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Proceedings of the International Conference on

Emerging Trends in Computer Science and Intelligent Systems (ICETCSIS 2025)

AMIEE
Empowering Innovation. Shaping Futures

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Proceedings of the International Conference on "Emerging Trends in Computer Science and Intelligent Systems (ICETCSIS 2025)"

First Volume

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Preface

The rapid advancements in **Artificial Intelligence (AI) and Financial Technology (FinTech)** have revolutionized the global business landscape, creating new opportunities and challenges for industry professionals, academicians, and researchers. Recognizing the significance of these evolving technologies, the **Proceedings of the International Conference on "Emerging Trends in Computer Science and Intelligent Systems (ICETCSIS 2025)"** was organized on **11th and 12th October 2025**, as a platform to facilitate **knowledge exchange, research collaboration, and industry academia engagement**.

The conference, hosted by the **CMAOI Association in collaboration with and AMIEE Association**, aimed to explore the **transformative role of AI in financial services, predictive analytics, cybersecurity, blockchain, and digital transformation**.

This **Conference Proceedings** is a compilation of **selected research papers**, each presenting valuable insights, case studies, and empirical findings that contribute to the growing body of knowledge in AI and FinTech. The contributions from **renowned academicians, researchers, and industry experts** reflect the conference's success in fostering **intellectual discussions and technological innovations**.

We extend our gratitude to all **authors, presenters, keynote speakers, session chairs, and participants** who contributed to the success of this event. We hope that this publication serves as a **valuable resource for researchers, academicians, and professionals** striving to navigate the rapidly evolving AI, ML, and Emerging Technologies landscape.

Happy reading!

Dr. Aamir Junaid Ahmad
Conference Chair
Secretary, CMAOI Association

Proceedings of the International Conference on “Emerging Trends in Computer Science and Intelligent Systems (ICETCSIS 2025)"

An International Conference on "Emerging Trends in Computer Science and Intelligent Systems (ICETCSIS 2025)" was held on 11th and 12th October 2025. The conference was organized by the CMAOI Association in Collaboration with and AMIEE Association.

Commerce and Management Association of India (CMAOI)

A revered organization of commerce, management, and technology professionals, CMAOI is a junction of intellectual higbrow with revolutinizing industry trends. With over 500 illustrious members from academia and industry, the association is a resourceful platform for industry alliance and partnership. The association's initiatives are geared towards shaping the future of commerce and management practices in India, ensuring that members are well-equipped to navigate the evolving business landscape.

AI-ML Innovative Entrepreneurs and Engineers Association (AMIEE)

AMIEE is a distinguished syndicate committed to augmenting Artificial Intelligence, Machine Learning, and entrepreneurial inventiveness. AMIEE is the heart of India's technological resurrection, having a dynamic nexus of around 500 academicians and industry leaders across the board who perform excellent networking, knowledge exchange, and collaboration, aiming to drive progress and innovation in the millennial domain.

Proceedings of the International Conference on "Emerging Trends in Computer Science and Intelligent Systems (ICETCSIS 2025)"

Innovation is the foundation of progress, and collaboration is the force that drives it forward. The Proceedings of the *International Conference on "**Emerging Trends in Computer Science and Intelligent Systems (ICETCSIS 2025)**"*, organized in association with **CMAOI** and **AMIEE**, brought together thought leaders, researchers, and professionals from around the globe. The event witnessed an impressive collection of **research submissions and presentations,** including contributions from international institutions like the a from across India The participation of experts from **top NIRF-ranked institutions** further highlighted the global relevance and academic depth of the conference.

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About AMIEE Association

The Artificial Intelligence, Machine Learning, Innovative Entrepreneurs and Engineers Association **(AMIEE)** is an eminent nonprofit professional body that plays a pivotal role in the advancement of Artificial Intelligence **(AI)**, Machine Learning **(ML)**, innovation, engineering, and entrepreneurship. With a strong focus on interdisciplinary collaboration and societal transformation, **AMIEE** brings together a diverse community of researchers, academicians, technologists, engineers, industry professionals, and aspiring entrepreneurs committed to leveraging technology for the greater good.

AMIEE's foundational objective is to bridge the gap between cutting-edge technological innovation and societal application. The association actively promotes the research, development, and ethical use of **AI** and **ML** across a wide range of sectors, including but not limited to healthcare, education, scientific research, agriculture, environmental sustainability, arts, commerce, and social welfare. By fostering the responsible deployment of these technologies, **AMIEE** seeks to create inclusive solutions that address complex real-world problems and contribute to sustainable development.

The association serves as a dynamic platform for knowledge exchange, skill development, and collaborative engagement. It regularly organizes international conferences, research symposiums, innovation challenges, technical workshops, and capacity-building programs that empower individuals to excel in their respective fields. **AMIEE** also supports scholarly research by facilitating publications, research collaborations, and interdisciplinary dialogues that span academic institutions and industry networks globally.

At its core, **AMIEE** is deeply committed to social equity and inclusive growth. Through targeted initiatives and community outreach programs, the association prioritizes the empowerment of underprivileged and marginalized populations, especially in rural and semi-urban regions of India. These efforts include providing access to quality education, digital literacy, technical training, and entrepreneurship support to children, youth, women, and disadvantaged groups. **AMIEE** believes that technology should serve as a tool for social inclusion, not division, and works relentlessly to ensure that the benefits of **AI** and **ML** are equitably distributed.

As a nonprofit entity, **AMIEE** adheres to a principle of reinvestment—allocating all revenue and resources toward the advancement of its objectives. The organization does not distribute profits or dividends to its members. Instead, it channels funding into the development of impactful programs, research support, community empowerment projects, and capacity enhancement strategies aimed at building a better, more equitable society.

Through its holistic and visionary approach, **AMIEE** positions itself as a key enabler of innovation-led development. It is not only a hub for professional excellence but also a movement towards creating a society where technological progress is inclusive, ethical, and human-centric. The association's long-term vision is to be a catalyst in shaping a future where every individual, regardless of socio-economic background, has the opportunity to learn, grow, innovate, and contribute meaningfully to the advancement of humanity.

Conference Highlights

With the harmony of wit and its delibration, the conference spotlighted keynote addresses, panel discourses, and research orientation, with an intermix of Artificial Intelligence and Fintech. The discussions and ruminations uncovered the evolving and revolutionizing ramifications of AI in financial services, providing the future scope of emerging trends, limitations, and upcoming prospects. Therefore, the conference assimilated the beautiful encounter of tomorrow's reality with today's discernment.

"Join us. Shape the future". A big shout-out to the budding scholars.

About CMAOI Association

The Commerce and Management Association of India (CMAOI) is a distinguished, nonprofit professional organization committed to the advancement

of education, research, and ethical practices in the domains of commerce, management, and allied disciplines across India. Incorporated with a vision of catalyzing systemic transformation in the academic and professional landscape, CMAOI serves as a national platform for scholars, educators, institutional leaders, researchers, and industry practitioners who are collectively working toward academic excellence, innovation, and social upliftment.

With an active and growing membership of over 650 professionals, including Heads of Departments, senior academicians from prestigious universities and colleges, and influential figures from the industry, CMAOI represents a powerful consortium of thought leaders and change-makers. The association fosters a collaborative and interdisciplinary environment where ideas, research findings, and pedagogical advancements are shared freely to elevate the standards of commerce and management education in India.

CMAOI's mission is to empower individuals and institutions through opportunities for continuous learning, professional development, knowledge dissemination, and collaborative research. The association plays an instrumental role in organizing conferences, faculty development programs (FDPs), workshops, and seminars at regional, national, and international levels. These initiatives are designed to enhance the skill sets of educators and practitioners, promote cutting-edge research, and encourage knowledge-sharing that contributes to sustainable business practices and ethical leadership.

The vision of CMAOI is to be a leading catalyst for transformative advancements in commerce and management education, fostering excellence, integrity, and innovation. The organization envisions a future where Indian professionals and institutions lead global conversations in business, entrepreneurship, corporate governance, and economic development. Through strategic alliances and community-driven programs, CMAOI actively promotes inclusive practices and strives to bridge the gap between academic research and practical business solutions.

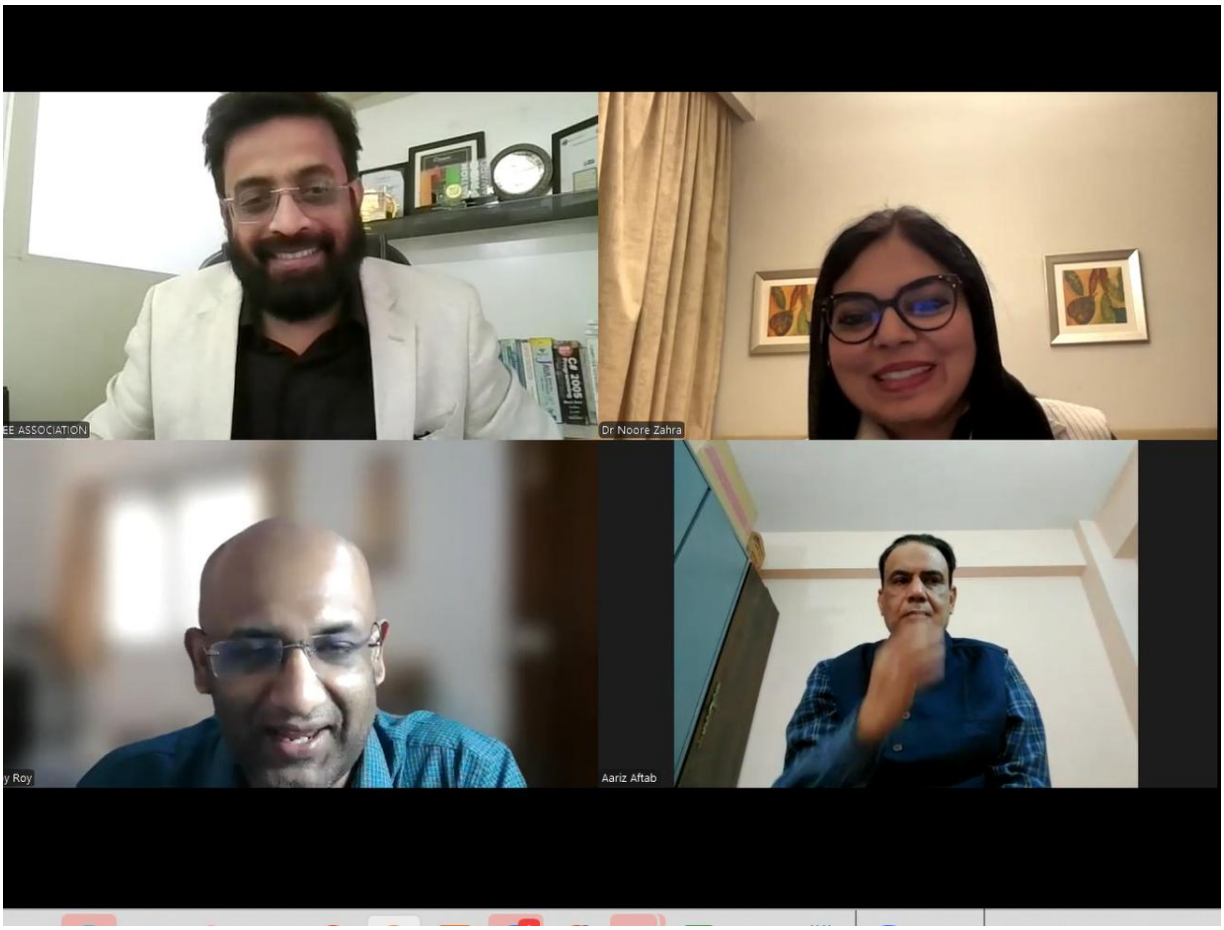
Aligned with its nonprofit mandate, CMAOI is deeply committed to societal development. The organization reinvests all revenue and resources into programs that support underprivileged communities through education, skill-building, healthcare access, and awareness campaigns. Special emphasis is placed on empowering children, youth, women, and marginalized groups by integrating them into mainstream society through inclusive policies and collaborative outreach. This social vision aligns with national developmental goals and positions

CMAOI as a socially responsible body working toward an equitable and progressive India.

Furthermore, the organization extends its objectives beyond academia into areas such as art, science, sports, environmental protection, social welfare, and charity, reflecting a comprehensive commitment to national development. The association is strictly non-dividend-paying and functions with the sole purpose of societal betterment, capacity-building, and the dissemination of knowledge.

In essence, the Commerce and Management Association of India stands as a beacon of academic and professional excellence. It is a vibrant intellectual ecosystem that not only advances commerce and management education but also drives impactful change at the grassroots level. CMAOI continues to contribute to India's vision of inclusive growth by equipping professionals and institutions with the tools they need to lead responsibly and effectively in a rapidly evolving global economy.

