Department of CSE [Artificial Intelligence & Machine Learning]

List of Journal Papers Published (A.Y 2024-25)

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1	Dr S Rao Chintalapudi VNV sri Harsha	Segment Anything: GPT-3 and Logistic Regression Approach for Skin Cancer Detection	https://doi.org/10.1201/9781003529231	9781003529231	Algorithms in Advanced Artificial Intelligence & Scopus Indexed	July 2024
2	B Swaroopa Rani	Automated and reliable detection of multi-diseases on chest X-ray images using optimized ensemble transfer learning	10.1016/j.eswa.2023.12.810	0957-4174	Expert Systems with Applications ,sciencedirect Elsevier BV & Scopus Indexed	July 2024
3	Mamatha.B	Artificial Intelligence for Early stage detection of chronic kidney disease	10.11591/ijece.v14i4.pp4775-4790	2088-8708	International Journal of Electrical and Computer Engineering & Peer Reviewed	August 2024
4	Dr S Rao Chintalapudi	Optimized PCA Infused Liquid Neural Network Deployment for FPGA-Based Embedded Systems	10.35882/jeeemi.v7i2.681	2656-8632	Journal of Electronics, Electromedical Engineering, and Medical Informatics & Scopus Indexed	March 2025
5	Dr S Rao Chintalapudi	Multi-Disease Detection System with X-Ray Images using Deep Learning Techniques	18.0002.IJAEMA.2025.V17I05.200001.01568266	0886-9367	The International journal of analytical and experimental	May 2025

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6	Dr S Rao Chintalapudi	Building Document Scanner Using Computer Vision	10.22214/ijraset.2025.70988	2321-9653	International Journal for Research in Applied Science & Engineering Technology (IJRASET) & Peer Reviewed	May 2025
7	Dr S Rao Chintalapudi	Music Recommendation System based on Facial Expression using Deep Learning	www.jetir.org/papers/JETIR2505599.pdf	2349-5162	Journal of Emerging Technologies and Innovative Research (JETIR) & Peer Reviewed	May 2025
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21	Gottimukkula Sravan Rao	Bone Fracture Detection System Using Machine Learning	https://www.ijsat.org/research-paper.php?id=5322	2455-2631	International Journal on Science and Technology (IJSAT) & Peer Reviewed	May 2025
22	Gottimukkula Sravan Rao	Online Tutoring App	18.0002.IJAEMA.2025.V17I05.200001.01568268	0886-9367	The International journal of analytical and experimental	May 2025

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23	B Prashanth	Secure Files Using Secure Hash Algorithm and Elliptical Curve Cryptography	www.ijsat.org/papers/2025/2/5555.pdf	2229-7677	International Journal on Science and Technology (IJSAT) & Peer Reviewed	May 2025
24	B Swaroopa Rani	Detection Of Employees Stress Using Machine Learning	https://jseepublisher.com/wp-content/uploads/21-JSEE3186.pdf	1671-1793	Journal of Systems Engineering and Electronics & Peer Reviewed	May 2025
25	Dr.Md Shareef	Lung Cancer Prediction	https://ijsret.com/wp-content/uploads/IJSRET_V11_issue3_934.pdf	2395-566X	International Journal of Scientific Research & Engineering Trends & Peer Reviewed	May 2025
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28	G Aravind	A Deep Learning ApproachTowards Detection of Kidney Stones Using CT Scan Images	https://jseepublisher.com/wp-content/uploads/22-JSEE3188.pdf	1671-1793	Journal of Systems Engineering and Electronics & Peer Reviewed	May 2025

29	K. Nagamani	Deep Learning Approach for Multimodal Biometric Recognition System Based On Face, Iris and Finger Vein Traits	10.71097/IJSAT.v16.i2.5843	2229-7677	International Journal on Science and Technology (IJSAT) & Peer Reviewed	May-25
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< Algorithms in Advanced Artificial Intelligence (https://www.taylorfrancis.com/books/mono/10.1201/9781003529231/algorithms-advanced-artificial-intelligence?refId=9a874d77-5939-4958-9c82-b33c24b82130&context=ubx)

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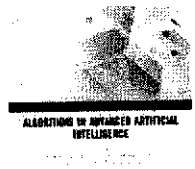
Chapter



Segment Anything: GPT-3 and Logistic Regression Approach for Skin Cancer Detection

By V. N. V. Sri Harsha (/search?contributorName=V. N. V. Sri Harsha&contributorRole=author&redirectFromPDP=true&context=ubx), S. Rao Chintalapudi (/search?contributorName=S. Rao Chintalapudi&contributorRole=author&redirectFromPDP=true&context=ubx), V. S. Manoj Kumar Chenna (/search?contributorName=V. S. Manoj Kumar Chenna&contributorRole=author&redirectFromPDP=true&context=ubx)

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ABSTRACT

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Automated and reliable detection of multi-diseases on chest X-ray images using optimized ensemble transfer learning

Kavitha Rani Balmuri [a 1], Srinivas Konda [b], Kishore kumar Mamidala [b], Madhukar Gunda [c], Swaroopa Rani B [d]

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Highlights

- To design an automatic multi-disease detection in CXR images by ensemble model.
- To adopt ODeepLabv3 to perform segmentation process for multi-disease detection.
- To adopt a new ensemble model named Optimized Ensemble Transfer Learning (OETL).
- To design a Mutation Rate-based Lion Algorithm (MR-LA) to obtain high accuracy.
- To optimize the epochs in ensemble classifier with the help of MR-LA algorithm.

Abstract

Chest radiography is a comparatively low-cost, most probably applied in a medical process that brings crucial information to discover diagnostic conclusions. Chest X-rays (CXR) are used in the prognosis of chest diseases that includes asthma, lung cancer, pneumonia, and COVID-19. Artificial intelligence detects the multi-disease automatically to enhance its proficiency and performance by solving image detection complications with various machine learning and deep learning approaches. Convolutional Neural Network (CNN) has been designed for the advancement of computerized recognition systems. For the classification of medical images, texture, shape, size, and tissue constitution are essential features for detecting diseases. Hence, huge input features are merged with

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Artificial intelligence for early-stage detection of chronic kidney disease

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ABSTRACT

Early-stage detection of chronic kidney disease (CKD) is crucial in research to enable timely intervention, enhance understanding of disease progression, reduce healthcare costs and support public health initiatives. The traditional approaches on early-stage chronic kidney disease detection often suffer from slow convergence and not integrate advanced technologies, impacting their effectiveness. Additionally, security and privacy concerns related to patient data are ineffectively addressed. To overcome these issues, this research incorporates novel optimized artificial intelligence-based approaches. The main aim is to enhance detection process through enhanced hybrid mud ring network (EHMRN), a novel detection technique combining light gradient boosting machine and MobileNet, involving extensive data collection, including a large dataset of 100,000 instances. The introduced network is optimized through the mud ring optimization to attain enhanced performance. Incorporating spark ensures secure cloud-based storage, enhancing privacy and compliance with healthcare data regulations. This approach represents a significant advancement in primary stage detection more effectively and promptly. The results show that the introduced approach outperforms traditional approaches in terms of accuracy (99.96%), F1-score (99.91%), precision (100%), specificity (99.98%), recall (100%) and execution time (0.09s).

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1. INTRODUCTION

Chronic kidney disease (CKD) poses a significant global health challenge, characterized by a gradual decline in kidney function. Despite its asymptomatic nature, CKD progress silently to advanced stages, leading to severe complications and increased healthcare burdens. The imperative for early-stage CKD detection is underscored by its potential to substantially improve patient outcomes through timely intervention and management [1]. Recognizing the importance of this issue, this research seeks to address existing challenges in CKD detection by employing a novel big data analytics approach [2], [3].

Traditional methods for detecting CKD encounter significant challenges when faced with large-scale datasets, managing missing data, and selecting optimal features. These limitations hamper their effectiveness in early detection. Recent advancements in machine learning (ML) and deep learning (DL) have introduced various techniques tailored for early-stage detection of chronic kidney disease (ESDCKD).

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Optimized PCA Infused Liquid Neural Network Deployment for FPGA-Based Embedded Systems

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ABSTRACT The integration of neural networks into FPGA-based systems has revolutionized embedded computing by offering high performance, energy efficiency, and reconfigurability This paper introduces a novel optimization framework integrating Principal Component Analysis (PCA) to reduce the complexity of input data while preserving essential features for accurate neural network processing. By applying PCA for dimensionality reduction, the computational burden on the FPGA is minimized, enabling more efficient utilization of hardware resources. Combined with hardware-aware optimizations, such as quantization and parallel processing, the proposed approach achieves superior performance in terms of energy efficiency, latency, and resource utilization. Simulation results demonstrate that the PCA-enhanced Liquid Neural Network (LNN) deployment significantly outperforms traditional methods, making it ideal for edge intelligence and other resource-constrained environments. This work emphasizes the synergy of PCA and FPGA optimizations for scalable, high-performance embedded systems. A comparison study using simulation results between cascaded feed forward neural network (CFFNN), deep neural network (DNN) and liquid neural network (LNN) has been encountered here for the embedded system to show the efficacy of PCA based LNN. It has been shown from case studies that the average F1score is 98% in case of proposed methodology and accuracy is also 98.3% for high clock value.

