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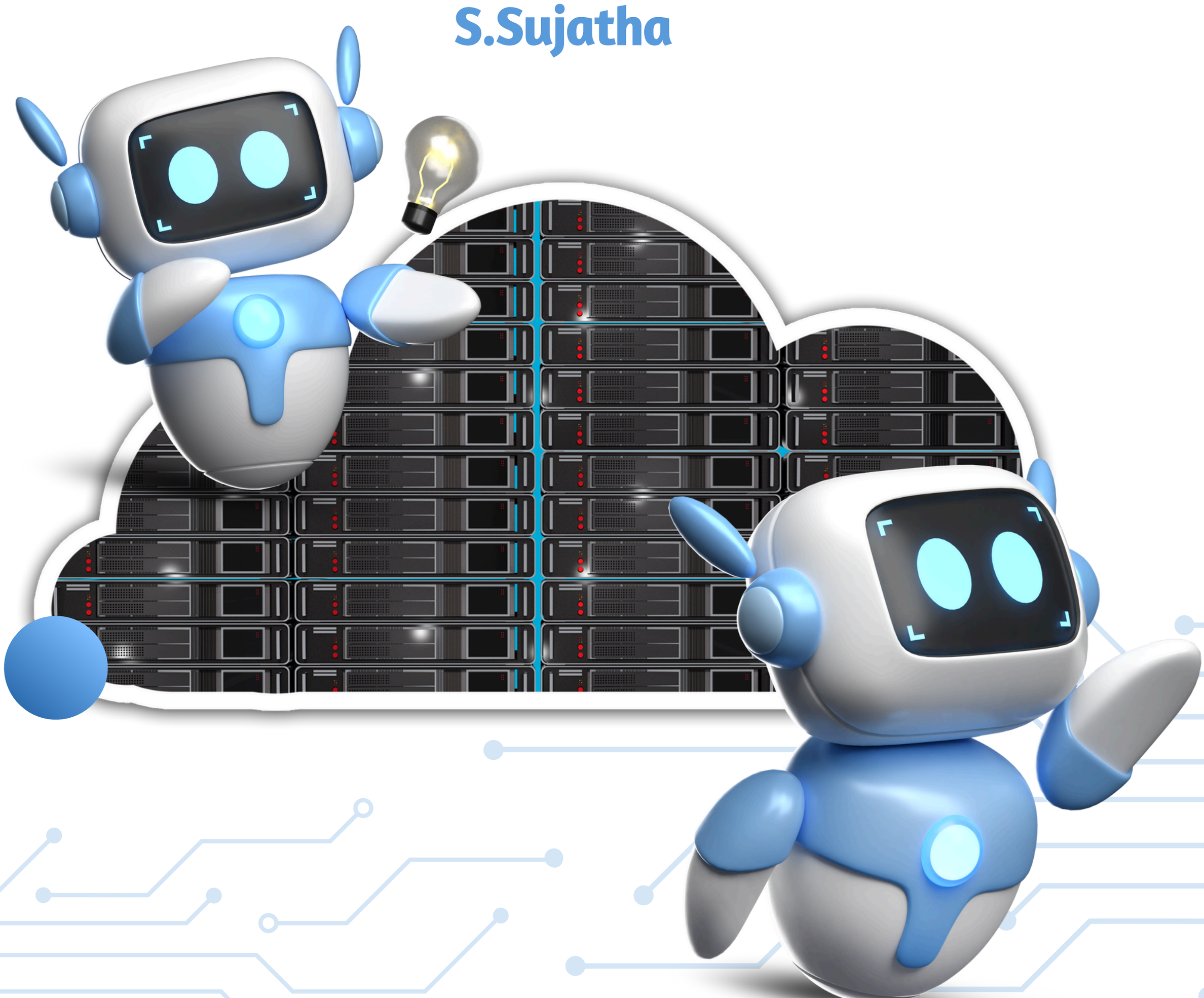

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CA - 001

Hybrid Predictive Systems for Structured Data on Machine Learning

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Abstract

The increasing availability of structured data across domains such as finance, healthcare, e-commerce, and industrial systems has amplified the need for predictive models that combine accuracy, interpretability, and computational efficiency. Hybrid predictive systems offer a promising solution by integrating the strengths of classical machine learning algorithms with advanced representation-learning techniques. This study proposes a hybrid framework designed to enhance predictive performance on structured datasets by combining feature-driven models, such as decision trees and gradient boosting machines, with deep learning components capable of capturing nonlinear interactions and latent patterns. The framework incorporates automated feature selection, model-level ensembling, and optimization strategies to reduce over fitting and improve generalization. Experimental evaluations on multiple structured-data benchmarks demonstrate that the hybrid architecture consistently outperforms individual baseline models in terms of accuracy, robustness, and inference reliability. The findings underscore the value of hybrid predictive pipelines as a scalable and effective approach for modern structured-data analysis, enabling more reliable decision support across diverse real-world applications.

Keywords*: Predictive, optimization, gradient, robustness*

CA - 002

Enhanced Intrusion Detection for High-Velocity Networks Using Deep Learning

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Abstract

The rapid growth of high-velocity network traffic in modern digital infrastructures has created new challenges for traditional intrusion detection systems, which struggle to maintain accuracy and scalability under increasing data volume and complexity. This paper investigates the application of advanced deep learning techniques to enhance intrusion detection performance in high-speed network environments. We propose a deep learning–based framework that integrates convolution and recurrent neural architectures to extract spatial–temporal patterns from network streams in real time. The system is evaluated on benchmark intrusion detection datasets and simulated high-velocity traffic scenarios. Experimental results demonstrate significant improvements in detection accuracy, false-positive reduction, and throughput compared to conventional machine-learning approaches. Additionally, the study examines the model's robustness, adaptability to emerging threats, and suitability for deployment in distributed and cloud-native architectures. This research highlights the potential of deep learning to provide intelligent, scalable, and resilient intrusion detection solutions capable of safeguarding modern high-speed network infrastructures.

Keywords: *Intrusion, Scalability, Convolution, Spatial, Temporal*

CA - 003

Finding Heart Diseases Using Machine Learning and Different Data Classification Techniques

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Abstract

The HD is one of the greatest causes of death in the globe and early diagnosis is highly important in minimizing the mortality rate. The problem of heart disease prediction is hard because it is difficult to predict this disease with complicated medical data and impossibility of providing the constant monitoring. Based on the Heart Disease dataset, many feature selection methods were applied, "such as ANOVA F-statistic (ANOVA FS), Chi-squared test (Chi2 FS), and Mutual Information (MI FS)" to determine important predictors. To remove data imbalance and to improve model performance, "Synthetic Minority Oversampling Technique (SMOTE)" was used. A number of ML models and ensemble techniques were used to help with the overall classification process. All of these feature selection methods worked, but a SC of Boosted DT, ET, and Light GBM got the best results with 100% accuracy. The effectiveness of advanced ensemble learning in gaining dependable predictions of heart diseases is also given by the high performance and these findings demonstrate the possibility of using effective feature selection and combination with powerful classification models to effectively analyze medical data. This method shows the ability to help in diagnosing earlier and achieving better patient outcomes.

Keywords: *Cardiovascular disease, heart disease, machine-learning app, ML algorithms, SDG 3, SHAP, SMOTE*

CA – 004

Reinforcement Learning for Robotics and Automation

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Abstract

Reinforcement Learning (RL) has emerged as a powerful machine learning approach for enabling robots to learn optimal actions through trial and error. This research focuses on applying RL techniques to enhance robotic decision-making and automation tasks. In this study, a robot interacts with its environment, receives feedback in the form of rewards, and gradually learns the best actions that maximize long-term performance. Various RL algorithms such as Q-learning, Deep Q-Networks (DQN), and Policy Gradient methods are explored to enable autonomous navigation, object manipulation, and task scheduling. The system reduces the need for manual programming and allows robots to adapt to dynamic and uncertain environments. The results demonstrate that RL-based robotics can achieve higher efficiency, accuracy, and flexibility compared to traditional rule-based automation methods. This work highlights the potential of reinforcement learning to advance intelligent automation in industries, smart manufacturing, and real-world robotic applications.

Keywords*: Q-learning, RL algorithms, Deep Q-Networks (DQN)*

CA – 005

Unified Deep Intelligence System for Real-Time Criminal Face Detection, Recognition, and Expert Analysis

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Abstract

The rapid rise in criminal activities demands intelligent, automated, and reliable surveillance systems that can support law enforcement agencies in real time. Traditional biometric methods such as fingerprint and iris recognition require active user participation and are therefore limited in criminal identification scenarios. To overcome these challenges, this research proposes a Unified Deep Intelligence System, integrating advanced face detection, recognition, and expert decision-support capabilities into a single framework. The system combines the strengths of modern machine learning and deep learning technologies, including MTCNN, LBPH, Haar Cascades, Support Vector Machines, Convolutional Neural Networks (CNNs), and ResNet-34, to achieve high accuracy even under variations in illumination, pose, occlusion, aging, and facial expressions. The framework supports real-time processing, one-shot learning, and seamless integration with criminal databases to instantly retrieve suspect information and alert security personnel with location details. This unified expert system provides a detailed comparative analysis of multiple detection and recognition approaches and identifies the most effective models for real-world criminal surveillance. The proposed solution enhances reliability, reduces manual workload, and strengthens public safety by offering a robust and scalable architecture for intelligent criminal identification.

Keywords*: Criminal Face Recognition, Deep Learning, Real-Time Surveillance, Expert Identification System, Machine Learning*

CA - 006

Multi-Path Routing Algorithms for Reliable Data Transmission

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Abstract

Reliable data transmission is a fundamental requirement in modern communication networks, where increasing traffic demands and dynamic link conditions often result in congestion, high latency, and packet loss. To address these challenges, multi-path routing has been recognized as an effective approach for improving network reliability by distributing traffic across multiple independent paths rather than relying on a single route. In this paper, we propose an improved multi-path routing algorithm aimed at maximizing network throughput, minimizing end-to-end delay, and enhancing fault tolerance in heterogeneous network environments. The proposed approach integrates real-time link quality estimation with adaptive path selection, allowing the algorithm to dynamically adjust routing decisions based on current network conditions. Extensive simulation studies are conducted to evaluate the performance of the proposed algorithm against conventional single-path routing and existing multi-path strategies. The results demonstrate that the proposed method significantly improves data delivery ratio, increases resilience to link failures, and enhances overall network performance. These findings underscore the potential of intelligent multi-path routing techniques in supporting next-generation high-performance communication systems, particularly in environments with variable link quality and high traffic loads.

Keywords: *Multi-path routing, Network reliability, Fault tolerance, Adaptive path selection, Throughput optimization, End-to-end delay, Heterogeneous networks*

CA – 007

Predictive Analytics for Student Academic Performance Using Machine Learning

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Abstract

Understanding how students perform academically is important for improving the quality of education and supporting learners who may be struggling. With the growing use of digital systems in education, large amounts of student data are now available, creating an opportunity to analyze academic performance more effectively. Machine learning offers powerful techniques to study this data and uncover patterns that are difficult to identify using traditional methods. This research focuses on predicting student academic performance using machine learning–based predictive analytics. The study uses a student performance dataset that includes academic records, demographic information, and behavioral factors. After performing data preprocessing and exploratory data analysis, several machine learning models such as Decision Tree, Random Forest, k-Nearest Neighbors, and Logistic Regression are applied to predict student performance levels. The models are evaluated using standard performance metrics including accuracy, precision, recall, F1-score, and confusion matrix. The results show that ensemble learning models, particularly Random Forest, provide better prediction accuracy compared to individual classifiers. This study demonstrates how data-driven approaches can help educators identify students who may need additional academic support at an early stage. Overall, the proposed system highlights the potential of machine learning and data science in enhancing educational planning and improving student outcomes.

Keywords: *Decision Tree, Random Forest, k-Nearest Neighbors, Logistic Regression*

CA – 008

An Energy-Efficient Routing Protocol Based Wireless Sensor Network Using LEACH

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Abstract

Wireless sensor networks have received significant interest in topical years. These sensor nodes can be collect information from environment around and transmitted into destination location. Each sensor nodes are WSNS has some degree of energy and may occur network failure. So the result energy efficient statement seen as a critical except in extend the lifespam of sensor node Therefore to avoid this issues an energy-efficient routing. Protocol WSNS using LEACH is proposed in this paper. It is an improvement of low energy adaptive clustering hierarchy algorithm. The aim of this algorithm is to reduce power consumption by new cluster header in data transfer and avoid network failures. The main goal of this paper energy saving using routing protocol and LEACH algorithm has improved the performance. For sensor networks while consuming comparable with amount of energy.

Keywords: *WSNS, Protocols, LEACH, Energy efficient, Sensor nodes*

CA – 009

A Novel and Efficient Approach for Near Duplicate Page Detection in Web Crawling

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Abstract

In recent times, the concept of Web Crawling has received remarkable significance owing to the drastic development of the World Wide Web. Huge challenges have been posed by the voluminous amounts of web documents warming the web to the web search engines making their less appropriate to the users. Additional overheads are created for the search engines by the presence of duplicate and near duplicate web documents in abundance, by which their performance and quality is significantly affected. The web crawling research community has extensively recognized the detection of duplicate and near duplicate web pages. Providing the users with pertinent results for their queries in the first page without duplicate and redundant results is a vital requisite. The near duplicate web pages are detected followed by the storage of crawled web pages in to repositories. The keywords are extracted from the crawled pages initially and on the basis of the extracted keywords, the similarity score between the two pages is calculated. The documents are considered as near duplicates if its similarity scores are lesser than a threshold value. Memory for repositories has been reduced and the search engine quality has been improved owing to the detection.

Keywords: *Crawling, Threshold, Extraction*

CA – 010

Ensemble Learning in Machine Learning

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Abstract

Ensemble learning in machine learning combines multiple individual modelsto create a single, stronger, more accurate, and robust predictive model, reducing errors, bias, and overfitting, much like a jury's collective wisdom beats a single judge. The common techniques include **Bagging** , **Boosting** and **Stacking**to harness diverse model perspectives for better performance in classification, regression, and other tasks.Bagging Models are trained independently on different random subsets of the training data. Their results are then combined usually by averaging for regression or voting for classification. This helps reduce variance and prevents overfitting.BoostingModels are trained one after another. Each new model focuses on fixing the errors made by the previous ones. The final prediction is a weighted combination of all models, which helps reduce bias and improve accuracy.Stacking models are multiple different models are trained and their predictions are used as inputs to a final model, called a meta-model. The meta-model learns how to best combine the predictions of the base models, aiming for better performance than any individual model.

Keywords*: Ensemble learning, Bagging, Boosting, Stacking, Meta-model*

CA – 011

A Secure and Dynamic Multikeyword Ranked Search Scheme over Encrypted Cloud Data

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Abstract

Cloud computing provides flexible and cost-effective data storage services, but it also raises serious concerns about data security and privacy. To protect sensitive information, data owners often encrypt their data before outsourcing it to the cloud. However, encryption makes traditional data search operations inefficient and difficult. This project presents a secure and dynamic multi-keyword ranked search scheme over encrypted cloud data that enables users to perform efficient searches while preserving data confidentiality. The proposed scheme allows users to search encrypted documents using multiple keywords and retrieves the results in ranked order based on their relevance. A dynamic indexing mechanism is employed to support document insertion, deletion, and updating without compromising security. The system ensures strong privacy protection by preventing the cloud server from learning sensitive information about the stored data or search queries. Experimental analysis shows that the proposed approach improves search accuracy and efficiency while maintaining low computational and storage overhead. This makes the scheme suitable for secure and practical cloud-based data storage and retrieval applications.

Keywords: *Multi-keyword, Encrypted Search, Dynamic Indexing, Privacy-Preserving, Encryption*

CA – 012

Artificial Intelligence and Machine Learning for Early Detection and Management of Epileptic Seizures

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Abstract

Epilepsy is a chronic neurological disorder characterized by recurrent seizures, requiring accurate and timely detection to improve patient safety and clinical outcomes. Traditional diagnosis relies on manual analysis of electroencephalogram (EEG) signals, which is time-consuming and subject to variability. Recent advancements in Artificial Intelligence (AI) and Machine Learning (ML) offer efficient solutions for automated seizure detection and management. This paper presents an overview of AI- and ML-based methods applied to EEG signal analysis for identifying seizure patterns. Machine learning techniques such as Support Vector Machines, Random Forests, and k-Nearest Neighbors, along with deep learning models including Convolutional Neural Networks and Long Short-Term Memory networks, are discussed for their ability to capture complex temporal and spatial characteristics of EEG data. The integration of these models with real-time monitoring systems and wearable devices enables continuous patient observation and timely alerts. Key challenges related to data quality, model interpretability, and patient privacy are also addressed. Overall, AI and ML techniques demonstrate strong potential to enhance epilepsy diagnosis and long-term management within intelligent healthcare systems.

Keywords: *Artificial Intelligence, Machine Learning, Epilepsy, Seizure Detection, EEG Signal Analysis*

CA - 013

Adaptive Multi-Layer Network Architecture for Enhancing Reliability and Performance in Next-Generation Communication Systems

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Abstract

The rapid evolution of next-generation communication technologies has increased the demand for highly reliable, scalable, and performance-efficient network infrastructures. This paper proposes adaptive multi-layer network architecture designed to optimize data transmission, reduce latency, and maintain stable connectivity across heterogeneous environments. The architecture integrates three core layers physical, routing, and application to enable seamless coordination between hardware resources, intelligent routing algorithms, and service-level requirements. Machine learning-driven optimization techniques are employed to predict traffic patterns, dynamically reroute congested paths, and enhance fault tolerance in real time. Experimental simulations demonstrate a significant improvement in throughput, packet delivery ratio, and network resilience compared to traditional static network models. The study also highlights the importance of cross-layer communication, automated congestion handling, and distributed control mechanisms in supporting emerging technologies such as 5G, IOT ecosystems, and edge computing platforms. The findings suggest that adaptive multi-layer architectures offer a robust pathway to building future-ready communication networks capable of meeting the increasing performance demands of modern digital systems.

Keywords: *Network Architecture, Adaptive Routing, Next-Generation Networks, Cross-Layer Optimization, Fault-Tolerant Systems*

CA – 014

Human-Centered Software Engineering: An Empirical Evaluation of Usability-Driven Design and User Experience Enhancement

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Abstract

The present study highlights the principles and applications of Human-Centered Software Engineering (HCSE), an approach that integrates user needs and human factors into every stage of software development. HCSE emphasizes designing systems that are intuitive, accessible, and aligned with real-world user expectations. In this study, key HCSE methodologies such as user requirement analysis, prototyping, usability evaluation, and iterative design were examined to understand their role in improving software quality. The effectiveness of the HCSE approach was assessed through user feedback, task performance measures, and usability testing, which collectively demonstrated significant improvements in user satisfaction, system efficiency, and error reduction. The findings reveal that incorporating human-centered practices not only enhances the overall usability of software applications but also contributes to better adoption, reduced learning time, and improved user experience. This work suggests that HCSE serves as an essential framework for developing reliable, user-friendly, and sustainable software systems suitable for diverse technological and organizational environments.

Keywords: *HCSE, usability, user-centered design, software development, human factors*

CA – 015

An Intelligent IoT Based System for Real-Time Data Monitoring and Analysis Using Big Data Analytics

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Abstract

The exponential growth of Internet of Things (IoT) technologies has resulted in the continuous generation of large volumes of real-time data from heterogeneous sources, creating significant challenges in data processing, storage, and analysis. To address these challenges, this paper proposes an intelligent IoT-based system for real-time data monitoring and analysis using big data analytics. The proposed system integrates smart IoT sensors with cloud and edge computing infrastructures to enable efficient data acquisition, transmission, and storage. A scalable big data framework is employed to process high-velocity data streams and manage structured and unstructured data effectively. Advanced analytics and machine learning algorithms are utilized to perform real-time data analysis, anomaly detection, and predictive modeling, thereby enhancing decision-making capabilities. The system architecture emphasizes scalability, fault tolerance, data security, and low-latency performance to support large-scale deployments. Additionally, data visualization and alert mechanisms are incorporated to provide actionable insights to end users in real time. Experimental evaluation demonstrates that the proposed system achieves improved performance in terms of data throughput, processing efficiency, and analytical accuracy compared to traditional data monitoring approaches. The results indicate that the system is capable of handling massive data streams while maintaining reliable and timely analysis. The proposed intelligent IoT-based solution is applicable to various domains, including smart cities, healthcare monitoring, industrial automation, and environmental monitoring, where real-time data-driven decision-making is critical.

