Human Emotion Detection Using AI

Dr. S Muthusamy[1], Kumaran K[2], Mathesh B[3], Bharath C[4], Gnanasekar P[5]

[1]Assistant Professor, [2,3,4,5]UG Scholars

[1,2,3,4,5]Department of Information Technology, Erode Sengunthar Engineering College, Perundurai, Tamil Nadu, India, 638057.

ABSTRACTS

Human emotion detection is an area of interest in artificial intelligence (AI) that has grown rapidly in recent years. Understanding and interpreting human emotions can play a vital role in improving human-computer interaction (HCI). This project explores an AI-based system that detects human emotions using facial expressions. It uses deep learning techniques and computer vision frameworks to classify emotions like happiness, sadness, anger, fear, and surprise. Our implementation demonstrates how machine learning models can process facial features and categorize emotional states with significant accuracy.

REFERENCES

1. M.K. Chowdary, T.N. Nguyen, D.J. Hemanth, Deep learning-based facial emotion recognition for human–computer interaction applications, (2021).
2. S.K. Singh, R.K. Thakur, S. Kumar, R. Anand, Deep learning and machine learning based facial emotion detection using CNN, (2022).
3. Y. Chen, J. He, Deep learning-based emotion detection, (2022).

Privacy-Preserving Mechanisms for SaaS-Based Applications in Multi-Tenant Environments

Gayathri J[1], Dr. D Shanmuga Priyaa[2]

[1]Research Scholar, [2]Assistant Professor

[1,2]Department of Computer Science, Sri Krishna Adithya College of Arts & Science, Coimbatore, Tamil Nadu, India, 641042.

ABSTRACTS

Cloud computing, and especially Software as a Service (SaaS), provides scalable and affordable solutions for organisations. Nevertheless, the multi-tenancy aspect of SaaS presents serious privacy issues since multiple tenants share the same resources and infrastructure. This paper discusses current and forthcoming privacy-preserving mechanisms specific to SaaS-based applications running under multi-tenant environments. We categorize privacy risks, assess mitigation techniques, and suggest an integrated approach merging encryption, anonymization, access control, and blockchain auditing. The research seeks to reconcile between privacy needs and feasible implementations to maintain confidentiality of the data and adhere to privacy legislations.

REFERENCES

1. Syed Umar, Venkata Raghu Veeramachineni, Ravikanth Thummala, Srinadh Ginjupalli, Ramesh Safare, Techniques for ensuring data privacy in multi-tenant cloud environments, (2023).
2. Xiaojie Zhu, Peisong Shen, Yueyue Dai, Lei Xu, Jiankun Hu, Privacy-preserving and trusted keyword search for multi-tenancy cloud, (2024).
3. Ashraf A. Shahin, Areeg Samir, Abdelaziz Khamis, An Aspect-Oriented Approach for SaaS Application Customization, (2014).

Experimental Study on Self Compacting Concrete with Fly ASH and GGBS

Mr. Kallamadi Naveen Reddy[1], Dr. M Hemapriya[2]

[1]Research Scholar, [2]Assistant Professor

[1,2]Department of Civil Engineering, Bharath Institute of Higher Education and Research (BIHER), Chennai, Tamil Nadu, India, 600073.

ABSTRACTS

The first attempt SCC is utilized largely for repair application and for casting concrete in constrained places, particularly parts that present limited access to vibrate. Self-compacting concrete (SCC) has high self-compactability and may be filled in all types of forms without vibratory compaction, which is needed for historical concrete. The use of mineral admixtures is beneficial in reducing thermal cracking enhancing of strength, Impermeability, pore refinement and durability on chemical attack. The mix design for concrete M80 grade is done in accordance with the Indian Standard Code. In addition to cement & fine aggregates, chemicals such as superplasticizer, fly ash, & ground granulated blast furnace slag (GGBFS).

