

24th & 25th January, 2025
Ahmedabad, India

2nd INTERNATIONAL CONFERENCE ON RECENT ADVANCES IN ENGINEERING AND COMPUTER APPLICATIONS-2025



Organized By:

**L J Institute of Computer Applications,
L J University, Ahmedabad, India**





2nd International Conference on Recent Advances in
Engineering and Computer Applications(ICRAECA)-2025

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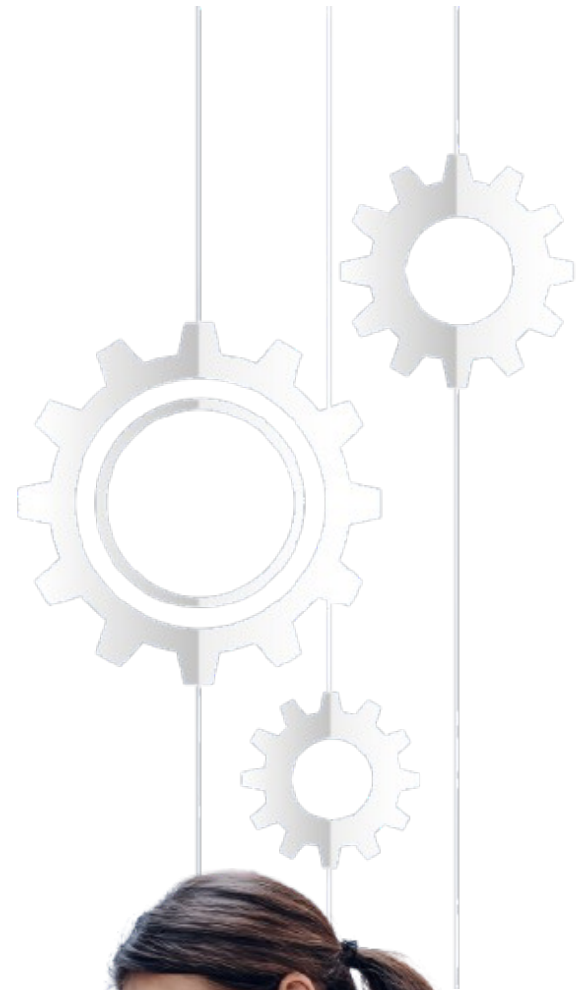
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Conference Theme:

“Recent Advances in Technolgoy”

– 24th & 25th January, 2025 | Ahmedabad, India



PREFACE

We are delighted to extend a warm welcome to all participants attending 2nd International Conference on Recent Advances in Engineering and Computer Applications (ICRAECA-2025), taking place in Ahmedabad, India on 24th & 25th January, 2025. This conference provides a vital platform for researchers, students, academicians, and industry professionals from all over the world to share their latest research results and development activities in the field of Sustainable Agriculture and Climate Resilience. It offers delegates an opportunity to exchange new ideas and experiences, establish business or research relationships, and explore global collaborations.

The proceedings for ICRAECA-2025 contain the most up-to-date, comprehensive, and globally relevant knowledge in the field of Engineering, Technology and Management. All submitted papers were subject to rigorous peer-reviewing by 2-4 expert referees, and the papers included in these proceedings have been selected for their quality and relevance to the conference. We are confident that these proceedings will not only provide readers with a broad overview of the latest research results in Engineering, Technology and Management but also serve as a valuable summary and reference for further research in this field.

We are grateful for the support of many universities and research institutes, whose contributions were vital to the success of this conference. We extend our sincerest gratitude and highest respect to the many professors who played an important role in the review process, providing valuable feedback and suggestions to authors to improve their work. We also extend our appreciation to the external reviewers for providing additional support in the review process and to the authors for contributing their research results to the ICRAECA-2025.

Since November 2024, the Organizing Committees have received more than 175+ manuscript papers, covering all aspects of ICRAECA-2025. After review, approximately 80+ papers were selected for inclusion in the proceedings of ICRAECA-2025. We would like to thank all participants at the conference for their significant contribution to its success. We express our gratitude to the keynote and individual speakers and all participating authors for their dedication and hard work. We also sincerely appreciate the efforts of the technical program committee and all reviewers, whose contributions made this conference possible. Finally, we extend our thanks to all the referees for their constructive comments on all papers, and we express our deepest gratitude to the organizing committee for their tireless work in making this conference a reality.

ABOUT ICRAECA – 2025

The “International Conference on Recent Advances in Engineering and Computer Applications-2025 (ICRAECA2025)” organized and hosted by the LJ University in Ahmedabad on January 2025 in association with IFERP. ICRAECA2025 will provide a platform for researchers, academicians, industry experts, and students to share their innovative ideas and varied skills on a global scale. The best part is you can participate either online or offline, making it accessible to everyone, no matter where you are in the world..!

The conference will feature many different tracks, including Artificial Intelligence, Robotic Technology, Signal Processing, Image Processing, Communications, Embedded Systems, Networking, IoT, Machine Learning, Deep Learning, Civil Engineering, Mechanical Engineering, and many more. The conference will feature invited talks and keynote addresses from eminent personalities all around the world and referred paper presentations.

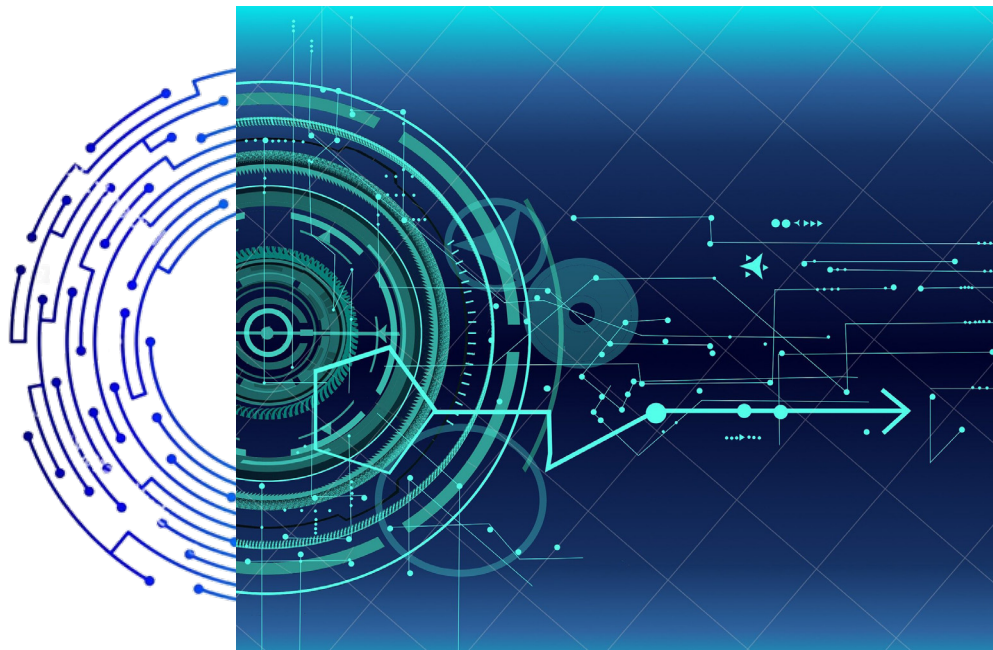
In addition to the exciting lineup of speakers and tracks, the ICRAECA2025 will also offer participants the opportunity to have their research published in renowned journals. Selected papers from the conference will be published in Scopus index journals, providing a valuable opportunity for researchers to share their work with a wider audience and gain recognition in their field. Additionally, all accepted papers will be published in IFERP proceedings with an ISBN, ensuring that your research is accessible to others and contributing to the advancement of knowledge in the field of information technology.



ABOUT COLLEGE

LJ Group of Institutes is managed by Lok Jagruti Kendra (LJK), a Charitable Trust and a Registered Society established in 1980 by eminent academicians and visionaries like Prof. B.M. Peerzada, former Dean of Commerce Faculty, Gujarat University, Padma Bhushan Lord Meghnad Desai (London School of Economics), Prof. Gautam Appa (LSE), Late Prof. M.S. Trivedi, former Vice Chancellor, South Gujarat University, renowned jurist Late Shri Girishbhai Patel and Shri Subodhbhai Shah. It was envisioned as “a key player in education and social development by promoting and nurturing creativity, scholarship, innovation and excellence through a chain of quality institutes.” LJK’s mission has been “to establish and manage institutions with an environment in which new ideas, delivery strategies and scholarship flourish and from where leaders and innovators of tomorrow shall emerge.

LJK runs 32 institutions on two well-developed environment-friendly campuses with dedicated buildings and infrastructure facilities, and offering various diploma, undergraduate and postgraduate programmes duly approved by respective apex bodies. LJ Institutes have over 21000 students and 1000+ faculties engaged in teaching-learning, research and extension activities and striving to develop students into complete citizens not only having the necessary subject knowledge and skills, but also the empathy towards various environmental, social, cultural and other issues affecting the society.



ABOUT IFERP

Institute For Engineering Research and Publication (IFERP) is a non-profitable professional association meant for research and development in the field of Engineering, Science & Technology. IFERP is on its way to digitize innovation processes through our professional networking services and thus Providing an Integrated Virtual Scientific Community, mutual engagement, exploring Potential of researchers, creating a cooperative and collaborative academic environment.

IFERP is a paramount body which has brought technical revolution and sustainable development in the field of Engineering, science and technology. IFERP fulfills the need of professionals even for their end to end research & development. IFERP supports the professional growth of its members by providing opportunities for professional networking, life-long learning and career development. Our members, associates, students & staff together made a few milestones achieved through our R&D activities in nook & corners of the world.

IFERP is a forum where innovations & research interest could be supported and developed prioritizing our mutual interest. Our forums & Associates consist of Professional leaders, Engineers, Academicians, Delegates, Scientists, students, Universities, Institutions, Industries, Organizations & Associations connecting each other with a mission to work as wizards of science for defending the earth. IFERP connects engineers, exchange global innovation and act as a bridge between Researchers & Academicians.



MESSAGE FROM COLLEGE DIGNITARIES



Mr. Alok Manke

Director

As a steering committee chair, I am delighted to announce the “International Conference on Recent Advances in Engineering and Computer Applications-2025” has been organized by our university. The conference brings together experts and practitioners from diverse fields to share their technical knowledge and proficiency in emerging sectors of information and technology. We have planned an engaging program that includes keynote speeches, panel discussions, and workshops. You will have the opportunity to network with peers, learn from experts, and contribute to the global knowledge base. Join us in this journey of sharing and learning.



Dr. Dinesh Awasthi

Vice-chancellor

Technologies has changed the way we live. They are emerging at an exponential pace. Consequently, the rate of technological obsolescence has also accelerated substantially. It necessitates academia to keep abreast of the developments in emerging technologies. I am happy to learn that the School of Computer Sciences, L J University is organizing a 2-day conference to address these issues. We endeavor to provide a platform for the academic fraternity to discuss, deliberate, and learn from each other. I am pleased to invite you and welcome you to the Conference to extend the frontiers of knowledge and be an active participant in the ongoing technological revolution. Please join the conference to share your intellectual excellence with your peers.