Keywords*: Hadoop, Apache Spark, Machine Learning, Data Streaming*

CA - 016

NebulaQ-HyperSync Algorithmic Ascendancy

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Abstract

The NebulaQ-HyperSync Algorithmic Ascendancy represents a revolutionary leap in computational intelligence, merging quantum computing principles with advanced synchronization technologies to achieve unprecedented levels of processing power and efficiency. At its core, NebulaQ-HyperSync is an adaptive algorithmic framework designed to navigate the complexities of vast, interconnected datasets, identifying patterns and correlations at speeds previously unimaginable. The "NebulaQ" component signifies the algorithm's ability to operate within a quantum-inspired, probabilistic framework, allowing it to explore multiple solution spaces simultaneously and adapt to changing conditions in real-time. Meanwhile, "HyperSync" emphasizes the technology's capacity for hyper-efficient synchronization, ensuring seamless coordination across distributed computing networks and unlocking massive scalability. Together, these elements drive the Algorithmic Ascendancy, empowering organizations to tackle previously intractable challenges, optimize complex systems, and unlock new frontiers in fields such as artificial intelligence, cryptography, and computational biology.

Keywords: *NebulaQ-HyperSync Algorithmic Ascendancy, Quantum computing, Synchronization technologies, Computational intelligence, Adaptive algorithmic framework*

CA - 017

An Efficient Data Mining Approach for Knowledge Discovery

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Abstract

In the modern digital era, large volumes of data are generated every second from various sources such as social media platforms, business transactions, educational systems, and healthcare applications. Extracting meaningful information from this massive data is a major challenge. Data Mining is an important field of computer science that focuses on discovering useful patterns, trends, and relationships hidden within large datasets. This project aims to study and implement data mining techniques to support effective knowledge discovery and decisionmaking. The proposed project analyses structured datasets using various data mining processes such as data preprocessing, data transformation, pattern discovery, and result evaluation. Preprocessing techniques like data cleaning, handling missing values, and normalization are applied to improve data quality. The project mainly focuses on popular data mining techniques including classification, clustering, association rule mining, and prediction. Classification techniques such as Decision Tree and Naïve Bayes are used to categorize data into predefined classes. Clustering algorithms like K-Means are applied to group similar data objects without prior labeling. Association rule mining is implemented using the Apriori algorithm to identify relationships among data attributes. Predictive analysis is also performed to forecast future trends based on historical data. The system is implemented using data mining tools and programming environments such as Python and R, which provide efficient libraries for data analysis and visualization. Experimental results demonstrate that the proposed data mining approach improves accuracy, reduces processing time, and supports better decision-making.T his project highlights the importance of data mining in real-world applications such as business intelligence, healthcare analytics, educational data analysis, and fraud detection. The outcome of this project provides a foundation for advanced research in data analytics and artificial intelligence.

Keywords*: Data Mining, Knowledge Discovery, Classification, Clustering*

CA – 018

Cloud Computing: A Modern Paradigm for Scalable and On-Demand Computing

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Abstract

Cloud computing has emerged as a revolutionary computing paradigm that enables on-demand access to shared computing resources such as servers, storage, databases, networking, software, and analytics over the Internet. It eliminates the need for organizations to maintain expensive physical infrastructure and allows users to pay only for the resources they consume. This paper presents an overview of cloud computing, its architecture, service models, deployment models, key advantages, challenges, and real-world applications. The study highlights how cloud computing supports scalability, flexibility, cost efficiency, and innovation across various industries. Additionally, the paper discusses security concerns and future trends that are shaping the evolution of cloud computing.

Keywords: *Cloud Computing, Virtualization, SaaS, PaaS, IaaS, Scalability, On-Demand Services, Data Security*

CA - 019

Internet of Things System Architectures that Support Monitoring

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Abstract

The Internet of Things (IoT) is a technological paradigm involved in a diversity of domains with favorable impacts on people's daily lives and the development of industry and cities. Nowadays, one of the most critical challenges is developing software for IoT systems since the traditional Software Engineering methodologies and tools are unproductive in the face of the complex requirements resulting from the highly distributed, heterogeneous, and dynamic scenarios in which these systems operate. Model-Driven Engineering (MDE) emerges as an appropriate approach to abstract the complexity of IoT systems. Furthermore, existing DSLs have an in complete language to represent the IoT entities that may be needed at the edge, fog, and cloud layers to monitor IoT environments. Therefore, this paper proposes a domain-specific language named Monitor-IoT, which supports developers in designing multi-layer monitoring architectures for IoT systems with high abstraction, expressiveness, and flexibility. The empirical evaluation of Monitor-IoT through the application of an experiment, which contemplates the use of the Technology Acceptance Model (TAM), demonstrates the intention of the participants to use this tool in the future since they consider it easy to use and useful.

Keywords: *Architecture, domain-specific language (DSL), Internet of Things (IoT), meta model, model-driven engineering (MDE), monitoring*

CA – 020

A Plant Leaf Disease Image Classification Method Integrating Capsule Networks And Transformer Models

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Abstract

Plant leaf diseases pose a serious threat to agricultural productivity and food security. This paper presents a hybrid image classification framework for detecting plant leaf diseases by integrating Capsule Networks and Transformer models with established architectures such as CNN, AlexNet, and VGG16. Capsule networks contribute to preserving spatial hierarchies and relationships of disease features on leaves, improving robustness in recognizing disease patterns despite variations in orientation and damage. Transformer models, known for their self-attention mechanisms, enhance the extraction of global contextual information and long-range dependencies.The hybrid approach leverages the strengths of capsules in capturing local spatial features and transformers in modelling global contextual relationships, leading to superior accuracy and robustness in disease classification. Evaluations on benchmark plant leaf disease datasets demonstrate that the proposed framework outperforms existing methods, highlighting its potential for real-time disease monitoring and precision agriculture applications.

Keywords: *Deep Learning, CNN, AlexNet, VGG16, Capsule networks, Transformer models, Plant leaf diseases*

CA – 021

An AI-Driven Approach to Touch-Free Virtual Mouse Control

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Abstract

Human–computer interaction has traditionally relied on physical input devices such as a mouse and keyboard, which require direct contact and close proximity. This paper presents an **AI-based Virtual Mouse system** that enables **touchless computer interaction** using real-time hand gesture recognition. The proposed system utilizes computer vision techniques to track hand landmarks from a live camera feed and map intuitive hand gestures to mouse-like operations such as cursor movement, selection, and media control. To improve reliability and reduce unintended actions, the system incorporates a **gesture stability mechanism** that validates gestures across multiple frames before execution. In addition, a **novel spatial intent confirmation zone** is introduced, where actions are triggered only when the user performs a valid gesture within a predefined region of interest. This dual validation approach significantly minimizes false activations caused by accidental hand movements. The virtual mouse further supports a **multi-mode interaction framework**, allowing the same set of gestures to perform different functions based on the current operational context, thereby reducing cognitive load and gesture memorization. The system is implemented using lightweight vision models and operates without any specialized hardware, making it suitable for environments where physical interaction is restricted. The proposed AI Virtual Mouse is particularly useful in applications such as presentations, sterile environments, smart displays, and assistive human–computer interaction. By combining gesture recognition, temporal stability, and spatial intent verification, the system offers an efficient, contactless, and extensible alternative to conventional pointing devices.

Keywords: *AI Virtual Mouse, Hand Gesture Recognition, Touchless Interaction, Computer Vision, Intent Confirmation Zone*

CA – 022

Data Visualization for Business Intelligence

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Abstract

In today's data-driven era, organizations continuously generate vast amounts of information across various domains such as sales, finance, marketing, and customer operations. However, the lack of effective visualization within Business Intelligence (BI) systems often results in information overload, delayed analysis, and poor decision-making. To address these challenges, this project proposes the development of an interactive Business Intelligence dashboard designed to transform raw business data into meaningful, real-time insights using advanced data visualization techniques. The proposed solution integrates dynamic charts, drill-down filters, and role-based dashboards to deliver customized views tailored to the specific needs of different departments. By allowing stakeholders to interact with data visually, the system enhances clarity, accelerates the decision-making process, and reduces the likelihood of misinter pretation. Additionally, the integration of predictive analytics can help forecast future trends and support proactive business strategies. Overall, this system aims to empower organizations to convert complex datasets into actionable intelligence, ultimately enabling smarter, faster, and more effective business decisions.

Keywords: *Data Visualization, Business Intelligence, Predictive analytics, Real time insights, Interactive Dashboard*

CA – 023

Machine Learning Using Python

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Abstract

Machine learning (ML) is a branch of artificial intelligence that enables systems to learn patterns and make decisions from without explicit programming. By leveraging statistical models and algorithms, ML transforms raw information into actionable insights across diverse domains such as healthcare, finance, transportation, and natural language processing. Core approaches include supervised, unsupervised, and reinforcement learning, each addressing unique problem types ranging from prediction and classification to clustering and sequential decision-making. Recent advances in deep learning and neural networks have significantly expanded ML's capabilities, enabling breakthroughs in computer vision, speech recognition, and autonomous systems. Despite its rapid progress, challenges remain in interpretability, fairness, and scalability, underscoring the need for responsible development. Machine learning continues to evolve as a transformative technology, reshaping industries and driving innovation in the era of data-driven intelligence.

Keywords: *supervised learning, unsupervised learning, semi-supervised learning, reinforcement learning, artificial intelligence*

CA – 024

Machine learning in fraud detection

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Abstract

The increasing adoption of digital platforms and online transaction systems has led to a rapid rise in fraudulent activities across domains such as banking, e-commerce, insurance, and healthcare. Fraud detection has become a critical challenge due to the large volume of transactions, highly imbalanced data, and continuously evolving fraud patterns. Traditional rule-based and manual detection systems are often ineffective, as they rely on static rules and fail to adapt to new and sophisticated fraud strategies.This paper presents an in-depth study of machine learning techniques for fraud detection, focusing on their ability to automatically learn patterns from historical transactional data and accurately distinguish between legitimate and fraudulent behaviour. Both supervised and unsupervised learning approaches are examined, including Logistic Regression, Decision Trees, Random Forest, Support Vector Machines, and Neural Networks, along with anomaly detection methods such as Isolation Forest and Autoencoders. The study emphasizes the importance of data preprocessing, feature engineering, and class imbalance handling techniques to enhance model performance.Experimental analysis indicates that ensemble and deep learning models achieve superior results compared to traditional classifiers, particularly in terms of recall and F1-score, which are crucial metrics for fraud detection. The proposed machine learning-based framework provides an adaptive, scalable, and efficient solution capable of real-time fraud detection. The findings demonstrate that machine learning significantly improves detection accuracy while reducing false positives, making it a reliable approach for modern fraud prevention systems.

Keywords: *Machine Learning, Fraud Detection, Anomaly Detection, Classification, Imbalanced Data, Financial Transactions, Ensemble Learning, Data Mining*

CA – 025

Hybrid 5G-Satellite Communication Frameworks for Maritime IoT Monitoring

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Abstract

The rapid expansion of the Internet of Things (IoT) in the maritime sector encompassing smart logistics, engine diagnostics, and container tracking—demands continuous and reliable connectivity. However, a significant challenge remains in maintaining seamless communication as vessels transition from near-shore environments to the deep sea. While terrestrial 5G networks offer high bandwidth and low latency, they are geographically limited to coastal regions. Conversely, Non-Terrestrial Networks (NTN), such as Low Earth Orbit (LEO) satellites, provide global coverage but often suffer from higher latency and operational costs.This paper proposes a novel Hybrid 5G-Satellite Communication Framework designed to optimize data transmission for Maritime IoT. We introduce an intelligent Vertical Handover (VHO) algorithm that dynamically switches between terrestrial 5G and satellite links based on real-time parameters including Signal-to-Noise Ratio (SNR), available bandwidth, and cost-efficiency metrics. The proposed architecture utilizes a Software-Defined Networking (SDN) controller to manage traffic routing, ensuring that critical safety data is prioritized over high-latency links while routine telemetry utilizes cost-effective terrestrial networks when available. Simulation results demonstrate that the proposed hybrid framework significantly reduces packet loss during network transitions and lowers communication costs by approximately 30% compared to satellite-only approaches. This study confirms that a cooperative 5G-Satellite model provides a robust, scalable solution for the future of smart maritime transportation.

Keywords: *Maritime IoT, 5G Networks, Satellite Communication, Vertical Handover, Hybrid Networks, Edge Computing*

CA – 026

Deep learning for natural language processing

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Abstract

Deep Learning has revolutionized NLP, moving beyond traditional statistical and rule-based methods. At its core, it employs complex neural network architectures, primarily Recurrent Neural Networks (RNNs), Convolutional Neural Networks (CNNs), and especially Transformers, to process sequential text data. These models automatically learn hierarchical feature representations from massive text corpora, capturing intricate dependencies and semantic relationships. This powerful synergy enables significant advancements across various NLP tasks, including Machine Translation, Sentiment Analysis, Text Summarization, and Question Answering. The Transformer architecture, leveraging the self-attention mechanism, is currently dominant, allowing models like BERT and GPT to understand context bidirectionally and generate highly coherent, human-quality text, driving the field toward truly intelligent language understanding and generation.

Keywords: *Transfer Learning, Attention, Sentiment Analysis, Machine Translation, Neural Networks (NN)*

CA – 027

Deep Learning Applications in Brain Computer Interface Based Lie Detection

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Abstract

This work explores how deep learning can improve lie detection using Brain–Computer Interface (BCI) technology. Instead of relying on traditional lie detectors that measure physical responses like heart rate, breathing patterns, or sweating, BCI systems analyze brain activity directly through EEG signals. Since EEG signals reflect the brain's internal processing, they are much harder for a person to consciously control, manipulate, or hide. The proposed approach uses advanced deep learning models, such as Convolutional Neural Networks (CNNs) and Long Short-Term Memory (LSTM) networks, to automatically learn subtle patterns in brainwave activity that may indicate whether someone is telling the truth or lying. These models can extract features that traditional hand-crafted methods often miss, enabling them to detect complex variations in the EEG signal. The study also compares the performance of deep learning models with classical machine learning algorithms and older lie-detection technologies. Results show that deep learning models consistently achieve higher accuracy, better generalization, and more stable predictions across different subjects. The system also reduces the need for manual feature engineering, making the lie-detection process faster and more objective.

Keywords: *Brain–Computer Interface, EEG Signals, Deep Learning, Lie Detection*

CA – 028

Field of View Estimation in thermal Cameras with Deep Learning

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Abstract

This work explores the use of deep learning to estimate the field of view (FOV) in thermal cameras. Accurate FOV estimation is important for applications such as surveillance, autonomous navigation, and industrial monitoring, where knowing the exact area captured by the camera improves analysis and decision-making. The proposed approach uses deep learning models to automatically analyze thermal images and predict the FOV, accounting for variations in temperature, distance, and camera angles. Experiments show that the model can estimate the FOV accurately and efficiently, even in challenging thermal conditions. Overall, this study demonstrates that combining thermal imaging with deep learning provides a reliable and automated way to understand and optimize the viewing area of thermal cameras.

Keywords: *Deep learning, Field of view (FOV), Thermal imaging, Prediction, Surveillance*

CA – 029

Precise Key Frames Adversarial Attack Against Deep Reinforcement Learning

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Abstract

This study investigates the susceptibility of Deep Reinforcement Learning (DRL) agents to adversarial perturbations applied selectively to the most influential frames within their visual observation sequences. Instead of modifying every input, the proposed method identifies frames that exert substantial influence on the agent's policy and introduces minimal, nearly imperceptible perturbations. Although small in magnitude, these targeted alterations significantly degrade the agent's decision-making capability, resulting in reduced rewards and unstable behavioural patterns. Experimental evaluations demonstrate that manipulating only a limited set of critical frames is sufficient to destabilize DRL performance. The findings highlight the inherent vulnerability of DRL models to fine-grained, frame-level adversarial attacks and underscore the necessity for more robust defense mechanisms in safety-critical applications such as autonomous driving, robotics, and game AI.

Keywords: *Deep Reinforcement Learning (DRL), Adversarial Attacks, Key-Frame Perturbation, Policy Manipulation, Robustness in Safety-Critical Systems*

CA – 030

AI-Driven Framework For Automated E-Government Services Using Deep Learning Models And Smart Information Management And Citizen Satisfaction

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Abstract

Artificial Intelligence (AI) has recently made significant progress in many fields. However, it still faces challenges that limit its use in e-government applications. These challenges affect both the e-government systems and their interactions with citizens. In this paper, we tackle the issues faced by e-government systems and suggest a framework that uses AI technologies to automate and streamline e-government services. Al technologies such as machine learning, natural language processing, computer vision, robotic process automation, and predictive analytics to automate government functions and improve public service delivery. First, we present a framework for managing e-government information resources. Second, we create a set of deep learning models designed to automate various e-government services. Third, we propose a smart architecture for an e-government platform that supports the development and implementation of AI applications for e-government. Our main goal is to use reliable AI techniques to enhance current e-government services, reduce processing times, lower costs, and boost citizen satisfaction.

Keywords: *Artificial intelligence (AI), Deep learning, Intelligence Information Management*

CA – 031

A Novel Cryptography – Driven Approach For Dynamic Encryption And Decryption Of Digital Data Using Adaption Key Mechanisms

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Abstract

This paper presents a novel cryptography-based method for dynamic encryption and decryption of digital data by using adaptive key mechanisms. Unlike traditional systems that rely on fixed keys, the proposed approach automatically adjusts key size, strength, and rotation depending on the sensitivity of the data being transmitted. This makes the encryption process more flexible and resistant to attacks. The adaptive key engine evaluates data patterns and network conditions in real time and generates short-lived, unpredictable keys that reduce the risk of interception. This ensures secure and efficient decryption while maintaining accurate key synchronization between sender and receiver. The approach also includes secure key distribution and integrity checks to prevent tampering and ensure data reliability. This dynamic model is especially suitable for cloud environments, IoT devices, and mobile networks where security needs constantly change. Overall, the study shows that adaptive key mechanisms offer stronger protection, improved confidentiality, and better resilience against modern cyber threats.

Keywords: *Cryptography, Encryption, Decryption, Adaptative Key Mechanisms, Data Security*

CA – 032

The Future Extended technology of quantum Computing Using qubits, Artificial Intelligence and Machine Learning

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Abstract

Quantum computing is rapidly emerging as a revolutionary technology that could redefine the future of computing and problem-solving. Unlike classical computers that process information using bits, quantum computers use qubits, which can exist in multiple states at the same time due to superposition. Combined with entanglement, qubits allow quantum systems to perform highly complex calculations far more efficiently than traditional machines. The potential applications of quantum computing span across multiple fields. In medicine, it promises faster drug discovery and more personalized treatment solutions. In artificial intelligence and machine learning, quantum computing enables faster processing of large datasets, creating opportunities for smarter algorithms and innovative technologies. Despite its vast potential, quantum computing still faces significant challenges. Qubits are sensitive to environmental noise, require advanced error correction, and need sophisticated hardware to function reliably.