A Glimpse into the Knowledge Exchange at the "International Conference on Emerging Trends in Computer Science and Intelligent Systems (ICETCSIS 2025)"



You are cordially invited for the

Inaugural Session

Of The

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Saturday, 11th October 2025, 11:00 am - 12:30 pm

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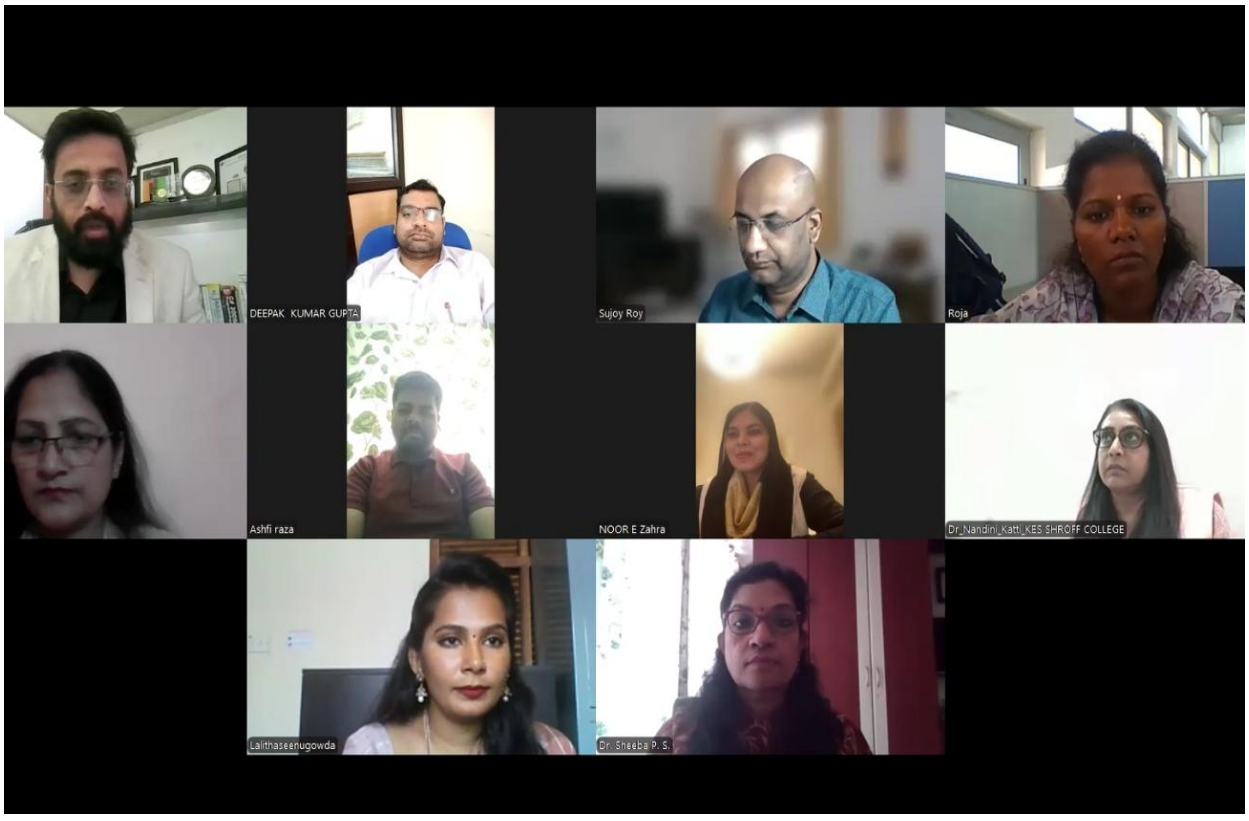

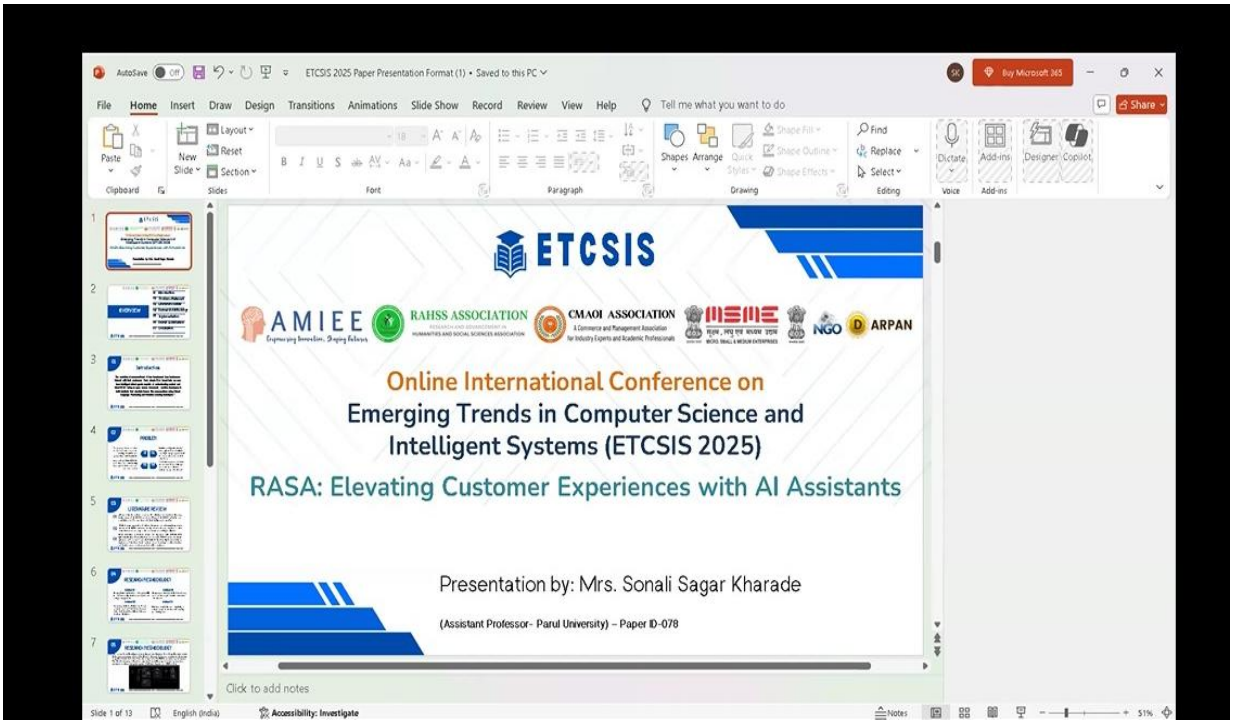
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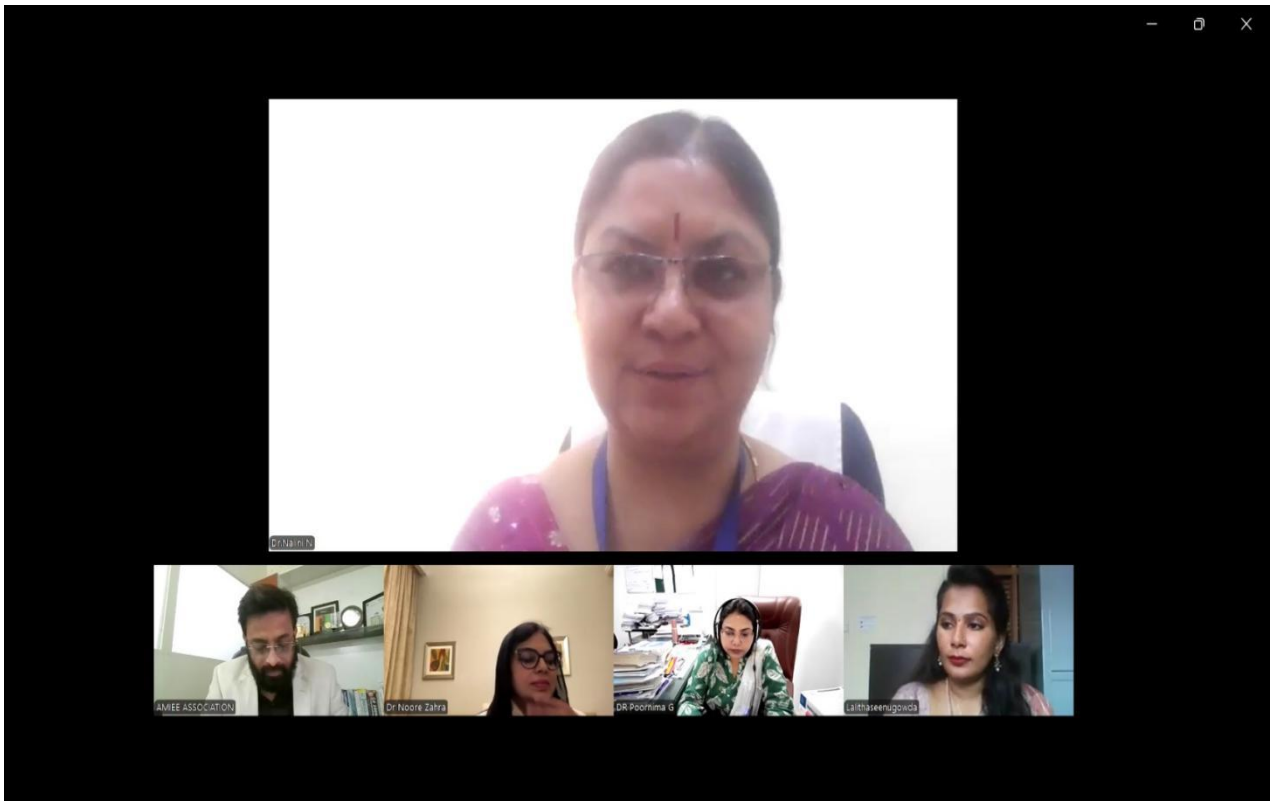
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Acknowledgement

The **Proceedings of the International Conference on *"Emerging Trends in Computer Science and Intelligent Systems (ICETCSIS 2025)"*** was a resounding success, made possible through the collective efforts of academicians, researchers, industry professionals, and institutional collaborators. We take this opportunity to express our sincere gratitude to everyone who contributed to the successful realization of this academic endeavor.

We extend our heartfelt thanks to our primary collaborator, the **CMAOI Association**, for their visionary leadership and active involvement in organizing the conference. We also gratefully acknowledge the **AMIEE Association**, whose partnership with CMAOI significantly enhanced the quality and reach of the event.

A special note of appreciation goes to:

- Our esteemed **keynote speakers and panelists** for generously sharing their expertise and offering deep insights into the latest developments in AI, ML, and emerging technologies.
- The **authors and presenters** for their original research contributions, which enriched the academic dialogue and stimulated meaningful discussion.
- The **organizing and technical committees** for their detailed planning, coordination, and flawless execution of the event.
- The **reviewers and editorial board members** for their critical evaluation and unwavering commitment to upholding the scholarly standards of the conference proceedings.

Finally, we thank all **participants and attendees** for their enthusiastic engagement and valuable interactions. It is through such academic collaboration and knowledge-sharing that we can collectively foster innovation and contribute to transformative advancements across industries and society.

We look forward to continuing this spirit of collaboration and academic excellence in future events.

Contents

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CH-1 Comparing and Ranking Metaheuristic Algorithms on Common Multi-Objective Test Problems

Dr. Renu Kumari, Dr. Md. Amir Khusru Akhtar
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Abstract

This paper presents a comparative study of five well-known metaheuristic algorithms - NSGA- II, MOPSO, ACO, WOA, and GWO - tested on standard multi-objective benchmark problems such as ZDT1, ZDT2, ZDT3, DTLZ1, and DTLZ2. The experiments were carried out using MATLAB R2021 with a consistent setup across all algorithms. Performance was evaluated using four important metrics: Inverted Generational Distance (IGD), Hypervolume (HV), Spread, and Convergence. Each algorithm was assigned a final score based on these metrics to prepare an overall ranking. The results show that NSGA-II performed the best in terms of both convergence and diversity, while MOPSO was a strong alternative choice. GWO gave stable but moderate results, whereas ACO and WOA showed weaker performance on complex problems. This study helps provide a baseline comparison and will serve as a reference point for future development of improved hybrid optimization techniques.

Keywords: Metaheuristic Optimization, Multi-Objective Optimization, Pareto Front, Multi-Criteria Decision Making, Hybrid Optimization.

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CH-2 Machine Learning-Based Student Performance Prediction Using Socio-Demographic and Academic Features

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Faculty of IT &CS, PICA-BCA, Parul University, Vadodara

Abstract

In recent years, educational institutions have increasingly turned to data-driven decision-making to enhance student outcomes. This research paper presents a machine learning approach for predicting student academic performance using socio-demographic and academic features. The study leverages publicly available data from secondary school students, incorporating attributes such as study time, past grades, parental background, and lifestyle factors. Several classification algorithms—including Logistic Regression, Decision Tree, Random Forest, Support Vector Machine (SVM), and K-Nearest Neighbors (KNN)—were applied and compared based on accuracy and precision metrics. The results highlight the Random Forest classifier as the most effective model, achieving the highest accuracy in predicting final grades. The findings can support educators and policymakers in identifying at-risk students and providing timely interventions. This study demonstrates the potential of machine learning to foster academic success through early prediction and personalized support.

Keywords: Student Performance Prediction, Machine Learning, Educational Data Mining, Classification Algorithms, Socio-Demographic Features, Academic Intervention, Random Forest, Student Analytics

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CH-3 Decoding Emotions: A Comparative Study of NLP Techniques for Emotion Extraction from Textual Data

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Abstract

Emotion recognition from textual data has become a crucial task in understanding user sentiment, behavioral insights, and social media interactions. This study presents a comprehensive comparison of Natural Language Processing (NLP) techniques—encompassing rule-based systems, lexicon-driven models, and advanced machine learning algorithms such as Support Vector Machines (SVM) and Recurrent Neural Networks (RNNs)—for extracting emotions from diverse text sources. Utilizing a multi-domain labeled dataset, we evaluate the performance of each technique based on content type (e.g., news vs. social media) and the complexity of emotion granularity (e.g., basic vs. subtle emotions). The study underscores the importance of feature engineering, data balancing, and hyperparameter tuning in achieving optimal performance. Error analysis further reveals context-dependent challenges and limitations across models. Our findings advocate for hybrid and context-aware approaches to emotion detection, highlighting that no single method universally outperforms others. This work lays a foundation for future explorations into deep learning integration and ensemble modeling to capture the full spectrum of emotional expressions in textual content.

Keywords: Emotion Detection, Natural Language Processing, Lexicon-Based Methods, Machine Learning, Sentiment Analysis, Text Mining, Deep Learning, Feature Engineering, SVM, RNN, Emotion Classification, Context-Aware NLP.

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CH-4 Self-Adaptive & RL-Driven Metaheuristics: A Systematic Review of Dynamic Parameter Control and Premature-Convergence Mitigation

Ms. Manisha Prasad, Dr. Md. Amir Khusru Akhtar
Research Scholar
Faculty of Computing and IT, Usha Martin University, Ranchi, Jharkhand

Abstract

Optimization problems often hide many traps, a search algorithm must jump over local hills and avoid deep valleys. Classic metaheuristics such as Genetic Algorithm, Particle Swarm Optimization, Differential Evolution, Ant Colony Optimization operates with fixed rules. However fixed rules can fail under dynamic conditions. They may freeze too early or need heavy tuning. Several researchers have tried two fresh ideas: self-adaptation (the rules tune themselves) and reinforcement learning (an agent learns which rule to apply). This review surveys recent work and found clear growth: Q-learning PSO for path planning, PPO-guided DE for multi-objective tasks, and meta-controllers that switch among many search moves. Most studies report better accuracy and faster convergence on CEC, BBOB, and WFG testbeds. Yet open issues remain such as results do not always transfer to other problems, large RL agents add cost and many works still lack fair runtime limits. This review maps the state of the art, groups the methods into simple classes and lists gaps.

