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(ICIRTCS-24) **PROCEEDINGS**

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Department of Computer Science and Engineering

4th "International Conference on Innovations and Recent Trends in Computer Science"

(ICIRTCS-24)

Organized on 17th & 18th December, 2024

Patron, Program Chair & Editor in Chief

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Professor & Group Director, SMEC

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Associate Professor & Head, Department of CSE, SMEC

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Associate Professor of CSE, SMEC

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Sri. M. LAXMAN REDDY
CHAIRMAN



MESSAGE

I am extremely pleased to know that the Department of Computer Science and Engineering of SMEC is organizing 4th **"International Conference on Innovations and Recent Trends in Computer Science"** (ICIRTCS – 24) on 17th and 18th of December 2024. I understand that the large number of researchers has submitted their research papers for presentation in the conference and for publication. The response to this conference from all over India and Foreign countries is most encouraging. I am sure all the participants will be benefitted by their interaction with their fellow researchers and engineers which will help for their research work and subsequently to the society at large.

I wish the conference meets its objective and confident that it will be a grand success.

M. Laxman Reddy

M.LAXMANREDDY
Chairman

Sri. G. CHANDRASEKHAR YADAV
EXECUTIVE DIRECTOR



MESSAGE

I am pleased to state that the Department of Computer Science and Engineering of SMEC is organizing 4th **"International Conference on Innovations and Recent Trends in Computer Science"** (ICIRTCS – 24) on 17th and 18th of December 2024. For strengthening the "MAKEIN INDIA" concept many innovations need to be translated in toworkable product. Concept to commissioning is along route. The academicians can play a major role in bringing out new products through innovations.

I am delighted to know that there are large numbers of researchers has submitted the papers on Engineering and Technology streams. I wish all the best to the participants of the conference additional insight to their subjects of interest.

I wish the organizers of the conference to have great success.

G. CHANDRASEKHAR YADAV
Executive Director

Dr. P. SANTOSH KUMAR PATRA
PROFESSOR & GROUP DIRECTOR



MESSAGE

I am delighted to be the Patron & Program Chair for the 4th **"International Conference on Innovations and Recent Trends in Computer Science"** (ICIRTCS – 24) organized by the Department of Computer Science and Engineering on 17th and 18th of December 2024. I have strong desire that the conference to unfold new domains of research among the Artificial Intelligence, Machine Learning, Block chain Technology, Internet of Things, Deep Learning, Data Analytics and will boost the knowledge level of many participating budding scholars throughout the world by opening a plethora of future developments in the field of Computer Science and Engineering.

The Conference aims to bring different ideologies under one roof and provide opportunities to exchange ideas, to establish research relations and to find many more global partners for future collaboration. About 200+ research papers have been submitted to this conference, this itself is agreat achievement and I wish the conference a grand success.

I appreciate the faculties, coordinators and Department Heads of Computer Science and Engineering for their continuous untiring contribution in making the conference a reality.

Dr. P. Santosh Kumar Patra
Professor & Group Director
St. Martin's Engineering College

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Dr. M. SRINIVAS RAO
Principal



MESSAGE

Contemporary Society is technological and relies on technology for various aspects of daily life. There is no life without digital platforms, Internet, apps, codes, etc. Navigating the complexities of a technological society requires a balance between embracing innovation and addressing the challenges that come in the way. Considering the immediate needs of the technical Society, SMEC has been organizing International Conferences every year which really help a candidatein acquiring technical skills and making themselves familiar with the new inventions.

International Conferences are a Perfect Platform for enthusiastic researchers to come up with their innovative ideas, and I am delighted that SMEC is organizing the 4th **"International Conference on Innovations and Recent Trends in Computer Science"** (ICIRTCS – 24) this academic year as well to enhance the skills of desiring participants. The showcase of new ideas and the latest technological advancements through this Conference would facilitate the transferof technology, helping participants to get updated with the latest tools and methodologies. I firmly believe that this Conference serves as the catalyst for change by bringing attention to pressing issues in different fields, encouraging discussions, fostering collaboration, and promoting initiatives that address different challenges on a global scale. It is an excellentopportunity to broaden our knowledge, establish meaningful connections, and contribute to advancing engineering research. I assure you that the commitment to excellence in education andresearch is reflected in this Conference, providing a unique platform for learning and growth.

Around 200+ research papers were submitted to this Conference. I wish the authors a promising future and the Conference a grand success.

I appreciate the continuous efforts and dedication of the HOD of Computer Science and Engineering and faculty members for their invaluable contribution to advancing global discourse. My most profound appreciation to the organizers and coordinators for organizing a conference of such caliber.

Dr. M. Srinivas Rao
Principal

Dr. SANJAY KUMAR SUMAN
Dean R&D



MESSAGE

Research, curiosity and discovery has been in existence ever since man's presence on this planet millions of years ago, civilization has been characterized by curiosity and discovery. Therefore, the curiosity to explore what will happen, how it happens, is there a better way to do it, has been the driving force behind all research efforts. During the past few decades, the engineering faculties have taken a number of initiatives to reorient the engineering machinery to play leading roles in the industrial development process.

I am delighted to acknowledge the 4rd "**International Conference on Innovations and Recent Trends in Computer Science"** (ICIRTCS – 24) organized by the Department of Computer Science and Engineering on 17th and 18th of December 2024. I appreciate organizing team for showing their keen interest in organizing a successful conference to provide a platform for contributors to explore new ideas and exchange research findings among researchers. I thank the support of all students, authors, reviewers, conference team, faculty members, and conference Convenor for making the conference a grand success.

Best Wishes

Dr. Sanjay Kumar Suman

Dean R&D

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Dr. S V S RAMA KRISHNAM RAJU
Dean Academics



MESSAGE

It gives me immense pleasure to know that St. Martin's Engineering College, 4th "**International Conference on Innovations and Recent Trends in Computer Science"** (ICIRTCS – 24) organized by the Department of Computer Science and Engineering on 17th and 18th of December 2024. I am sure that this conference will provide a forum to national and international students, academicians, researchers and industrialists to interact and involve in Research and Innovation. Such academic events benefit the students, teachers and researchers immensely and widen the horizons of their knowledge and work experience in the field of Deep Learning, Machine Learning, Data Mining Engineering and Innovation.

I sincerely appreciate the humble efforts of the Institute in providing a platform for students, academicians, researchers and industrialists to share their ideas and research outcome through the forum of this Conference.

I give my best wishes to all delegates and organizing committee to make this event a grand success.

Best Wishes

Dr. S V S Rama Krishnam Raju

Dean Academics

Dr. D V SREEKANTH
Dean Administration



MESSAGE

I am delighted to acknowledge the 4th **"International Conference on Innovations and Recent Trends in Computer Science"**(ICIRTCS – 24) organized by the Department of Computer Scienceand Engineering on 17th and 18th of December 2024 in St. Martin's Engineering College (SMEC), Hyderabad, India. The objective of this conference was to bring together experts from academic institutions, industries, research organizations for sharing of knowledge and experience in the recent trends and revolutionary technologies in Computer Science and engineering. The conference programme featured a wide variety of invited and contributed lectures from national and international speakers with expertise in their respective fields. The ICIRTCS-2024 has become one of the most extensive, spectacular international events hosted by St. Martin's Engineering College (SMEC), for its high-level quality and the large size of participation. Well- known international and national invited speakers addressed the audience, shared knowledge, and rich experiences on Revolutionary Technology in Computer Science and Engineering.

I am sure that this conference will provide a forum to national and international students, academicians, researchers and industrialists to interact and involve in Research and Innovation. Such academic events benefit the students, teachers and researchers immensely and widen the horizons of their knowledge.

Best Wishes

Dr. D V Sreekanth
Dean Administration

Dr. R. SANTHOSHKUMAR
Associate Professor & HOD



MESSAGE

The world is always poised to move towards new and progressive engineering solutions that results in cleaner, safer and sustainable products for the use of mankind. India too is emerging as a big production center for world class quality. Computer Science and Engineering play a vital role in this endeavor.

The aim of the 4th **"International Conference on Innovations and Recent Trends in Computer Science"** (ICIRTCS – 24) being conducted by the Department of Computer Science and Engineering of SMEC, is to create a platform for academicians and researchers to exchange their innovative ideas and interact with researchers of the same field of interest. This will enable to accelerate the work to progress faster to achieve the individuals end goals, which will ultimately benefit the larger society of India.

We, the organizers of the conference are glad to note that more than 200+ papers have been received for presentation during the online conference. After scrutiny by specialist 150 papers have been selected, and the authors have been informed to be there at the online platform for presentations. Steps have been to publish these papers with ISBN number in the Conference Proceedings and all the selected papers will be published in Scopus/UGC recognized reputed journals.

The editorial committee and the organizers express their sincere thanks to all authors who have shown interest and contributed their knowledge in the form of technical papers. We are delighted and happy to state that the conference is moving towards a grand success with the untiring effort of the faculties of Department and Head of Computer Science and Engineering of SMEC and with the blessing of the Principal and Management of SMEC.

Dr. R. SANTHOSHKUMAR
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PAPER ID: ICIRTCS-24-001

HARMONIZING EMOTIONS: TRANSFORMING SPEECH ANALYSIS WITH AUTOMATED EMOTION DETECTION SYSTEMS

[1]Challa Sindhuja*, [2]G Lokesh, [3]Ch.Kaarthika, [4]Dr. R. Santhoshkumar
[1,2,3] UG Scholar, [4]Associate Professor & Head, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail: sindhuja123@gmail.com, drsanthoshkumarcse@smec.ac.in

ABSTRACT

Emotion recognition from speech is a crucial task in human-computer interaction, psychology, and healthcare. It involves analyzing audio signals to detect the underlying emotions conveyed by a speaker's voice. This capability has broad applications, including improving customer service, designing empathetic virtual assistants, and enhancing mental health diagnosis and treatment. Traditional approaches to speech emotion recognition often rely on handcrafted features extracted from audio signals, such as pitch, intensity, and spectral features. These features are then fed into machine learning models, such as Support Vector Machines (SVMs) or Gaussian Mixture Models (GMMs), to classify emotions. However, these systems often struggle with generalization across different speakers, languages, and recording conditions. They also require extensive feature engineering and may not capture subtle nuances in vocal expressions. The primary challenge in speech emotion recognition is to develop robust and accurate models that can effectively capture and interpret the complex patterns present in audio signals. This includes accounting for variations in voice quality, speaking style, and emotional intensity across different individuals and cultural contexts. Our proposed system aims to leverage advancements in signal processing techniques to address the limitations of traditional speech emotion recognition systems. We seek to automatically learn discriminative features from raw audio data, enabling more robust and scalable emotion classification. Additionally, we plan to explore multimodal approaches that combine speech signals with other modalities, such as facial expressions or text, to further improve emotion recognition accuracy and robustness. Through rigorous experimentation and evaluation on diverse datasets, we aim to develop a state-of-the-art speech emotion recognition system capable of achieving high accuracy across various real-world scenarios.

Keywords: Emotional Recognition, Machine Learning, Support Vector Machine, Gaussian Mixture Model

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REVOLUTIONIZING MULTI-CLASS DIAGNOSIS OF RETINAL DISEASES USING DEEP NEURAL NETWORKS

[1]Nadia Shaikh*, [2]Shylaja Sudi, [3]Aljapur Sahasra, [4]S. Bavankumar

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : nadiashaikh2024@gmail.com, sudishylaja1@gmail.com, sbavankumarcse@smec.ac.in

ABSTRACT

The incidence of retinal diseases has been increasing significantly, with an estimated 285 million individuals globally suffering from vision loss in 2023. Studies have shown that the most common cases of blindness are conditions like glaucoma, age-related macular degeneration, and diabetic retinopathy. The figures are concerning and this needs to be addressed by introducing diagnostic methods that will facilitate accurate identification and efficient treatment. Traditional methods of diagnoses involved manual inspection by ophthalmologists and the use of fundus photography. These methods are time-consuming and are prone to inaccuracy as specialists may have varying levels of skill. The extensive training required for accurate interpretation of retinal images and the shortage of specialists, particularly in developing countries, aggravate the challenges in providing timely and precise diagnosis. Hence, a promising solution is to make use of deep neural networks, namely CNNs (Convolutional Neural Networks). It automates the analysis of retinal images. The CNN model when combined with optimization techniques, namely Adam Optimization not only enhances diagnostic accuracy but also facilitates early intervention and ultimately contributes to improved patient outcomes. By utilizing a multiclass dataset and augmenting images, the model demonstrated enhanced performance in diagnosis of retinal diseases. This revolutionary approach paves the way for a more accessible and reliable retinal disease detection and has the potential to transform the landscape of ophthalmic care.

Keywords: Ophthalmology, Retinal Diseases, Convolutional Neural Networks, Augmentation, Optimization Techniques.

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ANALYZING A CENTURY OF CIVIL AVIATION ACCIDENTS: PATTERNS, TRENDS, AND SAFETY IMPLICATIONS

[1] G.Harshitha*, [2] A.Preetham Ram, [3] C.Vaishnavi, [4]Dr. G. JawaherlalNehru

[1,2,3]UG Scholar, [4]Associate Professor, Department of Computer Science and Engineering,

[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : harshithagummuluri@gmail.com, drjawaherlalcse@smec.ac.in

ABSTRACT

Over the past century, civil aviation has experienced significant advancements, yet accidents have remained a critical concern. Between 1920 and 2023, over 20,000 accidents were recorded, with the highest number of incidents occurring in the 1970s. The early 2000s saw a significant decline in accident rates, yet the complexity and volume of air traffic necessitate continued vigilance. These statistics highlight the urgent need for innovative approaches to enhance aviation safety. Traditionally, aviation safety analysis has relied on manual inspection and reporting systems, which are often labor-intensive and prone to human error. Investigators manually sift through vast amounts of data to identify causes and recommend preventive measures. This process, while thorough, is time-consuming and overlooks subtle patterns or emerging trends due to its dependence on human expertise and the variability in data interpretation. These limitations underscore the need for more efficient and accurate methods to analyze and learn from past incidents. So, the proposed machine learning (ML) offers a promising solution to these challenges by automating data analysis and identifying complex patterns that elude human analysts. ML algorithms can process extensive datasets rapidly, providing insights into accident causes, predicting potential future incidents, and suggesting proactive safety measures. By leveraging historical data, ML can enhance predictive accuracy and inform decision-making processes, ultimately contributing to a significant reduction in aviation accidents and improving overall safety in the skies.

Keywords: Machine learning, Data Interpretation, Air Traffic, Safety Measures, Efficiency, Accuracy.

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PREDICTING HOME PRICES: A BEGINNER'S JOURNEY WITH REGRESSION ANALYSIS USING BOSTON HOUSING DATASET

[1]P.Srihitha*, [2]Shahid Akthar, [3]L.Bhanu Raj, [4]Dr. M. Vadivukarassi

[1,2,3]UG Scholar, [4]Associate Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : varshadayya02@gmail.com, drmvadivukarassicse@smec.ac.in

ABSTRACT

In the realm of real estate, accurately predicting home prices is a crucial task for buyers, sellers, and real estate professionals alike. It enables informed decision-making, aids in property valuation, and contributes to market analysis. Leveraging machine learning techniques for this purpose has become increasingly popular due to their ability to analyse complex data patterns and generate predictive models. In the traditional real estate market, pricing homes often relies on the expertise of real estate agents and appraisers, coupled with market trends and comparable sales data. While effective to some extent, this approach has limitations. It can be subjective, prone to human error, and may not fully capture all relevant factors affecting home prices. Moreover, it might not scale well for large datasets or provide insights into underlying data patterns. There is a growing need for more accurate, data-driven methods to predict home prices. With the advent of big data and machine learning, there is an opportunity to leverage advanced analytical techniques to enhance price prediction accuracy, improve decision-making, and provide valuable insights into the housing market. The challenge of predicting home prices accurately using regression analysis techniques. The proposed system involves leveraging the Boston Housing Dataset, a classic dataset widely used in machine learning research, to train and evaluate regression models. . It seeks to build machine learning models that can effectively learn from historical housing data and make reliable predictions about the prices of new properties based on their features. The goal is to develop models that outperform traditional methods and provide actionable insights for stakeholders in the real estate industry.

Keywords: Feed Forward Neural Network, Geographically weighted regression(GWR), Cascade Forward Neural Network.

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THE ERA OF INFORMATION: NAVIGATING THE CHALLENGES OF MISINFORMATION IN THE DIGITAL AGE

[1]Andra Lalitha*, [2]Anantha Srilaxmi, [3]Daini Harini, [4]C. Yosepu
[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : andralalitha41@gmail.com, cyosepucse@smec.ac.in

ABSTRACT

In the digital age, the rapid dissemination of information through social media and online platforms has transformed the way we access and share knowledge. As of 2023, over 4.5 billion people worldwide are active internet users, with the majority relying on digital sources for news and information. However, this unprecedented access has also given rise to a significant challenge: the proliferation of misinformation. Studies have shown that misinformation spreads faster and more widely than factual information, leading to serious consequences such as public health crises, political instability, and social discord. Traditional methods for combating misinformation, such as fact-checking and content moderation, have proven to be inadequate in addressing the scale and speed of false information dissemination. These approaches often struggle to keep up with the volume of content and may be influenced by biases or limited by the resources available. Furthermore, the sheer diversity of misinformation tactics and the sophistication of manipulation techniques make it difficult to develop one-size-fits-all solutions. Machine learning offers a promising approach to navigating the challenges of misinformation by enabling automated detection and analysis of false information patterns. Techniques such as natural language processing (NLP), sentiment analysis, and anomaly detection can be employed to identify and flag misleading content. Machine learning models can analyze vast amounts of data to discern between credible and dubious information, enhancing the efficiency and accuracy of misinformation detection. By integrating machine learning with existing fact-checking and moderation efforts, it is possible to create more robust systems for managing digital information, thereby promoting a more informed and resilient society.

Keywords: Misinformation, Factual information, Fact-Checking, Content Moderation, Machine Learning, Natural Language Processing(NLP), Sentiment Analysis, Anomaly Detection, Long Short-Term Memory(LSTM), Random Forest Algorithm.

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ARTIFICIAL INTELLIGENCE FOR ANOMALY CLASSIFICATION IN SMART HOME SECURITY

[1]Lakki Reddy Vyshnavi Reddy*, [2]Putta Rahul, [3]Ramadolla Anvika, [4]K. Ganapathi Babu

[1,2,3]UG Scholar, [4]Associate Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : kganapathibabucse@smec.ac.in

ABSTRACT

The integration of artificial intelligence (AI) into smart home security systems has revolutionized the way we protect our homes and personal safety. With the increasing adoption of smart home devices, such as security cameras, motion detectors, and smart locks, the volume of data generated has surged. As of 2023, the global market for smart home security systems is estimated to exceed $40 billion, driven by advancements in technology and growing consumer demand for enhanced security. However, the vast amount of data collected presents a significant challenge in identifying and classifying anomalies that could indicate security breaches or other issues. Traditional security systems often rely on predefined rules and manual monitoring, which can be inadequate for handling the complexity and volume of data generated by modern smart home devices. Machine learning and AI offer a transformative approach to anomaly classification, enabling systems to automatically detect and respond to unusual patterns or behaviors. By employing techniques such as supervised learning, unsupervised learning, and deep learning, AI can analyze data from various sensors to identify potential security threats with high accuracy. This approach enhances the efficiency of smart home security systems, providing timely alerts and reducing the reliance on manual monitoring.

Keywords: AI integration, smart home security, anomaly detection, machine learning, automated alerts, data analysis, supervised learning, deep learning.

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PREDICTING BIGMART SALES: A REGRESSION ANALYSIS OF PRODUCT AND STORE ATTRIBUTES FOR ENHANCED SALES FORECASTING

[1]N. Divyendra Venkata Varma*, [2]Shaik Salma,[3]A. Deevena, [4]P. Swetha

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : divyendranandyala@gmail.com, shaiksalma4888@gmail.com, pswethacse@smec.ac.in

ABSTRACT

In recent years, the retail industry has seen substantial growth, with global sales reaching $25 trillion in 2021. Big Mart, a leading retail chain, has contributed significantly to this surge, recording an annual sales increase of 5% from 2017 to 2021. Despite this growth, accurately predicting sales remains a complex challenge due to the myriad factors influencing consumer behavior and purchasing patterns. This necessitates advanced predictive models that can leverage historical data to forecast future sales effectively. Traditional approaches to sales forecasting, such as time series analysis and expert judgment, have been extensively used. However, these methods often fall short due to their inability to handle large datasets with numerous variables. Time series analysis, for instance, primarily focuses on historical sales data without considering external factors like product attributes or store-specific characteristics. Expert judgment, while valuable, is inherently subjective and can lead to inconsistent predictions. These limitations highlight the need for more robust, data-driven approaches to sales forecasting. So, proposed machine learning (ML) offers a promising solution to these challenges by enabling the analysis of vast amounts of data to identify patterns and trends that traditional methods might overlook. In this study, we employ regression analysis to predict BigMart sales, utilizing various product and store attributes as predictors. Our ML model demonstrates superior accuracy in sales forecasting, providing actionable insights that can help BigMart optimize inventory management, pricing strategies, and marketing efforts. This approach not only enhances the precision of sales predictions but also supports data-driven decision-making in the retail sector.

Keywords: Sales prediction, Purchasing patterns, Forecasting, Store-specific characteristics, Retail sector.

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ENHANCING MUSIC DISCOVERY: PREDICTIVE MODELLING FOR SONG REPETITION IN A MUSIC STREAMING SERVICES

[1]K. Vaishnavi*, [2]K. Srivallika, [3]T. Mythreya, [4] B. Amrutha Raju
[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : vyshukammari@gmail.com, aamuratharajcse@smec.ac.in

ABSTRACT

User engagement metrics are absolutely necessary for ensuring that subscribers continue to be satisfied in the music streaming market, which is expanding at a rapid rate. Over seventy percent of people who use music streaming services engage with playlists that contain repetitive songs, and the number of songs that are repeated will increase at a rate of fifteen percent annually between the years 2018 and 2023. Despite the progress that has been made in recommendation systems, there is still a significant need to refining prediction models that are capable of more precisely forecasting song repeat patterns. This will ensure that users get an experience that is both personalized and engaging. Manual procedures that are currently in use for regulating song repetition rely mostly on user feedback and fundamental heuristic criteria, which frequently lead to recommendations that are not always ideal. For example, manual curation methods are unable to adapt to changing listening patterns, which results in a lack of personalization and a decline in user happiness. Because these methods often require a lot of manual labor and do not scale well with the increasing amount of streaming data, they are not suitable for use in large-scale applications because they are inefficient. The suggested machine learning (ML) method provides a robust solution by employing sophisticated algorithms to assess historical listening data and forecast song repetition with a high degree of accuracy. ML approaches have the ability to learn intricate patterns and preferences, which enables them to provide more accurate recommendations. Through the implementation of these machine learning strategies, music streaming services have the potential to dramatically improve the user experience by providing tailored playlists and reducing the amount of repetition, which will ultimately lead to increased customer retention and happiness.

Keywords: Song Repetition, Popularity of a song, GradientBoostClassifier, CatBoostClassifier.

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AI IN THE MRI ERA TRANSFORMING BRAIN TUMOR DIAGNOSTICS WITH MACHINE LEARNING INNOVATIONS

[1]Chodamani Harshit*, [2]Gunnala Tagore Monish, [3]Sawanth Nagendra Rao, [4]S. Bavankumar
[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : sbavankumarcse@smec.ac.in

ABSTRACT

Brain tumors have increased significantly over the past decade, with around 700,000 new cases recorded globally each year. In the US, there were 84,000 cases in 2023, underscoring the need for better diagnostics. Ways for successfully managing and treating these illnesses. Radiologists' ability in analyzing medical imaging data, such as MRI images, is crucial for manually classifying brain tumors. These procedures are labor-intensive, time-consuming, and prone to interpretation errors, resulting in inconsistent diagnoses. Current diagnostic techniques have limitations due to subjective assessment and human error. Objective and scalable solutions are needed database The integration of Taiwan's medical resources has the basis for cross-service cooperation. Machine learning is a viable solution for automating processes and it's a promising solution for automating classification and improving diagnostic accuracy. Machine learning models trained on large picture repositories produce consistent and reliable results, allowing for faster and more accurate diagnosis. This technology development improves medical imaging and brain tumor categorization, overcoming limitations of older me These approaches may struggle to capture small changes in tumor form or texture, resulting in inaccurate classification. Furthermore, traditional approaches may necessitate knowledge in radiology and medical imaging, restricting their accessibility and scalability in clinical settings. Furthermore, human feature engineering may overlook essential tumor traits or fail to use the potential of MRI data for categorization. The suggested approach uses machine learning techniques to automate and improve brain tumor categorization from MRI imaging data, thereby overcoming the limitations of existing systems. This study uses machine learning methods to extract discriminatory information straight from MRI scans. Training models on large-scale MRI datasets annotated with tumor labels allows the proposed algorithms to successfully differentiate between different tumor types and reliably categorize brain tumors into important categories.

Keywords: Brain tumors, MRI, Machine learning, MRI datasets, Training models, Categorization, Diagnostic accuracy.

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REDUCING FALL RISKS WITH MACHINE LEARNING-BASED DETECTION SYSTEMS IN ELDERLY CARE

[1]Mohammed Afroz*, [2]Mohammed Muzamil, [3]Shaik Kareem Pasha, [4]M P. Devasudha
[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : mdafroz0307@gmail.com, pdevasudhacse@smec.ac.in

ABSTRACT

Fall detection systems are critical for ensuring the safety and well-being of elderly individuals, particularly those living independently or in assisted living facilities. Leveraging Internet of Things (IoT) sensors, these systems can provide real-time monitoring and alerting in the event of a fall, enabling prompt assistance and intervention. These systems enable timely detection of falls and rapid response, reducing the risk of injury and minimizing the impact of falls on elderly individuals' health. Moreover, fall detection systems can provide peace of mind to caregivers and family members, knowing that their loved ones are being monitored and protected. Additionally, these systems can support healthcare professionals in identifying individuals at higher risk of falls and implementing preventive interventions, ultimately reducing healthcare costs and improving outcomes for elderly populations. Existing fall detection systems often rely on rule-based algorithms or simple threshold-based approaches, which may be prone to false alarms or fail to accurately detect falls in real-world scenarios. These systems may struggle to differentiate between falls and other activities, such as sitting down or bending over, leading to false positives or missed detections. Moreover, traditional systems may be limited by the types and placement of sensors, potentially missing falls that occur in non-standard positions or locations. Additionally, these systems may lack adaptability and scalability, making them less suitable for diverse environments and user populations. The proposed system aims to address the limitations of existing fall detection systems by leveraging machine learning techniques and IoT sensors data. This work explores the use of supervised learning algorithms to train models on sensor data collected from wearable and ambient IoT devices. By incorporating features such as acceleration patterns, orientation changes, and spatial context, the proposed models can learn to accurately detect falls while minimizing false alarms.

Keywords: Internet of Things, Machine Learning, Exploratory Data Analysis, Heart Rate Variability.

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PREDICTIVE PANDEMIC MANAGEMENT: LEVERAGING MACHINE LEARNING FOR COVID-19 DETECTION

[1]Manthi Teja [*], [2]Korey Shashank, [3]Sambana Chiranjeevi, [4] K. Ram Mohan

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,

[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : tejamanthi@gmail.com, shashankkorey@gmail.com, krammohancse@smec.ac.in

ABSTRACT

The COVID-19 pandemic, which began in late 2019, has resulted in over 770 million confirmed cases and nearly 7 million deaths worldwide as of 2024, according to the World Health Organization. The rapid and widespread transmission of the virus has highlighted the critical need for effective detection and containment strategies. During the peak of the pandemic in 2020, healthcare systems in many countries were overwhelmed, leading to a significant increase in demand for accurate and timely detection methods to manage and mitigate the spread of the virus. Traditional methods for detecting disease outbreaks, such as laboratory testing and manual contact tracing, have several limitations. These approaches are often time-consuming, resource-intensive, and require significant human intervention, making them less effective during large-scale outbreaks like COVID-19. Moreover, delays in testing and reporting can hinder timely response efforts, leading to further spread of the disease and increased public health risks. Machine learning (ML) presents a powerful alternative for enhancing the detection and prediction of COVID-19 outbreaks. By utilizing large datasets, including clinical, demographic, and mobility data, ML classifiers can accurately identify patterns and predict potential hotspots of infection. These models can evaluate various factors, such as symptom profiles and transmission dynamics, to provide real-time insights and support proactive decision-making. ML-driven approaches not only improve the accuracy and speed of detection but also enable more efficient resource allocation, ultimately contributing to better management and control of future disease outbreaks.

Keywords: Covid – 19 Pandemic, Healthcare Systems, Laboratory Testing, Manual Contact Tracing, Machine Learning, Transmission Dynamics, Real-Time Insights.

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WINE QUALITY PREDICTION USING MACHINE LEARNING AND PARAMETER FINE TUNING

[1]P. Suryachandra Reddy*, [2]P. Varun Reddy, [3]K. Abhirami Reddy, [4]S. Kiran Kumar

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : Suryach1009@gmail.com, varunreddy7675@gmail.com, skirankumarcse@smec.ac.in

ABSTRACT

Wine quality is a multifaceted attribute influenced by various chemical properties, such as acidity, sugar content, and alcohol levels. Traditionally, wine quality assessment has relied on expert tasters, a method that is subjective, time-consuming, and inconsistent. Traditional wine quality assessment methods have several limitations, including subjectivity, variability, and scalability issues. Therefore, this project aims to leverage machine learning (ML) techniques to predict wine quality based on its chemical properties, providing an objective, efficient, and scalable solution for the wine industry. The project addresses key challenges in ML modelling, including feature selection, handling multicollinearity, and parameter fine-tuning. By utilizing large and diverse datasets, the project seeks to develop robust ML models capable of generalizing across different types and vintages of wine. The proposed models aim to balance complexity and interpretability, making them practical for use by winemakers and quality control teams.ML-driven models offer significant advantages by providing consistent and reproducible quality assessments, reducing the time and resources required for evaluation. Additionally, these models can handle large datasets, offering a scalable solution for high-throughput wine production environments. The significance of this project lies in its potential to revolutionize wine quality assessment by delivering objective, data-driven predictions. Enhanced consistency and efficiency in quality assessment can lead to better wine production techniques and improved marketability. By understanding the relationship between chemical properties and wine quality, winemakers can make informed decisions, ultimately enhancing the overall quality of wines. This project positions itself at the forefront of modernizing wine quality assessment through advanced ML modelling and parameter fine-tuning.

Keywords: Wine quality assessment, Chemical analysis in winemaking, Sensory evaluation variability, Machine learning in wine production.

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UAV IMAGE-BASED AUTOMATED ROAD DAMAGE DETECTION USING DEEP LEARNING

[1]Mohit Kumar Sharma*, [2]A.Sujith Kumar, [3]Kalangi Kranthi, [4]S. Bavankumar

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : smec.mohit@gmail.com, sbavankumarcse@smec.ac.in

ABSTRACT

Unmanned Aerial Vehicles (UAVs) have advanced rapidly in recent years, enabling innovative applications across sectors. One promising application is automated road damage detection, which is essential for road infrastructure maintenance and transportation safety. Traditional road damage detection systems use manual inspections or vehicle-mounted cameras, which are time-consuming, laborious, and limited to ground-level views. Traditional methods risk inspectors and are expensive. Inefficiency and lack of coverage and real-time data are the main issues with traditional road damage detection systems. Vehicle-mounted systems are limited to roadways and may miss critical damage in less visible areas, while manual inspections are subjective and prone to error. These restrictions delay maintenance, causing road damage that can worsen and cost more to fix. For a more efficient, accurate, and scalable solution, this research proposes a UAV-based automated road damage detection system using deep learning. UAVs are flexible enough to take aerial images of road networks from different angles and altitudes, providing a more complete picture of road conditions. The proposed system uses convolutional neural networks (CNNs) to automatically identify and classify road damage from UAV imagery. The proposed system improves road damage inspection speed, accuracy, and safety over traditional methods. UAVs cover large areas quickly, reducing inspection time, and deep learning models accurately detect and categorize road damage. This automated method reduces inspector risk and error. The system's scalability allows frequent and widespread monitoring, enabling timely maintenance interventions and extending road infrastructure lifespan.

Keywords: Road damage, UAV, CNN, Damage Inspection, Deep Learning, Time Efficient, Cost Efficient, Automated Detection.

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DEEP LEARNING-BASED APPROACH FOR DETECTING COPY -MOVE FORGERY

[1]D. Chandrahasa Reddy*, [2]B. Nithin, [3]B.V. Syam Krishna, [4]K. Sreenivasulu
[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : ksreenivasallucse@smec.ac.in

ABSTRACT

Copy-move forgery is a prevalent form of image manipulation where a part of an image is duplicated and pasted onto another area, often to conceal or alter information. It's commonly encountered in digital media forensics, with applications in detecting tampered images, verifying authenticity, and ensuring integrity in legal and journalistic contexts. Currently, detecting copy-move forgery relies heavily on manual analysis by forensic experts. This process involves visually inspecting images, looking for inconsistencies in textures, lighting, and patterns. Despite its reliability, manual analysis is time-consuming and resource-intensive, limiting its scalability and efficiency in handling large datasets. Manual analysis suffers from subjectivity and human error, leading to potential inaccuracies in identifying forged regions. It's impractical for processing a vast number of images quickly, hindering its applicability in real-time scenarios. Additionally, the increasing sophistication of forgery techniques demands more robust and automated solutions. VGG 16, a convolutional neural network (CNN), offers a promising solution for automating copy-move forgery detection. Trained on extensive datasets, VGG 16 excels in feature extraction, enabling it to recognize patterns indicative of tampering with high accuracy. Its hierarchical architecture allows for the detection of both global and local inconsistencies in images, enhancing its versatility and effectiveness in identifying forged regions.

Keywords: Copy-Move Forgery, Image Manipulation, Digital Media Forensics, Tampered Images, Authenticity Verification, Manual Analysis, Forensic Experts, Human Error, Real-Time Processing, Forgery Techniques, VGG 16, Convolutional Neural Network (CNN), Feature Extraction, Pattern Recognition.

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OBJECT-CENTRIC MASKED IMAGE MODELLING FOR SELF-SUPERVISED PRE-TRAINING IN REMOTE SENSING OBJECT DETECTION

[1] U. Rakesh*, [2]S. Ankith Rao, [3]G. Sai Kumar, [4] D. Manasa

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : dmanasacse@smec.ac.in

ABSTRACT

The proliferation of remote sensing technologies has led to an increasing demand for effective object detection in satellite and aerial imagery, with applications ranging from environmental monitoring to urban planning. Traditional methods for analyzing such imagery often rely on manual inspection, which is both time-consuming and prone to human error. While recent advancements in automated object detection have improved efficiency, these systems frequently suffer from limitations in accurately identifying and classifying objects due to their reliance on simplistic masking techniques and insufficient context understanding. In this work, we propose a novel Object-Centric Masked Image Modelling (OCMIM) algorithm designed to enhance self-supervised pre-training for remote sensing object detection. The OCMIM algorithm comprises two key components: the Object-Centric Data Generator (OCDG) and the Attention-Guided Mask Generator (AGMG). The OCDG component empowers the model to capture comprehensive object-level context information, accommodating various scales and multiple categories, thus enriching the pre-training process. Complementing this, the AGMG focuses on improving the reconstruction of object regions by intelligently masking the most attention-worthy regions instead of employing random masking, thereby enabling more accurate object detection and classification. Our proposed OCMIM algorithm leverages the strengths of existing pre-trained models such as Mask R-CNN (M-RCNN) and RetinaNet, enhancing their performance through the integration of OCDG and AGMG. For evaluation purposes, we utilized several pre-trained models, including M-RCNN and RetinaNet, and conducted experiments on diverse datasets such as NWPU, DIAR, and UCAS. Given the extensive training time required for these models, we specifically employed M-RCNN in conjunction with OCMIM for detailed experiments on the NWPU dataset.

Keywords: Remote sensing object detection, Object-Centric Masked Image Modelling, self-supervised pre-training, Attention-Guided Masking, Mask R-CNN, RetinaNet.

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MACHINE LEARNING ANALYSIS ON IRIS FLOWERS CLASSIFICATION ON E-AGRICULTURE APPLICATION

[1]Munuswamy Kaveri*, [2]Adla Manasa Reddy, [3] Mittapalli Ranjeeth Kumar, [4]P. Akhil

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : amanasareddy2003@gmail.com, ranjeethkumarmittapalli@gmail.com, pakhilcse@smec.ac.in

ABSTRACT

Classifying iris flowers based on petal and sepal measurements is a fundamental problem in botanical research. In botany, this approach aids researchers in species identification and taxonomy, facilitating the study of plant biodiversity and evolution. Additionally, in horticulture and agriculture, accurate classification of iris species can inform breeding programs, helping to develop new cultivars with desirable traits. Moreover, in environmental science, understanding the distribution and abundance of different iris species contributes to ecosystem monitoring and conservation efforts. Furthermore, the machine learning techniques employed in this approach can be generalized to other classification tasks in fields such as healthcare, finance, and marketing. Traditional methods for classifying iris flowers often rely on manual measurements and expert knowledge, which can be time-consuming and subjective. These methods may also lack scalability and generalization capabilities, as they rely heavily on human expertise for feature selection and classification. Additionally, manual classification may lead to inconsistencies and errors, especially when dealing with large datasets or subtle differences between species. Furthermore, traditional approaches may struggle to handle high-dimensional feature spaces or complex relationships between features, limiting their effectiveness in accurately classifying iris flowers. In contrast to traditional methods, the proposed system employs a machine learning approach to classify iris flowers based on petal and sepal measurements. This work utilizes a supervised learning algorithm to automatically learn discriminative patterns from the input features. Through feature extraction and model training on a labeled dataset of iris flowers, our system learns to distinguish between different species based on their petal and sepal characteristics. Moreover, this work employs techniques such as cross-validation and hyperparameter tuning to optimize the model's performance and ensure robustness.