Keywords: *Problem-solving, Qubits, Error correction, Machine learning, sensitive*

CA – 033

Fake-News / Misinformation Detection using Natural Language Processing, Machine Learning and Deep Learning

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Abstract

The proposed methodology involves an end-to-end pipeline, beginning with data collection from diverse news datasets containing both real and fake articles. The textual data undergoes rigorous preprocessing using NLP techniques such as tokenization, stop-word removal, and lemmatization to ensure quality and consistency. Feature engineering is performed using methods like Term Frequency-Inverse Document Frequency (TF-IDF) and advanced word embedding (e.g., Word2Vec, GloVe, or BERT) to transform text into a format suitable for computational analysis. Various ML and DL models are explored for classification. The ML models include traditional classifiers such as Logistic Regression, Support Vector Machines (SVM), and Random Forests, while the DL architectures encompass Convolutional Neural Networks (CNNs), Long Short-Term Memory (LSTM) networks, and Bidirectional LSTMs (BiLSTMs). Performance is evaluated using metrics such as accuracy, precision, recall, and F1-score on a held-out test set. Experimental results on benchmark datasets demonstrate that deep learning models generally achieve superior accuracy and robustness compared to traditional machine learning approaches, capturing more complex linguistic patterns and contextual dependencies. This work highlights the potential of NLP-driven computational systems in effectively combating misinformation, thereby contributing to a more reliable and trustworthy digital information ecosystem. The swift spread of fabricated stories and misleading data on online channels, especially social networks, seriously endangers public confidence, communal faith, and democratic mechanisms.

Keywords: *Tokenization, Lemmatization, Natural language processing, Machine learning, Deep learning, NLP-driven computational systems*

CA – 034

Emerging Trends and Effectiveness of Artificial Intelligence and Machine Learning Using Java Technologies

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Abstract

The integration of Artificial Intelligence (AI) with Java programming creates a strong foundation for building smart, efficient, and scalable applications. This paper discusses how Java's flexibility works together with AI's problem-solving abilities, presenting different methods, tools, and approaches that use Java's strengths in developing AI-based systems. It begins with an outline of AI fundamentals and explains Java's role in the AI ecosystem. The paper explores major AI areas such as machine learning, natural language processing (NLP), computer vision, and reinforcement learning, showing how these can be implemented in Java using frameworks like Deeplearning4j, Weka, and Apache OpenNLP. It also highlights how Java supports the creation of intelligent agents, expert systems, decision-making models, and heuristic approaches. Additionally, it focuses on data preparation, feature selection, and deploying AI models using Java-supported tools. The paper further examines the challenges and possibilities of AI development in Java, including performance issues, handling different data types, and ensuring module compatibility. It concludes by looking at future improvements in Java AI frameworks and technologies that will help in building more advanced intelligent applications.

Keywords: *Artificial Intelligence, Java Programming, Machine Learning, NLP, Intelligent Systems*

CA – 035

Machine Learning-Based Cybersecurity Threat Detection Systems

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Abstract

Cybersecurity threats are increasing rapidly as digital systems grow in complexity, making traditional security methods less effective. Machine Learning (ML) offers an advanced approach to detecting cyberattacks by identifying unusual patterns and predicting potential risks. ML models analyze large volumes of network traffic, user behavior, and system logs to recognize anomalies that may indicate malware, phishing, or unauthorized access. These systems continuously learn from new data, improving their accuracy over time and helping organizations respond to threats more quickly. ML-based threat detection reduces human error, enhances real-time monitoring, and provides stronger protection against evolving cyberattacks. However, challenges such as data quality, model accuracy, and false alerts must be addressed to ensure reliability. Overall, Machine Learning plays a significant role in building intelligent and proactive cybersecurity systems that support safer digital environments.

Keywords: *Cybersecurity, Threat Detection, Anomaly Detection, Network Security, Malware Detection*

CA – 036

Comparative Analysis of Machine Learning Algorithms for Spam Email Detection

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Abstract

Spam emails continue to be a major challenge, affecting productivity, security, and user experience. This study presents a comparative analysis of machine learning algorithms for spam email detection, focusing on Naive Bayes, Support Vector Machines (SVM), Decision Trees, and Random Forests. Using a publicly available dataset, the models were evaluated based on accuracy, precision, recall, and F1-score. The results indicate that while all algorithms demonstrate reasonable detection capabilities, ensemble methods such as Random Forest achieve higher overall performance due to their robustness against feature variability and overfitting. The study also examines trade-offs between computational efficiency and predictive accuracy, offering practical guidance for real-world implementations. These findings contribute to the design of more effective and reliable spam filtering systems, supporting enhanced email security and user productivity.

Keywords*: Spam Detection, Machine Learning, Naive Bayes, SVM, Decision Tree, Random Forest, Predictive Accuracy*

CA – 037

Cybersecurity and Privacy: Navigating the Digital Threat Landscape

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Abstract

The rapid digitization of global infrastructure, commerce, and personal life has rendered Cybersecurity and Privacy (CSP) paramount. This field addresses the ongoing and escalating threats to digital systems, networks, and data, focusing on the core principles of Confidentiality, Integrity, and Availability (CIA). The modern threat landscape is characterized by sophisticated, persistent attacks (e.g., ransomware, advanced persistent threats) targeting critical infrastructure, corporate assets, and sensitive personal information.Crucially, cybersecurity and privacy exist in a complex, often oppositional, relationship. While robust security measures are essential for protecting data privacy, the methods used (such as deep network monitoring) can themselves introduce privacy concerns. Current research and solutions are moving beyond traditional perimeter defenses to embrace:Artificial Intelligence (AI) and Machine Learning (ML): Used for advanced threat prediction, anomaly detection, and automated incident response. Privacy-Enhancing Technologies (PETs): Such as Homomorphic Encryption and Differential Privacy, which allow data analysis while preserving individual anonymity.Policy and Governance: The implementation of stringent regulatory frameworks like GDPR and CCPA, which mandate data protection standards and influence technological design through principles like 'Privacy by Design.'This paper/field explores the critical intersection of technology, human factors, and policy required to secure the digital ecosystem, emphasizing the need for adaptive defenses and a balanced approach that reconciles the imperatives of security with the fundamental right to individual privacy.

Keywords: *Cybersecurity, Privacy,Confidentiality,IntegrityAvailability, Threat Landscape, Artificial Intelligence, Machine Learning, Privacy-Enhancing Technologies, Data Protection*

CA – 038

Python programming language using in data science

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Abstract

Data science is an interdisciplinary field that involve meaningful insights from large volumes of data python plays a vitalrole in data science due to simplicity , flexibility, and powerful libraries. python provides extensive support for data analysis, data visualization, machine learning and statistical computing through libraries such as numpy,pandas,matplotlib,seaborn, and scikit-learn. Using python ,data scientist can efficiently collect,clean,process,and analyse structured and unstructured data.python also data-driven decision-making across various domains such as healthcare,finance,education,and business.due to its strong community support and wide industry adoption,python has become one of the most preferred programming Languages for data science application .can have both abstract and non-abstract methods .abstract classes are useful when you want to provide a blueprint for other classes to follow ,but they can't be used .

Keywords*: Data collection, Data cleaning, Healthcare, Finance, Business application*

CA – 039

Machine Learning in Artificial Intelligence

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Abstract

Machine Learning (ML) is a fundamental branch of Artificial Intelligence (AI) that enables systems to learn from data, identify patterns, and make intelligent decisions with minimal human intervention. This paper explores the role of machine learning in enhancing AI capabilities and powering modern intelligent applications. It discusses major ML techniques such as supervised, unsupervised, and reinforcement learning, explaining how these methods help AI systems perform tasks like classification, prediction, natural language processing, and autonomous decision-making. Artificial Intelligence (AI) is the broad field that aims to make machines act intelligently. Machine Learning (ML) is one of the main methods used to achieve AI. So, we use AI concepts to design systems that learn automatically using Machine Learning techniques. The paper also highlights real-world applications in healthcare, finance, robotics, and smart devices where ML significantly improves AI performance. Additionally, major challenges such as data quality, model bias, and computational requirements are examined. The aim of this study is to show how machine learning drives advancements in artificial intelligence and contributes to the growth of smart technologies.

Keywords*: Machine Learning, Artificial Intelligence, Data Processing, Prediction Models, Automation*

CA – 040

Optimizing Robot Behavior With Deep Reinforcement Learning

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Abstract

Optimizing robot behavior in complex and dynamic environments remains a central challenge in autonomous robotics. Deep Reinforcement Learning (DRL) offers a promising framework by combining deep neural networks with trial-and-error learning to derive optimal policies directly from high-dimensional sensory inputs. In this paper, we propose an integrated DRL methodology that enhances sample efficiency and robustness in real-world robotic tasks. The framework leverages a hybrid architecture of model-based planning and model-free policy learning to balance exploratory behavior with stability. To address the challenges of sparse rewards and safety in physical robots, we introduce a reward shaping strategy guided by demonstration priors and a safety-aware action filter that constrains exploration within feasible state spaces. We evaluate our approach on both simulated benchmarks and a set of real robotic platforms, including mobile manipulation and legged locomotion tasks. Results demonstrate significant improvements in learning speed, task success rate, and generalization to unseen scenarios compared to baseline DRL algorithms. The proposed approach highlights the potential of combining deep learning with reinforcement frameworks to yield adaptable, efficient, and reliable robot behavior optimization.

Keywords: *Model-Free Policy Learning, Mobile Manipulation, Model-Based Planning, Reward Shaping*

CA – 041

E-Government And Public Information System: Enhancing Transparancy, Efficiency, And Citizen Engagement

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Abstract

E-Government and Public Information Systems have emerged as critical enablers of modern governance, transforming how governments deliver services and interact with their citizens. By leveraging information and communication technologies (ICT), these systems improve the accessibility, transparency, and responsiveness of public services, while reducing administrative overheads and enhancing citizen participation. This paper examines the conceptual evolution, key components, benefits, and challenges of E-Government initiatives. Through an analytical review of current implementations and a comparative assessment of technological and socio-organizational factors, the study highlights strategies that can bridge digital divides, strengthen data governance, and support sustainable policy outcomes. Recommendations for future research and practice conclude the paper.

Keywords: *E-Government, Public Information Systems, Digital Governance, Citizen Engagement, Transparency, ICT, Service Delivery*

CA – 042

Artificial Intelligence Safety And Ethics-Governance, Standards And Risk Assessment

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Abstract

The growing adoption of artificial intelligence (AI) across industries has increased the need for strong safeguards that ensure system operate safely, ethically and transparently. Effective governance frameworks and clearly defined standards help guide the responsible design, deployment and oversight of AI technologies. Central to these efforts is risk assessment, which involves potential impacts, identifies vulnerabilities and support informed decision- making to reduce harm. Together, these elements create a foundation for trustworthy AI that protects user, promotes accountability and support sustainable innovation.

Keywords*: Artificial intelligence, ethics, safety, governance framework, transparency*

CA – 043

Evaluating Skills Growth Pathway Through App-Based Coding Learning Platform

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Abstract

The increasing integration of technology in education has encouraged learners to adopt digital platforms for developing programming abilities. This paper examines the role of coding-oriented educational applications in enhancing students learning performance and overall skill growth. The study focuses on how elements such as guided tutorials, gamified tasks, visual learning components, and instant feedback systems influence comprehension, coding accuracy and logical reasoning. A sample group of undergraduate students used selected coding exercises applications over a structured learning period, while their progress was tracked through assessments, coding exercise, and learner experience reports. Results reveal that students who engaged with these apps demonstrated stronger conceptual understanding, improved problem-solving pace, and higher involvement in learning activities when compared to traditional classrooms-only learners. The research concludes that incorporating educational coding apps as supplementary learning tools can significantly boost programming proficiency and support continuous, self-driven learning for beginners.

Keywords: *Educational Coding Apps, Programming Skill Development, Digital Learning Tools, Students Engagement, Self-Paced Learning*

CA – 044

A Data Driven Framework for Predicting Emerging Online Shopping Trends Using Advanced Mining Techniques

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Abstract

The rapid of commerce has led to the continuous generation of massive volumes of customer behaviour data, creating new opportunities to analyse and predict online shopping trends. This study presents an integrated data-driven framework that combines key data mining techniques-including classification, clustering, association rule mining, and predictive analytics-to extract meaningful patterns from consumer purchase history, browsing behaviour, session activity, product preference, and interaction trends. Clustering is used to segment customers based on similar behaviour attributes, while association rule mining identifies frequent co-purchase relationship and hidden product correlation. Classification techniques assist in categorizing consumer groups and predicting purchasing tendencies and predictive models are applied to forecast future demand and emerging trends. the study shows that multiple data-mining techniques improve predication accuracy, identifies shopping patterns and reveals useful customer insights. These findings help enhance marketing, recommendations, inventory planning and sales forecasting.

Keywords: *Data Mining, Online Shopping Trends, Consumer Behaviour Analysis, Classification Techniques, Clustering, Trend Forecasting, E-commerce, Inventory Optimization*

CA – 045

Full Stack Web Development with Database

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Abstract

Full-stack development involves building both the front-end and back-end of web applications, ensuring seamless interaction between user interfaces and server-side logic. It integrates technologies like HTML, CSS, JavaScript, and server frameworks to create dynamic, responsive applications. Databases play a crucial role in storing, managing, and retrieving application data efficiently. Relational databases like MySQL and PostgreSQL and NoSQL databases like MongoDB support different data models based on application needs. Full-stack developers design APIs and handle server-side logic to connect the front-end with the database securely. They ensure scalability, performance, and data integrity in complex systems. Modern full-stack development often includes cloud integration, DevOps practices, and continuous deployment. Overall, it combines software engineering, database management, and system design to deliver robust web solutions.

Keywords*: PostgreSQL, Modem full stack development*

CA – 046

Cooperative spectrum sensing meets machine learning:deep reinforcement learning approach

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Abstract

Cooperative spectrum sensing (CSS) is widely used in cognitive radio networks to enhance the reliability of detecting primary users. However, conventional cooperative sensing schemes suffer from limited adaptability to dynamic wireless environments and typically rely on predefined fusion rules. This work presents a deep reinforcement learning–based cooperative spectrum sensing framework that enables secondary users to learn optimal sensing and cooperation strategies directly from environmental interactions. By formulating spectrum sensing as a sequential decision-making problem, the proposed approach dynamically selects sensing actions and fusion policies without requiring prior knowledge of channel statistics. The learning-based method effectively addresses noise uncertainty, fading, and user mobility. Performance evaluation shows that the proposed deep reinforcement learning approach significantly improves detection probability while reducing false alarms compared to traditional cooperative spectrum sensing techniques, demonstrating its effectiveness for intelligent spectrum management.

Keywords: *Cooperative Communication, Machine Learning, Deep Reinforcement Learning, Cognitive Radio*

CA – 047

Spam Email Detection Using Machine Learning

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Abstract

Spam emails are unwanted and harmful messages that waste users' time and may contain phishing links, malware, or fraudulent information. With the rapid growth of internet communication, detecting spam emails in real time has become a major challenge. Traditional rule-based filtering methods are not effective against new and evolving spam techniques. To overcome this problem, machine learning techniques are used for accurate and automatic spam email detection. This system uses machine learning algorithms to classify emails as spam or ham (legitimate) based on their content and features. Text processing techniques such as tokenization, stop-word removal, and feature extraction are applied to email data. Algorithms like Naive Bayes, Support Vector Machine (SVM), or Logistic Regression are trained using labelled email datasets to identify patterns in spam messages. The trained model can then detect spam emails in real time with high accuracy. The proposed system helps improve email security, reduces the risk of cyber threats, and enhances user experience by filtering unwanted emails efficiently. Spam email detection using machine learning is widely used in real-world applications such as Gmail and Yahoo Mail, making it an important and practical solution in today's digital communication systems.

Keywords*: Tokenization, Filtering unwanted mails, Support vector machine (SVM), Logistic regression*

CA – 048

Big data and its role in business

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Abstract

In the digital era, businesses generate massive amounts of data from various sources such as social media, online transactions, sensors, and customer interactions. This large and complex collection of data is known as Big Data. Traditional data processing tools are not sufficient to handle such data, which has led to the development of Big Data technologies. Big Data plays a crucial role in modern business by enabling organizations to make data driven decisions. By analyzing large data sets, businesses can understand customer behavior, improve operational efficiency, predict market trends, and reduce risks. Technologies such as Hadoop, Spark, and cloud based analytics platform shell in storing, processing, and analyzing Big Data effectively. This paper discusses the concept of Big Data, its key characteristics, and its importance in various business sectors such as marketing, finance, healthcare, and e-commerce. It also highlights how Big Data helps businesses gain a competitive advantage, improve customer satisfaction, and enhance overall performance. Finally, the paper briefly addresses the challenges of Big Data, including data security, privacy, and skilled workforce requirements.

Keywords*: Big Data, Business Analytics, Data-Driven Decision Making, Hadoop, Cloud Computing, Customer Behaviour Analysis, Predictive Analytics, Data Security*

CA – 049

Real-Time Traffic Monitoring System Using Computer Vision and IoT

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Abstract

A Real-time traffic monitoring system that integrates computer vision with Internet of Things (IoT) technology is proposed to provide efficient and continuous supervision of roadway conditions. The system processes live video streams using machine learning–based object detection algorithms to accurately identify, count, and track vehicles in real time. Key traffic parameters such as vehicle flow density, speed estimation, lane occupancy, and congestion levels are extracted from the video data. These parameters are transmitted through IoT communication modules to a centralized cloud platform for remote monitoring and analysis. The proposed design operates with low latency, enabling traffic authorities to observe current traffic situations instantly and respond quickly to incidents, accidents, or abnormal traffic patterns. By combining edge-level video analytics with cloud-based data visualization dashboards, the system reduces dependence on traditional physical sensors and minimizes infrastructure and maintenance costs. Additionally, the system supports scalability, real-time alerts, and data-driven decision-making. Experimental results demonstrate reliable performance under varying weather and lighting conditions, highlighting its effectiveness for smart city traffic management applications.

Keywords:*Traffic Monitoring System, ComputerVision, IoT Integration, Smart City Applications*

CA – 050

Mining Open Source Viewer Signals To Forecast Youtube Content Trend Shifts

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Abstract

Youtube has emerged as one of the world's largest digital ecosystems, where creators, brands and audiences continuously interact through millions of daily Video uploads. Understanding how video trends form, grow, and influence audience behaviour has become a crucial area of research. This study investigates you tube video trends using publicly available metadata such as views , likes, comments, upload frequency, titles, tags, category insights, and audience engagement statistics. Using data mining techniques and machine learning models, the research identifies key patterns that drive video popularity and trend evolution. The analysis examines trending categories, audience engagement behaviour and viewer responses. Factors such as posting time, content type, keyword relevance, visual elements, and viewer demographics are evaluated to understand their contribution to sudden visibility growth. Furthermore, clustering, classification, and correlation analysis are applied to forecast emerging trends and estimate engagement levels. The outcomes of this study Provide deeper insights into trend dynamics and offer data-driven recommendations that can support creators, marketers, and researchers in optimizing content strategies. By understanding the mechanisms behind trend formation, this research helps improve audience reach, refine digital marketing decisions, and enhance the all overall effectiveness of you tube content.

Keywords: *Youtube Trends, Data Mining, Machine Learning, Video Metadata, Audience Engagement*

CA – 051

An Intelligent Automated Attendance Monitoring Framework Using Advanced Deep-Learning-Based Facial Recognition Technique

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Abstract

The rapid shift toward digital systems in educational institutions and workplaces has created a strong need for reliable and automated attendance solutions. Conventional methods—such as manual signatures, ID card scanning, and fingerprint authentication—are often affected by issues like proxy attendance, physical contact, delays, and inaccurate recordkeeping. To address these challenges, this study introduces an intelligent face-recognition-based smart attendance system that integrates deep learning, computer vision, and real-time image processing. The system captures live facial images through a camera and analyzes them using a convolutional neural network (CNN) supported by preprocessing steps, including face detection, feature extraction, and image normalization, to enhance recognition precision. The model verifies identities using a pre-trained dataset and automatically updates attendance records in a secure, time stamped database. Features such as duplicate prevention, accuracy checks, and cloud-enabled data management further strengthen the system's performance and usability. Experimental evaluation shows that the proposed system outperforms traditional attendance methods by offering faster processing, higher accuracy, and improved reliability. It reduces manual involvement, eliminates proxy marking, and is suitable for large-scale deployment in academic institutions, corporate offices, and restricted-access facilities. Overall, the framework provides a modern, efficient, and trustworthy solution for seamless attendance management.