Keywords: Metaheuristic, self-adaptive optimization, reinforcement learning, dynamic Parameter control, premature convergence

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CH-5 Anomaly Detection in Multivariate Time Series Data Using Autoencoder and LSTM Networks: A Hybrid Deep Learning Approach

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Abstract

In today's data-driven environments, detecting anomalies in multivariate time series data is crucial across various domains, including healthcare, manufacturing, and finance. Traditional statistical methods often fail to capture complex temporal and inter-variable relationships inherent in such datasets. This research proposes a hybrid deep learning framework that combines autoencoders and Long Short-Term Memory (LSTM) networks to perform unsupervised anomaly detection. The Autoencoder is used for dimensionality reduction and feature extraction, while the LSTM captures temporal dependencies to predict and reconstruct the time series. Anomalies are identified based on deviations in reconstruction error. The model is evaluated on publicly available multivariate datasets and demonstrates superior accuracy and robustness compared to standalone models and conventional anomaly detection techniques. The proposed approach offers a scalable and domain-adaptive solution suitable for real-time monitoring and decision support systems.

Keywords: Multivariate Time Series, Anomaly Detection, LSTM, Autoencoder, Deep Learning, Reconstruction Error, Predictive Maintenance, Unsupervised Learning, Temporal Modeling, Hybrid Neural Networks

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CH-6 Enhancing Healthcare Intelligence: Integration of Artificial Neural Networks with AI and IoT for Smart Medical Solutions

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Abstract

The convergence of Artificial Neural Networks (ANN), Artificial Intelligence (AI), and the Internet of Things (IoT) is revolutionizing modern healthcare systems by enabling smarter, data-driven, and patient-centric solutions. This paper explores the synergistic integration of ANN with AI and IoT technologies to improve diagnosis accuracy, patient monitoring, and personalized treatment. Through real-time data collection from IoT-enabled medical devices and intelligent processing using ANN models, healthcare providers can detect anomalies, predict disease progression, and optimize treatment plans with greater precision. The study also reviews recent advancements, implementation challenges, and future opportunities for ANN-driven smart healthcare systems. Ultimately, this integration holds the potential to enhance clinical outcomes, reduce operational costs, and address the growing demands of digital healthcare ecosystems.

Keywords: Artificial Intelligence (AI), Healthcare, Internet of Things (IoT), ANN

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CH-7 Detection of Fake News Using Natural Language Processing and Machine Learning Techniques

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Abstract

In the digital age, the rapid spread of misinformation through online platforms has become a significant societal concern. Fake news, often crafted to mislead or manipulate public opinion, can have serious political, economic, and social implications. This research presents a Natural Language Processing (NLP)-based approach for detecting fake news by analyzing textual content from news articles. Using Python and machine learning libraries, a classification model is trained on publicly available datasets to distinguish between real and fake news. The model employs key NLP techniques such as tokenization, TF-IDF vectorization, and supervised learning algorithms including Logistic Regression, Naive Bayes, and Support Vector Machines. Evaluation metrics such as accuracy, precision, recall, and F1-score are used to assess performance. The results demonstrate that NLP combined with machine learning provides an effective and scalable solution for automated fake news detection. This system can be integrated into content moderation tools, social media platforms, or educational settings to promote information integrity.

Keywords: Fake News Detection, Natural Language Processing, Machine Learning, Text Classification, Misinformation, TF-IDF, Logistic Regression, Python, News Dataset, Information Integrity

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CH-8 Design and Simulation of a Blockchain-Based Voting System Using Python

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Abstract

Blockchain technology has gained significant attention for its ability to provide transparency, immutability, and security in digital systems. This study aims to design and simulate a secure, tamper-resistant voting system using blockchain principles implemented in Python. The system leverages core blockchain components such as cryptographic hashing, block chaining, and decentralized record-keeping to prevent electoral fraud and ensure voter anonymity. A proof-of-concept model is developed using Python libraries such as hashlib, Flask, and pycryptodome to simulate voting, validate voter identity, and record votes as immutable blocks. The proposed system incorporates a lightweight consensus mechanism and voter ID encryption to demonstrate the integrity and security of the election process. Preliminary simulations suggest that such blockchain-based systems can significantly improve trust in digital elections, reduce human intervention, and resist tampering. This paper contributes to the field by providing a practical, educational-level Python-based model suitable for academic, civic, or institutional adaptation.

Keywords: Blockchain, E-Voting System, Python, Cryptographic Hashing, Decentralized Ledger, Immutable Records, Flask, Digital Identity, Tamper-Resistant Voting, Blockchain Simulation

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CH-9 Deep Learning based Semantic Segmentation on LowDose CT Scan Towards lung Nodule Cancer Prediction: A Comparative Analysis

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Abstract

Image segmentation plays a crucial role in computer vision and image processing with important applications such as scene understanding, medical image analysis etc, a field with a rich history of exploration. In this context, the prevalent success of deep learning model has driven the creation of innovative image segmentation techniques. It conducts a comparative analysis of various architectural paradigms, including U-Net, DenseNet, AlexNet, CoatNet, and VGG19. Through meticulous experimentation conducted in Python, the study aims to ascertain the efficacy of these architectures, striving to identify the most promising approach. The outcomes and implications drawn from the results pave the way for future avenues of research and development.

Keywords: Medicalimage segmentation,deeplearning,semantic segmentation,u-net,alexnet,vgg19,coatnet,densenet

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CH-10 Hybrid-Fusion Metaheuristics for Global Optimization: Taxonomy, Trends, and Benchmark Insights for Hyper-Adaptive Algorithms

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Abstract

Optimization today is used in almost every area, from routing trucks on roads to saving energy in power grids, and even training AI models. Classic algorithms like GA, PSO, and DE have worked well in many cases. But when the problem becomes very large or complex, they start struggling. Many times, they get trapped in local solutions. They also lose balance where exploration becomes weak, and exploitation turns slow.

To improve performance, researchers started mixing methods. One algorithm can give global jumps, another can refine locally. Together they become stronger. This is the core idea of hybrid metaheuristics. Early days saw simple mixes like GA with SA. Later PSO joined with DE to balance speed and accuracy. In recent years, many fusions have come like Whale Optimization with Teaching–Learning, Honey-Badger with Beluga Whale, and even modern hybrids where reinforcement learning or large language models act like a brain to guide the search.

This survey reviews these new hybrid-fusion methods of recent years. It explains the taxonomy: operator-level mixing, phase-level switching, and population-level fusion. It also shows the synergy tricks: reinforcement-learning switchers, adaptive weight sharing, ensemble voting, and surrogate models. Benchmarks and fair comparison methods are also discussed.

As a result, hybrids prove to be more robust and converge faster than single algorithms. However, several challenges still remain such as too many parameters, missing convergence proofs, heavy computational cost and poor reproducibility. Therefore, hybrids are the road forward. The future is to make them lean, adaptive, and truly useful across many types of problems.

Keywords: Hybrid Metaheuristics, Fusion Algorithms, Global Optimization, Exploration–Exploitation Balance, Reinforcement Learning

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CH-11 Enhancing Digital Education: A Study on Intelligent Tutoring System(ITS)

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Abstract

Intelligent Tutoring Systems (ITS) are widely used to manage, deliver, and evaluate educational content; however, most lack adaptive capabilities to meet individual learner needs. This study integrates three key components—student activity tracking, performance prediction, and data visualization—to enable early identification of at-risk learners and support targeted interventions. Leveraging deep learning techniques enhances prediction accuracy, demonstrating the potential of advanced analytics to improve instructional decision-making, personalized feedback, and overall learning outcomes.

Keywords: ITS, Personalized Learning, Student Engagement, Adaptive Feedback.

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CH-12 Reimagining Employee Experience In Higher Education Through Digital Marketing Ecosystems: Building The Connected Campus Workforce

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Abstract

The ongoing digital revolution is significantly transforming higher education, leading to new roles and expectations for both academic institutions and their employees. Oral history, Indian universities have concentrated on student engagement and academic achievement. In addition to, there is now a growing understanding that the experiences and satisfaction of faculty members are equally essential for driving institutional progress and innovation. Even so awareness, many regions, such as Bihar, still lack comprehensive strategies to build a supportive and motivated academic workforce. This research examines how digital marketing ecosystems—often used in business to improve customer relationships—can be adapted to enhance the professional environment for educators in higher education. Via digital channels, modern technologies, and data-driven methods, these ecosystems can support better communication, offer tailored professional development, and strengthen the sense of community among faculty.

The study adopts a descriptive research approach to evaluate the level of awareness, adoption, and effectiveness of digital marketing tools among faculty in Bihar's higher education sector. It identifies which digital solutions are most effective for employee engagement, assesses their impact on creating a unified workforce, and explores challenges such as limited digital skills and inadequate infrastructure. The findings of the study revealed that most of the faculty members from the private higher education institutions of Bihar are Young Males who are well aware and actively engaged with the tools of digital marketing on daily basis reflecting high level integration in the academic activities. The research also provides practical recommendations to address these barriers and gathers faculty opinions on the use of digital tools. Theoretically, these students aim to fill a notable gap in the literature by showing how digital marketing ecosystems can improve employee experiences, foster collaboration, and promote digital inclusion within academic institutions.

Keywords: Digital Marketing Ecosystems, Employee Experience, Connected Workforce

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CH-13 AI-Driven Approaches for Cybercrime Detection and Prevention: A Machine Learning Perspective

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Abstract

The rapid digital transformation acrossindustries has significantly increased the prevalence and sophistication of cybercrime, posing severe threats to individuals, organizations, and governments. Traditional security mechanisms are often inadequate in detecting and mitigating such evolving threats. In recent years, Artificial Intelligence (AI) and Machine Learning (ML) techniques have emerged as powerful tools for enhancing cyber defense systems. This paper presents a comprehensive study on AI-driven approaches for cybercrime detection and prevention, focusing on machine learning models such as Support Vector Machines, Random Forest, Deep Neural Networks, and Hybrid Architectures. AI-powered systems use techniques like anomaly detection, pattern recognition, and predictive analytics to spot malicious activities in real time. This helps them cut down on false alarms and quickly adapt to new types of threats. Furthermore, this research highlights the role of explainable AI (XAI) and federated learning in improving trust, privacy, and scalability of cyber defense frameworks. The study concludes that AI- driven solutions are not only effective in preventing cybercrime but also essential for building proactive, resilient, and adaptive security infrastructures in the digital era.

Keywords: Cybercrime, Artificial Intelligence, Machine Learning, Deep Learning, Intrusion Detection, Anomaly Detection, Cybersecurity, Predictive Analytics, Explainable AI, Federated Learning.

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CH-14 Crop Recommendation System Based on Soil and Weather Conditions: A PythonBased Approach

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Abstract

Accurate crop selection plays a pivotal role in enhancing agricultural productivity and ensuring sustainable farming practices. This research proposes a machine learning–based crop recommendation system that leverages soil parameters (e.g., pH, nitrogen (N), phosphorus (P), potassium (K)), climate variables (rainfall, temperature, humidity), and agronomic indicators to suggest optimal crops for specific agro ecological zones. Utilizing publicly available datasets and preprocessing techniques, a suite of classification models—including Random Forest, XGBoost, Decision Tree, K Nearest Neighbors, SVM, and Logistic Regression—is trained and evaluated in Python. Model performance is assessed through metrics such as accuracy, precision, recall, and F1 score. The ensemble-based models, particularly Random Forest and Gradient Boosting, exhibit superior performance. The proposed system supports decision-making for farmers and extension services, enabling data-driven crop planning and contributing to resource optimization and food security.

Keywords: Crop Recommendation, Machine Learning, Soil Parameters, Weather Conditions, Random Forest, XGBoost, Python Implementation, Precision Agriculture, Classification Models, Sustainable Farming

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CH-15 Crop Yield Prediction Using Machine Learning and Weather Data: A Python-Based Approach

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Abstract

Agriculture remains a critical sector for global food security, yet crop productivity is increasingly influenced by volatile climatic conditions and resource constraints. Accurate crop yield prediction plays a vital role in enhancing decision-making for farmers, agronomists, and policymakers. This paper presents a machine learning-based approach for crop yield prediction using historical weather patterns, soil data, and crop-specific variables. Leveraging publicly available datasets, various regression models—including Linear Regression, Random Forest Regressor, and XGBoost—were implemented and evaluated using Python. Feature engineering was employed to extract meaningful insights from variables such as rainfall, temperature, soil type, fertilizer usage, and crop type. The models were trained and tested to predict yield with respect to specific crops across multiple seasons. Performance metrics such as R^2 score, RMSE, and MAE were used to compare model effectiveness. Among the models evaluated, ensemble-based methods demonstrated superior accuracy and robustness. The proposed system showcases the potential of machine learning techniques to provide actionable insights in agricultural planning and risk management, especially in resource-constrained environments.

Keywords: Crop Yield Prediction, Machine Learning, Agriculture, Weather Data, Regression Models, Random Forest, XGBoost, Python Implementation, Agricultural Forecasting, Data-Driven Farming

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CH-16 Artificial Intelligence in Predictive Criminal Psychology: Evaluating Efficacy, Ethical Implications, and Future Directions

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Abstract

This study examines the role of artificial intelligence (AI) in predictive criminal psychology, focusing on its capabilities to analyze behavioural patterns, predict criminal tendencies, and assist law enforcement in crime prevention. Utilizing machine learning, natural language processing (NLP), and biometric data, AI models can assess risks and identify potential offenders. However, ethical challenges such as algorithmic bias, privacy violations, and profiling persist. This study critically examines AI's effectiveness and limitations in crime prediction, reviews ethical concerns, and discusses regulatory frameworks necessary to ensure accountability and fairness. A data-driven approach evaluates the relationships between crime predictors and outcomes, highlighting implications for future AI integration in criminal justice.