INDEX TERMS CFFNN, DNN, FPGA, Liquid neural network, Principal component analysis, Reconfigurable hardware,

I. INTRODUCTION

With the rapid advancement of embedded and mobile systems, a nascent domain of inquiry within data mining has emerged, focusing on streamlined software code and compact hardware architecture[1], [2]. In the contemporary landscape, data mining has assumed a pivotal role across various sectors, encompassing scientific research, medical diagnostics, marketing, biotechnology, multimedia, security, finance, among others. In the present era, the tasks associated with data management and data mining are increasingly characterized by computational complexity and significant data intensity[1],[3], [4]. These tasks necessitate considerable data processing capabilities. Moreover, in various contexts, the real-time data must be managed effectively to derive the genuine benefits. These limitations significantly impact the performance accuracy and speed of embedded system applications. To alleviate the demands and constraints present in portable, embedded devices, and to enhance the efficiency of applications on these platforms, it is imperative to integrate certain hardware within software and hardware system

Multi-Disease Detection System with X-Ray Images using Deep Learning Techniques

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Abstract— **In the healthcare sector, early and accurate detection of multiple diseases from X-ray images is crucial for timely diagnosis and treatment. This paper leverages deep learning techniques to automate disease detection, reducing reliance on manual interpretation by radiologists. Convolutional Neural Networks (CNNs), combined with transfer learning, are utilized to classify diseases like pneumonia, tuberculosis, and lung cancer. The model is trained on publicly available X-ray datasets and evaluated using metrics such as accuracy, precision, recall, and F1-score. Experimental results demonstrate superior accuracy compared to traditional methods, making the proposed approach a reliable and efficient tool for AI-driven medical diagnostics.**

Keywords— **Deep Learning, Transfer Learning, Disease Detection, Convolutional Neural Networks, Support Vector Machine.**

I. INTRODUCTION

Healthcare plays a vital role in ensuring the well-being of individuals worldwide. Accurate and early disease detection is crucial for effective treatment planning and improved patient outcomes. Traditional diagnostic methods rely on manual interpretation of medical images by radiologists, which can be time-consuming, subjective, and prone to human error. To address these challenges, this paper proposes an AI-driven multi-disease detection system that utilizes deep learning techniques to analyse X-ray images and classify diseases with high accuracy.

Machine learning and deep learning [1] have transformed various industries including healthcare, by providing innovative solutions to complex diagnostic challenges. In the context of medical imaging, Convolutional Neural Networks (CNNs) enable automated feature extraction and classification, significantly improving diagnostic accuracy. Despite advancements in AI-powered medical diagnosis, many existing models are limited to detecting a single disease at a time. This paper bridges this gap by developing a robust multi-disease detection system capable of identifying multiple conditions, such as pneumonia, tuberculosis, and lung cancer, in a single analysis.

The remainder of this paper is structured as follows: Section II discusses system analysis and existing approaches. Section III covers the proposed approaches. Section IV explains environmental setup and dataset information. Section V presents results and performance evaluation, followed by Section VI concludes with future directions

II. RELATED WORK

The detection of multiple diseases from medical images has been a significant area of research due to its crucial role in improving patient care and optimizing clinical decision-making. Traditional diagnostic methods primarily depend on radiologists analyzing X-ray images, a process that is often time-consuming, subjective, and susceptible to human error. While manual interpretation remains the gold standard, its limitations, such as variability in expertise and increasing workload, necessitate the development of automated solutions using artificial intelligence (AI).

Existing computational approaches have explored machine learning techniques like Support Vector Machines (SVM) and K-Nearest Neighbor (KNN) for disease classification. While these models offer simplicity and interpretability, they struggle with high-dimensional image data and require extensive feature engineering. Moreover, single-disease detection models fail to address the growing need for multi-disease classification, limiting their effectiveness in real-world healthcare applications.

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Building Document Scanner Using Computer Vision

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Abstract: ***In this digital era, scanning documents is essential for filling online application forms. This paper presents building mobile document Scanner using Computer Vision. OpenCV is an open-source computer vision and machine learning software library which is used to perform all the image processing tasks effectively. In this application, several image processing techniques are used such as image re-sizing, Grayscale conversion, applying Gaussian blur, Edge detection, finding Contours, Perspective transformation, and Adaptive threshold. By implementing all these techniques on a given scanned image, the system can accurately detect edges automatically and produces required scanned documents from images captured through mobile camera. The accuracy of the scanned documents compared with 240p and 720p cameras. This application makes life more convenient while also promoting a paperless, eco-friendly way of working.***

Keywords: Computer Vision, Image Processing, Perspective Transformation, Edge Detection, Contours

I. INTRODUCTION

Developing an automatic document scanner using computer vision, integrating advanced image processing techniques for efficient and accurate digitization. Adrian Rosebrock's practical implementation [1] forms the foundation, employing edge detection, perspective transformation, and adaptive thresholding for effective document extraction. OpenCV, introduced by Gary Bradski and Adrian Kaehler [2], provides versatile tools like image preprocessing and contour detection, which are crucial for this system. Szeliski's work [5] offers theoretical insights into edge detection and perspective correction, strengthening the scanner's design. To handle challenging conditions like poor lighting, Deng et al. [6] proposed adaptive thresholding methods, enhancing the readability of scanned documents. The system's real-time efficiency is supported by findings from Matuska et al. [7], who demonstrated OpenCV's superiority in performance for such applications.

Friedman and Fisher's exploration [3] highlights potential future improvements using AI for advanced feature detection. Additionally, concepts from Viola and Jones [4] on object detection inform edge and contour enhancements. Inspired by Neukermans et al.'s early handheld scanners [8], this application delivers a software-based solution. By automating processes, the scanner ensures high-quality, distortion-free digitization, promoting productivity and eco-friendly practices across various domains.

II. RELATED WORK

The idea of document scanning has been explored in various studies and papers, each contributing important methods and insights. Adrian Rosebrock [1] demonstrated how to build a document scanner using OpenCV, using techniques like edge detection, perspective correction, and adaptive thresholding to extract documents from images effectively. His work serves as a practical guide for building similar systems. Bradski and Kaehler [2] introduced OpenCV as a powerful tool for image processing and computer vision. Their book explains many useful techniques that are directly applied in document scanning system.Friedman and Fisher [3] explored the use of machine learning with OpenCV for image-related tasks. Viola and Jones [4] developed a fast method for detecting objects in images. Although their work focuses on object detection, the same principles can help improve how we detect and extract document edges. Szeliski [5] provided an in-depth overview of many computer vision techniques, including those used in document scanners, like edge detection and perspective transformation. His work is a great resource for understanding the theory behind these methods. Deng et al. [6] proposed an adaptive thresholding algorithm to detect corners in images. Their method can be helpful in cases where documents are difficult to detect due to poor lighting or noisy backgrounds. Matuska et al. [7] compared the performance of image processing algorithms in Matlab and OpenCV. They found that OpenCV is faster, making it ideal for real-time applications like document scanning.Finally, Neukermans et al. [8] developed one of the first handheld document scanners, focusing on hardware solutions. While our project uses a software-based approach, their work inspired the idea of creating efficient and portable scanning systems. These studies and resources are the foundation for our proposed system, helping us design a document scanner which is accurate, efficient, and easy to use, all powered by OpenCV.

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Music Recommendation System based on Facial Expression using Deep Learning

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Abstract : This paper presents an automatic music recommendation system using facial emotion detection with a Convolutional Neural Network (CNN). The model captures real-time facial expressions via a webcam, classifies emotions such as happy, sad, angry, surprised, neutral and recommends music using Deep Learning and Streamlit. Achieving an accuracy of around 85%, it enhances recommendation precision while reducing computational time. This system is ideal for music streaming platforms and therapeutic applications. The final output is displayed as an audio-visual experience via YouTube integration in a user-friendly web application.

IndexTerms **– Deep Learning, Convolutional Neural Networks, Recommendation Systems, Haar Cascades, Emotion Detection**

I. INTRODUCTION

Music recommendation system that integrates facial expression recognition and deep learning to create a personalized listening experience. By leveraging Convolutional Neural Networks (CNNs), the system captures real-time facial expressions via a webcam, classifies emotions such as happy, sad, angry, surprised, neutral and recommends suitable music. Unlike traditional recommendation systems that rely on historical data, our approach adapts dynamically to the user's emotional state, enhancing engagement and satisfaction. The model is trained on a diverse dataset using image processing, data augmentation, and transfer learning for improved accuracy and robustness. Once an emotion is identified, a hybrid recommendation engine—combining collaborative and content-based filtering—maps emotions to appropriate music genres. Designed for cross-platform compatibility, the system operates on desktops, laptops, tablets, and smartphones, ensuring broader accessibility. This paper not only enhances user experience in music streaming platforms but also has potential applications in mental health and therapeutic interventions. Achieving an accuracy of around 85%, the proposed system efficiently reduces computational time while providing emotionally adaptive music recommendations.

The structure of the remaining paper is as follows. Section II discuss about the existing approaches related to facial expression based music recommendation. Building a music recommendation system is discussed in section III. Section IV outlines the experimental setup. Section V elaborates Results and Discussion. Section VI concludes the paper with future directions.