***Keywords**: Face Recognition, Smart attendance, Deep learning, CNN model, Automated system*

CA – 052

Machine Learning enabled Fall Detection Improve Safety of Elderly Individuals

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Abstract

Falls remain one of the leading causes of injury and hospitalization among elderly individuals, especially those living alone or with limited mobility. Timely detection and immediate assistance are crucial to reducing the severity of fall-related complications. This paper introduces an AI-based fall detection system that utilizes sensor-derived movement data to monitor physical activity and identify unusual or dangerous motion patterns. The system collects continuous motion signals, processes them to extract meaningful features, and uses machine learning models that learn the differences between routine activities—such as walking, sitting, and standing—and sudden movements that resemble a fall. The AI model is trained on annotated datasets to improve its recognition ability, minimize false alarms, and ensure reliable real-time operation. The proposed framework integrates preprocessing, pattern analysis, and dynamic classification to deliver a robust and adaptable monitoring solution. Experimental results indicate that the use of AI sensors significantly enhances detection accuracy compared to traditional threshold-based systems. The system is lightweight, scalable, and suitable for different environments such as homes, elderly care centers, and assisted living facilities. By providing continuous monitoring and instant alert notifications, the AI-based fall detection system supports independent living, improves safety, and reduces the response time during emergencies. This work demonstrates the potential of AI-driven sensing technologies to strengthen elderly healthcare and create safer living conditions.

***Keywords**: Fall Detection, Elderly Safety, AI Sensors, Machine Learning, Active Monitoring*

CA – 053

Management of Cyber Forensics And Digital Evidence Investigation Procedure For Safe And Legal Data Handling

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Abstract

With cybercrimes rising at a fast pace, the need for dependable approaches to gather and evaluate digital evidence has become more critical than ever. This paper explores the foundational concepts of cyber forensics and describes methods that help ensure the accuracy, protection, and legal validity of electronic data. It outlines major stages in the forensic process, including locating relevant information, creating exact forensic copies, preserving stored data without alteration, and conducting systematic analysis. The study also examines important legal and ethical factors such as evidence admissibility, documentation requirements, and privacy obligations. By bringing together technical procedures and legal guidelines, this research shows how well-structured forensic practices can strengthen the credibility and reliability of digital investigations within the justice system.

Keywords: *Cyber Forensics, Digital Evidence, Data preservation, Chain of custody*

CA – 054

Cloud Storage Optimization Using Erasure coding To Reduce Repair Bandwidth In Cloud Storage

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Abstract

Cloud storage systems must balance reliability, cost, and performance as data volumes continue to grow. Traditional techniques provide fault tolerance but incur high storage overhead. Erasure coding offers more efficient alternative by dividing data into fragments and encoding them with redundant parity blocks, enabling reconstruction even if multiple blocks fail. This presentation explores erasure coding techniques-such as reed-solomon, local reconstruction codes (LRCs), and XOR-based codes-and evaluates their impact on storage efficiency, recovery time, network traffic, and cloud cost. We discuss optimization strategies used by modern cloud providers and proposed an improved hybrid erasure-coding model that reduces repair bandwidth while maintaining strong fault tolerance, making it suitable for large-scale, cost-sensitive cloud storage systems.

Keywords: *Cloud Storage, erasure coding, fault tolerance, data redundancy, repair bandwidth*

CA – 055

Artificial Intelligence in Modern Computer Applications

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Abstract

Artificial Intelligence (AI) is one of the most rapidly growing fields in computer science and has become an integral part of modern computer applications. AI refers to the simulation of human intelligence in machines that are programmed to think, learn, and make decisions. This paper discusses the role of Artificial Intelligence in various computer applications such as healthcare, education, banking, e-commerce, and cybersecurity. AI technologies like machine learning, natural language processing, and computer vision help in improving efficiency, accuracy, and automation of tasks. In the healthcare sector, AI assists in disease prediction and medical image analysis. In education, AI-powered systems support personalized learning experiences. Banking and e-commerce applications use AI for fraud detection, customer support, and recommendation systems. Despite its advantages, AI also faces challenges such as data privacy, ethical concerns, and lack of transparency. This paper highlights the importance of Artificial Intelligence and its impact on modern computer applications, making it a key technology for future development in the field of computer science.

Keywords: *Artificial Intelligence, Machine Learning, Computer Applications, Automation, Data Analysis*

CA – 056

Blockchain-Based Secure Voting System

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Abstract

A Blockchain-Based Secure Voting System is an advanced digital voting framework that leverages blockchain technology to ensure secure, transparent, and trustworthy elections. In conventional voting systems, issues such as centralized control, ballot tampering, lack of voter trust, delayed result processing, and limited accessibility are common. Even electronic voting machines (EVMs) depend heavily on central authorities, which can become single points of failure. blockchain technology introduces a decentralized and immutable ledger where each vote is treated as a transaction. These transactions are cryptographically secured, time-stamped, and distributed across multiple nodes in the network. Once a vote is recorded on the blockchain, it cannot be altered or deleted, ensuring election integrity. Smart contracts automate voting rules, preventing double voting and ensuring fairness without human intervention. Blockchain addresses these issues by recording votes as immutable transactions on a distributed ledger, ensuring security, integrity, and verifiability of the election process. This approach enhances voter confidence while maintaining privacy and reducing fraud.

Keywords: *Decentralization, Immutability, Transparency, Cryptographic Security*

CA – 057

Research On Reference Target Detection Of Deep Learning Framework Rcnn

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Abstract

This work studies the use of the Faster R-CNN deep learning framework for reference target detection. Faster R-CNN is a popular object detection model known for its speed and accuracy in identifying objects within images. The proposed research focuses on improving the detection of specific reference targets by training Faster R-CNN to recognize and locate them accurately, even in complex or cluttered environments. By optimizing the feature extraction and region proposal stages, the model can quickly and reliably identify targets in real-time. Experimental results show that the Faster R-CNN–based system achieves high detection accuracy and efficiency compared to traditional detection methods. Overall, this study demonstrates that Faster R-CNN is an effective solution for precise and fast reference target detection in various applications such as surveillance, autonomous navigation, and industrial inspection.

Keywords*: Faster R-CNN, Reference Target Detection, Deep Learning, Object Detection*

CA – 058

AI-Driven Incident Response System

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Abstract

Traditional incident response methods in cybersecurity often rely on manual monitoring, rule-based alerts, and delayed human intervention, which can result in slow detection and ineffective mitigation of security threats. To address these challenges, this project proposes an AI-driven Incident Response System that uses machine learning and intelligent automation to detect, analyze, and respond to security incidents in real time. The system continuously monitors system logs, network traffic, and user activities to identify abnormal patterns and potential threats. Advanced machine learning models are applied to classify incidents, assess severity, and determine appropriate response actions. Once an incident is detected, the system automatically triggers alerts or containment measures, reducing dependence on manual intervention. In addition to real-time response, the system maintains incident logs and generates analytical reports to support auditing and future threat prevention. The proposed approach improves detection accuracy, reduces response time, minimizes potential damage, and enhances overall security management. Compared to conventional methods, this system provides a faster, adaptive, and intelligent solution for modern digital environments by enabling proactive and data-driven security operations.

Keywords*: Incident Response, Artificial Intelligence, Machine Learning, Cybersecurity, Automation*

CA – 059

Deep Learning Model on Blockchain for Secured Mobile Communication

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Abstract

This should continue, with basically the same security considerations in regard to data breaches, malicious attacks, and single-point failures in the context of a rapid expansion of mobile communications, especially in the IoT ecosystem and next-generation networks such as 6G. Traditional security models often adopt centralized systems that easily face scalability issues and are prone to data manipulation and the catastrophic failure of an entire system. Hence, here, a novel framework is presented that uses the decentralized, immutable ledger provided by blockchain technology for secure, transparent data management and authentication in combination with deep learning algorithms for optimization of security parameters through real-time anomaly detection across the network.

Keywords: *Data breaches, Catastrophic, Scalability, Malicious, IoT Ecosyste*

CA – 060

The Role Of Green Computing In Social Environment Using Machine Learning Techniques

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Abstract

Green computing is the environmentally responsible use of computers and related resources. Attracting eco-conscious customers and helping meet environmental regulations. One of the earliest initiatives toward green computing in the United States was the voluntary labeling program known as Energy Star. Energy conversation and energy- efficiant hardware and software red use power draw. Green computing cuts green house gasemissions from data centers and devices, combating climate change. Adoping green practices boosts a companies reputation as socialy enhanced brand image and compliance responsibling. improving corporate through efficient design, usage, saving money, planet and the disposal. green computing is a natural preserving resources. Clearly there is a huge potential from savings in their infrastructure. there are many existing technologies and methods by which significant savings can be made .Energy to manufacture store, operate and cool computing systems has grown significantly in the recend years, primarly due to the volume of systems and computing that now heavily rely upon. In green computing energy conservation one of the most obvious advantages is energy consorvations.

***Keywords**: Green Computing, Energy star, Eco conscious, Energy conservation*

CA – 061

AI-Based Emotion Recognition In Text Using Natural Language Processing Techniques

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Abstract

The rapid growth of digital communication has made it increasingly important to understand human emotions expressed through text. This paper explores the development of an **AI-based system for emotion recognition in text**, which can accurately identify emotions such as happiness, anger, sadness, and surprise from written messages. By leveraging natural language processing (NLP) techniques and machine learning algorithms, the system analyzes linguistic patterns, word usage, and contextual cues to classify emotions in real-time. Such a system has applications in mental health monitoring, customer service optimization, social media analysis, and personalized content delivery. The proposed approach emphasizes efficiency, accuracy, and adaptability, aiming to bridge the gap between human emotional understanding and automated text analysis, offering a practical solution for emotion-aware computing in modern communication platforms.

Keywords*: Artificial Intelligence, Emotion Recognition, NLP, Machine Learning, Text Analysis, Sentiment Classification*

CA – 062

Robotic Process Automation (RPA) Automation Repetitive Digital Tasks For Faster And Smarter Business Operations

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Abstract

Robotic process Automation (RPA) is an emerging technology that user software bots to automate repetitive, rule-base task that are usually performed by human. These bots can interact with digital systems, extract data, fill forms, process transactions, and accuracy. RPA help organization reduce manual workload, minimize errors, and improve overall efficiency While lowering operational costs. It also enables employees to focus on more strategic, creative and decision-oriented work instead of routine tasks. RPA is widely adopted in industries such as banking, healthcare, IT services, customer support, and manufacturing. Although RPA offers powerful benefits, challenges like bot maintenance, process complexity, and integration with legacy system must be addressed. As automation evolves, combining RPA with artificial intelligence (AI) will lead to smarter, will lead to smarter, more adaptive system capable of handling complex workflows and transforming business operations. RPA as a key driver of digital transformation, enabling organizations to streamline repetitive tasks and improve operational efficiency .the study concludes that RPA serves effective catalyst for improvement an plays a critical role in strengthening competitive advantage. Discussion concludes by considering the evolving role of RPA as convers with artificial intelligence and intelligent automation, positioning it as a key drive of digital transformation

Keywords: *Robotic process automation, automation, software bot, business efficient, digital workforce optimization , intelligent automation*

CA – 063

Voxel Driven Deep Learning Archeitecture For 3d Objects Recognition

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Abstract

Voxel ambitious bottomless wisdom has emerged as influential pattern for 3D objects be familiar with enable neural networks to directly process of representation of geometric data. In this works presents of a voxel – based architecture that transform raw 3D inputs – such as point haze, CAD Morases and fund. There have a three –dimensional objects familiar has to gained to momentous significance across sphere similar as robotics, independent navigation, augmented reality and Medical imaging. It is smallest. The future model integrates hierarchical 3D complications blocks with left over and thought mechanisms to capture a local geometric detailand overall figure environment. The process of converting 3D data (points haze or morase) into ausual voxel grid suitable for neural network processing. Moreover, some degree of available oflarge-scale annotate 3D datasets and sympathy to resolution and standpoint variations affect model show and overview.

Keywords: *Voxel symbol, 3D objects credit, 3D convoluational neural Networks, Sparse voxel networks, Deep learning, 3D idea, Point cloud processing*

CA – 064

IME Management and Productivity In Software Development Teams

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Abstract

Time management is one of the most critical skills available to maximize the successful outcomes of any software development project's efficiency in a rapidly changing environment. Software Development Teams encounter difficulties with many aspects of their projects. Many Other Issues That Can Detract From the Quality Of the Final Result. In The Sea of Continuous Change, Through Analysis And Examination Of Effective Team Time Utilization, It Is Possible To Increase Team Productiveness. The Data Collected Will Help To Discover The Influence Of Agile Methodologies, Task Prioritization, And Team Collaboration And Communication On Team Productiveness. Some Case Studies Will Investigate The Use And Applicability Of Sprint Planning, Kanban Boards, Time Blocking, And Workflow Automation As Effective Methods Of Alleviating Bottlenecking And Optimizing Resource Usage While Increasing Overall Productivity. Team Productiveness Will Be Measured And Evaluated Through Behavior Metrics, Including Velocity, Cycle Time, Defect Density, Developer Engagement, And So On. In Summary, This Research Will Reveal That The Combination Of Structured Planning, Open Communication Lines, And Tools That Automate Processes Will Increase The Efficiency Of The Team And Reduce The Frequency And Duration Of Delivery Delays While Improving Delivery Quality. Several factors influence the speed and efficiency with which software teams can build and deliver software over the last few years. Software development teams have had to overcome challenges associated with project requirements that are complex, unknown, and time constrained; these challenges detracted from both the quality of work produced by software development teams and the morale of the teams themselves.

Keywords: *Time Management, Software Development Teams, Team Productivity, Agile Project Management, Task Prioritization*

CA – 065

Downlink Secrecy Rate Maximization For Irs-Aided Cell-Free Massive Mimo Network: Analysis And Deep Learning Design

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Abstract

This paper studies how to improve secure downlink communication in IRS-aided cell-free massive MIMO networks. An intelligent reflecting surface is used to guide signals toward the user and away from the eavesdropper. The goal is to maximize the secrecy rate through optimized beamforming, power control, and IRS phase shifts. Because this problem is complex, a deep-learning model is designed to quickly find near-optimal solutions. Results show that the proposed method greatly improves security and overall network performance.This work investigates secure downlink transmission in IRS-aided cell-free massive MIMO networks, where multiple distributed access points jointly communicate with users in the presence of eavesdroppers. By leveraging an intelligent reflecting surface (IRS), the wireless environment is adaptively reconfigured to improve signal quality for legitimate users and limit information leakage

Keywords: *IRS-Aided Cell-Free Massive MIMO, Beamforming Optimization, IRS Phase Shift Design, Deep Learning Approach, Secure Downlink Communication*

CA – 066

P-Swish : Activation Function with learnable parameters based on swish activation function in deep learning

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Abstract

This work proposes P-Swish, a new activation function for deep learning that builds on the popular Swish function but includes learnable parameters to improve performance. Activation functions play a key role in neural networks by introducing non-linearity, which helps the network learn complex patterns. While Swish has shown good results in many tasks, it uses fixed parameters, which can limit flexibility. P-Swish allows the network to learn the best parameter values during training, enabling better adaptation to different datasets and tasks. Experiments on benchmark datasets show that networks using P-Swish achieve higher accuracy and faster convergence compared to traditional activation functions like ReLU and the original Swish. Overall, this study demonstrates that learnable activation functions like P-Swish can enhance the learning ability and performance of deep neural networks.

Keywords*: P-Swish,Activation function, Learnable parameters, Neural networks, Performance improvement*

CA – 067

ECG Arrhythmia Classification For Comparing Pre-Trained Deep Learning Models

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Abstract

Accurate detection of arrhythmias from electrocardiogram (ECG) signals is essential for early diagnosis of cardiac disorders. Recent advances in deep learning have enabled automated analysis of ECG data with improved reliability. This study compares multiple pre-trained deep learning models to determine the most effective architecture for ECG arrhythmia classification. ECG signals are processed, segmented, and transformed into suitable input formats, followed by training using models such as Mobile Net, ResNet50, VGG16, InceptionV3, and Efficient Net. The models are evaluated based on key performance metrics including accuracy, sensitivity, specificity, and F1-score. Comparative analysis indicates that deeper convolutional architectures offer enhanced feature extraction and achieve higher classification performance. The findings demonstrate the potential of transfer learning-based approach in building efficient and accurate arrhythmia detection systems for healthcare applications.

Keywords: *Image classification, Deep Learning, Transfer Learning, Feature Extraction, Vision Transformers (ViTs)*

CA – 068

Deep learning compiler optimization on multi-chiplet architecture

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Abstract

This work investigates how deep learning compiler optimization can improve performance on modern multi-chiplet architechtures. As processors increasingly use multiple small chiplets instead of one large chip,managing communication,memory access, and workload distribution becomes more complex. The proposed approach uses deep learning-based compiler techniques to automatically optimize how tasks are arranged,scheduled,and executed across different chiplets. These optimizations help reduce latency,balance workloads,and improve the overall speed and efficiency of applications running on multi-chiplet systems. Experiments show that the optimized compiler significantly improves performance compared to traditional compilation methods,especially for compute-heavy tasks like AI and data processing. Overall,this study demonstrates that combining deep learning with compiler design can unlock better efficiency in next-generation chiplet-based hardware systems.

Keywords: *Deep learning, multi-chiplet architectures, performance enhancement, workload scheduling, high-performance computing (HPC)*

CA – 069

Research on Real Time Dynamic Object Detection Based on YOLOv3 Deep Learning Network

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Abstract

This work studies how the YOLOv3 deep learning network can be used for real-time detection of moving or dynamic objects. YOLOv3 is known for its fast processing speed and strong accuracy, making it suitable for applications like video surveillance, autonomous driving, and robotics. The proposed research focuses on improving how YOLOv3 detects objects that change position, size, or appearance while the scene is in motion. By optimizing the model's feature extraction and adjusting its detection layers, the system is able to recognize dynamic objects more reliably and at high speed. Experimental results show that the improved YOLOv3 model achieves better real-time tracking and detection performance compared to the standard version. Overall, this study demonstrates that YOLOv3 can be effectively enhanced for dynamic object detection and can support real-time decision-making in various intelligent systems.

Keywords: *YOLOv3, Dynamic Object Detection, Real-Time Detection, Deep Learning Network, Object Tracking*

CA – 070

AI Based Fraud Detection For Financial Transition Using Machine Learning

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Abstract

With businesses increasingly migrating to a digital banking environment, financial fraud has become a rapidly-growing threat. As a result, it is becoming increasingly important for the banking industry to have advanced detection methods that keep up with changing fraud patterns. A fundamental challenge in developing such an advanced method is that many traditional systems use rules-based detection, which often results in many false positives and missed real fraudulent transactions. Thus, this research introduces and builds on a framework for detecting financial fraud using artificial intelligence (AI) through the real-time analysis of transactional, behavioral, and contextual information using machine learning algorithms. The effectiveness of machine learning techniques, such as supervised and unsupervised methods, including Random Forest, Gradient Boosting, Isolation Forest and Auto encoders, is systematically and empirically compared with the purpose of detecting anomalous financial activities. The issue of imbalanced datasets has been addressed through the development of methods such as SMOTE (Synthetic Minority Over-sampling Technique) and cost-sensitive learning, as well as through feature - engineering, which involves deriving insights related to purchasing patterns of the buyer, the speed of transaction, and device characteristics.