REFERENCES

1. Beycioglu, Workability and mechanical properties of self-compacting concretes containing LLFA, GBFS and MC, Constr. Build. Mater, (2014).
2. J.J. Brooks, Effect of admixtures on the setting times of high-strength concrete Cem. Concr. Compos, (2000).
3. H.J.H. Brouwers et al. Self-compacting concrete: theoretical and experimental study, (2012).

Effects of Coconut Fiber in Improving the Strength Property of Clay Soil

Mr. Michel Theivadurai G[1], Dr. M Hemapriya[2]

[1]Research Scholar, [2]Assistant Professor

[1,2]Department of Civil Engineering, Bharath Institute of Higher Education and Research (BIHER), Chennai, Tamil Nadu, India, 600073.

ABSTRACTS

This study explains about the effect of geo coir in the two different types of soil samples collected from two different sites. Through plate load test the load bearing capacity of the soil is been determined and also revels about the different percentage of geo coir such as 3%, 5% and 7% from the wholesome weight of the soil sample. The plate load test is done with the tank size of 20cm X 20cm with the plate size of 9cm X 9cm in triaxial loading frame. From this study it can be confined that the geo coir is also only the effect additive which improves the bearing capacity of the soil. As the percentage of geo coir increases the bearing capacities of the soil also increase gradually in such a way in the soil sample which has more clay content.

REFERENCES

1. Ramesh H., Manoj Kumar B.M., Coconut fiber reinforced laterite soil for sustainable construction, (2018).
2. Jayanthi R., Vidhya R., Study on the behavior of coir fiber in clay soil stabilization, (2017).
3. Ramesh S., Elango G., Optimization of coir fiber content in clayey soil for subgrade applications, (2016).

Early Detection of Skin Cancer Using Evolving AI Approach

Sankar T C[1], Jamuna V[2]

[1]Assistant Professor, [2]Professor

[1]Department of Computer Science and Engineering, Vel Tech High Tech Dr. Rangarajan Dr. Sakunthala Engineering College, Avadi, Tamil Nadu, India, 600062.
[2]Department of Electrical and Electronics Engineering, Jerusalem College of Engineering, Chennai, Tamil Nadu, India, 600100.

ABSTRACTS

Early-stage detection of cutaneous malignancies, particularly melanoma, presents a persistent clinical challenge in India, where the early diagnosis rate remains below 1%. a diagnostic platform powered by deep learning techniques, tailored for the automatic detection of carcinoma and non-melanoma skin neoplasms across diverse age cohorts. The system integrates state-of- contemporary Convolutional Neural Networks (CNNs) with Vision Transformer (ViT) architectures with dermoscopic image analysis, yielding superior diagnostic accuracy—exceeding 95% sensitivity and 90% specificity in distinguishing melanoma variants such as Superficial Spreading Melanoma (SSM), Lentigo Maligna, and Nodular Melanoma. The architecture incorporates automated lesion segmentation, multiscale texture-color analysis, and morphological feature extraction from high-resolution dermatoscopic imagery to facilitate robust lesion classification. Furthermore, the predictive model assimilates patient-specific clinical variables—including cumulative ultraviolet radiation exposure, chronological age, and personal dermatologic history—to enhance risk stratification and predictive accuracy. Clinically deployable and non-invasive, the platform augments diagnostic precision through the integration of dermoscopy and reflectance confocal microscopy (RCM) modalities, thereby enabling proactive clinical decision-making and accelerated therapeutic intervention, ultimately improving prognostic outcomes in melanoma management.

REFERENCES

1. S. Mohan, S. P. Rina, S. Sivakannan, Integration of machine learning techniques for cardiac health wellness service data analysis, (2022).
2. R. S. Patil, S. Subramani, Feature selection using subconscious selection strategy and heart disease prediction using machine learning models, (2021).
3. S. Subramani, A. Abdellatif, Fusion models for coronary heart disease prediction: Enhancing accuracy and robustness, (2023).