MESSAGE FROM MANAGING DIRECTOR, IFERP



Mr. A. SIDDH KUMAR CHHAJER

MD & Founder,
IFERP, Technoarete Groups

On behalf of Institute For Educational Research and Publications (IFERP) & the organizing Committee, I express my hearty gratitude to the Participants, Keynote Speakers, Delegates, Reviewers and Researchers.

The goal of the 2nd International Conference on Recent Advances in Engineering and Computer Applications (ICRAECA-2025) is to provide knowledge enrichment and innovative technical exchange between international researchers or scholars and practitioners from the academia and industries in the field of Recent Advances in Engineering and Computer Applications.

This conference creates solutions in different ways and to share innovative ideas in the field of Recent Advances in Engineering and Computer Applications. ICRAECA-2025 provides a world class stage to the Researchers, Professionals, Scientists, Academicians and Students to engage in very challenging conversations, assess the current body of research and determine knowledge and capability gaps.

2nd International Conference on Recent Advances in Engineering and Computer Applications (ICRAECA-2025) will explore the new horizons of innovations from distinguished Researchers, Scientists and Eminent Authors in academia and industry working for the advancements in Science and Engineering from all over the world. ICRAECA-2025 hopes to set the perfect platform for participants to establish careers as successful and globally renowned specialists in the field of Science and Engineering.

MESSAGE FROM CHIEF EXECUTIVE, IFERP



MR. RUDRA BHANU SATPATHY

CEO & Founder,
IFERP, Technoarete Groups

IFERP is hosting the 2nd International Conference on Recent Advances in Engineering and Computer Applications (ICRAECA-2025) this year in month of 24th & 25th January 2025, Ahmedabad, India. The main objective of ICRAECA-2025 is to grant the amazing opportunity to learn about groundbreaking developments in modern industry, talk through difficult workplace scenarios with peers who experience the same pain points and experience enormous growth and development as a professional. There will be no shortage of continuous networking opportunities and informational sessions. The sessions serve as an excellent opportunity to soak up information from widely respected experts.

Connecting with fellow professionals and sharing the success stories of your firm is an excellent way to build relations and become known as a thought leader. I express my hearty gratitude to all my Colleagues, Staffs, Professors, Reviewers and Members of Organizing Committee for their hearty and dedicated support to make this conference successful. I am also thankful to all our delegates for their pain staking effort to make this conference successful.

BIOGRAPHY OF KEYNOTE SPEAKER



Dr. Sayan Kumar Ray

Professor, Head of School of Computer Science, Taylor's University Malaysia.

Dr Sayan Kumar Ray is the Head of School of Computer Science and full Professor at Taylor's University, Malaysia. He completed a Ph.D degree in Computer Science from the University of Canterbury in New Zealand with full scholarship. Prior to that he completed the Master of Technology and Bachelor of Engineering degrees both in Computer Science and Engineering from India. While in New Zealand, Sayan worked in the School of Digital Technologies at Manukau Institute of Technology (MIT) in Auckland where he held positions like Associate Dean, Head of School, Academic Leader of Research and Curriculum Development, and Network Leader. He also won multiple awards, including, Research Excellence Award, Overall Outstanding Performance Award, and Teaching Excellence Award. Prior to MIT, Auckland, Sayan used to work as Design Engineer at Tait Communications, New Zealand, where he researched on Evolved Packet Core backbone network of LTE-Advanced technologies. Sayan research on topics related to Cybersecurity, IoT Applications, Autonomous Transportation System, 5G/6G networks, and Applications of AI and Machine Learning. His work regularly features in top-tier journals and conferences and till date has more than hundred publications, including in top journals like IEEE Communications Surveys and Tutorials, IEEE JSAC, IEEE Access, Elsevier JNCA, Computer Networks, Sensors and in premier conferences like IEEE LCN, IEEE WCNC, IEEE APCC, ACIS, PACIS, etc. He is a New Zealand PBRF ranked researcher. Sayan's coauthored papers have won 5 Best Paper Awards and 1 best commendation award in international conferences of repute. He has given multiple keynotes and invited talks at conferences and other events. Sayan has supervised multiple Ph.D and Masters research work to successful completion and has been a regular examiner for Ph.D and Research Masters thesis. He also has two published UK Design patents.

BIOGRAPHY OF KEYNOTE SPEAKER



Dr. Kiran Trivedi

Engineering and Information Science,
University of Wollongong Australia- India

Dr Trivedi has served in Professor and Head of department positions at prestigious institutions throughout India and the US. His award-winning research in complex, frontier disciplines such as machine learning applications in health informatics, IoT systems and data analytics is documented in more than 35 publications. In 2023, during his time as Associate Teaching Professor at Northeastern University, Seattle, Dr Trivedi developed a course on Data Mining for the institute's popular Master of Science in Data Analytics Engineering on Coursera – adapting theory to evolving technological landscape and industry needs. Promising a global education experience in India, Dr Trivedi is excited to welcome prospective students to UOW's India campus. "With a curriculum mirroring UOW Australia's high standards, students can look forward to an internationally recognised education that prepares them for the global job market.

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Abstract's



The Impact of Digital Marketing Capabilities on Firm Performance: A Study of Micro and Small-Scale Industries in the Textile Sector of Haryana with Mediating Effects of Competitive Advantage and Value Creation, and Moderating Effects of Digital Leadership

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Abstract:

This research aims to examine the effect of digital marketing capabilities on the firm performance of Micro and Small-Scale Industries (MSMEs) in the textile sector of Haryana, India. Since digital marketing has become more significant in increasing business success, this study seeks to examine the role played by digital marketing capabilities in increasing operational success of the MSMEs. The paper also looks at the moderation effects of competitive advantage and value creating in this relationship in a bid to giving knowledge on firm performance. Moreover, it also examines the mediating role of digital leadership in the enhance of the outcomes of digital marketing strategies. Primary data was gathered from the textile sector MSMEs in Haryana and is tested by regression and structural equation modeling analysis. The present research establishes that digital marketing capabilities positively influence firm performance with both competitive advantage and value creation being pivotal moderators. Also, it was noted that digital leadership plays a big role in moderating this relationship, thereby enhancing the impact of digital marketing on performance. The findings of this research offer specific guidance for MSME owners and policymakers to develop digital marketing competencies and leadership qualities in order to increase competitiveness in the growing market.

Keywords:

Digital marketing capabilities, firm performance, MSMEs, textile sector, competitive advantage, value creation, digital leadership, mediation, moderation, Haryana

Crime Hotspot Detection and Future Crime Prediction using Machine learning

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Abstract:

In our project focused on detecting and analyzing criminal activities in urban environments. Existing systems commonly rely on historical crime data and traditional statistical methods, which may not adequately capture the complexities of crime patterns. In contrast, our proposed system utilizes the Naive Bayes algorithm to enhance the accuracy of crime predictions and analyses. By identifying neighborhoods with elevated crime rates, we enable law enforcement agencies to allocate resources more effectively. Our approach aims to locate spatial and temporal crime hotspots and forecast future criminal incidents, as well as predict the types of crimes likely to occur in specific locations within defined time frames. Additionally, we integrate demographic information to provide a comprehensive analysis of the factors influencing crime patterns across various neighborhoods. This study not only enhances public safety awareness but also equips residents with actionable insights, leading to improved crime prevention strategies.

Keywords:

Criminal activities, Naïve bayes algorithm, Crime hotspots, demographic information.

Quantum-Safe Cryptography: Evolution of Encryption Techniques

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Abstract:

As we step into the quantum era, the security of our traditional encryption methods faces a whole new set of challenges. The rise of quantum computers brings with it the looming threat of advanced algorithms like Shor's and Grover's, which have the potential to crack widely-used cryptographic systems. In this paper, this paper takes a deep dive into the limitations and vulnerabilities of our current encryption techniques, shining a spotlight on how susceptible they are to these quantum attacks. Our main goal is to advocate for the development and rapid deployment of quantum-resistant algorithms. By carefully examining the weaknesses in our existing encryption methods, this paper aims to emphasize the urgent need to strengthen our cryptographic systems against the computational might of quantum computers. But it's not just about algorithms – this paper also explores the resource-intensive nature of quantum computing itself. This includes looking into things like computational requirements, energy usage, and the practical challenges involved in building and maintaining quantum computers. We take a closer look at how implementing quantum key distribution (QKD) could potentially help address these challenges. This paper analyses what it would mean to integrate QKD into the current communication systems, weighing the pros and cons to gain a better understanding of this quantum-resistant approach. This paper serves as both a diagnosis of the vulnerabilities in the current cryptographic techniques and a call to action for the cryptography community. We urge for collaborative discussions, innovative thinking, and interdisciplinary approaches to tackle the complex challenges brought about by the quantum era. It's not just about finding solutions – it's about working together to pave the way for a more secure digital future.

Keywords:

Shor's Algorithm, Grover's Algorithm, Weaknesses in Cryptography Techniques, Quantum Key Distribution (QKD), Resource-Intensive Quantum Computing.

Employing Ai-Driven Methodologies and Intelligent Insights for Enhanced Management of Ear Disorders

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Abstract:

Otoscopy is a diagnostic technique used to examine the outside auditory canal and the eardrum (tympanic membrane) using an otoscope. This handheld instrument consists of a light source and a magnifying lens or camera that allow healthcare professionals to envisage the structures of the ear canal and the eardrum. Otoscopy is commonly performed to assess ear health, identify abnormalities such as infections, inflammation, wax buildup, foreign bodies, structural defects, tumors, or signs of trauma. It is an essential part of the evaluation process for patients with ear-related symptoms like pain, hearing loss, or discharge. Otoscopy is typically performed as part of a comprehensive ear examination and may be accompanied by other tests such as tympanometry or audiometry to further assess ear function. Otoscopy the stage a crucial role in diagnosing various ear pathologies, yet correct and timely classification of otoscopy images remainder a challenging task. In this study, we propose a deep learning-based come within reach of for automated otoscopy classification. We curated a diverse dataset comprising otoscopy images encompassing normal anatomy and a spectrum of pathologies, including infections, inflammations, tumours, and structural abnormalities. We employed Convolutional Neural Networks (CNNs) with Pre trained model named as DenseNet framework, a powerful class of deep learning models, for feature taking out and classification. The dataset was pre-processed to enhance uniformity and augment diversity, and the model was trained with categorical cross-entropy loss. Hyperparameters were fine-tuned to optimize performance, and the model was evaluated using standard metrics including accurateness, precision, recall, F1-score, and AUC-ROC. Our results demonstrate the effectiveness of the proposed move towards in accurately classify otoscopy images, showcasing its potential as a valuable tool in clinical practice for aiding in the diagnosis of ear pathologies.

Keywords:

Diagnostic technique, Auditory canal, Tympanic membrane, Healthcare professionals, Abnormalities and Infections, Inflammation.