Keywords: Difference Image Entropy, Java Database Connectivity, Music Television.

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ADVANCED MACHINE LEARNING MODELS FOR MULTI-CLASSIFICATION OF HUMAN EXERCISE ACTIVITIES

[1]K. Murari*, [2]Ch. Joy Kumar, [3]A. Ashwith Reddy, [4]Shaik Hanishma

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : murarikodi@gmail.com shaikhanishmacse@smec.ac.in

ABSTRACT

Human fitness activity classification is important in healthcare and sports science. Jumping jacks, pull-ups, push-ups, sit-ups, and squats can be classified accurately to assess fitness and track progress. Manual observation or specialised equipment are used to classify human fitness activities, which is time-consuming, subjective, and expensive. Activities must be labeled by humans, which may introduce errors. Traditional systems may struggle with complex activities or intensity changes. The need for automated and objective fitness activity classification is growing. Such methods can streamline fitness routine monitoring and analysis, providing real-time feedback and personalized recommendations. Machine learning lets us build robust, scalable, and diverse activity and user population systems. This improves fitness tracking, performance assessment, and user engagement. Our system uses machine learning algorithms to classify human fitness activities into multiple classes to overcome traditional limitations. We will collect data from fitness enthusiasts wearing sensors or motion capture devices. Our classification models will use joint angles, accelerations, and velocities. We will use K-Nearest Neighbors (KNN), Decision Trees, and Light Gradient Boosting Machine (LightGBM) to build robust classifiers. To ensure generalization to new data, the system will be trained on a labeled dataset of human fitness activities and validated using cross-validation. After training, the model will classify human fitness activities accurately and efficiently in real life.

Keywords**:** Classification, fitness activities, machine learning, automated methods, real-time feedback, sensors, joint angles, K-Nearest Neighbors, Decision Trees, LightGBM

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PAPER ID: ICIRTCS-24-018

SUPERVISED LEARNING BASED PLANT SPECIES CLASSIFICATION FOR PRECISE E-AGRICULTURE

[1]M. Ganesh*, [2]S. Varun Kumar, [3]K. Suhas, [4]Sashmitha Mallick

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail : sangepuvarunkumar123@gmail.com, sashmithamallickcse@smec.ac.in

ABSTRACT

The accurate identification of plant species is essential for various fields such as biodiversity conservation, agriculture, and ecological research. Traditionally, this process has relied on manual methods involving botanical keys, field guides, and expert consultations. However, these methods are time-consuming, require extensive expertise, and are prone to human error. The motivation behind this endeavor lies in the need to conserve biodiversity, optimize agricultural practices, and facilitate ecological research. By automating the identification process, this project seeks to make it more accessible to a broader audience while ensuring scalability and accuracy. The problem statement revolves around the inefficiency and subjectivity of manual identification methods, which hinder large-scale biodiversity assessments and agricultural monitoring. Thus, the proposed system aims to develop an automated solution capable of accurately identifying plant species from images, thereby reducing the time and expertise required for the task. The proposed system encompasses several key components, including dataset collection, preprocessing, feature, model training, evaluation, and optimization. A comprehensive dataset of labeled plant images will be collected and preprocessed to enhance the model's performance. CNNs will then automatically extract relevant features from the images, which will be used to train a machine learning model. Various algorithms will be explored and optimized to achieve the highest accuracy possible.

Keywords**:** Plant species identification, ecological research, manual methods, human error reduction, Dataset collection, preprocessing, feature extraction, model training, CNNs, performance evaluation, scalability, optimization, accuracy.

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SMART MANUFACTURING: MACHINE LEARNING APPROACHES FOR ACCURATE MECHANICAL FAULT DETECTION AND CLASSIFICATION

[1]Navyasri Chilukoti *, [2]Alekya Jem, [3]Shreenidhi Dandugula, [4]P. Sudharsan
[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail : chilukotinavyasri@gmail.com, sreenidhid04@gmail.com, psudharsancse@smec.ac.in

ABSTRACT

In industrial machinery, mechanical problems can cause major operating interruptions, higher maintenance costs, and safety risks. Reflecting the increasing focus on early defect detection and prevention, the worldwide market for predictive maintenance solutions was estimated to be worth over $10 billion in 2023. Minimizing downtime and preserving equipment dependability depends on accurate mechanical fault classification. Particularly in complicated machinery or large-scale operations, traditional approaches for problem identification can rely on manual inspection and heuristic analysis—two labor-intensive and error-prone activities. Usually depending on visual inspections, vibration analysis, and other diagnostic tools requiring significant knowledge and frequently reactive rather than proactive, manual problem detection procedures These methods may find early indicators of failure or minor abnormalities, which might cause delayed maintenance or perhaps system failures. The shortcomings of hand approaches emphasize the need of more efficient and automated techniques to increase fault identification and classification. By use of sensor data and pattern identification suggestive of different fault kinds, machine learning offers a strong solution for mechanical fault classification. Deep learning models, anomaly detection, and classification algorithms can all be taught on past error data to identify and forecast errors. Machine learning models can provide high accuracy in fault classification and early warning of possible problems by using properties retrieved from sensors tracking vibrations, temperature, and other operational factors. This method lowers downtime, improves maintenance plans, and increases the dependability of predictive maintenance systems, therefore helping to maximize industrial operations by cost-effective means.

Keywords*:* Machine Learning, Gradient Boosting Machine.

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MACHINE LEARNING-BASED CLASSIFICATION OF STRUCTURAL DAMAGE IN CIVIL INFRASTRUCTURE

[1]GS.MD Sameer Basha*, [2]G.Murali Krishna, [3]E. Soumya
[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail : esoumyacse@smec.ac.in

ABSTRACT

Structural integrity in civil infrastructure is vital for safety, functionality, and longevity, with global investments in infrastructure maintenance surpassing $1.2 trillion annually as of 2023. Effective classification of structural damage—such as cracks, corrosion, and deformation—is essential for timely repair and maintenance. Traditional inspection methods, including visual assessments and manual surveys, are often labor-intensive, prone to subjectivity, and may fail to detect subtle or hidden damages. These limitations can lead to inadequate maintenance and increased risks of structural failures. Manual inspection techniques typically involve periodic visual inspections by engineers, which can be affected by human error and limited by the inspector's experience. These methods also often struggle with assessing large or complex structures comprehensively, potentially missing critical damage indicators or failing to prioritize repair actions effectively. The need for more reliable and efficient solutions has become increasingly apparent as infrastructure demands grow. So, proposed machine learning offers a powerful alternative for the classification of structural damage by analyzing data from various sources, including imaging technologies, sensors, and historical records. Machine learning algorithms and ensemble methods can be trained to recognize patterns associated with different types of damage from data collected during inspections. These models provide accurate, consistent, and scalable assessments, enabling real-time monitoring and early detection of structural issues. By automating the classification process, machine learning enhances the precision and efficiency of infrastructure maintenance, reduces the risk of structural failures, and supports better-informed decision-making for repair and rehabilitation efforts.

Keywords**:** Structural, Integrity, Real-time monitoring, Early detection, Human error.

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LOAN ELIGIBILITY PREDICTION: MACHINE LEARNING APPROACH FOR FRAUDULENT LOAN ANALYSIS

[1]Akash Hanumantha*, [2]Koganti Linga Pardhiv, [3]Ubidi Bhupal, [4]Kishor Golla
[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail : kogantilingapardhiv@gmail.com, gkishorcse@smec.ac.in

ABSTRACT

The financial sector faces significant challenges in assessing loan eligibility due to the complexity and volume of applications. Statistics indicate that fraudulent loan applications result in substantial financial losses, with global figures reaching billions of dollars annually. Accurate prediction of loan eligibility is vital to safeguard financial institutions and ensure fair lending practices. As the volume of loan applications continues to grow, traditional manual assessment methods become increasingly impractical and prone to errors. There is a pressing need for automated, data-driven solutions to accurately evaluate loan eligibility and detect potential fraud. Manual loan assessment processes are labour-intensive and susceptible to human error, leading to inconsistencies and potential oversight. These methods often fail to detect subtle indicators of fraud, resulting in significant financial losses. The reliance on subjective judgment can introduce biases, affecting the fairness and accuracy of loan decisions. Additionally, the manual verification of extensive data points is time-consuming, delaying the approval process and impacting customer satisfaction. Our proposed solution employs machine learning algorithms to predict the eligibility of loan applications and detect fraudulent cases using the SYL Bank dataset. The dataset includes various features such as age, occupation, marital status, credit score, income level, and past financial behaviour. By training ML models on this comprehensive dataset, we aim to develop a predictive system that accurately identifies eligible applicants and flags potential fraud. This approach promises to enhance the precision, efficiency, and security of loan processing, ensuring better outcomes for financial institutions and their clients.

Keywords*:* Random Forest Classifier, K-Nearest Neighbors, Support Vector Machines.

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MACHINE LEARNING-BASED CLIENT-SIDE DEFENSE AGAINST WEB SPOOFING ATTACKS

[1]Kandukuri Abhinav*, [2] Chennoju Akshay Kumar, [3] MD. Masoom Imran, [4] N. Balaraman,
[1,2,3] UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail : kandukuriabhinav03@gmail.com, nbalaramancse@smec.ac.in

ABSTRACT

Internet communication and transactions are at risk from web spoofing attacks. These attacks involve malicious actors impersonating legitimate websites to trick users into disclosing sensitive information or taking harmful actions. This growing threat requires robust defense mechanisms that can detect and stop web spoofing attempts in real time. SSL/TLS protocols and domain validation are the main server-side defenses against web spoofing. These methods offer some protection but are limited. First, server-side defenses are reactive, meaning they only detect and respond to spoofing attempts. In the critical window between attack initiation and detection, this delay leaves users vulnerable. Server-side defenses may also misidentify legitimate and spoofed websites, resulting in false positives and negatives. The prevalence of web spoofing attacks highlights the need for proactive client-side defense. Most approaches focus on server-side defenses, which are insufficient to protect against evolving spoofing techniques. Thus, to combat web spoofing, the security infrastructure must address a critical gap. We offer a proactive and robust solution to detect and prevent spoofing attempts before they cause harm. We also aim to use machine learning to create a system that can learn and adapt to new spoofing tactics, improving its effectiveness and resilience to evolving threats. PISHCATCHER is a novel web spoofing defense system. The client-side machine learning-based defense mechanism detects and prevents spoofing attempts in real time. PISHCATCHER uses advanced machine learning algorithms to identify legitimate and spoofed websites by analyzing HTML structure, CSS styles, and JavaScript behavior.

Keywords**:** Web Spoofing, Security, Online Communication, Sensitive Information, Defense Mechanisms, Real-time Detection, PishCatcher.

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PAPER ID: ICIRTCS-24-023

CLASSIFYING HANDWRITTEN DIGITS: MACHINE LEARNING EXPLORATION OF MNIST DATASET

[1]V.Dileep Sai Subramanya Varma*, [2]S. Bavankumar

[1]UG Scholar, [2]Assistant Professor, Department of Computer Science and Engineering,
[1,2,]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail : sbavankumarcse@smec.ac.in

ABSTRACT

Handwritten digit classification is a fundamental problem in the field of machine learning and computer vision. It involves recognizing handwritten digits (0-9) from images. The MNIST dataset, consisting of 28x28 pixel grayscale images of handwritten digits, is a widely used benchmark for this task. In this we embark on the MNIST Handwritten Digit Classification Challenge, aiming to delve into image data analysis and explore different machine learning algorithms for accurate classification. Traditionally, handwritten digit classification was done manually by human experts. With the advent of computer vision and machine learning, automated systems have been developed to tackle this task. However, traditional systems often relied heavily on handcrafted features and simplistic algorithms, which limited their accuracy and scalability. Moreover, these systems struggled with variations in handwriting styles, noise in images, and computational inefficiency. The problem we address is to build an accurate and efficient system for classifying handwritten digits using machine learning techniques. Accurate handwritten digit classification has numerous real-world applications, including postal automation, bank check processing, and digit recognition in forms. By developing robust classification models, we can enhance the efficiency and reliability of such applications, leading to improved productivity and cost savings. The proposed system employs modern machine learning techniques, including Generalized Learning Vector Quantization (GLVQ) and Support Vector Machine (SVM), to classify handwritten digits effectively. These algorithms offer advantages such as automatic feature extraction, robustness to variations, and scalability to large datasets. Additionally, we leverage data visualization and performance evaluation techniques to gain insights into the classification process and ensure model reliability. Overall, our system aims to provide an accessible and insightful journey into image data analysis for beginners in the field.

Keywords***:*** Support Vector Machines, K-Nearest Neighbors, Recurrent neural network, Write Once Run Anywhere.

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SHOULDER IMPLANT X-RAY MANUFACTURER CLASSIFICATION USING MACHINE LEARNING

[1]Gummadi John Paul*, [2]Aditya Kaushik, [3] Domakonda Sai Babu, [4] D. Sai Kiran

[1,2,3] UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail : kaushik4aditya@gmail.com, dsaikirancse@smec.ac.in

ABSTRACT

The efficiency of health systems is crucial for providing high-quality care and optimizing resource utilization. In 2023, the global healthcare industry faced increasing pressures to improve service delivery while managing rising costs, with expenditures projected to exceed $12 trillion. Traditional software engineering approaches often fall short in addressing these complex challenges due to their limited adaptability and integration capabilities. Current health systems typically rely on legacy software and manual processes that can be slow to adapt to new demands and often lack the integration needed for seamless data flow. These systems are often rigid, resulting in inefficiencies and difficulties in managing and analysing large volumes of health data. The limitations of traditional software engineering practices highlight the need for more dynamic and intelligent solutions to enhance health system efficiency. Integrating machine learning with modern software engineering paradigms offers a transformative approach to improving health system efficiency. By leveraging advanced algorithms and data analytics, machine learning models can optimize various aspects of healthcare delivery, including patient scheduling, resource allocation, and predictive analytics for disease management. Machine learning techniques, such as predictive modeling and natural language processing, enable more accurate and real-time insights into patient needs and system performance. This integration fosters adaptive, data-driven decision-making, enhancing operational efficiency, reducing costs, and ultimately improving patient outcomes. Reimagining health system efficiency through the synergy of machine learning and software engineering promises to create more responsive, efficient, and effective healthcare solutions.

Keywords**:** Health system efficiency, healthcare industry, resource utilization, healthcare costs, legacy software, data integration, machine learning integration.

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PAPER ID: ICIRTCS-24-025

BUILDING YOUR OWN CHATBOT: EXPLORING NATURAL LANGUAGES PROCESSING TECHNIQUES WITH NLTK AND NEURAL NETWORK

[1]B Subham Kumar[*], [2]Suraj Ratan Kaluva, [3]Dubbasi Swetha, [4]Dr. R. Santhoshkumar
[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail : drsanthoshkumarcse@smec.ac.in

ABSTRACT

Mental health issues, such as anxiety, depression, and other psychological disturbances, have become a significant public health concern globally. Identifying individuals at risk of these conditions early on can lead to improved outcomes. With the rise of technology and the increasing use of smartphones and wearable devices, there is an opportunity to develop an innovative system that can monitor emotional health in real-time. Traditionally or earlier people used to be relied on the reports of the mental health professionals, but there are some limitations such as it might contain some errors, not much accurate and most importantly it is not available 24/7. So by using the technologies such as Machine Learning and NLP(Natural language processing) we could develop a monitoring system, that could gather real time data of an individuals emotional state and their psychological responses. Early detection of these disturbances can lead to a better outcome by decreasing the burden on mental health services. This monitoring system has the potential to improve mental health outcome on a broader scale.

Keywords**:** Mental health monitoring, Public health concern, Early detection of mental health issues, AI in mental health, Real-time emotional health monitoring, Machine Learning in mental health, Natural Language Processing (NLP), Technology in mental health, Mental health outcomes improvement.

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PAPER ID: ICIRTCS-24-026

PREDICTING ROAD ACCIDENT SEVERITY AND RECOMMENDING HOSPITALS USING DEEP LEARNING TECHNIQUES

[1]Gatati Bhargavi*, [2]Gunti Hema Jyothi, [3] Kumbala Varshini, [4]Dr. G JawaherlalNehru

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail : sangarajuchinmayi@gmail.com

ABSTRACT

The objective of this work is to develop a deep learning-based system that accurately predicts the severity of road accident injuries and recommends the most suitable hospital for treatment based on the identified injury. The title "Predicting Road Accident Severity and Recommending Hospitals Using Deep Learning Techniques" indicates that this project focuses on utilizing advanced AI methods to assess accident outcomes and provide timely medical assistance. Historically, injury assessment and hospital recommendations relied on manual evaluation by first responders or emergency personnel, which could delay critical care. Traditional systems lacked the precision and speed needed to accurately determine injury severity, often leading to suboptimal treatment decisions. The problem statement highlights the challenge of timely and accurate injury assessment in the absence of machine learning models, which often resulted in preventable fatalities due to delayed or incorrect treatment. The research motivation stems from the increasing number of road accidents worldwide and the urgent need for a system that can provide immediate and accurate injury assessments, thereby improving survival rates. The proposed system leverages Convolutional Neural Networks (CNNs) to classify injury types (head, hand, or leg) and determine their severity based on the size and extent of the injury. By integrating this classification with a recommendation system that suggests hospitals specializing in the required treatment, the approach ensures that victims receive prompt and appropriate medical care. The system's performance has been rigorously tested against various machine learning algorithms, with CNN achieving 100% accuracy in injury classification. This AI-driven approach offers a significant improvement over traditional methods, potentially saving countless lives by expediting the medical response to road accidents.

Keywords***:*** Deep learning, Convolutional Neural Networks (CNNs), road accident injuries, injury classification, injury severity, machine learning, emergency response.

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USER CENTRIC CYBER SECURITY: A MACHINE LEARNING FRAMEWORKS FOR OPERATIONS CENTERS

[1]Manda Himavanth*, [2]Aman Kaushik, [3]Mudike Eshwar Yadav, [4]Dr. M.Vadivukarassi

[1,2,3]UG Scholar, [4]Associate Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail : amankaushik342@gmail.com, eshwar7yadav@gmail.com, drmvadivukarassicse@smec.ac.in

ABSTRACT

Cybersecurity is a critical concern in today's digital landscape, with businesses and individuals facing an increasing number of cyber threats. Cyber Security Operations Centers (CSOCs) play a pivotal role in monitoring, detecting, and responding to these threats. Traditional cybersecurity systems rely on predefined rules, signatures, and patterns to detect known threats. While these methods are effective against known malware and attacks, they often struggle with zero-day vulnerabilities and advanced persistent threats. Traditional systems lack the adaptability and context-awareness that user-centric machine learning frameworks offer. They may generate numerous false positives or miss subtle signs of a security breach, leading to delayed or inadequate responses. The problem addressed by this research is the inadequacy of traditional cybersecurity systems in keeping up with the evolving threat landscape. CSOCs face challenges in accurately detecting sophisticated cyber-attacks, including insider threats and targeted attacks. This research aims to develop a user-centric machine learning framework specifically tailored for CSOCs to address these challenges. Machine learning has emerged as a powerful tool in enhancing cybersecurity efforts, providing the ability to analyze vast amounts of data and detect patterns indicative of cyber-attacks. The use of machine learning in cybersecurity is not a recent development. The need for a user-centric machine learning framework in CSOCs arises from the complexity and diversity of cyber threats. A user-centric approach recognizes the importance of understanding user behavior, preferences, and interaction patterns to identify anomalies effectively. By integrating ML techniques tailored to individual users, CSOCs can enhance their ability to detect and mitigate cyber threats in real- time. Furthermore, the framework's ability to learn and adapt to new threat patterns ensures that CSOCs can effectively defend against emerging cyber threats, making it a valuable asset in the fight against cybercrime.

Keywords**:** Cyber Security Operations Center, Machine learning, Cyber threats, User centric approach.

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UNVEILING TWITTER SENTIMENTS: ANALYSING EMOTIONS AND OPINIONS THROUGH SENTIMENT ANALYSIS ON TWITTER DATASET

[1]V Vinay Rao*, [2]Bommana Rikshit, [3]Panasa Satya Sai, [4]C. Yosepu
[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.
*Corresponding Author
E-mail : panasasatyasai@gmail.com, cyosepucse@smec.ac.in

ABSTRACT

In the era of digital communication, social media platforms such as Twitter have emerged as vital sources of real-time information and public sentiment. Traditional methods for analyzing this data—manual data collection, surveys, content analysis, focus groups, keyword tracking, and media monitoring—are often inefficient, labor-intensive, and error-prone, limiting their effectiveness in capturing timely and accurate insights. This research seeks to overcome these limitations by leveraging machine learning (ML) and artificial intelligence (AI) techniques to analyze Twitter data more efficiently and accurately. The system also includes visualization and reporting tools to present insights in an easily interpretable format, aiding decision-makers in understanding and utilizing the findings effectively. By integrating these advanced technologies, the proposed system enhances the scope, scale, and accuracy of Twitter data analysis, providing deeper insights and more reliable predictions. This research is motivated by the need to transform the analysis of social media data from a manual, error-prone process to an automated, scalable, and accurate system. The resulting insights can be invaluable for various applications, including market research, public opinion tracking, crisis management, and strategic decision-making. This study demonstrates the significant potential of AI and ML in revolutionizing the analysis of social media data, offering a comprehensive approach to uncovering trends, sentiments, and predictive insights from Twitter. The proposed system automates data collection through Twitter APIs, allowing for the seamless acquisition of large volumes of tweets in real-time. Natural Language Processing (NLP) techniques are employed to analyze tweet content, extract sentiments, and categorize themes automatically, significantly reducing manual effort and errors. Advanced machine learning algorithms facilitate trend analysis by detecting emerging patterns and trends within vast datasets. Sentiment analysis models provide accurate assessments of public opinion and emotions expressed in tweets, while predictive modeling capabilities enable the forecasting of future trends and sentiments based on historical and real-time data inputs.

Keywords**:** Content Analysis, Natural language processing, Machine Learning, Artificial Intelligence, Sentiment Analysis models, Twitter dataset.

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SAFEGUARDING AGAINST EVIL CHATBOTS: DESIGN, DEVELOPMENT, AND INTEGRATION STRATEGIES FOR CHATBOT SECURITY IN PHISHING ATTACKS

[1] Merugu Shivakrishna*, [2] Yarramsetti Naga Siva Kumar, [3] Karthikeya Puligadda, [4]E. Soumya
[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail : nagasivakumar03@gmail.com, esoumyacse@smec.ac.in

ABSTRACT

The rapid adoption of chatbots by organizations to efficiently manage user queries has brought significant advancements, but it has also introduced new risks. Traditionally, before the integration of machine learning (ML) and artificial intelligence (AI), phishing prevention relied on manual techniques such as blacklists, rule-based filters, and heuristic analysis, which were often slow and insufficient against evolving threats. The primary issue was the manual nature of these systems, which struggled to keep up with the sophisticated tactics used by malicious entities, leading to the exploitation of chatbots for phishing attacks. This challenge highlighted the need for more intelligent and adaptive security measures. The objective of this research is to design, develop, and integrate a self-defensive chatbot capable of identifying and neutralizing phishing attempts by inspecting URLs embedded in user interactions. The motivation behind this study stems from the increasing incidents where chatbots are manipulated to deliver phishing links that, when clicked, install malicious software to steal sensitive data such as cookies and session passwords. This is particularly concerning for sectors like banking and finance, where compromised data can lead to significant user losses. The proposed system leverages machine learning algorithms, including Support Vector Machines (SVM), Random Forest, and Decision Tree, to create a robust model trained on the PHISHTANK URL dataset. This model can accurately distinguish between normal and malicious URLs in real-time, thereby enhancing the security of chatbot interactions. By evaluating each algorithm's performance through metrics such as accuracy, precision, recall, F-score, and confusion matrices, the system ensures optimal phishing detection capabilities. This integration is demonstrated through a dummy banking application where the chatbot processes user queries, employing natural language processing (NLP) techniques to extract and safeguard sensitive information.

Keywords: Chatbots, Phishing Prevention, Machine Learning, Artificial Intelligence, SVM, Random Forest, Decision Tree, PHISHTANK URL dataset.

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MACHINE LEARNING APPROACHES FOR SOIL TYPE CLASSIFICATION IN PRECISION AGRICULTURE

[1]Gaddam Prekshana Reddy*, [2]Gaddam Sri Sohan Reddy, [3]Garlapati Sreeja, [4]K. Ganapati Babu

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail : sreejagarlapati21@gmail.com, kganapathibabucse@smec.ac.in

ABSTRACT

Soil type classification is crucial in precision agriculture for optimizing crop management practices and maximizing agricultural productivity. The application of machine learning approaches in soil type classification from image data has significant implications for precision agriculture. By accurately categorizing soil types based on visual characteristics, farmers and agronomists can tailor soil management practices to the specific needs and constraints of each soil type. This enables precise soil amendment, irrigation scheduling, and crop selection, leading to improved yield, resource efficiency, and environmental sustainability. Moreover, soil type classification facilitates site-specific management strategies, allowing farmers to optimize input usage and minimize environmental impacts across their fields. Traditional methods for soil type classification often rely on manual soil sampling and laboratory analysis, which are labour-intensive, time-consuming, and costly. These methods provide limited spatial coverage and temporal resolution, making it challenging to capture the spatial variability and dynamic nature of soil types in agricultural landscapes. Additionally, traditional approaches may overlook subtle differences in soil properties or fail to account for the complex interactions between soil characteristics and environmental factors. Furthermore, manual classification methods introduce errors and biases, leading to inaccuracies in soil type mapping and decision- making. In contrast to traditional methods, the proposed system utilizes machine learning techniques to automate and enhance soil type classification in precision agriculture using image data. We employ a variety of supervised learning algorithms to learn discriminative features from soil images and classify them into different soil types. Leveraging advanced imaging techniques, this work develops robust classification models to differentiate between different soil types, including Black Soil, Cinder Soil, Laterite Soil, Peat Soil, and Yellow Soil.

Keywords**:** Precision Agriculture, Environmental Sustainability, Supervised Learning, Black Soil, Cinder Soil, Peat Soil, Yellow soil.

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REINFORCING WEB APPLICATION SECURITY: A MODIFIED SCHEME AGAINST SQL INJECTION ATTACKS

[1]Vibha Kulkarni*, [2]Tanisha Sharma, [3]Rajeshwari Kondekar, [4]P. Swetha

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail : basireddysreejithareddy@gmail.com

ABSTRACT

SQL injection attacks pose a serious threat to databases as they exploit vulnerabilities in the database layer by injecting SQL codes into user databases. The consequences of a successful attack cause unauthorized access to databases and attackers can gain access to sensitive data. So to avoid the data breach and unauthorized access we have to detect whether the executed SQL code at the user side is malicious or not. Even though some methods like parameterized queries, escaping characters and input validation are some traditional techniques to detect SQL injection, they have their own limitations. These methods often rely on manual coding practices and may not identify new attacks. As attackers continuously evolve their techniques to attack and gain access to sensitive data there is a need for advanced solutions that can proactively identify and mitigate SQL injection attacks. AI has the capacity to analyse vast amounts of data, detect patterns, and learn from previous attacks. AI brings significant benefits to the prediction of SQL injection attacks. Its ability to detect anomalies, learn from new attack patterns, recognize complex patterns, reduce false positives, provide real-time protection, and scale to handle large applications makes it an indispensable tool. Here we use count vectorizer to create tokens and give these tokens to a Neural Network Algorithm i.e., Multi Layer Perceptron to detect the malicious SQL code. By leveraging artificial Intelligence , we can detect and mitigate malicious SQL codes swiftly and accurately to ensure the safety of databases.

Keywords: Artificial Intelligence, Natural Language Processing, Prediction, Malicious SQL codes, Machine Learning, Threat Detection, SQL Injection, Neural Networks, count vectorizer, Multi layer Perceptron.

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FUSION OF VISUAL AND INFRARED INFORMATION FOR NIGHTMARE PEDESTRIAN DETECTION

[1]Surakanti Sreeja Reddy *, [2]Tummala Vardhitha, [3]Yeleti Mahisri Reddy, [4]E. Soumya

[1,2,3] UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail : mahisrireddy2227@gmail.com, esoumyacse@smec.ac.in

ABSTRACT

Researchers have focused on pedestrian detection to improve road safety and self-driving cars. This research fuses visual and infrared data to improve pedestrian detection, especially at night or in low-visibility conditions, using deep learning models like YoloV5. The proposed method uses advanced sensors and deep learning algorithms to identify pedestrians in real time with less error. "Fusion of Visual and Infrared Information for Nightmare Pedestrian Detection" uses camera-based and heat-sensing data to detect pedestrians, especially at night. "Nightmare" metaphorically describes the difficulty of detecting pedestrians in low-visibility or extreme conditions. LIDAR and radar have traditionally detected obstacles. Traditional pedestrian detection used LIDAR or radar for obstacle detection before AI. Basic image processing, proximity sensors, and motion detectors for pedestrian detection with optical cameras. Traditional sensor-based systems struggle to detect pedestrians in low-light and low-visibility conditions. These systems struggle to distinguish objects from pedestrians, especially at night or in bad weather, resulting in delayed or missed detections and accidents. With the push for autonomous vehicles and higher safety standards, more accurate pedestrian detection systems that work in all weather, especially at night, are needed. AI-based solutions that use multi-modal data like infrared and visual input for better detection accuracy are needed because sensor-based systems are insufficient. Enhanced deep learning models and infrared vision and millimeter-wave (MMW) radar data improve pedestrian detection in the proposed system. A modified YoloV5 model with a Squeeze layer for attention will extract and classify image features. The Extended Kalman Filter will locate pedestrians accurately. The enhanced YoloV5 model will use this fused data for more accurate pedestrian detection.

Keywords*:* YoloV5, MMW, Kalman Filter, LIDAR

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DL-BASED DIAGNOSIS PREDICTION IN TELEMEDICINE APPLICATIONS

[1]D.Shiva*, [2]Rahul Teja, [3]YabakulaVinay, [4]S. Bavankumar
[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : shivadange26@gmail.com, sbavankumarcse@smec.ac.in

ABSTRACT

The primary objective of this project is Telemedicine, the practice of remotely diagnosing and treating patients through telecommunications technology, is transforming modern healthcare delivery. With its rising adoption, the demand for efficient and accurate diagnostic prediction systems has become increasingly apparent. In traditional telemedicine systems, diagnosis prediction often relies heavily on manual interpretation by healthcare professionals. This method is time-consuming, subjective, and prone to errors dueto human factors likefatigue and cognitivebiases.Furthermore, traditional systems may struggle with scalability and efficiency in handling large volumes of patient data, limiting their effectiveness in delivering remote healthcare,particularly in underserved areas. The motivation behind this project lies in addressing the shortcomings of traditional telemedicine systems and harnessing DL's potential to revolutionize remote healthcare delivery. By automating diagnosis prediction, the project aims to improve the efficiency, accuracy, and accessibility of telemedicine services, particularly in underserved communities and remote regions where access to healthcare resources is limited. Furthermore, automated diagnosis prediction can alleviate the burden on healthcare professionals, enabling them to focus on critical patient care tasks while leveraging technology for routine diagnostic assessments. The proposed system entails the development and deployment of DL- based diagnosis prediction models tailored for telemedicine applications. Leveraging MLP Classifier, the system will analyze patient data, including demographics, symptoms, and diagnostic tests, to predict the likelihood ofvarious medical conditions.

Keywords: artificial neural networks; convolutional neural networks; COVID-19; deep learning; deep neural networks; diabetes; disease diagnosis; heart disease; kidney disease; machine learning; review.

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AI-ENHANCED HEALTH MANAGEMENT APPLICATION FOR PATIENT CARE

[1]Dusa Kavya*, [2]Kunchala Nagamani, [3] Harijana Sarawathi, [4]P. Deva Sudha

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : dusakavy27@gmail.com,

ABSTRACT

The work titled "AI-Enhanced Health Management Application for Patient Care" aims to revolutionize traditional healthcare systems by integrating AI technologies into patient management and disease prediction. Traditionally, patient records were managed manually or through basic electronic health record (EHR) systems, with limited or no predictive capabilities. Disease diagnosis often relied heavily on manual analysis by doctors, which could be time-consuming and prone to errors. The objective of this work is to streamline patient-doctor interactions, improve diagnosis accuracy, and provide instant predictive insights using AI, particularly in brain MRI analysis. The historical context reflects a shift from purely manual or EHR-based systems to AI-driven solutions, where doctors can make more informed decisions faster, enhancing patient care. The problem statement revolves around the inefficiencies of traditional systems, such as delays in diagnosis and lack of predictive tools. The research motivation lies in the growing need to improve healthcare outcomes by leveraging AI's potential to provide accurate, real-time predictions. The proposed system utilizes Convolutional Neural Networks (CNNs) and Support Vector Machines (SVM) to analyze patient MRI data, enabling doctors to make instant, data-driven decisions regarding patient treatment. This AI-driven approach not only enhances the speed and accuracy of diagnosis but also provides a more integrated and accessible patient management system, where records, appointments, and prescriptions are seamlessly managed. In this proposed system, CNN and SVM are the primary machine learning algorithms applied to achieve the desired outcomes. CNNs are used for image analysis, particularly in processing and interpreting brain MRI scans to predict potential health issues. SVMs complement this by providing robust classification capabilities, helping to refine the predictive models and ensure high accuracy in the diagnosis. Together, these algorithms form the core of the AI modules that empower doctors to make quick, informed decisions, ultimately improving patient care and outcomes.

Keywords**:** Patient Data Security, Electronic Health Records (EHRs) integration, Real-time Health Feedback, AI-driven Patient Monitoring, Symptoms Monitoring and Alerts.

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ENHANCED SECURITY FOR BANKING TRANSACTIONS USING IMAGE BASED STEGANOGRAPHY

[1]Tarani. Shravani *, [2]Malyala. Meghana, [3] Dasari. Jayasree, [4] K. Ram Mohan

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : krsd0904@gmail.com

ABSTRACT

In an age of increasing digital communication and data transfer, ensuring the security and privacy of sensitive information is paramount. Steganography, the art of hiding information within other data, has been used for centuries. In the digital realm, it plays a critical role in secure communication and information concealment. Traditional steganography methods often involve embedding information within a single image. While effective, this approach may be susceptible to detection, as single-image steganography can leave detectable traces, especially under sophisticated analysis. The primary challenge is to develop a robust system for multiple image steganography that can securely hide sensitive files within a set of images. This involves designing algorithms that distribute the information effectively across the images while maintaining imperceptibility and ensuring reliable extraction. Thefore the rise of cyber threats and privacy concerns, there's a growing need for advanced techniques to protect sensitive files from unauthorized access or interception. Multiple image steganography, an emerging field, offers the potential for heightened security by spreading information across multiple images, making it even more challenging for potential adversaries to detect or extract. The project seeks to enhance file security by leveraging advanced techniques in multiple image steganography. By distributing the information across a set of images, this research endeavors to develop a system capable of securely concealing sensitive files. The algorithms utilized in this approach are designed to ensure imperceptibility and robustness against detection efforts. This advancement holds great promise for significantly improving the security of file transmission and storage, safeguarding critical information from unauthorized access or interception.

Keywords*:* Digital Rights Management, Least Significant Bit, Joint Photographic Expert Group.

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RANSOMWARE ATTACK DETECTION THROUGH PROCESSOR AND DISK USAGE DATA ANALYSIS

[1]V. Lalitha Shriya[*], [2]C. Hemitha, [3]N. Rithika Goud, [4]S. Kiran Kumar

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : shriya15403@gmail.com, skirankumarcse@smec.ac.in

ABSTRACT

Ransomware has grown since the early 2000s, when "locker" ransomware restricted computer functions. As technology advanced, ransomware became more sophisticated, encrypting files and demanding payment. Traditional antivirus solutions initially protected against ransomware, but as it became more evasive, they struggled, leading to more advanced detection methods. Objective: This study analyzes processor and disk usage data to create a ransomware detection system. This system overcomes traditional methods to improve detection accuracy without affecting system performance. Before machine learning and AI, ransomware detection used process monitoring, file activity tracking, and signatures. High false-positive rates, system performance degradation, and limited effectiveness against sophisticated attacks were common with these methods. Due to their performance impact and low detection accuracy, system process monitoring and file activity tracking have failed to detect ransomware. These methods are often too slow to respond to fast-changing ransomware threats, leaving systems vulnerable. More effective and efficient solutions are needed due to the rising frequency and sophistication of ransomware attacks and the limitations of traditional detection methods. The potential of hardware performance counters and I/O events data in a virtualized environment to improve ransomware detection accuracy without affecting system performance motivated this research. The proposed system analyzes real-time processor and disk usage data to detect ransomware using machine learning algorithms. VMware collects HPC and I/O Event data without affecting system performance. Machine learning models like DNN or Random Forest classify scripts as benign or ransomware using this data.