LoRa-Based RSSI Alert System for Maritime Boundary Monitoring and Fishermen Safety

Shobana Nageswari C[1]

[1]Assistant Professor

[1]Department of Electronics and Communication Engineering, R.M.D Engineering College, Chennai, Tamil Nadu, India, 601206.

ABSTRACTS

The RSSI (Received Signal Strength Indicator) system used in this project is based on LoRa and is designed to alert fishermen operating boats in territorial waters and detect border ranges. The system establishes reliable contact between a central monitoring station and the fishing boats by utilizing long-range, low-power communication technologies. Using RSSI data, the technique accurately determines a boat's proximity to defined maritime restrictions, enabling real-time location tracking. When a boat approaches a predefined border threshold, an alert is triggered to notify fishermen of their location and help prevent unintentional entry into areas that are restricted. The proposed system has an intuitive user interface that displays crucial information, such as the signal strength and the distance to the border, allowing fisherman to make informed decisions while fishing.

REFERENCES

1. D. L. Durgadevi, T. S. Tejal, S. Jayapriyadharshini, K. Vishnupriya, Survey on IoT-based fisherman border alert and security system using LoRa communication, (2024).
2. F. Nofandi, R. Mahendra, E. P. Purwanti, Vessel safety monitoring system based on LoRa for the safety of traditional fishermen, (2022).
3. S. R. Karthiga, S. Vishnuvarathan, V. Yuvaraj, Shipborne monitoring system using LoRa technology, (2022).

Tea Leaf Harvesting Using BLDC Motor

A Usaina Banu[1]

[1]Assistant Professor

[1]Department of Electrical and Electronics Engineering, Mepco Schlenk Engineering College, Sivakasi, Tamil Nadu, India, 626005.

ABSTRACTS

Tea leaf harvesting is still a hard job especially in hilly areas. Many workers struggle to climb slopes and bend for long hours to pluck tea leaves. This idea introduces tea leaf harvesting system using BLDC motor system to make their work easier. This proposed system integrates a BLDC motor which rotates at a very high speed. This motor is connected to a cutting blade which is used to cut the tea leaves. The on and off mechanism and speed of the motor is controlled by using servo motor tester. This mounted onto a heavy lift drone. The drone will be equipped with a high-resolution camera enabling real-time visual guidance for a human operator. This method can save time reduce human effort and reach areas that are difficult to walk in. it is a new step towards using smart technology to help farmers and tea estate workers.

REFERENCES

1. G. Abhiram, M. M. K. D. Manathunga, R. Raveendran, Performance Analysis of High-Efficiency Motor and Variable Speed Drive in Black Tea Processing Machinery, (2020).
2. B. Li, H. Zhu, L. Fang, Y. Zhu, S. Fang, Design and experimentation of crawler tea harvesting machine, (2024).
3. S. R. W. Pathiranage, M. A. Wijeratne, W. A. J. M. De Costa, Impact of Motorized Tea Harvesters on Tea Yield and Yield Determining Parameters, (2023).

DeepEyeNet: Hybrid CNN with Genetic Bayesian Optimization for Glaucoma Detection

Anitha R[1]

[1]Assistant Professor

[1]Department of BCA, SRM Institute of Science and Technology, Ramapuram, Tamil Nadu, India, 600089.

ABSTRACTS

Glaucoma, a leading cause of irreversible blindness, necessitates early detection for effective management. In recent developments, DeepEyeNet introduces a novel hybrid framework that integrates ConvNeXtTiny-based convolutional neural networks (CNNs) with Adaptive Genetic Bayesian Optimization (AGBO) for the classification of glaucoma using retinal images. The CNN model, designed for deep feature extraction, is coupled with AGBO, which fine-tunes the hyperparameters of the network for optimal performance. The approach was evaluated on the EyePACS-AIROGS-light-V2 dataset, achieving an impressive classification accuracy of 95.84%, demonstrating significant improvements over traditional methods. The proposed method effectively addresses challenges in glaucoma detection, such as subtle image variations and inter-class similarities, by leveraging the combined strengths of CNNs and optimization techniques. DeepEyeNet offers a promising solution for automated, high-accuracy glaucoma detection, which could enhance early diagnosis and aid in the prevention of vision loss in high-risk populations.