Speech Emotion Recognition using Deep Learning Techniques

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Abstract:

The aim to develop an advanced Speech Emotion Recognition (SER) system utilizing the RAVDESS and TESS datasets, widely recognized in the domain of affective computing. The system focuses on extracting critical audio features, particularly Mel-frequency cepstral coefficients (MFCCs), to capture the subtle emotional cues embedded in human speech. The core machine learning model implemented in this study is a Multi-Layer Perceptron (MLP), chosen for its capacity to handle complex patterns in the data. The model's performance is rigorously evaluated using accuracy metrics, providing an in-depth assessment of its effectiveness in emotion recognition tasks. The study highlights the potential of MLP in classifying speech-based emotions, offering valuable insights into its applicability in SER systems. The outcomes of this research have significant implications for practical applications, such as enhancing human-computer interaction, supporting mental health diagnostics, and personalizing customer service with emotion-aware technologies. This work advances the field of SER, contributing to the development of more emotionally intelligent and responsive systems for everyday use.

Keywords:

Speech Emotion Recognition (SER), Multi-Layer Perceptron (MLP), Mel-frequency cepstral coefficients (MFCCs).

Safe URL Detection with Privacy using Machine Learning and Cryptography Techniques

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Abstract:

A malicious URL, or website, represents a prevalent and serious threat to cybersecurity. Search engines logically serve as the foundation for managing in order. However, the influx of a significant number of malicious websites on search engines has created a considerable threat to our users. Most existing systems designed to identify malicious websites concentrate on particular types of attacks. Simultaneously, available browser extensions relying on blacklists are ineffective against numerous websites. In order to stop the server from deriving any useful information from the masked data, it is imperative that any data supplied from the client side be successfully hidden. We provide the first Privacy-Preserving Safe Browsing service in this regard. Strong security guarantees that are now absent from other Safe Browsing services are offered by this service. In particular, it preserves the capacity to recognise dangerous URLs while safeguarding the user's privacy and the blacklist provider's proprietary assets. In this study, we provide a methodology that protects users' privacy from outside analysts and the service provider by encrypting their perceptual data. Furthermore, while maintaining differential privacy, it fully enables selected aggregate operations for examining user behavior online. The AES (Advanced Encryption Standard) algorithm is employed for encrypting users' online search behavior data. Only authenticated users can decrypt their history with assistance from the secret key sharing and verification process. A user feedback system notifies the search engine administrator of any malicious URLs, enabling the administrator to frequently update the malicious URL database.

Keywords:

Malicious URL Detection, Blacklist Creation, History encryption using AES, URL Recommendation, Key verification, History Access.



Advanced Tennis Analysis Using AI-Powered Object Detection and Key Point Analysis

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Abstract:

This paper introduces a comprehensive framework for post-match tennis analytics using YOLO Object Detection and Key Point Extraction in PyTorch. The system takes game video as input and provides detailed post-match analysis, including player movement tracking, ball trajectory analysis, and court key point detection. Our model demonstrates significant improvements in accuracy and speed over existing systems such as Hawk-Eye and traditional machine learning models, offering valuable insights for both coaches and players. By providing in-depth analytics on player performance and strategy, the system has the potential to revolutionize training sessions and competitive match preparations. By leveraging YOLO's object detection for identifying players and tennis balls, the system offers a highly accurate breakdown of player actions and game events. This framework demonstrates significant improvements in accuracy and detail over existing models in the literature, making it a valuable tool for post-game analysis in training and competitive environments.

Enhancing Accessibility for People with Attention Deficit Hyper-active Disorder through Text Summarization

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Abstract:

Individuals with Attention Deficit Hyperactivity Disorder (ADHD) often experience cognitive overload when processing complex information, resulting in reduced comprehension. This paper introduces an ADHD-friendly text summarization system combining traditional NLP techniques (TF-IDF, TextRank) with a transformer-based BART model. This system generates bullet-point summaries to reduce cognitive load, with additional support from Text-to-Speech (TTS) functionality to enhance accessibility for users who may benefit from auditory learning. Experimental results demonstrate increased precision, indicating that the system effectively filters essential content, making it well-suited for ADHD accessibility needs. This study contributes to the field of accessible technology, aligning with Sustainable Development Goal (SDG) 4 by promoting inclusive information access.

RNN-Powered Predictive System for Heart Disease Prediction

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Abstract:

In recent years, heart disease has become one of the leading causes of mortality worldwide, necessitating early prediction and prevention through advanced computational approaches. This project, titled RNN-Powered Predictive System for Heart Disease Prediction, presents a novel model designed to leverage Recurrent Neural Networks (RNN) for predicting the likelihood of heart disease based on multiple clinical parameters. By focusing on the sequential nature of health-related data and utilizing time series analysis, our RNN model captures temporal dependencies and patterns that are crucial for effective prediction. The dataset used in this study comprises numerous patient records with attributes such as age, blood pressure, cholesterol levels, and other vital statistics relevant to cardiac health. This data undergoes pre-processing to handle missing values, normalize features, and convert categorical data into numerical form to ensure model accuracy and stability. The RNN architecture selected for this model includes layers with Long Short-Term Memory (LSTM) units, which are particularly effective in retaining long-term dependencies, thereby enhancing the prediction accuracy of the model. Hyperparameters, including learning rate, batch size, and the number of epochs, are meticulously tuned to optimize model performance. The model's effectiveness is evaluated through metrics like accuracy, precision, recall, and F1-score, with a cross-validation approach to ensure robustness. The results demonstrate that our RNN-powered predictive system performs with a high degree of accuracy, significantly outperforming traditional machine learning models for heart disease prediction. Furthermore, this approach not only facilitates early diagnosis but also provides a framework for personalized healthcare solutions, where real-time patient data can be continuously monitored and fed into the model for ongoing assessment. This predictive system holds great potential for integration into healthcare systems, providing clinicians with a reliable tool for early intervention, ultimately contributing to reduced mortality rates and improved patient outcomes in cardiovascular care.

Keywords:

Heart Disease Prediction, Recurrent Neural Networks (RNN), Long Short-Term Memory (LSTM), Time Series Analysis, Clinical Data, Cardiovascular Health and Predictive Modeling

Deep Learning Framework for Comprehensive Multi-disease Detection in Retinal Images with CNN

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Abstract:

Retinal imaging has emerged as a valuable tool in the early detection and diagnosis of various systemic diseases. This study presents a novel approach for the simultaneous prediction of multiple diseases utilizing retinal images. The proposed methodology involves the collection of a diverse dataset comprising retinal images labeled with the presence or absence of multiple diseases, including but not limited to diabetic retinopathy, glaucoma, or cataracts. Preprocessing techniques are applied to ensure data consistency and remove noise, followed by feature extraction from retinal images using advanced deep learning architectures. Machine learning models, including multi-label classification and multi-task learning, are trained on the extracted features to predict the presence of multiple diseases simultaneously. The performance of the models is evaluated using rigorous validation techniques, including accuracy, sensitivity, specificity, and area under the receiver operating characteristic curve (AUC-ROC). Clinical validation is conducted to assess the effectiveness of the predictive system in real-world healthcare settings. The integration of the predictive system into clinical workflows is discussed, emphasizing seamless interaction with healthcare professionals and compliance with regulatory standards. The study concludes with insights into ongoing research and development efforts aimed at further improving the accuracy and scope of multi-disease prediction using retinal images using VGG16 framework in deep learning framework. This research represents a significant step towards leveraging retinal imaging for comprehensive disease diagnosis and management, with the potential to enhance early intervention and improve patient outcomes.

Keywords:

Retinal imaging, Diabetic retinopathy, Glaucoma, Cataracts, Dataset, Noise removal and VGG16 framework

Accident Severity Classification and Prediction using Machine Learning

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Abstract:

Road traffic accidents are a major cause of fatalities and injuries across the globe, underscoring the need for systems that can accurately predict accident severity. This project employs machine learning, specifically the Random Forest algorithm, to classify and predict the severity of road accidents using available traffic and environmental data. The dataset utilized includes various features such as driver demographics, vehicle details, road conditions, and weather information. To prepare the data for model training, several preprocessing steps were undertaken, including handling missing values, scaling features, and addressing class imbalances using SMOTE. The model's performance was assessed using several key metrics such as accuracy, precision, recall, and F1-score, achieving an accuracy of 70.1%. The Random Forest model proved to be highly effective, particularly in predicting major and fatal accidents, with recall values of 80% and 83%, respectively. Moreover, the model was deployed as a Flask-based web application, enabling real-time predictions of accident severity. This web app allows users to input accident data and instantly receive severity predictions, which can aid emergency responders in prioritizing their resources more efficiently. The integration of this predictive system into traffic management and road safety infrastructure has the potential to significantly improve emergency response times and overall public safety. The study concludes that machine learning models, particularly Random Forest, offer a scalable and effective solution for accident severity prediction, with the possibility of further refinement and broader application in real-time systems.

Crop and Fertilizer Recommendation with Plant Disease Detection System

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Abstract:

This project is a machine learning and deep learning-based website designed to provide recommendations to farmers for crop growth, fertilizer usage, and plant disease prevention. Agriculture is a crucial sector in countries like India where a significant portion of the population depends on it for their livelihood. By implementing new technologies such as machine learning and deep learning, we aim to make agriculture easier for farmers to increase their yield and profitability. The crop recommendation system predicts the best crop to grow based on the soil data, state, and city provided by the user. The fertilizer recommendation system provides suggestions on which nutrients the soil lacks or has excess of, based on the soil data and crop type. The plant disease detection system uses ResNet algorithm with hyperparameter tuning to identify the disease present in the leaf image, providing suggestions to cure/prevent the disease accordingly. The methodology we used involved preprocessing the data and passing it through decision trees, Naive Bayes classifiers, SVM, logistic regression, and random forest algorithms to provide the final recommendations. We used the Flask framework to develop the website, and the website can be easily accessed through a web browser. Overall, our project aims to simplify the agricultural process for farmers by providing accurate recommendations for crop growth, fertilizer usage, and plant disease prevention. We hope that our website can help farmers maximize their yield and profitability, ultimately contributing to the economic growth of the country

Intelligent License Plate Recognition (ILPR) With YOLOv8 and Easyocr Integration

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Abstract:

This project introduces an Intelligent License Plate Recognition (ILPR) system that integrates YOLOv8, a cutting-edge object detection model, with EasyOCR, a robust Optical Character Recognition (OCR) tool, to deliver fast and accurate license plate detection and recognition. YOLOv8 is used to detect license plates in real-time from various sources, such as images and video streams, excelling in speed and precision even under challenging conditions, like complex backgrounds and varying light. Once a plate is identified, EasyOCR extracts the alphanumeric characters from the detected area, converting visual data into text with high accuracy. The system effectively overcomes common challenges in license plate recognition, such as image quality variations, diverse plate designs, and different fonts. The ILPR solution is suitable for a wide range of applications, including automated toll collection, traffic monitoring, and security surveillance. Testing shows strong performance in various environments, highlighting the system's potential for real-world deployment. This work demonstrates how the combination of YOLOv8 and EasyOCR can provide an efficient and scalable solution for license plate recognition in dynamic environments.