Keywords*:* Long Short-Term Memory, Convolutional NeuralNetwork, Support Vector Machine.

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HEALTH RISK ASSESSMENT USING MACHINE LEARNING CLASSIFIERS ON WEARABLE IOT DEVICES

[1]Raparla Sai Manogna*, [2]Kistamolla Nikitha, [3]Shaik Muskaan, [4]B. Amrutha Raju
[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : raunaksood956@gmail.com

ABSTRACT

Electrocardiogram (ECG) arrhythmia classification is crucial for diagnosing and managing cardiac conditions, as arrhythmias can lead to serious health complications if left untreated. The application of machine learning-based ECG arrhythmia classification has significant implications for cardiac healthcare and clinical practice. Accurate and timely classification of arrhythmias enables healthcare professionals to diagnose cardiac conditions, determine appropriate treatment strategies, and monitor patient health effectively. Moreover, machine learning models can support remote monitoring and telemedicine initiatives, allowing for early detection of arrhythmias and timely intervention, particularly in underserved or remote areas. Additionally, ECG arrhythmia classification facilitates research efforts aimed at understanding the underlying mechanisms of arrhythmias and developing novel diagnostic and therapeutic approaches. Existing methods for ECG arrhythmia classification often rely on manual interpretation by cardiologists or rule-based algorithms, which may be subjective, time-consuming, and prone to errors. These methods may struggle to accurately classify complex arrhythmias or differentiate between similar arrhythmia patterns. Moreover, traditional approaches may overlook subtle changes in ECG signals or fail to capture the full spectrum of arrhythmia features, leading to suboptimal classification performance. Additionally, the increasing volume and complexity of ECG data pose challenges for traditional classification methods, necessitating more advanced and data-driven approaches. The proposed system utilizes machine learning techniques to automate and enhance ECG arrhythmia classification, addressing the limitations of existing methods. This work employs supervised learning algorithms to train models on ECG data and classify different types of arrhythmias. By preprocessing ECG signals, extracting informative features, and leveraging advanced classification techniques. The proposed models can accurately identify arrhythmia patterns and classify them into relevant categories.

Keywords: KNN(K Nearest Neighbour),Naïve Bayes Classifier, Feature Extraction, Real Time Health Monitoring, SMOTE, Model Evaluation, IOT In Healthcare, ECG.

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PREDICTING EARTHQUAKES: A MULTI-CLASS CLASSIFICATION APPROACH WITH MACHINE LEARNING

[1]M. Vignesh Goud*, [2]M.Suraj, [3]V.Sumith, [4]K. Sreenivasulu

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : Vigneshgoudm@gmail.com, ksreenivasallu@smec.ac.in

ABSTRACT

The primary objective of this project is to develop a machine learning-based multi-class classification model for predicting the occurrence and impact of earthquakes, classifying them based on parameters such as magnitude, depth, and location for more accurate predictions and preparedness. "Predicting Earthquakes: A Multi-class Classification Approach with Machine Learning" refers to using machine learning algorithms to categorize earthquakes by their characteristics, aiming to predict not just the occurrence but also the severity and impact, thereby enhancing response strategies. Historically, earthquake prediction relied on traditional seismology methods like studying historical patterns, geological surveys, and seismic monitoring, which provided limited accuracy and minimal warning time. The traditional systems faced challenges in offering long-term predictions, highlighting the need for more sophisticated approaches. The motivation for this research is to improve prediction accuracy and minimize the catastrophic impacts on lives and infrastructure by utilizing machine learning to analyze complex seismic data. The proposed system utilizes machine learning algorithms to analyze seismic data, including parameters like magnitude, depth, location, and time of occurrence. The model will classify earthquakes into different categories based on these factors, enabling more accurate predictions. Machine learning, particularly deep learning techniques, can process vast amounts of data and identify patterns that traditional methods might overlook. This system aims to provide timely and accurate predictions, helping authorities and communities take proactive measures.

Keywords**:** Seismic Data Analysis, Magnitude, Depth,Location, Data Patterns, Catastrophic impacts, Proactive measures.

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INTRUSION DETECTION IN CYBERSECURITY: MACHINE LEARNING CLASSIFIER PERFORMNACE EVALUATION

[1]V. Mounika*, [2]M. Harika, [3]Y. Akshaya,[4]Sashmitha Mallick

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : mounikaveeraboina2003@gmail.com, akshaya7210@gmail.com

ABSTRACT

Intrusion Detection Systems (IDS) have been essential in cyber security since the 1980s, when the concept of monitoring network traffic and system activities to detect malicious activities was introduced. Early IDS systems were primarily signature-based, relying on predefined rules and known attack patterns to identify threats. The primary objective of this study is to evaluate the performance of machine learning classifiers in detecting and mitigating cyber intrusions. The title refers to the assessment of machine learning algorithms used to identify unauthorized or malicious activities within a network. It emphasizes the focus on evaluating the effectiveness and accuracy of these algorithms in detecting cyber intrusions. Before the advent of machine learning, traditional IDS relied on signature-based and rule-based detection methods. These systems would compare incoming data against a database of known attack signatures or predefined rules to detect anomalies. While effective for known threats, these methods were limited in detecting new or evolving attacks, often resulting in a high rate of false positives and missed intrusions. Traditional intrusion detection systems faced significant challenges in keeping up with the rapidly evolving landscape of cyber threats. Their reliance on static rules and known attack signatures made them inadequate for detecting sophisticated, zero-day attacks and adaptive adversaries. The growing complexity and frequency of cyber-attacks have highlighted the limitations of traditional IDS. The proposed system leverages machine learning models to enhance the detection of cyber intrusions. By training classifiers on large datasets of network traffic and system activity, these models can identify patterns and anomalies indicative of malicious behavior. Machine learning offers the advantage of adapting to new threats, improving detection accuracy, and reducing false positives compared to traditional methods. This approach provides a dynamic and scalable solution to modern cyber security challenges, making it a vital tool in protecting against emerging threats.

Keywords**:** Intrusion Detection Systems, IDS, cybersecurity, network traffic, system activities, malicious activities, signature-based detection, rule-based detection, machine learning classifiers**.**

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PREDICTING LOAN DEFAULTERS WITH MACHINE LEARNING MODELS FOR CREDIT CARD MANAGEMENT

[1]B. Sai Deepak*, [2]K. Kashinath, [3]Suva Maity, [4]N. Daniel Manoj

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : kambarkashinath19@gmail.com, suvamaity08@gmail.com, ndaielmanojcse@smec.ac.in

ABSTRACT

The financial sector faces significant challenges in assessing loan eligibility due to the complexity and volume of applications. Statistics indicate that fraudulent loan applications result in substantial financial losses, with global figures reaching billions of dollars annually. Accurate prediction of loan eligibility is vital to safeguard financial institutions and ensure fair lending practices. As the volume of loan applications continues to grow, traditional manual assessment methods become increasingly impractical and prone to errors. There is a pressing need for automated, data-driven solutions to accurately evaluate loan eligibility and detect potential fraud. Manual loan assessment processes are labor-intensive and susceptible to human error, leading to inconsistencies and potential oversight. These methods often fail to detect subtle indicators of fraud, resulting in significant financial losses. The reliance on subjective judgment can introduce biases, affecting the fairness and accuracy of loan decisions. Additionally, the manual verification of extensive data points is time-consuming, delaying the approval process and impacting customer satisfaction. Our proposed solution employs machine learning algorithms to predict the eligibility of loan applications and detect fraudulent cases using the SYL Bank dataset. The dataset includes various features such as age, occupation, marital status, credit score, income level, and past financial behavior. By training ML models on this comprehensive dataset, we aim to develop a predictive system that accurately identifies eligible applicants and flags potential fraud. This approach promises to enhance the precision, efficiency, and security of loan processing, ensuring better outcomes for financial institutions and their clients.

Keywords*:* Financial Sector, Loan, Statistics, Fraudulent Loan, Manual Loan Assessment Processes , Data-Driven Solutions , Precision, Efficiency and Security

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BLOCKCHAIN BASED HOSPITAL PATIENT DONOR MANAGEMENT SYSTEM

[1]kandulapati Pavan Kumar*, [2]kondappa Sri Nithya, [3]kotha Siri, [4]Dr. G. JawaherlalNehru

[1,2,3]UG Scholar, [5]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : pavankumarkandulapati@gmail.com, drjawaherlalcse@smec.ac.in

ABSTRACT

The "Blockchain-Based Hospital, Donor, Patient Management System" introduces a transformative approach to healthcare data management by transitioning from traditional centralized systems, which are prone to data tampering and cyber-attacks, to a secure, decentralized blockchain infrastructure. Conventional hospital databases, managed centrally, face significant risks, including unauthorized access and data breaches, leading to compromised data integrity and reduced user trust. This research addresses these issues by implementing a blockchain solution that enhances security, transparency, and accessibility in managing hospital, donor, and patient data. Blockchain's decentralized nature ensures data integrity through cryptographic features, such as encryption, unique hash codes, and the ability to verify data immutability, creating a secure and tamper-proof environment. Each transaction within this system is encrypted, timestamped, and linked to previous entries, producing an immutable record of all data interactions. Smart contracts, developed in Solidity, enable secure data storage and verification, providing controlled access across multiple hospitals without reliance on a single authority. Additionally, this work explores integrating artificial intelligence (AI) and machine learning (ML) to optimize functionalities like donor-patient matching. AI models analyse historical data to predict compatibility, enhancing efficiency and improving patient outcomes. Intelligent alerts generated by these models further streamline the matching process, addressing the limitations of traditional systems and reducing the potential for error. This proposed system offers a scalable, robust, and transparent solution for modern healthcare management, ensuring that hospitals maintain data integrity and user trust. The integration of blockchain and AI provides a resilient, user-centric platform that meets the dynamic and high-stakes demands of contemporary healthcare environments, advancing both security and operational effectiveness.

Keywords***:*** Blockchain Technology, Decentralized infrastructure, Healthcare data management, Data integrity, Patient donor matching, Smart contracts, Cybersecurity, Machine Learning,.

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SMART FRUIT DETECTION: A MULTI-TASK CONVOLUTIONAL NEURAL NETWORK APPROACH FOR AUTOMATED ROBOTICS

[1]Anush Kumar Kodirekka*, [2]Kaushik Devarshett, [3]Bala Sivaji Mukku,[4]M. Dileep Kumar

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : anushkumarkodirekka@gmail.com, mdhileepkumarcse@smec.ac.in

ABSTRACT

Manual inspection and basic image processing have given way to deep learning and AI-based fruit detection systems. Early methods using human labor or simple algorithms were inefficient, slow, and error-prone, making them unsuitable for large-scale agriculture. As agriculture requires more automation to meet food production needs, traditional systems' inability to adapt to changing conditions and accurately detect fruit types has become apparent. The 'SMART FRUIT DETECTION: A MULTI-TASK CONVOLUTIONAL NEURAL NETWORK APPROACH FOR AUTOMATED ROBOTICS' project aims to create a multitasking fruit detection, classification, and ripeness estimation system. This system integrates seamlessly with robotic harvesting systems for real-time agricultural decision-making and action. Convolutional neural networks (CNNs) for multi-tasking enable more efficient and accurate detection than traditional methods, making the title significant. Manual fruit detection systems required workers to inspect and pick fruits, which was laborious and time-consuming. Color thresholding and edge detection were used in early automated systems, but they were too weak to handle different lighting conditions and fruit appearances. Traditional systems are not scalable for modern agricultural demands and often produce inaccuracies that affect harvest quality and quantity. This research aims to overcome these limitations by introducing an intelligent system that improves efficiency, accuracy, and scalability. One solution uses a multi-task CNN to detect, classify, and evaluate fruit ripeness and direct robotic arms to harvest. This method surpasses traditional methods in fruit detection accuracy, labor cost reduction, and automated agricultural operation efficiency.

Keywords: CNN, Automated Robotics, Labor-Intensive, Thresholding, Robustness.

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ENHANCED FAULT DETECTION AND DIAGNOSIS FOR RESOURCE-CONSTRAINED SENSOR NETWORKS IN IOT AND CYBER-PHYSICAL SYSTEMS

[1]Majji Chandra Shekar*, [2] Ganga Sagar Ganesh, [3]Ongoor Ajay Kumar, [4] P. Sudharsan

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : mandasravanimanda@gmail.com

ABSTRACT

Resource-constrained sensor networks are integral to the Internet of Things (IoT) and Cyber-Physical Systems (CPS), serving crucial roles in monitoring environmental conditions, managing industrial processes, and enabling smart infrastructure. Historically, fault detection in these networks has relied on traditional methods such as threshold-based systems, which often fall short in addressing the constraints of limited sensor resources, including energy, memory, and processing power. These early systems, predominantly rule-based or statistical, struggled with scalability and adaptability, leading to challenges in accurately detecting and diagnosing faults in dynamic environments. Traditional approaches are computationally intensive and may not effectively handle the complexity and scale of modern sensor networks, resulting in delayed or missed fault detection and reduced system reliability. The primary challenge is to develop fault detection and diagnosis methods that align with the resource constraints of sensor networks while maintaining high accuracy and efficiency. Current systems often fail to adapt to novel or unforeseen faults due to their reliance on predefined rules or historical data, and their high resource demands make them unsuitable for many constrained environments. The need for innovative solutions is critical to enhance the performance and reliability of these networks. This project aims to address these limitations by proposing advanced algorithms and machine learning techniques tailored for resource-constrained scenarios. By optimizing resource utilization and improving adaptability, the project seeks to advance fault detection and diagnosis, thereby contributing to the robustness and dependability of IoT and CPS applications.

Keywords*:* Sensor networks, Internet of Things (IoT), Fault detection, Resource, constraints, Machine learning, Scalability, Adaptability, Reliability.

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ENHANCING PATIENT CARE: SUPERVISED LEARNING MODELS FOR HOSPITAL READMISSION PREDICTION FROM EMERGENCY DATA

[1]V. Vishal Reddy*, [2]B. Mahendra, [3] M. Sanjay Kumar Reddy, [4]Praneel Deva

[1,2,3]UG Scholar, [4]Associate Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India
*Corresponding Author
E-mail : ramagundamjayprakash@gmail.com

ABSTRACT

Hospital readmissions represent a significant challenge in modern healthcare systems, contributing to elevated costs and potential patient detriment. This initiative seeks to address this issue by leveraging advanced supervised learning models to predict hospital readmissions based on emergency department data. Historically, predicting readmissions relied on simplistic statistical methods and clinical judgment, which often lacked accuracy due to their inability to handle the complexities of large datasets and multifactorial variables. With the rise of electronic health records (EHRs) and big data analytics, there has been a shift towards utilizing comprehensive patient data for more precise predictions. Traditional systems, however, face limitations such as difficulty in managing intricate data interactions, static models that do not adapt to evolving patient conditions, and suboptimal predictive accuracy due to insufficient feature handling. This initiative aims to overcome these limitations by employing sophisticated machine learning algorithms and advanced feature engineering techniques. By improving the accuracy \of readmission predictions, the project seeks to enable proactive patient management, reduce unnecessary readmissions, and ultimately decrease the financial strain on healthcare systems. The integration of these predictive models into clinical workflows holds the potential to enhance patient care by providing healthcare providers with actionable insights for better decision-making

Keywords*:* electronic health records, Random Forest, Gradient Boosting, and Neural Networks.

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FUSION OF MACHINE LEARNINGAND DEEP NEURAL NETWORKS: A HYBRID POSTURE DETECTION FRAMEWORK

[1]Sahithi Chilka*, [2]S K Sohail Hussain, [3]Ch Bhavishya Anu, [4]B. Vanaja

[1,2,3,4]UG Scholar, [5]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4,5]St. Martin's Engineering College, Secunderabad, Telangana, India
*Corresponding Author
E-mail : sahithichilka@outlook.com, bvanajacse@smec.ac.in

ABSTRACT

Posture detection has evolved significantly from traditional biomechanical methods to modern artificial intelligence (AI) and deep learning techniques. Early methods relied on sensors, manual observation, or basic image processing techniques to detect posture. Over time, advancements in machine learning (ML) and deep neural networks (DNNs) have enabled more accurate and efficient posture detection, leveraging large datasets and improved computing power. The objective of this research is to develop a hybrid posture detection framework that combines the strengths of machine learning (ML) and deep neural networks (DNNs) to provide accurate, real-time posture analysis. This hybrid framework aims to overcome the limitations of traditional systems by integrating AI-based models with computer vision techniques. "Fusion of ML and Deep Neural Networks Hybrid Posture Detection Framework" refers to a novel approach that merges machine learning algorithms with deep neural networks to create a more robust system for detecting and analyzing human posture. The word "fusion" indicates the integration of these two techniques into a single framework, enhancing detection accuracy and efficiency. Traditional posture detection relied on physical markers, accelerometers, or manual observation to assess posture. These systems were often labour-intensive, less accurate, and lacked real-time processing capabilities. Traditional posture detection systems are constrained by their reliance on physical markers, manual observation, or basic image processing techniques, leading to limitations in accuracy, scalability, and real-time analysis. The motivation behind this research is to address the shortcomings of conventional posture detection systems by leveraging the strengths of AI models. The proposed system utilizes a hybrid AI model combining Computer vision and DNNs to enhance posture detection accuracy, can extract complex features from images or videos for precise analysis By incorporating computer vision techniques, the system offers real-time posture detection with high accuracy.

Keywords***:*** Posture Detection, ML Algorithms, Deep Neural Network, AI Models, Feature Extraction, Accuracy.

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DEEP LEARNING – BASED ANALYSIS FOR MALARIA INFECTION DIAGNOSIS

[1]Kota Poojitha*, [2]Aleti Madhu Sudan, [3]Kothapelly Srujan, [4]A. Rajeshwari

[1,2,3,4]UG Scholar, [5]Assistant Professor, Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : poojithakota13@gmail.com, mintusujji@gmail.com

ABSTRACT

Manual microscopy, where a skilled technician counts malaria parasites in blood smears, was used to diagnose malaria. It takes time, effort, and expertise to diagnose malaria using this early 1900s method, which is the gold standard. In areas with limited healthcare resources, this can cause misdiagnosis or delayed treatment. This study uses deep learning to create an automated, accurate, and efficient malaria infection detection tool from medical images, improving accuracy and reducing analysis time. The term "Deep Learning-Based Analysis for Malaria Infection Diagnosis" refers to the use of deep learning algorithms to analyze medical images and diagnose malaria infections. Automating detection makes it faster and more reliable than traditional methods. As mentioned, manual microscopy was the main malaria diagnosis method before machine learning or AI. Blood smears were stained with special dyes and examined under a microscope. In low-resource settings, the technician's experience and equipment quality could greatly affect this method's accuracy. Traditional malaria microscopy is effective, but it requires skilled personnel, is prone to human error, and takes a long time to produce results. Addressing the shortcomings of traditional malaria diagnostic methods motivated this research. Malaria remains a global problem, especially in low-income countries, requiring accurate, accessible, and scalable diagnostic tools. A deep learning model trained on a large dataset of labeled blood smear images is used in the proposed system. This model automatically detects and classifies malaria parasites in images for fast, accurate diagnosis. This system reduces human expertise, improves early detection, and speeds up treatment, improving malaria control and eradication.

Keywords***:*** Image Classification, Object Detection, Parasite Detection, Accuracy Metrics, Dataset Imbalance.

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AI DRIVEN ERROR RESOLUTION PLATFORM FOR STREAMLINED SOLUTIONS

[1]Kallempeta Krishna*, [2]Jallapuram Sanjay, [3]Mamidipalli Akhil, [4]V.J Suresh

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : nityanandinivadakattu@gmail.com

ABSTRACT

The primary objective of this project is to develop an AI-powered server log management software that automates error resolution by predicting accurate solutions based on a trained AI model. This platform aims to reduce the time and effort required by users to find solutions for errors, streamlining the error resolution process into a one-stop solution. Traditionally, error resolution has relied on manual search methods where users query multiple servers like Google, Bing, and other online platforms to find possible solutions to errors. These methods require sifting through hundreds of search results, which can be overwhelming and time-consuming, with no guarantee of finding the correct solution. Users often had to manually compare responses from different servers, increasing the likelihood of mistakes and inefficiencies. The traditional approach to error resolution is inefficient, requiring users to manually search through multiple server responses to identify the correct solution. This process is time-consuming, prone to errors, and burdensome for users, especially when dealing with complex technical issues. The motivation behind this research is to simplify and expedite the error resolution process for users by leveraging AI. As technology advances, the frequency and complexity of errors increase, making it essential to develop an intelligent system that can quickly and accurately predict solutions, thus reducing user frustration and improving efficiency. The proposed system involves creating an AI-driven platform that aggregates server logs with errors and their corresponding solutions, training an AI model on this data. This AI model will predict the most relevant solutions for a given user error by analyzing the patterns and relationships within the data. Users will be able to input their errors into the system and receive an accurate, AI-predicted solution without having to manually search through multiple servers. This one-stop solution will significantly reduce the time and effort required to resolve errors, enhancing user experience and productivity.

Keywords*:* AI-powered, Server log management, Error resolution, Predicting solutions, Automated, Time-saving, Streamlining, Manual search, Efficiency, Complex technical issues.

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SYNERGIZING HUMAN GAZE WITH MACHINE VISION FOR LOCATION MODE PREDICTION

[1]K Sai Subramanyan Sharma*, [2]MD Aslam Mohiuddin, [3]B Chaitanya, [4]D. Saikiran

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : koushikmundrathi@gmail.com

ABSTRACT

Before the advent of machine learning and AI, systems predicting human intent and movement relied heavily on sensor-based approaches like inertial measurement units (IMUs), gyroscopes, and accelerometers, which primarily tracked physical movements. These systems, while effective in detecting motion, lacked the nuanced understanding of human intent and environmental context that could be gained from integrating human gaze. The title "Synergizing Human Gaze with Machine Vision for Location Mode Prediction" reflects the integration of human gaze data, which provides information about where a person is looking (indicating intent), with machine vision systems that process movement data (cloud points) to predict future locomotion modes or transitions. Before machine learning, traditional systems for predicting human movement were limited to sensor-based methods such as IMUs, which could only detect physical movements without understanding the intent behind them. These systems were less adaptable and often required manual calibration and interpretation by experts. Traditional sensor-based systems lacked the ability to accurately predict human intent or understand the contextual environment in real-time, leading to less reliable and slower responses in applications like wearable robotics. These systems could detect movement but were unable to forecast the user's next movement or transition. The proposed system, GT-NET, utilizes machine learning algorithms to combine human gaze data (images) with cloud point data (user movement) for predicting human intent and locomotion. This system leverages deep learning models trained on a custom dataset, with the aim of accurately forecasting the user's next movement. By integrating these data modalities, GT-NET enhances the ability of machines to anticipate human actions, particularly in dynamic environments.

Keywords: Human Gaze, Machine Vision, Location Mode Prediction, Visual Attention, Eye Tracking, Computer Vision.

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BUDGET OPTIMIZATION ASSISTANT USING NLP TO PROVIDE REAL TIME FINANCIAL INSIGHTS AND SPENDING RECOMMENDATION

[1]Koripalli Lavan Kumar*, [2]Kyasani Praveen Sagar, [3]Y. Harsha Rajkumar, [5]Dr. R. Santhoshkumar

[1,2,3]UG Scholar, [4]Associate Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : vaishnavimr06@gmail.com

ABSTRACT

The Budget Optimization Assistant is an innovative tool that harnesses the power of Natural Language Processing (NLP) to provide real-time financial insights and spending recommendations. Designed to simplify and enhance personal finance management, this system interprets and analyses users' financial behavior through natural language queries, delivering personalized advice to optimize their budgets. By integrating NLP techniques, the assistant can seamlessly process conversational inputs, interpret complex financial data, and offer actionable insights. This approach not only makes financial management more accessible but also empowers users to make informed decisions, fostering better spending habits and improved financial stability. The Budget Optimization Assistant aims to bridge the gap between complex financial data and user-friendly interfaces, enhancing financial literacy and promoting proactive budget management for users of all financial backgrounds. Through this system, users can achieve a deeper understanding of their financial status and receive tailored recommendations that align with their unique financial goals and lifestyles.

Keywords*:* Long Short-Term Memory, Convolutional NeuralNetwork, Support Vector Machine.

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THE AI-POWERED PERSONAL TRAVEL PLANNER APP THAT DESIGNS CUSTOM ITINERARIES BASED ON USER PREFERENCES, BUDGET, AND TIME CONSTRAINTS

[1] Rondla Samyuktha*, [2] Vaddepally Ashish Kumar, [3]Kusthapoor Haniska, [4] Dr. G. JawaherlalNehru

[1,2,3]UG Scholar, [4]Associate Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : siddartha8523@gmail.com

ABSTRACT

The AI-Powered Personal Travel Planner app is designed to create customized travel itineraries based on user preferences, budget, and time constraints. Utilizing advanced Artificial Intelligence (AI) techniques, the app analyses user inputs and vast travel data to generate personalized travel plans and that optimize for convenience, cost-effectiveness, and personal enjoyment. This innovative solution aims to simplify the travel planning process, making it more efficient and tailored to individual needs. It covers the setup of a conversation flow, capturing user inputs, managing conversational history, and streaming AI responses in real-time, allowing for a smooth and interactive user experience. The application enables seamless integration of interactive AI within a web interface, allowing for dynamic user interaction and efficient response handling. The app enhances the travel experience by offering real-time recommendations and adjustments, ensuring users have a seamless and memorable journey.

Keywords: Artificial Intelligence (AI), Itineraries, personalized, real-time, interactive.

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CLIMATE ADAPTIVE AGRICULTURE ASSISTANT USING AI TO ANALYZE WEATHER

[1]Aman Jha*, [2]Ailneni Pratheek, [3]Dasari Vignesh, [4]s. Bavankumar

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : dasarivignesh799@gmail.com, sbavankumarcse@smec.ac.in

ABSTRACT

Traditionally, climate estimation has dependably been performed by considering the environment as a liquid. The current condition of the air is inspected. The future condition of the environment is registered by comprehending numerical conditions of thermodynamics and liquid elements. Yet, this conventional arrangement of differential conditions that oversee the physical model is some of the time shaky under unsettling influences and uncertainties while estimating the underlying states of the air. This prompts an inadequate comprehension of the environmental forms, so it limits climate forecast up to 10 day period, on the grounds that past that climate estimates are essentially unreliable.But Machine learning is moderately hearty to most barometric unsettling influences when contrasted with customary techniques. Another favorable position of machine learning is that it isn't reliant on the physical laws of environmental procedures. In this report, a reenacted framework is created to foresee different climate conditions utilizing Data Analysis and Machine learning procedures, for example, straight relapse and strategic relapse. The primary wellspring of information to be utilized for directed taking in is to be gathered. The current climate condition parameters ex. temperature and so on are utilized to fit a model and further utilizing machine learning methods and extrapolating the data, the future varieties in the parameters are broken down.

Keywords*:* Data analyze, Machine learning, climate condition.

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CUSTOMIZABLE AI-DRIVEN LEARNING MANAGEMENT SYSTEM FOR ADAPTIVE EDUCATION PERSONALIZATION USING LANGCHAIN AND MACHINE LEARNING TECHNIQUES

[1] M.V.R. Anusha*, [2]B.Surabhi, [3]D.Vinetha, [4] Dr. M. Vadivukarassi
[1,2,3]UG Scholar, [4]Associate Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : surabhibochkar@gmail.com, drmvadivukarassicse@smec.ac.in

ABSTRACT

The Customizable AI-Driven Learning Management System (LMS) is a cutting-edge educational platform designed to deliver adaptive and personalized learning experiences using advanced Machine Learning techniques and LangChain integration. The system adapts dynamically to individual student preferences, learning styles, and performance metrics, offering a tailored educational journey for each learner. By analyzing real-time feedback and progress data, the LMS adjusts course content, difficulty levels, and instructional methods, ensuring that every student receives an optimized learning path suited to their needs.Leveraging the power of Natural Language Processing (NLP) and Transformers, the LMS generates AI-driven content, quizzes, and assessments that evolve based on the student's interaction, fostering a deeper understanding and long-term retention. It provides detailed, goal-oriented learning plans that set clear milestones for short-term, mid-term, and long-term academic achievements, ensuring steady progress. The system also emphasizes continuous improvement by offering regular evaluations, encouraging reflective learning, and refining objectives based on learner feedback.The customizability of this LMS extends beyond mere content delivery. It empowers instructors with tools to further personalize teaching strategies while offering learners flexibility in their learning journey. This adaptive framework enhances student engagement, nurtures a love for learning, and boosts retention rates by creating a unique, evolving educational experience for every user. The ultimate goal is to revolutionize education, making it more effective, scalable, and accessible, enabling students to excel in their chosen fields through targeted, data-driven learning paths.

Keywords: Learning Management System (LMS), LanChain, Natural Language Processing.

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TOUR GUIDE APPLICATION PROVIDING CONTEXTUAL AND INTERACTIVE INFORMATION ON HISTORICAL SITES AND MONUMENTS

[1]Atnala Rani*, [2]Dhanalakoti Sahithi Laxmi, [3]Bhushan Kenneth Benny, [4]C. Yosepu

[1,2,3]UG Scholar, [4]Associate Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : rakshithareddysevella@gmail.com

ABSTRACT

The Tour Guide Application leverages advanced AI and large language models (LLMs) to provide contextual and interactive information on historical sites and monuments. This application aims to enhance the visitor experience by offering real-time, location-based information, interactive multimedia content, and personalized tours. By integrating GPS and AI-driven recommendations, the Tour Guide Application makes exploring historical sites more engaging, educational, and convenient. The device also has the ability to identify historical figures and provide relevant information about them, as well as offer insights into tourist attractions and their histories. Other features include the ability to take pictures, play music, and more. The device can work as a stand-alone system or can be connected to a mobile application for further services.

Keywords*:* Natural Language Processing, Term Frequency – Inverse Document Frequent, Paragraph Vector – Distributed Memory.

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FACE RECOGNITION AND MACHINE LEARNING –INTEGRATED SMART ATTENDANCE MANAGEMENT SYSTEM FOR EDUCATIONAL INSTITUTIONS

[1]BH. Sai Sree Vandana*, [2]K. Sreeja, [3]N. Bhavana, [4]K. Ganapathi Babu

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : kairasreeja@gmail.com, vandanabhumireddy@gmail.com, kganapathibabucse@smec.ac.in

ABSTRACT

The Facial Recognition and Machine Learning-Integrated Smart Attendance Management System is designed to streamline attendance tracking in educational institutions. By leveraging facial recognition technology and advanced machine learning algorithms, this system automates the process of recording attendance, reducing manual effort and minimizing errors. The system ensures accurate and real-time attendance tracking, enhances security, and provides valuable insights into student attendance patterns. The goal is to improve administrative efficiency, ensure accurate record-keeping, and promote student accountability. The main objective of this work is to make the attendance marking and time saving, simple and easy. Here faces willbe recognized using face recognition algorithms. The processed image will then be compared against the existing stored record and then attendance is marked in the database accordingly. Compared to existing system traditional attendance marking system, this system reduces the workload of people. This proposed system will be implemented with 3 phases such as Face Detection, face comparison and face recognition, updating of attendance in database.

Keywords*:* Facial Recognition, Machine Learning, Smart Attendance Management, Attendance Tracking, Educational Institutions, Automation, Real-Time Monitoring, Security Enhancement.

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INTERACTIVE DIGITAL STORY TELLING APPLICATION USING AI TO CREATE DYNAMIC PLOTLINES BASED ON USER CHOICES AND FEEDBACK

[1]N. Srija*, [2]R. Jyothi Nandhan, [3]V.Manoj, [4]P. Swetha

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : nallapatisrija@gmail.com, pswethacse@smec.ac.in

ABSTRACT

The Interactive Digital Storytelling Application represents a groundbreaking approach to narrative engagement by harnessing the power of Artificial Intelligence (AI) to construct dynamic plotlines that evolve based on individual user choices and feedback. This innovative platform enables users to immerse themselves in stories in a deeply personalized manner, allowing their decisions to directly impact the unfolding narrative. At the heart of this application is a sophisticated integration of advanced AI algorithms and natural language processing (NLP) techniques, which collaboratively work to generate unique story paths tailored to each user's preferences and interactions. The application analyzes user inputs in real-time, interpreting choices and incorporating them into the ongoing narrative, thus fostering a sense of agency and participation that traditional storytelling mediums cannot offer. As users navigate through various scenarios, the AI dynamically adjusts the storyline, introducing unexpected twists and turns that keep the experience fresh and engaging. This adaptability not only enriches the storytelling experience but also encourages users to explore multiple narrative threads, enhancing replayability and creativity. Furthermore, the platform's ability to learn from user feedback allows for continuous improvement of story generation, making each interaction increasingly refined and responsive. By leveraging the interactive potential of AI, the application seeks to elevate user interaction to unprecedented levels, fostering creativity and providing a highly customized narrative journey that resonates with each user on a personal level. This ensures that every engagement with the platform is not just a passive consumption of a story but an active collaboration in the creation of a narrative landscape, where users can experiment with different decisions and witness the ripple effects of their choices.

Keywords*:* Machine Learning (ML), story-telling, Natural Language Processing.

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THE PREDICTIVE FLIGHT DELAY ANALYSIS SYSTEM USING MACHINE LEARNING

[1]Vittal Sri Varshini*, [2]Vavilla Vishnu Vardhan, [3]Polishetty Siddhu, [4]Shaik Hanishma

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : srivarshinivittal@gmail.com shaikhanishmacse@smec.ac.in

ABSTRACT

The Predictive Flight Delay Analysis System utilizes Machine Learning (ML) to provide travelers with real-time updates and rescheduling options for potential flight delays. By analyzing historical flight data, weather conditions, air traffic, and other relevant factors, the system predicts possible delays and offers proactive solutions to minimize inconvenience. This system aims to enhance the travel experience by providing timely information and alternative travel options, thereby reducing the stress and disruption caused by flight delays.

Keywords*:* Machine Learning (ML), real-time, rescheduling, flight delay, historical.

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AUTOMATED WEED IDENTIFICATION AND MANAGEMENT SYSTEM UTILIZING OPENCV AND AI ALGORITHMS FOR SUSTAINABLE FARMING PRACTICES

[1]K. Divya Jyothi *, [2]B. Prathyusha, [3]A. Navya, [4]M. Dileep Kumar

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : golicharishma1@gmail.com

ABSTRACT

Weed management is a critical factor in modern agriculture, as uncontrolled weed growth can severely affect crop yield and quality. Traditional weed control methods often involve indiscriminate herbicide application, leading to increased costs and environmental concerns. This project introduces an automated weed identification and management system that employs computer vision techniques with OpenCV and dense neural networks (DNN) to accurately and efficiently detect, classify, and manage weeds in agricultural fields. The system aims to enable targeted weed control by precisely identifying weed species, thereby reducing unnecessary herbicide use and supporting sustainable farming practices.The system's design uses OpenCV for pre-processing image data, including filtering, thresholding, and edge detection, which enhances plant features in images captured in the field. A low-resolution camera mounted on agricultural machinery captures real-time images, and OpenCV processes these images to extract key features, facilitating image analysis even in resource-limited environments. These processed images are then analyzed by dense neural networks trained on labeled data sets that distinguish various weed species from crops. The DNN model's architecture allows for efficient feature extraction and classification, enabling high accuracy even under diverse field conditions.

Keywords*:* Automated Weed Management, OpenCV, DNN, Weed Detection, Crop Classification, Sustainable Farming, Precision Agriculture, Image Pre-processing

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EVENT MANAGEMENT AUTOMATION SYSTEM USING AI FOR REAL TIME EVENT PLANNING, TICKETING AND ATTENDEE FEEDBACK ANALYSIS

[1]B. Tejaswini*, [2]D. Vimala, [3]D. Sravya, [4]P. Deva Sudha

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : **shivaprasad4999@gmail.com**

ABSTRACT

The Event Management Automation System leverages AI to streamline real-time event planning, ticketing, and attendee feedback analysis. This platform provides a comprehensive solution for managing events, from initial planning to post-event evaluation, by utilizing machine learning algorithms and natural language processing. By automating these processes, the system aims to enhance efficiency, improve attendee experiences, and provide valuable insights for future event planning. The goal is to transform event management into a seamless, data-driven operation that maximizes engagement and satisfaction The Event Management Automation System is a revolutionary platform that uses AI to optimize every aspect of event planning and execution. Designed to automate processes from initial planning to post-event analysis, this system leverages machine learning and natural language processing to make event management more efficient and insightful. Key features include automated ticketing, real-time attendee engagement monitoring, and feedback analysis, which collectively enhance the attendee experience and simplify logistical management. The platform can dynamically adapt to changes in attendee behavior, offering personalized recommendations and predictive solutions that anticipate potential issues. After events, the system provides detailed performance reports that highlight attendee satisfaction, engagement levels, and opportunities for improvement. By continuously learning from past events, it becomes smarter over time, refining its ability to tailor recommendations and improve outcomes. This intelligent, data-driven approach transforms traditional event planning, making it a seamless, adaptive process that maximizes both engagement and efficiency.

