technology so it works smoothly on any device and gives different levels of access to administrators, teachers, and students. Security is a priority, with strong login protections and data safeguards to keep sensitive information safe. By using EduSync, schools can collaborate more easily, keep track of academic progress transparently, and make better decisions based on real-time data. Testing and user feedback show that EduSync helps school staff work more efficiently and communicate better than with older, traditional systems. Overall, EduSync shows how a single digital solution can make managing academics simpler and help schools move forward in the digital age.

Keywords: learning management system, web-based platform, academic management, student information system, real-time data, role-based access control, educational technology, data security.