REFERENCES

1. Angshuman Roy, Anuvab Sen, DeepEyeNet: Adaptive Genetic Bayesian Algorithm Based Hybrid ConvNeXtTiny Framework for Multi-Feature Glaucoma Eye Diagnosis, (2025).
2. M. Shanmuga Eswari, S. Balamurali, Lakshmana Kumar Ramasamy, Hybrid convolutional neural network optimized with an artificial algae algorithm for glaucoma screening using fundus images, (2024).
3. Sunija A. P., Kar S., Gayathri S., D-DAGNet: An improved hybrid deep network for automated classification of glaucoma from OCT images, (2022).

Groundwater Flow Model Development within a Coastal Watershed

Sridhar N[1]

[1]Assistant Professor

[1]Department of Civil Engineering, Kongunadu College of Engineering and Technology (Autonomous), Trichy, Tamil Nadu, India, 621215.

ABSTRACTS

The groundwater flow models have been used to demonstrate groundwater movement principles. This paper presents development of groundwater flow model using Visual MODFLOW of the Adappa coastal watershed. In this study, the watershed is divided into three zones and the aquifer properties are assigned based on lithology of the watershed. The assigned aquifer properties, such as hydraulic conductivity: 5 and 10m/day, Specific yield: 0.16 to 0.20 and porosity: 0.25 to 0.4 are given as input to the model. The appropriate engine and solver parameters are chosen based on the requirements and the model is simulated. The boundary conditions are assigned based on the recharge of the study area. The recharge rate from rainfall is 15% in all three zones of the watershed since it is attributed to the presence of clay, clayey sand, and sandy clay. Groundwater model should be calibrated and validated before it is used for any predictions or decision-support. The calibration is made for 1460 days in the period of January 2007 to December 2011 and the period of 2012-2013 is used for model validation process. After running the model, the output of the groundwater flow model is viewed in two dimensions. The calculated vs. Observed head indicates the calculated heads almost matching the observed heads. In this coastal watershed, the groundwater flow direction is towards the sea and the rivers. But in some places along the coastal line, groundwater moves towards the inland area which is due to the inward flow of saline water intrusion and towards the sea near the coastal line. The model also used to simulate possible future changes to hydraulic head or groundwater flow rates as a result of future changes in stresses on the aquifer system.

REFERENCES

1. S. F. R. Khadri, Chaitanya Pande, Groundwater flow modeling for calibrating steady state using MODFLOW software: a case study of Mahesh River basin, India, (2016).
2. Fethi Lachaal, Ammar Mlayah, Mourad Bedir, Jamila Tarhouni, Christian Leduc, Implementation of a 3-D groundwater flow model in a semi-arid region using MODFLOW and GIS tools: The Zeramdine–Beni Hassen Miocene aquifer system (east-central Tunisia), (2012).
3. H. J. Diersch, FEFLOW Finite Element Subsurface Flow & Transport Simulation System, Reference Manual, (2009).

Assessment of Ecofriendly Geopolymer Concrete Paver Blocks Incorporating Textile Sludge and Polypropylene Fibers

S Kavipriya[1], C.G Deepanraj[2]

[1]Professor, [1]Associate Professor

[1]Department of Civil Engineering, Kongunadu College of Engineering and Technology (Autonomous), Thottiam, Tamil Nadu, India, 621215.
[2]Department of Civil Engineering, Vivekanadha College of Engineering and Technology for Women, Tiruchengode, Tamil Nadu, India, 637205.