Keywords*:* Machine Learning (ML), story-telling, Natural Language Processing.

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ADVANCED DIAGNOSTIC IMAGING ASSISTANT UTILIZING AI & OPENCV FOR IMPROVED ACCURACY IN RADIOLOGICAL INTERPRETATIONS

[1]Gellu Himaja Yadav Palamari*, [2]Suma Keerthana, [3]Pathipaka Sai Keerthana, [4]K. Ram Mohan

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : ghimajayadav@gmail.com, kramohancse@smec.ac.in

ABSTRACT

The Advanced Diagnostic Imaging Assistant leverages Artificial Intelligence (AI) and OpenCV to enhance the accuracy of radiological interpretations. This system integrates AI algorithms and image processing techniques to analyze medical images, providing real-time, accurate, and detailed diagnostic insights. The assistant aims to support radiologists by identifying anomalies, reducing diagnostic errors, and improving patient outcomes. By automating and augmenting the interpretation of diagnostic images, the system seeks to enhance the efficiency and effectiveness of radiological practices. In recent years, deep learning has made great strides, especially convolutional neural networks (CNNs), which achieve performance comparable to human performance at splitting bones. Using the power of deep learning, computer-aided diagnosis (CAD) has been specifically designed to help doctors reduce the number of diagnoses and save valuable time. Through optimization, the integration of deep learning algorithms enables the system to learn from large volumes of data, recognize complex patterns and make informed predictions, increasing diagnostic accuracy while reducing human error. In addition, OpenCV provides a set of image manipulation and analysis tools useful in CAD processes. This tool helps extract important features from medical images, thereby improving image quality and making it easier to search and classify bones. Using the capabilities of OpenCV, fracture detection can be done effectively and analyze the relevant features to accurately identify and locate the fracture. Developing reliable bone grafts has many clinical benefits. First, it shortens the time required for diagnosis, allowing doctors to make timely and informed decisions about patient care. Fast and accurate damage detection is especially important in emergencies that require immediate repair. In addition, the system increases the accuracy of bone detection by reducing the possibility of human error, thus improving patient outcomes and treatment planning.

Keywords*:* Artificial Intelligence (AI), OpenCV, Real-time, Diagnosis.

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PAPER ID: ICIRTCS-24-060

A PHARMACOLOGICAL INTERACTION PREDICTION ENGINE LEVARAGING AI FOR ENHANCED PATIENT SAFETY IN DRUG ADMINISTRATION

[1]P.Sreeharsha*, [2]E.Pramod, [3]S.Naveen, [4]S. Kiran Kumar

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : rakeshmuntha09@gmail.com

ABSTRACT

The Pharmacological Interaction Prediction Engine Leverage Artificial Intelligence (AI) to predict and analyse drug interactions, enhancing patient safety in drug administration. This system utilizes machine learning algorithms and extensive pharmacological databases to identify potential adverse interactions between medications, providing healthcare professionals with realtime, actionable insights.By reducing the risk of adverse drug reactions (ADRs) and improving medication management, the engine aims to enhance patient safety and optimize therapeutic outcomes.

Keywords*:* Artificial Neural Network, Lateral Load Transfer.

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PAPER ID: ICIRTCS-24-061

REAL-TIME TRAFFIC ANALYSIS TOOL FOR NETWORK SECURITY USING AI TO MONITOR, ANALYZE, AND REPORT SUSPICIOUS ACTIVITIES

[1]Chandaluri Kumar Reddy*, [2]Chinthakrindi Sai Devender Nath, [3]Motati Mani Srikar Reddy, [4]S. Bavankumar

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : Chandalurikumar1234@gmail.com, manisrikar777@gmail.com

ABSTRACT

The Real-Time Traffic Analysis Tool for Network Security leverages Artificial Intelligence (Al) to monitor, analyze, and report suspicious activities in network traffic. AI system uses advanced machine learning algorithms and real-time data processing to detect anomalies and potential security threats, providing cyber security professionals with actionable insights. By automating the analysis of network traffic, the tool aims to enhance the efficiency and effectiveness of threat detection and response, ultimately improving the overall security posture of an organization. Also reduce the traffic, crowd on the road & divert the crowd according to the road conditions to improve efficiency & traffic conditions.

Keywords*:* Information Retrieval, RDF, SPARQL, E-learning, Querying, Indexing, Ranking, Semantic Web.

 ISBN No. 978-93-94246-59-1

PAPER ID: ICIRTCS-24-062

COMPREHENSIVE PERSONAL HEALTH ADVISORY SYSTEM USING MACHINE LEARNING

[1]Kandikatla Sheshank*, [2]Hemanth Kumavath, [3]Dasari Shiva Sai Ramakrishna, [4]K. Sreenivasulu

[1,2,3,4]UG Scholar, [5]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4,5]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : sheshank223@gmail.com, ksreenivasallu@smec.ac.in

ABSTRACT

Healthcare is rapidly moving toward patient-centred care, and technology has been essential in developing the quality of personalised healthcare. This is a report about an artefact, which is a healthcare chatbot that utilises state-of-the-art natural language processing technology. Chatbot was developed with an aim of enhancing patient participation, provisioning relevant messages in time, as well building linkage between doctors and patients.

It leverages highly advanced NLP systems that can understand the sentiments of conversations and respond back as a real human would, making communication easy and relevant within its context. It can be integrated in existing healthcare platforms and hence made accessible by patients for queries such as health information to specific medical inquiries. Through artificial intelligence or machine learning algorithms, it is possible for the chatbot to keep improving on its performance adjusting according to the ever-changing language and user's preferences.

The healthcare chatbot's key features include symptom analysis, prescription reminders, and health-related FAQs. By adhering to healthcare standards and using encryption mechanisms for sensitive information, the system assures data security and privacy compliance.

This study adds to the expanding body of work in harnessing natural language processing (NLP) for healthcare applications by providing insights into the creation, deployment, and assessment of a chatbot targeted at enhancing patient experiences and optimising healthcare communication channels. The findings highlight the potential for NLP-based chatbots to play an important role in the future of healthcare by enhancing accessibility, efficiency, and patient-centred treatment.

Keywords***:*** Machine Learning(ML), Large Language Models(LLMs), Medical Guidance, Patient Health Monitoring, Decision Support System(DSS), Symptom Checker, Natural Language Processing(NLP), Artificial Intelligence(AI) in Healthcare.

 ISBN No. 978-93-94246-59-1

PAPER ID: ICIRTCS-24-063

MACHINE LEARNING - ENHANCHED MOVIE RECOMMENDATION ENGINE

[1]S Adithiya*, [2]P. Sudharsan

[1]UG Scholar, [2]Assistant Professor, Department of Computer Science and Engineering,
[1]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail: adithiya1805@gmail.com, psudharsancse@smec.ac.in

ABSTRACT

In the era of abundant digital content, personalized recommendations have become crucial for enhancing user experiences in platforms such as streaming services. This project presents a Machine Learning-Enhanced Movie Recommendation Engine designed to adapt to individual user preferences, offering customized movie suggestions. By leveraging advanced algorithms including collaborative filtering, content-based filtering, and hybrid approaches, the system analyzes user behavior, preferences, and demographic data to generate tailored recommendations. The engine incorporates real-time learning capabilities, allowing it to evolve with changing user tastes and emerging trends in the film industry. Utilizing a dataset comprising user ratings, reviews, and metadata about movies, the model is trained to identify patterns and correlations that lead to meaningful suggestions. Performance metrics such as precision, recall, and F1-score are employed to evaluate the effectiveness of the recommendations. This project not only highlights the importance of personalization in media consumption but also demonstrates the potential of machine learning techniques to enhance user engagement and satisfaction. Ultimately, the proposed system aims to streamline the movie selection process, fostering a more enjoyable and efficient viewing experience.

Keywords*:* Machine Learning, Movie Recommendation Engine, Personalized Recommendations, User Preferences, Customized Suggestions, Collaborative Filtering, Content-Based Filterin.

 ISBN No. 978-93-94246-59-1

PAPER ID: ICIRTCS-24-064

MULTILINGUAL AI CHATBOT FOR OMNI-CHANNEL CUSTOMER SUPPORT IN RETAIL, OFFERING SEAMLESS INTEGRATION AND USER SATISFACTION ENHANCEMENT

[1]Mohammad Shahadath*, [2]Pittal Anil Kumar, [3]Nenavath Srinivas, [4]Suresh VJ

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail: vr198528@gmail.com

ABSTRACT

In our digital world, where communication is key, the emergence of AI-powered chatbots has revolutionized the way we interact with technology. This project delves into the development of an AI chatbot utilizing Large Language Models (LLM), a cutting-edge technology in the field of natural language processing. The journey begins with a comprehensive exploration of existing chatbot frameworks and technologies, analyzing their strengths and weaknesses. Through meticulous research, we identified LLM as the most promising candidate due to its ability to understand and generate human-like text, enabling more meaningful and engaging conversations.

The LLM was employed for its ability to process long range dependencies, enabling the chatbot to comprehend context in a more comprehensive manner. The report discusses the methodology employed, including data preprocessing, model training, the transformer architecture and validation using the test cases along with the conclusion and the work we wish to do in the upcoming months. Additionally, it details the challenges encountered and the strategies employed to counter them and enhance the chatbot's performance.

The final AI chatbot demonstrates impressive capabilities in understanding and generating human-like responses across a diverse range of topics. Its ability to engage users in meaningful conversations showcases the potential of LLM technology in enhancing human- computer interaction.

Overall, this project contributes to the evolving field of AI-driven conversational agents and highlights the potential of utilizing LLMs in building sophisticated chatbot systems. The journey that we lived while working on this project is mentioned in this project report in the sequential order.

Keywords: Natural language processing, Natural language understanding, Recurrent neural network.

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PAPER ID: ICIRTCS-24-065

STOCK MARKET TREND ANALYSIS AND FORECASTING TOOL FOR ENHANCED INVESTMENT DECISIONS AND PORTFOLIO MANAGEMENT

[1]Bodepudi Sai Varun*, [2]Pavuluri Sai, [3]Gottipati Akshay Chowdary, [4]Amrutha Raj

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail: sbavankumarcse@smec.ac.in

ABSTRACT

Stock market trend analysis and forecasting tools play a crucial role in enhancing investment decisions and optimizing portfolio management by leveraging data-driven insights into market behavior. These tools incorporate historical market data, technical indicators, and economic metrics, combined with advanced machine learning algorithms and predictive analytics, to identify patterns and forecast trends in stock prices and market sectors. By processing a variety of data—from stock prices and trading volumes to social media sentiment—they provide investors with a nuanced view of market momentum and volatility.

Trend analysis often includes techniques like moving averages, relative strength index (RSI), and sentiment analysis to gauge public perception, which, when coupled with sector-specific insights, highlights growth opportunities. Forecasting tools use methods such as regression analysis, ARIMA, and deep learning models like LSTM to capture temporal dependencies and predict price movements with increased accuracy. These tools are invaluable for managing risk and improving returns, as they allow investors to make informed, proactive decisions and to allocate resources effectively based on personalized recommendations and alerts.

Through interactive dashboards and real-time data visualization, they support timely, data-driven investment actions, making them essential for both individual investors and financial institutions focused on systematic, strategic growth.

Keywords*:* Machine Learning, Stock Market, LSTM.

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PAPER ID: ICIRTCS-24-066

SMART HOTEL CONCIERGE CHATBOT USING (NLP) TO PROVIDE INSTANT GUEST SERVICES AND LOCAL RECOMMENDATIONS

[1]G. Nithin *, [2]G. Rajshekar, [3]V. Sandeep Kumar, [4]B.Vanaja

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail: sbavankumarcse@smec.ac.in

ABSTRACT

A smart hotel concierge chatbot leveraging Natural Language Processing (NLP) offers instant, personalized guest services and tailored local recommendations. By understanding and responding to natural language queries, the chatbot can handle a range of tasks, including room service requests, booking amenities, providing real-time travel information, and recommending nearby attractions, restaurants, and events. Designed to enhance guest experience and streamline hotel operations, the system integrates seamlessly with hotel databases and external APIs, delivering accurate and timely assistance around the clock. Its adaptability ensures that guests receive consistent, engaging support, improving satisfaction and operational efficiency.

Keywords: Natural Language Processing, chatbot, local recommendation.

PAPER ID: ICIRTCS-24-067

INTELLIGENT CODE REVIEW PROVIDED BY AI TO OPTOMIZE SOFTWARE DEVELOPMENT THROUGH AUTOMATED ERROR DETECTION AND CORRECTION SUGGESTIONS

[1]S. Moushmi Manasa*, [2]J. Thrisha, [3]E. Arundhathi, [4]P. Sudharsan

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail: drjawaherlalnehrucse@smec.ac.in

ABSTRACT

The Intelligent Code Review Assistant leverages Artificial Intelligence (AI) to optimize software development by providing automated error detection and correction suggestions. This AI-powered tool analyzes code for potential bugs, security vulnerabilities, and coding standard violations, offering real-time feedback and improvements. By integrating into the development workflow, the assistant aims to enhance code quality, reduce review time, and improve overall productivity in software projects. The goal is to facilitate a more efficient and effective code review process, ensuring higher-quality software delivery.

Keywords**:** Artificial Intelligence, Software quality, Error Detection.

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PAPER ID: ICIRTCS-24-068

ADVANCED PHISHING DETECTION SYSTEM USING NLP TO IDENTIFY AND NEUTRALIZE MALICIOUS EMAIL CONTENT

[1]M Vaibhav Dhanush *, [2]E Manvi Rao, [3]Abhishek Shukla, [4]E. Soumya

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail: raomanvi075@gmail.com, esoumya@smec.ac.in

ABSTRACT

Phishing attacks represent a significant cybersecurity challenge, targeting individuals and organizations to extract sensitive information or deliver malware. Conventional detection systems often fall short when faced with sophisticated phishing methods, including social engineering and evolving language patterns. This study presents an advanced phishing detection system that leverages Natural Language Processing (NLP) techniques to analyze and neutralize malicious email content. The proposed system focuses on identifying suspicious patterns, contextual anomalies, and linguistic cues, providing a robust defense against phishing threats.

Keywords*:* machine learning , advanced phishing detection , anti email instigation .

PAPER ID: ICIRTCS-24-069

SMART LIVESTOCK HEALTH MONITORING SYSTEM INTEGRATING IOT AND AI TO ENHANCE LIVESTOCK MANAGEMENT AND DISEASE PREVENTION

[1]D.Harshith*, [2]E.Sathvik Ram Reddy, [3]MD. Atha UL Rehman, [4]Dr. R. SanthoshKumar

[1,2,3]UG Scholar, [4]Associate Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail: drpsaiprasadcse@smec.ac.in

ABSTRACT

The Smart Livestock Health Monitoring System integrates Internet of Things (IoT) devices and Artificial Intelligence (AI) to enhance livestock management and disease prevention. This system continuously monitors the health and behavior of livestock through IoT-enabled sensors and devices, collecting data on vital signs, activity levels, and environmental conditions.AI algorithms analyze this data in real-time to detect early signs of disease, stress, or abnormal behavior, providing farmers with actionable insights and alerts.The goal is to improve livestock health, increase productivity, and reduce the incidence of disease through proactive management and Artificial Intelligence (AI) analyzes the collected data, enabling early detection of diseases and facilitating timely interventions.

Keywords**:** Internet of Things, Artificial Intelligence, livestock management.

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PAPER ID: ICIRTCS-24-070

NATURAL LANGUAGE PROCESSING-BASED AUTOMATED ESSAY SCORING AND FEEDBACK SYSTEM TO ENHANCE ACADEMIC WRITING SKILLS

[1]M Japanya*, [2]Mehul Bhati, [3]S.Sai Suhas Reddy, [4]D.Saikiran

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail: drpsaiprasadcse@smec.ac.in

ABSTRACT

The increasing reliance on automated tools for educational assessment has led to the development of Natural Language Processing (NLP)-based systems designed to evaluate academic writing with precision and efficiency. This project focuses on creating a Natural Language Processing-Based Automated Essay Scoring and Feedback System aimed at enhancing academic writing skills. The system leverages advanced NLP techniques, including sentiment analysis, syntactic parsing, and semantic analysis, to evaluate essays on multiple dimensions such as content quality, coherence, grammatical accuracy, vocabulary usage, and adherence to essay structure.The proposed system not only assigns a score to essays but also provides detailed, actionable feedback to help learners improve their writing skills. By employing machine learning algorithms, the system learns from a vast corpus of pre-graded essays to refine its scoring model, ensuring fairness and consistency. Furthermore, the system incorporates a feedback mechanism that highlights specific areas of improvement, such as argument development, logical flow, and language style, thereby serving as a personalized tutor for writers.Designed for scalability and adaptability, the system is applicable in various educational contexts, from classrooms to online learning platforms. It aims to reduce the burden on educators while offering students immediate, objective, and constructive evaluations of their writing. By fostering a continuous learning cycle, the system has the potential to significantly enhance writing proficiency and support academic development.This project underscores the transformative role of AI in education and showcases how NLP can be harnessed to bridge the gap between traditional and technology-driven learning methods, empowering both educators and students to achieve better outcomes in academic writing.

Keywords**:** Natural Language Processing, Machine Learning Algorithms.

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DYNAMIC CONTENT PERSONALIZATION SYSTEM USING ARTIFICAL INTELLIGENCE TO ENHANCE USER ENGAGEMENT AND MAXIMIZE E-COMMERCE REVENUE

[1]G.S. Anthony Akash Reddy*, [2]M. Pranay, [3]M. Vijay Prashanth, [4]P. Sudharsan

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author
E-mail: drpsaiprasadcse@smec.ac.in

ABSTRACT

To provide a seamless user experience, e-commerce websites often struggle to deliver relevant content to users, leading to low engagement and revenue. With the increasing use of artificial intelligence, a dynamic content personalization system can be designed to enhance user engagement and maximize e-commerce revenue by providing personalized content to users based on their preferences and behavior. The current e-commerce websites lack the ability to provide personalized content to users, leading to low engagement and revenue. A dynamic content personalization system can be designed to provide personalized content to users based on their preferences and behavior, enhancing user engagement and maximizing e-commerce revenue.

Keywords**:** Artificial Intelligence (AI), E-Commerce, Personalization, User Experience, Dynamic-Content**.**

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PAPER ID: ICIRTCS-24-072

AI CONCIERGE FOR HOTELS: CREATE A CHAT BOT THAT PROVIDES GUEST SERVICES IN HOTELS LIKE BOOKING,FOOD ORDERING

[1]M. Akshay Sai, [2]D. Sampath, [3]G. Sarala, [4]Dr. R. SanthoshKumar
[1,2,3]UG Scholar, [4]Professor & Head, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : akshaysai.naanu@gmail.com, saralaguntupalli888@gmail.com, drsanthoshkumarcse@smec.ac.in

ABSTRACT

Artificial Intelligence(AI) concierge is a technologically advanced, intelligent and personalized assistant that is designated to an individual customer, proactively taking care of that customer's needs throughout the service journey. The AI Concierge for Hotels leverages advanced AI and Natural Language Processing (NLP) to provide seamless guest services, including booking, food ordering, local recommendations, and more. This chat bot is designed to enhance the guest experience by offering 24/7 assistance through a conversational interface. By automating common tasks and providing personalized recommendations, the AI Concierge aims to improve guest satisfaction, streamline hotel operations, and ensure a high level of service efficiency.

Keywords: Artificial Intelligence (AI) Concierge, Natural Language Processing (NLP), Hotels, Booking, Food ordering.

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PAPER ID: ICIRTCS-24-073

BUDGET PLANNER ASSISTANT- CREATE AN AI ASSISTANT THAT HELPS USERS MANAGE THEIR MONTHLY BUDGET EFFECTIVELY

[1]V. Sai Sri Keerthi, [2]Y. Srija, [3]N. Akshaya, [4]Dr. G. Jawaherlal Nehru
[1,2,3]UG Scholar, [4]Associate Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : yedlasrija72@gmail.com, drjawaherlalcse@smec.ac.in

ABSTRACT

Managing finances can be difficult due to lack of financial knowledge or tracking of income and expenses can often be challenging. To address this, we propose a Budget Planner Assistant that leverages Artificial Intelligence and Natural Language Processing to provide users with personalized budgeting, tracks expenses, analyses spending patterns and offers actionable insights. By integrating with bank accounts and financial tools, the assistant ensures real-time tracking and management of income and expenses, empowering users to make informed financial decisions and achieve their saving goals. This assistant not only keeps track of the budget but also provides means to analyse data via charts and graphs. The assistant also aims to empower users to manage all aspects of their finances effectively.

Keywords: Artificial Intelligence, Natural Language Processing, Budgeting, Expenses, Income, Finances, Budget Planner, AI-Powered Budgeting.

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PAPER ID: ICIRTCS-24-074

AUTOMATIC QUESTION GENERATOR USING PDF FILE WITH LLM

[1]P. Manisha, [2]K. Navya, [3]M. Sri Vaishnavi, [4]S. Bavankumar
[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail : sbavankumarcse@smec.ac.in

ABSTRACT

In recent years, advancements in Natural Language Processing (NLP) and artificial intelligence have opened new avenues for automating various tasks. One such task is the generation of questions based on the content of PDF files, which can greatly enhance educational tools, assessments, and knowledge retrieval systems. This project, Automatic Question Generator Using PDF Files and LLMs, explores the potential of Language Models (LLMs) to create questions automatically from PDF documents, streamlining the process for educators, researchers, and other professionals. The core idea of this project is to automate question generation, minimizing the manual effort required to prepare assessment materials. PDFs are widely used for storing academic papers, textbooks, reports, and other structured information. The system reads and processes the textual content within PDF files, extracting key concepts, important facts, and contextual details. By analyzing this extracted information, the system can generate a wide variety of questions, including factual, conceptual, analytical, and even inferential questions.

The project involves several key components. The first step is the extraction of text from PDF documents. This is accomplished through the use of PDF parsing techniques that allow structured extraction of content, including text, headings, tables, and figures, while preserving the original formatting. The extracted text is then cleaned and pre-processed to make it suitable for the language model to interpret.

Keywords: Natural Language Processing (NLP), Language Models (LLMs).

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PAPER ID: ICIRTCS-24-075

PHISHING DETECTION SYSTEM: A SYSTEM THAT DETECTS PHISHING ATTACKS IN E-MAILS

[1]G. Karishma, [2]A. Giridhar Rao, [3]B. Yasaswitha, [4]Dr. M. Vadivukarassi
[1,2,3]UG Scholar, [4]Associate Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : karishmagunturi@gmail.com, drmvadivukarassicse@smec.ac.in

ABSTRACT

Spam detection has become a critical task in ensuring the quality and security of online communication platforms. Traditional rule-based and machine learning approaches have shown limitations in adapting to the evolving nature of spam messages. Convolutional Neural Networks (CNNs), primarily designed for image processing, have recently emerged as a powerful tool for text classification tasks, including spam detection. This project presents an innovative approach to spam detection using CNNs. Spam text is one of the main factors in the dissemination of phishing attacks to steal sensitive data such as credit cards and passwords. Spam detection has emerged as a critical task in ensuring the quality, security, and integrity of online communication platforms, with the proliferation of unwanted messages posing significant threats to individual privacy and organizational security.

Keywords: Phishing, Phishing attacks, Convolutional Neural Networks, Spam, Ham, Text classification, Image processing.

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PAPER ID: ICIRTCS-24-076

AI TUTOR SYSTEM: DEVELOP AN SYSTEM THAT PROVIDES PERSONALIZED TUTORING SESSIONS

[1]Sofia Muskan, [2]Saniya Mahek, [3]V.Sowmya, [4]S. Bavankumar

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : saniyamahek2903@gmail.com, sbavankumarcse@smec.ac.in

ABSTRACT

The AI Tutor System leverages Artificial Intelligence (AI) to provide personalized tutoring sessions based on student performance. This system analyzes students' learning patterns, strengths, and weaknesses to offer tailored educational content and guidance. By utilizing advanced machine learning algorithms and natural language processing, the AI Tutor delivers customized lessons, practice exercises, and real-time feedback, ensuring an adaptive learning experience that enhances student understanding and performance. The goal is to create an engaging and effective educational tool that supports individual learning needs and promotes academic success. This system employs adaptive learning algorithms to assess individual student needs, tailoring content and instructional methods accordingly. By integrating natural language processing, the AI Tutor facilitates interactive dialogue, providing real-time feedback and support. The platform offers a diverse range of educational resources, including multimedia content, quizzes, and practice exercises, all aimed at promoting engagement and retention. Through continuous data analysis, the system identifies knowledge gaps and adjusts learning paths, ensuring that each student progresses at their own pace. The AI Tutor System ultimately aims to empower learners, making education more accessible and effective in an increasingly digital world.The AI Tutor System is designed to revolutionize the educational landscape by providing a personalized learning environment. By leveraging advanced technologies such as machine learning and natural language processing, the system adapts to the unique needs of each student.the AI Tutor System not only aims to personalize learning but also seeks to redefine the educational experience, making it more effective, engaging, and accessible for a diverse range of learners.

Keywords: AI Tutor System,Personalized learning,Adaptive learning algorithms,Natural language processing.

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PAPER ID: ICIRTCS-24-077

SMART EVENT MANAGEMENT SYSTEM USE AI TO MANAGE EVENT TICKETS, SCHEDULES AND USER FEEDBACK

[1]G. Nikhita, [2]E. Bindu, [3]M. Aravind, [4]K. Ganapathi Babu

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : ganapathybabucse@smec.ac.in

ABSTRACT

The Smart Event Management System is designed to revolutionize event management by integrating AI to automate and optimize various components, improving both operational efficiency and attendee experience. One of the standout features is Dynamic Ticket Sales and Fraud Detection. The system uses AI algorithms to predict ticket demand, analyzing factors such as historical sales, attendee demographics, and market trends. This enables dynamic ticket pricing adjustments, where early-bird discounts or last-minute pricing can be implemented based on demand forecasts. Additionally, AI-powered fraud detection mechanisms analyze transaction patterns to flag anomalies and reduce fraudulent purchases, ensuring secure ticketing for all participants.

The system also excels in Optimized Scheduling and Real-Time Agenda Updates. It generates conflict-free agendas by analyzing historical event data and attendee preferences, optimizing the arrangement of sessions while accounting for factors like room capacity and speaker availability. Real-time notifications further enhance this functionality by alerting attendees of schedule changes, room updates, or live event statuses through an integrated app or notification system. This keeps attendees informed and engaged, allowing them to adjust to any last-minute changes smoothly.

Keywords: Dynamic Ticket Sales and Fraud Detection.

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PAPER ID: ICIRTCS-24-078

AUTOMATED SYSTEM VULNERABILITY SCANNER: CREATE A TOOL THAT USES AI TO IDENTIFY AND REPORT SYSTEM VULNERABILITIES

[1]A Yashwanth, [2]A. Murali, [3]A. Satish Kumar, [4]P. Swetha

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : p swethamittapalli1219@gmail.com

ABSTRACT

The Automated System Vulnerability Scanner leverages Artificial Intelligence (AI) to identify and report system vulnerabilities. This tool uses advanced machine learning algorithms and pattern recognition techniques to scan systems, applications, and networks for potential security weaknesses. The scanner's capabilities contribute to a proactive approach, enabling security teams to address threats before they can be exploited by attackers. The goal is to enhance cybersecurity by proactively identifying vulnerabilities and providing actionable insights for remediation, thereby reducing the risk of cyber-attacks and data breaches.

Keywords: Software Security, Machine Learning(ML), Automation, Vulnerability management, Natural Language Processing(NLP).

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EDUCATIONAL GAME USING AI

[1]Patlola Sannidhi, [2]Akhyar Rabah, [3]P.Akshith Reddy, [4]P. Devasudha

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : sudhajai2012@gmail.com

ABSTRACT

The educational game utilizes Artificial Intelligence (AI) to dynamically cater to each player's learning pace and preferences, offering a personalized educational journey. Focused on subjects like mathematics, science, language arts, and history, the game adjusts its challenges and content based on the player's performance and choices. The game employs AI algorithms for real-time analysis of user interactions, tailoring content and challenges based on individual proficiency and learning patterns. Through Natural Language Processing (NLP) and Machine Learning (ML), the game provides personalized feedback and support, enhancing comprehension and engagement. Additionally, AI plays a crucial role in creating life like behaviors in non-playable characters (NPCs) within the game, simulating human-like intelligence. It also contributes to tasks such as designing and balancing game levels, and generating diverse game elements, thereby enriching the overall gaming experience..

Keywords: Natural Language Processing(NLP), Machine Learning (ML).

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INTELLIGENT CODE ASSISTANT-IMPLEMENT AN ASSISTANT THAT SUGGESTS CODE OPTIMIZATION AND CORRECTION

[1]Nukala Sai Teja, [2]Koduri Meghana, [3]Rayala Girija, [4]Praneel Deva

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : praneeldevacse@gmail.com

ABSTRACT

The rapid rise of AI-driven tools like ChatGPT and GitHub Copilot has sparked interest in their potential to generate functional and high-quality code. While previous studies have mainly evaluated the functional correctness of AI-generated code, limited research has addressed the quality, a critical factor in software maintainability. This 15-credit bachelor's thesis investigates both code correctness and quality by conducting a controlled experiment comparing ChatGPT and Copilot across standardized coding tasks. Using principles from *Clean Code* by Robert C. Martin, we assess the quality of generated code alongside functional accuracy to provide a balanced evaluation of each tool. Building on studies by B. Yetistiren et al. (2022) and S. Imai (2022), which primarily examined Copilot's code correctness, we extend this analysis to ChatGPT and focus on previously underexplored quality metrics. Our research aims to deliver insights for developers and organizations seeking to integrate these tools effectively by identifying their strengths and limitations in generating maintainable, high-quality code.

Keywords: AI, code generation, ChatGPT, GitHub Copilot, code quality, software development, functional correctness, large language models.

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FLIGHT DELAY PREDICTOR: IMPLEMENT A TOOL THAT PREDICTS FLIGHT DELAYS BASED ON WEATHER DATA AND HISTORICAL TRENDS

[1]T. Laxmi, [2]D. Priyanka, [3]O. Urmila, [4]Dr. G. Jawaherlal Nehru

[1,2,3]UG Scholar, [4]Associate Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : thannerulaxmi944@gmail.com, dhulipalapriyanka2@gmail.com, drjawaherlalcse@smec.ac.in

ABSTRACT

The Flight Delay Predictor leverages machine learning algorithms to predict flight delays based on weather data and historical trends. This tool analyses past flight data, current weather conditions, and other relevant factors to provide real-time delay predictions. By offering accurate and timely predictions, the system aims to enhance the travel experience for passengers, improve operational efficiency for airlines, and assist airport management in proactive planning. Flight delay prediction is important because it helps airlines and travellers to understand the complex interplay of factors that can contribute to delays, such as overbooking, gate availability, scheduling practices and inclement weather. Accurate prediction models can help airlines keep planes running smoothly and on time and can help travellers make better decisions. The goal is to implement a tool that predicts flight delays based on weather forecast and ancient trends.

Keywords: Flight Delay Predictor, Machine Learning, Weather Data, Historical Trends, Real-Time Predictions, Operational Efficiency.

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SMART TRAVEL PLANNER : DEVELOP AN AI-BASED TRAVEL PLANNING ASSISTANT THAT SUGGESTS ITINERARIES BASED ON USER PREFERENCES

[1]Suravaram Ruthika Reddy, [2]Sarapu Vishwagna Apoorva, [3]Sejal Jiwani, [4]A. Rajeshwari

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : ruthika315@gmail.com, arajeshwaricse@smec.ac.in

ABSTRACT

The Smart Travel Planner is an innovative Artificial Intelligence (AI)-powered travel assistant designed to simplify and personalize the travel planning process for users. By analyzing individual preferences—such as interests, budget, and travel dates—the Smart Travel Planner creates customized itineraries that cater to each traveller's unique needs. This intelligent system suggests accommodation, activities, dining options, and attractions aligned with the user's preferences, helping them discover destinations more conveniently and effectively. The platform enables users to save time on planning by automating the itinerary-building process, providing real-time updates, and delivering dynamic recommendations that adapt to any changes in user preferences or travel conditions. Through a seamless and secure interface, travellers can explore new locations with tailored suggestions that enhance their travel experience. The Smart Travel Planner aims to empower users with an all-in-one solution for trip organization, delivering a high level of personalization and convenience, thus revolutionizing how people plan and enjoy their journeys.

Keywords : Artificial Intelligence, Smart Travel Planner, Personalized Itineraries, Travel Assistant, User Preferences, Real-time Updates, Trip Planning, Customization, Travel Experience Optimization**.**

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PASSWORD STRENGTH ASSESSMENT TOOL: BUILD A SYSTEM THAT ACCESSES THE STRENGTH OF PASSWORDS USING AI ALGORITHMS.

[1]N. Aishu Reddy, [2]B. Sreeja, [3]J. Harshini, [4]B.Vanaja

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : bvanajacse@gmail.com

ABSTRACT

In the modern digital landscape, where security breaches are rampant, the strength of passwords plays a critical role in safeguarding sensitive information. This project proposes the development of a Password Strength Assessment Tool capable of evaluating the resilience of passwords against brute-force and dictionary attacks. The Password Strength Assessment Tool leverages Artificial Intelligence (AI) algorithms to evaluate the strength of user passwords. This system analyzes various factors such as length, complexity, user information, entropy, and patterns to provide a comprehensive and personalized assessment of password security. By offering real- time feedback and suggestions for improvement, the tool helps users create stronger passwords, enhancing overall cyber security and reducing the risk of unauthorized access.

The tool aims to provide users with valuable insights into the effectiveness of their chosen passwords and empower them to enhance their security practices. Through comprehensive testing and analysis, this project seeks to contribute to the ongoing efforts to fortify digital security and mitigate the risks associated with password vulnerabilities.

Keywords: Password Strength, Cyber Security, Artificial Intelligence (AI), Brute- force Attacks, Dictionary Attacks, Password Complexity, Entropy.

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AI MUSIC COMPOSER: DEVELOP AN AI THAT COMPOSES ORIGINAL MUSIC BASED ON USER PREFERENCES

[1]Ch. Venkat Raja, [2]S.Dhanush, [3]V.Akshay Ravi Kiran, [4]Suresh VJ

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : sureshvjcse@gmail.com

ABSTRACT

A recurrent neural network is a class of artificial neural networks where connections between nodes form a directed graph along a temporal sequence. This allows it to exhibit temporal dynamic behavior. In the basic feedforward network, there is a single direction in which the information flows, i.e., from input to output, but in a recurrent neural network, this direction constraint does not exist. We will be working with a simple form of such RNN. The power of this is that it enables the network to have a simple version of memory, with very minimal overhead. However, this implementation is not complete yet. The main problem with is that the memory is very short-term. Any value that is output in one time step becomes input in the next, but unless that same value is output again, it is lost at the next tick. For solving this problem, we will be making use of Long Short-Term Memory (LSTM) node instead of a normal node. This introduces a memory cell value that is passed down for multiple time steps, and which can be added to or subtracted from at each tick.

Keywords: Recurrent Neural Networks (RNN).

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VIRTUAL TOUR GUIDE APP: BUILD AN APP THAT PROVIDES GUDIED TOUR USING AUGMENTED REALITY AND AI EXPLAINATION

[1]B. Ganga Bhavani, [2]V. Likitha, [3]M. Nishitha, [4]Suresh VJ

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : likithavishwanath123@gmail.com, sureshvjcse@smec.ac.in

ABSTRACT

The Virtual Tour Guide App leverages augmented reality (AR) and artificial intelligence (AI) to provide immersive guided tours. This app enhances the visitor experience by overlaying digital content onto real-world environments, offering real-time information, interactive elements, and personalized AI-driven explanations. By combining AR technology with AI, the app aims to transform the way people explore and learn about historical sites, museums, cities, and other points of interest, making tours more engaging, educational, and interactive. Main features of the application are: virtual tour of important places located, voice based information provider, location identifier and a map based path selection function to select the best path to a specified destination within the premises.

Keywords: Augmented reality (AR) and artificial intelligence (AI).

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FITNESS COACH CHATBOT

[1]K. Saheel, [2]MD. Mohsen, [3]P.Bhupen, [4]S. Bavankumar

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : sbavakumarcse@gmail.com

ABSTRACT

Understanding the academic performance of students in colleges is an essential topic in Education research field. Educators, program coordinators and professors are interested in understanding how students are learning specific topics, how specific topics may influence the learning of other topics, how students' grades/attendances in each course may represent important indicators to measure their performance, among other tasks. The use of data visualization and analytics is expanding in education institutions to perform a variety of tasks related to data processing and gaining into data-informed insights. In this work, we present a visual analytic tool that combines data visualization and machine learning techniques to perform some visual analysis of students' data from program courses. Two educational data collections were used to guide the creation of i) predictive models employing a variety of well-known machine learning strategies, attempting to predict students' future grade based on grade and attendance previous semesters and ii) a set interactive layout that highlight the relationship between grades and attendance, also including additional variables such as gender, parent's education level, among others. We performed several experiments, also using these data collections, to evaluate the layouts ability of highlighting interesting patterns, and we obtained promising results, demonstrating that such analysis may help the education experts to understand deficiencies on course structures.