II. RELATED WORK

Facial expression recognition and its applications in emotion-driven systems have been extensively explored in recent research. Priya et al. [1] introduced a Machine Learning-based Enhanced Support Vector Machine (SVM) technique for predicting stress, demonstrating the potential of computational models in recognizing emotional states. However, SVMs face limitations in handling complex, high-dimensional image data, which deep learning models can address more effectively.

Rahul Ravi et al. [2] implemented a Convolutional Neural Network (CNN) combined with Local Binary Patterns (LBP) for facial expression recognition, highlighting the effectiveness of CNNs in feature extraction. Their model showcased improved performance in detecting subtle facial changes, which is crucial for real-time applications. However, their approach primarily focused on static image datasets rather than real-time video input.

A foundational contribution to face detection was made by Viola and Jones [3], who developed a real-time face detection framework using Haar-like features and an AdaBoost classifier. This work laid the groundwork for modern face detection techniques, making it possible to efficiently locate faces in images and videos, an essential step in facial emotion recognition.

To enhance the accuracy of facial expression recognition in dynamic settings, Fan et al. [4] proposed a hybrid CNN-RNN and 3D Convolutional Network (C3D) approach for video-based emotion recognition. Their model successfully captured both spatial and temporal features, improving performance for real-time emotion detection. However, its computational complexity remains a challenge for lightweight, real-time applications [7][8][9][10].

Further improvements in facial expression recognition were presented by Happy and Routray [5], who developed an automatic facial expression recognition system that utilized salient facial patches to improve feature extraction and classification accuracy. Their work demonstrated the importance of selecting relevant facial regions to reduce computational overhead while maintaining high accuracy.

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Cloud Based Flexible Unified Fine Grained Access Control of Health Records

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Abstract
Personal health records (PHRs) are important assets that require confidentiality, integrity and access control. ABE is one technology that could secure PHR in a cloud environment. Assembling PHR usually necessitates information from many sources, thus necessitating fine access control. ABE could help in controlling access to PHR. Other users would be able to exchange their PHR without them exposing their private data. This could be done through multi privilege access where key encryptions are generated and allowing the staff to access and store information at certain level, preserving patients' privacy. This paper's results show advances in PHR usability and efficiency and the potential to achieve S/S private requirements. Results show that Private Ciphertext-Policy Attribute Based Encryption Frameworks are capable of providing necessary security guarantees with simulations yielding promising results.

I. INTRODUCTION

Unified Fine-Grained Access Control for Personal Health Records in Cloud Computing' is targeting to configure an effective and versatile access regulation model for the protection of sensitive health data in cloud computing and its applications. By means of context-aware fine-grained permissions, the control framework confirms that only properly cleared individuals can use the designated set of PHRs at any given time. The control framework combines state-of-the-art encryption technologies to safeguard data while in motion and while in storage as well as user authentication mechanisms such as multi-factor authentication (MFA) to give a more controlled and real-time identity verification. The system was developed in a way to be capable of interoperability with the current Healthcare Information Systems, Electronic Health Records and Cloud based health-care application without much hassle and integration issues using designed protocols and APIs.

This project provides for the requirements of scalability and optimization of performance to deal with enormous amounts of data and wide ranges of users while ensuring adherence to healthcare compliance like HIPAA, GDPR, HITECH etc. Compliance with regulations is maintained through regular audits and DA- assessments, data loss prevention technologies, continuous monitoring of the environment and other measures related to security policies. The project also reinforced other educative programs focusing on healthcare providers and patients in order to improve the security perception and make them trusting the PHR systems based on the cloud techniques.

II. RELATED WORK

The idea of unified fine-grained access to personal health records has been explored in various studies and papers, each contributing important methods and insights. Kaelber et al. (2008) [1] Identifies key priorities and challenges for PHR systems, including usability, privacy, and integration with healthcare systems.Abbas and Khan (2014) [2] Discusses the state-of-the-art methodologies, privacy challenges, and potential future research directions in e-health cloud systems. Highlights the trade-offs between data privacy, usability, and scalability. Discusses cryptographic techniques and privacy-aware frameworks.Focuses on challenges such as trust, policy enforcement, and revocation mechanisms.Abukhousa et al. (2012) [3] Identifies challenges like compliance with regulations (e.g., HIPAA), data integrity, and latency. Suggests frameworks to balance performance and privacy.Vilaplana et al. (2013) [4] Explores cloud applications in e-health, including telemedicine and PHR management. Evaluates cost-effectiveness, scalability, and reliability of cloud-based solutions.Wang et al.

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ELECTRONIC COMPONENT IDENTIFICATION FROM VOICE

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ABSTRACT- This project describes the architecture of a door phone embedded system with interactive voice response. Because speech technology is not 100% reliable, the emphasis was on parts that have greater impact on overall performance (audio capture, speech recognition and verification, and power consumption). Using an embedded microphone array increases speech recognition effectiveness in very noisy environments.

To increase the speech recognition performance, a null grammar with confidence measure support was used. The speaker verification module was also optimized for nosy environments (using the cepstral mean normalization technique and a universal background mode). Any fundamental discrete device or physical object in an electronic system that affects electrons or the fields around them is referred to as an electronic component. Electrical elements, which are conceptual, should not be confused with electronic components, the majority of which are industrial goods that are only available in a single form. Abstractions used to represent idealised electronic parts and components. There are numerous electrical terminals or leads on electronic components. To build an electronic circuit with a specific purpose (such as an amplifier, radio receiver, or oscillator), these leads link to other electrical components, frequently by wire. Basic electronic components can be integrated inside of discrete packages like semiconductor integrated circuits, hybrid integrated circuits, or thick film devices, as well as arrays or networks of similar components. The list of electrical components that follows concentrates on their discrete form and treats such bundles as independent components.

I. INTRODUCTION

This project aims to provide an in-depth analysis of electronic components, categorizing them into three primary types: passive, active, and electromechanical components. The study will focus on how these components function within electrical and electronic circuits, as well as their role in circuit design and analysis. The project will explore the fundamental differences between these component types by examining their energy interaction properties, signal processing capabilities, and real-world applications. Special attention will be given to how electrical engineers differentiate between DC and AC circuit analysis, allowing for a better understanding of how energy flows and signals are processed within circuits. Additionally, this project will

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Short-Term Arrival Delay Time Prediction in Freight Rail Operations Using Data-Driven Models

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Abstract

Efficient management of freight rail operations is crucial for minimizing delays, optimizing schedules, and improving overall logistics performance. Short-term prediction of arrival delays can significantly enhance operational efficiency and customer satisfaction. Traditional methods for delay prediction often rely on historical data and manual analysis, which may not capture real-time operational dynamics or account for unforeseen disruptions.

This paper proposes a data-driven approach utilizing machine learning models to predict short-term arrival delays in freight rail operations. By analyzing a range of data inputs, including historical delays, real-time train proposed model aims to provide accurate and timely delay predictions. This approach seeks to improve decision-making processes, optimize scheduling, and enhance the reliability of freight rail services.

The goal of this study is to investigate a set of data-driven models for the short-term prediction of arrival delay time using data from the National Railway Company of Luxembourg of freight rail operations between Bettembourg (Luxembourg) and other nine terminal stations across the EU, and then investigate the effects of the features associated with the arrival delay time.

For our dataset, the lightGBM model outperformed other models in predicting the arrival delay performance, weather conditions, and track information, the time in freight rail operations, with departure delay time, trip distance, and train composition appearing to be the most influential features in short-term.

DATA AUGMENTATION USING PGGAN & MULTICLASS CLASSIFICATION WITH VGG16

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ABSTRACT

Deep learning, particularly through convolutional neural networks (CNNs), has achieved great success in image classification but often depends on large, annotated datasets. In real-world scenarios, acquiring such data is difficult, leading to overfitting and poor generalization. Data augmentation helps address this, but traditional methods like rotation or flipping may fall short for complex datasets. This study explores using Progressive Growing of GANs (PGGAN) to generate high-quality synthetic images that augment limited datasets. By incorporating these images into the training of a fine-tuned VGG16 model, we observe improved accuracy and robustness. The results show that GAN-based augmentation enhances performance, especially in data-scarce situations, demonstrating the potential of generative models to overcome dataset limitations.

I. INTRODUCTION

This project focuses on enhancing deep learning-based image classification by using Progressive Growing of GANs (PGGAN) for data augmentation [1]. PGGAN generates high-quality synthetic images to supplement real datasets, particularly helping with class

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Generating Synthetic Images From Text Descriptions Using Rnn & Cnn

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ABSTRACT

In today's AI-driven world, generating synthetic images from textual descriptions is an exciting yet complex challenge that bridges computer vision and natural language processing. As the demand for AI-generated visual content rises across industries like gaming, advertising, and virtual reality, achieving accurate and realistic text-to-image synthesis becomes increasingly important. Traditional generative models often fall short in understanding and representing the deep semantic connections between language and visuals, leading to inconsistencies in the generated images. To overcome these limitations, advanced deep learning techniques are essential to ensure both semantic fidelity and image quality.

