

AICDS 2026 - INTERNATIONAL CONFERENCE

AICDS 2026 - INTERNATIONAL CONFERENCE ON AI & DATA SCIENCE



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AICDS 2026

International Conference on AI & Data Science

Edited by

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Editorial Message

It is with great pleasure that we present the proceedings of the *AICDS 2026 – International Conference on AI & Data Science*. This conference represents a significant milestone in bringing together researchers, academicians, industry experts, and practitioners from across the globe to exchange knowledge, share innovative ideas, and discuss emerging trends in the rapidly evolving fields of Artificial Intelligence and Data Science.

In recent years, AI and Data Science have revolutionized the way we analyze information, make decisions, and solve complex problems. From intelligent healthcare systems and financial analytics to smart cities and autonomous technologies, these domains continue to shape the future of technology and society. The contributions included in this volume reflect cutting-edge research, practical implementations, and forward-looking perspectives that address both current challenges and future opportunities.

The editorial team has made every effort to ensure the quality and relevance of the published work through a rigorous peer-review process. We sincerely appreciate the dedication of the reviewers and the commitment of the authors in maintaining high academic standards. Their contributions have been instrumental in making this conference a success.

We also extend our heartfelt gratitude to the organizing committee, keynote speakers, and participants for their valuable support and active involvement. Their collective efforts have created a vibrant platform for intellectual exchange and collaboration.

We hope that this publication serves as a valuable resource for researchers, students, and professionals, inspiring further innovation and contributing to the advancement of AI and Data Science for the benefit of society.

Editors

Dr. Masthan Rao Kale
Dr. Phani Kumar Sindhe
Dr. CM Suvarna Varma

Preface

The *AICDS 2026 – International Conference on AI & Data Science* serves as a premier platform for researchers, academicians, and industry professionals to share innovative ideas and research findings. AI and Data Science are transforming industries such as healthcare, finance, education, and smart systems. We thank all contributors, reviewers, and organizing members for their support.

Building upon this vision, the conference aims to foster interdisciplinary collaboration and encourage the exchange of knowledge across diverse domains. With rapid advancements in machine learning, deep learning, big data analytics, and intelligent systems, the need for a global forum to discuss emerging trends and challenges has become increasingly important. AICDS 2026 provides an opportunity for participants to present cutting-edge research, engage in meaningful discussions, and explore practical solutions to real-world problems. The conference also emphasizes the ethical, social, and economic implications of AI technologies, ensuring responsible innovation and sustainable development. Through keynote sessions, technical presentations, workshops, and panel discussions, attendees gain valuable insights into the latest developments shaping the future of intelligent systems. Furthermore, the conference promotes strong academia–industry partnerships, enabling the translation of theoretical research into practical applications. By bringing together experts from around the world, AICDS 2026 aspires to inspire innovation, nurture talent, and contribute to the advancement of Artificial Intelligence and Data Science for the benefit of society.

Acknowledgement

We express sincere gratitude to all authors, reviewers, and organizing committee members. Special thanks to keynote speakers and participants for enriching this conference.

Their invaluable contributions, dedication, and collaborative spirit have played a crucial role in the successful organization of AICDS 2026. The authors have showcased innovative research and insightful perspectives that advance the frontiers of Artificial Intelligence and Data Science. The reviewers, through their rigorous evaluation and constructive feedback, have ensured the quality, relevance, and academic integrity of the accepted papers. We also extend our heartfelt appreciation to the organizing committee for their continuous efforts, meticulous planning, and commitment in coordinating every aspect of the conference.

We gratefully acknowledge the keynote speakers for sharing their expertise, visionary ideas, and thought-provoking discussions, which have greatly enriched the intellectual environment of the event. Their sessions have inspired participants to explore new research directions and address real-world challenges with innovative solutions. Furthermore, we thank all participants for their active involvement, enthusiastic discussions, and knowledge exchange, which have contributed to making this conference a vibrant and meaningful platform.

Finally, we recognize the support of all institutions, sponsors, and well-wishers who have contributed directly or indirectly to the success of this conference. Their encouragement and support have been instrumental in bringing together a global community of researchers and professionals dedicated to advancing the field of AI and Data Science.

About the Conference

AICDS 2026 focuses on Artificial Intelligence, Machine Learning, Deep Learning, Big Data, and Data Engineering. It provides a global platform for research presentation and collaboration.

The conference is designed to bring together leading researchers, academicians, practitioners, and industry experts to explore recent advancements and emerging trends in these rapidly evolving domains. It emphasizes the integration of theoretical foundations with practical applications, enabling participants to gain a comprehensive understanding of cutting-edge technologies and their real-world impact. AICDS 2026 encourages the presentation of high-quality research papers, case studies, and innovative solutions that address contemporary challenges across various sectors such as healthcare, finance, education, smart cities, and industrial automation.

In addition to technical sessions, the conference includes keynote lectures, panel discussions, and workshops that facilitate knowledge exchange and professional networking. These sessions aim to inspire new ideas, foster interdisciplinary collaboration, and promote the development of sustainable and ethical AI-driven solutions. The event also serves as a platform for young researchers and students to interact with experts, gain insights into current research directions, and enhance their academic and professional growth.

By providing opportunities for collaboration between academia and industry, AICDS 2026 seeks to bridge the gap between research and practice, ultimately contributing to technological innovation and societal advancement.

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Message from Editors

We are pleased to present AICDS 2026 proceedings highlighting advancements in AI and Data Science. This book will benefit researchers, students, and practitioners.

The proceedings encapsulate a diverse collection of high-quality research contributions that reflect the latest innovations, methodologies, and applications in the fields of Artificial Intelligence and Data Science. Each chapter has been carefully selected and reviewed to ensure academic rigor, relevance, and originality, providing readers with valuable insights into current trends and future directions. The content spans a wide range of topics, including machine learning models, deep learning architectures, big data analytics, intelligent systems, and real-world applications across multiple domains.

This volume serves as a comprehensive reference for scholars seeking to deepen their understanding of emerging technologies, as well as for professionals aiming to apply advanced computational techniques to practical challenges. It also provides students with a strong foundation in contemporary research, encouraging them to explore innovative ideas and develop critical thinking skills.

By bringing together contributions from experts around the world, this book fosters knowledge exchange and collaboration within the global research community. We hope that this publication will inspire further research, support academic excellence, and contribute meaningfully to the continued growth and evolution of AI and Data Science.

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Emotion Recognition using Brain-Computer Interface to Improve Human-Machine Interaction: Recent Advances and Future Perspectives

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Abstract

Brain-Computer Interface (BCI) technology has developed as a breakthrough approach to emotion recognition, providing new prospects for improving human-machine connections. This paper provides a complete overview of current techniques, problems, and applications for EEGbased recognition of emotional states. We investigate the transition from traditional feature extraction methods to complex neural networks by analysing current breakthroughs in deep learning, multimodal approaches, and machine learning algorithms. Our results show that multimodal ensemble techniques and deep learning architectures outperform single-modal systems, with accuracy increases of up to 17.82%. However, considerable hurdles remain in terms of inter-subject variability, environmental noise sensitivity, and real-world implementation. This paper summarizes current developments and outlines future research areas in BCI-enabled emotion identification for better interactions between humans and computers.

Keywords: Electroencephalogram, Human-Machine Interaction, Deep Learning, Multimodal Systems, Brain-Computer Interface, emotion identification.

An Optimized Quantum Deep Learning Approach with CNN and U-Net for Dementia Detection

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Abstract—Dementia is a progressive neurodegenerative disorder that significantly affects cognitive functions such as memory, reasoning, and decision-making, posing a major global healthcare challenge. Early and accurate diagnosis is crucial for effective treatment and management; however, conventional clinical approaches are often time-consuming, subjective, and limited in predictive capability. To address these challenges, this paper proposes a novel hybrid intelligent framework that integrates advanced machine learning (ML), deep learning (DL), and quantum-inspired optimization techniques for enhanced dementia diagnosis. The proposed approach combines multi-modal data analysis with optimized feature extraction and classification strategies. Initially, MRI images and clinical data are preprocessed using advanced interpolation and normalization techniques to improve data quality. Subsequently, deep learning models, including convolutional neural networks (CNN) and U-Net architectures, are employed for feature extraction, while feature selection is enhanced using adaptive optimization algorithms. Furthermore, an optimized Quantum Convolutional Neural Network (Q-CNN) integrated with an Improved iHow Optimization Algorithm (IiHOA) is utilized for accurate classification. A hybrid ensemble learning strategy is also incorporated to improve robustness and generalization. Experimental evaluation on benchmark datasets demonstrates superior performance, achieving accuracy exceeding 98% and outperforming existing ML and DL models. The proposed framework enhances diagnostic reliability, reduces computational complexity, and supports early-stage detection, thereby contributing to intelligent and efficient healthcare systems for dementia prediction and management.

Keywords—Dementia Detection, CNN, Q-CNN, Optimization, Ensemble Learning, Medical Imaging.

Federated Blockchain-Assisted Explainable Deep Learning Framework for Secure IoT Intrusion Detection

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Abstract—The rapid growth of Internet of Things (IoT) applications has intensified challenges related to secure data transmission, privacy preservation, and efficient intrusion detection. Existing blockchain-enabled deep learning approaches often rely on centralized architectures, resulting in increased latency, scalability issues, and limited interpretability. To address these challenges, this paper proposes a Federated Blockchain-Assisted Explainable Deep Learning (FBA-EDL) framework for secure IoT environments. The proposed model integrates an enhanced Amended Merkle Tree (AMerT) for data integrity and an optimized Secret Elliptic Curve Cryptography (SElIC) scheme for secure encryption. A federated learning mechanism enables distributed model training without sharing raw data, thereby preserving privacy. Additionally, a lightweight blockchain combined with the InterPlanetary File System (IPFS) ensures efficient and secure data storage. For intrusion detection, a hybrid Attention-based Bidirectional Gated Recurrent Unit with Transformer (Att-BGR-Trans) model is utilized to capture both temporal and contextual features. Furthermore, a SHAP-based Explainable Artificial Intelligence module is incorporated to improve model transparency. Experimental results on NSL-KDD, CICIDS-2017, and IoT-23 datasets demonstrate improved accuracy, reduced latency, and enhanced interpretability compared to existing methods.

Keywords—Internet of Things, Blockchain, Federated Learning, Deep Learning, Intrusion Detection, Explainable AI.

Hybrid GAN-Ensemble Deep Reinforcement Learning Framework for IoT Intrusion Detection

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Abstract—The increasing complexity of cyber-attacks in Internet of Things (IoT) environments necessitates intelligent and adaptive intrusion detection systems (IDS). Traditional machine learning approaches often fail to effectively detect evolving and imbalanced attack patterns. To address these challenges, this paper presents a novel hybrid intrusion detection framework integrating Generative Adversarial Networks (GAN), optimized ensemble deep learning, and Deep Reinforcement Learning (DRL). Initially, GAN-based data augmentation is employed to address class imbalance and enhance the diversity of training data. An optimized feature selection mechanism using a hybrid metaheuristic approach is applied to reduce redundancy and improve model efficiency. Subsequently, a stacked ensemble model combining Bidirectional Long Short-Term Memory (BiLSTM) networks and attention mechanisms is utilized for effective feature learning and classification. Furthermore, DRL techniques such as Deep Q-Network (DQN) and Proximal Policy Optimization (PPO) are incorporated to dynamically optimize detection strategies and improve decision-making under varying network conditions. Experimental results on benchmark intrusion detection datasets demonstrate that the proposed framework achieves superior performance in terms of accuracy, precision, recall, and F1-score compared to conventional models. The integration of GAN-based augmentation, ensemble learning, and DRL significantly enhances detection capability and adaptability, making the proposed approach suitable for real-time and large-scale IoT security applications.

Keywords—Intrusion Detection, IoT Security, DRL, GAN, Ensemble Learning, BiLSTM, Cybersecurity.