Keywords:

License Plate Detection, Real-Time Identification, YOLOv8, Text Recognition, Vehicle Monitoring, Deep Learning Models, Convolutional Neural Networks (CNNs)

Multi-Modal Fake Profile Detection Leveraging Hybrid Models

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Abstract:

The Multi-Modal Fake Profile Detection Leveraging Hybrid Models project aims to develop a comprehensive system for detecting fake social media profiles by analysing multiple data modalities text, numerical data, and images. In Phase 1, the system combines textual and behavioural data to classify profiles as genuine or fake. Text data, including profile descriptions and locations, is processed using BERT to generate embeddings that capture linguistic patterns, while behavioural features like follower count and engagement metrics are scaled and analysed using a Random Forest classifier. These features are integrated through a stacking ensemble model that includes Logistic Regression and Random Forest as base models, and a meta-classifier that consolidates their outputs, achieving a balanced, accurate classification. Phase 1 results demonstrate the model's effectiveness, achieving high accuracy, precision, and recall. In Phase 2, image data will be incorporated to further refine detection capabilities by analysing profile pictures for signs of manipulation or duplication. Convolutional Neural Networks (CNN) will generate image embeddings, which will be fused with text and numerical features, creating a holistic multi-modal detection framework. This extended model will provide more robust detection, identifying profiles that use synthetic or inappropriate images in addition to textual or behavioural anomalies. The combination of image data in Phase 2 is expected to further improve classification accuracy and enhance adaptability across various social media platforms. This project has significant applications for social media security, including reducing misinformation, enhancing platform trust, and preventing fraud. By integrating multiple data modalities and leveraging advanced machine learning and NLP techniques, the proposed system provides a scalable, adaptable solution that addresses the evolving nature of fake profile generation, offering a stronger defence against deceptive accounts across digital platforms.

AI-Driven Detection of Plant Disease: A Deep Learning Approach for Environmental Sustainability

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Abstract:

Agriculture, the backbone of human civilization, faces increasing challenges from plant diseases exacerbated by climate change and environmental conditions. Early detection and management of plant diseases are crucial for improving food security and sustainability. This paper presents an AI-driven approach for plant disease detection, utilizing deep learning techniques such as Convolutional Neural Networks (CNNs) to classify diseased and healthy plants based on image analysis. By leveraging a dataset of over 87,000 images across 38 categories, the proposed model achieves high accuracy in identifying plant diseases. Furthermore, the study explores a hybrid system combining CNNs with Support Vector Machines (SVM) for improved classification performance. The integration of advanced technologies such as drone surveillance and satellite imaging enhances field monitoring, while sustainable practices like Integrated Pest Management (IPM) ensure environmental balance. This paper highlights the potential of deep learning in revolutionizing agricultural disease management, promoting a healthier ecosystem, and ensuring long-term food security.

Integrating Machine Learning for Dynamic Demand Forecasting and Stock Control in Retail Supply Chains

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Abstract:

Modern supply chains face significant challenges in accurately forecasting demand and optimizing inventory levels. Traditional methods, often relying on expert intuition and basic statistical techniques, struggle to scale with the growing complexity of product categories and dynamic customer demand patterns. This research proposes a data-driven, programmatic approach to demand forecasting using the Facebook Prophet model. This model utilizes the historical sales record, product characteristics, and external influences such as holidays to predict future demand for a top-selling product. The analysis reveals a relatively stable demand pattern for the product over time. However, it also identifies cyclical variations in sales during specific quarters, indicating the potential impact of seasonality and promotions. The results of the demand forecast using the Prophet model show a high degree of precision, and a low Mean Absolute Percentage Error (MAPE) for horizons within a 200-day range. While the accuracy drops slightly for longer horizons, the model provides valuable insights for inventory planning. Based on the forecasted demand, the research investigates optimal inventory policies. The reorder point, which triggers the replenishment of stock, is calculated considering the average of lead time demand and safety stock to mitigate stockouts. On further analysis it suggests a reorder point of 3753 units for the top-selling product. Further exploration in inventory management methods, including the Economic Order Quantity model, can further enhance supply chain efficiency and responsiveness.

Keywords:

Demand forecasting, Prophet Model, supply chain management, time series forecasting, inventory optimization, predictive analysis.

Sequence-to-Sequence Learning for Audio Transcription: Leveraging Wav2Vec2 and Whisper

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Abstract:

Automatic speech recognition (ASR) has become a cornerstone of natural language processing (NLP), enabling real-time conversations with devices and powering essential services like voice assistants and real-time captioning. With the growing demand for accurate and efficient speech-to-text conversion, sequence-to-sequence (Seq2Seq) learning methods are emerging as powerful tools for audio transcription. This paper investigates the effectiveness of two pioneering Seq2Seq models for ASR: Wav2Vec2 and Whisper. Wav2Vec2, a pre-trained model leveraging self-supervised learning, has demonstrated strong performance in general audio transcription tasks. Whisper, on the other hand, is specifically designed for ASR, incorporating additional optimization techniques for efficiency and robustness. While both models utilize deep learning architectures to convert audio into textual representations, they possess distinct strengths and limitations. This study explores the performance of Wav2Vec2 and Whisper on a diverse audio dataset encompassing various languages and speech patterns, including recordings with background noise. We evaluate the models based on transcription accuracy (Word Error Rate), noise robustness, and computational efficiency. Additionally, we analyze the impact of fine-tuning and customization strategies on both models. By comparing and contrasting the performance of Wav2Vec2 and Whisper, in this research we aim to offer important intuition into the present-day capabilities of Seq2Seq models for ASR. These findings can apprise the development of even more effectual and versatile ASR systems in the future.

Keywords:

Automatic Speech Recognition, Audio Transcription, Wav2Vec2, Whisper, ASR Models.

Sentiment Analysis: A Comprehensive Review

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Abstract:

This paper includes a discussion on some other areas of concern including the convenience and nuisance of lexicon-based approaches, the potential of machine learning and deep learning methodologies. This is then followed by proper solutions, such as metrics used for the measurement of the applicability of sentiment analysis in different fields, and directions of its development. The goal of this review is to facilitate the professionals and students in search of understanding current trends in the field of sentiment analysis.

Keywords:

Sentiment analysis, natural language processing, machine learning, deep learning, evaluation metrics.

Legal Advisor: A LLM Based Chatbot

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Abstract:

Our research project is a comprehensive knowledge base system designed to address questions related to Indian law, and regulations. It is based on Optical Character Recognition (OCR) techniques and advanced machine learning models, the system extracts, processes, and stores data from various legal texts. The research integrates a large language model (LLM) in the backend, fine-tuned to understand and generate humanlike responses to legal queries. We have employed Gemini API to enhance the grammatical construction and coherence of the responses. The output data extracted from legal books is stored in vector embeddings, facilitating efficient retrieval and analysis. The backend is based on Python and Flask, which provides a robust framework for handling user queries and generating responses. The front end is built with HTML, CSS, Bootstrap, and JavaScript, ensuring a responsive and user-friendly interface. Our paper details the technical architecture and workflow of the LLM-based chatbot, including data collection, OCR processing, embedding generation, and LLM integration with a user-friendly front end. By offering a detailed account of the methodologies and tools used, our research aims to contribute to developing intelligent legal information systems and understanding legal texts for users.

Keywords:

Optical Character Recognition (OCR), large language model(LLM), vector embeddings, Indian law, Gemini API, Flask, HTML, CSS, Bootstrap, JavaScript.

Diabetic Retinopathy Classification Using CNN

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Abstract:

One of the most serious effects of diabetes is diabetic retinopathy, which, if left untreated, can lead to blindness. Identifying its stages is challenging and frequently requires expert interpretation of ocular pictures. To address this, a deep learning technique utilizing Convolutional Neural Networks (CNNs) has been developed to evaluate the illness stage from a single eye scan. Sources of analogous datasets have also been utilized in this strategy for high accuracy and have achieved early disease detection with significant effectiveness.

Keywords:

Deep learning, diabetic retinopathy, convolutional neural network, classification, Kaggle, APTOS.

Optimization Strategy of EV Charging Infrastructure with distribution grid

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Abstract:

More organizations and users are using electric vehicles (EVs), which has in turn highlighted the urgency of creating an appropriate, responsive, and expandable charging system that can work with existing electrical networks. With the growth in the number of EVs, there is a need to manage this system efficiently so that the users do not overburden the grid and that it remains available to them. Hence, we construct a highly developed optimization method for distribution networks and include a number of important aspects: where to place charging stations, control of grid capacity, integration of renewable energy sources, and the management of changing electricity demands. A distinctive feature of the model includes the presence of photovoltaic panels and wind turbines; by this, it minimizes the use of conventional energy thus aiding to high growth reserves of the economy. The model also contains a bidding mechanism, whereby EV chargers can establish active participation in the market, flexibly changing charging prices according to current demands and grid power conditions, helping decrease the power cost and energy shortage for the grid. The results show that this optimization framework is furthering grid reliability, reducing costs incurred due to charging and minimizing emissions associated with EV charging. As part of the energy supply model, where the key problems of range anxiety, demand variability, and renewable energy generation variability were solved by incorporating storage systems, batteries are utilized to store the excess energy generated from the renewables and to use it when the demand is high or when the renewable generation is low. To sum up, not only does this approach increase the efficiency of the charging infrastructure but it also helps achieve effective and eco-friendly EV ecosystem development in line with the overarching aim of sustainable transport.

Keywords:

Electric Vehicles, Charging Stations, Charging infrastructure, optimizations.

Enhanced Image Processing with IMPLY-Based No Carry Approximated Adders

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Abstract:

As computational demands continue to grow, traditional exact computation methods in image processing face challenges in balancing speed, energy efficiency, and accuracy. This report presents the design and implementation of an efficient Median Filter for noise removal using Approximate Computing (AxC) techniques with IMPLY-based adders. By allowing controlled errors, the proposed method significantly reduces computational complexity and power consumption while maintaining effective noise reduction capabilities. Simulated using Verilog HDL and synthesized in Xilinx Vivado, the results demonstrate enhanced performance, energy efficiency, and scalability for real-time and high-resolution image processing applications.

Keywords:

Image processing, Approximate Computing, IMPLY based adder, Xilinx.



Fake News Identification through LSTM: In Indian Context

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Abstract:

In today's digital age, there are 5.35 billion internet users worldwide, which amounts to 66.2 % of the Global Population. From physical newspapers to digital platforms Online networking changed everyone's life as it provides quick communication, vast reach, instant information and global connectivity. According to the Global Risks Report 2024 India Stands in 1st position for sharing Fake News & Misinformation. Fake News & Misinformation will be biggest danger to the world in coming years. even more dangerous than natural disasters. The spread of Fake News on online networks misleads the Nations, Societies and Public Opinions. Attacker use techniques such as Clickbait, Satire, False Connection. Misleading content are designed to deceive and exploit people through Algorithmic Loopholes. Detecting such news is Crucial to ensure the Trust and Worthiness of Online Sites. hence This survey review will convey the types of Machine Learning Techniques used for fake news Identification in context of India.