This project introduces a novel approach that combines Recurrent Neural Networks (RNNs) and Convolutional Neural Networks (CNNs) to improve the text-to-image generation process. The RNN component is responsible for interpreting and encoding the sequential nature of the textual input, effectively capturing its meaning and context. Meanwhile, the CNN focuses on generating and refining image features that visually represent the encoded semantics. By integrating these two architectures, the model can produce high-quality synthetic images that accurately reflect the given textual descriptions. This fusion leverages the contextual understanding of RNNs and the visual generation power of CNNs, resulting in an efficient and coherent text-to-image synthesis framework.

Keywords:Text-to-Image Synthesis, Synthetic Image Generation, Recurrent Neural Networks (RNNs), Convolutional Neural Networks (CNNs).

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Improving Vehicle Safety with V2V Communication: The Role of DSRC, GPS, and Low-Latency Alerts in Modern Traffic Systems

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Abstract

A robust wireless network of connected vehicles is needed to enable future telematics and infotainment applications in the vehicular domain. We need to focus on terms reliable and continuous system performances as vehicle to vehicle (V2V) faces a highly dynamic time-varying channel conditions and varying vehicle network topology. This paper mainly focuses on Wireless communication technologies used in v2v communication. Keeping in mind the terms reliability, scalability, latency and throughput of the system, the technologies we have focused on are Cellular vehicle to everything communication (C-V2X), 4rth Generation Long term evaluation (4G-LTE) Dedicated short range communication and it's a known wireless technology.

1. INTRODUCTION

V2V communication aims to facilitate efficient and reliable communication without reliance on third-party infrastructure such as GSM networks. Traditional communication systems like Vehicle-to-Infrastructure (V2I) depend on external infrastructure, which can be unreliable and unavailable in some areas. According to WHO, road traffic accidents cause approximately 1.2 million deaths globally each year. V2V solutions have been developed to improve road safety and reduce accident-related fatalities..

The primary purpose of this project is to enhance road safety and traffic efficiency by implementing a robust V2V communication system. By enabling direct wireless communication between vehicles, this system aims to reduce traffic collisions, improve situational awareness, and optimize traffic flow. Through the use of advanced wireless technologies such as DSRC and C-V2X, vehicles can exchange critical data in real-time, allowing for quicker reaction times and improved decision-making for drivers and autonomous systems. The project also seeks to overcome limitations in existing vehicular

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Ai Enabled Water Well Predictor

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Abstract- In the water resource management sector, ground water level prediction is a crucial issue to ensure sustainable water availability and prevent over- extraction. In this paper, machine learning techniques are used to predict groundwater levels by analyzing environmental and geological factors such as historical water levels, soil characteristics, topography, and climate conditions. Various predictive models, including GA-ANN, ICA-ANN, ELM, and ORELM, are applied to the dataset to improve accuracy in groundwater forecasting. The performance of these models is evaluated using metrics such as accuracy, precision, and F1-score, with the ORELM model achieving the highest accuracy of 92%. These AI-driven insights help in identifying optimal well locations, ensuring efficient water resource management and long-term sustainability.

IndexTerms- Groundwater Level Prediction,Machine Learning,Water Resource Management,Environmental Factors,Geological Factors, GA-ANN.

I. INTRODUCTION

Water is a fundamental resource for life, and efficient groundwater management is crucial for sustaining agriculture, urban development, and environmental conservation. With increasing population growth and climate change, understanding groundwater availability has become pressing issue to prevent resource depletion and ensure long-term water security. Groundwater levels are influenced by various factors, including soil properties, topography, historical water levels, and climatic conditions such as rainfall and temperature. Accurate groundwater level prediction can help optimize water well placement and support better decision-making in resource management. This paper focuses on developing an AI-enabled Water Well Predictor that Integrates advanced machine learning techniques to forecast ground water levels based on multiple environmental and geological parameters.

Machine learning has been widely adopted across various sectors, from healthcare to agriculture, for predictive analysis and data-driven decision- making. In the water resource sector, AI-based models have the potential to revolutionize groundwater management by providing real-time insights and improving prediction accuracy. Traditional methods rely on historical records and manual surveys, which are time-consuming and often inaccurate. By leveraging machine learning models such as GA-ANN, ICA-ANN, ELM, and ORELM, this project aims to enhance groundwater level forecasting. These models analyze large datasets to identify trends and patterns, ensuring precise and reliable predictions for sustainable water use.

The remainder of this paper is structured as follows: Section 2 explores related work on groundwater prediction models. Section 3 describes the proposed system architecture and methodology. Section 4 discusses the experimental setup and dataset details. The results and performance evaluation are presented in Section 5. Finally, Section 6 concludes the paper and outlines future research directions.

II. RELATED WORK

Groundwater level prediction has been an area of significant research due to its importance in sustainable water management. Traditional groundwater assessment methods rely on hydro geological surveys, manual bore well drilling, and empirical models, which are often time-consuming and prone to inaccuracies. Geographic Information Systems (GIS) have been widely used to map groundwater distribution and identify potential well locations. However, GIS-based approaches primarily rely on historical data and lack real-time predictive capabilities, limiting their accuracy in dynamic environments. Additionally, these traditional methods fail to consider changing climatic and environmental factors, leading to suboptimal decision-making in groundwater resource management.

Recent advancements in machine learning (ML) have introduced more efficient approaches for groundwater level forecasting. Researchers have developed AI-driven models that integrate environmental factors such as rainfall, temperature, soil characteristics, and topographical data to improve prediction accuracy. Machine learning techniques such as Support Vector Regression (SVR), Linear Regression (LR), and Online Sequential Extreme Learning Machine (ORELM) have shown promising results in analyzing groundwater fluctuations .These models enable automated data processing, Reducing the need for manual surveys and ensuring faster, more reliable predictions.

Extraction of Urban Roads from High Resolution Satellite Images using Machine Learning

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Abstract **- Extracting urban roads from high-resolution satellite imagery is a critical task in geospatial analysis, urban planning, and smart city development. This project presents an automated system leveraging machine learning, particularly deep learning models like Convolutional Neural Networks (CNNs) and U-Net, to accurately identify and map road networks from satellite images. The system includes preprocessing steps such as image normalization, resizing, and augmentation, followed by segmentation and post-processing to refine road continuity. The extracted data is converted into GIS-compatible formats, making it applicable for real-time navigation, infrastructure analysis, and disaster management. The model's performance is evaluated using metrics like Intersection over Union (IoU) and F1-score, demonstrating high accuracy and scalability across diverse urban environments.**

Index Terms- Urban Road Extraction, Satellite Imagery, Machine Learning, Deep Learning, CNN, U-Net, Image Segmentation, GIS

I. Introduction

The extraction of road networks from high-resolution satellite imagery has become increasingly important in modern. urban development and planning. Accurate road mapping supports various applications such as traffic monitoring, navigation systems, infrastructure planning, and emergency response. Traditional approaches to road detection often involve manual interpretation or basic image processing techniques, which are time-consuming and less reliable, particularly in dense or complex urban areas.Recent advancements in machine learning, especially deep learning, have significantly improved the ability to automatically identify and segment roads from satellite images. Techniques such as Convolutional Neural Networks (CNNs) and U-Net architectures enable the model to distinguish roads from surrounding elements like buildings, vegetation, and shadows with greater precision. By incorporating preprocessing methods to enhance image quality and post-processing to refine results, the system ensures the creation of accurate and continuous road maps. These outputs can be integrated into Geographic Information Systems (GIS) for further analysis and real- world application. This project aims to develop an efficient, scalable, and intelligent solution for extracting urban road networks, contributing to smarter and more responsive urban management systems.

GENERATION AND DETECTION OF FACE MORPHING ATTACKS

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Abstract- With the rise of digital manipulation techniques, face morphing attacks have become a significant security and privacy concern. These attacks involve combining multiple facial images to create a synthetic face that looks like more than one person. This poses risks such as identity theft and the potential to bypass biometric systems used for authentication. In this project, we aim to explore both the creation and detection of face morphing attacks. For generating morphed faces, we use advanced deep learning models along with traditional image processing methods to create realistic images with minimal noticeable flaws.Our approach focuses on identifying key signs or "artifacts" that are often left behind in morphed images. These include unusual texture patterns, distortions in facial features, and irregularities in the facial landmarks. To improve detection accuracy, we apply machine learning models like Support Vector Machines (SVM) and deep learning models such as MobileNetV2, which offer an effective, lightweight solution for detecting morphing attacks in realtime. Additionally, we use the Scale-Invariant Feature Transform (SIFT) method with SVM to enhance the extraction of features and improve classification accuracy.

IndexTerms- Digital manipulation techniques, face morphing attacks, Synthetic face, Biometric systems, Traditional image processing, Deep learning models, Machine learning models, Support vector machines, MobileNetV2, Scale-Invariant Feature Transform

I. INTRODUCTION

Face morphing attacks have become a significant security threat, especially in systems that rely on biometric authentication, as they enable fraudulent activities like identity theft and unauthorized access. These attacks work by blending multiple facial images to create a synthetic face that combines features from different people, making it difficult for facial recognition systems to distinguish between a genuine identity and a manipulated one.

The goal of this project is to tackle both the creation and detection of face morphing attacks using a combination of deep learning techniques and traditional image processing methods. To achieve this, the project will use advanced deep learning models such as MobileNetV2 for extracting features and classifying faces, as well as Support Vector Machines (SVM) and ScaleInvariant Feature Transform (SIFT) to spot the artifacts or irregularities left in morphed images.