A Review of Transformer-Based Deep Learning Models for Glioblastoma Segmentation and Survival Prediction Using MRI

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Abstract- Glioblastoma(GBM) is one of the most aggressive brain tumors, requiring accurate segmentation and prognosis for effective treatment. Traditional deep learning approaches, primarily based on convolutional neural networks (CNNs), have shown promising results but often struggle to capture long-range dependencies and global contextual information in MRI data. This paper presents a comprehensive review of emerging Transformer-based deep learning architectures for glioblastoma detection, segmentation, and survival prediction. Unlike conventional CNN models, Vision Transformers (ViT) and hybrid CNN-Transformer frameworks enable better global feature representation and improved learning of complex tumor structures. The study highlights a novel integrated pipeline that combines Swin Transformer for tumor segmentation, self-attention-based feature selection, and a Transformer encoder for classification and survival prediction. Recent studies demonstrate that Transformer-based models achieve superior performance, with improved segmentation accuracy and enhanced prediction capability compared to traditional CNN-based approaches. This review emphasizes the potential of attention-driven architectures in advancing automated glioblastoma diagnosis and improving clinical decision-making.

Keywords—Cloud Security, Searchable Encryption, Blockchain, Privacy Preservation, Encrypted Data Search, Secure Indexing.

Machine Learning and Image Processing for the Detection of Nourishing Deficits in Plants

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Abstract— Image Processing (IP) and Machine Learning (ML) are used to identify nutritional deficiencies in crops. Crops require an appropriate quantity of vitamins and minerals to finish and maintain a balanced lifetime. A adequate number of six key vitamins and minerals, such as nitrogen, calcium, phosphorus, potash, sulphur, and magnesium (mg), are highly critical for regular and robust crop development. Nutritional deficiencies or deficiency causes difficulty in performing out everyday crop operations and, as a result, reduces production. As a result, having a rapid assessment for nutritional intake is critical. Crops frequently have a noticeable shortage on their leaflets, with distinct configurations for every ingredient. The goal of our planned effort is to create an autonomous and dependable inexpensive alternative for nutritional deficit detection. The datasets for insufficient and healthier branches are constructed utilising IP techniques such as RGB colour feature extractor, real-time texture recognition, edge recognition, and so on. This produced database will be used as a training images for supervised ML to discover and identify specific nutritional deficiencies and healthier seedlings in order to take precautionary actions to optimise production.

Keywords— Crops, healthy leaves, deficiency leaves, nutritional deficiencies, nutrients, Feature Extraction.

Secure Financial Transactions with Blockchain Technology—An Alternative to Tokens

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Abstract

The advent and widespread use of digital technology has profoundly altered human existence. The financial system has discovered numerous risks and frauds. The banking system is unsafe because it relies on a centralized database, which gives attackers easy access to data. Implementing blockchain technology without tokens can improve the system and decrease the drawbacks of this centralized approach. To store and retrieve data from the database, blockchain employs a decentralized design. There will be fewer assaults on compromised databases as a result of this. Each block in the blockchain verifies a transaction, increasing the security of the transaction and facilitating speedier processing times in the banking system.

Cyber Physical System Classifications: A Comparative Study Using Deep Learning with Machine Learning

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Abstract-When it comes to resolving the vast range of problems that crop up in regular life, the cyber physical system (CPS) is by far the most popular infrastructure option. However, making the right decision quickly remains challenging in the big data era. Transforming the manufacturing sector and other applications will rely on Internet of Things (IoT) or CPS. These advantages of CPS come at a price, however, as companies struggle to deal with the massive amounts of data being produced by Internet-connected gadgets, resulting in a slew of difficulties for individuals. These infrastructures are too complex for even the most knowledgeable individuals to manage, monitor, or evaluate. As a result, there is a pressing need for the convergence of Machine Learning (ML) and cyber security in CPS, which equips experts with the tools they need to monitor the internet for potential threats in record time. Since the proposed study examines the various frameworks used for Cyber-attack detection using a learning method, it demonstrates the significance of ML and Deep Learning (DL) in a CPS for more accurately identifying potential dangers. Many academics rely on security analytics, and the tool may also be used to prioritize alarms and signals. It has been brought to the attention of the researchers that the suggested study on various assaults has also emphasized the need to be mindful of rare attacks that may become highly harmful. Additionally, the pros and disadvantages of various methodologies and datasets used in the study of various works in assessing different assaults are presented to aid in selecting the appropriate strategy according to demand.

Keywords- Big data, cyber-attacks, machine learning, deep learning, and cyber-physical systems.

Mango Crop Disease Detection Using a Multi-Swarm Intelligence-Based Model

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Abstract: Soft Computing is the combination of approaches that are used to develop solutions to real-world problems that are not easy to model mathematically. In the existing system, image segmentation is done using the k-means algorithm and disease identification is done using SVM classifier or Random Forest classifier. The existing systems had conducted experiments on only one type of disease mainly Anthracnose. In the proposed system, image segmentation is done using Particle Swarm Optimization (PSO) and disease identification is done using a minimum distance classifier. In this paper, different diseases and various images of mango leaves are considered for the study. The proposed system conducted experiments on six types of diseases such as Bacterial Canker, Mango Anthracnose, Mango Malformation, Oidium Mangiferae, Powdery Mildew, and Sooty Mould and achieved an accuracy of 92.5%.

Keywords: Mango leaf diseases, image segmentation, soft computing techniques, Population based swarm intelligence, expert system, swarm intelligence, minimum distance classifier.

Leveraging Long-Short Term Memory for Wild Fires Prediction

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Abstract - A raging wildfire is a catastrophic event which damages forests, which has a serious effect on people, fauna and flora that are dependent on the forest ecosystem. A study of the size of wildfires in a Canadian Province in USA i.e. Alberta is seen in this article. A variation of the duration of the fire and the area it burns defines the scale of a fire. Our predictive algorithm helps wildfire rescue workers to use their foreseen level in the initial phases in order to mitigate destruction inflicted by a forest fire. Modeling information has been gathered from Natural Resources Canada's real-time dataset, including forest fire and weather information for Alberta, Canada. To evaluate the severity of flames, the dimensions of the region affected with fire and the timeframe of the flames have been used. The information was split into training and evaluation environments after multi-linearity validation and function normalization. In addition, the climatic variables were used to create predictive model by using inputs, a Neural Network for Back Propagation (BPNN), a type of artificial neural network i.e. Recurrent Neural Network (RNN) and a type of RNN i.e. Long Short-Term memory (LSTM). LSTM showed the greatest precision, 95.9 percent, of these classification models. The findings suggest that the scope of a wildfire can be forecast using climatic knowledge at the outset of the event.

Index Terms - Multi-scale forest fire prediction, Prediction of Forest Wildfires, Environmental Integrity, Machine Learning (ML).

Blockchain Security for Transplant and Organ Donation Records

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Abstract—Registration, donor-recipient matching, organ removal, organ delivery, and transplantation all present unique challenges and opportunities in modern organ donation and transplantation systems due to legal, clinical, ethical, and technical constraints. Because of this, a comprehensive organ donation and transplantation system is necessary to ensure a fair and efficient procedure that improves patients' experiences and their confidence in the system. We propose a private Ethereum blockchain-based solution in this paper to facilitate organ donation and transplantation management in a way that is fully decentralised, secure, traceable, auditable, private, and trustworthy. We present six algorithms for smart contracts along with information about how they were built, tested, and validated. We compare our solution to preexisting solutions and conduct privacy, security, and confidentiality analyses to determine how well our proposal performs. We release the source code for the smart contract on Github so that everyone can use them.

Keywords— Block chain, Registration, Donors, Implantation, Procurement.

Attention-Based Probabilistic Model for Automatic Image Captioning

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Abstract—Computer Vision (CV) and Natural Language Processing (NLP) algorithms are used to provide textual descriptions of an image known as "image captioning." The performance of contemporary models has been improved by applying Deep Learning (DL) approaches to this issue. There is no way to tell whether parts of a picture are more significant than others, or to explain why certain phrases were chosen as captions. As a workaround for these issues, this study suggests an explainable image captioning model, which uses certain elements in an image to produce captions that can visually explain what they represent. An evaluation of the model's efficacy has been done using datasets like MSCOCO, Flickr8K, and Flickr30K. Some qualitative findings are reported.

Keywords—Bayesian induction, Caption maker, image captioning, objects, visual explanation.

Comprehensive Evaluation of Support Vector Machine Models Based on Kernels for Predicting Multiple Diseases

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Abstract— In today's digital age, data is invaluable, and massive amounts of data have been produced in every field imaginable. Reports from the healthcare sector often contain details about patients' health. By having this clinical expertise, we are better able to detect undetectable health problems and provide individualised therapy to each patient. The purpose of this study was to evaluate and contrast several kernel-based Support Vector Machine (SVM) models for use in healthcare prognostication. With the SVM-LRBF technique, we examined the models with the feature reduction set of the Renal Disorders Disease, Diabetes Mellitus, and Cardiovascular Disease datasets. Similarities and differences between the models and other machine learning systems such as Random Forest, SVM-Linear, Decision Tree, SVM-Gaussian Radial Bias Kernel, and SVM-Polynomial were also analysed. Performance of machine learning approaches was measured using a number of different metrics, including specificity, sensitivity, precision, misclassification rate, and accuracy. The experimental findings showed 98.1 percent accuracy for the Renal Disorders Disease dataset, 90.9 percent accuracy for the Diabetes mellitus dataset, and 98.1 percent accuracy for the Cardiovascular Disease dataset.

Index Terms—Support Vector Machine, Laplace Radial Bias Kernel, Multi-Disease Prediction Model, Radial Bias function, Diabetemellitus and Cardiovascular Disease, Renal Disorders.

Deep Recurrent Neural Network to Predict Tomato Yield

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Abstract. It is critical for greenhouse growers and farmers to be able to accurately predict plant growth and output. Growth and yield models may help farmers better manage the environment, better balance supply and demand, and save expenses. They can do this by developing models. A new generation of analytical tools based on Machine Learning (ML) and Deep Learning (DL) may be on the way. In a greenhouse under controlled circumstances, the proposed study will apply ML and DL algorithms to estimate production and plant growth variation. A new Deep Recurrent Neural Network (DRNN) comprising LSTM neurons is used in the creation of prediction models. In order to model growth variables, RNN architecture makes use of historical yield, growth, and stem diameter data, as well as microclimate conditions. Mean square error is used to assess the performance of various machine learning algorithms, such as Support Vector Regression (SVR) and Random Forest Regression (RF). Data from two greenhouses in Belgium and the United Kingdom under the EU Interreg SMARTGREEN project (2017-2021) reveal promising results.

Keywords: Plant Growth, Farmers, Greenhouse Growers, proliferation, production, tomato, ficus, stem dimension, forecasting.

Tracking the Distractions Caused by Visual and Physiological Signals to Drivers

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ABSTRACT

Nodding off while driving is a leading cause of accidents and deaths in motor vehicles. Consequently, there is a lot of interest in researching ways to detect and avoid driver fatigue. Most of the time-tested methods rely on either physical mechanisms, behaviors, or transportation. While some methods are intrusive and annoying to motorists, others necessitate costly sensors and data processing. Hence, we develop a conceptual model-based approach to driver tiredness detection that is fairly accurate. The suggested method uses image processing algorithms to identify the driver's face from footage captured by a webcam. The ratio of the detected face's eye aspect ratio to its mouth opening ratio is considered in the creation of adaptive thresholding, which is used to recognize drowsiness. Additionally, methods for offline machine learning have been developed. A sensitivity rate of 95.58% and a specificity rate of 100% were achieved by the classification system that relies on Support Vector Machines.

This mechanism has been referred to by a number of names, including drowsiness detection, OpenCV, Eye-to-Mouth Ratio (EOR), and Mouth-to-Opening Ratio (MOR).