ABSTRACTS

Textile sludge management is a huge problem for its disposal from the textile industry. It has tremendous applications, such as walking paths, street road, and fuel stations, etc. In this manner, an innovative step has been taken towards the manufacture of paver blocks blended with textile effluent waste from treatment plant with 25%,50%,75% and 100% with replacement of water to use it in reasonable extends. A different percentage of sludge from 50% to 100% was taken for this study for the effective utilization of sludge in the construction industry. To experience the potential use as binding fabric polypropylene fibres are added into pavers with 1%. Paver block is cast with replacement of sand by using M-sand as fine aggregate. Paver blocks consist of textile waste in addition to distinctive proportions was cast according to the recommendation of Indian Standards (IS) 15658 (2006), also the various results were obtained through experimentally. The different mix combinations outcome reveals that 50% of fine aggregate replacement by effective utilization of textile sludge and waste water from the textile industry reveals good results. The density and compressive strength of paver blocks were decreased with increase in the percentage of textile sludge and water absorption capacity was increased.

REFERENCES

1. C. C. Femina, P. S. Kumar, J. G. Joshiba, R. Racchana, S. J. Varjani, Bioremediation of 2,4-Diaminotoluene in aqueous solution enhanced by lipopeptide biosurfactant production from bacterial strains, (2020).
2. F. Riget, A. Bignert, B. Braune, M. Dam, R. Dietz, M. Evans, N. Green, H. Gunnlaugsdóttir, K. S. Hoydal, J. Kucklick, R. Letcher, D. Muir, S. Schuur, C. Sonne, G. Stern, G. Tomy, K. Vorkamp, S. Wilson, Temporal trends of persistent organic pollutants in Arctic marine and freshwater biota, (2019).
3. A. M. Awad, S. M. R. Shaikh, R. Jalab, M. H. Gulied, M. S. Nasser, A. Benamor, S. Adham, Adsorption of organic pollutants by natural and modified clays: a comprehensive review, (2019).

Intrusion Detection Using AI in Cloud Infrastructure

Sowmiya S[1]

[1]Assistant Professor

[1]Department of Computer Science, J.N.N College of Arts and Science, Chennai, Tamil Nadu, India, 601102.

ABSTRACTS

Cloud computing infrastructures are now vital for enterprise and public sector services but are now frequently under high-level cyberattack. Conventional intrusion detection systems (IDS) are ineffective at identifying and addressing such attacks because of the dynamic and expansive nature of the cloud. This paper explores AI-based intrusion detection techniques specific to cloud environments, examining machine learning and deep learning models for anomaly and signature-based detection. The paper also addresses issues in scaling IDS deployment and suggests an end-to-end AI-driven framework to improve cloud security.

REFERENCES

1. Ahmad Iqbal, Farhan Ahmed, Intrusion Detection Using Deep Learning Techniques in Cloud Environments, (2021).
2. Lina Zhang, Wei Chen, AI-Based Anomaly Detection Framework for Securing Cloud Infrastructure, (2022).
3. Sunil Rao, Meena Desai, Intelligent Intrusion Detection Model for Cloud Security Using Neural Networks, (2023).

AI-Powered Disease Prediction Using Patient Data

Bhuvaneshwaran K [1]

[1]UG Scholar

[1]Department of BCA, K.C.S. Kasi Nadar College of Arts & Science, Chennai, Tamil Nadu, India, 600021.

ABSTRACTS

The integration of artificial intelligence (AI) in healthcare has opened new frontiers in disease prediction using patient data. This study presents an AI-powered framework that leverages machine learning and deep learning algorithms to predict the onset and progression of various diseases based on structured electronic health records (EHR), clinical test results, and demographic attributes. By processing large-scale patient datasets, the model identifies hidden patterns and correlations among risk factors that are often overlooked in traditional diagnostics. The proposed system focuses on early detection and timely intervention for diseases such as diabetes, cardiovascular disorders, and chronic respiratory conditions. It incorporates data preprocessing techniques, feature selection, and ensemble methods to improve prediction accuracy and robustness. Real-world hospital datasets are used to validate the model's performance, achieving significant improvements in sensitivity and specificity over baseline models. Furthermore, the system ensures interpretability through explainable AI (XAI) techniques, helping clinicians understand key influencing factors. This AI-based approach not only enhances diagnostic precision but also supports personalized treatment planning, making it a valuable asset in modern predictive healthcare.