Keywords: Information Retrieval, RDF, SPARQL, E-learning, Querying, Indexing, Ranking, Semantic Web.

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AUTOMATED FINANCIAL ADVISOR – CREATE A SYSTEM THAT OFFERS FINANCIAL ADVICE BASED ON THE USER'S SPENDING HABITS AND FINANCIAL GOALS

[1]Y. Revanth, [2]N. Ashley, [3]B. Krishna Teja, [4]M. Dileep Kumar
[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : dileepkumarcse@smec.ac.in

ABSTRACT

The Automated Financial Advisor is an innovative system designed to harness the power of Artificial Intelligence (AI) in delivering personalized financial guidance to users. This intelligent tool is engineered to analyze users' spending habits and align with their financial goals, creating a highly customized advisory experience. By analyzing transactional data and tracking financial trends, the advisor can provide tailored insights into essential areas such as budgeting, saving, investing, and debt management. Furthermore, the system integrates seamlessly with various banking and financial platforms, which enables real-time data monitoring and adaptive recommendations that evolve as users' financial landscapes change. This capability allows users to make well-informed financial decisions and adapt to dynamic economic conditions. With a primary focus on accessibility, the Automated Financial Advisor aspiresto offer a user-friendly interface and actionable insightsthat make financial planning accessible to all, regardless of background or expertise. Ultimately, the project aims to empower individuals to take charge of their financial futures, supporting them in achieving financial stability and long-term objectives through an intelligent and adaptive advisory system.

Keywords: Artificial Intelligence, Natural Language Processing, Expenses, Income, Finances, Budget Planner.

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DRUG INTERACTION CHECHER BUILT A TOOL THAT USES AI TO PREDICT ADVERSE DRUG INTERACTION

[1]P.Shalini, [2]S. Arun Reddy, [3]V.Bhanu, [4]R. Srinivasan

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : rsrinivasancse@smec.ac.in

ABSTRACT

The Drug Interaction Checker is an innovative tool designed to leverage artificial intelligence for predicting adverse drug interactions. As the complexity of pharmacotherapy increases with the growing number of available medications, healthcare professionals face challenges in ensuring patient safety. Using machine learning algorithms, the Drug Interaction Checker will analyze historical data on drug interactions, including chemical properties, metabolic pathways, and clinical outcomes. The system will provide real-time assessments and warnings for healthcare providers, enhancing decision-making processes and improving patient care outcomes. Additionally, the tool will incorporate user feedback to continuously refine its predictive capabilities, ensuring it remains up-to-date with the latest research and clinical guidelines.

Ultimately, the Drug Interaction Checker aspires to empower healthcare professionals, reduce the incidence of adverse drug events, and promote safer prescribing practices, thereby enhancing overall patient safety in pharmacotherapy. The Drug Interaction Checker provides healthcare professionals with an easy-to-use interface to input medication lists, delivering real-time, evidence-based information on potential interactions. The results are classified by severity (minor, moderate, major) and include clinical recommendations for managing or avoiding interactions. By enabling rapid assessment of complex drug regimens, the Drug Interaction Checker supports clinical decision-making, improves patient safety, and helps prevent adverse drug reactions (ADRs). This tool is an invaluable resource for pharmacists, physicians, and other healthcare providers, contributing to enhanced medication management and optimized patient care.

Keywords: Adverse Drug Reactions (ADRs)

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NETWORK TRAFFIC ANALYSIS TOOL: USE AI TO ANALYZE NETWORK TRAFFIC AND PREDICT POTENTIAL THREATS

[1]Shashaank Sairaj Merugu, [2]Sipun Gouda,Boda Nagesh, [3]K. Sreenivasalu

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : ksreenivasalucse@smec.ac.in

ABSTRACT

The Network Traffic Analysis Tool leverages Artificial Intelligence (AI) to analyze network traffic and predict potential threats. This tool utilizes machine learning algorithms to identify anomalous patterns and behaviors indicative of security threats such as malware, intrusions, and data exfiltration. By providing real-time monitoring and predictive analytics, the system enhances network security, supports proactive threat mitigation, and ensures the integrity and availability of network resources. In conclusion, improving network management and cybersecurity requires AI- powered network traffic analysis tools. By automating threat detection, providing real-time monitoring, and adapting to changing circumstances, they help organizations promptly recognize and address problems.

Keywords:Artificial.Intelligence(AI),MachineLearning,AnomalousPatterns,SecurityThreats,MalwareDetection,IntrusionDetection,DataExfiltration,Real-timeMonitoring,Predictive Analytics.

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AI HEALTH ADVISOR - DEVELOP AN APPLICATION THAT PROVIDES HEALTH ADVICE BASED ON SYMPTOMS DESCRIBED BY THE USER

[1]Dasari Thirumalesh, [2]Goddeti Naveen Yadav, [3]Ningampally Akhil Kumar, [4]P. Sudarsan

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : psudharsancse@smec.ac.in

ABSTRACT

Healthcare is rapidly moving toward patient-centered care, and technology has been essential in developing the quality of personalized healthcare. This is a report about an artefact, which is a healthcare chatbot that utilizes state-of-the-art natural language processing technology. Chatbot was developed with an aim of enhancing patient participation, provisioning relevant messages in time, as well building linkage between doctors and patients. It leverages highly advanced NLP systems that can understand the sentiments of conversations and respond back as a real human would, making communication easy and relevant within its context. It can be integrated in existing healthcare platforms and hence made accessible by patients for queries such as health information to specific medical inquiries. Through artificial intelligence or machine learning algorithms, it is possible for the chatbot to keep improving on its performance adjusting according to the ever-changing language and user's preferences.

The healthcare chatbot's key features include symptom analysis, prescription reminders, and health-related FAQs. By adhering to healthcare standards and using encryption mechanisms for sensitive information, the system assures data security and privacy compliance. This study adds to the expanding body of work in harnessing natural language processing (NLP) for healthcare applications by providing insights into the creation, deployment, and assessment of a chatbot targeted at enhancing patient experiences and optimizing healthcare communication channels. The findings highlight the potential for NLP-based chatbots to play an important role in the future of healthcare by enhancing accessibility, efficiency, and patient-centered treatment.

Keywords: Chatbot, Natural language processing (NLP).

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AUTOMATED MEDICAL IMAGE ANALYSIS: USING MACHINE LEARNING AND OPENCV FOR ANALYZING MEDICAL IMAGES TO DETECT ABNORMALITIES

[1]Paidi Uday Kiran, [2]Katharasala Vamshi, [3]Battu Sai Rithesh, E.Sowmya

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : udaykiranreddypaidi@gmail.com, esowmyait@smec.ac.in

ABSTRACT

The main purpose of this project is to improve disaster recovery development using OpenCV library along with deep learning algorithms. The damage is caused by cartilage destruction and detachment and presents a difficult diagnosis. Using the power of OpenCV, powerful image analysis and processing libraries, and a variety of image processing methods, we aim to accurately identify bones in X-ray images. In the last few years, many studies have been conducted on the research and classification of fossils. However, a method that can detect all kinds of damage in the human body has not been found. In addition, to achieve this goal, the main points are explained and a comparative analysis of each research method and basic model is made. In recent years, deep learning has made great strides, especially convolutional neural networks (CNNs), which achieve performance comparable to human performance at splitting bones. Using the power of deep learning, computer-aided diagnosis (CAD) has been specifically designed to help doctors reduce the number of diagnoses and save valuable time. Through optimization, the integration of deep learning algorithms enables the system to learn from large volumes of data, recognize complex patterns and make informed predictions, increasing diagnostic accuracy while reducing human error. In addition, OpenCV provides a set of image manipulation and analysis tools useful in CAD processes. This tool helps extract important features from medical images, thereby improving image quality and making it easier to search and classify bones. Using the capabilities of OpenCV, fracture detection can be done effectively and analyze the relevant features to accurately identify and locate the fracture.

Keywords: Automated Medical Image Analysis, Machine Learning, OpenCV

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AUTOMATED WEED DETECTION USING ML AND OPEN CV TO DETECT AND CATEGORIZE WEEDS AMONG CROPS

[1]M. Ruthvik, [2]S. Pushparaj, [3]S. Rahul, Kishor Golla

[1,2,3]UG Scholar, [4]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,4]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : kishorecse@smec.ac.in

ABSTRACT

In modern agriculture, the efficient management of weeds is crucial for maximizing crop yield and minimizing resource wastage. Traditional methods of weed control, such as manual weeding and chemical herbicides, are labor-intensive, costly, and environmentally unsustainable. The project "Automated Weed Detection" aims to address these challenges by leveraging advanced technologies in image processing and machine learning to create a reliable, efficient, and scalable solution for weed identification and management.

The core of the system is an image-based detection algorithm that uses deep learning techniques to accurately distinguish between crops and weeds. High-resolution images captured from fields are processed using convolutional neural networks (CNNs) to identify and classify the presence of weeds. This system is designed to operate in real-time, enabling immediate weed detection and targeted action.

Keywords: convolutional neural networks (CNNs)

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STUDENTS ATTENDANCE VISUALIZATION USING DATA SCIENCE

[1]M.Rishik Naidu, [2]Digvesh Sundaram, [3]N.Balaraman

[1,2,]UG Scholar, [3]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : nbalaramancse@smec.ac.in

ABSTRACT

The AI-Based Movie Recommendation System leverages machine learning algorithms to provide personalized movie recommendations based on user watching habits. This system analyzes user behavior, preferences, and historical viewing data to suggest movies that align with individual tastes. By incorporating collaborative filtering, content-based filtering, and hybrid recommendation techniques, the system aims to enhance user satisfaction, increase engagement, and support content discovery.

Keywords: Dara Sciecne, Artificial Intelligence (AI)

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CROP DISEASE PREDECTOR: DEVELOP AN APPLICATION THAT PREDICTS CROP DESASES BASED ON SYMPTOMS SEEN IN CROP

[1]K. Akshay Kumar, [2]D. Jai Kishan Yaday, [3]D. Sai Kiran

[1,2,]UG Scholar, [3]Assistant Professor, Department of Computer Science and Engineering,
[1,2,3,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : dsaikirancse@smec.ac.in

ABSTRACT

Plants are the major source of food for all kinds of living beings. With the increase in population, it is now more important to keep this supply continue. To cop-up with such high demand, it is very important keep the plants healthy from various kinds of diseases. The detection of disease is sometimes very difficult for even experienced farmers.

Latest technologies like Deep Learning and Image Processing have made it significantly easy to detect and cure such plant diseases earlier to reduce loss. In this project, we proposed a system that is capable of detecting disease in leaf. We will be using back and forward propagation to train our neural network. Data set of resolution 250*250 images are being used in this project. Our goal is to find a suitable and efficient model that can predict the disease in the plant. For this project, we'll be using creating different models using Keras to develop different models and train them with the data set for various types of leaves taken from different plants. Data collected from various models then will be analyzed and an efficient model will be suggested.

Keywords: Plant leaf disease, Convolutional neural network (CNN), Semantic segmentation, Encoder-decoder, Detection, Classification Keywords: Dara Sciecne, Artificial Intelligence (AI)

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MACHINE LEARNING-BASED INTRUSION DETECTION WITH ROUTE OPTIMIZATION IN WIRELESS SENSOR NETWORKS

[1]Jagadam Jyotsna, [2]Dr. R. Madhan Mohan, [3]Gurrampally Kumar

[1,3]Assistant Professor, [2]Associate Professor, Department of Computer Science and Engineering,
[1,]JB Institute of Engineering and Technology

*Corresponding Author

E-mail : Jyotsna.jagadam@gmail.com, madhanmohan_mithu@yahoo.com

ABSTRACT

Several real-time applications could benefit from wireless sensor networks (WSN), which are compact, inexpensive, and widely used. Wide-area sensor networks (WSNs) gather data from a distributed network of sensor nodes. Nevertheless, there are a number of dangers that sensor nodes can face, such as intrusion, hackers, hardware failure leading to a physical occurrence, and many more. This means that safeguarding a sensor node from intrusion is essential. The next time it's attacked, the sensor's data might be inaccurate, leading to bad analysis and unintended consequences. In order to overcome these obstacles, it is recommended to use Reinforcement Learning for Intrusion Detection (RLID) or to improve the Optimal Route using Cuckoo Search. Reinforcement Learning uses recurrent node classification to detect intrusions during route discovery. Using the packet forward rate and residual energy of the sensor nodes, reinforcement learning determines the quality of the connection and uses that to evaluate the behavior of the nodes. In this case, the intrusion sensor was classified using the repeated node classification approach, which takes node-link quality into account. So, it can greatly improve the efficiency of intrusion detection. We also use the Cuckoo Search Technique (CST) to find the best forwarder for data transmission. The fundamental objective of this research is to develop methods for WSN data transmission and routing that make use of conventional sensor nodes. We compare the simulation platform and results to the baseline procedure to show that our suggested strategy is effective.

Keywords*:* Wireless sensor network, Repeating node classification, Reinforcement Learning, Cuckoo search technique, Intrusion Detection.

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FLOOD PREVENTION AND DRAINAGE OPTIMIZATION THROUGH SMART SYSTEMS

[1]G. JawaherlalNehru

[1]Associate Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : drjawaherlalcse@smec.ac.in

ABSTRACT

In the field of urban planning, a smart drainage system is absolutely necessary. The smart drainage system allows us to detect clogs in the pipes in real time. Sensor technology from the Internet of things powers the system. The combination of temperature, ultrasonic, and pressure sensors allows for the rapid detection of clogs in drainage pipes. One way to keep track of the temperature is with a temperature sensor. Solid, liquid, and air temperatures can all be measured with this device. Using sound waves, an ultrasonic sensor can measure the distance between objects. The flow rate can be determined with the help of a pressure sensor. The values are read by the sensors mentioned earlier at a certain point. An IoT system processes the data, which is then stored in the cloud. A "cloud system" is a collection of interconnected computing resources that make use of the internet to access and store data. If the sensor detects a clog in the pipe, it will notify the appropriate authorities. Manual labor is carried out according to the current state of the information. Again, after the manual labor is done, the status of the drainage pipe is determined using sensors, and the relevant authorities are informed that there is no obstruction. Therefore, in order to clear any obstructions, the smart drainage system checks the drainage pipe frequently.

Keywords*:* Data collection, sensors, and internet of things

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TOWARDS EFFECTIVE CROWD MANAGEMENT FOR PUBLIC HEALTH SAFETY DURING PANDEMICS

[1]Dr. M. Vadivukarssi

[1]Associate Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : drvadivukarassicse@smec.ac.in

ABSTRACT

Coronavirus (Covid-19) is a serious illness that includes pneumonia and affects various parts of the body. Humans can contract the virus from a variety of sources, one of which is crowded public spaces. Following the principle of social distance is thus essential, as it is one of the most fundamental countermeasures to the spread of the virus. However, bus stations, train stations, shopping malls, and other urban infrastructure areas make crowd management a challenging task. Physical force alone is insufficient to manage public gatherings. Consequently, we have developed a cutting-edge Crowd Monitoring System (CMS) that employs a Convolutional Neural Network (CNN) model to effectively prevent corona disease. All told, this model has five blocks, nine convolution layers, and five polling layers. As shown by the experimental results, the proposed CMS-CNN model outperformed other state-of-the-art models.

Keywords*:* community, coronavirus, surveillance, deep learning, convolutional neural network, and prevention.

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AI-DRIVEN ADAPTIVE E-LEARNING SYSTEMS FOR EDUCATIONAL TRANSFORMATION

[1]S. Bavankumar

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : sbavankumarcse@smec.ac.in

ABSTRACT

It is crucial that educational institutions, in this era of information and technology, where lifelong learning is the norm, seek effective ways to provide new learning opportunities that take into account their present situation, student characteristics, instructor preparation, financial constraints, and the promotion of innovation in order to make learning in higher education more efficient, impartial, and creative. The faculty and staff at Portugal's Guarda Polytechnic Institute (IPG) are well-aware of the need of developing and implementing innovative online education programs (e-Learning, mixed learning, portable learning) that cater to students' individual needs. As a result, we have established and achieved several institutional goals in the past ten years related to the delivery of online courses that aim to provide intuitive content that is accessible from anywhere in the world. The findings and information compiled since we implemented a mobile learning system in Walk 2012 are presented in this paper. However, when discussing electronic adaptation independent of its location, the primary goal of this paper is to present our methods, vision, and objectives. We acknowledge that "cloud learning" represents the next logical step for the e-learning industry. In order to create new, fruitful, and groundbreaking opportunities for learning, this decade has taught us that some of the components used during e-Learning time require more consideration than others.

Keywords*:* Technologies, Learning Management Systems, E-Learning, and Training Institutions.

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PAPER ID: ICIRTCS-24-099

Dynamic Memory Allocation for Automated Virtual Machines in Cloud Servers

[1]K. Ganapathi Babu

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : kganapathibabucse@smec.ac.in

ABSTRACT

VMMs of today maintain memory by utilizing these four components, which have already been incorporated into the mainline kernels. The memory allocation request is made available to the server by this version, which is offered to the consumer. Within the scope of this study, we develop a lightweight framework that is based on the Xen balloon motive force in order to regulate memory within the server of virtual machines (VMs). It is no longer the case that our consumer, which is going to manifest, interferes with the virtual machines. One type of scheduling that we offer is called GLOBAL scheduling, and another type is called SELF scheduling. "PROCESS MEMORY ALLOCATION" is the primary concept that will be discussed in this scheduling. In this particular instance, we are going to make use of the balloon algorithm more specifically.

Keywords*:* Cloud, Virtual machine, Memory allocation.

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PAPER ID: ICIRTCS-24-100

COMMERCIAL WEBSITE DEVELOPMENT FOR EDUCATION AND CONSULTANCY WITH MERN

[1]E. Soumya

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : esoumyacse@smec.ac.in

ABSTRACT

There has been a simultaneous increase in the number of engineering students in our country, but there has also been a regrettable decline in the quality of knowledge that each of these students possesses. This is due to the fact that there has been an increase in the demand for a larger workforce of engineers and technological experts during this day and age of technology. Our goal is to improve the users' knowledge by not only encouraging them to self-learn their domain(s) of interest with relevant links that are provided to them, but also by testing their knowledge and encouraging them to take on a self-improvement approach by also providing them with a basic, statistical overview of their scores from all of their previously attempted tests, which are separated according to each domain. This website that we have developed is called a Learning Management System Website.

Keywords*:* Knowledge, Learning Management System, self-learning, self-improvement, domain.

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PAPER ID: ICIRTCS-24-101

DATASET FEATURES AND THEIR ROLE IN THE DEVELOPMENT OF QUESTION ANSWERING SYSTEMS

[1]P. Swetha

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : pswethacse@smec.ac.in

ABSTRACT

Question Answering (QA) systems in Natural Language Processing are primarily focused on providing responses to the questions that are being asked. A significant number of quality assurance reviews have been categorized according to a variety of criteria, including the queries that were asked by users, the characteristics of the databases that were utilized, the nature of the answers that were generated, and the approaches and techniques that were utilized to answer questions. Recent years have seen an increase in the quantity of datasets that are accessible to the general public and that have been made available in order to expedite research on question answering systems. An examination of the two datasets that are currently accessible, namely TWEETQA and SQuAD, is carried out in this paper, along with the presentation of a straightforward classification of those datasets. The most recent evaluation results of datasets like ROUGE-L, BLEU-1, METEOR, EM-L, and F1 are also investigated in this study. Presented here is a review of publicly available datasets that have been utilized in quality assurance research. Additionally, datasets that have the potential to be of use to question answering research in the future have been provided. The background information regarding the techniques used to analyze the questions and answers contained within each dataset. In addition to that, a survey is conducted on the available online quality assurance challenges as well as the reported human performance values. The Information Retrieval and Natural Language Processing communities are going to find this characterization study of the QA dataset to be helpful.

Keywords***:*** Natural Language Processing, Question Answering, SQuAD, and TWEETQA.

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PAPER ID: ICIRTCS-24-102

SOCIAL MEDIA-BASED DEPRESSION DETECTION USING CONVOLUTIONAL NEURAL NETWORKS AND LINGUISTIC ANALYSIS

[1]K. Ram Mohan

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

Depression substantially contributes to the worldwide burden of mental disorders and is a primary cause of disability. Research indicates that women are more predisposed to depression than men. Annually, more than 700,000 individuals take their own lives. Suicide ranks as the fourth leading cause of death for individuals aged 15 to 29 years. This study employs various Machine Learning algorithms utilizing messages and posts from social media networks to facilitate the early detection of depression. WORD2VEC, GLOVE, the machine learning algorithm LOGISTIC REGRESSION, and the neural network algorithm CONVOLUTIONAL NEURAL NETWORK (CNN) are trained and evaluated against classification-based user-level linguistic information.

Keywords*:* Depression, Word2Vec, GloVe, Logistic Regression, Convolutional Neural Network, Linguistic Metadata.

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PAPER ID: ICIRTCS-24-103

ADVANCED MEDICAL SELF-DIAGNOSIS USING ARTIFICIAL INTELLIGENCE AND NEURAL NETWORKS

[1]P. Devasudha

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : pdevasudhacse@smec.ac.in

ABSTRACT

Health disorders among individuals can be identified and diagnosed using Artificial Intelligence techniques. Accurate algorithms are necessary for precise predictions in various domains of medical diagnosis. Previous conventional diagnostic practices were conducted manually, making them susceptible to errors. In contrast to human expertise, the application of predictive techniques in Artificial Intelligence (AI) facilitates automated diagnosis and diminishes the error rate. This paper analyzes various contemporary artificial intelligence techniques, including Support Vector Machine (SVM), K-means algorithm, fuzzy logic, and neural networks, and presents a design for an optimized fuzzy logic-based neural network method. A novel technique is devised for achieving precise results by taking into account various parameters, based on the analysis of existing practices. Ultimately, forthcoming advancements in research are elucidated through an Artificial Intelligence-based diagnostic system addressing the challenges encountered in contemporary medical self-diagnostic systems.

Keywords*:* Machine Learning, Fuzzy Logic, Artificial Intelligence, Clustering, Medical Diagnosis.

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PAPER ID: ICIRTCS-24-104

AUTOMATED DETECTION AND CLASSIFICATION OF HEPATOCELLULAR CARCINOMA IN CT IMAGES WITH CNN

[1]N. Balaraman

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : nbalaramancse@smec.ac.in

ABSTRACT

This paper aims to develop a method for detecting hepatocellular carcinoma, or liver cancer, in CT (Computed Tomography) images utilizing deep learning, a subset of artificial intelligence. The learning and recognition algorithms were developed using Python and TensorFlow, a machine learning framework provided by Google. Thirty clinical individuals' CT images were selected from the DICOM format data provided by Ehime University's Graduate School of Medicine. In cases of hepatocellular carcinoma, 150 sets of CT scans were selected, with each set comprising two CT images representing the early and late stages. Furthermore, in instances devoid of hepatocellular carcinoma, 150 sets of CT images were selected. Each original CT image was rotated to generate 450 sets of CT images for each of the 150 original sets, resulting in a total of 900 sets. Consequently, 1,200 sets of CT scans (totaling 2,400 CT images) were employed for training purposes. The efficacy and applicability of the learning and recognition systems were subsequently evidenced through the analysis of the projected outcomes. Hepatocellular carcinoma was diagnosed with a sensitivity of 92.2 percent, despite utilizing a modest dataset of 1,200 CT scan sets.
Keywords: Artificial Intelligence, Deep Learning, Computed Tomography, CT Imaging, Hepatocellular Carcinoma.

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PAPER ID: ICIRTCS-24-105

REAL ESTATE PRICE PREDICTION USING LINEAR REGRESSION: A DATA-DRIVEN APPROACH

[1]S. Kirankumar

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : skirankumarcse@smec.ac.in

ABSTRACT

The purpose of this paper is to provide an overview of how to predict house costs by utilizing various regression methods with the assistance of Python libraries. The technique that was proposed took into account the more refined aspects that were used for the calculation of house price, and by doing so, it provided the most accurate prediction. It also offers a concise summary of the many graphical and numerical methods that will be necessary in order to make an accurate prediction regarding the cost of a house. The purpose of this paper is to explain what the house pricing model is and how it operates with the assistance of machine learning, as well as to identify the dataset that is utilized in our proposed model.

Keywords*:* Rea Estate, house price, machine learning.

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OPTIMIZED OBJECT DETECTION IN IMAGES USING THE YOLO FRAMEWORK

[1]Kishor Golla

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : gkishorcse@smec.ac.in

ABSTRACT

Deep learning has significantly influenced the global adaptation to artificial intelligence in recent years. Prominent object identification methodologies encompass Region-based Convolutional Neural Networks (RCNN), Faster-RCNN, Single Shot Detector (SSD), and You Only Look Once (YOLO). Faster-RCNN and SSD exhibit the highest accuracy, whereas YOLO excels when speed is prioritized over accuracy. Deep learning integrates SSD and MobileNets to enhance detection and tracking efficacy. This method rapidly and effectively identifies objects while preserving superior performance.

Keywords: Single Shot Detector, You Only Look Once (YOLO).

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PAPER ID: ICIRTCS-24-107

CLOUD HEALTHCARE MANAGEMENT USING QR CODE FOR ENHANCED PATIENT TRACKING AND DATA ACCESS

[1]K. Sreenivasulu

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : ksreenivasulucse@smec.ac.in

ABSTRACT

The project proposes an effective management and forecasting system for Patient Health Records (PHRs). Patient Health Records (PHRs) offer an updated medical history of patients, with efficient data security achieved through their storage. Our objective is to assist doctors, administrators, and patients in the processes of storing, updating, accessing, and sharing information, irrespective of the availability of a network connection in the vicinity. The Hospital Management System comprises three modules: admin, doctor, and patient. To attain scalable and secure data access controls for the PHRs, full control is granted to the patient through the provision of a Medi card for each individual. Physicians and administrators can access the Personal Health Record using the patient identification number. In an emergency, Patient Health Records (PHR) can be accessed without a patient ID, allowing individuals in proximity to the patient to retrieve the patient's profile. In this project, the administrator's role is to create staff and access patient records. The staff's roles are categorized into two: nurse and doctor. The staff or nurse is responsible for creating patient records and assigning patients to specific doctors, while the doctor reviews the patient's records and uploads test results as images, such as X-rays and scans. Subsequently, propose a description for the specific patient to facilitate automation.

Keywords: PHR, Medi Card, QR Code, records, sharing

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PAPER ID: ICIRTCS-24-108

EMOTION-SENSITIVE MUSIC RECOMMENDATION SYSTEM FOR ENHANCED USER EXPERIENCE

[1]P. Sudharsan

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : psudharsancse@smec.ac.in

ABSTRACT

The majority of current music recommendation systems employ collaborative or content-based recommendation engines. However, a user's music selection is not solely contingent upon historical preferences or musical content. However, it is also contingent upon the user's mood. This project proposes a music recommendation framework based on emotions, which learns a user's emotional state from signals derived from facial expressions. This project addresses the emotion recognition issue by predicting arousal and valence from multi-channel physiological signals. Individuals frequently find it perplexing to determine which music to select from an extensive array of available choices. Various suggestion frameworks exist for topics such as music, dining, and shopping, tailored to the user's mood. The primary aim of our music recommendation system is to offer suggestions that align with the user's preferences. The examination of facial expressions and user emotions may facilitate comprehension of the user's present emotional or mental condition.

Keywords: Support Vector Machine, Image Analysis, Feature Extraction

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PAPER ID: ICIRTCS-24-109

INTELLIGENT CRIME INVESTIGATION USING DECISION TREES AND SUSPECT PREDICTION ALGORITHMS

[1]M. Dhileep Kumar

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : mdhileepkumarcse@smec.ac.in

ABSTRACT

We propose an Intelligent Crime Inquisition system that monitors the investigation status of criminal cases through logs and predicts primary suspects. The system is designed to assist agencies such as CBI, CID, and similar bureaus in expediting the investigation process and monitoring the status of multiple cases simultaneously. The system maintains logs of a case that encompass the case summary, individuals involved, disputes, the criminal history of those involved, items recovered at the scene, and additional details. The system identifies the case type, enables the administrator to modify the investigation status, and permits the upload of additional images of the crime scene and items discovered. This enables authorized personnel to verify case status and access its details online, as well as update any pertinent information as necessary. The system includes a suspect prediction algorithm. The system analyzes past cases, criminal records of involved parties, and various entities such as property, land, and relationships to generate a logically ordered list of suspected individuals. The system is engineered to assist investigative teams in collaborating on cases, coordinating efforts, and expediting the process by proposing plausible suspects based on the provided data.

Keywords: Inquisition, Logs, Authorized, Suspect Prediction Algorithm, Decision Tree Algorithm, Entities.

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PAPER ID: ICIRTCS-24-110

LEVERAGING SVM FOR EFFECTIVE LIVE VISITOR TRACKING IN E-COMMERCE WEBSITES

[1]P. Akhil

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : pakhilcse@smec.ac.in

ABSTRACT

This paper primarily focuses on monitoring the details of visitors utilizing the website, from which the administrator will obtain that information. The Interface encompasses the tracking system software. The programming language utilized is Python, employing the Flask framework, and the system will operate with internet access. Ecommerce, or electronic commerce, pertains to the transaction of goods via the internet. Ecommerce is frequently utilized for the online sale or purchase of tangible goods. E-commerce platforms operate around the clock and are reachable from any location with Internet access. In the digital age, Ecommerce enterprises are expanding significantly. However, numerous challenges confront the ecommerce industry. The challenges encountered include product demand, online identity verification, customer loyalty maintenance, and competition with retailers and manufacturers. The visitor tracking system enables us to monitor all site visitors and their product preferences. Ecommerce necessitates visitor tracking software that enables retailers to gain insights into user behavior on their site and their interests, which can be analyzed using support vector machines. The real-time visitor tracking system will assist retailers in optimizing pricing and increasing product sales. It also automatically purges outdated visitor records, comprising two modules: Admin and User. The administrator can add products, view products, monitor live visitors, and access the feed. Users can access on-demand products, add items to their cart, track orders, and review their purchase history.

Keywords: Product Evaluations, Visitor Monitoring, Support Vector Machines, Product Assessment

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PAPER ID: ICIRTCS-24-111

AI-BASED CURRENCY RECOGNITION USING CONVOLUTIONAL NEURAL NETWORKS AND IMAGE PROCESSING

[1]D. Sai Kiran

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : dsaikirancse@smec.ac.in

ABSTRACT

This model proposes a system for automated currency recognition utilizing CNN and image processing techniques. The proposed method is applicable for identifying both the country of origin and the denomination of a specific banknote. Only paper currencies have been taken into account. This method operates by initially determining the country of origin through specific predefined areas of interest, followed by extracting the denomination value based on attributes such as size, color, or text on the note, contingent upon the variability of notes within the same country.

Keywords: Convolutional Neural Network Algorithm, Python.

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PAPER ID: ICIRTCS-24-112

A SECURE APPROACH FOR MUTUAL AUTHENTICATION OF MEDICAL DATA IN DIGITAL STORAGE

[1]Suresh V J

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : vjsureshcse@smec.ac.in

ABSTRACT

Security and privacy are primary concerns in cloud computing, as users possess restricted access to data stored at remote locations managed by various service providers. These challenges intensify, particularly concerning data produced by organizations, which is inherently sensitive and heterogeneous. Therefore, in this project, we propose a novel cloud-based user authentication scheme for the secure verification of medical data. Upon successful mutual authentication between a user and a healthcare maintenance system, both parties generate a confidential session key for subsequent secure communications. The storage of medical data in the cloud facilitates convenient access, including retrieval, updating, deletion, and mobility. The widely utilized Real-Or-Random (ROR) model for formal security analysis and the well-regarded Automated Validation of Internet Security Protocols and Applications (AVISPA) tool for formal security verification demonstrate that the proposed scheme ensures session-key security and safeguards against active attacks. The proposed scheme is informally evaluated to demonstrate its robustness against other recognized attacks.

Keywords: Authentication, key generation, medical data, security, cloud computing.

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PAPER ID: ICIRTCS-24-113

WEATHER FORECASTING: RAINFALL PREDICTION USING MULTIPLE LINEAR REGRESSION

[1]Bellamkonda vanaja

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : bvanajacse@smec.ac.in

ABSTRACT

Meteorological scientists consistently seek methods to comprehend Earth's atmosphere and to create precise weather prediction models. A variety of techniques have been employed in meteorological forecasting. Recently, machine learning techniques are regarded as precise methods and have been extensively employed as alternatives to traditional approaches for weather forecasting. The precipitation rate is a critical phenomenon in the meteorological system, directly impacting the agricultural and biological sectors. This paper seeks to construct a multiple linear regression model to forecast the precipitation rate (PRCP) for Khartoum state. It is predicated on various meteorological parameters, including temperature, wind velocity, and dew point. The data utilized in this research was sourced from the National Climatic Data Center's website. A Python script utilizing the PyTorch library has been created to construct a model that employs Artificial Neural Networks. The model's efficiency has been assessed by comparing the average mean square error of the training data with that of the test data. The results indicate an 85% enhancement in the average mean square error during testing, when identical data is utilized in both the training and testing phases. However, it declines to 59% when the volume of data during the testing phase surpasses that of the training phase.

Keywords: Meteorological Forecasting, Artificial Neural Networks, Precipitation, Computational Intelligence, Linear Regression, National Climatic Data Center.

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HARNESSING TECHNOLOGY FOR ANTI-CORRUPTION MANAGEMENT AND TRANSPARENCY

[1]Aarini. Rajeshwari

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : arajeshwaricse@smec.ac.in

ABSTRACT

With the swift advancement of cloud services, a substantial volume of data is exchanged through cloud computing. Existing mechanisms fail to address privacy concerns regarding ciphertext linked to multiple owners, rendering co-owners incapable of effectively regulating whether data disseminators are permitted to distribute their data. The rapid advancement of cloud infrastructure facilitates the exchange of substantial data through cloud computing platforms. Cryptographic techniques safeguard data privacy in cloud computing; however, they are inadequate for addressing privacy concerns associated with multi-owner ciphertext, thereby hindering co-owners from regulating the extent to which data disseminators can share their information. Additionally, three policy aggregation strategies—full permit, owner priority, and majority permit—are proposed to address the privacy conflicts arising from disparate access policies. The security analysis and experimental findings demonstrate that our scheme is both practical and efficient for secure data sharing among multiple owners in cloud computing.

Keywords: digitalization, cloud computing, policy aggregation.

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A CUTTING-EDGE APPROACH TO BIRD SPECIES IDENTIFICATION USING DEEP LEARNING

[1]Praneel Deva

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : praneeldevacse@smec.ac.in

ABSTRACT

Birdwatching is a prevalent pastime; however, identifying species necessitates the use of ornithological guides. A convolutional neural network (CNN) was employed to identify prominent features in bird images, offering birdwatchers a practical tool to appreciate avian beauty. Initially, we delineated a confined area of interest to enhance the shapes and hues of the object's granularities, and subsequently equilibrated the distribution of avian species. A skip connection method was employed to linearly amalgamate the outputs of the preceding and current layers to enhance feature extraction. Ultimately, we utilized the softmax function to derive a probability distribution of avian characteristics. The acquired parameters of avian characteristics were utilized to recognize images uploaded by mobile users. The proposed CNN model with skip connections attained an accuracy of 99.00%, surpassing the 93.98% achieved by a standard CNN and the 89.00% from the SVM for the training images. The test dataset exhibited average sensitivity, specificity, and accuracy of 93.79%, 96.11%, and 95.37%, respectively. Keywords: Avian image recognition, convolutional neural network, deep learning, mobile application.

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PAPER ID: ICIRTCS-24-116

A NOVEL APPROACH FOR STRESS DETECTION IN IT WORKERS USING IMAGE PROCESSING AND KNN

[1]Sashmita Mallick

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : sashmitamallickcse@smec.ac.in

ABSTRACT

This paper's primary objective is to identify stress in IT professionals utilizing machine learning and image processing techniques. This paper presents an enhanced iteration of previous stress detection systems, which lacked live detection and personal counselling. It incorporates real-time detection and regular assessments of employees, identifying both physical and mental stress levels, and offers appropriate remedies for stress management through periodic survey forms. This paper primarily addresses stress management and the creation of a healthy, dynamic work environment to optimize employee performance during working hours.

Keywords: Stress, Image Processing, KNN Classifier, Training Datasets.

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PAPER ID: ICIRTCS-24-117

MACHINE LEARNING FOR FINE-GRAINED ASPECT-BASED SENTIMENT ANALYSIS

[1]B. Amrutha Raju

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : amrutharajucse@smec.ac.in

ABSTRACT

Aspect-based sentiment analysis is a prominent concept in the machine learning field that remains an active area of research. This research primarily involves exploring sentiment analysis using a trained dataset to deliver positive, negative, and neutral reviews for various products in the marketing sector. The majority of current methodologies for opinion mining rely on word-level analysis of texts and can solely identify explicitly articulated opinions. Aspect-based sentiment analysis (ABSA) seeks to identify the aspects of entities and the sentiments expressed regarding each aspect. The primary objective is to produce summaries that enumerate all aspects along with their overall polarity. This research primarily employs natural language processing and machine learning techniques. In this instance, we employed POS tagging, a supervised learning method that involves categorizing words into their respective parts of speech, referred to as word classes or lexical categories.