Forecasting Staple Food Commodity Prices Using Multivariate Regression Techniques

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Abstract--Profit margins for essential foodstuffs could be a demand rising problem. There are several variables influencing the currency fluctuations. For example, the various variables of commodity food prices are climate, crude prices and so on. The forecasting of the fluctuating prices of basic foodstuffs is also relevant even for government, producers, customers. The article will use ARCH (autoregressive conditionally heteroscedastic) to forecast the essential food market considering external conditions. The findings are well enough agreed with the assessment price in the industry by employing these two main approaches ARCH and GARCH (generalized autoregressive conditionally heteroskedasticity). Whereas for Jalapeno 96.87%, the best result in estimating the cost employing ARCH is achieved. In the meantime the best result for basic food tomato with 99.94% is observed by using GARCH. Proportionally, the ARCH is stronger seen than GARCH, since GARCH is very consistent without disrupting current information.

Keywords—Staple Foodstuffs, Multi-Variate Models, ARCH, GARCH, Machine Learning.

What Blockchain Can Do for the E-Commerce Industry and How It Does It

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Abstract—Consumer habits when it comes to buying are being influenced by the internet-based e-business, which is expanding in tandem with online activity. Nowadays, customers can buy almost everything online. Customers may easily purchase goods or services whenever and wherever they're needed by shopping via the Internet. But as there are more e-commerce sites, there are also more fraudsters. People are in great danger since e-commerce records frequently contain a significant quantity of sensitive data that might rapidly jeopardize their privacy. Consequently is suggested that the database systems for new business platforms incorporate blockchain-based systems. It is anticipated that a great deal of e-commerce-related company apps and procedures will be profoundly impacted by the advent of blockchain. The uses and impact of blockchain technology on the e-commerce sector are the primary subjects of this study. The main issues that blockchain technology aims to resolve are those related to middlemen, openness, decentralization, precision, safety, and operational liberty.

Keywords—Blockchain, E-Commerce, Smart Contracts, Supply Chain, Inventory Control.

Earthquake Damage Grade Prediction Using Machine Learning Techniques

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Abstract

Natural disasters such as earthquakes cause severe damage to human life, infrastructure, and economic systems. Rapid and accurate assessment of structural damage is essential for effective disaster response and relief distribution. Traditional manual inspection methods are time-consuming, resource-intensive, and prone to human error. This research proposes a machine learning–based framework to automatically predict the damage grade of buildings using the Gorkha earthquake dataset from the 2015 Nepal earthquake.

The study investigates multiple classification models including Gradient Boosting, AdaBoost, Random Forest, and Support Vector Machine classifiers. The proposed system follows a structured pipeline consisting of data preprocessing, feature extraction, model training, and performance evaluation. Key features such as building age, structural materials, geographical location, and construction characteristics are analyzed to predict the severity of building damage.

Experimental results demonstrate that ensemble learning models significantly improve prediction accuracy compared to traditional machine learning approaches. The findings highlight the potential of artificial intelligence in supporting disaster management systems by enabling faster and more reliable damage assessment. The proposed framework can also be extended to analyze structural damage caused by other natural disasters, thereby contributing to improved disaster preparedness and response strategies.

AI-Powered Monitoring of Crop Health, Soil Condition, and Pest Risks Using Multispectral/Hyperspectral Imaging

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Abstract

Agriculture plays a crucial role in global food production, but crop yield and quality are often affected by factors such as soil degradation, pest attacks, and plant diseases. Traditional crop monitoring methods rely on manual inspection, which is time-consuming, labor-intensive, and often inaccurate for large agricultural areas.

The proposed system introduces an AI-powered crop monitoring solution using multispectral or hyperspectral imaging technology. These imaging techniques capture data across multiple wavelengths beyond the visible spectrum, enabling detailed analysis of plant health, soil moisture levels, and early signs of pest infestation or diseases.

Using machine learning and deep learning algorithms, the system processes spectral images to detect crop stress, nutrient deficiencies, soil conditions, and pest risks at an early stage. The system can be integrated with drones or satellite imagery to monitor large farmland areas in real time. Farmers and agricultural authorities receive insights and alerts that help them take timely preventive measures, improve crop productivity, and reduce resource wastage.

Deep Learning: Advancing Artificial Intelligence

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Abstract: Deep learning is a subset of machine learning that uses neural networks with multiple layers to analyze complex data. This paper explores deep learning concepts, applications, and future scope.

Evaluating the Trustworthiness of Social Reviewing Systems' Users

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Abstract

The so-called social reviewing systems (srss) are an integral part of our everyday lives on social networks, where we often find data presented in the form of evaluations. The significance of social networks necessitates that they be trustworthy and secure, preventing assaults and misuses and allowing users to freely use the information they provide. False reviews are a major weapon in the fight against the reputation system. Since even accredited users of the network are capable of launching such attacks, a strong defense is to take advantage of trust management by giving each user a trust degree and then having them use it to evaluate the collected data. Managing trust in a srss setting is especially difficult because it is subjective and difficult to completely automate the process of identifying inappropriate conduct. Even though there have been a number of suggestions in recent literature, this problem is still not fully addressed. Combining fuzzy logic with the theory of evidence, we describe trust management as a multicriteriamultiexpert decision making and use the innovative idea of time-dependent and content-dependent crown consensus to suggest a remedy against mendacious reviews. We demonstrated through experiments that our method is superior to the most popular methods in the literature, including those that deal with sockpuppet attacks.

Implementing a Blockchain System to Secure Individual Health Records

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Abstract

The medical field has made extensive use of artificial intelligence (ai) for many years now. In order to improve medical diagnosis, treatment, and follow-up, we can use machine learning and AI algorithms. For example, during the COVID-19 pandemic, ai models were able to predict symptoms, understand the virus's transmission, and use medical data to speed up research and treatment. Building a generalized prediction model is difficult due to the fragmented nature of patient data across the healthcare system, and most organizations do not want to share their data with other third parties due to privacy concerns. Consequently, it is very challenging to make a robust artificial intelligence model and use it in a real-time and real-world environment. Using blockchain and AI, this study proposes a solution to the aforementioned issues. The blockchain will ensure the safety of data access and federated learning based on artificial intelligence in order to construct a reliable model for worldwide and real-time use.

A Hybrid Time-Series Predictive ARIMA and E-GARCH to Predict Rainfall

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Abstract— Today's precipitation is growing increasingly variable, making forecasting increasingly difficult. The Indian Meteorological Department (IMD) currently employs Composite and Stochastic approaches to forecast spring storm precipitation in Asia. As a corollary, planners are unlikely to predict the macroeconomic effects of disasters (due to excessive precipitation) or famine (less precipitation). The amount of precipitation that drops dependent on a variety of factors, including the temperature of the atmosphere, humidity, velocity, mobility, and weather conditions. This paper would then employ the Hybrid time-series predictive ARIMA (Autoregressive Integrated Moving Average)+ E-GARCH (Exponential Generalized Auto-Regressive Conditional Heteroskedasticity) to predict precise runoff by taking into account different climatic considerations such as maritime tension, water content, relative dampness, min-max heat, heavy ice, geostrophic tallness, breeze patterns, soil dampness, and barometric force. In perspective of RMSE, MAE, and MSE, the proposed hybrid ARIMA+E-GARCH paradigm outperformed single simulations and latest hybrid techniques.

Keywords— Yearly precipitation, rainfall frequency, Hybrid Time series prediction models.

Integrating a blockchain-based solution with e-KYC to ensure trust and privacy

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ABSTRACT

Banks and other dependent parties can use the electronic know your customer (e-KYC) system to verify their customers' identities. The majority of banks have moved their e-KYC systems to the cloud because of the scalability, accessibility, and low resource consumption of cloud computing. The primary concern shifts to the safety and confidentiality of electronic know-your-customer (e-KYC) records kept in the cloud. To meet their security and privacy goals, most current e-KYC platforms use strong authentication and conventional encryption. Using their host's key, the KYC system owner encrypts the file before uploading it to the cloud under this model. Communication and key management overheads, as well as encryption reliance, are introduced by this strategy. This paper presents e-KYC trustblock, a new approach to electronic know-your-customer (e-KYC) that uses blockchain technology and the ciphertext policy attribute based encryption (CP-ABE) method to provide privacy, security, and trust. To further facilitate privacy-preserving and fine-grained access to sensitive transactions stored on the blockchain, we also present attribute-based encryption. As a last step, we demonstrate our system's efficiency and scalability through tests.

Detecting Rumors on Social Media via Multi-Modal Meta-Task Learning

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Abstract

The rapid growth of social media platforms has led to an exponential increase in the amount of information shared online. Since the authenticity of posts on these platforms cannot always be guaranteed, rumor detection has become a critical task. Numerous research studies have proposed multi-task learning approaches that improve rumor detection by utilizing stance identification information. This approach helps in understanding users' reactions toward a post and improves the overall accuracy of rumor classification.

However, most existing methods suffer from three major limitations. First, they mainly focus on textual information while ignoring other modalities such as images, which are an important component of social media posts. Second, they do not consider that rumor detection and stance detection tasks exist in different feature spaces, resulting in inefficient knowledge sharing. Third, they do not fully utilize the semantic information contained in fine-grained stance labels.

To address these challenges, this paper proposes a **Multi-Modal Meta Multi-Task Learning (MM-MTL)** framework for social media rumor detection. The proposed framework includes a multi-modal post embedding layer that integrates textual and visual features. A meta knowledge-sharing mechanism is introduced to improve feature sharing between rumor detection and stance detection tasks by sharing higher-level meta network layers. Additionally, an attention mechanism is employed to assign different weights to user replies based on their stance importance. Experimental results on two large-scale Twitter benchmark datasets demonstrate that the proposed approach outperforms existing state-of-the-art methods.

Sharing Verified Service Provider Data on the Blockchain

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Abstract

An example of a heterogeneous node is the Internet of Things (IoT), which connects various types of devices and infrastructure, including sensors, robotics, smartphones, connected vehicles, smart homes, and more. Multiple security threats threaten the scattered and ever-changing settings in which these smart items interact with one another. When it comes to the internet of things, trust management is a major obstacle. Heterogeneity, mobility, and scalability are three new criteria of the internet of things (IoT) that current trust management solutions fail to address. Our proposed trust management protocol for mobile, hierarchical, blockchain-based, dispersed Internet of Things (IoT) systems is detailed in this article. As part of our protocol, mobile smart objects add service provider trust data to the blockchain. This streamlines the trust evaluation process by giving all objects a bird's-eye view of every service provider in the architecture. Not only that, our system can withstand the most common forms of malevolent assault, including ballot stuffing, badmouthing, and cooperative attacks. We use theoretical analysis and comprehensive simulations to prove that our proposal is efficient. Lastly, we demonstrate that it surpasses current systems, particularly with regard to scalability, support for mobility, communication, and computation costs.

MENTAL HEALTH DISORDER DETECTION FROM SOCIAL MEDIA USING NATURAL LANGUAGE PROCESSING AND MACHINE LEARNING TECHNIQUES

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Abstract— Social media platforms have become ambient recorders of human cognition, emotion, and behavioural expression, generating vast textual corpora that carry latent signals of psychological distress. This paper presents a supervised machine learning framework for the automated detection of mental health disorders — specifically depression, anxiety, and post-traumatic stress disorder (PTSD) — from user-generated social media text. A curated multi-source dataset comprising Reddit and Twitter posts with validated clinical annotations is subjected to a structured natural language processing (NLP) pipeline including text normalisation, stop-word removal, stemming, and TF-IDF and BERT-based feature extraction. Four classifiers — Logistic Regression, Random Forest, Support Vector Machine (SVM), and a fine-tuned BERT-based neural classifier — are trained, optimised via grid search cross-validation, and evaluated on accuracy, precision, recall, F1-score, and AUC-ROC. The BERT-based classifier achieves the highest overall F1-score of 0.91, while the Random Forest model demonstrates competitive interpretability through feature importance analysis, revealing linguistic markers such as anhedonia vocabulary, temporal hopelessness expressions, and social-withdrawal language as primary indicators of disorder risk. Results demonstrate that NLP-augmented machine learning can serve as a scalable, low-cost complement to clinical mental health screening, enabling earlier identification and personalised digital wellness interventions across diverse population groups.