An Extensive Review of LLaMA and BERT Applications in the Legal Field

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Abstract:

This paper discusses the applications of large language models, including LLaMA and BERT and also provides an overview of AI-driven platforms in legal practice. These models transform NLP and have found great applications in this domain, especially for legal research, drafting documents, and case analysis. We will discuss the architecture and functionality of the models, discuss their integration in legal platforms and analyze their impact on improvement in legal practice and education. We will also identify technical aspects in particular like hyperparameter tuning, and elaborate on alternative models applicable for similar applications. Finally, we sketch the challenges, prospects, and the ethical consideration related to AI use in the legal sector.

Keywords:

NLP, Bayesian Optimization, Softmax Activation, SwiGLU (Swish-Gated Linear Units), RMS Norm, Rotary Positional Embeddings, Positional Encoding, Multi-Head Attention, Loss, Functions in MLM, Adapters, Prefix Tuning, LoRA, QLoRA.



Harnessing Artificial Intelligence for Proactive Infection Control: A Review of Innovations and Challenges in Long-Term Care

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Abstract:

Artificial Intelligence (AI) has emerged as a powerful tool for addressing infection control challenges in long-term care (LTC) facilities. This article explores the current state of AI applications in proactively identifying and managing infection outbreaks, evaluating its potential, limitations, and future directions. Drawing on existing studies and expert opinions, this paper highlights how AI technologies—such as predictive analytics, real-time monitoring, and machine learning—can transform infection prevention while addressing barriers to implementation.

Keywords:

Artificial Intelligence (AI), Proactive Infection Control, Infection Management, Long-Term Care (LTC), AI Applications, Healthcare Innovation, Predictive Analytics, Outbreak Detection, Elderly Care, Infection Prevention, Healthcare Technology, Data-Driven Decision Making, Patient Safety, AI in Healthcare, Challenges in AI Adoption.

Review of Real-Time Crop Monitoring using User-Centric Visualisation Interface : Minimizing Usability Challenges for Non-Expert Farmers in Precision Agriculture

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Abstract:

Precision agriculture revolutionised traditional farming by introducing modern technologies for crop-monitoring in real-time and allowing for quick-decision making by the farmer. It's full potential is still under-utilised, especially in case of non-expert farmers, because of the complexity of the systems used in those systems. This review focuses on the aforementioned systems using user-centric interfaces to minimise challenges for non-experienced farmers. By analysing research from various fields, like GUI design for precision agriculture, nature of farmer computer interactions and automated systems based on IoT for crop security needs for more intuitive and accessible designs are explored in this review. When deployed, studies observed that despite the nature and usefulness of the data, the need for technical expertise for interpretation has been the limiting factor of wide adoption. Over the years, these systems have been promising in interaction, but usage of such systems is still an issue for small-scale or non-expert farmers. We also explore the potential of smart farms and networked farmers be able to tackle climate-related agricultural challenges in this review, emphasising the need of adaptable systems that can adapt to various userneeds. This review is concluded by identifying key gaps in current literature, focusing on the lack of personalised and adaptive interfaces and insufficient user testing with the wider agricultural population. To fully utilise and benefit from the aforementioned systems, future research should focus on interfaces along with technological advancements.

Keywords:

Precision agriculture, real-time crop monitoring, user-centric design, visualization interface, usability challenges.

WhatsApp Chat Analyzer Web App

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Abstract:

This paper presents a WhatsApp Chat Analyzer application developed with Streamlit, leveraging libraries such as Pandas, Seaborn, Matplotlib, WordCloud, Emoji, and NLTK. Users can upload a text file of their exported WhatsApp chats for analysis. The application provides insights through various analyses, including total messages sent, word cloud generation, sentiment analysis, identification of the most active users, and activity trends by day and month. The results are visualized with interactive charts and graphs. This study details the methodology, discusses the findings, and explores future enhancements of this tool.

Keywords:

Convolutional Neural Network, Deep learning, Computer vision, Gender, Age.

A Comparative Evaluation of Fake News Detection Techniques: Accuracy and Efficiency

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Abstract:

The fact that social media, blogs, and websites can be used by anyone creates a lot of problems. Fake news can be a big problem that can harm people or even create conflict between countries. Spread online, tricking people into accepting something that isn't true. It can be dangerous because it can influence what people think and do based on false information that spreads everywhere. That's why it's important to manage and control social media. Computer programs that learn can detect false information. It means that something happens on its own without being controlled by a person. This article suggests organizing a way to find fake news by examining specific parts of the news. "Math that picks the main features and a group of classifiers that vote for the correct answer."

The new technology can tell the difference between fake news and real news. First, we organized the information by removing extra letters and numbers and making it smaller. Lemmatization is the process of finding the basic form of a word using a reference guide. We found some important points by using two different methods. Take out the repeated words and the method used to find out how important they are. Vector calculation means figuring out the results of adding, subtracting, or multiplying vectors. A word inserting strategy means adding new words to a piece of writing. Third, the removed features were reduced. Can help with using the chi-square method and looking into the changes in calculations. We used three groups of data. Available online: Fake-or-Real-News, Media-Eval, and ISOT. We used eleven different ways to complete the task. The current system: accuracy, the area below precision, evaluation, and F1 score. We plan to improve accuracy for the Fake-or-Real dataset.



A Survey on Early Detection of Alzheimer's Disease by Employing Machine Learning and Deep Learning

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Abstract:

The name Alzheimer's is sometimes used to describe a neurological brain illness. It results in the death of brain nerve cells, which impairs brain function over time. A distinct form of this illness that is incurable is Alzheimer's, which causes a memory problem. The environment is the reason why the lethal disease is no longer a public issue, and health has reached its lowest point in history. The brain's nerve cells are in charge of identifying disorders like Alzheimer's disease (AD) and mild cognitive impairment (MCI). The most recent research on the latest developments in AD detection with deep learning and machine learning technologies is thoroughly examined in this review paper. In this paper is described a way to diagnose or identify an AD at an early stage, with the use of a different Imaging Modalities for AD Detection and algorithm diagnostic analysis.

Keywords:

Alzheimer's disease, Classification, Medical Imaging, Predictive Analysis, Machine Learning, Deep learning.

Cervical Cancer Risk Prediction based on cells found in cervix using ML, Computer Vision Techniques

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Abstract:

In recent years, machine learning (ML) techniques have made significant contributions to medical diagnostics, particularly in the classification of images for cancer detection. This paper explores the application of MobileNet, a lightweight deep learning model, for classifying cervical cancer images obtained from Pap smear and colposcopy tests. The objective is to automate the classification of 7 cervical lesion categories, such as HSIL, LSIL, SSC, and NILM, among others, which are crucial for early cancer detection. The proposed model achieves significant performance in terms of accuracy, validation loss, and computational efficiency compared to traditional models. Our results demonstrate the potential for MobileNet to be employed in a clinical setting for assisting healthcare professionals in diagnosing cervical cancer at early stages.

A New Era of Artificial Intelligence in Non-invasive Real Time 3D Human Pose Motion Tracking: A Scoping Review

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Abstract:

Artificial intelligence (AI) is revolutionizing fitness training with advanced 3D motion tracking systems. This review analyzed 20 studies from an initial pool of 146 articles to explore how AI-driven coaching tools enhance exercise performance using innovative frameworks such as Convolutional Neural Networks (CNN), MediaPipe, and YOLOv7. Platforms like Kaia Health, VAI Fitness Coach, Kemtai, and Lumin Fitness are at the forefront of applying computer vision and pose estimation for workout guidance. By leveraging technologies such as Dr. Muscle, RealSense camera systems, and apps like Fitbod and Freeletics, these solutions deliver real-time feedback and customized training for users at all fitness levels. The study emphasized key AI capabilities, including sensor-free movement analysis, body metrics tracking, joint angle estimation, and injury prevention. While 72.8% of physical therapists acknowledge AI's potential to improve patient care, challenges persist in accurately tracking dynamic movements and ensuring user privacy. Innovations like Stacked Bidirectional Gated Recurrent Units (Bi-GRU) and Sency Motion SDK are advancing the field, paving the way for AI to become an essential part of personalized fitness coaching.

Keywords:

Artificial Intelligence (AI), 3D Motion Tracking, Fitness Training, AI-based Coaching, Exercise Performance

Hybrid Frequency-Domain and Machine Learning Framework for Image Noise Classification and Adaptive Restoration

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Abstract:

Classification and restoration of envision noise are important problems in digital image processing that affect computer vision, medical imaging, and multimedia applications. This paper presents a sophisticated framework that addresses many noise types, such as Gaussian noise, impulse noise, motion blur, and speckle noise, by combining frequency-domain analysis, machine learning, and customized restoration algorithms. The method captures unique noise signatures by using both the Discrete Cosine Transform (DCT) and the Fast Fourier Transform (FFT) to extract subtle frequency-domain properties. Several classifiers are investigated to achieve accurate noise type detection, such as Support Vector Machines (SVM), Random Forest (RF), and Convolutional Neural Networks (CNN). When CNNs are integrated, multi-scale spatial-frequency patterns can be extracted, greatly enhancing classification performance on a multi-distorted dataset. A thorough assessment of the framework's flexibility and scalability is provided by this dataset, which includes a variety of distortions and noise levels. Cross-validation shows that CNN performs better than conventional classifiers because of its capacity to generalize despite intricate noise fluctuations.

Adaptive, noise-specific filtering algorithms that are in line with the recognized noise type are used by the system for noise restoration. A combination of bilateral and Gaussian filters is used to handle Gaussian noise, and sophisticated median and outlier-suppression techniques are used to recover impulse noise. Adaptive and wavelet-based filters reduce speckle noise, whereas Wiener filtering and deconvolution are used to fix motion blur. In order to further improve restoration quality, frequency-domain restoration techniques are also used, such as bandpass filtering and inverse FFT/DCT approaches.

Superior performance is demonstrated by extensive experimental data, which show notable gains in classification accuracy, structural similarity index measure (SSIM), and peak signal-to-noise ratio (PSNR). By establishing a comprehensive pipeline for reliable noise classification and restoration, this study shows how machine learning and frequency-domain analysis can be used to address practical issues in image quality improvement.

Keywords:

Noise Classification, Frequency Domain Analysis, Discrete Domain Analysis, Hybrid Features, Image Quality Improvement, NOise Restoration

Key Drivers of Cost Overruns in Public Housing Construction: A Comprehensive Categorization

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Abstract:

Cost overruns are a critical challenge in construction projects, particularly in public housing, where resources are limited and the demand for affordable housing is high. Effectively managing cost overruns is essential to mitigate risks, enhance efficiency, and ensure the successful delivery of these socially significant projects. This paper aims to identify and categorize the key drivers of cost overruns in public housing construction, focusing on their origins and frequency. Using a thematic approach, the study examines cost overrun factors reported across various countries to highlight the global challenges of public housing construction. An extensive literature review was conducted to identify and analyse potential factors, which were systematically grouped into six categories: client, contractor, consultant, labour, material/equipment, and external influences. The most frequently cited factors were further categorized and tabulated to provide a comprehensive understanding of their prevalence and impact. The findings offer valuable insights into the critical drivers of cost overruns, forming a foundation for targeted mitigation strategies. By identifying the most significant and recurrent factors, stakeholders including clients, contractors, consultants, and policymakers can develop more effective cost management approaches. These insights aim to reduce financial risks, enhance project efficiency, and ensure timely completion of public housing projects.