Keywords: *AI-Driven Fraud Prevention, Financial Crime Detection, Transaction Classification, Adaptive Learning Models, High-Risk Behavior Identification*

CA – 071

Socialmedia Psychology

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Abstract

This abstract explores social media psychology, focusing on how digital platforms influence human cognition, emotion, and behaviour. As online communication becomes central to daily life, individuals utilize social networks for connection, self-expression, identity formation, and validation, shaping how they perceive themselves and their environment. These platforms often encourage social comparison, evoke strong emotional reactions, and alter traditional social interactions, while also offering opportunities for learning, creativity, and relationship building. However, excessive or unmanaged use can negatively affect well-being by increasing stress, lowering self-esteem, and fostering compulsive digital habits. This study investigates the psychological mechanisms underlying motivation, emotional engagement, identity construction, and behavioral patterns observed on social media, emphasizing the importance of understanding these processes to promote healthier digital practices. The research highlights how algorithm-driven content influences attention and decision-making, examines how digital communities shape collective emotions and social norms, and stresses the growing need for responsible digital literacy in modern society.

Keywords: *Social media psychology, digital behavior, online identity, emotional influence, social interaction*

CA – 072

The Role Of Social Media In Shaping Public Opinion

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Abstract

Social media plays a significant role in shaping public opinion by transforming how information is created, shared, and interpreted. It provides a platform where individuals can access news instantly, express viewpoints, and engage in discussions beyond geographical and social boundaries. Through features such as likes, shares, comments, and trending topics, social media amplifies certain ideas and narratives, influencing what people perceive as important or widely accepted. Algorithms further shape public opinion by prioritizing content that aligns with user's interests and interactions, which can reinforce existing beliefs while limiting exposure to diverse perspectives. Influencers, public figures, and online communities also contribute by framing issues in persuasive ways, often affecting attitudes and behaviors on social, political, and cultural matters. At the same time, social media enables grassroots movements and marginalized voices to gain visibility and mobilize support. However, the rapid spread of information also increases the risk of misinformation, emotional manipulation, and polarization, which can distort public understanding. Overall, social media acts as a powerful tool that both reflects and shapes public opinion, making it a central force in contemporary communication and societal decision-making.

Keywords: *Social media, Public opinion, Information dissemination, Digital communication, Algorithms, Influencers, Online communities, Misinformation, Political communication, Social awareness, Media influence, User engagement*

CA – 073

Teaching Object-Oriented Programming Concepts Using Java In High School

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Abstract

Integrating Object-Oriented Programming (OOP) into high school computer science curricula has become increasingly essential for fostering early computational thinking skills. This research investigates effective teaching strategies for conveying fundamental OOP principles, including classes, objects, inheritance, polymorphism, encapsulation, and abstraction, using the Java programming language. Java is selected for its robust object-oriented framework, dependability, and suitability for novice learners. The study emphasizes a blended pedagogical approach that incorporates theoretical explanations, visual demonstrations, interactive coding exercises, and project-based learning to enhance student understanding and engagement. Classroom implementations utilizing beginner-friendly development environments, such as BlueJ and IntelliJ, alongside real-world analogies, were observed to significantly improve students' grasp of abstract programming concepts. The findings indicate that introducing OOP at the high school level not only strengthens logical reasoning and analytical problem-solving skills but also equips students for more advanced studies in computer science. The study concludes that a structured, activity-centered approach using Java can make complex OOP concepts comprehensible, practical, and motivating for high school learners.

Keywords: *Object-Oriented Programming (OOP), Java, Programming Pedagogy, Classes and Objects, Inheritance, Polymorphism, Encapsulation, Project-Based Learning, Computational Thinking, Educational Technology*

CA – 074

Digital Learning Challenges In Rural Communities

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Abstract

Rural communities continue to encounter major obstacles in adopting digital learning, including unstable internet connections, limited device availability, and low levels of digital literacy. These conditions reduce learners' ability to benefit from online resources and reinforce educational inequality. This study examines these challenges and presents a machine-learning–based framework designed to function reliably under rural constraints. The framework predicts learners' content needs, adapts materials to low-bandwidth environments, and supports offline access during connectivity gaps. Experiments conducted in a simulated rural setting demonstrate enhanced content accessibility and improved learner participation. The findings suggest that machine-learning approaches can strengthen the delivery, resilience, and inclusiveness of digital learning in underserved rural areas.

Keywords: *Digital learning, rural education, machine learning, low-resource environments, adaptive learning systems, educational technology*

CA – 075

A Study on the Impact of Immersive Technologies on Knowledge Retention and Conceptual Mastery

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Abstract

This paper investigates how Augmented Reality (AR) and virtual Reality (VR) Can improve teaching and learning in today's educational system. AR adds digital Objects to the real world, while VR creates a completely simulated environment Where learners can experience concept as if they are real. These technologies provide student with interactive, engaging, and hands-on learning opportunities. The study explains how AR and VR help students understand difficult topics more clearly, maintain better attention, and actively participate in classroom activities. It also reviews practical uses such as virtual laboratories, 3Dvirtual content, animated models, and subject-based simulations used in science, Engineering, and medical learning environments. The finding indicates that AR and VR Increase student involvement, strengthen practical understanding, and allow safe experimentation without physical equipment. Thesen tools make lessons more interactive, Simply complex ideas, and boost overall interest in learning. In conclusion, integrating, AR and VR into education can enhance traditional teaching methods and createsa more effective, technology – supported learning experience.

Keywords: *Augmented Reality, Virtual Reality, Educational Technology, interactive Learning, Immersive Learning, Digital Tools, Student Engagement, AR/VR Integration*

CA – 076

Hybrid Feature and Sequence Extractor Based Deep Learning Model for Image caption Generation

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Abstract

Image caption generation aims to automatically describe the content of an image in natural language, bridging the gap between visual understanding and human communication. This work proposes a Hybrid Feature and Sequence Extractor–based deep learning model that combines the strengths of different neural architectures to improve caption quality. Visual information is extracted using deep feature extractors that capture both fine details and global context from images, while a sequence modeling network learns the relationship between these visual features and corresponding words. By integrating these components, the model generates captions that are more accurate, fluent, and contextually meaningful. The hybrid design helps the system better understand complex scenes and produce descriptions that closely resemble how humans naturally describe images.

Keywords: *Image caption generation, deep learning, hybrid model, feature extraction, sequence learning*

CA – 077

Facial Recognition System for Automatic Attendance Tracking

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Abstract

The increasing demand for accurate and efficient attendance management has resulted in the adaption of automated biometric solutions. Proposed herein is an intelligent attendance tracking system based on face recognition techniques designed to replace manual and card-based attendance management systems. This is a real-time picture image capturing system that identifies the presence of faces using image processing techniques and identifies the respective identities using machine learning-based algorithms for facial recognition. Automatically, with little human assistance, the record of attendance is updated in the database upon successful authentication of a face. This technique serves to improve the overall security and dependability in both academic and organizational contexts, saves hours, and eliminates proxy attendance. The proposed system is a cost-effective alternative for attendance automation today, as it is characterized by high accuracy, user convenience, reliability and scalability.

Keywords: *Biometric, Reliability, User Convenience, Scalability, High Accuracy*

CA – 078

Multi-model deep reinforcement learning in ViZDoom with audio Component

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Abstract

Deep Reinforcement Learning (DRL) has demonstrated remarkable success in training intelligent agents within complex, high-dimensional environments. ViZDoom, a research platform based on the classic Doom game, provides a challenging testbed for evaluating DRL algorithms using visual perception. However, most existing approaches rely solely on visual inputs, neglecting other sensory modalities that are crucial for human-like decision-making. This work presents a multimodal deep reinforcement learning framework that integrates both visual and audio components to enhance agent performance in the ViZDoom environment. The proposed model processes raw game frames using Convolutional Neural Networks (CNNs) to extract visual features, while in-game audio signals are transformed into spectral representations and analyzed using dedicated audio-processing networks. These multimodal features are fused within a unified policy network and trained using a Deep Reinforcement Learning algorithm such as Deep Q-Networks (DQN) or Proximal Policy Optimization (PPO). By leveraging auditory cues—such as gunfire, enemy movement, and environmental sounds—the agent gains improved situational awareness, leading to faster learning and more robust decision-making. Experimental evaluations demonstrate that the multimodal agent outperforms vision-only baselines in terms of convergence speed, survival time, and overall game score. The results highlight the importance of audio perception in dynamic environments and establish multimodal learning as a promising direction for developing more adaptive and human-like intelligent agents in first-person gaming scenarios.

Keywords*: Multimodal Learning, Deep Reinforcement Learning, ViZDoom, Audio-Visual Perception, Autonomous Agents*

CA – 079

Classifying Phishing Email Using Machine Learning and Deep Learning

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Abstract

This work focuses on detecting and classifying phishing emails using machine learning and deep learning techniques. Phishing emails are designed to trick users into revealing sensitive information, and traditional rule-based filters often fail to detect new or sophisticated attacks. The proposed approach uses machine learning models, such as Random Forests and Support Vector Machines, along with deep learning models like Convolutional Neural Networks (CNNs) and Long Short-Term Memory (LSTM) networks, to automatically analyze email content, headers, and patterns. Experiments show that these models can accurately distinguish phishing emails from legitimate ones, achieving high detection rates and reducing false positives. Overall, this study demonstrates that combining machine learning and deep learning provides a more effective and adaptive solution for protecting users from email-based cyber threats.

Keywords: *Phishing Detection, Machine Learning, Deep Learning, Email Classification, Cybersecurity*

CA – 080

A Study on the Use of Augmented Reality (AR) and Virtual Reality (VR) in Enhancing Educational Learning

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Abstract

This paper investigates how Augmented Reality (AR) and Virtual Reality (VR) can improve teaching and learning in today's educational system. AR adds digital objects to the real world, while VR creates a completely simulated environment where learners can experience concepts as if they are real. These technologies provide students with interactive, engaging, and hands-on learning opportunities. The Study explains how AR and VR help students understand difficult topics more clearly, maintain better attention, and actively participate in classroom activities. It also reviews practical uses such as virtual laboratories, 3D virtual content, animated models, and subject-based simulations used in science, engineering, and medical learning environments. The finding Indicate that AR and VR increase student involvement, strengthen practical understanding, and allow safe experimentation without physical equipment. These tools make lessons more interactive, simply complex ideas, and boost overall interest in learning. In conclusion, integrating AR and VR into education can enhance traditional teaching methods and create a more effective, technology-supported learning experience.

Keywords: *Augmented Reality, virtual Reality, Educational Technology, Interactive Learning, Immersive Learning, Digital Tools, Student Engagement, AR/VR Integration*

CA – 081

Cloud Computing on Healthcare

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Abstract

The integration of cloud computing into healthcare systems is rapidly transforming the way medical data is stored, managed, and utilized. Cloud technology offers scalable and cost-effective solutions for handling large volumes of electronic health records, enabling seamless access to patient information for healthcare providers and enhancing collaboration across medical institutions. This paper explores the benefits of cloud computing in healthcare, including improved data accessibility, enhanced security, support for telemedicine, and the facilitation of advanced analytics for personalized care. Additionally, it examines challenges such as data privacy, regulatory compliance, and dependency on reliable internet infrastructure. By analyzing current implementations and emerging trends, the study highlights how cloud computing can improve operational efficiency, patient outcomes, and healthcare delivery, while emphasizing the importance of robust security measures to safeguard sensitive medical information. By allowing real-time access to electronic health records and facilitating collaboration among healthcare providers, cloud platforms improve patient care and operational efficiency. This paper examines the applications of cloud computing in healthcare, including telemedicine, data storage, analytics, and integration with artificial intelligence for personalized treatment. Key benefits such as cost reduction, enhanced accessibility, and streamlined workflows are highlighted, alongside challenges like data privacy, regulatory compliance, and dependence on reliable network infrastructure. The study underscores the potential of cloud computing to modernize healthcare delivery while emphasizing the need for robust security frameworks to protect sensitive patient information. Insights from this research can guide healthcare organizations in adopting cloud solutions effectively and safely.

Keywords: *Cloud Computing, Healthcare Information Systems, Electronic Health Records (EHR), Telemedicine*

CA – 082

Artificial Intelligence in Healthcare

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Abstract

Artificial Intelligence ("AI") is transforming healthcare globally, and India is emerging as one of the most dynamic regions adopting this leading-edge technology. The advancements in AI have the potential to elevate patient care, streamline administrative processes and improve disease identification and also modification. With its huge and various population, India faces unique challenges in healthcare delivery, including access to quality care, a shortage of skilled healthcare providers, and the rising burden of chronic diseases. AI has the potential to address these challenges by improving the accuracy of diagnoses, enhancing treatment plans, streamlining administrative tasks, and making healthcare services more accessible to remote and underserved populations. The tasks posed by an aged population ,the increasing frequency of chronic diseases, and the escalating costs of healthcare are motivation governments, healthcare providers and consumers to search for advanced solutions and transform healthcare delivery models. The Covid-19 pandemic has forced the healthcare industry to implement large-scale changes by adding data-driven visions into patient care. The pandemic has also underlined the current shortages in the healthcare workforce and gaps in access to care. The growing availability of varied data types, such as genomics, economic, demographic, clinical, and phenotypic data, joint with advancements in mobile technology, computing capabilities, and data security has the potential to basically reform healthcare delivery models done AI-enhanced systems.

Keywords: *Diagnostics, Personalized Medicine, Drug Discovery, Clinical Efficiency, Robotics, Prognosis*

CA – 083

International of Blockchain and Cryptocurrencies

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Abstract

Blockchain technology has evolved into a secure, transparent, and decentralized digital system capable of managing data and supporting cryptocurrency transactions. This research examines the core components of blockchain, such as immutability, distributed consensus, and cryptographic verification, and explains how these features enhance trust and efficiency in digital financial environments. The study also reviews the increasing adoption of cryptocurrencies, highlighting their advantages including low transaction costs, global accessibility, and improved financial inclusion. Furthermore, the paper addresses key challenges such as scalability issues, regulatory barriers, and high energy consumption that hinder large-scale adoption. The analysis concludes that blockchain technology has significant potential to transform industries such as finance, supply chain management, and healthcare, provided that existing technical and policy-related challenges are effectively addressed. Overall, this research provides a comprehensive understanding of blockchain applications and outlines future opportunities for decentralized digital technology.

***Keywords**: Blockchain Technology, Cryptocurrencies, Distributed Ledger, Smart Contracts, Decentralization, Crypto-Economics, Digital Transactions, Security, Transparency, Consensus Mechanism, Financial Technology*

CA – 084

Building Cross-Platform Hybrid Mobile Applications Using Angularjs, Ionic Framework

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Abstract

The widespread use of smartphones has increased the need for efficient, affordable, and cross-platform mobile application development. Developing native applications separately for different platforms such as Android and iOS often increases development time, cost, and maintenance effort. This paper focuses on building hybrid mobile applications by integrating AngularJS with the Ionic Framework, enabling applications to run across multiple platforms using a single codebase. AngularJS supports structured and dynamic application development through features like two-way data binding, dependency injection, and modular design. The Ionic Framework enhances development by providing responsive UI components and access to native device features. This study analyzes the performance, usability, and maintainability of hybrid applications developed using AngularJS and Ionic, and compares them with native applications. The findings show that the combination of AngularJS and Ionic offers an effective, scalable, and cost-efficient approach for cross-platform mobile application development, making it suitable for both startups and large enterprises.

Keywords: *AngularJS, Ionic Framework, Hybrid Applications, Cross-Platform Mobile Development, Single Codebase, Mobile App Design, Web-Based Technologies, Performance Evaluation*

CA – 085

Classification in the Era of Deep Learning

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Abstract

Image classification has undergone a transformative shift with the emergence of deep learning, particularly convolutional neural networks (CNNs) and their advanced variants. Traditional machine learning approaches relied heavily on handcrafted features, limiting their ability to generalize across complex visual patterns. Deep learning, however, enables automatic feature extraction, hierarchical representation learning, and end-to-end optimization, resulting in unprecedented accuracy across large-scale datasets. Modern architectures such as ResNet, Inception, DenseNet, and Vision Transformers (ViTs) have further enhanced performance by addressing challenges like vanishing gradients, computational efficiency, and global context modeling. Advances in transfer learning, data augmentation, and self-supervised learning have made high-performance models accessible even with limited labeled data. Despite significant progress, challenges remain—including computational cost, model interpretability, and robustness to noise and adversarial attacks. Overall, deep learning continues to redefine image classification, enabling applications in healthcare, autonomous systems, surveillance, and real-time mobile vision.

Keywords: *Deep learning, Image Classification, Convolutional Neural Networks (CNNs), Transfer Learning, Vision Transformer(ViTs)*

CA – 086

Deep Learning-Based Cyber Attack Detection

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Abstract

The rapid expansion of networked systems, cloud computing, and digital services has increased the vulnerability of modern infrastructures to cyber-attacks. Traditional intrusion detection systems depend largely on rule-based and signature-based mechanisms, which are ineffective in identifying unknown and evolving attack patterns. This paper presents a deep learning-based cyber-attack detection approach that enhances network security by automatically learning complex features from network traffic data. The proposed framework utilizes deep neural networks to analyse both behavioural and temporal characteristics of network activities, eliminating the need for manual feature engineering. Standard intrusion detection datasets are used for training and evaluation, with preprocessing techniques applied to improve model performance and generalization. The effectiveness of the system is measured using accuracy, precision, recall, and F1-score metrics. Experimental results indicate that the deep learning-based model achieves higher detection accuracy and lower false alarm rates compared to traditional machine learning methods. The study demonstrates that deep learning techniques provide a scalable and adaptive solution for detecting both known and unknown cyber threats in dynamic network environments.

Keywords: *Deep Learning, Cyber Attack Detection, Intrusion Detection System, Network Security, CNN*

CA – 087

Agentic AI - Autonomous AI Agents for Modern Applications

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Abstract

Agentic Artificial Intelligence (AI) represents a major paradigm shift in modern software systems, enabling autonomous agents that can plan, reason, and execute multi-step tasks on behalf of users. Unlike traditional AI models that operate as passive responders, agentic AI systems integrate decision-making, tool usage, and environmental interaction, allowing them to automate complex workflows across domains such as customer service, education, software development, and healthcare. This paper explores the architecture, capabilities, and challenges of agentic AI, focusing on autonomous task decomposition, multi-modal reasoning, and tool-integrated execution. A prototype workflow-automation agent was implemented using a planning-and-execution framework to evaluate performance in real-world tasks. Initial results demonstrate that agentic AI significantly improves task completion accuracy and reduces manual effort, while raising important concerns related to reliability, safety, and error-handling. The findings highlight the growing relevance of agent-based systems and their potential to transform the next generation of intelligent applications.

***Keywords**: Agentic AI, Autonomous Agents, Task Automation, Reasoning Models, Workflow Automation*

CA – 088

Ethical Implications of Artificial Intelligence in Decision-Making Processes

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Abstract

Artificial Intelligence (AI) has become an integral component of modern decision-making processes across diverse domains such as healthcare, finance, governance, and human resource management. While AI-driven systems offer increased efficiency, consistency, and data-driven insights, their growing influence raises critical ethical concerns that cannot be overlooked. This paper examines the ethical implications of employing AI in decision-making processes, with particular emphasis on issues of fairness, transparency, accountability, and human autonomy. AI systems often rely on historical and large-scale datasets, which may embed societal biases and result in discriminatory outcomes. Moreover, the opaque nature of complex algorithms limits explain ability, making it difficult to justify or challenge automated decisions. The delegation of decision-making authority to AI also complicates responsibility attribution when adverse outcomes occur. Additionally, extensive data dependency introduces significant risks related to privacy and data misuse. This study argues that ethical decision-making in AI cannot be achieved solely through technological advancement but requires robust governance frameworks, human oversight, and value-driven design principles. By highlighting these ethical challenges, the paper emphasizes the necessity of responsible AI integration to ensure that automated decision-making aligns with societal values, legal standards, and human rights.