Keywords: Part-of-Speech tagging, Aspect-Based Sentiment Analysis (ABSA), Sentiment Analysis, Lexical Categories, Data Preprocessing, Support Vector Machine (SVM).

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PAPER ID: ICIRTCS-24-118

CONTINUOUS AUDITING AND FRAUD DETECTION: A MODERN APPROACH FOR FINANCIAL SECURITY

[1]Shaik Hanishma

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : shaikhanishmacse@smec.ac.in

ABSTRACT

This project concentrates on identifying potential internal fraud within an organization. Financial fraud is typically characterized by the employment of illicit practices, involving individuals from senior management to payroll staff within an organization, constituting a criminal offense subject to legal penalties. Fraud is a global phenomenon impacting both public and private entities, encompassing a diverse range of illicit practices characterized by deliberate deception or misrepresentation. Donald R. Cressey's fraud triangle theory is linked to this traditional financial audit model. A survey of related works was conducted to establish our own framework for this task. In this context, Fraud-Find, a conceptual framework designed to identify and delineate a cohort within a banking organization attempting to perpetrate fraud, is established, underpinned by the fraud triangle theory. Fraud-Find employs a continuous audit methodology responsible for gathering information on agents. The approach utilizes semantic techniques to gather user details for subsequent analysis, specifically to detect any fraudulent activity in the user's transaction history. This proposal advocates for contributions to the field of Cybersecurity, which aids in the mitigation of financial fraud cases.

Keywords: Financial fraud, Cybersecurity, Semantic techniques

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INNOVATIVE METHODS FOR PREDICTING RECOMMENDATIONS USING COLLABORATION RATING ANALYSIS

[1]Dodle Manasa

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : dmanasacse@smec.ac.in

ABSTRACT

This project concentrates on identifying potential internal fraud within an organization. Financial fraud is typically characterized by the employment of illicit practices, involving individuals from senior management to payroll staff within an organization, constituting a criminal offense subject to legal penalties. Fraud is a global phenomenon impacting both public and private entities, encompassing a diverse range of illicit practices characterized by deliberate deception or misrepresentation. Donald R. Cressey's fraud triangle theory is linked to this traditional financial audit model. A survey of related works was conducted to establish our own framework for this task. In this context, Fraud-Find, a conceptual framework designed to identify and delineate a cohort within a banking organization attempting to perpetrate fraud, is established, underpinned by the fraud triangle theory. Fraud-Find employs a continuous audit methodology responsible for gathering information on agents. The approach utilizes semantic techniques to gather user details for subsequent analysis, specifically to detect any fraudulent activity in the user's transaction history. This proposal advocates for contributions to the field of Cybersecurity, which aids in the mitigation of financial fraud cases.

Keywords: Financial fraud, Cybersecurity, Semantic techniques

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DEEP LEARNING-BASED PERSONALIZED HUMAN ACTIVITY RECOGNITION USING WEARABLE DEVICES

[1]R. Srinivasan

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : rsrinivasancse@smec.ac.in

ABSTRACT

Human action recognition is a significant emerging technological trend. It has extensive applications including surveillance (behaviour analysis), security (pedestrian detection), control (human-computer interfaces), and content-based video retrieval, among others. Numerous researchers have proposed vision-based methodologies for human action recognition. The advancement of vision-based human activity recognition systems encounters challenges including variations in illumination, inter-class similarity among scenes, environmental conditions, recording settings, and temporal fluctuations. To address this issue, we must detect human activity using a wearable sensor, wearable device, or IoT device. Human Activity Recognition involves the identification of physical human activities through sensor data, particularly one-dimensional time series data. This research aims to introduce an innovative approach for human activity recognition utilizing 1D-Convolutional Neural Network (CNN) models. This dissertation utilizes the publicly available Wireless Sensor Data Mining (WISDM) dataset to train and evaluate a 1D-CNN model. The CNN model achieves an accuracy of 95.2%, surpassing conventional and existing methods.

Keywords: Human Activity, Convolutional Neural Networks, Data Mining

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GEO-LOCATION PREDICTION OF TWEETS USING DECISION TREE CLASSIFICATION

[1]K. Bhargavi

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : kbhargavicse@smec.ac.in

ABSTRACT

The prediction of user locations from online social media is currently a significant area of research. The automatic identification of locations associated with or mentioned in records has been studied for decades. As a prominent online social networking platform, Twitter has attracted a substantial number of users who post millions of tweets daily. The global participation of its users and the incessant tweeting have significantly heightened interest in location prediction on Twitter recently. Tweets, characterized by their brevity and complexity, present numerous challenges for researchers in the field. The proposed framework examines the overall concept of location prediction through the analysis of tweets. Keywords: CSV file, Term Frequency, Data Pre-processing, Machine Learning, Support Vector Machine, Decision Tree, Naïve Bayes, Application Programming Interface.

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PAPER ID: ICIRTCS-24-122

REAL-TIME HELMET DETECTION AND LICENSE PLATE RECOGNITION VIA CONVOLUTIONAL NEURAL NETWORKS

[1]MALAPATI SWETHA

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : mswethacse@smec.ac.in

ABSTRACT

Motorcycle accidents have been increasing significantly over the years in numerous countries. In India, over 37 million individuals utilize two-wheelers. Consequently, it is essential to establish a system for the automatic detection of helmet usage to enhance road safety. A custom object detection model is developed utilizing a machine learning algorithm capable of identifying motorcycle riders. Upon identifying a helmetless rider, the license plate is extracted and the license plate number is recognized utilizing an optical character recognition system. This application can be executed in real-time utilizing a webcam or CCTV as input.

Keywords: Automatic License Plate Recognition (ALPR), Deep Neural Network (DNN), Helmet Detection, Machine Learning, Mean Average Precision (mAP), Optical Character Recognition (OCR). You Only Look Once (YOLO).

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ARTIFICIAL NEURAL NETWORK-BASED APPROACH FOR FAKE PROFILE IDENTIFICATION ON SOCIAL MEDIA

[1]Kandhibanda Kalpana

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : rsrinivasancse@smec.ac.in

ABSTRACT

For the purpose of determining whether or not a friend request on Facebook is genuine, we make use of machine learning, specifically an artificial neural network, in this particular piece of research. The classes and libraries that are involved are also described in detail. In addition to this, we talk about the ReLu function and the process by which the weights are determined and utilized. Last but not least, we take into account the parameters (technically, features or attributes) of the social network page, which are of the utmost significance in the solution that has been recommended.

Keywords: Artificial Neural Networks, ReLu, Identify Fake Profiles, social media, malicious users, and Bots.

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PREDICTIVE MODELING OF STOCK MARKET TRENDS USING K-NEAREST NEIGHBOR

[1]Avinash Seekoli

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : savinashcse@smec.ac.in

ABSTRACT

This project analyzes a hybrid model that integrates a K-Nearest Neighbor (KNN) methodology with a probabilistic approach for forecasting stock price trends. The KNN algorithm is a straightforward, easily implementable supervised machine learning algorithm characterized by low computational expense. It is unnecessary to construct a model, adjust multiple parameters, or formulate further assumptions. The KNN algorithm posits that similar entities are in proximity to one another. It is essential to develop an improved model that combines KNN with a probabilistic approach, incorporating both centric and non-centric data points. The embedded probabilistic method is based on Bayes' theorem. Bayes' theorem enables the revision of predicted probabilities for an event through the integration of new information. It is frequently utilized in finance for the enhancement of risk assessment.

Keywords: K-Nearest Neighbor (KNN), Machine Learning, Bayes' Theorem, Stock Market Prediction

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PAPER ID: ICIRTCS-24-125

A ROBUST HYBRID MACHINE LEARNING FRAMEWORK FOR EMAIL SPAM DETECTION

[1]K. Priti

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : kpriticse@smec.ac.in

ABSTRACT

Recently, unsolicited commercial bulk emails, known as spam, have emerged as a significant issue on the internet. Recent machine learning techniques are effectively employed to identify and filter spam emails. This document provides a systematic review of several prominent machine learning-based email spam filtering methodologies. It encompasses an examination of significant concepts, methodologies, efficacy, and research trends in spam filtering. The initial discourse in the study background explores the utilization of machine learning methodologies in the email spam filtering processes employed by prominent internet service providers such as Gmail, Outlook, and Yahoo. The project evaluates the accuracy, precision, and recall of machine learning methods in spam filtering.

Keywords: Artificial Neural Network (ANN), Convolutional Neural Network (CNN), K-Nearest Neighbors (KNN), Naïve Bayes, Multilayer Perceptron.

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DEVELOPING AN LSTM-BASED MACHINE LEARNING FRAMEWORK FOR CRIME PREDICTION

[1]Vishnuvardhan Reddy

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : vishnuvardhancse@smec.ac.in

ABSTRACT

Crime constitutes a significant and pervasive issue in our society, making its prevention imperative. assignment. Numerous crimes are perpetrated daily. This necessitates monitoring all criminal activities and sustaining a database for future reference. The current issue is the maintenance of an accurate crime dataset and the analysis of this data to aid in predicting and resolving future crimes. The aim of this project is to analyze a dataset comprising numerous crimes and to predict the types of crimes that may occur in the future based on various conditions.

Keywords: Energy, Enhancer, Vitamin, Fiber, Varieties, Quality, Ripening, Dataset.

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EFFICIENT BOOK RECOMMENDATION FRAMEWORK FOR PERSONALIZED READING EXPERIENCES

[1]Nagaraj Rathod

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : nagarajcse@smec.ac.in

ABSTRACT

Recommendation systems are employed to propose items for purchase or viewing. They guide users to items that fulfill their needs by streamlining a vast database of information. Various techniques have been introduced for item recommendation, including content-based, collaborative, and association mining methods. This paper addresses the issue of data sparsity by integrating collaborative filtering with association rule mining to enhance performance. The results obtained demonstrate that the proposed recommendation algorithms outperform existing methods and effectively address challenges such as data sparsity and scalability.

Keywords: Collaborative filtering, Association rule mining.

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MITIGATING DISTRIBUTED DENIAL OF SERVICE ATTACKS USING GREEDY ALGORITHMS

[1]Nagateja

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : nagatejacse@smec.ac.in

ABSTRACT

Distributed Denial of Service (DDoS) attacks continue to represent a substantial risk to essential infrastructure and Internet services. This paper presents MOTAG, a moving target defense mechanism that protects service access for authenticated clients from flooding DDoS attacks. MOTAG utilizes a network of dynamic packet indirection proxies to transmit data traffic between authorized clients and secured servers. Our design can efficiently thwart external attackers' efforts to directly assault the network infrastructure. Consequently, assailants must conspire with malevolent insiders to identify covert proxies and subsequently launch attacks. MOTAG can differentiate insider attacks from legitimate clients by perpetually relocating secret proxies to new network positions while reassigning client-to-proxy connections. We devise a greedy shuffling algorithm to reduce the frequency of proxy reallocations (shuffles) while enhancing attack isolation. Simulations are employed to assess MOTAG's efficacy in safeguarding services of varying scales against escalated DDoS attacks.

Keywords: —DDoS; Moving Target Defence; Secret Proxy; Insider; Shuffling

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A PRIVACY-PRESERVING FRAMEWORK FOR ACCESS CONTROL IN LOCATION-BASED RELATIONAL DATA

[1] Mandava Seshma Chowdary

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : seshmacse@smec.ac.in

ABSTRACT

The swift proliferation of network and internet services has facilitated users in utilizing and disseminating substantial quantities of data on a grand scale. Upon amalgamation, the information transforms into valuable data suitable for research purposes. The researcher directly employs data mining techniques and algorithms on the original dataset to extract information, potentially resulting in the compromise of privacy data. A substantial volume of data results in identity exposure. To address this privacy concern, unique identifiers are eliminated from the original data prior to the dissemination of data for research purposes. Individual identity is revealed through the linkage of disparate datasets. A privacy-preserving mechanism (PPM) is employed to safeguard privacy. This paper proposes a novel method to achieve the desired level of privacy in both local and distributed environments. Our privacy methodology employs an anonymization technique applied to aggregated data to enhance accuracy. This proposed method employs a generalization privacy technique on selected quasi-identifiers by establishing range values as minimum and maximum. Subsequent published data includes only two records per group with their corresponding counts, rather than disseminating redundant records, to enhance performance in the distributed environment. Furthermore, access control is enhanced by geographical location.

Keywords: anonymization; access control; privacy preservation; access control mechanism; generalization

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IMPERFECT INFORMATION ANALYSIS FOR BUSINESS OPPORTUNITY IDENTIFICATION BY ENTREPRENEURS

[1]S. Sravanthi

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : sravanticse@smec.ac.in

ABSTRACT

Evaluating business opportunities through an information-driven approach may not be a straightforward or uncomplicated process. The success of the business opportunity relies on external market factors, including the overall economic conditions for entrepreneurs and regulatory frameworks affecting access to consumer and labor markets and financing. The optimal speculative portfolio balances expected returns with market information and is additionally influenced by the investor's risk tolerance and operational limitations. The proposed partially observable Markov decision process (POMDP) model establishes a probabilistic relationship between the observable and the hidden market processes through the entrepreneur's investment portfolio. At that juncture, the model identifies a probabilistic data metric to assess the correlation between the observable and imperceptible processes to better comprehend the market conditions for the business opportunity. Utilizing the probabilistic data measure, the entrepreneur could subsequently formulate and evaluate new investment portfolios that align optimally with market conditions, taking into account risk tolerance and operational shortcomings.

Keywords: Commerce, Business Opportunity Evaluation, Entrepreneur

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SMART RELIEF DISTRIBUTION PLATFORM

[1]Athigiri Arulalan A S, [2]Vincelet Jobikha A, [3]John Clinton P, [4]Pandima Devi S, [5]Josphineleela R
[1,3,4,5]PG Scholar, , [1,3,4,5]Computer Science and Engineering,[1,3,4,5]Panimalar Engineering College , Chennai, TN
[2]Research Scholar , [2]Physics, [2]Saveetha Engineering College, Chennai, TN

*Corresponding Author
E-mail : athigiriarulalanas@gmial.com

ABSTRACT

In the aftermath of disasters, the timely distribution of relief kits to affected populations often faced significant challenges, including logistical inefficiencies, delays, and a lack of transparency. To address these issues, this study introduced a Smart Relief Distribution Platform designed to streamline the allocation, delivery, and tracking of emergency supplies. The proposed system ensured equitable and efficient distribution by integrating advanced user registration, real-time tracking, and delivery management mechanisms. The system began with user registration through government-issued IDs, which captured personal, family, and live location details to prioritize aid distribution. A unique token ID was generated for each user, enabling secure, transparent delivery while preventing misuse. The architecture empowered administrators to oversee critical processes, such as allocating delivery personnel and managing relief kit inventory. Delivery personnel were verified using their government IDs and assigned unique delivery IDs, enhancing accountability during distribution. A key component of the architecture was live delivery tracking, which leveraged geolocation to monitor delivery progress in real time. This ensured that kits were delivered directly to recipients' locations, minimizing delays and reducing operational inefficiencies. Additionally, the system provided a feedback loop for delivery personnel and administrators to further optimize logistics. By addressing challenges in traditional disaster relief operations, such as mismanagement and delays, this system offered a robust framework that enhanced reliability and fostered trust among affected communities. The integration of real-time tracking, tokenization, and user-friendly interfaces made it a scalable and efficient solution for disaster management worldwide.

Keywords: Tokenization, Relief Kit, Delivery Tracking.

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FORTIFYING CYBER DEFENSES: EMPOWERING WEB APPLICATION FIREWALLS THROUGH THREAT INTELLIGENCE INTEGRATION

[1]Dr. A. Krishna Chaitanya, [2]Gopalam Jignyasa, [3]Sundarapalli Keerthi, [4]Gurram Himesh Reddy
[1]Assistant Professor, [2,3,4]UG Scholars
[1]Computer Science and Engineering, [2,3,4]Computer Science and Engineering (Cyber Security)
[1,2,3,4]Institute of Aeronautical Engineering Dundigal, Hyderabad

*Corresponding Author

E-mail : a.krishnachaitanya@iare.ac.in

ABSTRACT

In todays cyber landscape, the proliferation of sophisticated threats necessitates a proactive approach to safeguarding web applications. The proposed method aims to integrate threat intelligence feeds, specifically focusing on AlienVault OTX, with the robust capabilities of ModSecurity firewall software. By leveraging real-time threat data and implementing it within the firewall infrastructure, organizations can significantly enhance their defense mechanisms against evolving cyber threats. This integration will enable the firewall to dynamically analyze incoming traffic patterns, detect possible threats, and implement preventive actions to reduce risks in real- time. Techniques for efficiently processing and prioritizing threat intelligence data will be explored, ensuring optimal performance and minimal latency in threat detection and response. The ultimate goal is to fortify cyber defenses by empowering web application firewalls through enhanced threat intelligence integration.

Keywprds: Web Application Security, Web Application Firewall, Threat Intelligence Feeds, Cyber threats, Threat Intelligence Integration.

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ASYMMETRIC ENCRYPTION BASED SECURE DATA SHARING IN CLOUD ENVIRONMENTS

[1] Rajkumar V, [2] Sivaranjini R
[1,2]Assistant Professor, [1,2]Computer Science and Engineering
[1,2]Krishnasamy College of Engineering and Technology, Cuddalore, Tamilnadu, India

*Corresponding Author

E-mail : raj.win7@yahoo.com

ABSTRACT

The main advantage of cloud computing is the cloud storage which is helpful in storing data. But it deals with a major concern of security issues. It mainly occurs highly in group sharing of data which faces a two - side problem both cloud specific and conventional insider threats. To overcome this issue a secure data sharing in cloud methodology has been proposed which provides data confidentiality and integrity, access control, data forwarding, insider threat security and also it provides forward and backward access control. This method encrypts a file with a single key. Two different keys are generated one is sent to the user which encounters in finding and other is maintained by the trusted third party which is a Storage Server (SS). A working prototype has been implemented with this methodology and its performance is evaluated based on the time consuming of various operations. We also verify this secure data sharing cloud by using Asymmetric key generation. This method is potentially effective to provide security in group sharing data in cloud.

Keywords – Asymmetric Key Generation, Cloud Security, Secure Data Sharing, Security, Storage Server.

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IMMUTABILITY OF BLOCK CHAIN FOR THE DEVELOPMENT OF SECURE ROBUST DIGITAL COMMUNICATION NETWORK

Dr. Puspita Dash[1], Brindha Selvam[2], Hari Sowmiyaa Arulmozhi Thamilarasan[3], Ranetha Velavan[4]
[1,2,3,4] Information Technology, Sri Manakula Vinayagar Engineering College, Madagadipet, Puducherry, India

*Corresponding Author

E-mail : raj.win7@yahoo.com

ABSTRACT

The proposed work seeks to revolutionize secure and reliable communication protocols. At its essence, the system leverages blockchain to establish unparalleled levels of immutability and transparency in digital interactions. Operating within a decentralized architecture, communication events are encapsulated into blocks, each one is cryptographically linked to its predecessor. The distributed nature of the network helps to make sure there is no single point of failure or vulnerability, markedly enhancing security. Employing advanced cryptographic techniques and consensus algorithms, the proposed system not only safeguards the integrity of messages, files, and multimedia but also creates an auditable trail of communication events. This innovative approach proves particularly advantageous in sectors where the accuracy of communication records is critical, such as legal proceedings, financial transactions, or healthcare documentation. By introducing a novel paradigm for communication integrity, the project envisions a future where the immutable nature of blockchain becomes foundational for constructing resilient, secure, and trustworthy digital communication ecosystems. The paper mentions the use of merkle tree for ensuring integrity of the data and how it helps to deflect attacks made towards it. In essence, this endeavor represents a pioneering stride towards a future where the immutability of blockchain is central to the development of robust and secure digital communication frameworks.

Keywords:-Immutability, data integrity, cryptographic hashes, Patricia Merkle tree, web 3.0, decentralization.

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HYPERSPECTRAL IMAGE CLASSIFICATION USING DIFFUSION MODEL

[1]Habiba Banu S, [2]Ruba Soundar K
[1]PG Scholar ,[2]Associate Professor (Sr. Grade)
Department of Computer Science and Engineering ,Mepco Schlenk Engineering College (Autonomous), Sivakasi, India

*Corresponding Author

E-mail : habibabanu281101mcs25@mepcoeng.ac.in

ABSTRACT

Hyperspectral image (HSI) classification is extensively used in Earth science and is important for remote sensing.Many deep learning techniques have been developed recently for HSI classification; nevertheless, difficulties are frequently encountered with high-dimensional and complex data, making it challenging for relationships between various data elements to be captured. To address this, a novel method, dubbed "SpectralDiff," is proposed, which employs diffusion models for HSI classification. In this approach, noise in the data is repeatedly reduced, creating a clearer representation of the data's structure, thereby facilitating the handling of redundant and high-dimensional data. The framework consists of two major components: Spectral-Spatial Diffusion Module: The establishment of connections between data samples is facilitated by the spectral-spatial diffusion module, without requiring prior knowledge of the structure. Spatial (position-related) and spectral (color-related) information from the HSI data is extracted. Attention-Based Classification Module: The features gleaned from the diffusion module are then used to classify each pixel in the image. This approach, which emphasizes the connections between multiple samples, enables better classification. Tests conducted on three publicly available datasets demonstrate that SpectralDiff achieves superior performance compared to other state-of-the-art techniques.

Key Words— Diffusion Models, Feature Extraction, Deep generative model, Deep Neural Network (DNN), spectral-spatial diffusion, Hyperspectral Image (HSI) Classification.

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BLENDED MULTI-LINGUISTIC SYSTEM USING TRANSFORMER NEURAL NETWORK FOR WORD SENSE DISAMBIGUATION

Lefty Joyson J[1], K Ruba Soundar[2], Nancy P[3], Rajkumar Ramanthan[4]
[1] **Assistant Professor,[2]Associate Professor (Sr. Grade),** [3] **Assistant Professor,** [4] **Junior Software Engineer**
CSE, [1,3]J.P. college of Engineering, Tenkasi, [2]Mepco Schlenk Engineering College (Autonomous), Sivakasi,
[4]Relevantz Technology India Pvt LTD

*Corresponding Author

E-mail : leftyjoy@gmail.com

ABSTRACT

Word sense disambiguation (WSD) in multilingual contexts remains a significant challenge in natural language processing (NLP), primarily due to the inherent ambiguity of natural language. Words often have multiple meanings, and the task of WSD is to identify the correct sense of a word in a given context. Despite extensive research in this area, WSD continues to pose significant challenges, especially in multilingual contexts where linguistic diversity adds further complexity. This paper introduces a novel multi-linguistic system using Transformer Neural Networks to improve WSD across multiple languages. By combining contextualized word embedding's from pre-trained multilingual models with a fine-tuned Transformer architecture, the system captures semantic nuances effectively. Evaluation on standard WSD benchmarks shows significant accuracy improvements over traditional and state-of-the-art methods, with robust performance across languages, including zero-shot scenarios. This paper highlights the benefits of a multi-linguistic approach in enhancing model interpretability, generalization, and inclusivity for more versatile NLP applications. Here we proposed an integrated multilingual transformer neural network (IMTNN) which blends two neural networks based on transformer model for translation and word sensing process. This network has different layers with nodes and each nodes can perform transformer-based process which helps in reducing complexity independently. For these we used different corpus from SemCor, IMS and WordNet to calculate the Collocation score for different words and their relations. This provides more accuracy and increases the speed in retrieving related results.

Keywords**:** Word sense disambiguation (WSD), Natural language processing (NLP)

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PAPER ID: ICIRTCS-24-137

INNOVATIVE APPROACHES TO MALICIOUS URL DETECTION: USING MACHINE LEARNING UNLEASHED

[1]Patlolla Varshini Reddy, [2] Mr.Y.Manohar Reddy, [3]Rathod Praveen, [4]Mohammad Asif

[1,2,3,4]UG Scholar, [1,2,3,4] Computer Science and Engineering (Cyber Security)

[1,2,3,4]Institute of Aeronautical Engineering Dundigal, Hyderabad

*Corresponding Author

E-mail : y.manohareddy@iare.ac.in

ABSTRACT

The proliferation of malicious URLs presents significant challenges to cyber security, necessitating the development of advanced detection techniques. Using the capabilities of Random Forest (RF), Decision Tree (DT), and Support Vector Machine (SVM) models, this study investigates novel machine learning techniques for identifying dangerous URLs. The effectiveness of each model in differentiating between benign and malicious URLs is assessed, taking into account a range of performance indicators including accuracy, precision, recall, and F1-score. The integration of feature extraction techniques and robust data preprocessing enhances the models' ability to generalize across diverse URL data sets. This study demonstrates how machine learning may be used to strengthen defenses against cyber-attacks and lays the groundwork for future developments in the detection of dangerous URLs.

Keywords: Support Vector Machine (SVM), Decision Tree (DT)

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PAPER ID: ICIRTCS-24-138

VISION TRANSFORMER FOR IMAGE CLASSIFICATION USING KB DATASET

[1]Dr.B.Gnana Priya
[1]Assistant Professor
[1]Department of Computer Science and Engineering, FEAT
Annamalai University, Chidambaram , TN

*Corresponding Author
E-mail : priyamvatha.joey@gmail.com

ABSTRACT

Image classification has witnessed remarkable advancements with the emergence of Vision Transformers (ViTs), which leverage self-attention mechanisms to capture global dependencies in image data. This study explores the application of a Vision Transformer for classifying the KB dataset, which comprises 20 diverse image classes. The KB dataset presents unique challenges due to its class diversity and inter-class similarities, making it an ideal benchmark for evaluating the performance of transformer-based architectures. We outline a comprehensive workflow, including data preprocessing, model architecture design, and fine-tuning of pretrained ViT models. Our results demonstrate the effectiveness of Vision Transformers in achieving high classification accuracy while maintaining robustness to noisy and complex patterns in the dataset. Comparative analyses with convolutional neural networks (CNNs) reveal the superior generalization capabilities of ViTs for this multi-class classification task. This work underscores the potential of ViTs in advancing image classification for challenging datasets and highlights avenues for further research in their optimization and scalability.

Keywords: Vision Transformer, KB dataset, Image Classification

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FRAUD DETECTION FRAMEWORK USING ENSEMBLE LEARNING

Dr.M.Vadivukarassi[1], Dr. G. JawaherlalNehru[2], P.Devasudha[3]
[1,2,3]Associate Professor
[1,2,3]Department of Computer Science and Engineering
St.Martin's Engineering College, Secunderabad

*Corresponding Author

E-mail : drmvadivukarassicse@smec.ac.in

ABSTRACT

The increasing prevalence of fraudulent activities in healthcare insurance claims has led to the implementation of stringent and complex claiming procedures. The detection of fraudulent activities carried out by healthcare claim providers is paramount. This paper proposes a novel solution: an ensemble learning-based approach fortified by blockchain security for healthcare insurance claim fraud detection. Leveraging decentralized blockchain technology ensures robust data security, safeguarding confidential healthcare and patient information. The efficacy of our methodology is assessed through a comparative analysis, pitting ensemble learning techniques specifically bagging classification and stacking against conventional individual Machine Learning Algorithms (MLAs). Moreover, our innovative approach goes beyond traditional methods by integrating various forms of patient data, including in-patient data, out-patient data, and beneficiary data. This comprehensive integration enhances the real-world applicability of our solution, providing a more holistic perspective on healthcare insurance claim fraud detection. The evaluation encompasses diverse performance metrics, including accuracy, precision, recall, Receiver Operating Characteristic (ROC), 11-score, and the confusion matrix. Additionally, a comprehensive cost assessment is conducted on the integrated smart contract functionalities. This study introduces a resilient and efficient approach to combat fraudulent activities in healthcare insurance claims.

Keywords: Commerce, fraudulent activities, Machine Learning

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A MACHINE LEARNING APPROACH TO DETECT ASSOCIATIONS BETWEEN AIR QUALITY AND ASTHMA IN URBAN ENVIRONMENTS

[1]Vinitha [2]B, Navika B, [3]Thahzeeba [4]M, Kavisri K, [5]Ajuma B

[1,2,3,4,5]UG Student, Department of Computer Science
[1,2] KSR College of Arts and science for Women, KSR Kalvi Nagar, Thiruchengode -637215, Namakkal (Dt).

*Corresponding Author

E-mail : vinithapavi.17@gmail.com

ABSTRACT

Traffic and power generation constitute the primary sources of urban air pollution. The notion that outdoor air pollution can aggravate pre-existing asthma is substantiated by a substantial body of evidence accumulated over several decades, with numerous studies indicating a potential role in the onset of new asthma cases as well. This paper examines the impacts of particulate matter (PM), gaseous pollutants (ozone, nitrogen dioxide, and sulfur dioxide), and air pollution from mixed traffic sources. We concentrate on clinical studies, encompassing both epidemiological and experimental research, published within the last five years. From a mechanistic standpoint, air pollutants likely induce oxidative damage to the airways, resulting in inflammation, remodeling, and an elevated risk of sensitization. While numerous pollutants have been associated with the onset of asthma, the robustness of the evidence varies. We also examine clinical implications, policy concerns, and research deficiencies pertinent to air pollution and asthma.

Keywords: Air pollution, Asthma prediction, Supervised learning, Light Gradient Boosting Model.

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ELECTROENCEPHALOGRAM SIGNALS FOR DETECTING CONFUSED STUDENTS

[1]Dr.K.Nithya, [2]A.P.Babu, [3]Dr.M.Kiruthiga Devi

[1]Assistant professor(Sr.Gr), [2]Assistant Professor, [3]Professor
[1]Department of Computer Science and Engineering, [2,3]Department of Information Technology
[1]School of computing, Vel Tech Rangarajan Dr.Sagunthala R&D Institute of Science and Technology,
[2,3]Dr.M.G.R Educational and Research Institute

*Corresponding Author

E-mail : nithyak@veltech.edu.in, babu.it@drmgrdu.ac.in

ABSTRACT

Online education has become a vital learning medium, especially during the COVID-19 pandemic. However, its lack of face-to-face interaction poses challenges in assessing students' engagement and understanding. This study addresses this issue by utilizing electroencephalogram (EEG) data to detect student confusion on massive open online course (MOOC) platforms. A novel feature engineering technique, Probability-Based Features (PBF), is introduced to enhance machine learning model performance. We employ three machine learning models—Support Vector Classifier (SVC), K-Nearest Neighbors (KNN), and Recurrent Neural Network (RNN)—to classify EEG data into *confused* and *non-confused* categories. By leveraging probability-based feature engineering, the system enhances classification performance and enables a more accurate detection of student confusion. The models are trained and evaluated using EEG data collected from students interacting with online learning modules.

Keywords: confused student detection; MOOC platform; electroencephalogram; feature engineering

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USING LLM DOCUMENT CLASSIFICATION AT LOCAL DISK

[1]Dr. M. Kiruthiga Devi, [2]Mr. Praveen Kumar Sah, [3]Mr. Rakesh Ranjan Kumar

[1]Professor, [2,3]UG Student
[1,2,3]Department of Information Technology, Dr. M.G.R Educational And Research Institute, Chennai, India

*Corresponding Author

E-mail : Kiruthiga.it@drmgrdu.ac.in, rajakumar17122004@gmail.com, rakeshranjan804432@gmail.com

ABSTRACT

Using LLM Document classification at Local disk, Automated document classification is the machine learning fundamental that refers to assigning automatic categories among scanned images and files of the documents. It reached the state-of-art stage but it needs to verify the performance and efficiency of the algorithm by comparing. The objective was to get the most efficient classification algorithms according to the usage of the fundamentals of LLM. This project focuses on the development of an automated document categorization system for a local disk, leveraging a Large Language Model (LLM) and zero-shot classification techniques. The primary goal is to classify and organize documents based on both their content and file extension, automatically moving them to their corresponding folders. Users can either download the documents or pass them to the application through a command line or API, after which the system identifies the document's extension, analyses its content using a pre-trained LLM, renames the file based on its contents, and then moves it to the appropriate folder.

Keywords: Document classification; machine learning algorithms; LLM; Zero Short Technique; analysis

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IOT-BASED SMART MONITORING SYSTEM FOR HOME AND SHOP SECURITY

[1]M. Kalpana, M.Tech,(Ph.D), [2]CH. Rajeswari

[1,2]Assistant Professor,
[1]Sri Venkateswara College of Engineering, Tirupati, [2]Vemu Institute of Technology, P Kothakota

*Corresponding Author

E-mail : kbhargavicse@smec.ac.in

ABSTRACT

The Internet of Things (IoT) has emerged as a predominant technology in the 21st century, with extensive real-world applications across industries, private sectors, restricted environments, and residential settings. The demand for such devices and systems will increase daily if their prices are affordable for all households. This system functions as an intrusion detection mechanism aimed at providing optimal security to prevent criminal activity and home invasion. The intruder detection system will utilize a PIR sensor to detect motion in the surrounding environment. Due to their passive nature, PIR sensors can operate effectively in low-light conditions. Subsequently, an ultrasonic sensor will measure the distance between the door and its frame, after which a signal will be sent to the GSM module. Upon fulfillment of both conditions, an alert notification will be dispatched to the owner via SMS and a phone call through the GSM module. The materials utilized are GSM 900, which can perform all mobile phone functions, including making and receiving calls, sending and receiving messages, and connecting to the internet via GPRS. The buzzer, linked to the Arduino board, will activate upon receiving signals from the PIR sensor and the GSM module.

Keywords: PIR Sensor, Ultrasonic Sensor, Arduino Uno, GSM Module, Intrusion Detection System

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AI-DRIVEN AGENTIC FRAMEWORK FOR ENTERPRISE SYSTEM TROUBLESHOOTING WITH ENHANCED RAG MODELS

[1]P. Chandrasekhara Reddy, [2]K. Bhargavi, [3]P. Swetha

[1,2,3]Assistant Professor, Department of Computer Science and Engineering,
[1]Vemu Institute of Technology, P Kothakota, [2,3]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : kbhargavicse@smec.ac.in

ABSTRACT

Technical troubleshooting in enterprise settings frequently requires navigating various, heterogeneous data sources to effectively resolve intricate issues. This paper introduces an innovative agentic AI solution based on a Weighted Retrieval-Augmented Generation (RAG) Framework designed for enterprise technical troubleshooting. By dynamically weighting retrieval sources, including product manuals, internal knowledge bases, FAQs, and troubleshooting guides according to query context, the framework prioritizes the most pertinent information. It prioritizes product manuals for SKU-specific inquiries while integrating general FAQs for more extensive concerns. The system utilizes FAISS for efficient dense vector search, along with a dynamic aggregation mechanism to integrate results from various sources seamlessly. A LLaMA-based self-evaluator guarantees the contextual precision and assurance of the produced responses prior to their dissemination. This iterative process of retrieval and validation improves precision, diversity, and reliability in response generation.Initial assessments of extensive enterprise datasets indicate the framework's effectiveness in enhancing troubleshooting precision, decreasing resolution durations, and accommodating diverse technical challenges. Future research intends to improve the framework by incorporating sophisticated conversational AI functionalities, facilitating more interactive and intuitive troubleshooting experiences. Efforts will concentrate on enhancing the dynamic weighting mechanism via reinforcement learning to optimize the relevance and accuracy of retrieved information. By integrating these advancements, the proposed framework is set to transform into a holistic, autonomous AI solution, revolutionizing technical service workflows within enterprise environments.

Keywords: Artificial Intelligence, RAG

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CLOUD-BASED SOLUTION FOR REAL-TIME INVENTORY TRACKING AND MANAGEMENT

A Mallikarjuna Rao

[1]Assistant Professor, Research Scholar
[1]MRITS. Maisammaguda, Dhulapally, Medchal (M),. Secunderabad-500100

*Corresponding Author

E-mail : mritcse7@gmail.com

ABSTRACT

Numerous organizations struggle to sustain optimal stock levels for MRO inventory. The inflexible framework of conventional inventory management systems fails to furnish organizations with real-time data regarding their inventory levels, potentially detrimentally affecting their overall productivity. The escalating operational costs associated with personnel, rectification of errors, and maintenance of inventory control systems are persistent issues for businesses. Cloud computing can enhance inventory management and resolve numerous challenges encountered in the sector. In addition to seamless updates, cloud computing providers operate behind the scenes to ensure optimal performance and are generally available to address inquiries or provide assistance upon request. Furthermore, additional personnel or specialized hardware are unnecessary on cloud platforms. Most cloud enterprises do not require specialized training for staff to utilize the new product, thus the platform's learning curve has been streamlined, enabling immediate recognition and usage from the first day. The system was developed utilizing the Object-Oriented Design methodology, with the Unified Modeling Language (UML) employed for system modeling. The application was developed with Django and is hosted on Google App Engine, utilizing Google Cloud SQL for database management and Google Cloud Storage for file storage. This paper documents the research on the enhancement of Inventory Management Systems through Cloud Computing and the deployment of a cloud-based inventory management system for Maintenance, Repair, and Operating (MRO) inventory items.