Keywords:

Cost overruns, public housing construction, construction efficiency, risk mitigation, cost management strategies, global challenges.

MV-DBiLSTM: An Enhanced Human Activity Recognition for Smart Surveillance Systems Using a Deep BiLSTM Framework

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Abstract:

Human activity recognition (HAR) become an emerging field gaining significant attention in computer vision and pattern recognition. The increasing demand for AI-based systems to analyze human action behavior and enhance security highlights the importance of this research area. However, the existing techniques still have several issues, such as low-light conditions, intricate spatiotemporal features, cluttered backgrounds, and ineffective use of smart systems. Even if many researchers have showcased HAR models for dynamic video datasets based on various pre-trained architectures capable of feature extraction and classification, and still face problems like low-level accuracy and computational complexity. Such challenges originate from the enormity of video-based datasets and the correlative nature of data. In this paper, we tackle these issues by introducing a HAR technique called MV-DBiLSTM for video datasets by making use of a deep learning-based deep bi-directional long short-term memory model (DBiLSTM) combined with a CNN-based pre-trained model MobileNetV2 (MV) for feature extraction. The process starts with using MobileNetV2 to extract deeper-level features of the video frames. Then, these features are inputted into an optimized DBiLSTM network to capture dependencies and process data for optimal predictions. We present an iterative procedure applied during testing that engages in fine-tuning the learned model parameters, allowing us to adapt the trained model to a new environment with conditions different from those seen during training. To evaluate the asset of the proposed model, extensive empirical experiments are conducted on three benchmark HAR datasets, namely HMDB51, UCF Sport, and JHMDB, and on one synthesized dataset that achieves 77.5242%, 94.0052%, 96.785% accuracies, and 96.8213%, respectively. Our results demonstrate that the proposed strategy surpasses state-of-the-art methods. The model achieves exceptional performance in human activity recognition, delivering accurate and reliable recognition of activities in surveillance smart systems.

Evaluating Borrower's Confidence in AI-Powered Lending Decisions

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Abstract:

The adoption of Artificial Intelligence (AI) in the lending industry is revolutionizing traditional loan approval processes, enhancing both the speed and accuracy of credit decisions. AI-driven lending solutions, utilizing advanced machine learning (ML) algorithms, natural language processing (NLP), and big data analytics, have transformed various aspects of lending—from credit scoring and fraud detection to automated loan underwriting. This paper investigates the implications of AI in loan underwriting, focusing on its ability to reduce approval times, lower default rates, and decrease processing costs compared to traditional methods. By improving decision-making efficiency, AI holds the potential to create a more inclusive lending environment, particularly for underserved borrowers who may lack access to traditional credit scoring.

This study aims to assess AI's impact on operational metrics in loan approval processes and to evaluate the broader benefits and risks associated with its adoption. . Key variables analyzed include borrower credit scores, income, loan amounts, and processing costs. The study also examines the operational challenges AI poses, such as concerns over data privacy, algorithmic bias, and regulatory compliance.

Findings indicate that while AI streamlines and accelerates loan processing, leading to increased operational efficiency and potentially improved borrower outcomes, it also introduces ethical and legal concerns that require careful consideration. The anticipated results of this research underscore the importance of a balanced approach to AI implementation in lending—one that emphasizes transparency, fairness, and regulatory alignment. As AI technology continues to evolve, its integration with emerging technologies and its alignment with ethical frameworks will play a critical role in shaping the future of inclusive, responsible lending.

Keywords:

Artificial Intelligence, Loan Approval Process, Credit Scoring, Machine Learning, Automated Underwriting, Financial Inclusion, Algorithmic Bias, Data Privacy, Cost Efficiency, Risk Management.

Enterprise Architecture in Higher Education Institution (A Systematic Literature Review)

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Abstract:

Digital transformation is a demand in the current industrial era. Prioritizing the use of technology in every aspect creates opportunities for effectiveness in business processes and efficiency in the use of resources. Higher education is an educational organization that is responsible for developing science globally and being a key player in technological development. Alignment between IT and organizational business processes is necessary to ensure the success of digital transformation in higher education. Enterprise architecture provides clear documentation that can help organizations carry out digital transformation. The dream of becoming a smart campus can be realized by documenting every implementation and development of technology in the campus environment. For this reason, this research was carried out to invent the use of enterprise architecture in the scope of higher education and similar institutions. What is explored in this research are important points in the use of enterprise architecture in higher education and the possibility of developing a more agile enterprise architecture model to be implemented in higher education institutions. Using Scopus-indexed articles and the PRISMA method, it is hoped that this research can be used as a starting point in developing research within the scope of the enterprise architecture model in higher education.



Diagnosing of eye Related Disease using Deep Learning Algorithm

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Abstract:

According to the World Health Organization, visual impairment is a global health issue, with billions of cases preventable through regular eye tests. In emerging and developing countries, a lack of specialists inhibits accurate diagnosis of eye diseases and increases blindness count. This paper introduces a convolutional neural network (CNN) ensemble using transfer learning to diagnose eye diseases. The training involved high-quality fundus images, with testing on low-quality images from the minimum equipment cost. Despite lower image quality, the system demonstrated high accuracy in detecting various eye-related diseases, displaying the efficiency of deep learning techniques. These results highlight the potential of such approaches to improve eye disease diagnosis, especially in under-resourced healthcare systems.

IOT Based Real Time Monitoring and Exposure of Microbial Contamination in Drinking Water

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Paavai Engineering College, Namakkal

Abstract:

Water pollution is a major global problem that causes serious health hazards and loss of life. This paper presents an IoT-based water quality monitoring system designed to detect and solve pollution problems. The system evaluates various water samples and determines their suitability for different uses based on quality. An important feature of the solution is that it can detect harmful bacteria in water and turn on UV light for instant disinfection. This approach ensures safe water use and meets the urgent need for clean water. Using state-of-the-art technology, the system helps protect public health and support sustainable water management.



Enhancing Urban Waste Management With Gps Enabled Smart Trash Bins

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Abstract:

The integration of GPS-enabled smart trash bins represents a major advancement in urban waste management by utilizing GPS and sensor technologies. These bins offer real-time monitoring of fill levels via a mobile app, allowing waste management teams and city planners to track bin status instantly. This transparency helps prevent overflow, reducing littering and health risks. Unlike traditional bins, the smart bins automatically seal when full, promoting cleanliness and improving public space aesthetics. Equipped with sensors that detect rain, strong odors, and other adverse conditions, the bins proactively close to prevent spills and unpleasant emissions. If a bin is knocked over, alerts are sent to maintenance personnel for quick response. This approach enhances operational efficiency, providing real-time updates and fostering accountability among residents and city officials. The GPS feature optimizes collection routes, improving scheduling and resource allocation. This reduces fuel consumption, labor costs, and greenhouse gas emissions from waste collection trips. Ultimately, this initiative modernizes waste management and promotes a culture of responsibility, leading to cleaner and more sustainable urban environments.

Optimizing Circuit Performance and Power Through Error Aware Clock Control

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Abstract:

This paper introduces a new way in semiconductors, as semiconductors technology continues to scale down, the demand for high-performance and energy-efficient circuits becomes increasingly critical. In this context, timing errors, often caused by variations in pressure, voltage, and temperature (PVT), pose significant challenges to circuit reliability and efficiency. Traditional Design approaches typically add timing margins to prevent such errors, which can lead to suboptimal performance and excessive power consumption. By presenting a novel methodology for improving circuit performance and power efficiency, this work contributes to the broader goals of sustainable technology development and innovation.

Keywords:

Circuit Design, Timing Errors, Process, Voltage and Temperature (PVT), Timing Margin, Advanced Scaling, Performance Improvement, Power Consumption Reduction.

Intelligent IoT Driven Smart Poultry Farm Management System

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Abstract:

This paper proposes an IoT-based solution for monitoring and managing the environmental conditions of poultry farms to ensure optimal health and productivity. The system incorporates MQ-135, MQ-2, and MQ-7 gas sensors to detect air pollution levels, a DHT-11 sensor to measure temperature and humidity, and an LDR to monitor light intensity. Data from these sensors is processed by an Arduino microcontroller and displayed on an LCD screen for real-time visibility. IoT integration enables app-based remote monitoring of environmental parameters. If air pollution, temperature, or light levels cross critical thresholds, an alarm is triggered to alert farm operators, ensuring timely intervention. This system is designed to improve poultry health by maintaining a safe and comfortable environment, reduce the risk of diseases caused by poor living conditions, and enhance the overall efficiency of poultry farm management through advanced monitoring and alert mechanisms.

Keywords:

IoT, Poultry farming, Air quality monitoring, Arduino microcontroller, Sensors.

Design and Implementation of Smart Cradle System Using Internet of Things

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Abstract:

The early stages of a child's life are crucial, and ensuring their comfort, health, and safety is a top priority for parents. However, balancing modern-day responsibilities with the demands of parenting can be challenging. Traditional baby cradles, though effective for soothing infants, offer limited functionality and require constant manual supervision. This project proposes the design and implementation of a smart cradle system that integrates IoT to address the limitations of traditional cradles. The smart cradle is equipped with a suite of sensors to monitor the baby's vital signs such as heart rate and body temperature and environmental conditions like room temperature, humidity, and noise levels. The system can autonomously respond to the baby's needs, for instance, by gently rocking the cradle when movement is detected or playing soothing music when the baby cries. This innovative approach not only enhances the safety and comfort of infants but also alleviates the stress on parents by providing them with valuable insights and control over their child's environment. The integration of IoT in baby care systems marks a significant step forward in leveraging technology for enhanced parenting, promising a future where parents can ensure their child's well-being even from a distance.

Keywords:

IoT, Cradle system, Baby monitoring, Arduino microcontroller, Sensors.

Exploring The Multidimensionality of Cyberterrorism Vulnerability Behavior Among Millennial Employees in the Government: A Sequential Mixed Methods Approach

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Abstract:

The increasing adoption of e-governance in the Philippines transforms government operations but also exposes critical systems, sensitive data, and public trust to significant cyberterrorism threats. Millennials, as digital natives and a key segment of the government workforce, play crucial roles in protecting critical infrastructures while remaining vulnerable to cyber risks. This study addresses a gap in cybersecurity literature by identifying and validating two key dimensions of vulnerability: Organizational Cybersecurity Readiness (OCR) and Secure IT Infrastructure (SII). Using Confirmatory Factor Analysis (CFA), the study achieves excellent fit indices ($\chi^2/df = 1.933$, CFI = 0.988, RMSEA = 0.056) and high reliability scores (Cronbach's Alpha: 0.979 for OCR and 0.942 for SII), demonstrating the robustness of these constructs. The findings highlight the need for government institutions to implement clear cybersecurity policies, adopt proactive strategies, and strengthen IT systems to reduce vulnerabilities. The study recommends developing tailored cybersecurity policies, conducting targeted training programs, and allocating sufficient resources to enhance IT infrastructure. By addressing these vulnerabilities, the research supports Sustainable Development Goals (SDG) 9 and 16, promoting resilient institutions and secure digital ecosystems. This study provides a validated framework to empower millennial employees, mitigate cyber risks, and strengthen the cybersecurity resilience of critical government operations.