Keywords: Artificial Intelligence (AI), Predictive Criminal Psychology, Machine Learning, Natural Language Processing (NLP), Biometric Analysis, Crime Prediction, Predictive Policing, Algorithmic Bias, Ethical Considerations, Facial Recognition, Behavioral Analysis, Crime Forecasting, Explainable AI (XAI), Data Privacy, Criminal Profiling, Recidivism Risk Assessment, Hotspot Mapping, Surveillance, Human Rights, AI Regulation

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CH-17 Cloud-Based Big Data Analytics for Smart Cities: Architecture and Challenges

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Abstract

The proliferation of Internet of Things (IoT) devices, sensors, and connected infrastructure in urban environments has led to an explosion of data generation, presenting both opportunities and challenges for smart city development. Cloud computing offers a scalable, flexible, and cost-effective platform to store, process, and analyze this big data. This paper explores comprehensive cloud-based architecture designed specifically for big data analytics in smart cities. The proposed framework integrates data ingestion layers, real-time and batch processing modules, storage repositories, and advanced analytics engines, all hosted in a multi-cloud or hybrid cloud environment. The architecture supports key urban applications such as traffic optimization, energy management, waste disposal, and public safety. Additionally, the paper discusses critical challenges including data security and privacy, latency, interoperability among heterogeneous systems, and governance issues. Emerging technologies such as edge computing, federated learning, and AI-as-a-Service (AIaaS) are also evaluated for their role in augmenting cloud capabilities. By addressing these technical and operational issues, the paper aims to contribute toward the realization of resilient, efficient, and sustainable smart city ecosystems.

Keywords: Smart Cities, Cloud Computing, Big Data Analytics, IoT, Urban Infrastructure, Edge Computing, Hybrid Cloud, Data Privacy, Real-Time Processing, AIaaS, Federated Learning, Urban Governance.

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CH-18 Evaluating the Impact of Blended Learning vs. Conventional Teaching in Programming Courses.

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Abstract

The rapid advancement of educational technology has transformed the way Computer Science is taught in higher education. Traditional lecture-based teaching methods, though effective for delivering theoretical concepts, often lack interactive and practical engagement required in programming courses. Blended learning, which combines conventional face-to-face instruction with online learning resources, offers a promising alternative by promoting flexibility, interactivity, and active student participation. This study evaluates the impact of blended learning versus conventional teaching in programming courses using a data-driven approach. Student performance data, including assignment scores, examination results, and project outcomes, along with engagement metrics such as attendance, participation rates, and survey-based feedback, were analyzed. Statistical comparisons were conducted to measure improvements in problem-solving skills, coding proficiency, and overall academic achievement. The findings indicate that blended learning enhances student engagement, supports self-paced learning, and improves learning outcomes, though its effectiveness is influenced by the availability of digital resources and the instructor's adaptability. The study concludes by recommending a hybrid adoption strategy that leverages the strengths of both methods for effective programming education.

Keywords: Smart Cities, Cloud Computing, Big Data Analytics, IoT, Urban Infrastructure, Edge Computing, Hybrid Cloud, Data Privacy, Real-Time Processing, AIaaS, Federated Learning, Urban Governance.

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CH-19 Early Detection of Alzheimer's Disease Using Machine Learning and Neuroimaging Data.

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Abstract

Alzheimer's disease (AD) is a progressive neurodegenerative disorder that significantly affects memory, cognition, and daily functioning, making early detection crucial for timely intervention and effective treatment planning. Traditional diagnostic methods, relying on clinical assessments and neuropsychological tests, often fail to identify the disease in its initial stages. Recent advances in machine learning (ML) offer promising approaches for analyzing complex neuroimaging data, such as magnetic resonance imaging (MRI) and positron emission tomography (PET), to detect early structural and functional brain changes associated with AD. This study proposes a machine learning–based framework for early detection of Alzheimer's disease using neuroimaging biomarkers. Various supervised learning algorithms, including support vector machines, random forests, and convolutional neural networks, are applied to extract discriminative patterns from imaging data. The models are evaluated using performance metrics such as accuracy, precision, recall, F1-score, and area under the ROC curve. Experimental results demonstrate that ML-based models outperform conventional diagnostic approaches in classifying early-stage Alzheimer's, providing a potential pathway for clinical decision support systems. This research highlights the role of neuroimaging-driven ML approaches in enhancing early diagnosis, thereby contributing to improved patient care and advancing precision medicine in neurodegenerative disorders.

Keywords: Alzheimer's disease, early detection, machine learning, neuroimaging, MRI, PET, biomarkers, convolutional neural networks, classification, precision medicine

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CH-20 AI for Real-Time Network Traffic Analysis: Advanced Cybersecurity Threat Detection and Prevention Methods

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Abstract

This article provides in-depth research on artificial intelligence techniques for real-time network traffic analysis, with a focus on cybersecurity threat identification and mitigation. The study carries out a thorough comparison of deep learning, reinforcement learning, and conventional machine learning methods over a ten-year period. Our approach mixes real-world network traffic statistics from enterprise settings with synthetic phony data. Evaluation metrics include things like detection accuracy, false positive rates, and real-time system latency.This study uses more than 50 peer-reviewed references from prestigious publications and conference proceedings, and it follows the IEEE academic format. The results provide important insights into the advantages and disadvantages of different AI-driven approaches.With an emphasis on cybersecurity threat identification and mitigation, this article presents extensive research on artificial intelligence approaches for real-time network traffic analysis. Over the course of a decade, the study conducts a comprehensive comparative analysis of deep learning, reinforcement learning, and traditional machine learning techniques. Our method combines fake data synthesis with real-world network traffic statistics from enterprise settings.

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CH-21 Leveraging Data Science for Educational Data Analysis: A Machine Learning Approach to Student Performance Prediction and Learning Analytics

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Abstract

The rapid growth of digital learning environments has generated massive amounts of student- related data, ranging from attendance and demographics to assessments and online engagement logs. Traditional statistical methods are limited in handling such complex, high-dimensional, and dynamic datasets. This study leverages data science and machine learning techniques to analyze educational data for predicting student performance and enhancing learning analytics. Using classification algorithms such as Logistic Regression, Random Forest, Gradient Boosting, and Neural Networks, the study evaluates predictive accuracy and identifies key features contributing to academic outcomes. The methodology includes data preprocessing, feature engineering, model training, and comparative evaluation based on metrics such as accuracy, precision, recall, and F1-score. The results demonstrate that ensemble models outperform conventional approaches, and visualization dashboards enable actionable insights for educators. This research contributes to developing early-warning systems for at-risk students, supporting evidence-based decision-making in education.

Keywords: Educational Data Mining, Learning Analytics, Student Performance Prediction, Data Science, Machine Learning, Ensemble Learning, Neural Networks, Random Forest, Gradient Boosting, Predictive Analytics, Explainable AI, Learning Management Systems (LMS), Academic Success, Dropout Prediction

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CH-22 Machine Learning-Based Threat Detection Systems: A New Frontier in Cyber Security

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Abstract

The rapid evolution of cyber threats has rendered traditional rule-based security mechanisms increasingly inadequate. As cyber attacks grow in complexity and scale, there is a pressing need for intelligent and adaptive security solutions. Machine Learning (ML) has emerged as a powerful tool in the realm of cyber security, offering the ability to detect anomalies, recognize patterns, and predict potential threats with greater accuracy and speed. This paper explores the implementation and effectiveness of machine learning-based threat detection systems, examining both supervised and unsupervised learning techniques in identifying malware, phishing, intrusion attempts, and other cyber threats. The study also discusses the challenges associated with data quality, model interpretability, adversarial attacks, and real-time deployment. Through a comprehensive review of current approaches and future directions, this paper highlights how ML is shaping the next frontier of proactive and dynamic cyber defense systems.

Keywords: Cyber Security, Machine Learning, Threat Detection, Intrusion Detection Systems (IDS), Anomaly Detection, Malware Detection, Artificial Intelligence, Network Security, Phishing, Cyber Threat Intelligence.

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CH-23 Heart Disease Prediction Using Machine Learning and Clinical Data

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Abstract

Heart disease remains one of the leading causes of mortality worldwide, emphasizing the need for early detection and preventive healthcare strategies. Traditional diagnostic methods often require invasive procedures and may fail to provide timely predictions. In this study, we propose a machine learning-based approach for heart disease prediction using clinical data such as age, gender, blood pressure, cholesterol levels, resting electrocardiographic results, maximum heart rate, and other medical attributes. Various classification algorithms, including Logistic Regression, Decision Tree, Random Forest, Support Vector Machine (SVM), and K-Nearest Neighbors (KNN), are employed and compared to evaluate their predictive performance. The dataset used for experimentation is preprocessed through normalization, feature selection, and handling of missing values. Evaluation metrics such as accuracy, precision, recall, F1-score, and ROC-AUC are used to assess model effectiveness. The experimental results demonstrate that ensemble-based models achieve higher prediction accuracy compared to traditional methods. This work highlights the potential of machine learning techniques in developing intelligent healthcare systems capable of supporting physicians in early diagnosis and personalized treatment planning for patients at risk of heart disease.

Keywords: Heart disease prediction, machine learning, clinical data, logistic regression, decision tree, random forest, support vector machine, K-nearest neighbors, healthcare analytics, medical diagnosis, classification algorithms, predictive modeling, feature selection, healthcare system

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CH-24 Machine Learning and Data Science Applications in Academic Research and Pedagogy

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Abstract

The rapid growth of data-driven technologies has significantly influenced academic research and pedagogy, offering new methodologies for knowledge discovery, teaching, and learning. Machine learning (ML) and data science provide powerful tools for analyzing large-scale educational data, predicting student performance, personalizing learning pathways, and enhancing research efficiency. In academic research, these technologies support advanced data modeling, pattern recognition, and automation, enabling researchers to generate meaningful insights across disciplines. In pedagogy, ML-based recommendation systems, intelligent tutoring platforms, and adaptive assessments foster student engagement and improve learning outcomes. Furthermore, predictive analytics assists in institutional decision-making, academic planning, and early intervention for at-risk students. Despite their potential, challenges remain regarding data privacy, ethical implications, and the integration of these technologies into traditional academic systems. This study explores the transformative applications of machine learning and data science in academia, highlighting their impact on research productivity, teaching innovation, and the future of higher education.

Keywords: Machine learning, data science, academic research, pedagogy, predictive analytics, higher education, personalized learning, adaptive assessment, student performance, educational technology

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CH-25 Ransomware Detection in Cloud Environments Using Deep Learning Techniques

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Abstract

The rapid adoption of cloud computing has transformed the digital infrastructure of modern organizations, offering scalable, on-demand services. However, this transformation has also attracted sophisticated cyber threats, particularly ransomware attacks that encrypt or exfiltrate critical data and demand ransom payments. Traditional signature-based detection methods struggle to identify emerging and polymorphic ransomware variants, especially within dynamic and virtualized cloud environments. To address this challenge, deep learning techniques have emerged as promising solutions due to their ability to automatically learn complex data patterns and generalize across diverse threat landscapes. This paper explores the application of deep learning models—including Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), and hybrid architectures—for accurate and real-time ransomware detection in cloud environments. We propose a detection framework that leverages behavioral data (such as API calls, file system changes, and network traffic) extracted from cloud instances and applies advanced neural networks to identify malicious activities. Experimental results, based on public and synthetic datasets, demonstrate the effectiveness of deep learning in achieving high detection accuracy, low false positive rates, and adaptability to evolving attack strategies. The paper also discusses deployment challenges, privacy implications, and potential strategies for integrating these models into cloud security architectures. Our findings highlight the potential of AI-driven security frameworks in building resilient cloud ecosystems capable of proactively defending against ransomware threats.

Keywords: Cloud security, ransomware detection, deep learning, convolutional neural network, recurrent neural network, behavioral analysis, threat intelligence, cybersecurity, machine learning, cloud computing.

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CH-26 The Algorithmic Biologist: A Deep Learning Framework for Automated Wildlife Monitoring and Classification

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Abstract

Wildlife conservation increasingly depends on accurate monitoring of animal populations, yet traditional methods of analysing camera trap images are slow and often unreliable. These cameras capture millions of frames in a single season, but most images contain no animals, creating an overwhelming burden for researchers. Manual review not only consumes valuable time but also risks delaying important conservation decisions. To address this challenge, this paper introduces The Algorithmic Biologist, a deep learning framework designed to automatically detect and classify species in camera trap photographs. The framework employs a dual-headed structure that simultaneously identifies the presence of animals and categorizes them into species. Experimental results show an accuracy of over 98%, demonstrating that the system is both reliable and scalable. By automating repetitive image analysis, the framework allows conservationists to devote more time to ecological interpretation and strategic interventions, thereby supporting faster, data-driven decisions in biodiversity protection.

Keywords: Deep Learning, Wildlife Monitoring, Species Classification, Computer Vision, Ecological Research, Biodiversity.

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CH-27 A study on how the data mining techniques change the operation of various organization

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Abstract

In the digital age, organizations increasingly rely on data-driven decision-making to enhance efficiency and competitiveness. Data mining techniques play a crucial role in extracting valuable insights from vast amounts of data, enabling businesses to optimize operations, predict market trends, and improve customer experiences. This study explores how data mining techniques transform organizational functions across various sectors, including finance, healthcare, retail, and manufacturing. By analysing existing literature and reviewing popular data mining tools, the study highlights the significance of data mining in enhancing operational effectiveness, risk management, and strategic planning. The findings contribute to understanding the evolving role of data mining in modern enterprises and offer insights into future advancements. Data mining has emerged as a powerful tool in transforming organizational operations across various industries. It involves the extraction of valuable insights from large datasets, enabling organizations to enhance decision-making, optimize performance, and gain a competitive edge. This study explores the impact of data mining techniques on the functioning of diverse organizations, focusing on sectors such as healthcare, finance, retail, manufacturing, and education. The research examines how data mining methodologies—including classification, clustering, association rule mining, and predictive analytics—contribute to improving efficiency, detecting fraud, personalizing customer experiences, and forecasting trends. Furthermore, it highlights the role of machine learning and artificial intelligence in refining data mining processes, ensuring more accurate and actionable insights. Organizations leverage data mining for various purposes, such as customer segmentation, risk assessment, supply chain optimization, and operational automation. For instance, in the healthcare sector, predictive analytics assists in diagnosing diseases and optimizing patient care, whereas financial institutions use anomaly detection to identify fraudulent transactions. Similarly, retail businesses employ recommendation systems to enhance customer satisfaction, and educational institutions utilize learning analytics to improve student outcomes. Despite its numerous advantages, data mining poses challenges such as data privacy concerns, ethical considerations, and the need for high computational resources. This study also explores strategies to address these challenges, including the implementation of robust security measures, adherence to data governance policies, and the development of transparent algorithms.

Keywords: Data Mining, Data Association, Mining Process, Mining Tools.