Keywords — Mental Health Detection, Social Media Analysis, Natural Language Processing, BERT, Random Forest, SVM, Depression Detection, Sentiment Classification, Digital Healthcare.

COVID-19 prognosis Well-being of the victim Applying the eXtreme Gradient Boost Algorithm

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Abstract—In many areas, machine learning and data-driven approaches are becoming very important and popular. Gradient tree boosting is one technique of the machine learning approaches included in practice which appears in many application domains. Tree boosting has been appeared to have cutting edge execution on numerous normal measurements for classified benchmarks. A highly efficient and commonly used machine learning approach is tree boosting. This study proposed a calibrated Random Forest model improved by the eXtreme Gradient (XG) Boost algorithm. The model utilizes the spatial, transit, medical, and demographic details of the COVID-19 patient to forecast the seriousness of the patient and the potential result, recuperation, or demise. The system has 0.88 F1-score and 95% accuracy on the repository used. The descriptive statistics indicates a strong link between the sexual orientation and demise, and also shows that most victims are between the ages of 20 and 70.

Keywords---Healthcare Industry, Tree Boosting, Fine-tuned Random Forest Classifier, XGBoosting, Corona Virus Disease-2019(COVID-19), Machine Learning.

Machine Learning and Image Processing for the Detection of Nourishing Deficits in Plants

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Abstract— Image Processing (IP) and Machine Learning (ML) are used to identify nutritional deficiencies in crops. Crops require an appropriate quantity of vitamins and minerals to finish and maintain a balanced lifetime. A adequate number of six key vitamins and minerals, such as nitrogen, calcium, phosphorus, potash, sulphur, and magnesium (mg), are highly critical for regular and robust crop development. Nutritional deficiencies or deficiency causes difficulty in performing out everyday crop operations and, as a result, reduces production. As a result, having a rapid assessment for nutritional intake is critical. Crops frequently have a noticeable shortage on their leaflets, with distinct configurations for every ingredient. The goal of our planned effort is to create an autonomous and dependable inexpensive alternative for nutritional deficit detection. The datasets for insufficient and healthier branches are constructed utilising IP techniques such as RGB colour feature extractor, real-time texture recognition, edge recognition, and so on. This produced database will be used as a training images for supervised ML to discover and identify specific nutritional deficiencies and healthier seedlings in order to take precautionary actions to optimise production.

Keywords— Crops, healthy leaves, deficiency leaves, nutritional deficiencies, nutrients, Feature Extraction.

Tracking App for Buses

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Abstract

The daily journey of millions of children between their homes and schools is an essential one. In some cases, it is of the utmost importance for parents to secure safer transportation for their children. The number of crimes perpetrated against children is steadily rising, particularly in industrialized nations. Everywhere you look, kids spend a disproportionate amount of time getting to and from school. The planned app gives parents access to their children's school bus information, such as whether the bus is running late, when it will arrive, where the bus is on a map, and an alert if the bus is running behind schedule.

Cyber Security: Protecting Data in the Digital Age

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Abstract: In today's digital world, cyber security has become a critical issue due to the rapid growth of internet usage and digital technologies. This paper discusses the importance of cyber security, common threats, and methods to protect systems and data

Data-Driven Performance Prediction in Women Handball Athletes Using Machine Learning

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Abstract-- To execute a task that individuals have trouble performing, machine learning algorithms are applied. In both league and practice scheduling, the study and prognostication of the success of particular fitness events by athletes is increasingly relevant. When employing traditional approaches, the variety and difficulty of particular forms of sporting event and the often time - varying interactions among them start making research and forecasting activities difficult. The utilization of powerful Machine Learning(ML) algorithms can analyze the athletic success of players with amazing precision. The goal of this analysis was to test various ML models to forecast unique varieties of player' success and to use a better system to decide the critical attributes affecting projected outcomes in woman handball athletes. The basic type of regression in ML i.e Simple Linear Regression(SLR), Classification Tree(CT), Support Vector Regression(SVR), Neural Networks that employs Radial Basis Function(RBFNN) were executed to forecast the potential abilities of woman handball players in Squat Jump(SJ), Squat Jump on Toes(SJT), Sprint over a 10-m distance(SP10) and a *Handball Sport-Skill Test(HSST)*. To every ML model, a maximum of 23 feature values and 117 occurrences of training samples were captured. The outcomes proved that the RBFNN performed better than other models and was efficient in forecasting the players' performance with R-squared values between 0.86 and 0.97. Lastly, by upskilling the superlative system, essential attributes affecting expected success were evaluated. This is initial and earliest attempt using ML in the field of sports i.e handball, and the findings are promising and appealing for subsequent researchers.

Keywords—Machine Learning, Handball, Handball Sport-Skill Test, Sprint, Squat Jump.

Mango Crop Disease Detection Using a Multi-Swarm Intelligence-Based Model

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Abstract: Soft Computing is the combination of approaches that are used to develop solutions to real-world problems that are not easy to model mathematically. In the existing system, image segmentation is done using the k-means algorithm and disease identification is done using SVM classifier or Random Forest classifier. The existing systems had conducted experiments on only one type of disease mainly Anthracnose. In the proposed system, image segmentation is done using Particle Swarm Optimization (PSO) and disease identification is done using a minimum distance classifier. In this paper, different diseases and various images of mango leaves are considered for the study. The proposed system conducted experiments on six types of diseases such as Bacterial Canker, Mango Anthracnose, Mango Malformation, Oidium Mangiferae, Powdery Mildew, and Sooty Mould and achieved an accuracy of 92.5%.

Keywords: Mango leaf diseases, image segmentation, soft computing techniques, Population based swarm intelligence, expert system, swarm intelligence, minimum distance classified.

IoT's Role in Smart Cities: An Overview, Its Uses, Unresolved Problems, and Available Solutions

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Abstract— Smart cities have emerged as a response to the fast expansion of metropolitan areas; these places strive to improve the lives of their residents while simultaneously promoting environmentally responsible growth. To maximize urban services, the Internet of Things (IoT) is an essential technology that allows for the seamless integration of sensors, devices, and systems. This allows smart cities to become a reality. With an emphasis on smart transportation, energy management, healthcare, environmental monitoring, and public safety, this paper explores the critical role of IoT in smart cities. Data security, privacy, scalability, and interoperability are some of the problems that arise when smart cities use IoT, despite the revolutionary potential it has. These obstacles are thoroughly examined in this work, along with possible solutions to these problems. This study gives a thorough overview of the IoT and its impact on smart city development, innovation, and urban resilience by focusing on the present situation, applications, and unanswered questions.

Keywords—Fire detection, Waste Management, Smart City, Drainage Monitoring, Digital Technology.

A Secure and Efficient System for Requesting Data Downloads and Controlling Data Access

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Abstract

Academics and businesses alike have begun to take an interest in cloud-based data storage services in recent years, drawn by their efficiency and cheap administrative costs. Because it is an open network, service providers are required to take extreme precautions to safeguard their clients' private information and proprietary company data. The most popular method for protecting sensitive data from prying eyes is encryption. Encrypting data (with an algorithm like AES) is an excellent beginning, but it won't fix the data management issue in the real world. To further ensure that users are able to access the service, it is crucial to consider access control on download requests in order to prevent Economic Denial of Service (EDoS) assaults. This study considers dual access control as it pertains to cloud storage, with the goal of creating a mechanism to manage who can access data and make download requests while keeping performance and security at a high standard. Here we have a look at the blueprints for two distinct dual access control systems, one for a specific setting and one for another. The experimental results and security discoveries of the systems are also included.

PREDICTING HEART DISEASE WITH HYBRID ALGORITHMS

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Abstract

This paper focuses on predicting heart disease using various machine learning algorithms such as Support Vector Machine (SVM), Naïve Bayes, and Logistic Regression. Although these algorithms provide reasonable prediction results, their accuracy is not sufficient for reliable medical diagnosis. To improve prediction performance, this study proposes a hybrid machine learning approach that combines two classification algorithms: a Linear Model and Random Forest. The hybrid model uses a voting classifier technique, where predictions from multiple models are compared, and the final result is selected based on the highest accuracy. By integrating multiple algorithms, the proposed hybrid model enhances the overall prediction accuracy and provides a more reliable method for detecting heart disease. The results demonstrate that the hybrid approach performs better than individual machine learning algorithms.

Sahyaam: An IoT-Enabled Multi-Modal Emergency Response System for Elderly Rural Populations in India

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Abstract

Emergency response infrastructure in rural India remains critically underdeveloped, leaving elderly populations especially vulnerable during medical crises. Network coverage gaps, linguistic barriers, and the physical inability to operate conventional smartphones render existing digital emergency services ineffective for this demographic. Sahyaam is a proposed IoT-enabled, multi-modal emergency response system designed specifically for elderly rural users. The system integrates a hardware panic button (Safe Harbor Beacon), a community volunteer dispatch network, a family monitoring interface, and a multi-tier communication stack — spanning WiFi, GSM (SMS/USSD), and offline Bluetooth mesh — into a unified finite state machine (FSM)-driven workflow. The architecture employs a weighted dispatch scoring algorithm to identify and alert the nearest available volunteer, while simultaneously notifying registered family members. This paper presents the system design, proposed architecture, communication fallback model, and expected operational outcomes. Sahyaam positions itself not as a smartphone application but as an embedded smart-system layer capable of functioning in low-connectivity, resource-constrained environments.

Keywords: IoT emergency response, GSM fallback, rural healthcare, elderly care technology, volunteer dispatch, FSM workflow, Bluetooth mesh, smart systems

Immutable Defense: A Comprehensive Review of Blockchain Applications in Cyber-Resilience

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Abstract—The rapid development of digital technologies, cloud computing, and services of the internet has raised the issue of cyber security and data privacy to a considerably higher level. Organizations and individuals are engaging in online communication on a regular basis and sharing a lot of sensitive information on the internet, and thus they are at risk of cybercrimes like data breach, ransomware, and identity theft. Meanwhile, blockchain technology has provided a new opportunity to increase the levels of transparency, integrity, and security in digital transactions. Blockchain offers decentralization of data storage and cryptography, which can be used to mitigate some of the issues that have been faced in the conventional centralized systems. The paper represents a thorough analysis of the problem of cyber security, the issue of data privacy, and how blockchain technology can be used to resolve these problems. This paper discusses new advancements, typical attack patterns, privacy protection methods, and blockchain applications in different industries including finance, health, supply, and management of digital identities. Limitations, the future directions of research, as well as the possibility of integrating blockchain with the future technologies artificial intelligence and the Internet of Things (IoT) are also covered in the paper. The review also points out the role of blockchain in enhancing trust, transparency, and security in the contemporary digital ecosystems.

Keywords— Cyber Security, Data Privacy, Blockchain, Cryptography, Digital Security, Distributed Ledger.

A Strong Ensemble Learning Model for the Prevention of Phishing URLs

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Abstract

An ever-changing and serious cyber danger, phishing website attacks are among the most pervasive types of cybercrime. There are a number of proposed detection methods for phishing websites. Some examples include lookup systems and fraud cue-based solutions. We developed deep representation-based methods that can learn deep fraud cues for increased anti-phishing capacity because lookup systems and fraud cue-based methods have their limits. Lookup systems fail to address freshly designed assaults, and fraud cue-based methods rely on feature engineering. These approaches ignore the textual information and visual design that make up a website in favor of URL analysis. The lack of interpretability in these deep learning-based methodologies also lowers the credibility of the models and hinders the generation of useful and actionable intelligence. Therefore, in order to identify phishing websites, we provide MMHAM, a multi-modal hierarchical attention model that learns the deep fraud signals from the three main modalities of website content simultaneously. For the attention mechanism to properly align representations from various modalities, MMHAM employs a novel shared dictionary learning method. Our evaluation studies showed that the suggested MMHAM could learn better deep cues for better phishing detection and also gave us a hierarchical interpretability system to build phishing threat intelligence for multiple levels of phishing website detection.