Keywords:

IoT, Cradle system, Baby monitoring, Arduino microcontroller, Sensors.

Enhancement of ChaCha20 Algorithm Applied in Resource Constrained Device

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Abstract:

Resource-constrained devices, such as IoT devices and embedded systems, operate with limited computational power, memory, and energy resources. Ensuring secure data transmission in these environments requires lightweight cryptographic algorithms that balance security and efficiency. ChaCha20, a widely used lightweight encryption algorithm, is known for its speed, security, and energy efficiency. However, its performance and diffusion properties can still be enhanced to better meet the demands of resource-constrained devices. This study proposes enhancements to the ChaCha20 algorithm, applying Tent Maps for non-linear transformations in the quarter-round function, and randomizing rotation constants that produces high diffusion to improve diffusion properties. Conducted on an ARM-based processor with 512MB RAM and 1vCPU, the study demonstrated that the enhanced algorithm achieved higher diffusion properties, with avalanche effect percentages of 52.27% for short plaintexts and 52.34% for medium plaintexts, surpassing the original algorithm's 48.86% and 51.56%, respectively. Execution times also improved specifically its encryption speed, with the enhanced ChaCha20 averaging 8.63ms for 1MB plaintexts and 42.09ms for 5MB plaintexts, compared to the original's 8.78ms and 44.39ms. These findings highlight the potential of the enhanced ChaCha20 algorithm to strengthen security and efficiency in resource-constrained environments, offering a promising solution for lightweight cryptography applications.



Diving into the functionality of 3-D image Matrix representation using Stable Video 4D: A Simplified Overview on Techniques for Generative AI based Multidimensional Field of Vision

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Abstract:

This review paper simplifies the usability, the functionality, and the algorithms used work with Stable Video 4D by Stability AI, which can help diverse content creators, AR/VR engineers to access this model knowing it's flaws and strengths. Simplifying the aspects of Generative AI models and their workings with diffusers, this paper targets the keen learners of the Generative AI models. The process of delving into the SV4D model has been made understandable, and critiqued enough for its limitations can be known, and worked upon.

Plunging into the outskirts of Stable Video 4D, a generative model from Stability AI, that further enhances the capabilities of both Stable Video Diffusion and Stable Video 3D. Just from a single view video of an object, by the methodologies involved in this paper, 4D image matrix can be created, thus generating a multidimensional video of the object from different sides. The research paper focuses on the new technologies of Generative AI, which can help figuring out different aspects of the multidimensional appearance of an object from just a 2-Dimensional object's video.

Attribute-Based Cloud Data Integrity Auditing for Outsourced Storage

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Abstract:

The goal of this project is to explore and integrate key features of Attribute-Based Access Control (ABAC) and Attribute-Based Encryption (ABE) for secure data sharing across both trusted and untrusted domains. In industries that rely on data-driven analytics to optimize production and predict equipment wear, secure and controlled data access is essential. Traditional encryption methods, such as Public Key Infrastructure (PKI), struggle with efficiency and scalability in cloud environments, often increasing storage demands and risking data leaks. By leveraging ABAC's flexible policy management for access control and ABE's encryption capabilities for untrusted domains, we propose an architecture that allows secure, manageable, and revocable data sharing. This research identifies essential properties of ABAC and ABE, examines the state-of-the-art (SoTA) in attribute-based security, and considers architectural strategies to enhance access control and encryption. Our approach aims to create a robust framework that balances secure access with scalable, efficient data sharing in dynamic environments.

Keywords:

Attribute-Based Encryption, Secure Data Sharing, Trusted, Domains, Access, Control Policies, Encryption in Cloud Environments

Status of SDG Implementation in Context of Manual Scavenging in Gujarat

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Abstract:

India has over 5 million Scavengers, as suggested by a study by Dalbergi conducted in 2018. There are several forms of sanitation work prevalent in urban and rural areas, including cleaning of household toilets, public and community toilets, institutional toilets, sewers and septic tanks, drains, railway tracks; waste collection and segregation; etc. Due to social discrimination as well as the nature of their employment, sanitation workers lack a regular and decent pay; and usually do not have access to quality health care, employment benefits, insurance and other social security measures.

The global history of manual scavenging dates back to many centuries. Manual scavenging is found to have existed in Europe around 1214 AD. There existed different ways and forms of manual scavenging in which the people were forced to carry out the cleaning of Wada latrines, dry latrines, Dabba (Jajroo) box collecting, Wadoliya (back yard defecation), open defecation, Kharkua (pit or well), manhole at the sewer lines, septic tanks, and flush latrines. Many changes in the following years, such as the invention of water closet by John Harrington in 1596 and the invention of flush toilets by S.S. Helior in 1870, made manual scavenging disappear from the Western world (Meenakshi- sundaram 2012).

According to the UN, many developing countries in the global south are in the dark hands of manual scavenging, which are resource less and technologically deficient. There is a neobreed of manual scavengers such as Waste Water Workers or Sewer Workers who are appointed solely by the governments of the nations of the global south (Meenakshi Sundaram 2012). South Asian countries such as Bangladesh, Pakistan, and India have severe problems regarding manual scavenging and sewage-waste disposal. The major reason is the old and defective drainage system where the technologies cannot penetrate, and the development in this situation is still unperceived. Rapid unplanned urbanization, population explosion, inter-alia alarming increase in slum population, and migration are the core issues to be tackled here.

Keywords:

Manual Scavenging, SDG, United Nations.

Studies on Micro Milling Processes Using Micro End Mill Tools : Experimental Insights

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Abstract:

Recent improvements in micromilling, tool treatments, and ultra-precision machining centers have made it easier to produce tiny, high-quality parts for various industries. This paper looks at the latest developments in these areas, focusing on how new tools, surface treatments, and advanced machining technologies have helped improve accuracy, surface finish, and the lifespan of tools. These advancements have made a big impact in industries like biomedical engineering, electronics, and aerospace. The paper also talks about future research, emphasizing the need for continued innovation to keep up with the growing demand for precise micro-manufacturing.

Development of Nearly Linear-Phase IIR Filters: A Comprehensive Design Approach

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Abstract:

ECG signals are used primarily in the medical field to monitor the electrical activity of the heart. Artefacts in ECG signals are unwanted disturbances or noise that can interfere with the accurate interpretation of heart activity. These artefacts can be caused by a variety of factors unrelated to the heart's electrical activity, and they often need to be removed or minimized for proper diagnosis. This paper explores different approaches for designing IIR filters which has nearly linear phase to remove the artefact present in ECG signals. In the proposed method, initially IIR filter is designed using any of the conventional method i.e. Butterworth, Chebyshev, Inverse Chebyshev & Elliptic filter. The MIT-BIH Physionet Database is used in this study for ECG data. Secondly, for designing nearly linear phase IIR filter, we propose to incorporate different techniques i.e. Minimum Phase Transformation Techniques, Frequency Dependent Phase Compensation, Kautz Filter, Z-Transform after conventional IIR filter. The proposed technique is evaluated in terms of Signal-to-Noise Ratio (SNR) & Group Delay. The results of this proposed technique demonstrate the effectiveness of these approaches in enhancing filter performance, reducing artefacts, and maintaining signal integrity.

Redefining Public Transportation in Chandrapur

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Abstract:

With Chandrapur City experiencing rapid urbanization, population growth, and environmental pressures, an efficient and sustainable public transportation system has become critical. Previous studies evaluated the city's transit network, including bus stop locations, and developed a system design using Auto-CAD 3D software. This research focuses on improving the existing system to tackle issues like traffic congestion, air pollution, and the demand for affordable urban mobility solutions. The proposed improvements feature eco-friendly innovations, such as bio-CNG and electric buses, which drastically reduce emissions compared to diesel vehicles. To enhance accessibility and affordability, a dynamic fare system is introduced, offering tiered pricing and discounts for groups like students, senior citizens, and regular commuters. Key infrastructure enhancements include environmentally friendly bus shelters, electric bus charging stations, and GPS-based systems for real-time traffic monitoring. Additionally, technological upgrades like smart ticketing and mobile apps providing live transit information aim to improve passenger convenience and operational efficiency. This study presents a sustainable transit model designed to meet Chandrapur's evolving mobility needs. The solutions proposed not only prioritize environmental sustainability and cost-effectiveness but also offer a framework that can inspire similar initiatives in other rapidly developing urban areas.

Biometric-Driven Class Attendance and Scheduling System

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Abstract:

The Biometric-Driven Class Attendance Scheduling System utilizes biometric fingerprint authentication to automate attendance tracking and optimize class scheduling for students and faculty. The system captures student attendance data at multiple intervals throughout academic sessions, with records securely stored in a centralized database. Faculty members are required to log their attendance through biometric verification at any time during the day. If a faculty member fails to log attendance, the system automatically initiates an allocation process. Using predefined schedules stored on the server, it identifies and assigns substitute staff based on availability. If no substitute is available, the system reallocates students to alternative academic resources, such as the library, laboratory, or reserved placement sessions. Faculty members with short-term permissions can log their attendance upon arrival, preventing unnecessary substitute assignments. Notifications via SMS or email inform faculty members of any reassignments, ensuring a responsive, seamless approach to attendance and scheduling. By integrating biometric technology with real-time data processing, this system enhances accuracy, reduces manual intervention, and supports efficient attendance management and resource utilization.

Keywords:

Attendance Management System, Biometric technology, Substitute teacher allocation, Automated class scheduling.

Cardiovascular Disease Detection using ECG Image Processing

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Abstract:

Cardiovascular diseases (CVDs) remain a significant worldwide health issue, affecting rates of both illness and mortality. Prompt and precise diagnosis is crucial for improving patient outcomes and expediting treatment interventions. The study presents an approach based on machine learning, utilizing a VotingClassifier ensemble that combines K-Nearest Neighbours (KNN), Support Vector Machine (SVM), Logistic Regression, and XGBoost models to classify ECG data into four main diagnostic categories: abnormal heart rhythm, past heart attack, ongoing heart attack, and normal heart function.

Our system was taught with a structured ECG dataset, allowing it to recognize and categorize patterns associated with various heart conditions. Our strategy combines various algorithms in an ensemble to merge different decision viewpoints, increasing dependability and accuracy compared to single model categorizations. This classification of computers lessens the need for manual ECG analysis, which is time-consuming and subject to differences among practitioners. The findings suggest that utilizing a VotingClassifier ensemble may enhance the precision of diagnoses and effectiveness in procedures, acting as a valuable resource for aiding healthcare professionals in rapid data-driven decision-making.

This approach emphasizes the growing significance of machine learning in the healthcare field, as advanced models trained on extensive datasets are increasingly beneficial in enhancing diagnostic accuracy, standardizing evaluations, and improving clinical procedures. Utilizing these models in clinical settings could improve patient results by assisting medical professionals in delivering accurate and timely treatment.