Keywords: *Artificial Intelligence; Ethical Decision-Making; Algorithmic Bias; Transparency; Accountability; Human Autonomy; Responsible AI*

CA – 089

Artificial Intelligence in Agriculture

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Abstract

Artificial intelligence (AI) is opening as aauthoritativeknowledge for improving the competence and sustainability of agricultural organizations. Theeducationpresents an AI-supported unindustrialized model that associations machine education, environmental sensing, and drone-based monitoring to provide accurate insights for crop management. The model estimates soil moisture, nutrient levels, crop growth patterns, and climatic variations to detect early signs of stress and recommend appropriate interventions. By processing continuous data streams, the system optimizes irrigation, reduces unnecessary input usage, and enhances the precision of disease identification. Field trials indicate that AI-assisted decision-making improves crop yield, minimizes resource wastage, and supports more stable production under changing environmental conditions. The results highlight that AI-enabled agriculture can significantly strengthen farm production and promote long-term sustainability transversely diverse farming landscapes.

Keywords: *Artificial Cleverness, Clever Agriculture, Machine Learning Applications, Care Farming, Crop One-to-one care, Sensor-Based Farming, Drone-Assisted Agriculture, Maintainable Crop Production, Analytical Decision Support, Agricultural Data Analytics*

CA – 090

A Machine Learning Model for Predicting Student Performance

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Abstract

Predicting scholar academic performance is a critical challenge for educational institution to enhance learning outcomes and provide timely support to students. This studying investigates the application of machine learning algorithms to forecast student performance using a combination of demographic, behavioral, and academic features. Several models, including Decision Trees, Random Forests, and Support Vector Machines, were implemented and compared based on performance metrics such as accuracy, precision, recall, and F1-score. There sults indicate that ensemble methods, particularly Random Forests, out perform individual classifiers in predicting student out comes. Feature importance analysis identifies key factors affecting performance, including previous grades, study habits, attendance, and parental involvement. These finding shighlight the potential of machine learning asapractical tool for early identification of at-risk students, enabling educators to design personalized interventions and improve overall academic success. The study contributes to the field of educational data mining by demonstrating how predictive analytics can be effectively applied to support data-driven decision-making in education. Performance metrics such as accuracy, precision, recall, and F1-scorewereused to compare the models, with ensemble methods, particularly Random Forests, achieving the best results. Analysis of feature importance revealed that prior academic achievement, study habits, attendance, and family support significantly influence student outcomes. The findings demonstrate that machine learning can serve as a practical tool for educators to identifyat-risk students, design targeted interventions, and enhance over all learning effectiveness.

Keywords: *Student Performance, Machine Learning, Prediction Educational, DataMining, Random Forest, SVM*

CA – 091

Climate Change and Its Local Impact

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Abstract

Climate change has emerged as one of the most critical global challenges of the twenty-first century, with its effects increasingly visible at the local and regional levels. This study examines how rising temperatures, unpredictable rainfall patterns, extreme weather events, and environmental degradation are influencing local ecosystems, livelihoods, and socio-economic conditions. The research highlights that climate change does not affect all regions equally; instead, its impact varies based on geographic location, population density, land-use patterns, and existing environmental vulnerabilities. In many local communities, changes in seasonal cycles have disrupted agricultural productivity, reduced water availability, increased the frequency of floods and droughts, and contributed to the loss of biodiversity. Additionally, climate-related stress has intensified health risks, migration patterns, and economic instability, particularly among vulnerable and low-income groups. Through a review of scientific literature, local climate data, and field-based observations, this paper emphasizes the urgent need for adaptive strategies such as sustainable resource management, climate-smart agriculture, improved disaster preparedness, and community-level awareness programs. The findings underscore that addressing climate change at the local scale is essential not only for protecting the environment, but also for ensuring long-term resilience, development, and human well-being.

Keywords: *Climate Change, Local Impact, Environmental Degradation, Global Warming, Extreme Weather Events, Vulnerability, Adaptation Strategies, Sustainable Development, Climate-Smart Agriculture, Community Resilience*

CA – 092

Ethical Hacking: A Proactive Approach to Cybersecurity and Threat Prevention

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Abstract

Ethical hacking is a proactive cybersecurity approach that focuses on identifying and fixing security weaknesses in computer systems, networks, and applications with the owner's authorization. It follows the same techniques used by malicious hackers, but its purpose is to strengthen security rather than cause harm. A key component of ethical hacking is penetration testing, where controlled attacks are simulated to evaluate how well an organization's defenses can withstand real cyber threats. The ethical hacking process involves multiple stages, including planning and reconnaissance, scanning through static and dynamic analysis, gaining and maintaining access, and finally analyzing the results. These stages help security professionals understand system vulnerabilities, assess potential damage, and implement effective countermeasures such as firewall and web application firewall configurations. Overall, ethical hacking plays a crucial role in preventing cyberattacks, protecting sensitive data, and improving the overall security posture of modern organizations.

Keywords: *Ethical Hacking, Penetration Testing, Vulnerability Assessment,Web Application Security, Threat Prevention*

CA – 093

Soil Health and Sustainability: An AI-Based Monitoring Approach

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Abstract

Soil health plays a vital role in ensuring sustainable agriculture and long-term food security. However, modern agricultural practices and human activities have led to serious soil problems such as erosion, contamination, compaction, and acidification, which reduce soil fertility and crop productivity. With the advancement of technology, artificial intelligence (AI) and smart monitoring systems offer effective solutions for maintaining and improving soil health. This paper focuses on AI-based soil monitoring techniques that use sensors, spectroscopy methods, remote sensing, satellites, and drones to collect and analyze real-time soil data. Intelligent soil analyzers help measure essential parameters such as moisture, temperature, pH, and nutrient levels, enabling farmers to make data-driven decisions. By adopting AI-powered soil monitoring and sustainable practices, farmers can improve irrigation management, enhance crop quality, increase productivity, and reduce dependency on external agricultural resources. Overall, the integration of AI in soil monitoring supports sustainable farming practices and contributes to a better and more secure future.

Keywords: *Soil Health, Artificial Intelligence, Soil Monitoring, Sustainable Agriculture, Smart Sensors, Precision Farming, Food Security*

CA – 094

Artificial intelligence and machine learning (AI/ML) in future

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Abstract

"Future Horizons: AI &ML Convergence Revolutionizing industries (2025-2030)". Artificial Intelligence (AI) and Machine Learning (ML) will drive transformation changes in automation, decision-making, and human-tech interaction by 2030. This paper explores trends, impacts, and a roadmap for responsible AI\ML adoption. This paper explores the symbiotic evolution of Artificial Intelligence (AI) and Machine Learning (ML) over the next decade, focusing on paradigm shifts in autonomous systems, hyper-personalization, and ethical governance. We analyse breakthroughs in Generative AI, Quantum ML, and Edge Intelligence, predicating transformative impacts on healthcare (predicting medicine), climate modelling and human-AI collaboration.

Keywords*: AI future, ML advancements, autonomous systems, ethical AI, quantum computing, edge AI, edge computing*

CA – 095

A study on mobile spam: types, effects and Prevention methods

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Abstract

In recent days, everyone uses a mobile phone. Along with their phone calls, messages, some peoples are receiving spam messages on their mobile. Spam means a unwanted messages, calls and links are sent without a permission. Mobile spamming is increasing in every year; many people's are affected by the unwanted messages and calls. Nowadays, mobile spamming is a common problem and many peoples and students are facing it every day. Mobile Spam is started when mobile numbers are easy to collect and misuse. Many people's cannot understand which messages are real and which message are fake. Types of Spam: Promotional Spam: These are unwanted advertisement messages like sales, offer, discount even if you are not asked them. Scam Messages: These are fake messages to cheat people or user. Spam Calls: These are repeated calls from unknown numbers, like telemarketing calls, spam call. Malicious links: These are the links that can visit to the harmful websites. Mobile scam leads to wastes times, leads to financial loss, steals personal information, affects phone performances, safety risks, etc., Mobile spam can be reduced by some safety steps: user avoid clicking the unwanted inks setting on phone helps to separate unwanted messages. Peoples should also avoid sharing their phone number in public places or on social media. People should also avoid sharing their phone number in public places or on social media.

Keywords: *Mobile Spam, Scam Messages, Spam Calls, Prevention Methods, Awareness*

CA – 096

An artificial intelligence powered framework for automated data analysis and smart decision making applications

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Abstract

The amount of data continues to grow faster than our ability to analyze it, making good decisions has become increasingly difficult. Human limitations and traditional analytical tools often slow down or distort the decision-making process. To address this challenge, this paper introduces an AI-based framework that automates data analysis and learns continuously from incoming data. Unlike static dashboards or fixed rule-based systems, the proposed approach adapts over time and aligns its learning with organizational goals. It provides clear, explainable insights and context-aware recommendations that help decision-makers act quickly and confidently. The framework can be applied across multiple domains, including healthcare, finance, industrial automation, and management, and experimental results show improvements in decision accuracy, insight quality, and reductions in human effort.

Keywords: *Decision Support Systems, Data Analytics, Adaptive Learning, Explainable AI, Automated Decision-Making*

CA – 097

AxiomShift Cybernetic Apex: Resolver

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Abstract

The rapid evolution of digital technologies has intensified the demand for innovative frameworks that seamlessly integrate creativity and computation. Axiom Shift Cybernetic Apex: Resolver explores a conceptual and practical approach to building intelligent, scalable, and efficient software systems that transform abstract ideas into functional digital solutions. The study emphasizes the fusion of algorithmic design, data driven logic, and structured programming methodologies to create adaptable and reliable applications. By focusing on modular development, optimization techniques, and maintainable code structures, the proposed approach enhances performance while ensuring clarity and reusability. The framework highlights how thoughtful code architecture can illuminate complex problem spaces, enabling developers to translate conceptual "axioms" into executable logic. Experimental observations and case based evaluations demonstrate that structured coding practices significantly improve system reliability, development efficiency, and long term scalability. The findings underscore the importance of disciplined programming paradigms in modern computing environments.

Keywords: *Code architecture, optimization, scalability, modular design, programming frameworks*

CA – 098

Zero-Echo Quantum Lattice Optimizer (ZEQLO)

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Abstract

A Revolutionary Approach to Optimizing Complex System the Zero-Echo Quantum Lattice Optimizer (ZEQLO) is a cutting-edge technology that represents a paradigm shift in the optimization of complex systems. At its core, ZEQLO is a sophisticated algorithmic framework that leverages the principles of quantum mechanics and lattice theory to optimize complex systems, minimizing echo and maximizing efficiency. The term "Zero-Echo" refers to the optimizer's ability to eliminate resonant frequencies and noise, creating a frictionless environment that enables systems to operate at peak performance. The "Quantum Lattice" aspect of ZEQLO refers to the optimizer's use of a quantum-inspired lattice structure to model complex systems. This lattice structure allows ZEQLO to capture the intricate relationships between variables, identifying patterns and correlations that would be impossible to detect using traditional optimization techniques. By applying quantum-inspired optimization algorithms to this lattice structure, ZEQLO is able to identify the optimal configuration of the system, minimizing energy expenditure and maximizing overall performance. One of the key benefits of ZEQLO is its ability to optimize complex systems in real-time, adapting to changing conditions and disturbances in the environment. This is achieved through the use of advanced machine learning algorithms, which enable ZEQLO to learn from experience and adjust its optimization strategy accordingly. As a result, ZEQLO is able to optimize systems that were previously considered too complex or dynamic to be optimized using traditional methods.

Keywords: *Optimization, Complex systems, Quantum mechanics, Lattice theory, Algorithmic framework, Efficiency*

CA – 099

Photonix Agile Synthesis Prize Matrix

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Abstract

The Photonix Agile Synthesis Prize Matrix is a cutting-edge framework that combines the principles of photonics, agile methodologies, and matrix-based problem-solving to drive innovation and accelerate progress in complex, rapidly evolving environments. This powerful tool is designed to help organizations navigate the challenges of uncertainty and disruption, leveraging the speed and agility of photonics to synthesize diverse inputs and generate breakthrough solutions. At its core, the Photonix Agile Synthesis Prize Matrix is a flexible, adaptive structure that integrates multiple disciplines and perspectives, fostering cross-functional collaboration and co-creation. By applying the principles of photonics, this matrix enables teams to harness the power of light-speed information exchange, facilitating seamless communication and rapid iteration. The "Agile synthesis" component emphasizes the importance of swift, iterative progress, encouraging teams to rapidly prototype, test, and refine their ideas. The "Prize Matrix" element of this framework is outcomes-driven, focusing on rewarding innovative leaps and significant gains rather than incremental improvements. This approach incentivizes teams to push boundaries, take calculated risks, and strive for transformative outcomes. By leveraging the Photonix Agile Synthesis Prize Matrix, organizations can unlock new levels of creativity, innovation and productivity, turning challenges into opportunities and achieving unprecedented success in their respective fields.

Keywords: *Photonics, Agile methodologies, Matrix-based problem-solving, Innovation, Complex environments*

CA – 100

Lumina Foundry: Forging Light in Code

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Abstract

The rapid evolution of digital technologies has intensified the demand for innovative frameworks that seamlessly integrate creativity and computation. Lumina Foundry: Forging Light in Code explores a conceptual and practical approach to building intelligent, scalable, and efficient software systems that transform abstract ideas into functional digital solutions. The study emphasizes the fusion of algorithmic design, data-driven logic, and structured programming methodologies to create adaptable and reliable applications. By focusing on modular development, optimization techniques, and maintainable code structures, the proposed approach enhances performance while ensuring clarity and reusability. The framework highlights how thoughtful code architecture can illuminate complex problem spaces, enabling developers to translate conceptual "light" into executable logic. Experimental observations and case-based evaluations demonstrate that structured coding practices significantly improve system reliability, development efficiency, and long-term scalability. The findings underscore the importance of disciplined programming paradigms in modern computing environments.

Keywords: *Code architecture, optimization, scalability, modular design, programming frameworks*

CA – 101

The Effect of Loss Functions on Denoising and Reconstructing Sinograms Based on Deep Learning Methodologies

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Abstract

Sinograms, which represent the raw projection data in computed tomography (CT), are highly susceptible to noise due to low-dose acquisition and hardware limitations. Deep learning has emerged as a powerful tool for sinogram denoising and reconstruction, yet the performance of these models is strongly influenced by the choice of loss function used during training. This study investigates the effect of various loss functions—including L1, L2, SSIM, adversarial, and hybrid combinations—on the accuracy, structural fidelity, and noise-reduction capability of deep learning–based sinogram restoration. Experimental analysis demonstrates that while traditional pixel-wise losses such as L2 yield oversmoothed outputs, structure-aware losses like SSIM significantly improve edge preservation and fine-detail recovery. Adversarial losses further enhance high-frequency detail but may introduce artifacts if not combined with pixel-wise terms. Hybrid loss functions, particularly L1 + SSIM, provide the most balanced performance, producing denoised sinograms that lead to superior CT reconstructions with higher diagnostic quality. The findings highlight the critical role of loss function design in optimizing deep learning models for sinogram denoising and reconstruction.

Keywords: *Sinogram denoising, CT reconstruction, deep learning, loss functions, hybrid loss*

CA – 102

Real Time Analytics for Smart Cities

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Abstract

Smart Cities aim to improve the quality of urban life by using advanced technologies to manage resources efficiently and deliver better public services. Real Time Analytics plays a vital role in Smart Cities by collecting, processing, and analyzing data instantly from various sources such as IoT sensors, traffic cameras, smart meters, social media, and public infrastructure. This real-time data analysis helps city authorities make faster and more accurate decisions. Applications include traffic management, energy optimization, waste management, public safety, environmental monitoring, and emergency response systems. By enabling timely insights and predictive analysis, Real Time Analytics reduces operational costs, improves sustainability, and enhances citizen satisfaction. The integration of cloud computing, big data platforms, and artificial intelligence further strengthens smart city systems, making cities more responsive, intelligent, and resilient.

Keywords: *Real Time Analytics, Smart Cities, Internet of Things (IoT), Big Data, Cloud Computing, Artificial Intelligence, Urban Management, Data-Driven Decision Making*

CA – 103

Detecting Fake News on Social Media Using Artificial Intelligence

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Abstract

Social media platforms play a major role in spreading information in today's digital society. People rely on these platforms for news, updates, and opinions. However, the rapid and uncontrolled spread of fake news has become a serious challenge, leading to misinformation, loss of public trust, and social misunderstanding. Since millions of posts, articles, and messages are shared every second, manually verifying the authenticity of news content is time-consuming and impractical. This situation creates a strong need for an automated and intelligent system to detect fake news efficiently. This project proposes an Artificial Intelligence (AI)–based fake news detection system that uses Natural Language Processing (NLP) and machine learning techniques to analyze social media content. The system follows a systematic approach that includes data collection from online sources, text preprocessing, a feature extraction, and classification. During the preprocessing stage, the text data is cleaned and standardized using techniques such as tokenization, lemmatization, and stop-word removal to improve data quality and reduce noise. Meaningful features are then extracted using methods like Term Frequency–Inverse Document Frequency (TF-IDF) and word embeddings to capture both word importance and contextual information. The AI-based fake news detection system provides a practical and scalable solution to reduce the spread of misinformation on social media platforms. It can assist users, content moderators, and social media organizations in identifying unreliable information, thereby encouraging the sharing of accurate and trustworthy content and improving overall digital awareness.

Keywords: *Natural Language Processing, Support Vector Machine (SVM), Long Short-Term Memory (LSTM), Bidirectional Encoder Representations from Transformers (BERT)*

CA – 104

Crime Detection and Alert System

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Abstract

The rapid growth of urban populations and the increasing complexity of criminal activities have created a technological framework designed to detect, analyze, and respond to criminal activities as they pressing need for intelligent, automated security solutions. A Real-Time Crime Detection and Alert System is an advanced occur. By integrating technologies such as computer vision, machine learning, artificial intelligence, Internet of Things (IoT), and real-time data processing, the system continuously monitors environments through surveillance cameras and sensors. It identifies suspicious behaviors, weapons, violence, intrusions, or abnormal activities and instantly generates alerts for law enforcement agencies, security personnel, or relevant authorities. This system aims to reduce human dependency in monitoring, minimize response time, enhance public safety, and improve crime prevention efficiency. The solution is applicable in smart cities, public transport systems, banks, shopping malls, campuses, and residential areas. By providing accurate, timely alerts and actionable insights, the Real-Time Crime Detection and Alert System plays a crucial role in proactive policing and crime management.

Keywords: *Artificial Intelligence, Machine Learning, Computer Vision, Deep Learning, Internet of Things, Cloud Computing, Big Data Analytics*

CA – 105

Cyber Physical Systems Security (IoT, Smart Cities)

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Abstract

Cyber physical System (CPS) securing the deep integration of digital computation with physical city processes (like traffic, energy, water) via IoT devices, facing unique challenges like physical vulnerabilities, legacy systems, and IT/OT conflicts, requiring robust security from design to lifecycle to prevent disruptions, safety risks, and privacy breaches, enabling secure smart city functions. CPS in Smart Cities & IoT Integration: Smart cities are built on CPS, using IoT for data collection (sensors, smart meters) and control (smart grids, autonomous transport). Cyber & Physical Link: CPS emphasizes real-time feedback loops where digital data controls physical elements, unlike general IoT which focuses more on just connectivity. Examples: Smart grids, intelligent transportation, automated waste management, connected public safety systems. Smart cities are enabled by cyber physical systems (CPS), which involve connecting devices and system such as Internet of Things (IoT) technologies of in fundamentally new ways.

Keywords: *Data collection, sensors, securing the deep integration, physical vulnerabilities, Safety risks*

CA – 106

Future Scope of Artificial Intelligence and Machine Learning

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Abstract

Artificial Intelligence (AI), Machine Learning (ML),and Deep Learning(DL),all are concerned with making intelligent systems. These are becoming a need in our daily life. These systems make it possible for systems to process data efficiently and perform tasks with intelligence. This research work investigates the application and implications of AI, ML, and DL. The aim of this research is to clearly define the overall concept of AI, ML, and DL. It includes learning how machines learn from experiences. The role of these systems in modern applications is also shed light on. The research draws conclusions from literature, collecting research from various research papers/articles on modern AI, ML, DL systems such as supervised, unsupervised, Reinforcement learning, etc. The proposed methodology includes studying instances that highlight the application of AI, ML, DL systems. The findings clearly state that AI, ML systems are significantly successful in applications such as image, language, decision-making systems. Workload reduction through automation automation is also a result. The overall performance of systems is improved. They make it possible to efficiently manage huge amounts of data. A significant impact on technological development is generated by AI, ML systems. Their impact is bound to increase in the future. A lot has to be done to make use of the full potential of AI, ML systems.