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CH-28 Sentiment and Engagement Analysis in Online Education: A Data Science Perspective

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Abstract

The rapid growth of online education has created vast amounts of learner-generated data, including discussion forum posts, chat logs, course feedback, and social interactions. Analyzing this data provides valuable insights into student sentiment, motivation, and engagement—critical factors for improving learning outcomes. This research explores a data science–driven framework for sentiment and engagement analysis in online education, leveraging Natural Language Processing (NLP), machine learning, and learning analytics. By applying text preprocessing, feature extraction, and supervised/unsupervised modeling, the study identifies emotional tone, participation patterns, and engagement levels within online learning environments. The proposed framework supports early detection of disengaged or dissatisfied students, enabling instructors and institutions to implement timely interventions. The findings underscore the role of sentiment analysis as a complementary dimension to traditional performance metrics, enhancing personalized learning, learner satisfaction, and the overall quality of online education.

Keywords: Sentiment Analysis, Engagement Analysis, Online Education, Natural Language Processing, Machine Learning, Educational Data Mining, Learning Analytics, Student Feedback, Predictive Analytics, Emotion Detection

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CH-29 Early Dropout Detection in Online Learning Platforms using Deep Learning Techniques

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Abstract

The rapid expansion of online learning platforms, particularly MOOCs (Massive Open Online Courses), has revolutionized access to education. However, these platforms face a critical challenge: high dropout rates. Early identification of at-risk learners can enable timely interventions and improve course completion rates. This study proposes a deep learning-based framework to predict student dropout in online courses by analyzing their behavioral and interaction data. A Long Short-Term Memory (LSTM) neural network is employed to model temporal patterns in student activity logs, such as video views, quiz attempts, and forum interactions. Using the KDD Cup 2015 dataset from XuetangX, the model achieves high accuracy in predicting dropout risk within the first few weeks of course activity. The proposed method outperforms traditional machine learning models in capturing sequential engagement trends and highlights key indicators influencing dropout behavior. This research contributes a scalable and interpretable solution for educational platforms to enhance learner retention and personalize support mechanisms.

Keywords: Dropout Prediction, Online Learning, Deep Learning, MOOC Analytics, LSTM, Student Engagement, Educational Data Mining, Early Intervention, Learning Analytics, Behavioral Time Series

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CH-30 Intrusion Detection System Using Machine Learning and Network Traffic Analysis

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Abstract

With the rapid growth of the internet and digital services, cybersecurity threats have become increasingly sophisticated, posing significant risks to individuals, organizations, and governments. Traditional rule-based Intrusion Detection Systems (IDS) are limited in detecting novel and complex attacks, necessitating the use of intelligent solutions. Machine Learning (ML) offers promising approaches for analyzing large-scale network traffic and identifying malicious behavior patterns. This research focuses on the development of a Machine Learning–based Intrusion Detection System using benchmark datasets such as NSL-KDD and CICIDS2017. Various supervised and ensemble learning algorithms, including Logistic Regression, Decision Trees, Random Forest, Support Vector Machines, and K-Nearest Neighbors, are implemented and compared. The models are evaluated based on accuracy, precision, recall, F1-score, and ROC-AUC metrics. Furthermore, cross-validation is employed to ensure robustness of the results. The outcome of this study highlights the potential of ML-driven IDS in improving detection rates and reducing false positives, thereby contributing to enhanced cybersecurity in real-world environments.

Keywords: Intrusion Detection System, Machine Learning, Cybersecurity, Network Traffic Analysis, NSL-KDD, CICIDS2017, Random Forest, Support Vector Machine, Classification, ROC-AUC.

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CH-31 An IoT-based Environmental Monitoring System Using Python and MQTT Protocol for Real-time Data Visualization and Anomaly Detection

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Abstract

The Internet of Things (IoT) has revolutionized environmental monitoring by enabling real-time data collection and analysis from distributed sensors. This research presents an IoT-based Environmental Monitoring System implemented using Python, simulating key environmental parameters such as temperature, humidity, and air quality. The system utilizes MQTT protocol for efficient sensor data transmission to a centralized server, where data is processed and visualized through an interactive dashboard. The proposed approach demonstrates low-cost, scalable, and real-time monitoring capabilities suitable for smart cities and industrial applications. Experimental results validate the system's ability to detect abnormal environmental conditions and generate timely alerts, highlighting its potential for proactive environmental management.

Keywords: Internet of Things (IoT), Environmental Monitoring, MQTT, Python, Sensor Simulation, Real-time Data Visualization, Smart Cities, Air Quality, Temperature Monitoring, Humidity Sensing

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CH-32 Blood Group Detection Using Machine Learning

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Abstract

This paper introduces a web-based application that predicts a person's ABO-Rh blood group from fingerprint images using machine learning. The system provides a non-invasive, fast, and accessible solution for estimating blood groups, especially useful in emergency or low-resource settings. The application uses Histogram of Oriented Gradients (HOG) to extract key features from fingerprint images. These features are then analyzed using a Support Vector Machine (SVM) classifier trained on a labeled dataset of fingerprint samples across different blood groups. The model uses class balancing techniques to improve prediction fairness across all classes. Users upload fingerprint images through a simple web interface, and the system provides real-time predictions with confidence scores and probability breakdowns. It also allows users to correct or confirm predictions, which helps improve the model over time by saving corrected samples to the dataset.

Keywords: Fingerprint, Blood Group, SVM, HOG, Machine Learning.

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CH-33 Evaluating the Effectiveness of AI Chatbots as Learning Aids: A Study on Their Impact on Student Performance and Engagement in Higher Education

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Abstract

The integration of Artificial Intelligence (AI) in education has seen a rapid rise, with AI-powered chatbots emerging as interactive learning tools that provide real-time academic support. This study investigates the impact of AI chatbots on student learning, focusing on their effectiveness in improving academic performance, engagement, and satisfaction in higher education settings. Through a mixed-methods approach involving , interviews, and performance analytics, the research evaluates how students utilize chatbots for learning tasks such as homework assistance, concept clarification, and exam preparation. The study also explores students' perceptions of chatbot reliability, usability, and limitations. Initial findings suggest that AI chatbots, such as ChatGPT, can enhance personalized learning and student motivation, particularly when integrated thoughtfully into the academic environment. However, concerns related to overdependence and misinformation highlight the need for critical use and educator oversight. This research contributes to the growing body of knowledge on AI in education, offering practical insights for academic institutions aiming to implement intelligent tutoring systems.

Keywords: Artificial Intelligence in Education, AI Chatbots, ChatGPT, Student Engagement, Personalized Learning, Academic Performance, Conversational AI, Higher Education Technology, EdTech, Learning Support Tools

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CH-34 Quantum Machine Learning for Numerical Regression: A Hybrid Quantum-Classical Approach to Predictive Modeling

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Abstract

Quantum Machine Learning (QML) has emerged as a promising paradigm that integrates the computational advantages of quantum computing with the versatility of classical machine learning techniques. This study proposes a hybrid quantum-classical framework for numerical regression tasks, leveraging the capabilities of variational quantum circuits to capture complex, high-dimensional relationships within numerical datasets. The methodology encodes numerical features into quantum states using amplitude encoding and applies a parameterized quantum circuit trained via a classical optimizer. Experimental evaluation is conducted using IBM Qiskit's quantum simulator on benchmark regression datasets, comparing model performance against classical linear regression and neural network baselines. Results demonstrate that the proposed hybrid approach achieves competitive prediction accuracy while reducing model complexity, particularly for small to medium-sized datasets. Furthermore, the study discusses computational resource requirements, noise resilience, and scalability challenges, offering insights into the practical adoption of QML in predictive analytics.

Keywords: Quantum Machine Learning, Numerical Regression, Variational Quantum Circuits, Hybrid Quantum-Classical Computing, Qiskit, Predictive Modeling, Amplitude Encoding, Quantum Algorithms, Regression Analysis, Quantum Data Encoding.

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CH-35 Federated Learning for Predictive Agriculture: A Privacy-Preserving Approach to Crop Disease Detection

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Abstract

The growing adoption of smart farming technologies has led to the generation of large volumes of agricultural data, particularly for crop health monitoring and disease prediction. However, concerns over data privacy and ownership hinder the development of centralized machine learning models in agriculture. This paper proposes a novel framework that leverages Federated Learning (FL) to enable collaborative crop disease detection across multiple farms without sharing raw data. Each participating farm trains a local model on its proprietary image or sensor dataset, and only the model updates are aggregated to form a global model. This decentralized approach preserves data privacy while still leveraging the benefits of collective learning. We evaluate the proposed framework using benchmark plant disease datasets and simulate its deployment on edge devices typical in rural areas. The results demonstrate that federated learning achieves competitive accuracy compared to centralized models while offering robust privacy guarantees. This research paves the way for scalable, privacy-preserving AI solutions in precision agriculture, especially for low-resource and data-sensitive farming communities.

Keywords: Federated Learning, Crop Disease Detection, Privacy-Preserving Machine Learning, Smart Farming, Precision Agriculture, Edge Computing, Decentralized AI, Agricultural Data Privacy, Deep Learning, Plant Health Monitoring

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CH-36 Learnsphere- A Digital Learning And Sociohub

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Abstract

Most public school students, especially low-income families, have enormous difficulties getting quality learning materials, and thus encounter disparities in learning opportunities. They neither get enough support nor do they access any coaching to consolidate their views. Our website alleviates this situation by offering free AI-driven academic support for all learning materials. Besides AI, which works on doubt clearing, test, and assignments help, we provide according to the school syllabus an array of subjects. The AI system uses natural language processing(NLP) and deep learning to provide instant and accurate answers to student questions- reason given and step by step guidance, if wrong. The React.js, Node.js, Express.js, and MongoDB development have provided a handy interface to ask questions in real-time and track academic performance-attractive and engaging experiences for teachers and learners alike. The complete solution helps the students develop confidence and become successful academicians.

Keywords: Digital Learning, AI-based Support, Real-time Query Answering, Natural Language Processing(NLP), Deep Learning.

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CH-37 Analyzing Real Estate Market Trends and Customer Behavior with Data Science

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Abstract

The real estate industry generates vast amounts of data from property listings, transactions, customer interactions, and market activities. Leveraging data science enables researchers and practitioners to uncover hidden patterns, predict trends, and gain deeper insights into customer behavior. This study aims to analyze real estate market trends and customer preferences by applying machine learning and statistical techniques to structured and unstructured datasets. Regression models, clustering algorithms, and predictive analytics are utilized to identify price determinants, customer purchasing behavior, and demand forecasting. The proposed framework not only enhances decision-making for investors, developers, and agents but also contributes to improving personalized recommendations for customers. The study demonstrates how data-driven insights can optimize property valuation, marketing strategies, and overall customer satisfaction in the real estate sector.

Keywords: Real Estate, Data Science, Customer Behavior, Predictive Analytics, Machine Learning, Clustering, Regression, Property Valuation, Trend Analysis, Demand Forecasting

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CH-38 Smart Exam Monitoring Systems: A Computer-Based Approach to Cheating Detection and Prevention.

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Abstract

The rapid adoption of online and computer-based examinations has raised concerns regarding academic integrity and the increasing sophistication of cheating methods. Traditional invigilation techniques are often inadequate in virtual environments, necessitating the development of intelligent exam monitoring systems. This research paper presents a smart exam monitoring framework that leverages computer-based technologies such as artificial intelligence (AI), computer vision, and behavioral analytics to detect and prevent cheating in real time. The system integrates facial recognition, eye-gaze tracking, and audio-video analysis to ensure authenticity and fairness during assessments. In addition, machine learning models are employed to identify suspicious patterns of behavior, while maintaining scalability for large-scale examinations. The proposed approach not only enhances exam security but also reduces human bias and the operational cost of manual supervision. This study highlights the effectiveness of smart exam monitoring systems in promoting academic integrity and provides insights into challenges such as data privacy, technical limitations, and ethical concerns.

Keywords: Smart exam monitoring, computer-based assessment, academic integrity, cheating detection, online proctoring, computer vision, machine learning, behavioral analytics, AI-based surveillance, automated proctoring

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CH-39 Machine Learning Approaches for Skill Gap Analysis and Placement Assistance of Engineering Students

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Abstract

In today's competitive job market, engineering students often face challenges in securing placements due to a mismatch between their skill sets and industry requirements. This research focuses on developing a machine learning-based framework for skill gap analysis and placement assistance of engineering students. By leveraging historical academic records, technical skills assessments, and placement outcomes data, various machine learning algorithms are applied to predict the likelihood of placement success and identify specific skill deficiencies. The system analyzes patterns in student performance and provides actionable recommendations to bridge skill gaps through targeted training programs. Experimental results demonstrate that supervised learning models such as Random Forest and Support Vector Machines (SVM) offer high accuracy in predicting placement eligibility. This study aims to assist academic institutions and placement cells in making data-driven decisions to enhance student employability and streamline the placement process.

Keywords: Machine Learning, Skill Gap Analysis, Placement Assistance, Engineering Students, Predictive Analytics, Random Forest, Support Vector Machine, Employability Prediction, Data-Driven Decision Making, Academic Performance Analysis

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CH-40 Predictive Modeling for Lecture Adjustment: A Data Science Approach to Faculty Leave Management

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Abstract

Managing faculty leave and lecture adjustments in higher education institutions is often a challenging administrative task, typically performed manually through ad hoc scheduling. Inefficient allocation of substitute lecturers may result in increased workload imbalance, decreased teaching quality, and disruption of the academic timetable. This paper proposes a predictive modeling approach, powered by data science techniques, to optimize lecture adjustments when faculty members are on leave. By analyzing historical leave records, teaching schedules, workload distributions, and subject expertise, the proposed system can forecast potential leave patterns and recommend the most suitable substitute lecturers. Machine learning algorithms such as decision trees, random forests, and gradient boosting are employed to build predictive models for identifying leave trends and substitution requirements. The outcomes demonstrate that a data-driven approach not only improves scheduling efficiency but also enhances fairness in workload distribution among faculty members. This study highlights the potential of predictive analytics in transforming traditional faculty leave management into an intelligent, automated, and scalable decision-support system for academic institutions.

Keywords: Faculty Leave Management, Lecture Adjustment, Predictive Modeling, Data Science, Machine Learning, Workload Balancing, Academic Scheduling, Decision Support System.

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CH-41 AI-Powered Personalized Learning with Ayur-Deep for Preventing Obesity in Young Populations.