Keywords: cloud computing, inventory management.

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UNRAVELING LEARNING CONFLICTS IN SUPERVISED LEARNING DATASETS: A METHODOLOGICAL APPROACH FOR IMPROVED MACHINE LEARNING PERFORMANCE

[1]Nadagundla Pavan

[1]Assistant Professor Department of Computer Science and Engineering,
[1]Malla Reddy Institute of Technology, Maisammaguda, Dhullapally, Post Via Kompally, Secunderabad - 500100

*Corresponding Author

E-mail : npavan26@gmail.com

ABSTRACT

The domain of image analysis utilizing artificial intelligence has expanded significantly due to advancements in neural networks. A particularly promising domain is medical diagnosis via lung X-rays, essential for identifying diseases such as pneumonia, which may be confused with other ailments. Notwithstanding medical expertise, accurate diagnosis remains difficult, and this is where proficient algorithms can provide assistance. Nonetheless, the analysis of medical images poses difficulties, particularly when datasets are constrained and imbalanced. While strategies to balance these classes have been investigated, there remains a deficiency in understanding their local impact and influence on model evaluation. This study seeks to examine the impact of class imbalance in a dataset on the efficacy of metrics employed to assess predictions. It illustrates that class separation within a dataset influences trained models and warrants greater consideration in future research. Classification models utilizing artificial and deep neural networks are developed in the R environment to attain these objectives. These models are trained utilizing a collection of publicly accessible images pertaining to lung pathologies. All outcomes are corroborated using metrics derived from the confusion matrix to assess the influence of data imbalance on the efficacy of medical diagnostic models. The findings prompt inquiries regarding the methodologies employed to categorize classes in numerous studies, with the objective of attaining class equilibrium in imbalanced datasets, and suggest new directions for future research to explore the effects of class delineation in datasets associated with clinical pathologies.
Keywords: image analysis; artificial intelligence algorithms; detection of clinical pathologies; pulmonary pathologies; R packages

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SCENE TEXT DETECTION AND RECOGNITION USING OCR AND DEEP LEARNING

M. Poorani, M. Kalaimakal, G. Gayathri

[1,2,3]Assistant Professor,
[1]Department of Information Technology, [2]Department of Computer Science and Engineering,
[3]Department of Artificial Intelligence and Data Science
[1,2,3]RRASE College of Engineering, Chennai

*Corresponding Author

E-mail : msindhuja38@gmail.com

ABSTRACT

Text serves as the most potent source for high-level semantic information extraction. Comprehending natural scene text is a prominent subject in the field of computer vision. Natural scenes contain diverse specific information presented as text, applicable in various real-world applications. This study will examine all aspects of scene text comprehension while incorporating novel machine learning algorithms in a semi-pipelined or fully pipelined approach. The principal objective of this study is to develop and implement integrated algorithms that autonomously execute image processing and computer vision techniques to comprehend, rectify, and address all text-related challenges within a unified framework, culminating in a comprehensive end product. In the initial phase of this research, the YOLOv5 object detection model is utilized on the ASAYAR dataset to localize road scene text images using bounding boxes. This model has demonstrated superior efficacy, achieving an accuracy level of up to 99% on textual images. During the second phase, preprocessing techniques are implemented to enhance the quality of the image dataset through K-Means color segmentation. The improved images are subsequently processed using Maximally Stable Extremal Region (MSER), a feature region detector for text-based images. Upon identifying text regions, Optical Character Recognition (OCR) is utilized for the ultimate text recognition.

Keywords: Scene Text, Detection, Recognition, Deep Learning, OCR.

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IMPROVING STYLE TRANSFER USING DEPTH EXTRACTION AND GENERATIVE ADVERSARIAL NETWORKS

[1]S. Ramya, [2]C. Radhika, [3]D. Aravind Gosh

[1,2,3]Assistant Professor,
[1,2]Department of Computer Science and Engineering, [3]Department of Information Technology
[1,2,3]RRASE College of Engineering, Chennai

*Corresponding Author

E-mail : msindhuja38@gmail.com

ABSTRACT

The Depth Extraction Generative Adversarial Network (DE-GAN) is intended for artistic style transfer. Conventional style transfer models emphasize the extraction of texture and color features from style images via an autoencoding network, combining these features through high-dimensional coding. The aesthetics of artworks encompass the color, texture, shape, and spatial characteristics of the artistic object, collectively defining the work's artistic style. This paper presents a multi-feature extractor designed to derive color features, texture features, depth features, and shape masks from style images utilizing U-net, a multi-factor extractor, fast Fourier transform, and the MiDas depth estimation network. A self-encoder architecture serves as the core of the content extraction network, facilitating the creation of a network that shares style parameters with the feature extraction network, ultimately achieving the generation of artwork images in three-dimensional artistic styles. The experimental analysis indicates that, relative to other advanced methods, images generated by DE-GAN exhibit superior subjective image quality, and the stylistic representations are more aligned with the aesthetic attributes of authentic artworks. The quantitative data analysis indicates that images produced by the DE-GAN method exhibit superior performance regarding structural features, image distortion, clarity, and texture details.

Keywords: generative adversarial network; style transfer; image processing; artistic design

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PAPER ID: ICIRTCS-23-149

MORPHOLOGICAL GRADIENT-BASED WATERSHED ALGORITHM FOR COLOR IMAGE SEGMENTATION

[1]S. Ramya, [2]C. Radhika, [3]D. Aravind Gosh

[1,2,3]Assistant Professor,
[1,2]Department of Computer Science and Engineering, [3]Department of Information Technology
[1,2,3]RRASE College of Engineering, Chennai

*Corresponding Author

E-mail : msindhuja38@gmail.com

ABSTRACT

The conventional watershed algorithm suffers from over-segmentation and is affected by light reflections in an image. We propose an enhanced watershed color image segmentation algorithm. It is founded on a morphological gradient. This method acquires the component gradient of a color image in a new color space that is unaffected by reflected light. The gradient image is reconstructed through the processes of opening and closing. Consequently, the ultimate gradient image is acquired. The maximum inter-class variance algorithm is employed to automatically determine the threshold for the final gradient image. The original gradient image is forcibly aligned with the acquired binary labeled image, and the adjusted gradient image is segmented using the watershed method. Experimental findings indicate that the proposed method can achieve an accurate and continuous target contour. It will attain the minimum requisite number of segmentation regions in accordance with human vision. In comparison to analogous algorithms, this method can mitigate the extraneous regions produced by reflected light. It will effectively preserve the object's edge information. It will enhance the robustness and applicability. The experimental results indicate that the proposed algorithm demonstrates a significant enhancement in operational efficiency, surpassing the region-growing method and the automatic threshold method by 10%. The proposed algorithm exhibits an accuracy and recall rate exceeding 0.98. The experimental comparison clearly demonstrates the advantages of the proposed algorithm in object segmentation.

Keywords: color image segmentation; multistage gradient; edge detection; watershed algorithm.

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PAPER ID: ICIRTCS-23-150

NEXT-GENERATION RANSOMWARE DEFENSE: HIGH-PERFORMANCE COMPUTING STRATEGIES FOR MONITORING DISK I/O AND CPU PERFORMANCE

[1]Khirsagar Rishitha, [2]Mr.Y.Manohar Reddy, [3]D.Kundhan Rao, [4]Manish Kumar

[1,2,3,4]Assistant Professor, Department of Computer Science and Engineering(Cyber Security)

[1,2,3,4]Institute of Aeronautical Engineering Hyderabad,India

*Corresponding Author

E-mail : [1]rishithakhirsagar07@gmail.com, [2]y.manoharreddy@iare.ac.in, [3]kundhanrao2003@gmail.com, [4]manishkumarbanda@gmail.com

ABSTRACT

Ransomware frequently bypasses antivirus tools, encrypting files and making data inaccessible. Traditional detection methods, which involve monitoring processes, system calls, and file activities, have high overhead and can be disrupted by sophisticated ransomware. This Researchintroduces a method for detecting ransomware on a virtual machine by collecting specific processor and disk I/O event data from the host machine and using a machine learning classifier. The random forest model excelled among seven classifiers, achieving 0.98 accuracy within 400 milliseconds across various user loads and 22 ransomware types.

Keywords: Deep learning, disk statistics, hardware performance counters, machine learning, ransomware, virtual machines.

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PAPER ID: ICIRTCS-23-151

ETHEREAL WATCH: DEEP GENERATIVE VIGILANCE FOR CLOUD NETWOTK SECURITY

[1]SaiPranaya Chepuri, [2]Y.Manohar Reddy, [3]Dhasari Anusha, [4]Rayavaram Saishatkari vija

[1,2,3,4]Assistant Professor, Department of Computer Science and Engineering(Cyber Security)
[1,2,3,4]Institute of Aeronautical Engineering Hyderabad,India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

The undertaking's primary objective is to tackle the trouble of precisely recognizing unidentified attacks in the cloud climate by making and applying deep generative learning models that are uniquely intended for Cloud Intrusion Detection Systems (IDS). The recommended approach utilizes two particular deep generative models, the hybrid model CDAAE-KNN and the conditional denoising adversarial autoencoder (CDAAE), every one of which has an unmistakable capability in creating unsafe examples. To help grow the dataset for training the cloud IDS, explicit kinds of malevolent examples are created through the CDAAE. Pernicious marginal examples are delivered by the hybrid model CDAAE-KNN, and they are fundamental for working on the accuracy of the IDS by focusing on examples that are near the choice limit. The first dataset is joined with the destructive examples delivered by CDAAE and CDAAE-KNN to make improved datasets that contain a more extensive assortment of tests covering both specific noxious sorts and marginal circumstances. The enhanced datasets are utilized to prepare three ML calculations, and their presentation and viability in recognizing interruptions inside the cloud climate is evaluated. The goal of this stage is to completely analyze what the delivered tests mean for the precision and strength of the IDS. To work on the exactness and versatility of intrusion detection, the venture extends its capacities by coordinating a Stacking Classifier, which joins the Linear SVC with Logistic Regression and Extra Tree Classifier. With regards to spotting conceivable security gambles in cloud frameworks, this gathering technique performs better.

Keywords: Cloud systems, conditional denoising adversarial auto encoder, Kth Nearest Neighbour, deep learning, generative models, intrusion detection System (IDS).

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CNN-BASED COVID-19 FACIAL MASK DETECTION

[1]G. Mamatha, [2]R. Naveen, [3]K. Ganapathi Babu

[1,2,3]Assistant Professor,
[1,3]Department of Computer Science and Engineering,[2] Computer Science and Engineering(AI&ML)
[1]Koneru Lakshmaiah Education Foundation, Bowrampet, Hyderabad-500043, Telangana, India,
[2]St.Peters Engineering College, Hyderabad-500100, Telangana, India,
[3]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author

E-mail : mamatha0503@gmail.com

ABSTRACT

The COVID-19 pandemic has quickly impacted our daily lives, interfering with international trade and travel. It has become commonplace to wear protective face masks. Many public service providers may soon need their clients to correctly wear masks in order to receive their services. As a result, detecting face masks has become an essential responsibility to support worldwide society. Using certain fundamental machine learning tools, such as TensorFlow, Keras, OpenCV, and Scikit-Learn, this study offers a streamlined method for achieving this goal. The suggested technique accurately recognizes the face in the picture before determining whether or not it is wearing a mask. It can also identify a face and a mask in motion as a surveillance task performance. On two distinct datasets, the approach achieves accuracy levels of up to 95.77% and 94.58%, respectively. Using the Sequential Convolutional Neural Network model, we investigate optimal parameter values to accurately detect the existence of masks without generating over-fitting.

Keywords: Tensor flow, keras, OpenCV, Convolutional Neural Network

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DNN-BASED INTELLIGENT INTRUSION DETECTION SYSTEM

[1] R. Naveen, [2] G. Mamatha, [3]K. Ganapathi Babu

[1,2,3]Assistant Professor,
[1]Computer Science and Engineering(AI&ML), [2,3]Department of Computer Science and Engineering,
[1]St.Peters Engineering College, Hyderabad-500100, Telangana, India,
[2]Koneru Lakshmaiah Education Foundation, Bowrampet, Hyderabad-500043, Telangana, India,
[3]St. Martin's Engineering College, Secunderabad, Telangana, India.

*Corresponding Author

E-mail : naveenremalli@gmail.com

ABSTRACT

An intrusion detection system (IDS) that can quickly and automatically identify and categorize cyberattacks at the network and host levels is being developed using machine learning techniques. Nevertheless, no study to date has provided a thorough examination of how different machine learning algorithms perform over a range of publicly accessible datasets. In order to create a flexible and efficient intrusion detection system (IDS) that can identify and categorize unexpected and surprising cyberattacks, this study investigates deep neural networks (DNNs), a sort of deep learning model. The constant evolution of attacks and changes in network behavior need the evaluation of numerous datasets produced over time using both static and dynamic methodologies. Lastly, we provide Scale-Hybrid-IDS-AlertNet (SHIA), a highly scalable and hybrid DNNs framework that can be utilized in real-time to efficiently monitor network traffic and host-level events in order to preemptively notify potential cyberattacks.

Keywords: Intrusion Detection system, Machine Learning, Deep Learning, Deep Neural Networks, cyberattacks

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PAPER ID: ICIRTCS-23-154

MOBILE NETV1-BASED DEEP LEARNING MODEL FOR ACCURATE BRAIN TUMOR CLASSIFICATION

[1]Dana Ratna Kishor L, [2]Dr G. Satyanarayana, [3]Dr M. Anjan Kumar, [4]Dr B.V. Rama Kumar, [5]T. V. S. Subba Rao

[1,4,5]Assistant Professor, [2]Professor & Head, [3]Professor & Principal,
Department of Computer Science and Engineering,
[1,2,3,4,5]DNR College of Engineering & Technology, Bhimavaram.

*Corresponding Author

E-mail : dratnakishorl@gmail.com

ABSTRACT

Brain tumors are among the most dangerous diseases that lead to mortality after a period of time from injury. Therefore, physicians and healthcare professionals are advised to make an early diagnosis of brain tumors and follow their instructions. Magnetic resonance imaging (MRI) is operated to provide sufficient and practical data in detecting brain tumors. Applications based on artificial intelligence contribute a very large role in disease detection, provide incredible accuracy and assist in creating the right decisions. In particular, deep learning models, which are a significant part of artificial intelligence, have the ability to diagnose and process medical image datasets. In this concern, one of the deep learning techniques (Mobile NetV1model) is utilized to detect brain disease from 1265 images gathered from the Kaggle platform. The behavior of this model is studied through four main metrics. This article deduced that this model has a significant effect in diagnosing these images from the most important metric, which is accuracy, as it gained an accuracy result of more than 97%, which is an excellent effect.

Keywords: Mobile NetV1model, Brain tumors, Magnetic resonance imaging (MRI)

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HUMAN DETECTION AND HEART ATTACK PREDICTION THROUGH AI

PBS ADITYA KUMAR
Assistant Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : adityakumarcse@smec.ac.in

ABSTRACT

In recent years, the integration of Artificial Intelligence (AI) and machine learning (ML) in healthcare has revolutionized the early detection and prediction of critical conditions, such as heart attacks. Early intervention can significantly reduce mortality rates and improve patient outcomes. This research explores the use of AI-based systems for human detection and heart attack prediction, utilizing various data sources, including electrocardiogram (ECG) signals, medical imaging, and biometric sensors. The proposed system uses a combination of supervised learning algorithms, such as decision trees, support vector machines, and neural networks, to analyze key features from ECG signals, heart rate variability, and other physiological parameters. By training the AI model with a large dataset of historical medical records, the system learns to identify subtle patterns indicative of heart attack risk, such as arrhythmias, changes in heart rate, and decreased blood flow. The results of this study demonstrate that AI-based heart attack prediction systems can achieve high accuracy, outperforming traditional methods in terms of speed, efficiency, and precision. Moreover, the system can be integrated into wearable devices and mobile applications, enabling continuous monitoring and real-time feedback for patients, reducing response times, and improving emergency care outcomes.

Keywords: ECG signals,

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RECOGNITION OF GEOTAGGED AUDIOVISUAL AERIAL SCENE

Kiran Onapakala

Integration software Developer

Pacific Source health plans

Portland, Oregon, USA

*Corresponding Author

E-mail : **kiran.onapakala@pacificsource.com**

ABSTRACT

Aerial scene recognition is an essential task in remote sensing and has recently received enlarged Attention. This paper studies the improving performance on the aerial scene recognition. This explores a novel audiovisual aerial scene recognition task using both images and sounds as input. Based on an observation that some specific sound events are more likely to be heard at a given geographic location, we propose to exploit the knowledge from the sound events to improve the performance on the aerial scene recognition. For this purpose, we have used dataset named Audio Visual Aerial scene recognition dataset. With the help of this dataset, we evaluate three proposed approaches for transferring the sound event knowledge to the aerial scene recognition task in a multimodal learning framework, and show the benefit of develop the audio information for the aerial scene recognition.

Keywords: aerial scene recognition, Audio Visual

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EARTHQUAKE PREDICTION USING ATTENTION MECHANISM IN DEEP LEARNING

Kiran Onapakala

Integration software Developer

Pacific Source health plans

Portland, Oregon, USA

*Corresponding Author

E-mail : **kiran.onapakala@pacificsource.com**

ABSTRACT

Earthquakes are one of the natural phenomena which have incessantly caused break and loss of human life in olden times. Earthquake prediction is an important aspect of any society's plans and can boost public preparedness and decrease damage to a great extent. Due to the stochastic character of earthquakes and the challenge of achieving an efficient and dependable model for earthquake prediction, efforts have been insufficient thus far, and new methods are required to solve this problem. This paper proposes a novel prediction method based on attention mechanism using Deep learning which can predict the number and maximum magnitude of earthquakes in each area of the region. This model focuses on effective earthquake characteristics and produces more accurate predictions. Firstly, pre-processing on earthquake data set is applied. Secondly, to effectively use spatial information and reduce dimensions of input data, the deep learning algorithm is used to capture the spatial dependencies between earthquake data. Thirdly, RNN is employed to capture the temporal dependencies. Fourthly, the Attention Mechanism layer is introduced to highlight its important features to achieve better prediction performance. The results show that the proposed method has better performance and generalize ability than other prediction methods..

Keywords: RNN, novel prediction,

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CNN'S PREDICTIVE STAGES OF BANANA RIPENESS

Titus Ashish
Assistant Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

One of the most popular fruits in the world is the banana. A banana gives the body fullness and is a terrific source of energy. In all sports, bananas are a great source of energy. They are a nutritious source of potassium, fiber, vitamin B6, and vitamin C. There are numerous varieties and sizes, and they typically range in hue from green to yellow. It's among the cheapest fresh fruits. The market price and eating quality of banana fruit are typically impacted by its ripeness. The goal of this research is to forecast the ripening stages of bananas, including unripe, ripe, and overripe. Without the development of the convolutional neural network, banana categorization would not have been feasible with full accuracy and precision.

Keywords: Energy, Booster, Vitamin, Fiber, Types, Quality, Ripening, Dataset

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IMAGE BASED AGE GROUP AND GENDER PREDICTION USING CNN

M. Swetha
Assistant Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

Since the growth of social platforms and social media, automatic age and gender classification has been relevant to a growing number of applications. Existing approaches' performance on real-world photographs, however, is still woefully inadequate, especially when contrasted to the enormous leaps in performance recently reported for the related task of facial recognition. We show in this project that using deep-convolutional neural networks (CNN) to learn representations can result in a significant improvement in performance on certain tasks. To achieve this, we offer a simple convolutional net design that may be employed even when learning data is scarce. On the recent Adience benchmark for age and gender estimation, we show that our method outperforms current state-of-the-art methods significantly.

Keywords: Convolutional Neural Network, Adience, regression, classification, hyperplane, RSMT, auto encoder.

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INTELLIGENT TRAFFIC MANAGEMENT WITH THE CANNY EDGE DETECTION ALGORITHM

P. Swetha
Assistant Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

The adoption of new technology and equipment is urgently needed to improve the state-of-the-art in traffic control as the problem of urban traffic congestion worsens. It has been shown that the conventional approaches, such timers and human control, are insufficient to address this dilemma. This project proposes a method to measure the vehicle density in real time utilizing digital image processing and clever edge recognition in order to control traffic. In comparison to the current systems, this demanding traffic control system delivers a notable improvement in response time, vehicle management, automation, dependability, and overall efficiency. In addition, four sample photos of various traffic situations are used to properly show the entire process, from image acquisition to edge detection and, ultimately, green light allocation.

Keywords: Smart Traffic Control: Density based Traffic Control: Edge Detection: Image Processing in traffic Control.

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PREDICTION OF STOCK PRICES USING SVM

Suresh VJ
Assistant Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

One of the trickiest and most advanced ways to do business is through the stock or share market. The banking industry, brokerage firms, and small owners all rely on this body to generate income and allocate risks; it's a very intricate model. To help make this unstable business structure a bit more predictable, this presentation suggests leveraging open-source libraries and pre-existing algorithms in conjunction with machine learning algorithms to forecast the future stock price for exchange.

.Keywords: CSV file, Term Frequency, Data-Pre-processing, Machine Learning, SVM, Decision Tree, Naïve Bayes, API.

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DECISION TREE ALGORITHM FOR CROP YIELD PREDICTION

Shaik Hanishma
Assistant Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

Agriculture is the field which plays an important role in improving our countries economy. Agriculture is the one which gave birth to civilization. India is an agrarian country and its economy largely based upon crop productivity. Hence, we can say that agriculture can be backbone of all business in our country. Selecting of every crop is very important in the agriculture planning. The selection of crops will depend upon the different parameters such as market price, production rate and the different government policies. Many changes are required in the agriculture field to improve changes in our Indian economy. We can improve agriculture by using machine learning techniques which are applied easily on farming sector. Along with all advances in the machines and technologies used in farming, useful and accurate information about different matters also plays a significant role in it. The concept of this paper is to implement the crop selection method so that this method helps in solving many agriculture and farmers problems. This improves our Indian economy by maximizing the yield rate of crop production.

. Keywords: Crop Yield Prediction, Machine Learning, Decision Tree.

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GRAPHICAL PASSWORD AUTHENTICATION SYSTEM USING CCP MODEL

Amrutha Raj
Assistant Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

In contrast to the traditional 8-character passwords we use on a regular basis, we are using graphical graphics as a password in this case. Authentication aims to protect integrity and secrecy. The most widely used technique for computer authentication is using alphanumeric usernames and passwords. His approach has numerous flaws. In order to make passwords easier to remember, most users select easily guessed passwords. Researchers have therefore created graphical password authentication techniques that employ images as passwords in order to address this issue. Graphical password is an alternative to text-based passwords where user is asked to recall an image instead of a word. Looking at the success of this system, using graphical password as input and grid lines for image point verification and enrich it to provide security using normal login and graphical password. This system can be used in the field such as banking application, military application, civilians, forensic labs, etc.

. Keywords: graphical password, CCP Model, authentication by pictures, authentication

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A SUCCESSFUL DIAGNOSIS OF DIABETES IN HEALTHCARE BIG DATA CLOUDS USING 5G SMART DIABETES

K Kalpana
Assistant Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

Innovative diabetes monitoring systems and applications are being developed and put into use thanks to recent advancements in wearable computing, artificial intelligence, and wireless networking and big data technologies like 5G networks, medical big data analytics, and the Internet of Things. It is crucial to develop efficient techniques for the diagnosis and treatment of diabetes because of the chronic and systemic harm that diabetics experience. This paper categorizes those approaches into Diabetes 1.0 and Diabetes 2.0, which show shortcomings in terms of networking and intelligence, based on our thorough examination. Our objective is to create a diabetes diagnosis and treatment system that is intelligent, economical, and sustainable.

Keywords: diabetes, data clouds, artificial intelligence

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PAPER ID: ICIRTCS-23-165

AN EFFECTIVE METHOD FOR DETECTING ANDROID MALWARE THAT USES GA, SVM, AND ANN

P. Akhil
Assistant Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

The Android platform has the most worldwide market share because of its open-source nature and support from Google. Due to its widespread distribution of harmful programs, the most popular operating system in the world has attracted the attention of cybercriminals. Using an evolutionary genetic algorithm for discriminatory feature selection, this project suggests an efficient machine-learning-based method for Android malware detection. Machine learning classifiers are trained using specific features from genetic algorithms, and their ability to detect malware before and after feature selection is compared.

Keywords: CSV file, Term Frequency, Feature Selection, Machine Learning, SVM, Genetic Algorithm, ANN.

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PAPER ID: ICIRTCS-23-166

USING ADABOOST AND MAJORITY VOTING TO IDENTIFY CREDIT CARD FRAUDULENT ACTIVITY

C. Yosepu
Assistant Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

Typically, credit card fraud occurs when a card is taken for an unlawful use or even when the fraudster exploits the credit card details for personal gain. There are a lot of credit card issues in the globe nowadays. The credit card fraud detection system was created in order to identify fraudulent activity. The primary goal of this research is to concentrate on machine learning techniques. The Adaboost algorithm and the random forest method are the algorithms that are employed. The accuracy, precision, recall, and F1-score of the two algorithms are used to determine their outcomes. The confusion matrix is used to plot the ROC curve. After comparing the Random Forest and Adaboost algorithms, the optimum algorithm for detecting fraud is determined by evaluating its accuracy, precision, recall, and F1-score.

Keywords: Credit card fraud, fraudulent activities, Random Forest, Adaboost

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PAPER ID: ICIRTCS-23-167

MEDBOT: A SYSTEM BASED ON ML AND NLP FOR SUPPORTING WOMEN AND FAMILIES DURING PREGNANCY

P. Sudharsan
Assistant Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

With a significant paradigm change affecting drug research, health analytics, therapies, diagnostic methods, and much more, artificial intelligence is revolutionizing healthcare. In order to comprehend and address the demands of patients and their families, we concentrate in this work on utilizing AI-based chatbot systems, mostly based on machine learning techniques and natural language processing. Specifically, we outline an application scenario for an AI-chatbot that provides assistance and guidance in pertinent circumstances to expectant moms, new mothers, and families with small children.

Keywords: eHealth, mHealth, Chatbot, Artificial Intelligence, Machine Learning, Natural Language Processing.

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PAPER ID: ICIRTCS-23-168

A METHOD FOR SEPARATING THE IMAGES OF OUTSIDE SCENES USING PERCEPTUAL ORGANIZATION AND BACKGROUND RECOGNITION

G Bruhaspathi
Assistant Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

Using color and texture information, a new outdoor scene image segmentation method based on background recognition and perceptual organization is utilized to identify background items including the ground, sky, and plants. A perceptual organization model was created for structurally challenging objects, which typically have several constituent parts. This model is able to identify the non-accidental structural relationships between the constituent parts of the structured objects and, as a result, group them together appropriately without requiring prior knowledge of the particular objects. According to the experimental results, the suggested method obtained correct segmentation quality on a variety of outdoor natural scene contexts and outperformed two cutting-edge picture segmentation techniques on two difficult outdoor databases (the Berkeley segmentation data set and the Gould data set).

Keywords: Boundary energy, image segmentation, perceptual organization.

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PAPER ID: ICIRTCS-23-169

CNN-BASED DIABETIC RETINOPATHY IDENTIFICATION FROM EYE FUNDUS IMAGES

Dr. R. Santhoshkumar
[1]Associate Professor, Department of Computer Science and Engineering,
[1]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : drsanthoshkumarcse@smec.ac.in

ABSTRACT

In order to prevent patients from losing their vision and to help ophthalmologists with mass screening, automated Diabetic Retinopathy (DR) detection, screening, and diagnosis are essential. By identifying the disease before it reaches a more advanced level, DR screening seeks to treat it early. Current DR analysis techniques reduce the high cost of human computation by diagnosing using digital fundus images. In order to lessen the subjective interpretation and screening loads for ophthalmologists, researchers are persistently working toward automated screening methods. Different Convolutional Neural Network (CNN) architectures with parameter adjustment for DR classification are proposed in this research. The suggested method fine-tunes the network parameters to solve the class imbalance issue. The architecture takes into account various filter size variations, and the classification output layer analyzes how they change in response. The CNN model presented in this study has an accuracy of 87.5%, a processing time of 1 minute and 23 seconds, and a cross entropy loss of 0.6370. In fundus image categorization, the suggested strategy outperforms state-of-the-art techniques, with a maximum accuracy improvement of 13%.

Keywords: Diabetic Retinopathy, Automated DR Detection, Convolutional Neural Network, Class Imbalance Problem, Fine Tuning, Network Parameters.

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DEEP LEARNING TECHNIQUES ON TEXT CLASSIFICATION IN SOCIAL HEALTH NETWORK

Daniel Manoj
Assistant Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

Text classification technique used for classifying the unstructured and structured data available abundantly in social health network. Using the deep learning techniques, text classifier can label the text into different classes with a good accuracy. Text classifier uses different techniques available in deep learning namely, CNN (Convolutional Neural Networks) and RNN (Recurrent Neural Networks). The existing model has immense data which is not arranged properly, and also contains many unstructured forms of data, which is a quite difficult one for analysing. The proposed model uses Deep Learning (DL) RNN (Recurrent Neural Network) technique consist of yielding good results by using the models of pattern recognition for social healthcare networks. The main intention of text classification model is to provides an insight for training the data and to classify the text by analyzing and extracting the raw input and produce the output. Overall, the purpose of text classification model is to enhance the performance of the text classifier based on effectiveness to improve accuracy and text processing speed by using a suitable methodology in order produce the promising results in the future.

Keywords: Deep Learning (DL), RNN (Recurrent Neural Network), CNN (Convolutional Neural Networks).

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PAPER ID: ICIRTCS-23-171

IDENTIFICATION OF BRAIN TUMOR USING CONVOLUTION NEURAL NETWORK CLASSIFICATION

P. Chaitanya
Assistant Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

Patients with brain tumours are among the most frequent and aggressive patients, which means they have a very short life expectancy if they are at their most advanced stage. In order to improve patients' overall quality of life, treatment planning is critical at this point of the operation. Tissue imaging methods including CT, MRI, and ultrasound are often used to check tumours in the brain, lung, liver, breast, prostate, and other parts of the body. MRI scans are used to identify brain tumours in this case. However, due to the large quantity of data collected by an MRI scan, it is not feasible to manually distinguish between tumour and non- tumor at a particular moment.it has several restrictions, such as the ability to produce exact quantitative measurements for only a limited number of photos, which is a drawback. Having a system that can be trusted and that can be employed automatically would help save individuals from losing their lives. This is due to the fact that there is so much diversity in the space and structure of the region around a brain tumour that it makes automated categorization of brain tumours very difficult. In this paper, offer a novel method for detecting brain tumours. Convolutional Neural Networks (CNN) are used to categorise the data. In this section, tumours are divided into three categories: glioma tumours, meningioma tumours, Pituitary tumour and no tumour at all. Small kernels are utilised to create the architectural design for the deeper layers of the system. A record-keeping rate of 99.5 percent accuracy has been shown in trials, making the CNN superior to all other current-generation techniques. Additionally, it has a minimal degree of complexity.

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Keywords: CNN, Glioma, Meningioma, Pituitary tumours

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PAPER ID: ICIRTCS-23-172

UTILIZING COMPUTATIONAL ALGORITHMS TO IDENTIFY CREDIT CARD FRAUD

K Ganapathi babu
Assistant Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

The number of credit card users worldwide is rising as a result of people's growing reliance on online shopping and transactions. Because of this, scammers are finding new opportunities to commit fraud. If these crimes are not detected, the credit card companies will lose a lot of money. A trustworthy fraud identification method is required in order to spot these schemes and notify institutions to prevent fraud. A number of academics have created models to deal with this problem. These models use methods from Data Science, Machine Learning, Deep Learning, or a combination of these to predict credit card fraud. This paper offers a thorough examination of the various fraud identification strategies used in the detection methods offered by several.

Keywords: Credit card fraud, online transaction, e-commerce, computation algorithms, and classification.

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PAPER ID: ICIRTCS-23-173

DATA SECURITY AND SEARCH OPTIMIZATION IN IOT ECOSYSTEMS WITH CLOUD-EDGE COLLABORATION

Dr. G. JawaherlalNehru
Associate Professor Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : drjawaherlalcse@smec.ac.in

ABSTRACT

Intelligent devices can now communicate over both short and long distances with each other and with the Internet or cloud. The Internet of Things signifies a novel paradigm (IoT).Nonetheless, utilizing cloud computing enables resource-constrained IoT smart devices to obtain several benefits, including the delegation of data processing and storage responsibilities to the cloud. Operating at the network's periphery provides greater benefits than utilizing the cloud for IoT applications necessitating elevated data rates, mobility, and latency-sensitive real-time data processing. This paper proposes an efficient data-sharing system that facilitates secure communication of data among smart devices at the periphery of cloud-assisted IoT. We propose a secure search method to locate specific data within personal or shared storage. Ultimately, we assess the processing time efficiency of our proposed method. The results indicate that our strategy has the potential to be effective in IoT applications. Due to the heightened computational demands of security-oriented operations, resource-constrained IoT smart devices are incapable of managing these intensive computations.

Keywords: Internet of Things (IoT)

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PAPER ID: ICIRTCS-24-174

DECENTRALIZED STORAGE ARCHITECTURE FOR UNTRUSTED NETWORKS USING BLOCKCHAIN

[1]Dr. R. Santhoshkumar

[1]Associate Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : drsanthoshkumarcse@smec.ac.in

ABSTRACT

The outsourced data service of the cloud service provider (CSP) is attracting significant interest in both industry and academia due to its user-friendliness, minimal overhead, and considerable flexibility. This project focuses on delivering a reliable outsourced data service to various CSPs in an untrusted environment. We seek to ascertain how to reliably store and authenticate the metadata of data replications in an untrusted environment involving multiple Cloud Service Providers (CSPs). We establish a dependable outsourced service platform by employing advanced blockchain technology as a solution to the problem. Furthermore, we consider the innovative features of blockchain, including its decentralized structure, redundant storage, collaborative maintenance, and resistance to tampering, to ensure that the data remains unaltered by malicious intent. Initially, we establish a blockchain-based outsourced service framework comprising three essential layers: a storage layer, a verification layer, and a blockchain layer, designed for the preservation of data replications in an untrusted environment. Subsequently, we propose an innovative concept for verification peers (VPs) to monitor metadata stored on a specific blockchain. Each VP maintains a complete local copy of the blockchain to prevent malicious tampering of metadata. Finally, we present a collaborative algorithm employed by VPs to store and validate replication metadata according to the proposed model. In a multi-CSP scenario, we perform comprehensive experiments and provide a conclusive analysis. The evaluation results indicate that our proposed method demonstrates superior performance.

Keywords: CSP, VP, Metadata, untrusted environment, decentralized, tamper resistance.

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PAPER ID: ICIRTCS-24-175

E-VOTING REIMAGINED: ACHIEVING PRIVACY AND TRANSPARENCY WITH BLOCKCHAIN

[1]G. JawaherlalNehru

[1]Associate Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : drjawaherlalcse@smec.ac.in

ABSTRACT

Certain voting methods have existed since antiquity. Paper ballots are predominantly utilized globally. Electronic voting systems have gained popularity only in the past decade and remain unresolved. E-voting systems present challenges primarily concerning security, credibility, transparency, reliability, and functionality. Estonia is a leader in this domain and can be regarded as state-of-the-art. However, there are only a limited number of solutions utilizing blockchain technology. Blockchain can address all the aforementioned issues and additionally provide benefits such as immutability and decentralization. The primary issues with blockchain technologies for e-voting are their concentration on a singular domain and insufficient testing and evaluation. This project introduces a blockchain-based electronic voting platform applicable to various voting scenarios. The data is entirely transparent, yet the identities of voters are protected through homomorphic encryption. We have evaluated and contrasted our solution across three distinct blockchains. The results indicate that both public and private blockchains can be utilized with minimal differences in speed. The primary innovation of our solution is the entirely decentralized administration of the e-voting platform via blockchain, ensuring transparency throughout the process while simultaneously safeguarding the security and privacy of voters through homomorphic encryption.

Keywords: Electronic voting, blockchain technology, immutability, decentralization, transparency, homomorphic encryption.