Volcanic Eruption Forecasting using Radial Basis Function Neural Networks

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Abstract - When it comes to volcanic eruption surveillance, techniques rely on seismic analysis of data tend to use mechanistic techniques that ignore the fact that volcanic formations are varied and flexible. Sophisticated procedures for data categorization and assessment, evaluation, investigation and interpretation are needed to identify small variations in seismic sequences linked with volcanic instability. Machine Learning (ML) and Deep Learning (DL) technologies are continually being devised to better machine extraction and processing of valuable data. In this study we employed Radial Basis Function Neural Networks (RBFNN) to predict volcanic eruptions in Indonesia. We compared RBFNN with other Neural Network (NN) models. It was observed that RBFNN outperformed all the other models in terms of accuracy.

Index Terms – Neural Networks, Volcanic eruption, seismic zones, Prediction, Classification.

Predicting Future Rainfall using Machine Learning Techniques

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Abstract

The difficulty and unpredictability of rainstorm forecasting has far-reaching implications for human society. Proactively reducing casualties and property damage can be achieved through the use of accurate and early predictions. This study presents the results of a series of experiments that use well-known machine learning techniques to build models that can use current weather data to forecast the likelihood of rain in large cities across Australia the following day. The focus of this comparison study is on the modeling inputs, modeling methodologies, and pre-processing steps. The research compares and contrasts the accuracy of weather predictions made by several machine learning systems using different evaluation metrics.

Integrating a Privacy-Preserving Blockchain into a Stock Exchange Platform to Strengthen Its Security

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Abstract—This article introduces a privacy-preserving architecture for a distributed stock exchange platform, which keeps investors' accounts and trades private and untraceable. In order to fulfil these privacy needs, the proposed framework (i) uses specialised data generalisation and distortion techniques to conceal the unique account identifier (NIN) and balance information, and (ii) prevents trading transactions from being traced back to their original investors by making the NIN and balance k-anonymous, meaning that k accounts belonging to different investors share the same balance. In addition, the anonymization procedure is carried out on a periodic basis (after each trading session) to provide permanent anonymity. The suggested framework includes not only anonymity and unlinkability but also traceability and non-repudiation. The simulation studies on a variety of sized and kinds of markets verify the efficiency of the proposed framework in obtaining complete k-anonymity. Furthermore, we undertake a number of tests with varying degrees of anonymity k to evaluate the impact of the proposed privacy algorithms on the trade execution time. We evaluate our proposed platform by looking at how quickly trades are executed in comparison to a standard stock exchange built on a blockchain that does not protect user privacy. Even under the worst-case circumstances, the findings obtained reveal a reasonable increase in execution time.

Automated Currency Exchange System Using Image Processing Techniques

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Abstract

In this research, we suggested a digital image processing methodology-based automatic money recognition system. The recognition of currency by its image or photograph is the primary subject of the effort that follows. Users will be able to identify specifics about currency, such as its name, value, and value in US dollars, euros, and INR. It operates by utilizing the primary features of currency notes, such as their size, color, or printed text, and it also takes into account variations in currency notes within the same nation. The two most popular currencies in our area, the US dollar and the Indian rupee, have been taken into consideration along with their respective denominations. The cash notes may be swiftly and precisely identified using this technology.

Internet of Things (IoT): Connecting the Digital World

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Abstract: The Internet of Things (IoT) is a network of interconnected devices that communicate and exchange data over the internet. This paper discusses IoT concepts, applications, and challenges.

AI-Driven Financial Management System Using Machine Learning Techniques

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Abstract— Predicting future spending is an essential part of successful financial planning, which is a critical function of financial management in any organization's performance. Through the use of algorithms such as Decision Tree Regressor, Prophet, Support Vector Regression, Linear Regressions, and Support Vector Regressions. In order to help with financial obligation forecasting, this research investigates the use of historical spending data to build predictive models. Organizations may evaluate patterns and trends in past spending data to create educated forecasts about future expenditure by employing modern statistical and machine learning approaches. Economic circumstances, industry trends, and internal organizational dynamics are just a few of the many elements that impact spending. This study aims to create and evaluate prediction models that account for these aspects. In an effort to improve the precision and consistency of expenditure forecasts, the research applies data-driven methodologies to glean useful insights from previous financial data.

Keywords— Linear Regressions, Support Vector Regression, Prophet, Decision Tree Regressor, Machine Learning.

Predicting Rainfall using Machine Learning Techniques

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Abstract:

Rainfall prediction is one of the challenging and uncertain tasks which has a significant impact on human society. Timely and accurate predictions can help to proactively reduce human and financial loss. This study presents a set of experiments which involve the use of prevalent machine learning techniques to build models to predict whether it is going to rain tomorrow or not based on weather data for that particular day in major cities. This comparative study is conducted concentrating on three aspects: modeling inputs, modeling methods, and pre-processing techniques. The results provide a comparison of various evaluation metrics of these machine learning techniques and their reliability to predict the rainfall by analyzing the weather data.

Video-Based Object Recognition

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Abstract

Computer vision and artificial intelligence researchers face a formidable challenge when attempting to detect and recognize yolo and cnn items in both structured and unstructured contexts. A novel approach to technology and application object detection based on computer vision is presented in this research. Based on how it looks, every pixel in the image is assigned to either a target or an obstacle. The technique employs a high-resolution binary image captured by a single-lens webcam in real-time. Convolutional neural networks (cnns) provide superior accuracy in object detection and training. The combination of yolo and rcnn allows us to detect within seconds. We can use this to recognize images and even make our own images. Yolo outperforms competitors while consuming less power.

A comparison and forecast of program functionality using machine learning methods

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Abstract—At different milestones in the software evolution process, software quality evaluation is a trivial task. This can be used to schedule performance assessment, quality management and project enhancement operations. Two techniques Linear Programming with Multiple Parameters (LPMP) and Quadratic Programming with Multiple Parameters (QPMP) for assessing the quality of software had been employed in the ongoing studies and researches. Several experts conducted research with Support Vector Machine (SVM), Neural network (NN), C5.0 for quality assessment. These experiments had given poor and low results. In this research, by utilizing corresponding attributes of a multiple datasets, we fine-tuned prediction efficiency. In addition to employing a method of selecting a subgroup of relevant variables and variance matrix for getting greater and better results, we have applied different tests on latest approaches and accomplished good results for other predictive activities. Machine learning (ML) algorithms such as Logistic regression (LR), AdaBoost (AB), Random Decision Forest (RDF), Bagging Classifier (BC) and Classification Tree (CT) are executed on the data to forecast the software functionality, reliability and disclosed the association between the parameters of quality and production. The investigational outcomes proved that the measure of software quality can be well determined and assessed by ML techniques.

Keywords—Software Reliability, Tree Boosting, AdaBoost, Machine Learning, Software Functionality.

Ensemble Learning for Traffic Accident Analysis: Random Forest and Bagged Trees

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Abstract—Foreseeing the danger of an accident, mishap monitoring does just that. Reckless driving, poor road design, and the presence of socially sensitive elements are all significant contributors to traffic accidents. Tracking traffic helps gather data for modelling and testing detection systems. Investigative analysis of past incidents, vehicle movement, transportation systems, and other variables is often used to identify this tendency. Besides natural causes of morbidity and mortality, wounds inflicted in car crashes are a major contributor to mortality rates. Because of this, it's important to examine what causes car crashes and how such incidents might be avoided. In order to determine how to best categorise road accidents into mild, moderate, and catastrophic categories, researchers ran a dataset of events through a battery of Machine Learning (ML) classification algorithms. Foretelling crucial characteristics requires feature selection, and the Random Forest Algorithm excels at this. The severity of disasters may be categorised with the help of Bagged Tree Classifier.

Keywords—Traffic, Accident, Analysis, Bagged Tree classifier, car crashes, Random Forest.

Machine learning based movie recommendation system

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Abstract

For their potential use in online media and business, recommendation systems (rss) have attracted a great deal of attention. There are a number of drawbacks to using more traditional methods in RSS, such as content-based filtering (cbf) and collaborative filtering (cf), which rely on the user's past actions and preferences to make recommendations. This article suggests a hybrid rs for movies that uses sentiment analysis of tweets from microblogging sites and the finest ideas from cf and cbf to reduce the impact of such a limitation. The goal of analyzing movie-related tweets is to provide insight into the movie's reception, public opinion, and trending topics. There has been encouraging experimental evidence using the public database.

AI-Powered Smart Drone System for Disaster Rescue and Missing Person Detection

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Abstract- An Intelligent Approach Using Artificial Intelligence, Computer Vision, and UAV Technology Natural disasters such as floods, earthquakes, landslides, and forest fires have become increasingly frequent across the world, leading to severe destruction of infrastructure and loss of human lives. One of the major challenges faced during such disasters is the delay in identifying and rescuing victims trapped in affected regions. Traditional rescue operations primarily rely on manual search methods, which are time-consuming, labor-intensive, and often dangerous for rescue personnel. Due to difficult terrain, poor visibility, and limited accessibility, locating victims quickly becomes a significant challenge, directly affecting survival rates.

Keywords-Artificial Intelligence (AI) Smart Drones Disaster Management Search and Rescue Missing Person Detection Machine Learning (ML) Deep Learning (DL) Image Recognition Thermal Imaging UAV.

Implementing a Blockchain System to Secure Individual Health Records

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Abstract

The medical field has made extensive use of artificial intelligence (ai) for many years now. In order to improve medical diagnosis, treatment, and follow-up, we can use machine learning and AI algorithms. For example, during the COVID-19 pandemic, ai models were able to predict symptoms, understand the virus's transmission, and use medical data to speed up research and treatment. Building a generalized prediction model is difficult due to the fragmented nature of patient data across the healthcare system, and most organizations do not want to share their data with other third parties due to privacy concerns. Consequently, it is very challenging to make a robust artificial intelligence model and use it in a real-time and real-world environment. Using blockchain and AI, this study proposes a solution to the aforementioned issues. The blockchain will ensure the safety of data access and federated learning based on artificial intelligence in order to construct a reliable model for worldwide and real-time use.

The use of support vector machines for the prediction of breast cancer survival

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Abstract

Breast cancer (BC) is a serious public health concern in the modern world since it is among the most frequent malignancies in women and because, according to worldwide data, it accounts for the vast majority of cancer-related deaths and new cases. Developing an automated method for early cancer detection is necessary since manual cancer diagnosis takes too long and there aren't enough systems available. Detection using machine learning has been more popular and successful in recent years. This research presents a technique that can be used to forecast the stages of breast cancer. Before implementing the machine learning methods directly, we do K-fold cross validation on the dataset to determine which method works better with it.

Next-Generation Stock Market Prediction Using Hybrid Transformers and QINN Models

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Abstract:

The stock market is a highly dynamic and complex environment influenced by numerous factors including economic indicators, geopolitical events, and investor sentiment. Accurate prediction of stock prices and market trends is crucial for investors and financial institutions to make informed decisions. This project proposes a hybrid Artificial Intelligence (AI) framework that integrates Transformer-based models and Quantum-Inspired Neural Networks (QINN) for enhanced stock market prediction. Transformers are powerful for capturing long-term dependencies in time series data, while QINNs bring the advantages of quantum computing principles to optimize learning and improve model generalization. The hybrid approach aims to combine the strengths of both methods, improving prediction accuracy and robustness in highly volatile stock market conditions.