The project also has practical applications in real-world scenarios, such as biometric security, passport verification, and identity validation systems, where face morphing attacks can be exploited for fraudulent purposes. By improving the detection of these attacks, the project aims to enhance the security of facial recognition systems, particularly in government and corporate sectors.

II. RELATED WORK

This project aims to address the growing threat of face morphing attacks, which have become a major concern in areas like biometric authentication, identity verification, and digital security. Face morphing is the process of combining multiple facial images to create a synthetic face that features elements from different individuals. This makes it possible to trick facial recognition systems, which are commonly used in applications such as passport verification, border security, and access control. These attacks can be exploited for illegal activities like identity theft and unauthorized access, posing serious risks to security-sensitive systems.

The goal of this project is to create an effective system for both generating and detecting face morphing attacks by combining deep learning and traditional image processing techniques. At the same time, the project focuses

III. ROAD ACCIDENT PREDICTION

In this project, we use a Fusion Model Support Vector Machine (SVM) algorithm to improve the detection of face morphing attacks. This approach combines multiple SVM classifiers to boost the accuracy and performance of the detection system. Rather than relying on a single SVM model, the fusion method integrates various feature extraction techniques and different SVM classifiers, which allows the system to make more accurate predictions

The Fusion Model SVM works by extracting different features from facial images. We use techniques like Scale-Invariant Feature Transform (SIFT), Histogram of Oriented Gradients (HOG), and Local Binary Patterns (LBP) to capture various aspects of the image. These include inconsistencies in texture, distortions in facial landmarks, and spatial changes caused by the morphing process. The results from these classifiers are then combined, often using techniques like voting or averaging, to produce a final decision that is more accurate and reliable.

The main advantage of using the Fusion Model SVM is that it improves classification accuracy by considering multiple perspectives of the image. Traditional SVM models trained on just one feature set may struggle to detect different types of morphing attacks, leading to mistakes like false positives or negatives.

Furthermore, the Fusion Model SVM strikes a good balance between efficiency and accuracy compared to deep learning models, which require large amounts of training data and significant computational power. By combining traditional machine learning methods with advanced feature extraction, this approach provides a scalable and effective solution for detecting face morphing attacks. Ultimately, this fusion model can greatly improve biometric security, reducing the risk of identity fraud, passport forgery, and unauthorized access in systems that rely on facial recognition technology.

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Content Based Image Retrieval Using Deep Learning

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Abstract: Content-based image retrieval (CBIR) focuses on identifying similar images from extensive datasets based on a query image. Traditionally, the similarity between the representative features of the query image and those in the dataset has been utilized to rank images for retrieval. In the early stages of CBIR, various hand-designed feature descriptors were explored, relying on visual cues such as color, texture, and shape to represent images. However, over the past decade, deep learning has emerged as a powerful alternative to hand- crafted feature engineering, as it automatically learns features from data, significantly enhancing retrieval performance. This project provides a comprehensive survey of deep learning advancements in content-based image retrieval over the last ten years. It categorizes existing state-of-the-art methods from multiple perspectives to facilitate a deeper understanding of the field's progress. The taxonomy employed in this survey encompasses various types of supervision, networks, descriptors, and retrieval methods. Additionally, a performance analysis of these state-of-the- art techniques is conducted, offering valuable insights for researchers to track advancements and make informed decisions. The findings presented in this project aim to support further research and development in image retrieval using deep learning methodologies.

Index Terms- **: Image Retrieval, Content Based Image Retrieval, Convolutional Neural Network, Deep Learning, Feature Extraction, AlexNet.**

I. INTRODUCTION

The project titled "Content-Based Image Retrieval Using Deep Learning" aims to revolutionize the way users search for images by leveraging advanced deep learning techniques [1]. Traditional image retrieval systems often rely on metadata, tags, or textual descriptions, which may not accurately represent the visual content of images [4]. By employing convolutional neural networks (CNNs) for feature extraction, this project seeks to enhance the accuracy and efficiency of image searches, allowing users to find images based on their actual visual characteristics rather than associated text [3].

To achieve this, the project will involve the development of a robust backend that processes a diverse dataset of images, ensuring consistency through pre-processing and training deep learning models to recognize relevant features [2]. Additionally, a user-friendly web interface will be implemented, enabling users to upload images and receive relevant search results. The system will also be evaluated against traditional image retrieval methods to demonstrate the advantages of using deep learning, ultimately aiming to improve user satisfaction and streamline the image retrieval process [5].

This project presents an image retrieval framework that fuses high-level feature representations from different layers of the AlexNet convolutional neural network. By creating a single feature vector, the system enhances retrieval efficiency and improves image similarity without relying on human-crafted features [7]. The paper includes a literature review of recent methods, an overview of deep learning and CNNs, a detailed discussion of the proposed approach, and an experimental setup, concluding with a summary of key findings and implications.

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Online Block-Chain Based E-Governance in Health Care & Education System

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Abstract: Blockchain technology holds the potential to revolutionize e-governance in both health care and education by enabling secure, transparent, and efficient data management. In this research, we develop an integrated blockchain-based framework to enhance administrative processes and foster trust in governmental and institutional systems. Our approach harnesses the immutable and decentralized nature of blockchain to streamline record kéeping, automate transactions using smart contracts, and ensure data integrity across various platforms. A detailed evaluation of our framework highlights its effectiveness in minimizing data redundancy and enhancing accessibility, while preserving the confidentiality and authenticity of sensitive health and educational records. Experimental results indicate that our proposed method significantly improves system responsiveness and user trust compared to conventional centralized systems. These findings suggest that the strategic integration of blockchain technology can drive robust e-governance solutions that better serve the evolving needs of the health care and education sectors.

***Keywords**: Blockchain, E-Governance, Health Care, Education, Smart Contracts, Distributed Ledger Technology, Data Security, Interoperability.*

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I. INTRODUCTION

Blockchain technology is increasingly being recognized as a key enabler for modernizing public sector infrastructure. Recent reports indicate that up to 65% of public institutions in healthcare and education continue to face data management challenges, from security breaches to inefficiencies in record handling [1]. Traditional centralized systems are often plagued by vulnerabilities that compromise data integrity and erode public trust. In response to these systemic issues, blockchain's decentralized and immutable characteristics have inspired a wave of research focused on developing secure e-governance solutions.

The paper presents a blockchain-based e-governance framework designed to address the pressing challenges in the healthcare and education sectors. By harnessing blockchain's capabilities—such as transparent record-keeping and the automation of processes through smart contracts—this framework aims to significantly reduce administrative overhead and enhance the security of sensitive data. While earlier studies predominantly focused on isolated solutions, such as secure data storage or limited transaction automation, recent endeavors have shifted toward integrating multiple blockchain features. Yet, achieving optimal system scalability and interoperability remains a notable challenge.

In this work, we propose a comprehensive solution that combines smart contracts, distributed ledger technology, and secure data access protocols to streamline governance in healthcare and education. The framework is rigorously evaluated through simulated environments, where performance metrics such as data integrity, operational efficiency, and scalability are assessed. The aim is not only to demonstrate the efficacy of blockchain in mitigating current challenges but also to set the stage for future enhancements in public sector e-governance.

II. RELATED WORK

Recently, the adoption of blockchain technology in e-governance has accelerated the development of secure and transparent systems for managing sensitive public sector data. Early studies investigated blockchain's potential to transform traditional centralized systems into decentralized, tamper-proof networks that ensure data integrity and user privacy In the healthcare domain, researchers such as Kuo et al. (2017) demonstrated the use of blockchain to safeguard patient records, highlighting its advantages in preventing unauthorized access and enhancing interoperability among diverse medical systems. Similarly, studies in the education sector have shown that blockchain can effectively streamline the certification process, improve the authenticity of academic

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Future of Loan Approvals Using Explainable AI

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Abstract– The future of loan approvals is increasingly driven by Artificial Intelligence (AI), offering faster and data-informed decisions. However, traditional machine learning (ML) models often lack transparency, making them unsuitable for high-stakes financial decisions. This paper presents an Explainable AI (XAI) framework based on a Belief Rule Base (BRB) to automate and enhance the loan underwriting process. The BRB model combines expert knowledge with supervised learning and supports both factual and heuristic rules within a hierarchical structure. The system provides clear, interpretable explanations by highlighting activated rules and the influence of input attributes, ensuring transparency and regulatory compliance. A case study on mortgage underwriting demonstrates the model's ability to balance accuracy with explainability, outperforming conventional black-box approaches in trust and interpretability. This work underscores the potential of XAI to shape a fairer, more transparent future for automated loan approvals.

Keywords– Artificial Intelligence, Explainable AI(XAI), Belief Rule Base (BRB), LOAN APPROVALS, black-box approaches

I. INTRODUCTION

The growing demand for faster, fairer, and more transparent financial services has accelerated the integration of Artificial Intelligence (AI) into loan underwriting. The project titled "Future of Loan Approvals with Explainable AI" aims to revolutionize this process by combining AI with Explainable AI (XAI) technologies to automate and justify lending decisions. By analyzing large datasets—including borrower demographics, financial history, and collateral—the system evaluates loan applications in milliseconds using predefined rules, while also offering human-readable explanations to ensure trust and regulatory compliance.