An IoT-based Hypoxemia Monitoring and Alarming System

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Abstract:

Hypoxemia is a medical disease characterized by low oxygen levels in the bloodstream. Hypoxia is the result of inadequate oxygen supply to the body's tissues and organs, which can have detrimental consequences for one's overall well-being. Prompt care can greatly enhance outcomes and mitigate the likelihood of problems linked to hypoxemia. Advancement of Internet of Things (IoT) applications in the medical field significantly enhances the monitoring of hypoxemia and other related medical disorders. This paper describes the development of a wristband specifically designed to monitor an individual's blood oxygen saturation (SpO₂) levels and provide alert notifications to both patients and medical staff, thus minimizing potential hypoxemia complications. The wristband commences the gathering of data from the patient's body at a prearranged or user-designated interval. Afterwards, the gathered data is sent to the processing unit, which is connected to a microcontroller. The processing module examines whether the obtained data exceeds or falls below predetermined threshold values, producing an alarm signal, a notification to the registered medical practitioner. This system that has been created has the ability to generate comprehensive reports and analyze patterns based on the collected data. This feature enables healthcare providers to track an individual's heart rate trends for a long duration, identify reoccurring problems, and make informed judgments about treatment plans and actions. In addition, the technology facilitates remote patient monitoring, allowing healthcare personnel to remotely monitor patients' heart rates, and hence reducing the need for frequent hospital visits.

Keywords:

Hypoxemia, Internet of Things, Wearable device.

Technology – Enhanced Safety Shoes for Women

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Abstract:

The increasing need for innovative solutions to ensure women's safety has inspired advancements in smart wearable technologies. This project upgrades an existing smart shoe system by introducing enhanced automation and energy efficiency. The accelerometer is programmed to automatically detect specific motion patterns, such as sudden falls or struggles, thereby eliminating the need for manual activation in emergencies. Additionally, to extend the battery life and enhance reliability, piezoelectric sensors are integrated into the shoe sole to harvest energy from walking or running. This harvested energy acts as a backup power source, reducing dependency on external charging and ensuring continuous operation of critical components like the GPS and GSM modules. These upgrades make the system more autonomous, sustainable, and user-friendly, further solidifying its role as a dependable safety device for women in diverse scenarios.

Keywords:

Smart Shoe, Women Safety Device, Automatic Emergency Alert System, Accelerometer Sensor, GPS Module, GSM Module, Piezoelectric Sensor, Self-Defense Shocking Unit, Location Tracking, Motion Detection, Power Harvesting, Backup Power Supply, ATmega328 Microcontroller, Wearable Technology, Personal Security System

Bridging the Gap: Analyzing Low Voter Turnout in India and Lessons from High-Performing Democracies

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Abstract:

India, the world's largest democracy, faces a persistent challenge of low voter turnout, with an average participation rate of 65.79% in the 2024 Lok Sabha elections and as low as 45% in some urban constituencies[1][3]. Despite an electorate exceeding 911 million, significant portions of eligible voters, particularly in urban areas, fail to engage in the electoral process[4]. This raises concerns about the efficacy of civic participation and the robustness of India's democratic framework. Key barriers identified include poverty, illiteracy affecting 23% of the population, lack of accessibility in rural areas, urban voter apathy, frequent elections resulting in voter fatigue, and declining trust in political institutions.

This research employs a mixed-methods approach, analyzing Indian election data, global voter turnout statistics, and behavioral studies. Comparative analysis with democracies such as Australia, Belgium, and Sweden, where voter turnout consistently exceeds 80%, reveals effective practices like mandatory voting, comprehensive civic education, accessible polling mechanisms, and high public trust in governance[2].

The study's objectives are threefold:

1. To identify the root causes of low voter turnout in India, particularly urban apathy, migration, and disenchantment with politics.
2. To compare India's voter turnout with countries that exhibit high participation rates, extracting actionable lessons.
3. To propose evidence-based strategies for enhancing voter participation in India.
4. Key recommendations include implementing robust civic education campaigns, introducing online and absentee voting options, incentivizing voter participation, and considering the feasibility of mandatory voting policies. These measures aim to bridge the gap in electoral engagement, addressing systemic challenges and fortifying India's democratic legitimacy.

Keywords:

Low voter turnout, electoral participation, Indian democracy, mandatory voting, voter apathy, civic engagement, comparative analysis, election reform, global best practices, voter education.

Ontology-Guided Exploration for Indian Traditional Medicine Systems

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Abstract:

Ontologies is defined as a set of concepts and the relationships among them within a domain, help in understanding and interpreting the semantics of queries and documents. Ontology-based information retrieval (IR) leverages structured knowledge representations to enhance the retrieval of information. This approach improves the precision and recall of IR systems by considering the context and meaning of terms beyond their mere occurrence. The integration of ontology-based concept extraction in traditional Indian medicine aims to enhance the retrieval and organization of Indian medical knowledge from diverse sources. Traditional Indian medicine encompasses a vast array of practices and knowledge systems, which are often unstructured and difficult to access efficiently. By employing ontology-based methods, we can systematically extract and organize concepts, enabling more precise information retrieval and knowledge management. This paper outlines the proposed system, architecture, and key components involved in implementing an ontology-based information retrieval system for TIM. The proposed system integrates key components such as data acquisition, pre-processing, ontology construction, concept extraction, ontology mapping, indexing, query processing, and user interaction. The implementation of this system aims to address the challenges of accessing traditional Indian medical knowledge from multiple sources, ensuring more precise information retrieval and effective knowledge management. By employing a domain-specific ontology, the system ensures semantic consistency and improves the precision and recall of search results. Advanced query expansion and contextual interpretation enable users to access not only exact matches but also semantically relevant information, thereby enhancing knowledge discovery and decision-making.

Keywords:

ontology, Information retrieval, Traditional Indian Medicine (TIM), domain ontology, query expansion, contextual interpretation.



Security Aspects of Blockchain Technology – A Review

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Abstract:

Blockchain technology has the potential to significantly alter our corporate environment and will be extremely influential over the coming few decades. It has the potential to alter our economic structure and the way we view corporate processes. Since it cannot be altered or falsified, blockchain is a decentralised and distributed technology based on book of accounts whose objective is to make certain transparency, integrity as well as data security. Only a small portion of current research on blockchain technology is geared toward examining its use in contexts or industries other than cryptocurrencies like Bitcoin. The majority of current research on blockchain technology is concentrated on its use in cryptocurrencies like Bitcoin. Blockchain technology is more than simply bitcoin; it has a number of uses in business process management, government, banking, and finance. As a result, this study makes an effort to look into and examine the opportunities and difficulties associated with current and potential Blockchain Technology implementations. As a result, a sizable number of published papers were thoroughly examined and studied in light of their contributions to the field of Blockchain research.

Keywords:

Blockchain, IOT, blockchain security, cryptography, cryptocurrency, hashing, bitcoin.

Automated Overhead Tank Management System Using LabVIEW

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Abstract:

This project demonstrates how to control an electric water faucet using LabVIEW and Arduino to solve local water problems. The system can monitor and control water quality and level by integrating level and turbidity sensors with solenoid valves. Automatic cleaning is initiated if turbidity exceeds safety limits and maintenance alerts are sent when necessary. Preliminary tests show that the body has the ability to improve water use and promote sustainable practices. Future developments will include remote monitoring and predictive maintenance.

Keywords:

LabVIEW, Arduino, Water Quality Monitoring, Turbidity Sensor, Real-time Control.



Atomization on Agricultural – Model Design for Smart and Effective Process

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Abstract:

In this project, the design and implementation of smart agriculture with efficient utilization of solar energy is proposed. The main intent of soil moisture sensor, temperature, LDR and humidity sensors is to detect the moisture, temperature and water and send the signals to Arduino. Here Arduino will perform its operation internally and after that corresponding operations will be performed. By using solar panels, the electricity is provided. When the soil moisture level sensor will get low then water content is constantly judged and a signal is sent by the system to motor to turn on. After reaching to the upper threshold level, the motor automatically stops its operation. Whenever there is change in temperature then temperature sensor activates and gives buzzer indication. Hence the proposed system gives effective results.

Keywords:

Arduino, LDR Sensor, Temperature Sensor, Motor, Buzzer.

Analysis of Factors Influencing Mobile Banking User's Awareness on Information Security

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Abstract:

The advancement of technology in the digital era does not only bring various opportunities, but also raises various threats to information security, especially in the age of being highly dependent on mobile banking. This study focuses on analyzing the factors influencing the level of information security awareness of mobile banking users, especially against social engineering attacks in Jakarta. With the increasing use of mobile banking in Indonesia's heart of the economy, the city of Jakarta has become the focus of this study. Based on 429 respondents' data obtained through a quantitative survey, this study analyzes the key elements and relationship between cybersecurity knowledge, exposure to social engineering attacks, cyber hygiene practices, security perceptions, computer skills, and work experience with the level of information security awareness. The finding of the analysis show that cyber security knowledge and cyber hygiene have a significant influence in increasing awareness of social engineering threats, underscoring the importance of fostering cybersecurity culture amongst mobile banking users to safeguard their information. Interestingly, while variables like computer proficiency, perceived security, and work experience did not significantly affect security awareness, a weak negative correlation was observed between exposure to social engineering attacks and awareness, suggesting that experiencing such attacks does not necessarily heighten the level of awareness. This highlights the need for proactive education and targeted security policies to effectively equip mobile banking users in Jakarta against evolving cyber threats. This research aims to provide strategic recommendations for the development of more effective information security policies and education programs for mobile banking users in Jakarta.

Keywords:

Information Security, Mobile Banking, Social Engineering, User Awareness, Cyber Hygiene.

Comparative Study of Machine Learning and Deep Learning Approaches for Identifying AI-Generated Content

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Abstract:

The rapid advancements in large language models (LLMs) and artificial intelligence (AI) have introduced challenges in distinguishing between human-authored and AI-generated content. This study evaluates the effectiveness of machine learning (ML) and deep learning (DL) models in detecting AI-generated text across diverse genres, including essays, stories, poetry, and Python code. Using performance metrics such as accuracy, precision, recall, and F1-score, the models are thoroughly compared. Among the ML models, the highest accuracy was achieved by SVM at 96%. The combination of SVM and Random Forest had an accuracy of 97%, and standalone Random Forest achieved 94%. Logistic Regression scored 93%, and Multinomial Naive Bayes scored 84%. For DL models, the best accuracy was achieved by BERT and RNN, which were 96%. The combination of RNN and LSTM had the highest accuracy, at 97%. Other DL models such as LSTM, with 94%, and MLP, with 88%, provided valuable insights. The results indicate that DL models, specifically BERT and the RNN-LSTM hybrid, outperform ML techniques for binary classification tasks, showing greater flexibility to notice subtler patterns within the data. The gap decreases in more complex multiclass classification tasks where discernment among texts by many different LLMs is harder. This study, thus, reiterates the potential of DL techniques for AI text detection and emphasizes the requirement for further research to address emerging complexities in this evolving field.

Keywords:

Multinomial Naive Bayes (MNB), Support Vector Machine (SVM), Random Forest (RF), Logistic Regression (LR), Bidirectional Encoder Representations from Transformers (BERT), Long Short-Term Memory (LSTM), Multi-Layer Perceptron (MLP), Recurrent Neural Networks (RNN).