Keywords: *Machine Learning, Supervised, Unsupervised, Reinforcement, Decision Making*

CA – 107

Two-Factor Key Authentication Process for Cloud

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Abstract

Server storage is one of the most successful window-based applications, since it provides the huge data sharing demand. To protect the confidentiality of the shared data, the cryptographic schemes are usually applied. The security of cryptographic schemes stem from the security of underlying cryptographic key. Currently, the cryptographic key is simply stored in the computer in most of existing cryptographic schemes. Existing approach reported that the stored keys can be revealed by some viruses. To deal with the key exposure problem, many techniques have been proposed. However, the data protection is still posing significant challenges in cloud storage for data sharing. To solve the problems of existing system, here integrate the Keystroke Authentication and the Biometric Password system to remove the use of PKE and the storage of security device's secret in the key generation center while solving key exposure and revocation problems and supporting fine-grained access control.

Keywords: *Cloud Storage, Two-Factor Authentication, Keystroke Dynamics, Biometric Authentication, Cryptographic Key Security, Key Exposure Prevention, Fine-Grained Access Control*

CA – 108

AI Powered Personal Assistant in Education

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Abstract

Artificial Intelligence (AI) has become a transformation force in the education sector, enhancing the way students learn and teachers teach. An AI powered personal assistant in education is an intelligent system designed to support learners by providing personalized guidance instant feedback, and adaptive learning resource, these assistants use machine learning, natural language processing, and data analytics to understand student behaviour learning pace, and preferences. AI personal assistants can help students with tasks such as answering academic queries, recommending study materials, scheduling reminders, tracking progress, and offering real-time tutorial support for educators, they reduce administrative workload by automating grading, attendance, and performance analysis. This technology promotes self-paced learning, improved engagement, and ensures inclusive education by supporting diverse learning heads. Despite challenges related to data privacy, ethical concerns, and system reliability, AI powered personal assistants hold great potential to revolutionize education by making more efficient, accessible, and student centered.

Keywords: *Artificial Intelligence, personal assistants, Education technology, Machine Learning, Natural language processing, personalized learning, Intelligence tutoring system, System engagement, Adaptive learning*

CA-109

Enhancing Cybersecurity Measures in Cloud ComputingEnvironments

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Abstract

Cloud computing has revolutionized the way organizations manage and deploy their IT infrastructure. However, ensuring the security and integrity of cloud-based systems remains a major concern. This study explores the current state of cybersecurity measures in cloud computing environments, highlighting key vulnerabilities and proposing effective countermeasures. We examine the role of artificial intelligence and machine learning in enhancing cloud security, and discuss the importance of implementing robust access controls, encryption mechanisms, and incident responsestrategies. Our research aims to provide a comprehensive framework for BCAstudents and IT professionals to design and implement secure cloud computing solutions.

Keywords: *Cloud Computing, Cybersecurity, Artificial Intelligence, Machine learning access control*

CA-110

AI-Powered Smart Attendance System using Facial Recognition

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Abstract

This project aims to develop a smart attendance system using facial recognition technology, leveraging artificial intelligence and machine learning algorithms. The system captures and processes images of students, detects faces, and marks attendancein real-time. It also integrates with a database to store attendance records and provides automated notifications to parents and teachers. The proposed systemenhances accuracy, reduces manual effort, and promotes a paperless environment.It captures and processes images, detects faces, and marks attendance in real-time. The systemintegrates with a database to store records and provides automated notifications toparents and teachers. It enhances accuracy, reduces manual effort, and promotes a paperless environment.

Keywords: *Facial Recognition, Artificial Intelligent*

CA-111

Brain Computer Interface with Deep Learning

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Abstract

The integration of Brain–Computer Interfaces (BCIs) with deep learning techniques has revolutionized the interpretation of neural signals for direct communication between the human brain and external devices. Traditional signal processing and feature extraction methods often struggle with the high dimensionality, noise, and variability of electroencephalography (EEG) and other neuro physiological data. Deep learning, particularly convolutional neural networks (CNNs), recurrent neural networks (RNNs), and transformer-based architectures, enables the automatic extraction of discriminative spatial–temporal features from raw brain signals, significantly improving classification accuracy and robustness. This synergy has accelerated advancements in diverse applications such as neuroprosthetic control, motor imagery recognition, cognitive workload monitoring, and neural rehabilitation. Furthermore, end-to-end deep BCI models reduce the reliance on handcrafted features and adapt effectively to user-specific neural patterns through transfer learning and domain adaptation. This paper explores the state-of-the-art developments in deep learning–based BCIs, highlighting architectural trends, challenges in generalization and interpretability, and emerging directions toward real-time, adaptive, and personalized brain–machine interfaces.

Keywords: *Brain–computer interfaces, deep learning, electroencephalography, convolutional neural networks, recurrent neural networks, transfer learning, neural signal processing*

CA-112

Artificial Intelligence in Healthcare

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Abstract

One area of computer science that can analyze complex medical records is artificial Intelligence. In many medical scenarios, their ability to utilize meaningful dating within a records Set can be applied to diagnosis, treatment, and outcome prediction. Techniques. The terms" synthetic intelligence" and "neural networks (laptop)" have been used in Medline and online Searches. Additionally, references were obtained by cross-referencing important articles. This Paper evaluates important medical applications and provides an overview of various synthetic intelligent strategies. Consequences: Almost every branch of medicine has investigated the potential of artificially intelligent strategies. Even though various synthetic shrewd strategies, such as fuzzy expert systems, evolutionary computation, and hybrid shrewd structures, synthetic neural networks were the most commonly used analytical tool.

Keywords: *Machine learning, artificial intelligence, healthcare, technology, patients, cardiology*

CA-113

Blockchain Security

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Abstract

Blockchain security employs cryptography, decentralization, and consensus mechanisms to protect data from unauthorized alteration. By distributing the ledger across multiple nodes, blockchain ensures integrity, transparency, and immutability, making unauthorized modifications extremely difficult. Cryptographic hashing, along with public–private key encryption and consensus mechanisms such as mining and staking, is used to validate transactions and securely link blocks, thereby creating a verifiable and tamper-resistant record without reliance on a central authority. Despite these strengths, blockchain systems may still face vulnerabilities in smart contracts, user key management, and network protocols. As a result, effective security requires robust cybersecurity practices, including secure private key protection, careful avoidance of coding flaws, and defenses against threats such as 51% attacks.

Keywords: *Blockchain security, cryptography, decentralization, consensus mechanisms, smart contracts, private key management, 51% attack, distributed ledger technology*

CA-114

Fog Computing and Iot for Real-Time Decision Making

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Abstract

The rapid proliferation of the Internet of Things (IoT) has resulted in an unprecedented volume of sensor-generated data, creating significant challenges in latency, bandwidth, and scalability for traditional cloud-based architectures. Fog computing emerges as a distributed paradigm that extends cloud capabilities to the network edge, enabling localized data processing and analysis closer to IoT devices. This integration facilitates real-time decision making by reducing communication delays, enhancing data privacy, and optimizing network resources. Through intelligent task allocation among fog nodes and IoT devices, critical applications such as smart healthcare, autonomous vehicles, and industrial automation can respond dynamically to time-sensitive events. Moreover, the synergy of fog computing with artificial intelligence and machine learning models allows for predictive analytics and context-aware computing at the edge. This paper explores the architecture, mechanisms, and performance benefits of fog-enabled IoT systems, highlighting their potential to transform latency-sensitive domains into autonomous, adaptive, and efficient ecosystems.

Keywords: *Fog computing, Internet of Things, edge computing, real-time decision making, low-latency systems, task offloading, intelligent IoT systems*

CA-115

Cloud-network synergy for 5g and 6g: enabling intelligent, scalable, and low-latency communication systems

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Abstract

The integration of cloud computing with advanced network technologies is essential for 5G and emerging 6G systems. 5G uses cloud-native architectures, edge computing, and virtualization technologies such as NFV and SDN to provide low latency, high data rates, and massive connectivity. Cloud platforms enable scalable resource allocation and flexible service delivery.In 6G, the convergence of AI-enabled cloud systems and distributed edge intelligence will support real-time processing and advanced applications such as holographic communication, autonomous systems, and massive IoT. While this integration offers significant benefits, challenges related to privacy, energy efficiency, and network complexity must be addressed. Overall, cloud–network synergy is key to future intelligent communication networks.

Keywords: *Edge Computing, Network Function Virtualization(NFV), Software Defined Networking(SDN), Low Latency*

CA-116

Enhancing Customer Experience in Banking Through AI Technologies

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Abstract

Artificial Intelligence (AI) is transforming the banking industry by enhancing efficiency, decision-making, and customer experience. By leveraging technologies such as machine learning, natural language processing, and predictive analytics, banks can automate processes, reduce errors, and provide personalized financial services. AI applications include fraud detection, credit risk assessment, regulatory compliance, and 24/7 customer support through chatbots and virtual assistants. While challenges like data privacy, high implementation costs, and ethical concerns exist, AI continues to drive innovation, operational efficiency, and competitive advantage in the banking sector. Building on these advancements, banks are increasingly exploring AI-driven investment strategies and wealth management solutions. By analyzing vast amounts of market data and customer behavior, AI can provide personalized investment advice, portfolio optimization, and risk management tailored to individual clients. Additionally, AI-powered sentiment analysis enables financial institutions to gauge market trends, customer feedback, and public perception in real time, allowing for more informed strategic decisions.

Keywords: *Chatbots, Virtual Assistants, Natural Language Processing, Customer Support, Personalization, AI in Banking*

CA-117

Modern Network Security: Trends, Challenges, And Ai-Driven Solutions

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Abstract

Network security protects computer networks and data from unauthorized access, attacks, and misuse. With the rise of internet communication, cloud services, and IoT devices, networks face threats like malware, ransomware, phishing, DoS attacks, and insider threats.To ensure confidentiality, integrity, and availability, network security uses tools such as firewalls, IDS/IPS, VPNs, encryption, and access control.Modern security also uses AI and ML for detecting anomalies and responding to threats in real time. New trends like Zero Trust Architecture (ZTA), SDN, and blockchain are improving defense mechanisms.Despite this, challenges like evolving cyberattacks, complex networks, and diverse devices continue to cause risks.

Keywords: *Cyber Threats, Zero Trust Architecture, Encryption*

CA-118

Role of AI and Machine Learning in Medical Imaging for Early Disease Detection

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Abstract

Artificial Intelligence (AI) and Machine Learning (ML) are transforming healthcare by using large-scale data such as EHRs, medical images, sensor records, and genomics. These technologies improve diagnostic accuracy, especially in detecting cancer, heart diseases, neurological disorders, and infections. Deep learning models like CNNs enhance X-ray, CT, and MRI image interpretation.AI also supports personalized treatment planning and accelerates drug discovery by identifying potential drug candidates faster. Virtual assistants, chatbots, and remote monitoring systems improve patient care and accessibility.Key challenges include data privacy, ethical concerns, algorithmic bias, and the need for transparent and explainable AI. With proper regulations and high-quality datasets, AI and ML can enable predictive, efficient, and patient-centered healthcare systems.

Keywords: *Convolutional Neural Networks (CNNs), Medical Imaging, Electronic Health Records (EHRs), Personalized Medicine, Data Privacy and Ethics*

CA-119

IOT: Internet of Things in Smart Cities

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Abstract

The Internet of Things (IoT) is a transformative technology driving the evolution of traditional urban environments into smart, efficient, and sustainable cities. By connecting sensors, devices, and networks, IoT enables real-time monitoring, data collection, and intelligent decision-making across urban infrastructure. In smart cities, IoT applications include traffic and parking management, environmental monitoring, waste management, energy-efficient street lighting, and public safety systems. These systems leverage cloud and edge computing to process large volumes of data, enabling predictive analytics and automated responses that improve efficiency and quality of life for citizens. The integration of IoT with 5G and emerging 6G networks provides ultra-low latency, high-speed connectivity, and massive device support, which are essential for large-scale urban deployments. Despite its potential, IoT in smart cities faces challenges such as data privacy, cyber security, interoperability, and high infrastructure costs. Addressing these challenges through robust security protocols, standardization, and scalable architectures is critical for successful implementation.

Keywords: *Smart Cities, Urban Infrastructure, Cloud Computing, 5G Networks, 6G Networks, Data Analytics, Cyber security*

CA-120

Machine Learning Technique for Mobile Devices

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Abstract

The rapid growth of mobile devices has increased the demand for intelligent applications that can operate efficiently under limited computational power, memory, and energy constraints. Machine learning techniques for mobile devices focus on enabling accurate and real-time data processing while preserving privacy and reducing latency. Approaches such as on-device learning, federated learning, and edge computing allow models to perform inference directly on smart phones without relying heavily on cloud servers. Lightweight deep learning models, including Mobile Net and Efficient Net-Lite, along with model optimization techniques such as quantization, pruning, and knowledge distillation, make machine learning feasible on resource-constrained devices. Additionally, transfer learning and context-aware learning enable mobile systems to adapt to user behavior and environmental changes. These techniques collectively support a wide range of mobile applications, including image recognition, speech processing, activity recognition, and personalized recommendations, making machine learning an essential component of modern mobile computing.

Keywords: *Machine Learning, Mobile Devices, Federated Learning, Edge AI, Lightweight Models, Transfer Learning, Context-Aware Computing*

CA - 121

Reimagining Cyber Defense with Large Language Models: Opportunities and Risks

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Abstract

The emergence of Large Language Models (LLMs) has introduced powerful new capabilities into the cyber security landscape, offering transformative potential for threat detection, incident response, and security automation. This paper explores how LLMs can be leveraged to enhance cyber defense through intelligent log analysis, automated threat intelligence generation, anomaly detection, and real-time decision support. By integrating LLM-driven reasoning with traditional security frameworks, organizations can achieve faster detection of complex attack patterns and improved response coordination. However, the adoption of LLMs also presents considerable risks, including susceptibility to adversarial manipulation, model hallucinations, data privacy concerns, and the potential misuse of generative models for crafting sophisticated cyber attacks. Through a comprehensive analysis of current research, system prototypes, and real-world use cases, this work examines both the opportunities and limitations of deploying LLMs in critical security infrastructures. The study concludes by outlining mitigation strategies, responsible-AI principles, and future research directions necessary to ensure that LLM-enabled cyber defense systems remain robust, trustworthy, and resilient.

Keywords: *LLM, Model Hallucinations, Cyber security, Cyber Defense*

CA - 122

AI in Life Sciences: Emerging Applications and Trends in Biochemical Research

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Abstract

In the life sciences, artificial intelligence (AI) has become a game-changing tool that allows for sophisticated biological data processing, prediction, and interpretation. Drug discovery and therapy development in biochemistry are being greatly accelerated by AI-driven techniques like machine learning and deep learning, which are transforming protein structure prediction, enzyme optimization, and biomolecular interaction investigations. Systems-level knowledge of biological processes and disease pathways has been made possible by the integration of AI with multi-omics datasets, such as proteomics, metabolomics, and genomics. High-throughput testing and automation driven by AI have also improved laboratory productivity, repeatability, and decision-making. New developments like explainable AI, multimodal learning, and hybrid computational models are tackling ethical and legal issues while enhancing model transparency and dependability. All things considered, AI is changing the living sciences by moving biochemical research away from descriptive analysis and toward predictive and design-oriented frameworks, creating new opportunities for sustainable biotechnology, precision medicine, and diagnostics.

Keywords: *AI, Life Sciences, Machine Learning, Multi-Omics, Drug Discovery*

CA - 123

An Intelligent Approach for Anomaly Detection Using Machine Learning Techniques

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Abstract

Rapid growth of digital systems and networked applications, detecting abnormal behavior in large-scale data has become a critical challenge in computer science. Traditional rule-based and signature-based methods often fail to identify unknown or evolving anomalies due to their static nature. This paper presents an intelligent approach for anomaly detection using machine learning techniques that can adapt to dynamic environments and complex data patterns. The proposed approach focuses on leveraging supervised and unsupervised learning models to identify deviations from normal system behaviour with improved accuracy and reduced false alarm rates. The study highlights the effectiveness of algorithms such as Support Vector Machines, k-Means clustering, and Random Forests in analyzing high-dimensional datasets. Feature selection and data preprocessing play a significant role in enhancing model performance and scalability. Experimental observations indicate that machine learning-based anomaly detection systems outperform traditional techniques, particularly in handling large and heterogeneous datasets. This work emphasizes the importance of intelligent data-driven solutions in modern computing environments, including cybersecurity, network monitoring, and fault detection systems. The findings demonstrate that integrating machine learning techniques can significantly improve detection efficiency and robustness, contributing to the development of secure and reliable computing infrastructures.

Keywords: *Anomaly Detection, Machine Learning, Data Mining, Cyber security, Intelligent Systems*

CA-124

Deep Neural Network Approaches for Medical Image Understanding

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Abstract

Medical image analysis plays a crucial role in the early detection, diagnosis, and treatment of diseases. With the rapid growth of medical imaging technologies such as X-rays, MRI, CT scans, and ultrasound, analyzing large volumes of image data has become a challenging task for healthcare professionals. Deep Learning techniques, especially Convolutional Neural Networks (CNNs), have shown significant success in automatically extracting meaningful features from medical images and performing accurate classification, detection, and segmentation tasks. This paper presents an overview of deep learning–based approaches for medical image analysis, highlighting their applications in disease diagnosis, tumor detection, organ segmentation, and anomaly identification. By reducing human error and improving diagnostic accuracy, deep learning models assist doctors in making faster and more reliable clinical decisions. The integration of deep learning with medical imaging systems enhances healthcare efficiency, supports early disease detection, and contributes to improved patient outcomes.

Keywords: *Medical Image Analysis, Deep Learning, Convolutional Neural Networks (CNN), Healthcare, Disease Diagnosis, Image Classification, Image Segmentation*

CA-125

An Intelligent Framework for Secure and Efficient Big Data Analytics in Distributed Cloud Environments

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Abstract

The exponential growth of data generated by cloud services, Internet of Things (IoT) devices, and large-scale enterprise applications has intensified the demand for secure, efficient, and scalable Big Data analytics solutions. Distributed cloud environments offer elastic computational resources; however, they introduce critical challenges related to data security, privacy, performance optimization, and dynamic resource management. This paper proposes an intelligent framework for secure and efficient Big Data analytics in distributed cloud environments by integrating machine learning–based resource optimization with advanced security mechanisms. The proposed framework dynamically allocates computing resources based on workload characteristics while ensuring data confidentiality and integrity through encryption, access control, and secure data distribution techniques. A distributed analytics model is employed to enhance parallel processing and fault tolerance across cloud nodes. Experimental evaluation using large-scale datasets demonstrates that the proposed framework significantly improves processing efficiency, reduces latency, and enhances security compared to traditional cloud-based Big Data architectures. The results indicate that intelligent, security-aware resource management is a promising direction for next-generation Big Data analytics in distributed cloud infrastructures.

Keywords: *Big Data Analytics, Cloud Computing, Distributed Systems, Machine Learning, Data Security*

CA-126

House Pricing Prediction Using AI and Data Science

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Abstract

House price prediction using Artificial Intelligence and Data Science helps in estimating property prices based on various factors. The system uses past housing data such as location, house size, number of rooms, and facilities to analyse price trends. Data science methods are applied to prepare and organize the data, and machine learning models are used to predict house prices. This model provides accurate price estimates and supports buyers, sellers, and real estate companies in making informed decisions. The system is efficient, reliable, and reduces the chances of pricing errors. historical housing data such as location, area, number of bedrooms, and amenities are collected and analysed. Data science techniques are used to clean and process the data, while machine learning algorithms are applied to build a prediction model. The system learns from past data and predicts house prices for new inputs.