Traditional AI models often lack interpretability, raising concerns in high-stakes applications such as lending. Doshi-Velez and Kim [1] emphasized the need for interpretable machine learning in sensitive domains, while Ribeiro et al. [2] and Lundberg & Lee [3] introduced tools like LIME and SH AP to explain model predictions. However, these post-hoc methods may still fall short in regulatory and user-facing contexts. To overcome these limitations, recent work has explored hybrid models—like belief-rule bases (Wang and Tan [4])—which integrate expert knowledge and learning for inherently transparent decision-making. Building on these insights, this project develops AI models capable of assessing affordability, repayment behavior, and collateral value, while minimizing human bias through data-driven decisions. Key components include robust data collection and preprocessing, model development aligned with regulatory standards, and the creation of a user-friendly interface that enables underwriters and applicants to view and understand loan decisions.

The system is designed to adapt to evolving compliance requirements, and undergoes rigorous testing to evaluate accuracy, speed, fairness, and user satisfaction across diverse lending scenarios.

II. RELATED WORK

The integration of Artificial Intelligence (AI) in financial services—particularly in loan underwriting—has gained momentum due to its potential to enhance accuracy, speed, and efficiency. However, the opaque nature of many AI models has raised concerns over fairness, transparency, and regulatory compliance. This has led to an increasing focus on Explainable AI (XAI), which aims to make algorithmic decisions understandable to stakeholders. Doshi-Velez and Kim [1] outlined the critical importance of interpretability in AI, especially in domains like finance where decisions have a direct impact on individuals. Ribeiro et al. [2] introduced LIME, a model-agnostic explanation tool that interprets predictions by approximating black-box models locally. Similarly, Lundberg and Lee [3] proposed SHAP, which offers unified feature attribution to explain model outputs. While both tools have advanced the field of XAI, they are post-hoc in nature and may not fully align with regulatory expectations for explainability. To address this gap, researchers have explored inherently interpretable models. Belief Rule Base (BRB) systems, as discussed by Wang and Tan [4], offer a hybrid approach by incorporating expert knowledge with machine learning, enabling structured, rule-based decision-making.

These systems not only handle uncertainty and incomplete data effectively but also allow the reasoning process behind each decision to be traced and understood.

IMAGE CAPTION GENERATION USING DEEP LEARNING

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Abstract: Image caption generation using deep learning is a challenging task that involves generating meaningful textual descriptions for images. It combines techniques from computer vision and natural language processing (NLP) to automatically describe the contents of an image. A typical deep learning-based image captioning model consists of a convolution neural network (CNN) for feature extraction from images and a recurrent neural network (RNN) or a transformer-based model for generating captions. The CNN extracts high-level features from the image, which are then fed into an RNN, such as a long short-term memory (LSTM) network, or a transformer to generate coherent and contextually relevant descriptions. Recent advancements in deep learning have improved the accuracy and fluency of generated captions. Attention mechanisms, such as soft and hard attention, allow models to focus on specific regions of an image while generating each word in a caption, resulting in more contextually relevant descriptions. Additionally, transformer-based models like Vision Transformers (ViTs) and large-scale pre-trained models such as CLIP and BLIP have further enhanced image captioning by leveraging vast amounts of visual and textual data.

I. INTRODUCTION

In today's digital landscape, social media platforms such as Instagram, Twitter, and Facebook have become major channels for sharing visual content like images and short videos. While users often accompany these visuals with textual annotations—such as comments, hashtags, and captions—these texts are frequently ambiguous or unrelated to the actual visual content, creating a challenge for content-based image retrieval systems. Traditional search engines rely heavily on these textual cues, which leads to an evident gap between low-level visual data and the high-level semantic information users seek—a problem known as the "semantic gap." To address this, researchers have explored Automatic Image Annotation (AIA) techniques that aim to generate meaningful textual descriptions directly from visual input, thereby enhancing accessibility, especially for visually impaired users, and improving content discovery.

Recent advancements in deep learning, particularly the fusion of Convolution Neural Networks (CNNs) and Long Short-Term Memory (LSTM) networks, have demonstrated remarkable success in image captioning tasks. CNNs are adept at extracting spatial features from images, while LSTMs are proficient in generating sequences of text based on learned patterns. By integrating these models, it becomes possible to automatically generate coherent and contextually relevant captions that bridge the semantic gap. This paper investigates such an image caption generation system, leveraging CNNs to capture visual information and LSTMs to generate natural language descriptions. Through this approach, we aim to contribute to the development of more intelligent systems capable of understanding and communicating the content of images with minimal human input.

For this study secondary data has been collected. From the website of KSE the monthly stock prices for the sample firms are obtained from Jan 2010 to Dec 2014. And from the website of SBP the data for the macroeconomic variables are collected for the period of five years. The time series monthly data is collected on stock prices for sample firmsand relative macroeconomic variables for the period of 5 years. The data collection period is ranging from January 2010 to Dec 2014. Monthly prices of KSE - 100 Index is taken from yahoo finance.

II.RELATED WORK

Automatic image annotation (AIA) has been a focal point of research in the fields of computer vision and multimedia retrieval due to its potential to bridge the semantic gap between low-level image features and high-level semantic concepts. Traditional AIA methods, including generative models, discriminative models, and nearest neighbor approaches, initially offered moderate success but were limited by scalability issues and poor generalization across diverse datasets. The advent of social media platforms such as Instagram and Twitter introduced an abundance of image–tag pairs, which were proposed as a valuable source for training AIA systems.

II. However, empirical studies revealed that a significant proportion of these user-generated tags—often fewer than 25%—accurately reflect the actual visual content, with many hashtags serving auxiliary purposes such as emotional expression or content discoverability. This necessitated the development of sophisticated filtering techniques to isolate visually relevant tags, including the use of algorithms such as Hyperlink-Induced Topic Search (HITS) and topic modeling approaches like Latent Dirichlet Allocation (LDA).

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Bone Fracture Detection System Using Machine Learning

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ABSTRACT

Bone fractures are a common medical condition that can result from trauma, accidents, or certain diseases. Accurate and timely detection of fractures is crucial for effective treatment and recovery. Traditional methods of fracture detection primarily rely on manual interpretation of X-ray images by radiologists, which can be time-consuming and prone to human error. In recent years, advancements in machine learning and computer vision have paved the way for automated systems that can assist in the detection of bone fractures. This paper proposes a bone fracture detection system that utilizes deep learning techniques to automatically identify fractures in medical images, such as X-rays or CT scans. The proposed system aims to improve diagnostic accuracy, reduce detection time, and support medical professionals in clinical decision-making. The system's performance is evaluated against traditional methods, highlighting its potential to enhance the efficiency and reliability of fracture diagnosis. Leveraging deep learning techniques, particularly Conventional Neural Networks (CNN), the system enhances accuracy and reduces the time required for diagnosis. Traditional manual analysis by radiologists, while expert-driven, is time-consuming and prone to errors.

Key Words: machine learning (ML) and deep learning (DL) algorithms

1. Introduction

Bone fractures are a common medical issue caused by accidents, trauma, or underlying health conditions, requiring accurate and timely diagnosis for effective treatment. Traditionally, radiologists manually analyze X-ray or CT images to detect fractures, a process that can be slow and error-prone. With advancements in artificial intelligence, especially deep learning, automated detection systems have emerged to support medical professionals. These systems analyze medical images with high speed and accuracy, reducing the diagnostic burden on radiologists. The proposed system utilizes CNN-based algorithms to efficiently identify and classify fractures, even in noisy or low-resolution images.

Recent research, including work by Mallikarjuna Swamy M. S., highlights the use of image processing and machine learning techniques for effective bone fracture analysis. By employing methods such as pre-processing, segmentation, and feature extraction, as well as classifiers like Neural Propagation Networks and Naïve Bayes, these systems achieve substantial accuracy. While current

ONLINE TUTORING APP

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ABSTRACT

The "Online Tutoring App" is a web-based platform designed to facilitate efficient and intelligent access to educational materials using machine learning (ML) and deep learning (DL) algorithms. The system comprises two primary user roles: Admin and User. The Admin is responsible for uploading tutoring materials and training ML and DL models to enhance search performance, while the User can sign up, log in, and search for tutoring resources using intelligent query processing.

Users can register, log in, and issue queries related to tutoring materials. The system processes user queries and retrieves the most relevant materials based on the performance of trained ML algorithms. Upon retrieving the results, users can download the required materials for further learning. The intelligent search mechanism enables efficient retrieval of educational content for various subjects such as Java, SQL, and JavaScript. This project demonstrates the integration of ML and DL models in an educational framework, optimizing the search process and improving the accessibility of learning resources.

Key Words: machine learning (ML) and deep learning (DL) algorithms

1. Introduction

The Online Tutoring App aims to revolutionize the digital learning experience by providing an intuitive, AI - driven platform that connects students with high-quality educational materials. In an era where accessibility and convenience are paramount, this project seeks to bridge the gap between learners and educational resources by integrating machine learning (ML) and deep learning (DL) algorithms for an optimized search experience. By leveraging advanced technologies, the platform ensures that users can efficiently locate relevant tutoring materials tailored to their academic needs.