A DECENTRALIZED DIGITAL HEALTH SYSTEM BUILT ON THE BLOCKCHAIN

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Abstract

A digital twin (DT) is an innovative technology that allows for the creation of an exact digital replica of a real-life item or phenomenon. However, creating a Healthcare DT model for patient care is seen as a huge problem due to the lack of a defined system for collecting essential data. There are further privacy and security concerns because healthcare information is sensitive and could be misused. The necessity to create effective ways of collecting and safely managing structured data is underscored by these gaps in our understanding. A mathematical data model for methodically collecting, standardizing, and clearly detailing patient-relevant data is presented in this study. There is an explanation of the provided data model that is in line with real-world uses as well. We have used this patient-centric mathematical data model to clarify the goals and parameters of our proposed HDT system, which is based on the Blockchain. Thus, the reader is presented with the complete picture of the proposed system, including its vital components, protocol flows, and analysis of its several aspects. Lastly, by comparing it to previous research in the subject, the proposed model has proven its feasibility.

Immutable Defense: A Comprehensive Review of Blockchain Applications in Cyber-Resilience

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Abstract—The rapid development of digital technologies, cloud computing, and services of the internet has raised the issue of cyber security and data privacy to a considerably higher level. Organizations and individuals are engaging in online communication on a regular basis and sharing a lot of sensitive information on the internet, and thus they are at risk of cybercrimes like data breach, ransomware, and identity theft. Meanwhile, blockchain technology has provided a new opportunity to increase the levels of transparency, integrity, and security in digital transactions. Blockchain offers decentralization of data storage and cryptography, which can be used to mitigate some of the issues that have been faced in the conventional centralized systems. The paper represents a thorough analysis of the problem of cyber security, the issue of data privacy, and how blockchain technology can be used to resolve these problems. This paper discusses new advancements, typical attack patterns, privacy protection methods, and blockchain applications in different industries including finance, health, supply, and management of digital identities. Limitations, the future directions of research, as well as the possibility of integrating blockchain with the future technologies artificial intelligence and the Internet of Things (IoT) are also covered in the paper. The review also points out the role of blockchain in enhancing trust, transparency, and security in the contemporary digital ecosystems.

Keywords— Cyber Security, Data Privacy, Blockchain, Cryptography, Digital Security, Distributed Ledger.

A Predictive Health Monitoring System Using Big Data Analytics and Machine Learning

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Abstract— Substantial technology advancements in the medicare industry have resulted in a slew of advances in therapeutic interventions, patient health assistance programmes, identifying trends in medical consequences, and so on. This also contributes to a plethora of information resources that can provide a range of forecasts on a lot of illnesses. The paper mentions technology advances in health sector, as well as the intricacy of systems and data quantities that may be utilised to make sophisticated clinical forecasts. It illustrates the opportunities that Big Data (BD) and Machine Learning (ML) might offer to this profession by employing a system that uses a Matlab/Simulink predictive model of a persons health and AzureML to identify potential cardiac issues.

Keywords— Analytics; medical care; health sector; Prediction; AzureML.

An in-depth look at how machine learning and deep learning can be used to improve IoT security

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Abstract—Through the IoT, millions of smart devices may be networked together and set to automatically exchange information with one another. By 2022, the number of connected devices is projected to have reached 80 billion, making IoT one of the fastest-growing digital sectors. Furthermore, additional security concerns have arisen due to the interconnectedness of IoT devices and the many different fields that must work together to install such devices. The underlying weaknesses of IoT devices render useless the implementation of security mechanisms such as protection from cyber threats, authorization, access control, networking, and information protection. To protect the IoT ecosystem, it is necessary to improve upon current security checks. As a result of recent developments in Machine Learning and Deep Learning (ML-DL), artificial intelligence has moved from the realm of science fiction to that of everyday life in several crucial contexts. Therefore, ML-DL techniques play a crucial role in advancing the protection of IoT systems beyond just ensuring encrypted communications between IoT components. To better secure IoT devices, this analysis helps to give a complete overview of ML strategies and current breakthroughs in DL strategies. Vulnerabilities to the protection of the IoT are addressed, including those that have always been present as well as those that are relatively new. The merits, demerits, and overall viability of the ML/DL approach to IoT protection are then described and analyzed. The use of ML/DL to enhance IoT security is explored, along with its advantages and disadvantages. These prospects and difficulties suggest avenues for future study.

Keywords—Machine Learning; Gadgets; Security Challenges and Checks; Issues; Deep Learning; IoT;

PregBot: A Smart Maternal Health Support System Using Machine Learning and NLP

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Abstract. A woman's physical, emotional, and informational requirements are greatly amplified throughout her pregnancy, which marks a life-altering stage. In this study, we present a novel system that uses ML and NLP to provide personalized assistance to pregnant moms and their families, thereby transforming prenatal care. By combining technology advances with compassionate help, this initiative aims to reimagine the pregnant process. Leveraging ML and NLP, our system aims to deliver personalized guidance, reliable information dissemination, and compassionate aid, addressing the diverse and evolving needs inherent in the prenatal period. This paper outlines the comprehensive design, development, and potential impact of the system in enhancing the prenatal care landscape. It explores the technological architecture, methodologies applied in ML and NLP integration, and the ethical considerations underpinning the delivery of supportive care via a digital platform. Additionally, this study highlights the system's scalability and flexibility, guaranteeing its effectiveness in meeting the unique demands and diverse situations faced by pregnant women. It highlights the pivotal role of nurturing emotional well-being, empowering women, and furnishing accurate information crucial for informed decision-making during pregnancy. The objective of this article is to help improve prenatal care paradigms by introducing this method, which will hopefully lead to an atmosphere where pregnant women and their families may feel supported, educated, and empowered as they begin the incredible adventure that is pregnancy.

Keywords: Pregnancy, Women, Machine Learning, Supportive Care, Prenatal Care.

Time Series Forecasting of Weekly Sales Using NeuralProphet

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Abstract— For companies in all sorts of different sectors, sales forecasting is an essential part of long-term strategy. Optimization of inventories, effective allocation of resources, and informed decision-making are all made possible by accurate sales predictions. For a long time, this function has been filled by conventional time series forecasting techniques like ARIMA and Exponential Smoothing. The complexity of today's sales data, with its irregular patterns, seasonality, and non-linear trends, may be too much for conventional systems to handle. This research also presents a comparative study of sales forecasting techniques, focusing on the application of NeuralProphet, an extension of the popular Prophet forecasting library that integrates neural networks. To overcome the shortcomings of conventional approaches, NeuralProphet models complex patterns in time series data using Deep Learning (DL). The study utilizes historical sales data from a diverse set of industries, including retail, e-commerce, and manufacturing, to evaluate the performance of NeuralProphet in comparison to traditional forecasting methods. The results showed that Neural prophet showed better results compared to Facebook prophet in terms of Root Mean Square Error (RMSE).

Keywords—Sales Prediction, Weekly Prediction, Neural Prophet, Facebook Prophet, Sales Data.

Robust intelligent malware detection using deep learning

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Abstract

Malicious software or malware continues to pose a major security concern in this digital age as computer users, corporations, and governments witness an exponential growth in malware attacks. Current malware detection solutions adopt Static and Dynamic analysis of malware signatures and behaviour patterns that are time consuming and ineffective in identifying unknown malwares. Recent malwares use polymorphic, metamorphic and other evasive techniques to change the malware behaviors quickly and to generate large number of malwares. Since new malwares are predominantly variants of existing malwares, machine learning algorithms (MLAs) are being employed recently to conduct an effective malware analysis. This requires extensive feature engineering, feature learning and feature representation. By using the advanced MLAs such as deep learning, the feature engineering phase can be completely avoided. Though some recent research studies exist in this direction, the performance of the algorithms is biased with the training data. There is a need to mitigate bias and evaluate these methods independently in order to arrive at new enhanced methods for effective zero day malware detection. To fill the gap in literature, this work evaluates classical MLAs and deep learning architectures for malware detection, classification and categorization with both public and private datasets. The train and test splits of public and private datasets used in the experimental analysis are disjoint to each other and collected in different time scales. In addition, we propose a novel image processing technique with optimal parameters for MLAs and deep learning architectures. A comprehensive experimental evaluation of these methods indicates that deep learning architectures outperform classical MLAs. Overall, this work proposes an effective visual detection of malware using a scalable and hybrid deep learning framework for real-time deployments. The visualization and deep learning architectures for static, dynamic and image processing based hybrid approach in a big data environment is a new enhanced method for effective zero-day malware detection.

SYSTEM FOR SUPERVISING AND PROGRAMMING WATER QUALITY

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Abstract

Every aspect of daily living depends on water. The vulnerability of source water to pollution has increased due to pollution and urbanization. Preserving the quality of source water and, by extension, human health, requires the immediate implementation of a water quality monitoring system. In order to continuously monitor the quality of water held in above tanks, this research suggests a low-cost, wireless water quality monitoring system. There are a number of characteristics that serve as key quality indicators for water. A timestamp and all of the data pertaining to these parameters are saved in a cloud database in real-time. By comparing the recorded data to set standards, we can determine the water's quality. Because of the timestamp annotation, the data is considered a time series. To predict specific water quality metrics, we use an arIMA model, which is univariate and non-seasonal. In order to foretell when water quality would decline, forecasts are utilized. When comparing the predicted and real values, the model had mean square errors of 0.001 for pH, 0.076 for temperature, and 0.001 for turbidity.

The use of support vector machines for the prediction of breast cancer survival

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Abstract

Breast cancer (BC) is a serious public health concern in the modern world since it is among the most frequent malignancies in women and because, according to worldwide data, it accounts for the vast majority of cancer-related deaths and new cases. Developing an automated method for early cancer detection is necessary since manual cancer diagnosis takes too long and there aren't enough systems available. Detection using machine learning has been more popular and successful in recent years. This research presents a technique that can be used to forecast the stages of breast cancer. Before implementing the machine learning methods directly, we do K-fold cross validation on the dataset to determine which method works better with it.

Identifying Triple Riders and Those Who Do Not Wear Helmets

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Abstract

The sheer number of people living in India makes it very challenging to implement strict traffic laws. Many bikers continue to ride without protective headgear, despite the obvious dangers. The time it takes for traffic cops to keep tabs on every car on the road is substantial. Cctv has been set up in several of the more heavily populated regions to make them feel safer. Motorcyclists can already take advantage of preexisting infrastructure that allows for faster monitoring and surveillance. The authors of this study propose a system to detect riders who are not wearing helmets and to locate the vehicle identification numbers (VINs) of all motorcycles used by individuals without protective headgear. The rider, helmet, and bike's identities are ascertained using the YOLO (You Only Look Once) technique. With the help of the COCO dataset, YOLO has successfully differentiated between eighty different classes. Data from sources including license plate information and images of helmets were used to train YOLO. Using this strategy yields excellent outcomes.

A Look at How Machine Learning and Deep Learning Can Be Used to Make Cyberspace Safer

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Abstract

Machine Learning (ML) and Deep Learning (DL) have attracted significant academic attention in recent years. With the increasing use of online communities and social media, serious societal risks have also emerged. Protecting sensitive data, networks, and computer systems from malicious cyberattacks has become a challenging task. Cybersecurity plays a vital role in ensuring the safety of data.

ML and DL, as advanced technologies, are being integrated to address these cybersecurity challenges. This paper provides an overview of recent research on applying deep learning techniques in cybersecurity and discusses the major challenges that must be addressed for effective implementation.

AI-Driven Autonomous Defense Systems for Modern Warfare

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Abstract:

The rapid advancement of Artificial Intelligence (AI) has significantly transformed modern warfare by enabling autonomous defense systems capable of real-time decision-making. This paper explores the development of AI-driven autonomous defense systems designed to enhance military capabilities and operational efficiency. The proposed system integrates machine learning, computer vision, and sensor fusion techniques to detect, identify, and respond to threats in real time. AI algorithms analyze data from drones, satellites, and ground-based sensors to provide situational awareness and predictive threat analysis. Autonomous systems can operate in high-risk environments, reducing the need for human intervention and minimizing casualties. The system also incorporates reinforcement learning to improve decision-making over time and adapt to dynamic battlefield conditions. Ethical considerations, including accountability, transparency, and the risks associated with autonomous weapons, are discussed. Additionally, challenges such as cybersecurity threats, system reliability, and integration with existing defense infrastructure are addressed. This paper highlights the potential of AI in revolutionizing defense strategies while emphasizing the importance of responsible and controlled deployment.