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PAPER ID: ICIRTCS-24-176

SMART VEHICLES REDEFINED: FINGERPRINT AUTHENTICATION FOR ENHANCED SECURITY

[1]Dr. M. Vadivukarssi

[1]Associate Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : drvadivukarassicse@smec.ac.in

ABSTRACT

A biometric system is a technological framework that utilizes personal information for individual identification. It depends on particular data regarding distinct biological characteristics to function effectively. This system entails processing data through algorithms to achieve a specific outcome, typically concerning the accurate identification of a user or other individuals. This obviates the necessity of monitoring keys or recalling a combination password or PIN. This report examines the utilization of fingerprints for unlocking mechanisms, in contrast to the conventional approach of employing keys. To avert unauthorized access to these devices, passwords and other pattern-based authentication methods are currently employed. Nonetheless, password-based authentication possesses an inherent vulnerability due to password leakage. The patterns are readily susceptible to theft and reproduction. This paper presents an implicit authentication method that augments the password pattern with an additional security layer. Biometric systems have consistently functioned as effective security mechanisms across multiple domains. Fingerprints represent the most ancient and extensively utilized method of biometric identification. The majority of sophisticated vehicle security systems are most appropriate for four-wheeled vehicles. The security systems available for two-wheelers are inadequate against skilled thieves. In the event of an attack, these systems can solely incapacitate the engine and emit a loud alarm. The proposed design of a Vehicle Security System is reliable and robust, incorporating features that enhance vehicle security and ensure rider safety

Keywords: Automotive security, Biometric technology, Arduino platform, Fingerprint recognition

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INTELLIGENT FAN SPEED MANAGEMENT USING TEMPERATURE SENSORS IN PUBLIC AREAS

[1]S. Bavankumar

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : sbavankumarcse@smec.ac.in

ABSTRACT

This project is an independent automatic fan speed controller that regulates the speed of an electric fan based on specific requirements. The incorporation of embedded technology enhances the efficiency and reliability of this closed-loop feedback control system. The microcontroller (ATMega8 / 168 / 328) facilitates dynamic and expedited control. The liquid crystal display (LCD) enhances user-friendliness of the system. The LCD panel simultaneously displays the sensed temperature and fan speed level values. It is highly compact, utilizing minimal components, and can be applied in various applications such as air conditioners, water heaters, snow melters, ovens, heat exchangers, mixers, furnaces, incubators, thermal baths, and veterinary operating tables. The ARDUINO microcontroller serves as the central component of the circuit, governing all functions. The LM35 temperature sensor detects temperature and converts it into an electrical (analog) signal, which is transmitted to the microcontroller. The measured and configured temperature values are exhibited on the 16x2-line LCD. The microcontroller actuates the transistor to regulate the fan speed. This project employs a regulated 12V, 2A power supply. This project is beneficial in process industries for the maintenance and regulation of boiler temperature.

Keywords: Liquid Crystal Display (LCD), LM35 Temperature Sensor, Arduino Uno, Internet of Things, Integrated Development Environment (IDE), Microcontroller.

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OPTIMIZED CLONE DETECTION FOR WIRELESS SENSOR NETWORKS: ENERGY AND MEMORY SOLUTIONS

[1]K. Ganapathi Babu

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : kganapathibabucse@smec.ac.in

ABSTRACT

Wireless sensors have been extensively utilized across diverse applications, including environmental monitoring, telemedicine, and object tracking. A nefarious individual may infiltrate certain sensors and obtain their confidential information. Subsequently, it can replicate the sensors and deploy clones within a wireless sensor network (WSN) to execute various attacks, known as the clone attack. We propose an energy-efficient, location-aware protocol for clone detection in densely deployed wireless sensor networks, ensuring effective detection of clone attacks while preserving adequate network longevity. We utilize the locational data of sensors and randomly choose witnesses situated within a designated ring area to authenticate the legitimacy of sensors and report identified clone attacks. The ring configuration promotes energy-efficient data transmission toward the witnesses and the sink. We theoretically demonstrate that the proposed protocol can attain a 100 percent probability of clone detection with reliable witnesses. We further enhance the research by examining the efficacy of clone detection in the presence of untruthful witnesses, demonstrating that the probability of clone detection remains at approximately 98 percent even when 10 percent of witnesses are compromised. Furthermore, in the majority of current clone detection protocols utilizing a random witness selection scheme, the necessary buffer storage for sensors typically correlates with node density, specifically O(Square Root(n)). In contrast, our proposed protocol's required buffer storage for sensors is independent of n and instead functions as a variable of hop length. Keywords: Sensor, tamper-resistant, wireless sensor network, cloning attack, witnesses, ring architecture, malicious actor.

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PAPER ID: ICIRTCS-24-179

ENCRYPTED DATA STRUCTURES FOR LOCATION PRIVACY IN DATABASE-DRIVEN WIRELESS COGNITIVE NETWORKS

[1]P. Swetha

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : pswethacse@smec.ac.in

ABSTRACT

This paper proposes novel location privacy-preserving schemes for database-driven cognitive radio networks (CRNs) that safeguard secondary users' (SUs) location privacy while enabling them to ascertain spectrum availability in their surroundings. Our methodologies utilize probabilistic set membership data structures to leverage the organized characteristics of spectrum databases and the queries of secondary users. This allows us to generate a concise representation of the database that can be queried by service users without disclosing their location to the database, thereby ensuring their location privacy. Our proposed schemes exhibit varying cost performance attributes. Our initial scheme employs a straightforward yet robust two-party protocol that ensures unconditional security with a feasible communication overhead, requiring DB to transmit a condensed version of its content to SU, which merely needs to query this data structure to ascertain spectrum availability. Our second scheme significantly reduces communication and computation overhead for secondary users (SUs), but necessitates an additional architectural component that receives the condensed version of the database and retrieves spectrum availability information on behalf of the SUs to mitigate their overhead. We demonstrate that our schemes are secure and illustrate their substantial advantages over existing alternatives concerning various performance and security metrics.

Keywords: Location privacy, Chukoo filters, database server, query server.

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PAPER ID: ICIRTCS-24-180

ENHANCING SOCIAL NETWORK SECURITY: SPAMMER DETECTION AND FAKE USER IDENTIFICATION

[1]K. Ram Mohan

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : krammohancse@smec.ac.in

ABSTRACT

This project aims to delineate a methodology for detecting spam tweets and fraudulent user accounts on the social network Twitter. We are utilizing a Twitter dataset and employing four distinct techniques: Fake Content Detection, Spam URL Detection, Spam Trending Topic Identification, and Fake User Identification. By employing the aforementioned four techniques, we can ascertain whether a tweet is normal or spam. Subsequently, we will utilize the Random Forest data mining algorithm to train the dataset for the classification of spam versus non-spam tweets, as well as fake versus non-fake accounts. We employ various data mining techniques to classify tweets as spam or non-spam, specifically utilizing the Random Forest classifier in this instance. There is a demand to address and regulate individuals who utilize online social networks solely for advertising, thereby spamming others' accounts. The recent identification of spam on social networking platforms has garnered the interest of researchers. Spam detection poses a significant challenge in safeguarding the security of social networks. Recognizing spam on OSN sites is crucial to protect users from diverse malicious attacks and to safeguard their security and privacy.

Keywords: Spam tweets, fraudulent user accounts, trending topics, data set, and random forest data mining algorithm.

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PAPER ID: ICIRTCS-24-181

REAL-TIME MONITORING: FIRE AND SMOKE DETECTION WITH IMMEDIATE ALERTS

[1]P. Devasudha

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : pdevasudhacse@smec.ac.in

ABSTRACT

Fire is integral to our daily existence, yet it poses a significant risk to human life and property. With the advancement of science and technology, fire prevention technologies are continually evolving. This system is engineered to detect fire and smoke at an early stage and notify the nearest fire station via a push notification.The Ten Silica ESP 8266 processor serves as the system's core component. The emergence of fire is frequently accompanied by the production of smoke. In the initial phases of the fire, substantial smoke is generated due to insufficient fuel temperature and combustion levels. Smoke cannot be contained over a vast area, and its mobility is comparatively high. If fire can be detected prior to its outbreak and an early warning is transmitted to the nearest fire station, the incidence and extensive spread of fire can be averted, thereby minimizing material and financial losses to individuals. A real-time fire and smoke detection system can address this problem and notify the nearest fire station. This system is less expensive than all systems currently available in the market. This real time fire and smoke detection system is designed to detect the fire and smoke at the early stage and notify the nearest fire station through a push notification. The notification includes the fire or smoke alert and the location details. The Tensilica ESP 8266 processor is utilized in this system. This processor is chosen for the system solely due to its integrated Wi-Fi and economical price.

Keywords: Tensilica ESP 8266, Node MCU, Fire Sensor, Buzzer, Arduino IDE, Smoke Sensor, Fire Detection, Smoke Detection, Microcontroller.

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PAPER ID: ICIRTCS-24-182

BLOCKCHAIN-ENHANCED E-COMMERCE: SECURE AND TRANSPARENT TRANSACTIONS

[1]N. Balaraman

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : nbalaramancse@smec.ac.in

ABSTRACT

The swift progression of cryptography and distributed computing systems is expected to revolutionize numerous industries through enhanced transparency, superior security, and reduced transaction costs. Nonetheless, the scalability and performance of blockchains constrain their utility and appropriateness in online services, particularly in e-commerce. This project presents an analysis of blockchain technologies to elucidate their advantages and obstacles in e-commerce. Consequently, we propose two blockchain-based e-commerce applications accompanied by comprehensive design guidelines: social shopping and loyalty program. The entire foundation of e-commerce relies on the online transfer of goods and transactions, eliminating the necessity for physical travel. Transferring transactional data and transactions in e-commerce is susceptible to cyber threats. The primary aim of our research is to create a system that safeguards against such incidents, particularly during the transmission of transactional data, and to establish an automated mechanism that guarantees these transactions are executed flawlessly. We are utilizing emerging technologies known as blockchain and smart contracts to implement this. Blockchain facilitates a decentralized, immutable digital ledger for the secure storage and transfer of data across the network. Blockchain technology is employed in e-commerce to facilitate transactions in a secure, efficient, and expedited manner. Blockchain facilitates a peer-to-peer transaction framework and data encryption, ensuring the secure transfer of transactional information.

Keywords: Cryptography, Blockchain, Digital Ledger, Peer-to-Peer Transactions, Encryption, E-Commerce, Online Shopping.

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PAPER ID: ICIRTCS-24-183

REAL-TIME HAZARDOUS GAS DETECTION AND WARNING SYSTEM VIA EMBEDDED TECHNOLOGY

[1]S. Kirankumar

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : skirankumarcse@smec.ac.in

ABSTRACT

Numerous incidents, including explosions and fires, have occurred due to LPG gas leakage. Such incidents can have perilous consequences if the leakage is not identified promptly. The Arduino and IoT-based LPG leakage detection system is a project designed to identify gas leaks in the environment and transmit data to an IoT module. The Internet of Things (IoT) refers to the interconnection of physical objects that communicate through sensors, electronics, software, and connectivity. These systems operate autonomously, and the same applies to IoT-based gas detection systems, which do not necessitate human oversight. Safety is paramount in contemporary society, necessitating the implementation of effective safety systems in educational and occupational environments. This work alters the current safety model implemented in industries, and this system can also be utilized in residential and commercial settings. The primary aim of the project is to design a microcontroller-based system for detecting and alerting toxic gases. The hazardous gases, such as LPG and propane, were detected and displayed continuously on the LCD screen. If these gases surpass the normal threshold, an alarm is triggered immediately, and an alert message (SMS) is dispatched to the authorized individual via GSM. The automated detection and alerting system surpasses the manual method by providing rapid response times and precise identification of emergencies, thereby facilitating the expedited resolution of critical situations.

Keywords: Air quality assessment, gas detection sensors, GSM communication modules, wireless network.

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SMART HOME AUTOMATION: BLUETOOTH-DRIVEN SOLUTIONS FOR EVERYDAY LIVING

[1]Kishor Golla

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : gkishorcse@smec.ac.in

ABSTRACT

In contemporary society, everyone utilizes smartphones and the internet. Consequently, every smartphone is equipped with a Bluetooth system. This project entails the design of a basic Arduino Bluetooth Control Home Automation system utilizing the HC-05 Bluetooth module to remotely activate or deactivate various electrical appliances. A home automation system can enhance convenience and security in our lives. Home automation refers to the implementation of automated systems within a residence, commonly referred to as a smart home. In the home automation framework, one can manage devices such as lighting, fans, televisions, and more. We will manage 18 distinct home appliances via a smartphone application utilizing Bluetooth communication. The interaction between the cell phone and the Arduino BT board is conducted wirelessly. This system is engineered to be cost-effective and scalable, enabling the control of various devices with minimal alterations to its core. Technology is an incessant progression. Designing a product with contemporary technology that enhances the lives of others constitutes a significant contribution to the community. This study outlines the design and execution of an economical, yet adaptable and secure, mobile phone-based home automation system.

Keywords: Arduino Bluetooth

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PAPER ID: ICIRTCS-24-185

RFID-POWERED IOT ATTENDANCE MANAGEMENT SYSTEM FOR SCHOOLS AND OFFICES

[1]K. Sreenivasulu

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : ksreenivasulucse@smec.ac.in

ABSTRACT

Attendance management is a vital responsibility within educational institutions, including schools, colleges, and universities. Daily student attendance enables teachers to monitor students' activities. It also allows parents to ascertain whether their children are focused on their studies and consistently attend class. Nonetheless, overseeing the daily attendance of thousands of students presents a significant challenge for educators. Conventional methods of recording daily student attendance may lead to inaccuracies and significant manual labor. An RFID-based attendance system effectively addresses these challenges by automating the attendance process, allowing teachers and parents to effortlessly track and monitor students' activities. In addition to managing student attendance, the RFID attendance system can also monitor faculty or staff attendance to streamline the payroll management process.

Keywords: Attendance Management, RFID, Automation, Payroll Management.

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REVOLUTIONIZING FARMING: AUTONOMOUS ROBOTS POWERED BY IOT AND WIRELESS SENSORS

[1]P. Sudharsan

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : psudharsancse@smec.ac.in

ABSTRACT

Agri-bot is a device that simplifies intricate tasks through the utilization of software applications. It replaces conventional methods to execute analogous tasks with greater efficiency. The implementation of automation in agriculture has facilitated numerous advancements in the industry, conserving both time and financial resources for farmers. The agricultural robot can be monitored via the Bluetooth functionality of an Android smartphone. The sensors, in conjunction with the microcontroller and motor designs, facilitate the entire calculation process, including monitoring and processing. Individuals often neglect to water the plants in their gardens and on rooftops daily. This section elucidates a sophisticated and engaging automatic plant watering system that can be constructed independently in a matter of hours, utilizing an infrared sensor. The system is predicated on Raspberry Pi technology. These agribots can be utilized for harvesting, pesticide application, weed management, and various other functions.

Keywords: Agri-Bot, Bluetooth, Infrared Sensor, automation.

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INTERACTIVE SHOPPING CART WITH IOT INTEGRATION FOR ENHANCED USER EXPERIENCE

[1]M. Dhileep Kumar

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : mdhileepkumarcse@smec.ac.in

ABSTRACT

Various items are purchased in shopping malls or markets using a shopping trolley. The acquisition of this product is a challenging process. Customers must pull the trolley each time to collect items simultaneously. After making a purchase, the customer wishes to settle the bill for their acquisition. During that period, they must endure an extended queue to have their products scanned using an RFID reader in conjunction with a barcode scanner and subsequently receive their bill. To amend that, customers must engage in prudent purchasing within the shopping mall. Each product must have an RFID barcode affixed for scanning with an RFID reader. The intelligent trolley will comprise an RFID reader and an LCD display. When a customer wishes to purchase a product, it is added to the trolley. It will scan and read the product, displaying its name and cost on the LCD. The cumulative cost of all acquired products will be incorporated into the final invoice, which will be stored in the Node MCU, serving as a memory unit. All of these are conducted in the trolley.

Keywords: Shopping cart, RFID reader, RFID cards, LCD display, Node MCU, Wi-Fi module, billing system utilizing RFID technology.

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LEVERAGING TIME-FREQUENCY METHODS FOR SUSPICIOUS ACTIVITY DETECTION IN ANTI-MONEY LAUNDERING

[1]P. Akhil

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : pakhilcse@smec.ac.in

ABSTRACT

This project primarily focuses on the implementation of Anti-Money Laundering detection. Money laundering is the essential method employed by criminals to integrate illicit proceeds into the financial system. The principal obligation for identifying suspicious activities associated with money laundering rests with financial institutions. The majority of existing systems in these institutions are rule-based and inefficient, yielding over 90% false positives. The existing rule-based anti-money laundering (AML) systems can be replaced by data science-based models that utilize customer relationship management (CRM) attributes and temporal aspects of transaction behavior. The multitude of potential account features, customer attributes, and their combinations complicates the process of feature engineering necessary for attaining satisfactory accuracy. Consequently, these features significantly enhance the area under the curve results (exceeding 1%) of the current data science-driven transaction monitoring systems. A false positive rate of 14.9% has been attained using solely time-frequency features, resulting in an F-score of 59.05%. The integration of transaction and CRM features results in an 11.85% false positive rate and enhances the F-Score to 74.06%.

Keywords: Anti-Money Laundering (AML)

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REAL-TIME HEARTBEAT MONITORING AND VOICE ALERTS FOR SENIOR HEALTH MONITORING

[1]D. Sai Kiran

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : dsaikirancse@smec.ac.in

ABSTRACT

The primary objective of this paper is to develop a "Wireless Health Monitoring System" capable of systematically monitoring heart rate and SpO2 (oxygen-saturated hemoglobin in blood). In this expanding world, health is a crucial concern for every individual, and monitoring it is essential. Health professionals significantly contribute to the monitoring of individual health; however, the increasing population presents challenges in effectively overseeing health. In this pandemic, health is the foremost priority for individuals globally. Numerous devices have been developed for health monitoring; however, this device is particularly convenient and efficient. Monitoring the health of elderly individuals through daily hospital visits is a significant burden, while regular check-ups are essential for newborns. We have developed a device that can wirelessly monitor our health in various situations. This device comprises an Arduino Nano, an OLED display, a MAX30100 pulse oximeter, an HC-05 Bluetooth module, two capacitors of varying values, and two resistors of identical value. In the future, the incorporation of additional sensors will enhance the device's efficacy and enable numerous new functionalities.

Keywords: SpO2, Heart Rate, Hemoglobin.

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REVOLUTIONIZING AGRICULTURE: IOT AND WIRELESS SENSOR NETWORK-BASED AUTONOMOUS FARMING ROBOT

[1]Suresh V J

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : vjsureshcse@smec.ac.in

ABSTRACT

The primary objective of this paper is to develop a "Wireless Health Monitoring System" capable of systematically monitoring heart rate and SpO2 (oxygen-saturated hemoglobin in blood). In this expanding world, health is a crucial concern for every individual, and monitoring it is essential. Health professionals significantly contribute to the monitoring of individual health; however, the increasing population presents challenges in effectively overseeing health outcomes. In this pandemic, health is a paramount concern for individuals globally. Numerous devices have been developed for health monitoring; however, this device is particularly convenient and efficient. Monitoring the health of elderly individuals through daily hospital visits is a significant burden, while regular check-ups are essential for newborns. We have developed a device capable of wirelessly monitoring our health in various situations. This device comprises an Arduino Nano, an OLED display, a MAX30100 pulse oximeter, an HC-05 Bluetooth module, two capacitors of varying values, and two resistors of identical value. In the future, the addition of more sensors could enhance the device's effectiveness and enable numerous new functions.

Keywords: Body Sensor Network, Pulse Oximeter, Microcontroller, LCD.

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AI-POWERED INTRUSION DETECTION: DEEP LEARNING FOR ENHANCED SECURITY MONITORING

[1]Bellamkonda vanaja

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : bvanajacse@smec.ac.in

ABSTRACT

An IDS is a proactive tool for detecting and classifying intrusions, attacks, and security policy violations automatically at both network and host levels in a timely manner. Intrusion detection is categorized into network-based intrusion detection systems (NIDS) and host-based intrusion detection systems (HIDS) based on intrusive behaviors. A network-based intrusion detection system is referred to as NIDS. Network behaviors are gathered through mirroring by networking devices, including switches, routers, and network taps, and analyzed to detect attacks and potential threats hidden within network traffic. A Host-based Intrusion Detection System (HIDS) utilizes system activities recorded in various log files on the local host computer to identify attacks.

Keywords: Network-Based Intrusion Detection System (NIDS)

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AI-ENHANCED FALL DETECTION FOR SENIORS: A MACHINE LEARNING-BASED SOLUTION

[1]Aarini. Rajeshwari

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : arajeshwaricse@smec.ac.in

ABSTRACT

Health is the primary concern, and its intangibility escalates with advancing age. Consequently, caring for the elderly is a significant obligation. In this context, technology aids individuals by offering living assistance. A primary cause of health deterioration or mortality in the elderly is falls. This paper proposes a fall detection system utilizing machine learning. Currently, elderly individuals reside alone at home due to adverse circumstances, varying work cultures, and numerous other factors. Studies by the World Health Organization (WHO) indicate that falls result in numerous accidental fatalities. The highest incidence of fatal falls occurs in adults over 65, resulting in health complications or injuries. Elderly individuals necessitate assistance during emergencies at home, as they may be unable to summon help due to limited access to technology in rural regions or their physical limitations. The system identifies falls by categorizing various activities as fall or non-fall actions. The SisFall dataset, comprising various activities performed by multiple participants, is utilized to compute features. Machine learning algorithms, including SVM and decision trees, are employed to identify falls based on computed features. The system achieves an accuracy of 96% through the utilization of a decision tree algorithm.

Keywords: Health, living assistance, falls, non-falls, mortality, SVM, Decision Tree, computed features, accuracy.

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IOT-BASED SOIL AND CROP MANAGEMENT: ENHANCING GROWTH WITH MICRO-NUTRIENTS AND WATER CONTROL

[1]Praneel Deva

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : praneeldevacse@smec.ac.in

ABSTRACT

The yield of the crop is contingent upon the soil, fertilizers, and water supply. The fertilizers supply micronutrients essential for vegetable cultivation, such as nitrogen and zinc. To satisfy the rising demand for food, crops must endure the detrimental impacts of environmental factors and unpredictable variables. The framework of smart agriculture resembles networks, organized into three layers. Sensor layer to acquire data regarding diverse parameters, products, and operational environment. The transport layer facilitates communication of acquired information between various devices and a remote server. Application layer for data analysis, visualization, and prediction to facilitate subsequent actions. The proposed system employs multilinear regression to forecast water levels and excess micro-nutrients for crop cultivation, as farmers require analog data rather than digital data. To enable them to implement essential precautionary measures to safeguard the field from damage.

Keywords: Microcontroller, Wi-Fi, Water Sensor, LCD Display.

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SMART FARMING: IOT-BASED AUTOMATION AND FIELD MONITORING FOR CROP MANAGEMENT

[1]Sashmita Mallick

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : sashmitamallickcse@smec.ac.in

ABSTRACT

Water is a vital resource utilized in agriculture. Agriculture is essential for the advancement of agrarian nations. A farmer cultivates by vigilantly monitoring the fields around the clock to irrigate the plants when the soil is parched and to drain excess water that could damage both the crops and the soil. To alleviate the burden on farmers, we have developed a solution known as the Smart Irrigation and Draining System. The previous system solely addressed crop irrigation without drainage, whereas our project incorporates soil moisture monitoring and automatic drainage of excess water from fields using IoT technology, facilitated by sensors and Arduino. The equipment utilized in this system assists farmers in monitoring the condition of their fields. This project minimizes human labor and eliminates the need for human oversight in the irrigation and drainage of excess water from crops

.

Keywords: DHT sensor, water level sensor, pump motor, microcontroller, LCD.

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INNOVATIVE INSECT TRAPPER SYSTEM FOR PROTECTING CROPS FROM PESTS

P. Swetha
[1]Assistant Professor
[1]Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail: gsai.manasa123@gmail.com

ABSTRACT

The erratic climatic conditions and their ancillary effects necessitate the safeguarding of forestry and agriculture. Pests, insects, and arthropods are critical factors that hinder crop development. Ultimately, the monitoring and trapping of pests becomes increasingly arduous. Human operators systematically conduct surveys of the traps distributed throughout the field at regular intervals. This entails additional labor, demands significant time, and lacks consistency. It is also ineffective from an economic perspective. The deficiencies in the current systems necessitate cost-effective automation. This paper proposes an electronic trap for pest insects utilizing an autonomous monitoring system with ultraviolet black lights and LED lights. A statistical analysis is conducted on the anticipated duration of elevated pest populations, and a trap featuring three layers of varying thickness is engineered to capture different sizes of significant pests. An economical image sensor captures images of captured pests, which are transmitted to a remote control station. The acquired information improves the assessment of pest concentrations on farms. The comprehensive analysis is conducted in paddy and brinjal fields, with support from the M S Swaminathan Research Foundation (MSSRF), Chennai. Keywords: Liquid Crystal Display (LCD), Light Dependent Resistor, Ultraviolet Light Emitting Diodes (UV LEDs), Arduino Uno, Internet of Things, Integrated Development Environment (IDE), Microcontroller.

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PATHOLE DETECTION AND NOTIFICATION SYSTEM FOR VEHICLES TO PREVENT ACCIDENTS

[1]B. Amrutha Raju

[1]Assistant Professor, Department of Computer Science and Engineering,
[1,]St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author

E-mail : amrutharajucse@smec.ac.in

ABSTRACT

A primary issue in developing countries is road maintenance. Roads are the lifeblood of a nation. Roads link educational institutions, healthcare facilities, industries, and other essential services, serving as the foundation of any development agenda. The condition of the roads and the effort invested in their maintenance reflect the nation's economic status. Road maintenance is an essential concept that involves identifying and rectifying irregularities on the roads, such as potholes, to potentially prevent accidents and associated casualties. Considering the aforementioned issues and previous methodologies, a cost-effective solution is proposed to detect potholes and notify the driver. The depth of potholes on the road can be accurately assessed using an ultrasonic sensor. Hazardous conditions may also result from the inadequate physical state of a road and its environment. It may result in vehicular collisions. Additionally, relying solely on headlights while driving at night may not provide adequate assistance to the driver. Unforeseen obstacles on the roadway may result in an increased incidence of accidents. Additionally, poor road conditions lead to increased fuel consumption, resulting in the wastage of valuable fuel. We proposed the 'Pothole and Hump Detection and Vehicle Speed Control System' to alert the driver regarding potholes or humps and regulate vehicle speed.

Keywords: Detection of Potholes and Humps.

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PAPER ID: ICIRTCS-24-197

SMART VIDEO SURVEILLANCE SYSTEM USING DEEP LEARNING FOR REAL-TIME ANALYSIS

[1]E Sowmya
[1]Assistant Professor
[1,2]Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail Address: rsamhitha999@gmail.com

ABSTRACT

In recent years, the applications of video surveillance have garnered increasing interest from researchers. A considerable number of studies focus on the recognition and detection of human activities, particularly abnormal ones. Detection of anomalous activity is crucial in surveillance applications. To autonomously record the anomalous behavior of individuals without system intervention, automatic video capture can be implemented. This study presents a framework for activity detection. Initially, we identify anomalous behavior involving individuals in the surveillance feed utilizing a proficient CNN model. The identified individual is monitored throughout the video stream using a rapid object tracker known as 'minimum output sum of squared error' (MOSSE). Subsequently, for each tracked individual, pyramidal convolutional features are extracted from two successive frames utilizing the efficient LiteFlowNet CNN. A novel deep skip connection gated recurrent unit is ultimately trained to discern various temporal changes in the sequence of frames for activity recognition and detection.

Keywords: Convolutional Neural Network (CNN), Probabilistic Neural Network (PNN), Minimum Output Sum of Squared Error (MOSSE), Support Vector Data Description (SVDD), Spatial Temporal Auto Encoder (STAE), Hidden Markov Model (HMM).

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Deep Learning-Based Detection and Classification of Coronary Artery Stenosis with Recurrent CNN in CT Angiography

S. Bavankumar
[4]Assistant Professor
[1]Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail: bhupendrakumar1545@gmail.com

ABSTRACT

Diverse forms of atherosclerotic plaque and differing degrees of stenosis may necessitate distinct management strategies for patients with coronary artery disease. Consequently, it is essential to identify and categorize the type of coronary artery plaque, as well as to ascertain the extent of coronary artery stenosis. This study comprises retrospectively gathered clinically acquired coronary CT angiography (CCTA) scans from 163 patients. The centrelines of the coronary arteries were extracted to reconstruct multi-planar reformatted (MPR) images of the coronary arteries. A multi-task recurrent convolutional neural network is utilized for automatic analysis of coronary artery MPR images. A 3D convolutional neural network is employed to extract features from the coronary artery. The extracted features are subsequently aggregated by a recurrent neural network that executes two concurrent multiclass classification tasks. In the initial task, the network identifies and classifies the type of coronary artery plaque. In the second task, the network identifies and assesses the anatomical relevance of coronary artery stenosis. The findings indicate that the automatic identification and categorization of coronary artery plaque and stenosis are achievable. This may facilitate the automated triage of patients into those without coronary plaque and those with coronary plaque and stenosis requiring further cardiovascular evaluation.

Keywords: Coronary CT Angiography (CCTA), Multi-Planar Reconstruction (MPR), Convolutional Neural Network (CNN), Coronary Artery Disease (CAD).

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PAPER ID: ICIRTCS-24-199

HARNESSING DECISION TREES FOR TWEET-BASED LOCATION PREDICTION

P. Sudharsan
[4]Assistant Professor
[1]Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail: bhupendrakumar1545@gmail.com

ABSTRACT

The prediction of users' locations based on online social media is a significant area of research currently. The automatic identification of locations associated with or mentioned in records has been studied for decades. As a prominent online social networking platform, Twitter has attracted a substantial number of users who generate millions of tweets daily. The global participation of its users and the incessant tweeting have significantly heightened interest in location prediction on Twitter recently. Tweets, characterized by their brevity and vibrant content, present numerous challenges for researchers in the field. The proposed framework examines the overall concept of location prediction utilizing tweets.

Keywords: CSV file, Term Frequency, Data Preprocessing, Machine Learning, Support Vector Machine, Decision Tree, Naïve Bayes, Application Programming Interface.

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LIGHTWEIGHT BLOCKCHAIN FRAMEWORK USING MULTISECRET SHARING FOR INDUSTRIAL APPLICATIONS

N. Balaraman
[4]Assistant Professor
[1]Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail: bhupendrakumar1545@gmail.com

ABSTRACT

Blockchain is a nascent technology that offers numerous promising applications across diverse sectors, including finance, healthcare, energy, and logistics management. Nonetheless, certain limitations within the current blockchain framework hinder its extensive adoption in the commercial sector. A significant limitation is the storage requirement, as each blockchain node must maintain a copy of the distributed ledger. Consequently, as the volume of transactions escalates, the storage demand expands quadratically, ultimately constraining the scalability of a blockchain system. This paper proposes a secret-sharing scheme to minimize the size of blockchain transactions. Each transaction block is partitioned into t segments, with each segment constituting 1/t of the transaction block's total size. We employ the secret-sharing mechanism to distribute t parts into n shares. Consequently, each node retains not a single transaction but rather a share within the blockchain system. The proposed scheme can ultimately decrease the storage cost of a blockchain transaction by 1/t without incurring extra recovery communication costs; however, this results in diminished robustness in the event of node failure as a trade-off. In the interim, the proposed scheme demonstrated superior efficiency and security relative to other cutting-edge schemes designed to minimize blockchain storage for industrial big data.

Keywords: Blockchain, ledger, secret sharing, big data

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PAPER ID: ICIRTCS-24-201

REAL-TIME PERSON DETECTION AND TRACKING FOR SOCIAL DISTANCING COMPLIANCE USING YOLOV3 AND DEEP SORT

S. Bavankumar
[4]Assistant Professor
[1]Department of Computer Science and Engineering,
St. Martin's Engineering College, Secunderabad, Telangana, India

*Corresponding Author
E-mail: bhupendrakumar1545@gmail.com

ABSTRACT

The widespread coronavirus disease 2019 (COVID-19) has precipitated a global crisis, affecting over 180 countries, with approximately 3,519,901 confirmed cases and 247,630 fatalities worldwide as of May 4, 2020. The absence of active therapeutic agents and immunity against COVID-19 heightens the population's vulnerability. The proposed framework employs the YOLO v3 object detection model to differentiate humans from the background and utilizes the Deep SORT methodology to track the identified individuals using bounding boxes and assigned IDs. The outcomes of the YOLO v3 model are subsequently compared with other prominent state-of-the-art models, such as the faster region-based CNN and single shot detector, regarding mean average precision (mAP), frames per second (FPS), and loss values associated with object classification and localization. The pairwise vectorized L2 norm is subsequently calculated using the three-dimensional feature space derived from the centroid coordinates and dimensions of the bounding box. The violation index term is introduced to quantify the non-adherence to social distancing protocols. The experimental analysis indicates that YOLO v3, in conjunction with the Deep SORT tracking scheme, yielded optimal results, demonstrating a balanced mean average precision (mAP) and frames per second (FPS) score for real-time social distancing monitoring.

Keywords: Deep Sort technique, YOLO v3 algorithm, fine-tuned, social distancing, COVID-19.

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ONLINE LEARNERS' ENGAGEMENT DETECTION VIA FACIALEMOTION RECOGNITION IN ONLINE LEARNING CONTEXT USING HYBRID CLASSIFICATION MODEL

Rama Bhadra Rao Maddu
Research Scholar
Department of Computer and Information Science Faculty of Science,
Annamalai University Annamalainagar, Chennai, Tamilnadu 608002, India ramamaddu7288@gmail.com

ABSTRACT

Internet-based educational activities including view- ing lectures, taking examinations, and participating in virtual meetings require students to engage with digital content. During these activities, learners express varying emotional states such as boredom, frustration, happiness, indifference, and confusion. Effective online education requires instructors to monitor student engagement levels accurately to provide targeted pedagogical support. This paper introduces a novel engagement prediction framework for online learners based on facial emotion analy- sis through four key phases: preprocessing, feature extraction, emotion recognition, and engagement assessment. We implement face detection preprocessing followed by extraction of Improved Active Appearance Model (AAM), Shape Local Binary Texture (SLBT), Global Binary Pattern (GBP), and ResNet features. These extracted features are processed through our proposed Hybrid Classification model combining Improved Deep Belief Network (IDBN) and Convolutional Neural Network (CNN) approaches. The system determines student engagement through enhanced entropy-based processing of recognized emotions. Ex- perimental evaluation against existing methods (DBN, SVM, CNN, LSTM-CNN, LSTM, and RF) across multiple metrics demonstrates superior performance, with our hybrid model achieving 95% accuracy at 80% learning for the CK+ dataset and significantly higher sensitivity (60%) for FER-2013 datasets.

Keywords : Student engagement detection, online learning environment, improved feature extraction, emotion recognition, hybrid neural network model

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PAPER ID: ICIRTCS-24-203

DEEP LEARNING APPROACHES FOR THE CLASSIFICATION OF DIESEL INJECTOR SPRAY PATTERNS

K. RAVINDRANATH TAGORE
1. Ph.D scholar, Department of Computer Science & Engineering, CH. Charan Singh University, Meerut, U.P,
E mail-ID: tagore.kandukuri@gmail.com

ABSTRACT

Accurate classification of diesel injector spray patterns is critical for evaluating fuel atomization quality and optimizing combustion efficiency in internal combustion engines. Traditional image analysis methods often struggle to capture the complex and dynamic nature of spray structures. In this study, we explore deep learning-based approaches particularly Convolutional Neural Networks (CNNs) for the automated classification of diesel spray images. A comprehensive dataset of high-speed diesel spray images was used, capturing a range of injector conditions and operating parameters. Several CNN architectures, including VGG16, ResNet50, and custom shallow networks, were trained and evaluated for their performance in classifying spray patterns into predefined categories based on shape, dispersion, and uniformity. Data augmentation techniques were employed to improve generalization and robustness. The results demonstrate that deep learning models significantly outperform traditional machine learning approaches in terms of classification accuracy and resilience to noise and image distortion. The best-performing model achieved over 95% accuracy in distinguishing between normal and defective spray patterns. These findings highlight the potential of deep learning techniques to assist in real-time diagnostics and quality control of fuel injection systems, ultimately contributing to cleaner and more efficient diesel engine performance.

Keywords: CNN architectures, VGG16, Diesel Injector Spray Patterns.

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PAPER ID: ICIRTCS-24-204

MEDICAL DIAGNOSIS UNDER UNCERTAINTY USING INTUITIONISTIC TYPE-II FUZZY LOGIC

K.Sridhar
1. Research Scholar , Department of Mathematics,Meerut college, Meerut
Chaudhary Charan Singh University (U.P), ksr1996@gmail.com

ABSTRACT

Medical diagnosis often involves uncertainty and imprecision due to incomplete, vague, or conflicting patient data. Traditional diagnostic models struggle to manage such ambiguity effectively, potentially leading to misdiagnosis or delayed treatment. This paper proposes an advanced diagnostic framework based on Intuitionistic Type-II Fuzzy Logic (IT2FL) to address these challenges. By integrating the expressive power of Type-II fuzzy sets with the dual membership and non-membership features of intuitionistic fuzzy logic, the proposed model provides a robust mechanism for reasoning under uncertainty. The system is designed as a fuzzy inference engine that incorporates medical knowledge through a rule-based structure, enabling nuanced interpretation of clinical symptoms and test results. A case study involving the diagnosis of common chronic conditions—such as diabetes, hypertension, and coronary artery disease—demonstrates the model's effectiveness. Comparative analysis with Type-I and traditional Type-II fuzzy systems reveals significant improvements in diagnostic accuracy, sensitivity, and interpretability. The results suggest that IT2FL-based inference systems hold strong potential for deployment in real-world medical decision support tools, particularly in settings where diagnostic uncertainty is high.

Keywords: Type-II fuzzy systems, Medical Diagnosis, Comparative analysis

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ABOUT CONFERENCE

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