The system is designed with a strong focus on user engagement, enabling seamless interactions between students and the platform while maintaining the integrity and security of educational content. This project encompasses two primary user roles—Admin and User—each playing a crucial part in the platform's functionality. Admin's are responsible for uploading new educational materials, categorizing them based on subject matter, and training ML/DL models to enhance search accuracy. By employing an 80-20 data split for training and testing, the app ensures continuous improvement in algorithm performance, adapting dynamically to new content.

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Secure Files Using Secure Hash Algorithm and Elliptical Curve Cryptography

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ABSTRACT

In today's digital landscape, ensuring the security and integrity of files is a critical challenge. With the growing reliance on cloud storage and data-sharing platforms, the risk of unauthorized access and tampering has significantly increased. Protecting sensitive files requires robust cryptographic mechanisms that ensure confidentiality while maintaining efficiency. Traditional encryption methods provide security, but there is a need for advanced techniques that offer stronger protection with optimized performance. In this project, we are proposing Secure Hash Algorithm (SHA) and Elliptic Curve Cryptography (ECC) to enhance file security. SHA provides data integrity verification by generating unique hash values, while ECC ensures secure encryption with minimal computational overhead. Consequently, the integration of modern cryptographic algorithms strengthens data protection, preventing unauthorized modifications and access. By harnessing the efficiency of SHA and ECC, this project takes a significant step toward enhancing file security, ensuring data integrity, and fostering a trusted digital ecosystem for secure file storage and transmission.

Keywords: - Securing files, Machine Learning, Algorithms, Accuracy, Model Evaluation, Precision, Recall, F1-Score, Dataset Pre-processing.

1. INTRODUCTION

The overarching goal of this project is to address the critical challenges associated with file security by implementing advanced cryptographic techniques, specifically Secure Hash Algorithm (SHA) and Elliptic Curve Cryptography (ECC). In an era where digital data is constantly transmitted and stored across various platforms, it is imperative to enhance security mechanisms to prevent unauthorized access and tampering. This project aims to develop a robust encryption framework that ensures the confidentiality, integrity, and authenticity of files while optimizing performance and resource utilization. The scope of this initiative spans multiple domains, including cloud storage, secure data transmission, and file-sharing systems, where the protection of sensitive information is of paramount importance. By leveraging SHA for data integrity verification and ECC for strong encryption, the project provides a comprehensive solution tailored to the evolving security landscape. These techniques offer lightweight yet highly secure cryptographic

DETECTION OF EMPLOYEES STRESS USING MACHINE LEARNING

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Abstract

In the fast-paced world of Information Technology (IT), employees often face significant stress due to tight deadlines, high workloads, and continuous technological advancements. This study aims to develop a system for detecting stress in IT employees through image processing and machine learning techniques. The system uses facial recognition and analysis to identify physiological stress markers such as changes in facial expressions, skin tone variations, and eye movements. Machine learning models are trained on a dataset comprising images of employees under different stress levels to classify the degree of stress accurately. By implementing real-time monitoring, this approach seeks to offer an objective, non-invasive method for early stress detection, enabling timely intervention and support for IT employees. This innovation could improve workplace well-being and productivity by addressing stress before it escalates into severe health issues.

I. Introduction

The Information Technology (IT) industry is renowned for its rapid pace, continuous innovation, and the constant need for adaptation to new technologies. While these characteristics drive progress and development, they also contribute to an environment that can be highly stressful for IT employees. Factors such as high workloads, tight deadlines, and the pressure to maintain peak performance often led to increased stress levels. Chronic stress can negatively impact mental and physical health, leading to decreased productivity and higher turnover rates. Despite the evident need for effective stress management solutions, many current methods rely on

self-reported measures or periodic evaluations, which may not capture real-time stress levels accurately.

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Lung Cancer Prediction

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Abstract- Lung cancer remains a leading cause of cancer-related mortality worldwide, underscoring the critical need for effective predictive models to aid in early detection and intervention. This study presents a comprehensive approach to lung cancer prediction, leveraging advanced machine learning techniques and multimodal data integration. By incorporating diverse sources of information, including medical imaging scans, clinical records, and genetic markers, our proposed model aims to capture the complex interplay of factors influencing lung cancer risk. We employ a combination of feature engineering, feature selection, and ensemble learning methods to develop robust predictive models capable of accurately identifying individuals at elevated risk of developing lung cancer. Furthermore, we explore the interpretability of our models to gain insights into the underlying factors driving lung cancer susceptibility. Through extensive experimentation and validation on large-scale datasets, we demonstrate the efficacy of our approach in achieving superior predictive performance compared to existing methods. The proposed model holds significant promise for facilitating early detection, personalized risk assessment, and targeted interventions in lung cancer management, ultimately improving patient outcomes and reducing the burden of this devastating disease.

Keywords: Lung cancer prediction, Machine learning, Multimodal data integration, Medical imaging, Clinical data.

INTRODUCTION

Lung cancer, a leading cause of cancer-related deaths worldwide, presents significant challenges in diagnosis and treatment, making early detection crucial for improving patient outcomes. Predictive models have emerged as essential tools in assessing individual risk factors by integrating medical history, genetic predispositions, and environmental exposures such as smoking and occupational hazards. While smoking remains the primary risk factor, non- smoking-related factors like genetic susceptibility and exposure to carcinogens also contribute significantly. Advances in genomic research have identified specific mutations linked to increased risk, enhancing the accuracy of predictive models. The integration of machine learning and artificial intelligence has further revolutionized lung cancer prediction by analyzing vast datasets from electronic health records, imaging studies, and genomic profiles, leading to greater predictive accuracy and continuous model refinement. These sophisticated algorithms help clinicians identify high-risk individuals, personalize screening strategies, and implement targeted interventions. However, despite their potential, predictive models must undergo rigorous validation and ethical scrutiny to ensure reliability and effectiveness in clinical practice. As research advances, predictive modelling stands at the forefront of precision medicine, offering a proactive approach to early lung cancer detection and improved patient care.

II. RELATED WORK

Focusing on machine learning techniques, this systematic literature review explores the landscape of predictive modelling for lung cancer. It examines the methodologies, algorithms, and datasets utilized in machine learning-based prediction models, highlighting their predictive accuracy and clinical utility. Additionally, the review identifies emerging trends and challenges in the field, paving the way for future research directions aimed at enhancing the effectiveness of predictive algorithms in lung cancer risk assessment.

This paper provides a comprehensive survey of existing predictive models for lung cancer risk assessment. It systematically evaluates the methodologies, data sources, and performance metrics of various models, offering insights into their strengths, limitations, and applicability in clinical practice. By synthesizing findings from diverse studies, the

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AI Healthcare Chatbot

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Abstract: ***The increasing demand for accessible and efficient healthcare services has led to the integration of artificial intelligence in medical support systems. This paper presents the design and development of an AI Healthcare Chatbot built using a modern technology stack comprising Java (version 17) and Spring Boot for the backend, JavaScript for integration, and HTML/CSS for the frontend interface. The chatbot aims to provide instant, AI-driven medical advice based on user inputs such as symptoms, disease names, gender, age, duration of illness, and severity levels. It covers a range of general and vector-borne diseases including fever, cough, dengue, typhoid, and more. The system intelligently processes the data and offers outputs such as recommended medications for mild to moderate symptoms, preventive care tips, dietary suggestions, and health monitoring guidance. To enhance user interaction, the chatbot interface is designed to resemble a WhatsApp-style conversation with quick-reply button functionalities, allowing intuitive selection of options. The Spring Boot framework serves as the core for business logic and RESTful API communication, ensuring scalability and modularity. This AI-based solution can serve as a preliminary health assistant, reducing dependency on direct human interaction for basic consultations and supporting overburdened healthcare systems.***

I. INTRODUCTION

The healthcare industry is witnessing a paradigm shift with the integration of artificial intelligence (AI) to enhance service delivery, efficiency, and accessibility. One such innovation is the development of intelligent healthcare chatbots that simulate human conversation to offer medical assistance, especially in preliminary diagnosis and health guidance. In regions with limited access to immediate medical care, AI-driven tools can bridge the gap by offering real-time, personalized support.

This paper introduces an AI Healthcare Chatbot designed to act as a virtual medical assistant for users seeking instant health advice. The chatbot allows users to input their symptoms or disease names, along with demographic and contextual data such as gender, age, duration of illness, and severity of the condition. Based on these inputs, the chatbot provides AI-generated responses including possible causes, prevention methods, recommended dietary practices, and suitable medications for mild and moderate conditions. Severe cases are advised to seek immediate consultation with a certified healthcare professional.

The system is developed using Java (version 17) for robust backend logic, powered by the Spring Boot framework for efficient REST API handling and modular architecture. The frontend is implemented using HTML and CSS, while JavaScript acts as the connector between the UI and backend, ensuring smooth user interaction. A key highlight of the chatbot is its intuitive WhatsApp-like interface that includes quick-reply buttons for selecting options such as diseases, symptoms, and severity levels, improving user experience and accessibility.

This project not only demonstrates the practical application of AI in healthcare but also contributes to reducing the load on healthcare professionals by managing common health queries and providing proactive suggestions. It also promotes early detection and management of diseases by encouraging users to engage with their health data in a simple, conversational format.