Keywords: *Efficient, Reliable, Amenities, High Accuracy, Machine learning, data science*

CA-127

Predicting Crop Yield with Machine Learning Algorithms

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Abstract

Agriculture is the foundation of India's economy since more than half of its people rely on it for their livelihood. Machine learning (ML) is important because it provides a Crop Yield Prediction (CYP) decision assistance system that helps with Choosing which crops to plant and how to spend the growing season The current paper deals with a comprehensive review that extracts and synthesizes the features used for CYP, in addition to other ways developed to investigate agricultural yield prediction utilizing artificial intelligence approaches. The neural network's primary disadvantages are reduced relative error and decreased crop yield forecast effectiveness. In a similar vein, supervised learning techniques struggled to understand the nonlinear relationship between input and output variables while selecting, grading, or sorting fruits. A precise and efficient model for crop classification, including crop yield estimation based on weather, crop disease, crop classification based on growing phase, etc., was the goal of the many research proposed for agricultural development. This paper provides a comprehensive assessment of the accuracy of numerous machine learning techniques used in agricultural production estimation.

Keywords: *Machine learning, Agriculture, Crop Yield Prediction (CYP), Neural Networks*

CA-128

Classifying Images Using Support Vector Machines and Feature Extraction Methods

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Abstract

A key job in computer vision, image categorization has applications in fields like object detection, surveillance, and medical imaging. An image classification system based on Support Vector Machines (SVM) and efficient feature extraction techniques is presented in this paper. Discriminative features are retrieved from photos to capture key visual elements including texture, shape, and intensity patterns rather than depending on raw pixel values. The capacity of feature extraction methods such as statistical descriptors, Local Binary Patterns (LBP), and Histogram of Oriented Gradients (HOG) to describe visual information is assessed. To obtain reliable accuracy in classification, a Support Vector Machine (SVM) classifier with suitable kernel functions is trained using the collected features. Results from experiments show that the suggested method maintains computing efficiency while offering good accuracy and generalization capacity. The paper emphasizes the significance of kernel optimization and feature selection in enhancing SVM-based image classification, which makes the suggested approach appropriate for applications with constrained processing power and training data.

Keywords: *Image classification, Support Vector Machine (SVM), Feature Extraction, Histogram of Oriented Gradients (HOG), Local Binary Patterns (LBP), Statistical Feature Extraction, Kernel Optimization, Computer Vision, Machine Learning*

CA-129

Management Practices in the Future Role of Artificial Intelligence (AI) and Automation

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Abstract

The rapid advancement of Artificial Intelligence (AI) and automation is significantly reshaping future management practices across organizations. Traditional management functions such as planning, organizing, decision-making, and control are increasingly supported by intelligent systems capable of analyzing large volumes of data and automating routine processes. AI enables data-driven and predictive decision-making, while automation enhances operational efficiency, accuracy, and productivity. These technologies allow managers to shift their focus from repetitive administrative tasks to strategic planning, innovation, and people-oriented leadership. Despite the numerous benefits, the adoption of AI and automation also presents, ethical concerns, data security issues, and the need for continuous skill development. This article examines the role of AI and automation in future management practices, highlights their benefits and challenges, and emphasizes the importance of developing new managerial competencies to effectively lead in a technology-driven environment. This article explores the evolving role of managers as organizations transition from human-centric hierarchies to integrated human-agent ecosystems. Key findings suggest that while automation significantly enhances operational efficiency and data-driven decision-making, it simultaneously introduces complex challenges in algorithmic governance, ethical accountability, and employee psychological safety. The article concludes that the future of management lies in a "Human-Centered Automation" model, where leaders prioritize high-level strategic judgment and emotional intelligence to navigate an increasingly autonomous business landscape.

Keywords: *Artificial Intelligence (AI), Automation, Future Management Practices, Digital Transformation, Decision-Making, Predictive Analytics, Organizational Efficiency, Human–Machine Collaboration*

CA-130

Achieving the Goals of Next-Generation Software Engineering By Automating, Learning, And Sustaining

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Abstract

Traditional software engineering methods, which are mainly manual, reactive, and short-term focused, have basic limits that are being showed by the quick development of large-scale, distributed and data intensive software system. In order to maintain high standards of quality, dependability, security and sustainability, modern software systems must constantly evolve. Next Generation Software Engineering (NGSE) was born as a paradigm that redefines the design, development and evolution of software in response to these objectives. This article explores how automation, learning and sustainability can work together to meet the fundamental objectives of NGSE. By facilitating continuous and repeatable operations throughout the software development life cycle, including requirement assessment, design, implementation, testing, deployment, and operation, automations plays a crucial role in minimizing human effort and error. However, the growing complexity and dynamic nature of contemporary software systems cannot be managed by automation alone. Learning driven methods based on artificial intelligence and machine learning are used to overcome this constraint, enabling adaptive system behavior, predictive quality assurance, and data informed decision making. By utilizing past data, runtime feedback, and developer interactions, learning mechanisms enable software systems and engineering process to grow.

Keywords: *Next Generation Software Engineering, Automation, Machine Learning, Sustainable Software, Intelligent Software System, Next Generation Software Engineering*

CA-131

Machine Learning Architecture Hybrid Approach to Stable and Generalizable Liver Disease Classification

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Abstract

The rising liver-related disorders cases in the world require effective, clinically viable, and early diagnostic models. Most of the conventional diagnostic procedures are usually invasive, time consuming and expensive thus restricting their applicability to high population. As the recent Artificial Intelligence (AI) and Machine Learning (ML) developments have proven, it has the potential to achieve a high degree of accuracy in disease prediction when based on the routinely collected clinical and demographic data. Nonetheless, most of available research works mainly focus on the optimization of accuracy, but do not pay sufficient attention to the concept of model stability, generalizability and clinical robustness. In order to fill this gap, the current research is suggested to create a **Hybrid Machine Learning Architecture to Stable and Generalizable Liver Disease Classification** that combines several complementary classifiers into a single predictive model. The suggested methodology will use an ensemble plus standard machine learning models, such as, Random Forest, CatBoost, Light Gradient Boosting Machine, AdaBoost, Support Vector Classification, and Logistic Regression. These models are trained and tested on structured clinical data that includes biochemical, demographic and symptom-level data that are important in the diagnosis of liver disease. To ensure the integrity and fairness of data, an elaborate preprocessing pipeline, which consists of data cleaning, normalization, categorical encoding, and mitigation of class imbalance, is used. The stratified k-fold cross-validation is applied to improve the reliability and minimize the variability in the performance between the data partitions.

In contrast to single-model architectures, the hybrid architecture is focused on the performance stability of the architecture in various evaluation metrics, such as the accuracy, the precision, the recall, the F1-score, and the Receiver Operating Characteristic (ROC) analysis. The experiment shows that ensemble based models, and CatBoost, and Random

Forest in particular, are always superior to baseline classifiers and have lower variance and better generalization ability. The hybrid framework is a good solution that maintains predictive accuracy and robustness to reduce overfitting and enhance the applicability in the real world. The confusion matrix analysis also gives clear understanding of model behavior, which is more interpretable to support clinical decision making.

The results demonstrate that a hybrid architecture involving the incorporation of different machine learning paradigms is much more effective in enhancing the accuracy of liver disease classification systems. This paper advances the creation of reliable medical AI solutions by shifting away from the concept of accuracy-based assessment and addressing the topics of stability, generalizability, and clinical applicability. The suggested framework can be used as a scalable decision-support instrument of early liver disease diagnosis and can be applied to other healthcare diagnostic instruments with comparable data attributes.

***Keywords**: Liver Disease Classification, Hybrid Machine Learning Architecture, Clinical Decision Support Systems, Model Stability and Generalizability, Medical Artificial Intelligence*

CA-132

Ensemble Learning-Based Crop Yield Forecasting With Strong Performance Across Climatic Varies

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Abstract

Proper forecasting of crop yields is important in food security, resource management, and facilitating the agricultural decision-making process based on data. Nonetheless, conventional statistical and one-model machine learning models do not provide consistent performance when subjected to varying climatic settings, non-uniform soil characteristics as well as regional production habits. This is greatly limiting to their applicability in the actual world especially when it comes to climate variability and uncertainty. To solve those problems, the current paper is suggested to present an ensemble learning-based crop yield prediction scheme that is to deliver strong and generalizable results under different climate-related conditions. The given methodology combines several complementary machine learning models, such as Random Forest, Gradient Boosting, Extreme Gradient Boosting, Support Vector Regression, and Linear Regression, to create one ensemble structure. The models are conditioned using multi-source farm data which includes historical data on crop yields, weather conditions, soil properties and other agronomic factors. The entire data preprocessing pipeline is used, including an approach to missing values, normalization, feature encoding, and data imbalance mitigation to make sure that the data quality is appropriate, and the data is fair. Stratified k-fold cross-validation is used to improve the reliability and minimize variances of performance in various data partitions, as well as in a variety of climatic conditions.

This study in contrast to traditional studies does not rely heavily on maximizing prediction power, but rather performance stability, robustness, and consistency based on several measures of evaluation including Root Mean Square Error (RMSE), Mean Absolute Error (MAE), coefficient of Detroit (R 2) and analysis of error distribution. Experimental outcomes reveal that the ensemble-based method is always more successful than individual baseline models, which have less prediction variance and better generalization with different climatic conditions. Moreover, the analysis of feature importance offers clues to the effect of the important environmental and agronomic variables on the final result of crop yield.

The results show that ensemble learning provides a valid and scalable prediction system in climate-responsive agricultural systems to forecast crop yields. The suggested framework is a tool to effectively support decision-making by the farmers, policymakers, and agri-technology platforms to engage in sustainable and climate-resilient agricultural practices.

Keywords: *Crop Yield Forecasting, Ensemble Learning, Climate Variability, Precision Agriculture, Robust and Generalizable Models, Agricultural Decision Support Systems, Machine Learning in Agriculture*

CA-133

Enhancing Predictive Intelligence: Novel Machine Learning Models and Their Applications in Real-World Systems

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Abstract

Artificial Intelligence (AI) and Machine Learning (ML) are rapidly changing the way technology supports human decision-making and problem-solving. Instead of relying on fixed rules, modern systems learn from data, adapt to new situations, and continuously improve their performance. This paper explores how AI and ML techniques are being effectively used to solve real-world problems in areas such as healthcare, education, finance, and smart systems. The study focuses on commonly used learning models, including supervised and deep learning approaches, and explains how these models help in accurate prediction, pattern recognition, and automation. Special attention is given to making intelligent systems more understandable and reliable for users by emphasizing transparency, fairness, and ethical use of data. Practical examples are discussed to show how human-centered AI solutions can improve efficiency while supporting responsible decision-making. The paper highlights the importance of designing AI systems that not only perform well technically but also align with human values and societal needs. This work aims to contribute to the development of trustworthy and user-friendly AI solutions suitable for large-scale adoption.

Keywords: *Artificial Intelligence, Machine Learning, Human-Centered Computing, Predictive Systems, Ethical AI*

CA-134

Hybrid Quantum-Classical Systems for Machine Learning

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Abstract

The rapid evolution of Artificial Intelligence has pushed classical computing architectures to their physical limits, particularly when processing massive datasets for complex deep learning models. This study explores the emerging field of Quantum Machine Learning (QML), a specialized technology that integrates Quantum Computing Theory with AI algorithms. By leveraging quantum phenomena such as superposition and entanglement, QML offers the potential to solve optimization problems and pattern recognition tasks exponentially faster than traditional binary systems. The proposed framework examines current structures for quantum-enhanced neural networks and addresses challenges such as hardware noise and decoherence. Experimental insights suggest that quantum-classical hybrid systems will define the next generation of emerging technologies, providing scalable solutions for industrial and academic domains.

Keywords: *Quantum Computing, Artificial Intelligence, Machine Learning, Hybrid Algorithms, Emerging Technologies*

CA-135

Human Resources Practices in IT Industries with Special References to Kanchipuram District

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Abstract

The rapid expansion of the Information Technology (IT) sector in Kanchipuram district has necessitated a significant shift in how human capital is managed within the local commerce domain. As this region evolves into a primary tech hub, IT firms are moving away from traditional administrative roles toward strategic Human Resource (HR) practices that emphasize employee engagement and technological integration. This study examines the current landscape of recruitment, talent retention, and performance management strategies utilized by IT organizations operating in the Kanchipuram belt. Current trends indicate that the proximity to major educational centers and the industrial corridor of Sriperumbudur has created a unique talent ecosystem. HR departments are increasingly adopting digital platforms for talent acquisition and implementing continuous skill-development programs to keep pace with the fast-moving software market. Furthermore, the transition toward flexible work cultures and merit-based incentive schemes has become essential for maintaining a competitive edge. By analyzing these regional practices, the study highlights how effective people management directly contributes to the organizational growth and economic stability of the IT industry in Kanchipuram.

Keywords: *Human Resource Practices, IT Industry, Talent Management, Employee Engagement, Regional Tech Growth*

CA-136

Deep Learning (Climate Change, Agricultural)

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Abstract

This work explores the application of deep learning techniques to address the growing challenges of climate change and agriculture by developing intelligent models capable of analyzing complex environmental and farming data. Climate change has created significant uncertainty in agricultural production through variations in temperature, rainfall patterns, soil conditions, and the increased occurrence of pests and diseases, making traditional decision-making methods less effective. Deep learning offers powerful tools to process large amounts of satellite images, weather records, crop information, and sensor data to support tasks such as yield prediction, drought assessment, crop disease detection, precision irrigation, and sustainable resource management. By learning hidden patterns from diverse data sources, these models can help farmers and policymakers understand the impact of changing climatic conditions and take timely actions to improve productivity while reducing environmental risks. The study highlights how advanced neural networks can contribute to climate-resilient agriculture and promote smarter, more efficient farming practices for a sustainable future.

Keywords: *Deep learning, Crop prediction, Precision farming, Environmental data analysis*

CA-137

Ethical and Privacy Challenges In AI-Driven Human Resource Management

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Abstract

The integration of Artificial Intelligence (AI) in Human Resource Management (HRM) has transformed traditional HR practices through automation, predictive analytics, and data-driven decision-making. While AI-driven HR systems enhance efficiency in recruitment, performance evaluation, and workforce planning, they also raise significant ethical and privacy challenges. This paper examines key ethical concerns such as algorithmic bias, lack of transparency, fairness, and accountability in AI-based HR decision processes. In addition, it analyzes privacy-related issues including employee data surveillance, consent, data security, and compliance with data protection regulations. The study highlights the potential risks of discrimination, erosion of employee trust, and misuse of personal data arising from AI adoption in HRM. By reviewing existing frameworks and ethical AI principles, the paper proposes strategic guidelines for responsible AI implementation in HR functions. The findings aim to support HR professionals, policymakers, and organizations in balancing technological innovation with ethical responsibility and employee privacy protection.

Keywords: *Artificial Intelligence (AI), Human Resource Management (HRM), Ethical Challenges, Data Privacy, Algorithmic Bias, Responsible AI, Employee Data Protection*

CA-138

Spam Email Detection using Naive Bayes

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Abstract

With the rapid growth of digital communication, email has become a primary medium for information exchange; however, it is increasingly exploited for distributing spam messages that pose security and productivity challenges. This project presents an efficient **Spam Email Detection System** based on the **Naive Bayes classification algorithm**, a probabilistic machine learning approach well-suited for text classification tasks. The proposed system analyzes the content of emails using Natural Language Processing techniques such as tokenization, stop-word removal, and feature extraction through term frequency representations. The Naive Bayes classifier is trained on a labeled dataset containing both spam and legitimate (ham) emails to learn the statistical patterns associated with each class. Due to its assumption of feature independence, the algorithm offers fast training and low computational complexity while maintaining high classification accuracy. Experimental evaluation demonstrates that the proposed model effectively identifies spam emails with reliable precision and recall, making it suitable for real-world deployment. The results indicate that Naive Bayes remains a strong baseline model for spam filtering, especially in resource-constrained environments. This system can be further enhanced by incorporating advanced feature selection methods or ensemble learning techniques. Overall, the project highlights the practical applicability of machine learning in improving email security and reducing unwanted digital communication.

Keywords: *Spam Email Detection, Naive Bayes Classifier, Machine Learning, Text Classification, Natural Language Processing, Email Security*

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Implementation of Edge-AI for Real-Time Anomaly Detection In Industrial IOT (Iiot) Systems

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Abstract

The Industrial Internet of Things (IIoT) has transformed industries by enabling real-time monitoring and automation, driving operational efficiency. However, the increasing number of connected devices creates challenges in anomaly detection due to latency, bandwidth constraints, and reliance on cloud-based solutions. Edge-AI offers an effective solution by processing data locally on edge devices, ensuring real-time anomaly detection with minimal delay. This paper explores the implementation of Edge-AI in IIoT systems, focusing on the deployment of machine learning algorithms for immediate detection of anomalies such as equipment failures, environmental shifts, and potential security threats. By utilizing edge-based data pre-processing, feature extraction, and classification, the system can operate efficiently without overloading central servers. This approach reduces data transmission overhead, improves detection accuracy, and enhances system responsiveness. Our findings demonstrate the potential of Edge-AI in improving industrial operations by providing faster insights, reducing downtime, and ensuring continuous system reliability. The paper also discusses challenges such as model adaptation, resource constraints on edge devices, and the scalability of Edge-AI solutions across diverse industrial applications.

Keywords: *Edge-AI, Anomaly Detection, Predictive Maintenance, Data Processing, System Reliability*

CA-140

From Awareness to Adoption: Marketing Web 4.0 and AI-Driven Pricing in Semi-Urban Smart Infrastructures

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Abstract

The rapid evolution of Web 4.0 technologies and artificial intelligence (AI)–driven pricing models is reshaping the landscape of smart infrastructures, particularly in semi-urban regions where digital transformation is emerging at an uneven pace. This study examines the transition from consumer and stakeholder awareness to actual adoption of Web 4.0–enabled marketing systems and AI-based dynamic pricing within semi-urban smart infrastructures. Drawing on technology acceptance theories and data-driven marketing frameworks, the research explores how intelligent connectivity, real-time personalization, and predictive analytics influence trust, perceived value, and adoption behaviour among users and service providers. The study highlights the role of AI-driven pricing in optimizing resource allocation, enhancing operational efficiency, and promoting sustainable infrastructure development, while also addressing challenges such as data privacy concerns, digital literacy gaps, and infrastructural readiness. By focusing on semi-urban contexts, the paper bridges a critical gap in smart city and digital marketing literature, offering strategic insights for policymakers, infrastructure developers, and marketers aiming to accelerate inclusive and sustainable adoption of Web 4.0 technologies.

Keywords: *Web 4.0, Artificial Intelligence (AI), AI-Driven Pricing, Smart Infrastructure, Semi-Urban Development, Digital Marketing, Technology Adoption, Smart Cities*

CA-141

Anomaly Detection in Data Mining

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Abstract

Anomaly detection in data mining is about finding data values or patterns that do not behave the way we normally expect them to. These unusual patterns, often called outliers, may appear because of data entry mistakes, sudden changes in behaviour, or rare but important events. By analyzing large datasets, anomaly detection techniques try to understand what "normal" looks like and then identify cases that fall outside that range. Methods used for this purpose include simple statistical techniques, distance and density-based approaches, and machine learning models that learn regular patterns from data. This concept is widely used in everyday applications such as detecting fraudulent transactions in banking, identifying network intrusions in cyber security, spotting equipment faults in industries, and recognizing abnormal medical readings in healthcare. Even though anomaly detection is very useful, it is not always easy to implement, as real-world data can be noisy, complex, and constantly changing. Because of this, anomaly detection remains a practical and important area of research in data mining.

Keywords: *Anomaly detection, Fraud detection, Security monitoring, Pattern analysis*

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