REFERENCES

1. Swathi Nair, Pavan Gupta, Patient-Centric AI Models for Chronic Disease Prediction, (2023).
2. Kiran Mehta, Sneha Rajan, Deep Learning Framework for Disease Forecasting from Clinical Data, (2022).
3. Ravi Verma, Ayesha Farooq, Intelligent Healthcare: AI Applications in Disease Diagnosis and Prediction, (2021).

Smart Diagnosis System for Skin Cancer Using CNN

Praveen A[1]

[1]UG Scholar

[1]Department of BSC, Tajore Arts and Science College, Chennai, Tamil Nadu, India, 600044.

ABSTRACTS

Skin cancer remains one of the most prevalent and potentially life-threatening forms of cancer worldwide. This paper presents a Smart Diagnosis System powered by Convolutional Neural Networks (CNNs) to automatically detect and classify skin cancer from dermoscopic images. The proposed system is designed to assist dermatologists by offering high-accuracy predictions through deep learning-based image analysis. The CNN architecture is optimized using multiple convolutional and pooling layers to extract intricate features from skin lesion images. The system undergoes training on a large, annotated dataset of benign and malignant skin lesions, ensuring a balanced learning process. Data augmentation techniques are used to enhance generalization and reduce overfitting. The performance of the model is evaluated using metrics such as accuracy, precision, recall, and F1-score, with results demonstrating superior detection capability compared to traditional machine learning approaches. Additionally, the system incorporates a user-friendly interface to facilitate real-time diagnosis for clinical and remote healthcare settings. By integrating deep learning with dermatological diagnostics, the system aims to reduce diagnostic errors, support early detection, and improve patient outcomes in skin cancer treatment.

REFERENCES

1. Divya Rao, Imran Shaikh, AI-Powered Image Processing for Early Skin Cancer Detection, (2023).
2. Meera Reddy, Vikram Patel, Deep Learning Techniques for Melanoma Classification, (2022).
3. Sneha Joshi, Ramesh Iyer, Convolutional Neural Networks in Dermatology: A Diagnostic Approach, (2021).

Early Detection of Parkinson's Disease Using Voice Analysis

Ajith B[1]

[1]UG Scholar

[1]Department of Computer Science and Engineering, Selvam College of Technologies, Namakkal, Tamil Nadu, India, 637003.

ABSTRACTS

Parkinson's Disease (PD) is a progressive neurodegenerative disorder that affects movement and vocal abilities. Early detection is critical for effective management and slowing disease progression. This paper proposes a novel approach for the early detection of Parkinson's Disease using voice analysis techniques. The system utilizes machine learning algorithms to analyze vocal attributes such as pitch variation, jitter, shimmer, and harmonic-to-noise ratio extracted from patient voice recordings. These features are known to degrade subtly in early stages of PD, even before noticeable motor symptoms occur. A dataset of voice samples from both healthy individuals and PD patients is used to train and evaluate classifiers, including Support Vector Machines (SVM) and Random Forests. Feature selection methods enhance the performance by focusing on the most predictive voice markers. The proposed system achieves high classification accuracy, demonstrating its potential as a non-invasive, low-cost, and accessible screening tool. This voice-based diagnostic model could be integrated into telemedicine platforms, enabling continuous monitoring and early intervention, especially in remote areas with limited clinical facilities.