II. RELATED WORK

The integration of artificial intelligence into healthcare systems has been an area of active research and practical development. Numerous studies and projects have explored the application of AI-based chatbots for preliminary diagnosis, health information dissemination, and patient engagement. These systems are particularly valuable in providing 24/7 medical support, reducing patient waiting times, and offering scalable solutions in remote or underserved areas.

Several existing healthcare chatbots, such as Babylon Health, Ada, and HealthTap, have demonstrated the potential of AI in assessing symptoms and guiding users toward appropriate care paths. These platforms utilize natural language processing (NLP) and machine learning (ML) to interpret user inputs and deliver relevant health advice. However, many of them are built with complex AI models requiring large-scale datasets and often depend on cloud-based services, which may pose limitations in terms of cost, accessibility, and data privacy.

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AI Based FAQ Chatbot with Voice Assistance

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ABSTRACT

In recent years, chat bots have gained significant attention as a convenient means of providing customer support, information retrieval, and task automation. With advancements in artificial intelligence (AI) and natural language processing (NLP), these chat bots have become increasingly sophisticated, offering more personalized and efficient interactions. This project aims to develop an AI-based FAQ Chabot with voice assistance, leveraging state-of-the-art NLP techniques and voice recognition technology.

The proposed Chabot will be designed to assist users in retrieving information from a predefined knowledge base using natural language queries. Users will be able to interact with the Chabot through both text input and voice commands, providing a more intuitive and versatile user experience. The system will employ machine learning algorithms to understand user queries, extract relevant information from the knowledge base, and generate appropriate responses in real-time.

Key Words: Artificial Intelligence (AI) and Natural Language Processing (NLP)

1. Introduction

The AI-based FAQ Chabot with voice assistance aims to enhance user interaction by providing an intelligent conversational interface. By leveraging Artificial Intelligence (AI) and Natural Language Processing (NLP), the Chabot can answer frequently asked questions using both text and voice input. The system ensures improved information retrieval and personalized responses to user queries.

The main objective of this project is to develop a Chabot that efficiently answers user queries from a predefined knowledge base. Unlike traditional FAQ pages, this Chabot enhances accessibility through voice assistance, making it a valuable tool for customer support, e-learning, and various automated services.

A DEEP LEARNING APPROACH TOWARDS DETECTION OF KIDNEY STONES USING CT SCAN IMAGES

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Abstract

Kidney stone detection is crucial for early diagnosis and effective treatment, reducing the risk of complications. This project utilizes deep learning techniques to detect kidney stones from CT scan images with high accuracy. A Convolutional Neural Network (CNN)-based model is implemented to classify kidney scans and identify the presence of stones. The system further enhances patient care by generating personalized dietary recommendations based on detected kidney conditions. Performance evaluation is conducted using metrics such as accuracy, precision, and F1 score. The proposed model demonstrates superior accuracy, highlighting its potential to improve kidney stone detection and patient management. This approach enhances diagnostic precision while enabling proactive healthcare interventions.

I. Introduction

Kidney stone disease is a prevalent and painful condition affecting millions worldwide, often leading to severe health complications if not detected early. Accurate and timely diagnosis is crucial to prevent worsening conditions that may require surgical intervention. Traditional diagnostic methods, such as urine analysis and X-rays, often lack precision, making CT scan imaging a preferred technique for detecting kidney stones. However, manual

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Deep Learning Approach for Multimodal Biometric Recognition System Based On Face, Iris and Finger Vein Traits

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Abstract

Biometric recognition systems have become an essential component of modern authentication mechanisms. However, unimodal biometric systems relying on a single trait, such as face or iris, are vulnerable to spoofing attacks, environmental variations, and acquisition noise. To overcome these limitations, this study proposes a deep learning-based multimodal biometric recognition system that integrates face, iris, and finger vein traits. The system utilizes Convolutional Neural Networks (CNNs) and Deep Neural Networks (DNNs) to extract deep feature representations from each biometric modality. A feature-level fusion approach is employed to combine the extracted features, leveraging the unique strengths of each modality to enhance recognition accuracy and robustness. Experimental evaluations on benchmark biometric datasets demonstrate that the proposed multimodal system significantly outperforms unimodal biometric models in terms of accuracy, security, and resilience against spoofing attacks. Additionally, the hybrid feature and score-level fusion strategy ensures lower false acceptance and rejection rates, making the system more reliable for real-world applications such as access control, financial security, and identity verification. The results highlight the potential of deep learning in advancing multimodal biometric systems, reinforcing authentication security while minimizing vulnerabilities. This research establishes a strong foundation for future innovations in biometric security and identity management.

Keywords: NLP, SVM, LIWC, LDA, MLP, Depression, Detection, Linguistic patterns.

I. Introduction

The overarching goal of this project is to develop a deep learning-based multimodal biometric recognition system that enhances authentication security by integrating face, iris, and finger vein traits. Traditional unimodal biometric systems face limitations such as susceptibility to spoofing, environmental variations, and poor recognition performance under challenging conditions. To address these issues, this project seeks to provide a robust and highly accurate authentication mechanism by leveraging deep learning methodologies. By employing Convolutional Neural Networks (CNNs) and Deep Neural Networks

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Illuminating Autonomy Federated Learning For Object Detection In Autonomous Vehicles Under Low Light Conditions

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ABSTRACT

Autonomous vehicles rely heavily on object detection systems to navigate safely, but their performance significantly degrades under low light conditions. This project explores a novel approach that combines federated learning with advanced image enhancement techniques to improve object detection in such challenging environments. By leveraging decentralized learning across multiple vehicles, the system preserves data privacy while continuously refining detection models with diverse, real-world low-light data [3][11][13]. The proposed framework enhances detection accuracy and robustness without requiring centralized data collection, thereby advancing the safety and reliability of autonomous driving at night or in poorly lit areas. This project explores the integration of Federated Learning for object detection in autonomous vehicles operating under low-light conditions. By leveraging decentralized data from multiple vehicles, the system enhances object detection accuracy without compromising data privacy. The proposed framework adapts advanced deep learning models to handle illumination challenges, improving vehicle perception and safety in night-time or poorly lit environments. The study demonstrates how FL can empower autonomous systems with robust, collaborative learning while preserving data confidentiality across diverse driving scenarios.

KEY WORDS: Federated Learning, Autonomous Vehicles, Object Detection, Low-Light Conditions, Deep Learning, Privacy-Preserving AI, Decentralized Training, Edge Computing, YOLOv5, Sensor Fusion, Differential Privacy, Secure Aggregation, Model Optimization, Vehicle Perception, Collaborative Learning

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Deepfake Detection On Social Media: Leveraging Deep Learning And Fasttext Embeddings For Identifying Machine-Generated Tweets

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1. Abstract

With the rise of deepfake content on social media, distinguishing between genuine and AI generated tweets has become a major challenge. This project proposes an advanced detection framework that utilizes Fast-Text embeddings and deep learning models to identify manipulated text. Fast-Text is chosen for its ability to capture semantic meaning, sub word information, and contextual nuances in social media text, including slang and misspellings. The system integrates LSTM, GRU, and Transformer models to enhance classification accuracy, following a structured workflow of data collection, text preprocessing, Fast Text-based feature extraction, and model training. To ensure reliable detection, the system is evaluated using key metrics like accuracy, precision, recall, and F1 score, demonstrating superior performance over traditional methods. By effectively handling out-of-vocabulary (OOV) words and noisy tweet data, the proposed framework provides a scalable and robust solution for detecting machine-generated tweets. Future enhancements may include real-time detection, integration with BERT, RoBERT, or GPT-based models, and direct implementation with social media platforms for proactive content moderation.

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Design and Development of an Intelligent Online Apparel Shopping System

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Abstract

The Online Shopping Apparel paper is a robust e-commerce platform designed to enhance the online clothing shopping experience. It features a visually appealing, user-friendly interface where customers can browse a wide range of apparel by style, size, and brand. Users can register, log in, and receive personalized product recommendations based on their preferences and shopping history. The platform includes advanced search and filtering options, secure payment gateway integration, seamless checkout, and real-time order tracking. A key highlight is the AR-based virtual try-on feature, allowing customers to see how clothes would look on them before purchasing. AI-driven systems provide personalized recommendations and chatbot support for queries, order tracking, and fashion advice. The admin panel offers tools for managing inventory, updating products, processing orders, and analyzing customer data. AI-powered analytics also help generate insights to boost sales and optimize operations.

1. Introduction

The overarching goal of this paper is to create an immersive and intelligent e-commerce platform by integrating Augmented Reality (AR) and Artificial Intelligence (AI) to enhance the user experience. The platform allows customers to browse and purchase apparel while utilizing AR-based virtual try-on features to visualize how clothing fits before making a decision. AI-powered recommendations personalize product suggestions based on user behaviour, while an AI-driven chatbot assists with queries, outfit selection, and sizing advice. The system includes essential e-commerce functionalities such as secure authentication, product filtering, a wish list, a shopping cart, secure payment gateways, and order tracking. Additionally, an admin dashboard enables inventory management, order processing, and AI-driven analytics to optimize sales and user engagement .

2. Related Work