Keywords: Artificial Intelligence, Autonomous Systems, Defense Technology, Military AI, Threat Detection

AI-Based Cyber Warfare and Intelligent Threat Intelligence Systems

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Abstract:

Cyber warfare has emerged as a critical component of modern defense strategies, requiring advanced technologies to detect and mitigate cyber threats. This paper presents an AI-based cyber warfare and threat intelligence system designed to enhance cybersecurity in military and national infrastructures. The system utilizes machine learning and deep learning algorithms to analyze network traffic, detect anomalies, and identify potential cyber-attacks such as malware, phishing, and zero-day exploits. By leveraging big data analytics, the system processes large volumes of data in real time, enabling rapid threat detection and response. AI-driven predictive models anticipate potential cyber threats and provide proactive defense mechanisms. The system also integrates natural language processing (NLP) to analyze threat intelligence reports and identify emerging attack patterns. Challenges such as data privacy, adversarial attacks, and model robustness are discussed. The proposed solution enhances the resilience of defense systems against cyber threats and supports strategic decision-making in cyber warfare. This research demonstrates the critical role of AI in securing digital infrastructures in modern warfare.

Keywords: Cyber Warfare, Artificial Intelligence, Threat Intelligence, Cybersecurity, Machine Learning

Biofuel-Based Sustainable Alternatives for Traditional Fossil Fuels

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Abstract:

The depletion of fossil fuel resources and the increasing environmental impact of carbon emissions have driven the need for sustainable energy alternatives. This paper explores the use of biofuels as a viable replacement for traditional fossil fuels. Biofuels, derived from organic materials such as plant biomass, agricultural waste, and algae, offer a renewable and environmentally friendly energy source. The proposed study analyzes different types of biofuels, including biodiesel, bioethanol, and biogas, evaluating their efficiency, production methods, and environmental impact. Advanced technologies such as enzymatic conversion and genetic engineering are discussed to improve biofuel production efficiency. The paper also examines the economic feasibility and scalability of biofuel adoption in various sectors, including transportation and power generation. Challenges such as land use, food security, and production costs are addressed. The findings highlight the potential of biofuels to reduce greenhouse gas emissions and dependence on fossil fuels, contributing to sustainable energy development.

Keywords: Biofuels, Renewable Energy, Biodiesel, Bioethanol, Sustainability

Hydrogen Energy Systems as Clean Alternatives to Conventional Fuels

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Abstract:

Hydrogen energy is emerging as a promising alternative to conventional fossil fuels due to its high energy efficiency and zero carbon emissions. This paper explores the development and implementation of hydrogen-based energy systems for sustainable power generation and transportation. The study focuses on hydrogen production methods such as electrolysis, steam methane reforming, and biomass gasification. It also examines storage and distribution challenges associated with hydrogen energy. Fuel cell technology is analyzed as a key component for converting hydrogen into electricity with high efficiency. The integration of hydrogen energy with renewable sources such as solar and wind power is discussed to create a sustainable energy ecosystem. The paper also addresses economic and infrastructural challenges, including high production costs and the need for specialized storage systems. Despite these challenges, hydrogen energy has the potential to significantly reduce carbon emissions and support global energy transition efforts. This research highlights the role of hydrogen as a clean and sustainable alternative to traditional energy sources.

Keywords: Hydrogen Energy, Fuel Cells, Clean Energy, Renewable Energy, Sustainability

AI in Climate Change Prediction and Environmental Sustainability

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Abstract:

Climate change is one of the most pressing global challenges, requiring advanced technological solutions for accurate prediction and mitigation. This paper explores the application of Artificial Intelligence (AI) in climate modeling and environmental sustainability. The proposed system utilizes machine learning and deep learning techniques to analyze large-scale environmental data, including temperature variations, greenhouse gas emissions, ocean currents, and deforestation patterns. By processing historical and real-time data, AI models can predict future climate scenarios with higher accuracy compared to traditional statistical methods. The system also incorporates satellite data and IoT-based environmental sensors to enhance monitoring capabilities. Predictive analytics helps policymakers and environmental agencies design effective strategies for reducing carbon emissions and managing natural resources. Additionally, AI-driven optimization techniques are used to improve renewable energy systems such as solar and wind power. The paper highlights the role of AI in enabling data-driven decision-making for sustainable development. Challenges such as data availability, model interpretability, and computational complexity are also discussed. This research demonstrates how AI can play a critical role in addressing climate change and promoting environmental sustainability.

Keywords: Artificial Intelligence, Climate Change, Sustainability, Environmental Monitoring, Predictive Analytics

AI-Driven Precision Medicine for Personalized Healthcare

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Abstract:

The advancement of Artificial Intelligence (AI) has significantly transformed the healthcare industry, particularly in the field of precision medicine. This paper presents an AI-driven approach to personalized healthcare, where treatment plans are tailored based on individual patient characteristics such as genetic information, lifestyle, and medical history. Machine learning algorithms analyze large datasets, including genomic data and clinical records, to identify patterns and predict disease risks. The system supports early diagnosis and personalized treatment recommendations, improving patient outcomes and reducing healthcare costs. Deep learning models are used to analyze medical images and detect diseases at early stages. The integration of AI with electronic health records enables continuous monitoring and adaptive treatment strategies. The paper also discusses ethical considerations, data privacy concerns, and regulatory challenges associated with AI in healthcare. By enabling personalized and data-driven healthcare solutions, this research contributes to the development of next-generation medical systems.

Keywords: Artificial Intelligence, Precision Medicine, Personalized Healthcare, Genomics, Machine Learning

AI in Autonomous Robotics for Industrial Automation

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Abstract:

The integration of Artificial Intelligence (AI) with robotics has revolutionized industrial automation, enabling intelligent and autonomous systems capable of performing complex tasks. This paper explores the use of AI in autonomous robotics for manufacturing and industrial applications. The proposed system utilizes machine learning and computer vision techniques to enable robots to perceive their environment, make decisions, and execute tasks with minimal human intervention. Reinforcement learning algorithms are used to optimize robot behavior and improve efficiency over time. The system supports applications such as assembly line automation, quality inspection, and predictive maintenance. AI-powered robots can adapt to dynamic environments, reducing downtime and increasing productivity. The paper also discusses the challenges of implementing AI in robotics, including safety concerns, high computational requirements, and integration with existing systems. By enhancing automation and efficiency, AI-driven robotics plays a crucial role in the development of smart factories and Industry 4.0.

Keywords: Artificial Intelligence, Robotics, Industrial Automation, Computer Vision, Reinforcement Learning

AI for Financial Fraud Detection and Risk Management

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Abstract:

Financial fraud poses a significant threat to the global economy, necessitating advanced detection and prevention mechanisms. This paper presents an AI-based system for financial fraud detection and risk management. The system uses machine learning algorithms to analyze transaction data and identify suspicious patterns indicative of fraudulent activities. Techniques such as anomaly detection, clustering, and classification are employed to improve detection accuracy. The system processes large volumes of financial data in real time, enabling quick identification and response to potential threats. Deep learning models enhance the system's ability to detect complex fraud patterns that may not be visible through traditional methods. The paper also discusses the integration of AI with financial systems to improve risk assessment and decision-making. Challenges such as data privacy, model bias, and regulatory compliance are addressed. By leveraging AI, the proposed system enhances financial security and reduces losses due to fraud.

Keywords: Artificial Intelligence, Fraud Detection, Financial Security, Machine Learning, Risk Management

AI in Smart Energy Management for Sustainable Power Systems

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Abstract:

The increasing demand for energy and the need for sustainable solutions have led to the adoption of Artificial Intelligence (AI) in energy management systems. This paper explores the use of AI in optimizing energy consumption and improving the efficiency of power systems. The proposed system utilizes machine learning algorithms to analyze energy usage patterns and predict future demand. It integrates renewable energy sources such as solar and wind power, optimizing their utilization through intelligent control systems. AI-driven models help balance energy supply and demand, reducing wastage and improving grid stability. The system also incorporates smart meters and IoT devices for real-time monitoring and control. Predictive maintenance techniques are used to identify potential faults in power systems, minimizing downtime. The paper highlights the role of AI in enabling smart grids and sustainable energy solutions. Challenges such as data integration, scalability, and cybersecurity are also discussed. This research demonstrates how AI can contribute to efficient and sustainable energy management.

Keywords: Artificial Intelligence, Smart Energy, Renewable Energy, Smart Grid, Sustainability

6G-Enabled Ultra-Low Latency Communication for Smart Cities

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Abstract:

The evolution from 5G to 6G is expected to revolutionize communication systems by enabling ultra-low latency, high reliability, and massive connectivity. This paper explores the design and implementation of a 6G-enabled communication framework tailored for smart city applications. The proposed system integrates advanced technologies such as terahertz (THz) communication, artificial intelligence, and edge computing to support real-time data exchange across urban infrastructures. It focuses on critical applications such as autonomous vehicles, smart traffic management, remote healthcare, and intelligent energy systems. The architecture leverages AI-driven network optimization to dynamically allocate resources and reduce latency to microsecond levels. Additionally, the system incorporates advanced security protocols to ensure data privacy and integrity. Simulation results demonstrate significant improvements in data transmission speed, network efficiency, and reliability compared to existing 5G systems. The paper also discusses challenges such as spectrum management, hardware limitations, and energy efficiency. By addressing these challenges, the proposed framework contributes to the realization of next-generation smart cities powered by 6G communication technologies.

Keywords: 6G, Smart Cities, Ultra-Low Latency, THz Communication, Edge Computing

7G Wireless Networks: A Vision for Global Seamless Connectivity

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Abstract:

The concept of 7G wireless networks extends beyond terrestrial communication systems to provide seamless global connectivity through the integration of satellite networks, high-altitude platforms, and terrestrial infrastructures. This paper presents a comprehensive vision of 7G networks, focusing on achieving uninterrupted connectivity across remote and underserved regions. The proposed architecture integrates satellite communication with advanced terrestrial networks, enabling global coverage and high-speed data transmission. The system utilizes AI-driven network management to optimize connectivity and ensure efficient resource allocation. Key applications include global internet access, disaster management, remote education, and space communication. The paper also explores the use of advanced modulation techniques and spectrum sharing to enhance network performance. Challenges such as high deployment costs, latency in satellite communication, and interoperability are discussed. The findings highlight the potential of 7G networks to bridge the digital divide and provide universal connectivity, making it a transformative step toward a fully connected world.

Keywords: 7G, Global Connectivity, Satellite Communication, AI Networks, Wireless Systems

8G Communication Systems: Future of Intelligent Hyper-Connected Networks

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Abstract:

The future of wireless communication is expected to evolve toward 8G systems, which aim to achieve unprecedented levels of intelligence, speed, and connectivity. This paper explores the conceptual framework of 8G communication systems, focusing on the integration of artificial intelligence, quantum communication, and advanced networking technologies. The proposed system envisions a fully autonomous network capable of self-optimization, self-healing, and adaptive communication. It leverages quantum communication principles to enhance security and data transmission efficiency. The architecture supports ultra-high data rates, near-zero latency, and seamless connectivity across multiple devices and platforms. Applications include advanced robotics, holographic communication, brain-computer interfaces, and immersive virtual environments. The paper also addresses challenges such as technological feasibility, infrastructure requirements, and energy consumption. By exploring the possibilities of 8G, this research provides insights into the future of communication systems and their impact on society.