REFERENCES

1. Nishant Kapoor, Ayesha Noor, Acoustic Feature-Based Classification for Parkinson's Disease, (2023).
2. Deepak Sharma, Priyanka Menon, AI-Enabled Voice Analysis for Neurodegenerative Disease Detection, (2021).
3. Kavitha Rajan, Sudeep Bhat, Early Parkinson's Identification via Speech Signal Processing, (2022).

Medical Image Classification Using Deep Learning

Priya Dharshini S[1]

[1]UG Scholar

[1]Department of BCA, Sree Muthukumaraswamy College, Kodungaiyur, Tamil Nadu, India, 600118.

ABSTRACTS

The classification of medical images plays a vital role in accurate diagnosis and treatment planning. This paper presents a deep learning-based approach for medical image classification across various modalities such as MRI, CT scans, and X-rays. Leveraging the power of Convolutional Neural Networks (CNNs), the system is designed to automatically extract hierarchical features from raw image data, eliminating the need for manual feature engineering. The model is trained and validated on diverse medical datasets, including images related to tumors, pneumonia, and fractures. Advanced architectures like ResNet and DenseNet are explored to optimize performance in terms of accuracy and generalization. Techniques such as data augmentation, dropout, and transfer learning are employed to enhance robustness and prevent overfitting. Evaluation results show high precision, recall, and F1-score, indicating the model's reliability in clinical scenarios. Furthermore, Grad-CAM visualizations are incorporated to provide interpretability, allowing clinicians to understand the decision-making process. The proposed deep learning model offers a scalable, efficient, and intelligent solution for assisting healthcare professionals in timely and accurate disease detection through medical images.

REFERENCES

1. Divyansh Patel, Ananya Roy, Transfer Learning in Medical Image Analysis: A Deep Learning Approach, (2023).
2. Sneha Kulkarni, Ramesh Iyer, Interpretable Deep Learning Models for Medical Image Recognition, (2021).
3. Karthik Reddy, Meena Shah, Automated Classification of Medical Scans Using Deep Networks, (2022).

Mental Health Monitoring Chatbot Using NLP

Kanivarma T[1]

[1]UG Scholar

[1]Department of BCA, Sree Muthukumaraswamy College, Kodungaiyur, Tamil Nadu, India, 600118.

ABSTRACTS

Mental health issues often go unnoticed due to stigma and limited access to timely care. This paper introduces a Mental Health Monitoring Chatbot powered by Natural Language Processing (NLP) to provide initial mental health support and continuous emotional monitoring. The chatbot is designed to engage users in empathetic conversations, analyze textual inputs, and detect emotional states such as anxiety, depression, or stress. Using pre-trained language models and sentiment analysis techniques, the system evaluates user responses to identify psychological red flags. The chatbot adapts its responses based on user mood and severity levels, offering coping strategies, self-help resources, and, when necessary, referrals to mental health professionals. Named Entity Recognition (NER) and intent classification modules are integrated to personalize interactions and ensure contextual understanding. User data privacy and ethical handling of sensitive information are emphasized throughout the system design. The chatbot was tested with real-world conversational datasets and showed promising accuracy in emotion detection and user satisfaction. This intelligent assistant aims to act as a supportive, non-judgmental, and accessible tool for individuals seeking mental health guidance, especially in underserved or remote areas.

REFERENCES

1. Anjali Menon, Ravi Khanna, NLP-Based Chatbots for Mental Health Monitoring and Support, (2021).
2. Sarthak Deshmukh, Priya Anand, Emotion-Aware Conversational Agents for Mental Wellness, (2022).
3. Meenal Shah, Tarun Arora, Intelligent Chat Interfaces for Detecting Mental Health Conditions, (2020).

Product Recommendation Engine Using Collaborative Filtering

Jagadev K[1]

[1]UG Scholar

[1]Department of BCA, St. Thomas College of Arts and Science, Koyambedu, Tamil Nadu, India, 600107.