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Abstract

The increasing prevalence of obesity among children and adolescents poses significant public health challenges, necessitating innovative approaches for early prevention. This study proposes Ayur-Deep, an AI-powered personalized learning framework that integrates educational strategies with predictive analytics for obesity risk management in young populations. The framework leverages machine learning algorithms to identify individual risk profiles based on behavioral, dietary, and lifestyle data, while delivering adaptive educational interventions through interactive digital modules. By personalizing health education and prevention strategies, Ayur-Deep aims to enhance awareness, encourage positive lifestyle modifications, and support early intervention. The research further explores the integration of AI-driven learning analytics with evidence-based health guidelines to design scalable, youth-centric obesity prevention programs. The proposed framework contributes to advancing digital health education, fostering sustainable behavior change, and reducing the long-term burden of obesity in society.

Keywords: AI-powered learning, personalized education, childhood obesity prevention, youth health, Ayur-Deep, predictive analytics, adaptive interventions, digital health education, machine learning in healthcare, early prevention strategies

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CH-42 Automated Talent Identification in Cultural Events Through Machine Learning and Multimedia Data.

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Abstract

Cultural events in colleges serve as vital platforms for students to showcase their artistic and creative talents. However, traditional talent identification methods rely heavily on subjective judgments, which may lead to biases and inconsistencies. This study proposes an automated talent identification framework using machine learning and multimedia data analysis. Audio, video, and image features of student performances are processed using deep learning models such as Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs) to classify and evaluate artistic abilities in domains such as singing, dancing, and dramatics. The system integrates feature extraction, performance assessment, and ranking mechanisms to ensure objective and scalable talent identification. Experimental results demonstrate the potential of machine learning techniques in improving accuracy, reducing human bias, and supporting fair recognition in student cultural events. This research contributes to the development of intelligent cultural event management systems that can enhance inclusivity, transparency, and efficiency in identifying emerging student talent.

Keywords: Automated talent identification, cultural events, machine learning, multimedia data, deep learning, audio analysis, video recognition, performance evaluation, CNN, RNN

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CH-43 Fuzzy Logic-Based Decision Support System for University Timetable Management

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Abstract

Timetable management in universities is a complex task involving multiple constraints such as faculty availability, classroom capacity, course requirements, and student preferences. Traditional scheduling techniques often fail to accommodate uncertainty and flexibility, leading to conflicts and inefficiencies. This research proposes a Fuzzy Logic-Based Decision Support System (DSS) to optimize timetable scheduling by incorporating soft constraints and preference-based decision-making. The system models uncertainty through fuzzy sets and applies inference rules to evaluate and rank scheduling alternatives. A prototype is developed using Python with the scikit-fuzzy library, demonstrating how fuzzy inference can effectively handle imprecision in faculty preferences, room suitability, and time slot allocation. The experimental results show that the proposed approach reduces scheduling conflicts, improves satisfaction levels, and provides a more adaptable framework compared to conventional deterministic methods.

Keywords: Timetable management, fuzzy logic, decision support system, university scheduling, soft constraints, uncertainty modeling, scikit-fuzzy, Python-based analysis, optimization, artificial intelligence

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CH-44 Crop Recommendation System Using Machine Learning

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Abstract

This paper discusses a crop suggestion system based on machine learning that assists farmers in selecting appropriate crops with the help of soil and weather information. The system considers factors such as soil nutrients (N, P, K), pH, temperature, humidity, and rainfall. We experimented with various models such as Random Forest, Support Vector Machine, Decision Tree, Naïve Bayes, and K-Nearest Neighbors. Among them, Random Forest performed best, with achieving an accuracy of 95%. This paper provides an overview of the way the system is developed, the methodologies applied, information regarding the data, and how every model worked. As a whole, this system has the goal to increase farming efficiency and facilitate more accurate farming practices.

Keywords: Crop Recommendation, Machine Learning, Random Forest, Agriculture, Predictive Analytics

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CH-45 Revolutionizing Artificial Intelligence Application for Detection of Gujarati Handwritten Characters

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Abstract

The handwritten character recognition (HCR) has grown significance in document digitisation, multilingual text processing, and automated form interpretation. Among the different Indic scripts it is relatively underexplored, despite a large population of speakers. This paper provides a comprehensive review of the state of the art of Artificial Intelligence (AI) models for the detection and recognition of characters from Gujarati handwritten text. We critically review over 30 work references focusing on the benefits and limitations of traditional machine learning (ML) methods, hybrid models and state-of-the-art deep learning (DL) architectures. We study the unique features of the Gujarati Script including diacritical marks and visually similar subset of characters and their impact on identification quotient. In addition, we discuss important challenges such as the lack of large-scale public datasets, variations in handwriting styles, and the details of Gujarati ligatures. By synthesising current knowledge, identifying methodological gaps, and providing potential future directions, this paper aims to assist both novices and experienced researchers in designing robust, efficient, and scalable solutions for Gujarati HCR.

Keywords: Gujarati handwritten character recognition, handwritten text recognition, artificial intelligence, deep learning, transfer learning, dataset, variability, linguistic complexity.

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CH-46 Automated Bleeding Detection in Wireless Capsule Endoscopy: A Deep Learning Approach

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Abstract

Wireless Capsule Endoscopy (WCE) enables non-invasive visualization of the gastrointestinal (GI) tract, but manual analysis of the thousands of images produced per examination is time-consuming and error-prone. Deep learning approaches, including Convolutional Neural Networks (CNNs), transfer learning, and hybrid models, have shown promise in automating bleeding detection and segmentation in WCE images. This paper reviews recent advances in these techniques, compares their performance metrics, and discusses challenges such as limited annotated datasets, class imbalance, and model generalization. Future directions, including attention-based models, data augmentation with Generative Adversarial Networks (GANs), and explainable AI, are highlighted to guide further research. The insights provided aim to improve clinical workflows and enhance diagnostic efficiency for gastrointestinal bleeding detection.

Keywords: Wireless Capsule Endoscopy, Deep Learning, Bleeding Detection, Convolutional Neural Networks, Transfer Learning, Hybrid Models, Gastrointestinal Diagnostics.

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CH-47 Psychological State Analysis of Students During Examinations through ML-Based Stress Detection

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Abstract

Examinations are one of the most critical and stressful phases in the academic life of students, often resulting in heightened anxiety, reduced performance, and adverse psychological outcomes. Traditional assessment methods for evaluating exam-induced stress, such as surveys and self-reporting, are limited by subjectivity and lack real-time insights. This study proposes a machine learning (ML)-based framework for detecting and analyzing the psychological state of students during examinations by leveraging multimodal data, including physiological signals, behavioral patterns, and sentiment analysis. By applying supervised learning algorithms, the framework aims to classify stress levels into low, moderate, and high categories with improved accuracy. The results highlight the potential of ML-driven approaches to provide early detection and intervention, thereby assisting educators, psychologists, and institutions in improving student well-being and academic performance.

Keywords: Machine Learning, Stress Detection, Student Psychology, Examinations, Emotion Recognition, Educational Data Mining, Mental Health

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CH-48 Implementation of a Face Recognition-Based Access Control System for Enhanced Campus Security Using Python

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Abstract

With the increasing need for robust security measures in educational institutions, biometric authentication has emerged as a reliable and convenient solution. This paper presents the design and implementation of a face recognition-based access control system tailored for college campuses. Leveraging Python and its powerful libraries such as OpenCV and face_recognition, the system captures and processes facial images to authenticate individuals in real-time. The proposed system enhances security by restricting unauthorized access and streamlining the entry process without physical tokens or cards. Performance evaluation demonstrates high accuracy and efficiency, indicating potential for scalable campus deployment. This research contributes to the advancement of automated security systems in academic settings, providing a practical approach to safeguarding campus facilities.

Keywords: Face Recognition, Biometric Authentication, Access Control System, Campus Security Python, OpenCV, Real-Time Authentication, Face_Recognition Library, Automated Security, Educational Institutions

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CH-49 Intelligent Conversational Agents Using RASA Framework: Applications in Education and Mental Health

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Abstract

The advancement of Artificial Intelligence (AI), Natural Language Processing (NLP), and neural networks has significantly enhanced chatbot applications across various domains, including education, e-commerce, mental health, and customer service. Among various chatbot frameworks, RASA, an open-source conversational AI framework, provides a flexible and customizable solution for developing intelligent chatbots. This study explores the features and implementation of RASA, including its NLU and Core components, which facilitate intent recognition, entity extraction, and interactive learning. The chatbot system is designed to handle user queries, interact with databases and APIs, and personalize responses based on user preferences. Additionally, we examine the integration of RASA with reinforcement learning, database interaction, and Tracker Store modifications to capture user metadata, such as IP and port. A specialized use case in education is also presented, where a chatbot supports rural students by providing course recommendations, quiz tracking, and faculty appointment scheduling. Another application focuses on mental health, offering AI-driven conversational support to individuals facing anxiety and depression. Furthermore, experimental comparisons between RASA NLU and neural networks in entity classification and intent recognition demonstrate the strengths of RASA in chatbot development. The findings suggest that AI-powered chatbots significantly improve user engagement and efficiency in various sectors, reinforcing the necessity of intelligent conversational agents in modern digital interactions.

Keywords: Chatbots, Artificial Intelligence, Natural Language Processing, RASA, Reinforcement Learning, Neural Networks, Conversational AI, Intent Recognition, Entity Extraction, Educational Chatbots, Mental Health Chatbots.

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CH-50 An overview on different Layers of Artificial Neural Network

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Abstract

We know that human brain is the only part of human body that is responsible for the various activities that our body performs. When we decide to do a particular task our brain generates a concept first then it will create an algorithm about how we can perform it. But the bigger question is, "Can we use our brain to do multitask at the same time?" and the answer is no. If we take a closer look to a human brain we will get to know that our brain is made up of individual neuron units, which is a nerve cell which is the basic building block of our nervous system. So if we can replicate the behaviour of a neuron then we can build an Artificial Neural Network (ANN) that can replicate functionality of our human brain. Here I will give a brief idea how it works like we have many processes going in our brain e.g. watching, feeling air on our skin or feeling hungry etc. all these tasks are carried in our brain with the help or different neurons, just like that in ANN there are different nodes which carries different signals in this network with their respective weights, in ANN it calculates its weighted sum and then passes it to function which makes it perform different actions.

Keywords: Artificial Neural Network, Learning, Number Recognition, Pattern Recognition.

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CH-51 Advancing Low-Resource NLP: Transformer and Deep Learning Strategies for Gujarati News Article Classification and Summarization

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Abstract

Gujarati, a morphologically rich and low-resource Indian language, presents significant challenges for natural language processing (NLP) tasks such as news article classification and summarization due to limited annotated datasets and linguistic complexity. This research proposes a comprehensive framework that leverages transformer-based models (BERT, mBERT, XLM-R) in combination with deep learning and traditional machine learning approaches to enhance the performance of Gujarati news classification and summarization. The study explores data preprocessing techniques, transfer learning, and multilingual embeddings to overcome data scarcity while maintaining semantic and contextual accuracy. Experimental results demonstrate that transformer architectures outperform conventional methods by achieving higher classification accuracy and more coherent abstractive summaries, thus providing a scalable solution for other low-resource languages. The proposed methodology contributes to the advancement of low-resource NLP, supporting the development of intelligent news analytics systems and fostering wider accessibility of digital content in Gujarati.

Keywords: Gujarati news classification, news summarization, transformer models, deep learning, machine learning, low-resource NLP, transfer learning, multilingual embeddings, BERT, XLM-R

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CH-52 Machine Learning-Based Cancer Subtype Classification Using High-Dimensional Gene Expression Data: A Comprehensive Analysis for Precision Oncology Applications

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Abstract

Cancer subtype classification remains a critical challenge in precision oncology, with traditional histopathological methods often inadequate for capturing molecular heterogeneity. This study evaluates machine learning approaches for accurate cancer subtype classification using high-dimensional gene expression profiles. We implemented and compared four machine learning algorithms: Support Vector Machines (SVM), Random Forest (RF), k-Nearest Neighbors (k-NN), and deep neural networks, using publicly available datasets from The Cancer Genome Atlas (TCGA) and Gene Expression Omnibus (GEO). Dimensionality reduction techniques including Principal Component Analysis (PCA) and feature selection methods such as Least Absolute Shrinkage and Selection Operator (LASSO) were employed to enhance model performance and interpretability. Performance evaluation utilized 10- fold cross-validation with metrics including accuracy, precision, recall, F1-score, and area under the ROC curve (AUC-ROC). Random Forest achieved the highest classification accuracy of 94.7% (95% CI: 92.1-96.8%), followed by SVM at 93.2% (95% CI: 90.4-95.6%). LASSO feature selection identified 183 discriminative genes, with PCA reducing dimensionality by 99.75% while retaining 95% of variance. The models successfully identified biologically relevant gene signatures associated with cancer pathogenesis and treatment response. These findings demonstrate that machine learning algorithms achieve superior performance in cancer subtype classification compared to conventional approaches. The integration of dimensionality reduction and feature selection techniques enhances both computational efficiency and biological interpretability, supporting the clinical implementation of ML-based diagnostic tools in precision oncology.

Keywords: Machine learning, cancer classification, gene expression profiling, precision oncology, bioinformatics, molecular diagnostics, support vector machines,random forest, deep learning

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CH-53 Augmented Reality and Internet of Things Integration: Transforming Human-Digital Interactions Across Multiple Domains

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Abstract

The convergence of Augmented Reality (AR) and Internet of Things(IOT) technologies is a revolutionary paradigm shift in user interaction with digital information in the physical world. The convergence, referred to as AR-IoT, presents immersive and interactive engagement that bridges the digital and physical worlds, thus providing a paradigm shift in user interaction in numerous areas. This systematic review examines the human-mediated aspects of the convergence of AR and IoT, with emphasis on their use in manufacturing, medicine, smart cities, education, and retail markets. Through systematic review of existing applications, advantages, disadvantages, and future directions, we examine how integration of these technologies enhances human decision-making, operational efficiency, and overall user experience. The review consolidates evidence from recent studies (2019-2024) and presents a forward-looking perspective on the ongoing development of human-computer interactions fueled by AR-IoT convergence in the digital world.

Keywords: Augmented Reality, Internet of Things, Human-Computer Interaction, Smart Systems, Digital Transformation

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CH-54 An Examination of Cybercrime in India

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Abstract

The term "cybercrime" describes crimes committed through the use of a communication channel or device, such as a watch, laptop, desktop computer, PDA, mobile phone, or car, either directly or indirectly. In the "Global Risks for 2012" research, cyberattacks are expected to be among the top five worldwide threats to the government and corporate sectors. Cybercrime is a kind of crime that gradually damages victims' life and is hard to detect and stop once it has occurred. Because online banking and shopping are becoming more and more popular and entail sensitive financial and personal data, we hear this phrase in the news a lot. In this paper, the various forms of cybercrime, their evolution, case studies, majors that focus on prevention, and the departments that fight them are briefly summarized.