Keywords: 8G, Intelligent Networks, Quantum Communication, Hyper-Connectivity, Future Wireless

AI-Driven Resource Allocation in 6G Wireless Networks

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Abstract:

Efficient resource allocation is a critical challenge in next-generation wireless networks. This paper proposes an AI-driven resource allocation framework for 6G wireless networks to optimize network performance and efficiency. The system utilizes machine learning algorithms to analyze network traffic patterns and dynamically allocate resources such as bandwidth, spectrum, and power. By leveraging predictive analytics, the system anticipates network demand and adjusts resource allocation accordingly. The proposed approach improves network throughput, reduces latency, and enhances overall quality of service. The integration of edge computing enables real-time decision-making and minimizes processing delays. The paper also evaluates the performance of the system through simulations, demonstrating significant improvements compared to traditional resource allocation methods. Challenges such as data privacy, computational complexity, and scalability are also discussed. This research highlights the importance of AI in enabling intelligent and adaptive 6G networks.

Keywords: 6G, AI, Resource Allocation, Machine Learning, Wireless Networks

Terahertz Communication for Beyond 6G Networks

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Abstract:

Terahertz (THz) communication is considered a key technology for beyond 6G networks, offering extremely high data rates and bandwidth. This paper investigates the use of THz frequency bands for next-generation wireless communication systems. The proposed system utilizes advanced modulation techniques and beamforming to overcome challenges such as signal attenuation and propagation loss. The architecture supports ultra-high-speed data transmission, making it suitable for applications such as holographic communication, high-definition video streaming, and advanced virtual reality systems. The paper also explores the integration of THz communication with existing network infrastructures to ensure compatibility and scalability. Experimental results demonstrate the potential of THz communication to achieve data rates significantly higher than current technologies. However, challenges such as hardware limitations, energy consumption, and environmental factors are discussed. This research provides valuable insights into the role of THz communication in shaping future wireless networks.

Keywords: Terahertz Communication, 6G, THz Spectrum, High Data Rate, Wireless Technology

AI-Based Smart Healthcare Monitoring System

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Abstract:

The rapid advancement of Artificial Intelligence (AI) and the Internet of Things (IoT) has revolutionized modern healthcare systems by enabling real-time monitoring and intelligent decision-making. This paper presents an AI-based smart healthcare monitoring system designed to continuously track vital patient parameters such as heart rate, body temperature, blood pressure, and oxygen saturation levels. Wearable IoT sensors are used to collect physiological data, which is transmitted to a cloud-based platform for storage and analysis. Machine learning algorithms process both historical and real-time data to detect anomalies and predict potential health risks, including cardiac issues and respiratory problems. The system incorporates automated alert mechanisms that notify healthcare providers and caregivers in case of abnormal readings. Additionally, a user-friendly dashboard enables remote monitoring, reducing the need for frequent hospital visits and improving accessibility, especially in rural areas. The integration of predictive analytics allows early diagnosis and preventive care, shifting the healthcare model from reactive to proactive. The proposed system enhances accuracy, efficiency, and patient outcomes while reducing overall healthcare costs.

Keywords: Artificial Intelligence, IoT, Healthcare Monitoring, Predictive Analytics, Smart Health

Blockchain-Based Secure E-Voting System

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Abstract:

The integrity and transparency of voting systems are crucial for democratic processes, yet traditional voting mechanisms are vulnerable to fraud and manipulation. This paper proposes a blockchain-based secure e-voting system that ensures transparency, security, and reliability. Blockchain technology provides a decentralized and immutable ledger where each vote is securely recorded as a transaction. Smart contracts automate the processes of vote validation, authentication, and counting, eliminating the need for intermediaries and reducing human errors. Cryptographic techniques are employed to protect voter identity and ensure data privacy while maintaining the integrity of the election process. The system also incorporates multi-factor authentication to prevent unauthorized access and duplicate voting. Additionally, remote voting capabilities increase accessibility and voter participation. By leveraging blockchain, the system ensures tamper-proof records, transparency, and trust in electoral systems. This paper demonstrates how emerging technologies can modernize voting systems, making them more secure, efficient, and scalable for future applications.

Keywords: Blockchain, E-Voting, Smart Contracts, Security, Decentralization

Deep Learning-Based Fake News Detection System

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Abstract:

The widespread dissemination of fake news on digital platforms has become a serious societal challenge, influencing public opinion and spreading misinformation. This paper presents a deep learning-based fake news detection system that utilizes Natural Language Processing (NLP) techniques to identify misleading content. The system analyzes textual data from news articles and social media posts by extracting semantic, syntactic, and contextual features. Advanced deep learning models such as Long Short-Term Memory (LSTM) networks and Bidirectional Encoder Representations from Transformers (BERT) are used to classify news as genuine or fake. The model is trained on large labeled datasets to improve accuracy and generalization. Additional techniques such as sentiment analysis and source credibility evaluation enhance the detection process. A user-friendly interface allows users to input text or URLs and receive real-time verification results. The system can be integrated into social media platforms and browser extensions to provide instant fact-checking. By reducing the spread of misinformation, the paper contributes to building a more informed and responsible digital society.

Keywords: Deep Learning, Fake News Detection, NLP, LSTM, BERT

IoT-Based Smart Agriculture System

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Abstract:

Agriculture is a critical sector that can benefit significantly from the integration of emerging technologies. This paper proposes an IoT-based smart agriculture system that enhances productivity and sustainability through data-driven decision-making. Sensors are deployed to monitor environmental parameters such as soil moisture, temperature, humidity, and nutrient levels. The collected data is transmitted to a cloud platform, where machine learning algorithms analyze conditions and provide actionable insights. Automated irrigation and fertilization systems are triggered based on these insights, optimizing resource usage and reducing manual labor. Weather prediction models are also integrated to anticipate climatic changes and minimize crop damage. The system includes mobile and web applications that provide farmers with real-time updates and recommendations. By improving efficiency and reducing resource wastage, the system supports precision farming and sustainable agriculture practices. This paper demonstrates how IoT and AI can transform traditional farming into a smart, technology-driven process.

Keywords: IoT, Smart Agriculture, Precision Farming, Sensors, Machine Learning

Cloud-Based Cybersecurity Threat Detection System

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Abstract:

As digital systems become more complex, cybersecurity threats continue to evolve, posing significant risks to organizations and individuals. This paper introduces a cloud-based cybersecurity threat detection system that leverages machine learning and big data analytics to identify and mitigate threats in real time. The system continuously monitors network traffic, system logs, and user activities to detect anomalies and suspicious behavior. Machine learning algorithms analyze patterns and identify potential threats such as malware, phishing attacks, and Distributed Denial of Service (DDoS) attacks. The cloud-based architecture ensures scalability, flexibility, and efficient data processing. Automated response mechanisms are implemented to minimize damage and prevent further attacks. Visualization tools provide security analysts with insights into threat patterns and system vulnerabilities. By combining cloud computing with intelligent analytics, the system enhances the speed and accuracy of threat detection, ensuring robust protection for modern digital infrastructures.

Keywords: Cybersecurity, Cloud Computing, Threat Detection, Machine Learning, Network Security

AI-Powered Chatbot for Student Support Systems

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Abstract:

The increasing demand for efficient student support services has led to the adoption of AI-driven solutions in educational institutions. This paper presents an AI-powered chatbot designed to assist students with academic and administrative queries. The chatbot uses Natural Language Processing (NLP) and machine learning techniques to understand user inputs and provide accurate responses. It can handle queries related to course information, schedules, examinations, and campus services. The system operates 24/7, ensuring continuous availability and reducing the workload on administrative staff. It is trained on a dataset of frequently asked questions and improves over time through machine learning. The chatbot can be integrated into websites, mobile applications, and messaging platforms, making it easily accessible. Multilingual support enhances usability for diverse users. By automating routine tasks and providing instant assistance, the chatbot improves user experience and operational efficiency in educational institutions.

Keywords: Chatbot, AI, NLP, Student Support, Automation

Edge Computing-Based Real-Time Traffic Management System

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Abstract:

Urban traffic congestion is a growing problem that affects transportation efficiency and environmental sustainability. This paper proposes an edge computing-based real-time traffic management system that uses IoT devices and machine learning algorithms to optimize traffic flow. Sensors and cameras collect real-time traffic data, which is processed at edge devices to reduce latency and enable faster decision-making. Machine learning models analyze traffic patterns and dynamically adjust traffic signals based on current conditions. The system also provides real-time updates and route recommendations to drivers through mobile applications. By processing data locally, the system reduces reliance on centralized cloud infrastructure and improves response time. The proposed solution enhances traffic efficiency, reduces congestion, and contributes to the development of smart cities.

Keywords: Edge Computing, Traffic Management, IoT, Smart Cities, Real-Time Systems

AR/VR-Based Virtual Learning Environment

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Abstract:

The integration of Augmented Reality (AR) and Virtual Reality (VR) technologies in education has transformed traditional learning methods. This paper proposes a virtual learning environment that uses AR and VR to provide immersive and interactive educational experiences. Students can interact with 3D models and simulations, improving their understanding of complex concepts. The platform supports real-time collaboration between students and instructors. Technologies such as motion tracking and gesture recognition enhance user interaction. The system can be accessed through VR headsets or AR-enabled devices, making it flexible and scalable. By bridging the gap between theory and practice, the paper enhances learning outcomes and engagement.

Keywords: AR, VR, Virtual Learning, Immersive Technology, Education

AI-Based Personalized Recommendation System

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Abstract:

This paper presents an AI-based recommendation system that provides personalized suggestions based on user behavior and preferences. Machine learning algorithms such as collaborative filtering and content-based filtering analyze user data to predict interests. The system continuously learns and improves its recommendations over time. It addresses challenges such as data sparsity and cold start problems. The system can be applied in e-commerce, entertainment, and online platforms to enhance user engagement and satisfaction.

Keywords: Recommendation System, Machine Learning, Personalization, Data Analytics

Quantum Computing Simulation for Optimization Problems

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Abstract:

This paper explores quantum-inspired algorithms for solving complex optimization problems. It demonstrates how quantum techniques can outperform classical methods in specific scenarios such as logistics and financial optimization. The study highlights both advantages and current limitations of quantum computing technologies.

Keywords: Quantum Computing, Optimization, Simulation

Quantum Machine Learning for Pattern Recognition

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Ravuri Yogaiah

Principal
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Abstract:

This paper explores the application of quantum computing in machine learning for pattern recognition tasks. Quantum algorithms such as QSVM and variational circuits are utilized to improve data processing efficiency. The results indicate improved performance in specific cases compared to classical approaches, while also addressing current limitations in quantum hardware.

Keywords: Quantum Machine Learning, QSVM, Pattern Recognition

Quantum Cryptography for Secure Communication Systems

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Abstract:

This paper focuses on secure communication using quantum cryptography. It implements Quantum Key Distribution (QKD) protocols such as BB84 to ensure secure data exchange. The system detects eavesdropping attempts and enhances communication security beyond classical encryption techniques.

Keywords: Quantum Cryptography, QD, Security

Quantum Optimization Algorithms for Supply Chain Management

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Abstract:

This paper investigates the application of quantum optimization algorithms such as QAOA in supply chain management. It demonstrates improved efficiency in logistics, scheduling, and resource allocation. The results highlight the potential of quantum computing in industrial optimization problems.

Keywords: Quantum Optimization, QAOA, Supply Chain

Quantum Simulation of Molecular Structures for Drug Discovery

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Dr. Masthan Rao Kale

Director, Pooja Computer Education

Abstract:

This paper explores quantum computing for simulating molecular structures in drug discovery. Algorithms such as VQE are used to improve accuracy in chemical modeling. The approach accelerates drug development and enhances pharmaceutical research efficiency.

Keywords: Quantum Simulation, Drug Discovery, VQE

Hybrid Classical-Quantum Algorithms for Big Data Analytics

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Abstract:

This paper proposes a hybrid approach combining classical and quantum computing for big data analytics. Quantum algorithms such as QPCA are used to enhance data processing efficiency. The system demonstrates improved performance in certain scenarios while addressing integration challenges.

Keywords: Hybrid Computing, QPCA, Big Data

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