Keywords: Augmented Reality, Internet of Things, Human-Computer Interaction, Smart Systems, Digital Transformation

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CH-55 Rasa: Elevating Customer Experiences With AI Assistants

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Abstract

Conversational AI has evolved significantly over the years, transforming chatbots from simple rule-based systems to sophisticated, context-aware entities. Rasa, with its natural language processing (NLP) capabilities and machine learning algorithms, stands at the forefront of this transformation, enabling developers to build chatbots that understand, interpret, and respond to user queries in a manner resembling human conversation. The way businesses engage with their consumers is being revolutionized by chatbots. They act as a service interface that helps clients make decisions more quickly by impacting their experience [23]. The perception of chatbot usage is key to determining the customer experience, as relevant answers to information requirements are crucial in providing a satisfactory interaction [25]. In the past couple of years, chatbots have become an integral part of the online customer experience. Customers often cannot discern whether they are interacting with a chatbot or a human, thanks to the rapid evolution of artificial intelligence. This has created immense opportunities for companies to leverage chatbot technology and enhance customer interactions.

Keywords: Rasa Framework, Conversational AI, NLU, BERT Classifier, Complexity and Simplicity.

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CH-56 Optimizing Land Area Calculation: A GPS-Based Approach for Improved Accuracy and Efficiency

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Abstract

This research article details the design and development of an Android-based application titled "GPS Land Area Calculator", aimed at providing precise measurement of land areas using Global Positioning System (GPS) technology. The application captures the user's geospatial coordinates in real time as they traverse the boundary of a given land parcel, and subsequently computes the enclosed area based on the recorded path.The primary objective of this study is to develop an efficient and accessible digital tool that facilitates accurate land area estimation for stakeholders such as agricultural practitioners, land surveyors, and real estate professionals. By eliminating the need for conventional surveying instruments and manual calculations, the application significantly reduces the time, cost, and expertise required for field measurements. Key features of the application include support for multiple units of measurement, persistent data storage, and user-friendly interaction design. The development process adhered to standard software engineering methodologies, encompassing requirement elicitation, system architecture design, implementation, validation, and performance evaluation. The application was implemented using the Java programming language within the Android Studio integrated development environment (IDE), and extensively tested across a variety of Android devices to ensure functional consistency, accuracy, and compatibility. Experimental results confirm that the GPS Land Area Calculator offers a high degree of precision and reliability in land area computation, thereby demonstrating its potential utility in agricultural management, geospatial surveying, and property assessment domains. Future work may focus on extending the system's capabilities through the integration of advanced functionalities such as topographical analysis, satellite imagery overlays, and cross-platform operability.

Keywords: GPS, Land area calculator, Android app, Land surveying, Measurement units, GPS technology, Java programming, Accuracy, Reliability, Terrain analysis.

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CH-57 Optimization of Deep Neural Networks Using Evolutionary Machine Learning Approaches

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Abstract

Deep Neural Networks (DNNs) have demonstrated remarkable success across various domains; however, their performance heavily depends on effective architecture design, parameter tuning, and optimization strategies. Traditional gradient-based optimization methods often suffer from challenges such as local minima, vanishing gradients, and computational inefficiency. Evolutionary Machine Learning (EML) offers a robust alternative by employing population-based search strategies inspired by natural evolution, such as genetic algorithms, particle swarm optimization, and differential evolution. This paper explores the integration of evolutionary approaches to optimize neural network architectures, weights, and hyperparameters. Experimental results demonstrate that evolutionary optimization enhances convergence speed, generalization capability, and robustness of DNNs, making it a promising direction for real-world applications.

Keywords: Deep Neural Networks, Evolutionary Machine Learning, Optimization, Genetic Algorithms, Particle Swarm Optimization, Differential Evolution, Hyperparameter Tuning, Neural Architecture Search

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CH-58 AI-Driven Detection of Cyber Crime in Social Media Platforms

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Abstract

The rapid expansion of social media platforms has brought about significant advancements in communication but has also created fertile ground for cybercrimes such as cyberbullying, online harassment, hate speech, phishing, and misinformation. Traditional rule-based systems often fail to keep pace with the evolving language and tactics used by cybercriminals. This paper explores the application of Artificial Intelligence (AI), particularly Natural Language Processing (NLP) and Machine Learning (ML), in detecting and mitigating cybercrimes on social media platforms. The study reviews current AI models used for identifying harmful content, user behavior anomalies, and coordinated malicious activity. It also examines challenges such as data privacy, model bias, real-time detection, and multilingual content analysis. The paper proposes a hybrid framework integrating deep learning classifiers with contextual awareness for enhanced detection accuracy. Experimental results on benchmark datasets demonstrate improved precision and recall compared to traditional methods. The findings highlight the importance of AI in ensuring digital safety and underscore the need for continuous model updates to counter evolving cyber threats.

Keywords: Cybercrime Detection, Social Media Security, Artificial Intelligence (AI), Natural Language Processing (NLP), Machine Learning (ML), Online Harassment, Misinformation, Deep Learning, Content Moderation, Real-time Monitoring

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CH-59 Comparative Analysis of Indian Legal Text Documents using Large Language Models

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Abstract

This study compares the performance of five Large Language Models (LLMs)—ChatGPT, Google Gemini, Bing Copilot, Claude, and Cohere—in summarizing Indian legal text documents. We collect a diverse dataset of legal documents, preprocess them to remove noise, and tokenize them into sentences. Each LLM is then used to generate summaries, which are evaluated using standard metrics such as F1 Score, Recall, and Accuracy. Additionally, we solicit feedback from legal experts to assess the relevance, accuracy, and completeness of the summaries. Our results show that ChatGPT performed the best overall, with Google Gemini as a close second. These findings suggest that ChatGPT and Google Gemini are promising tools for summarizing Indian legal text documents. Further research is needed to explore the specific strengths and weaknesses of each LLM and address challenges such as domain-specific pretraining. This study contributes to the literature on LLMs in legal text summarization and provides guidance for future research and practice.

Keywords: LLM, Natural Language Processing, Legal Text

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CH-60 Real-Time Parking Slot Occupancy Detection using CNNs and Computer Vision in Smart Cities

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Abstract

Urban parking inefficiencies have been exacerbated by rapid growth in vehicles based on human supervision. Smart parking system proposed utilizes computer vision and deep learning to identify occupied parking slots without per-slot hardware. Live video feeds from IP cameras are analyzed in a Flask-based micro service using OpenCV and a pre-trained Convolutional Neural Network. Every slot is virtually split and examined, with occupancy status determined by a confidence threshold improving classification accuracy and reducing false positives. The system has a three-layer architecture, users can make bookings using a web interface and receive a receipt with a specific QR code for entry and exit authentication. Experimental comparisons shows high reliability and lower user wait times, making it ideal for high-density urban areas. Administrators get live monitoring and slot analytics, allowing for optimal space utilization. SmartPark presents a pragmatic, future-proof answer that is congruent with smart city objectives and sustainable urban transport.

Keywords: Smart Parking System, Real-Time Slot Detection, Computer Vision, Convolutional Neural Network (CNN), QR Code Verification.

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CH-61 AI For Health Care Role Of Machine Learning In Early Diseases Prediction

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Abstract

In the past, doctors' observations were frequently used to make diagnoses, which could cause therapeutic delays. These days, artificial intelligence (AI) employs big data, deep learning, and machine learning to identify patterns in massive medical records, improving detection speed and accuracy. CNNs, RNNs, and SVMs are examples of Al models that are assisting inrecords, improving detection speed and accuracy. CNNS, RNNs, and SVMs are examples of Al models that are assisting in the early diagnosis of mental health issues, diabetes, cancer, and heart disease. Al also aids in the development of individualized treatment programs with the aid of wearable technology, genetic data, and electronic health records.

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CH-62 AI Powered Chatbots In Education : A Survey On Benefits And Challenges

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Abstract

With the rise of artificial intelligence (AI), machine learning (ML), and chatbot technology, the education sector has under gone a major transformation recent development in AI chatbots, such as ChatGPT, have shown many advantages for both students and teachers. however these benefits also brings certain challenges that can affect student learning and create difficulties for educators. This study aims to examine both the advantages and challenges of using AI chatbots in educational environment; with the goal of understanding ho they can help overcome current learning barriers. The paper first explains the historical development of chatbots and key complements that makeup their architecture. It then discusses the main challenges and limitations related to integrating AI chatbots into education. Findings from this narrative review highlight several benefits of using AI chatbots in teaching and learning. Chatbots like ChatGPT can act as virtual tutors, supporting personalized learning by helping students with different activities such as learning new languages, programming, understanding difficult concepts, assisting in research, and providing instant feedback. Teachers can also use chatbots to prepare course content, design assessments, evaluate student performance, and conduct data analysis and research. Despite these advantages, there are serious concerns about data privacy, security, academic integrity, and overdependence on technology.

Keywords: AI chatbots; generative AI; education; benefits and challenges; learning technology.

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CH-63 Automated Irrigation System Using IoT Cloud Computing

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Abstract

In India, 85% freshwater is used in agriculture. This percentage continues to lead in water consumption. The population evolution and increased food demand are one of the primary factors of water maximum utilization. Therefore, primarily, agriculture is contingent on the monsoon, which is not an adequate source of water. So, irrigation is lively in the agricultural zone. Nowadays, with the constant evolution of Artificial Intelligence, IOT and Robotics, the development of monitoring and observing the garden from manual and static, can be transformed into a smart, dynamic one that is central to higher convertibility, water use productivity, and fewer human supervision exertion. This paper focuses on Internet of Things (IOT) computing, smart garden surveying, and irrigation structure, using Mega 2560. The proposed system uses a microcontroller, sensors, and a cloud server that provides real-time web concluded through a Wi-Fi network. The observed data, directed endlessly to the ThingSpeak IOT cloud. The data gathered in the cloud from the system is examined and analyzed. When the target threshold of soil moisture is touched, an action is sent consequently, cloud to the smart irrigation system to irrigate the garden. The microcontroller (Arduino Mega 2560) is implemented to design the control unit. IOT is primarily used to keep the garden owner updated about the position of the sprinklers. The data are frequently updated by the sensors on the IOT cloud. In addition to this, readings are transmitted by the sensors to a cloud channel to produce graphs for analysis.

Keywords: IOT, Smart garden, Arduino Mega, ThingSpeak, Cloud Computing

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CH-64 AI in Smart Cities: Role Of Machine Learning In Traffic And Waste Management

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Abstract

Smart Cities: Using Technology to Improve Quality of Life Cities encounters difficulties in managing resources, transportation, and public services as they expand. IoT, artificial intelligence, and machine learning are some of the technologies that smart cities use to improve the sustainability, efficiency, and enjoyment of urban living. Both public transit and traffic flow are improved by this technology. Reduce waste and increase energy efficiency. Boost public security and safety. Better services for citizens the objective is to build cities that are sustainable, efficient, and livable for citizens. In order to accomplish this, machine learning and deep learning are crucial.

Keywords: AI, IoT, smart cities, technologies, machine learning, liveable

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CH-65 A Comparative Study Of Supervised And Unsupervised Learning Technology For Real-World Applications

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Abstract

This paper presents a comparative study of supervised and unsupervised learning techniques and their applicability to real-world problems. It outlines the key concepts, methodologies, strengths, and limitations of each approach, while also highlighting practical applications across domains such as healthcare, finance, and natural language processing.

Keywords: Supervised Learning, Unsupervised Learning Techniques, Machine Learning, Real World Applications

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CH-66 Sentiment Analysis of Social Media Data Using Machine Learning

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Abstract

The growth of social media platforms has created a vast amount of user-generated text data. This data provides important insights into public opinions, feelings, and attitudes. Sentiment analysis uses machine learning techniques to automatically classify and understand these sentiments. This is useful in areas like marketing, politics, public health, and crisis management. This review explores recent advances in machine learning-based sentiment analysis on social media, covering key algorithms, datasets, preprocessing methods, challenges, and future research areas. It highlights the evolving role of deep learning models and hybrid approaches to tackle the complexities of informal and noisy social media text.

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CH-67 Online Chat-Bot Ticketing System

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Abstract

Aspiring to change the process of booking and managing tickets for trains, buses, flights, movies and museums, YatraBot is creating a new platform. As part of this research project, a powerful client-side chatbot interface is developed in order to facilitate ticketing without the use of backend servers. JavaScript, HTML, and CSS are the three languages that are used to develop a single-page application that is responsive and can function offline. The client-side generation of PDF tickets and the local storage of data are both possible. The user experience is improved by accessibility, swift navigation, and a modular chatbot design, which additionally contribute to the system's efficiency, openness, and scalability.

Keywords: Chatbot; Chatbot; Ticketing System; Client-Side; JavaScript; Online Booking; Single-Page Application (SPA); User Interface; Accessibility; Automation; YatraBot.

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CH-68 Early Detection of Diabetes Using Supervised Machine Learning Techniques

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Abstract
Diabetes, caused by high blood glucose levels, can lead to heart disease, renal failure, and nerve damage if not detected early. This study tests diabetes prediction machine learning methods utilising the Pima Indians Diabetes dataset. The best predictor is found using five classification models: K-Nearest Neighbors (KNN), Logistic Regression (LR), Decision Tree (DT), Support Vector Machine (SVM), and Random Forest (RF). Model accuracy, precision, recall, F1-score, and ROC AUC are assessed on a 70:30 training-testing dataset. Random Forest had the greatest accuracy (73.16%) and ROC AUC (0.8019), followed by Logistic Regression with 73.59% and 0.7980. While Support Vector Machine and KNN performed moderately, Decision Tree had a lesser accuracy of 69.26% but better recall. This comparison shows that ensemble models like Random Forest can Predict diabetes. The results show that machine learning might help doctors diagnose diabetes early and intervene quickly.

Keywords: Machine learning, Random Forest, KNN, Logistic Regression, Decision Tree, SVM.

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CH-69 Hybrid Model for DDoS Detection in Cloud Environment

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Abstract
The Cloud computing is scalable and on-demand service to users; its open and distributed structure makes it a prime target for Distributed Denial of Service (DDoS) attacks. These attacks affect the availability of cloud services and pose serious security risks. A hybrid DDoS detection model based on XGBoost algorithm and Chi-Square feature selection technique is presented. The Chi-Square method is used to statistically select important network traffic features. the data dimension and increasing the interpretability of the model. Normal and malicious traffic is then classified using the XGBoost classifier. The model analysis is based on the standard datasets including NSL-KDD and CICIDS2017. the fundamental key performance metrics such as accuracy, recall, precision, F1-score, and ROC-AUC. Its fast processing and low-key alarm rate, the model for real-time attack detection in cloud environments.

Keywords: DDoS Detection Cloud Security XGBoost Classifier Chi-Square Feature Selection Machine Learning Intrusion Detection System (IDS) NSL-KDD Dataset CICIDS2017 Dataset Network Traffic Classification Real-time Threat Detection

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CH-70 Bridging Academia and Industry: Machine Learning-Driven Insights into the Importance of Research Skills for Employability

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Abstract

This study explores the critical role of research skills in enhancing employability by bridging the gap between academia and industry. Using machine learning-driven insights, the research analyzes how research-oriented competencies such as problem-solving, data analysis, and innovation contribute to career readiness and job performance. The study employs predictive models to assess the relationship between students' research engagement and their employment outcomes. Results highlight that candidates with strong research backgrounds demonstrate higher adaptability, decision-making ability, and industry relevance. The findings provide valuable implications for educators, employers, and policymakers to integrate research-driven skill development into employability frameworks.

Keywords

Research skills, employability, academia-industry gap, machine learning, career readiness, predictive models, job performance, skill development

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CH-71 Digital Threats and Emotional Turmoil: The Mental Health Impact of Cyberbullying and Cyberstalking

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Abstract
The rapid proliferation of digital communication technologies has revolutionized human interaction but has also given rise to new forms of psychological harm through cyberbullying and cyberstalking. This study examines the profound mental health consequences associated with these digital threats, focusing on emotional disturbance, anxiety, depression, and social withdrawal among victims. Using a mixed-method approach that integrates quantitative surveys and qualitative interviews, the research explores the relationship between exposure to online harassment and the development of psychological distress. The findings reveal that persistent digital victimization significantly increases levels of stress, fear, and emotional instability, often leading to long-term mental health challenges such as post-traumatic stress disorder (PTSD) and diminished self-esteem. Furthermore, the study highlights the role of social media platforms in amplifying the reach and intensity of online abuse, thereby compounding emotional harm. The research emphasizes the urgent need for psychological intervention strategies, awareness programs, and stricter cyber policies to safeguard mental well-being in digital environments.

Keywords
Cyberbullying, Cyberstalking, Digital Threats, Mental Health, Emotional Disturbance, Psychological Impact, Online Harassment, Anxiety, Depression, PTSD, Social Media, Victimization, Cyber Psychology, Emotional Turmoil, Cybercrime

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Summary Report: International Conference on Emerging Trends in Computer Science and Intelligent Systems (ICETCSIS 2025)

1. Overview and Significance

The **International Conference on Emerging Trends in Computer Science and Intelligent Systems (ICETCSIS 2025)** successfully concluded on **12 October 2025 at 6:30 PM**, marking a major academic milestone in global research collaboration. Organized by **AMIEE (Association for Machine Intelligence & Emerging Engineering)**, in partnership with **CMAOI** and **RAHSS**, the conference served as a dynamic virtual platform for academicians, researchers, and industry professionals to exchange knowledge on **AI, intelligent systems, and emerging technologies**.

Chief Guest and Inauguration

The conference was inaugurated by **Dr. Aariz Aftab, IAS**, former **Chief Electoral Officer & Additional Chief Secretary, Government of West Bengal**, who highlighted the transformative potential of **AI-driven governance**, **data-centric decision systems**, and **digital transparency** in public administration.

2. Leadership and Organizing Committee

Convener:
Prof. (Dr.) Ipseeta Nanda, Vice Chairperson & Director, Rourkela Institute of Technology, Odisha

Co-Conveners:
Dr. Sheeba P. S., Dean (Academics & Research) and HoD, Computer Engineering, Lokmanya Tilak College of Engineering, Navi Mumbai
Dr. Nandini Katti, Sr. Vice Principal, KES Shroff College, Mumbai
Dr. Uma Nagarajan, Associate Professor, BITS Pilani

Conference Chairs:
Dr. Aamir Junaid Ahmad, Secretary, AMIEE Association
Prof. M. A. Anusua, JSS Science & Technology University, Karnataka

Conference Directors:

Dr. Rita Rani – Daulat Ram College, Delhi
Dr. Poornima G. – B.M.S. College of Engineering, Bangalore
Dr. B. N. Manjunatha Reddy – Cambridge Institute of Technology, Bengaluru
Dr. Malatthi – K.S.R. College of Engineering

The extensive list of S**ession Chairs**, **Jury Members**, and **Review Committee members** reflected pan-India representation, including experts from SRMIST, BITS Pilani, Jadavpur University, Gayatri Vidya Parishad College of Engineering, Surana College, and many others, ensuring broad academic participation.

3. Technical Scope and Research Themes

ICETCSIS 2025 covered an expansive range of research tracks, with presentations from India and abroad. The conference highlighted both **fundamental advances** and **application-oriented research** in modern computing.

Major Research Domains

- Artificial Intelligence and Machine Learning
- Data Science and Big Data Analytics
- Internet of Things (IoT)
- Blockchain and Cybersecurity
- Educational Technology and Smart Learning Systems
- Healthcare Intelligence and Biomedical Applications

Key Discussion Themes

- Ethical AI and digital governance
- Intelligent data-driven public systems
- Human-centric computing for societal impact
- Cross-domain AI applications in healthcare and education
- Interdisciplinary innovation bridging engineering, commerce, and management

4. Technical and Healthcare Application Review Committee

To ensure high-quality interdisciplinary evaluation, the **Technical and Healthcare Application Review Committee** included distinguished experts such as:

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- **Mr. Sujoy Roy** – Solventum, Bengaluru
- **Dr. Sneha Jha** – MTMH, Jamshedpur
- **Dr. Gunveen Kaur Narula** – Ruban Memorial Hospital, Patna
- **Ms. Noore Zahra** – Princess Nourah University, Riyadh

Their participation strengthened the conference's integration of **AI technologies** with **healthcare innovation**, underscoring the event's real-world relevance.

5. Academic and Global Impact

Over **200 research papers** were presented in **parallel sessions**, reflecting the conference's large-scale academic outreach. Participants ranged from **doctoral researchers** to **industry professionals**, fostering international collaboration and academic networking.

The papers showcased innovative solutions in **AI, IoT, data analytics, and smart systems**, with discussions emphasizing **societal impact**, **sustainability**, and **practical deployment** of intelligent technologies.

6. Awards and Publications

To acknowledge excellence in research and presentation, ICETCSIS 2025 announced awards in multiple categories:

- Best Research Paper Award
- Best Innovation Paper Award
- Best Application Paper Award
- Best Interdisciplinary Paper Award
- Best Student Paper Award

All **accepted papers** are to be published in the **Journal of Research and Innovation in Technology, Commerce, and Management (JRITM)** — an ISSN-listed, DOI-enabled, **Google Scholar-indexed** journal (www.jritm.org).

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Heartfelt Thanks for the Grand Success of the International Conference!

The **Association for Machine Intelligence and Emerging Engineering (AMIEE)** expresses its heartfelt gratitude to everyone who contributed to making the **International Conference on Emerging Trends in Computer Science and Intelligent Systems (ICETCSIS 2025)** a resounding success!

The two-day international virtual conference, held on **11th–12th October 2025**, concluded on a high note with over **200 research papers** presented by eminent academicians, researchers, and professionals from across the globe. The conference served as an inspiring platform for sharing innovative ideas, exploring emerging technologies, and fostering interdisciplinary collaboration in the fields of **Artificial Intelligence, Data Science, IoT, Cybersecurity, Blockchain, and Healthcare Intelligence**.

We were deeply honored by the presence of our **Chief Guest, Dr. Aariz Aftab, IAS**, former **Chief Electoral Officer & Additional Chief Secretary, Government of West Bengal**, who graced the inaugural session and delivered an enlightening address on the importance of integrating AI, data-driven governance, and digital transformation in public services.

Our sincere appreciation goes to the **Convener, Prof. (Dr.) Ipseeta Nanda**, Vice Chairperson & Director, Rourkela Institute of Technology, Odisha, and **Co-Conveners Dr. Sheeba P. S., Dr. Nandini Katti, and Dr. Uma Nagarajan** for their outstanding leadership and dedication.

We extend our warm thanks to our **Conference Chairs, Directors, Session Chairs, Jury Members, and Review Committees**, whose tireless efforts ensured the high academic standard and smooth conduct of all sessions. Their expertise and commitment made ICETCSIS 2025 a truly enriching experience for all participants.

A special note of gratitude goes to all **paper presenters, delegates, and attendees** who brought valuable insights and vibrant discussions to the conference. Your active participation and enthusiasm were the true driving forces behind the event's success.

We also thank the members of the **Technical and Healthcare Application Review Committee** for their invaluable contributions in bridging research, technology, and real-world applications.

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All accepted papers will be published in the **Journal of Research and Innovation in Technology, Commerce, and Management (JRITM)** — an ISSN, DOI, and Google Scholar indexed journal — ensuring wide visibility and academic recognition for the contributions made at ICETCSIS 2025.

This achievement marks yet another milestone in AMIEE's journey of promoting academic excellence, innovation, and global collaboration among researchers and institutions. Together, we continue to push the frontiers of knowledge and technology for a smarter, sustainable future.

Once again, **thank you** to every contributor, partner, and participant who made **ICETCSIS 2025** a grand success!
We look forward to your continued support and collaboration in our upcoming events.

With Warm Regards,
Organizing Committee, ICETCSIS 2025
Association for Machine Intelligence and Emerging Engineering (AMIEE)
www.amiee.in

Thank you
Dr. Aamir Junaid Ahmad

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CONCLUSION

The **International Conference on Emerging Trends in Computer Science and Intelligent Systems (ICETCSIS 2025)**, organized by the **Association for Machine Intelligence and Emerging Engineering (AMIEE)** in collaboration with **CMAOI** and **RAHSS Associations**, concluded with remarkable success and global participation.

The two-day virtual conference, held on **11th–12th October 2025**, brought together a vibrant community of scholars, researchers, industry experts, and academicians who presented **over 200 high-quality research papers** across multiple tracks. The event became a hub for intellectual exchange, collaboration, and innovation in fields such as **Artificial Intelligence, Data Science, Internet of Things, Cybersecurity, Blockchain, Educational Technologies, and Healthcare Intelligence**.

In his insightful inaugural address, **Dr. Aariz Aftab, IAS**, emphasized the transformative potential of **AI and data-driven governance**, inspiring participants to align research with real-world societal needs. The conference featured diverse technical sessions, expert-led discussions, and interactive presentations, reflecting the global momentum toward intelligent, ethical, and sustainable digital transformation.

The contributions of our **Convener, Co-Conveners, Conference Chairs, Directors, Session Chairs, Jury Members, and** Review **Committees** were instrumental in maintaining academic excellence throughout the event. Their collective effort, along with the enthusiasm of participants, ensured a seamless and intellectually enriching experience.

All accepted and peer-reviewed papers will be published in the **Journal of Research and Innovation in Technology, Commerce, and Management (JRITM)**, providing enduring visibility and impact within the global research community.

With renewed inspiration and collective vision, AMIEE extends heartfelt gratitude to all collaborators, speakers, reviewers, and delegates who contributed to making **ICETCSIS 2025** an outstanding global academic event.

Dr. Aamir Junaid Ahmad
Conference Chair
Secretary, CMAOI Association

GLIMPSES OF THE INTERNATIONAL CONFRENCE

AMIEE
Empowering Innovation, Shaping Futures

CMAOI ASSOCIATION
An Commerce and Management Association for Industry Experts and Academic Professionals

RAHSS ASSOCIATION

INTERNATIONAL CONFERENCE ON EMERGING TRENDS IN COMPUTER SCIENCE AND INTELLIGENT SYSTEMS (ICETCSIS 2025)

Organised By

AI-ML, Innovative Entrepreneurs, and Engineers Association (AMIEE Association)

In Collaboration With

A Commerce and Management Association for Industry Experts and Academic Professionals (CMAOI Association)
&
Research and Advancement in Humanities and Social Sciences Association (RAHSS Association)

The International Conference on Emerging Trends in Computer Science and Intelligent Systems (ICETCSIS 2025) aims to provide a platform for researchers, academicians, and industry professionals to present and discuss the latest innovations, trends, and challenges in the evolving fields of computer science and intelligent systems.

ORGANIZING COMMITTEE

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Vice Chairperson and Director
Rourkela Institute of Technology, Kalunga, Odisha, India

Co-Convenors

Dr. S. Arvind
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Hyderabad Institute of Technology and Management, Hyderabad-Telangana, India

Dr Sheeba P S
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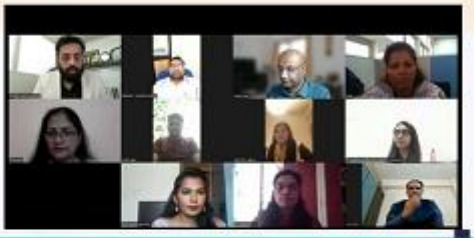

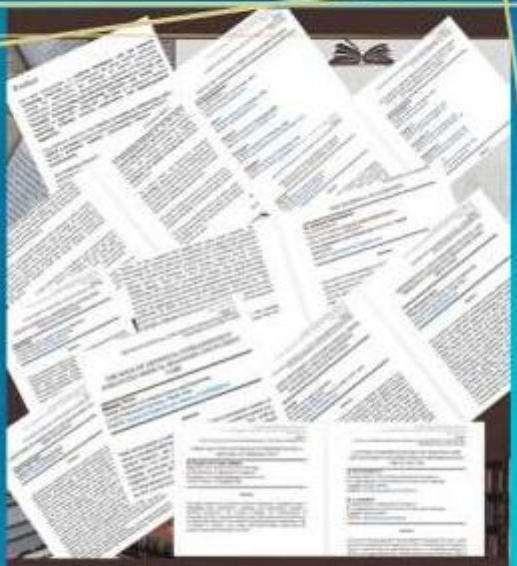

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