ABSTRACTS

In the age of e-commerce and digital platforms, personalized product recommendations have become essential for enhancing user experience and increasing customer engagement. This paper presents a Product Recommendation Engine utilizing Collaborative Filtering techniques to predict user preferences based on historical interactions. The system implements both user-based and item-based collaborative filtering approaches, leveraging similarity metrics such as cosine similarity and Pearson correlation to identify relevant products for users. Sparse rating matrices are handled through matrix factorization techniques like Singular Value Decomposition (SVD), enabling the system to uncover latent user-item relationships. The model is trained on real-world datasets and evaluated using metrics such as Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE). The recommendation engine dynamically adapts to new user behavior through incremental updates, ensuring relevance over time. Results demonstrate that collaborative filtering significantly improves product discovery and user satisfaction compared to non-personalized recommendation methods. The proposed engine is scalable and suitable for integration into various online platforms, such as retail websites, streaming services, and social commerce applications.

REFERENCES

1. Rahul Verma, Neha Sinha, Collaborative Filtering Techniques for Product Recommendation Systems, (2021).
2. Arjun Rao, Pooja Mehta, Enhancing User Experience with Item-Based Collaborative Filtering, (2020).
3. Tanvi Jain, Rajeev Rathi, Intelligent Product Suggestions Through Collaborative Filtering Approaches, (2021).

Customer Sentiment Analysis from Reviews Using NLP

Kirubakaran S[1]

[1]UG Scholar

[1]Department of BCA, Sree Muthukumaraswamy College, Kodungaiyur, Tamil Nadu, India, 600118.

ABSTRACTS

Understanding customer opinions is crucial for businesses aiming to improve products, services, and user satisfaction. This paper presents a robust system for Customer Sentiment Analysis from Reviews Using Natural Language Processing (NLP) techniques. The proposed model processes textual reviews from e-commerce platforms, social media, and feedback forms to determine the polarity and emotion behind user opinions. The system performs text preprocessing, including tokenization, stop-word removal, lemmatization, and vectorization using TF-IDF and word embeddings. Sentiment classification is achieved through machine learning algorithms like Logistic Regression, Naive Bayes, and deep learning models such as LSTM. The approach also incorporates aspect-based sentiment analysis to extract sentiments about specific product features. A labeled dataset of customer reviews is used to train and evaluate the model, achieving high precision, recall, and F1-scores. The system supports multilingual inputs and offers visual sentiment summaries for business insights. The results highlight the potential of NLP in turning unstructured customer feedback into actionable intelligence, helping businesses enhance user engagement, manage brand reputation, and make data-driven decisions.

REFERENCES

1. Akash Deshmukh, Priyanka Sen, Aspect-Based Sentiment Analysis Using NLP Techniques, (2022).
2. Mitali Singh, Arjun Nair, Deep Learning Approaches for Sentiment Classification in Customer Reviews, (2023).
3. Kavya Reddy, Ramesh Kapoor, Multilingual Sentiment Analysis Using Natural Language Processing, (2021).

AI-Based Dynamic Pricing System for E-commerce

Jaffar Hussain L[1]

[1]UG Scholar

[1]Department of BCA, K.C.S. Kasi Nadar College of Arts & Science, Chennai, Tamil Nadu, India, 600021.

ABSTRACTS

Dynamic pricing has emerged as a competitive strategy in the e-commerce domain, enabling businesses to optimize profits and respond to market fluctuations in real-time. This paper introduces an AI-Based Dynamic Pricing System for E-commerce that uses advanced machine learning algorithms to determine optimal product prices based on a variety of factors including demand trends, competitor pricing, inventory levels, customer behavior, and time-based patterns. The system integrates supervised learning models, such as Gradient Boosting and Random Forest, along with reinforcement learning techniques to continuously adapt pricing strategies in dynamic market conditions. Historical transaction data and web-scraped competitor pricing data are used to train and fine-tune the models. The pricing engine is capable of real-time decision-making and can be integrated into existing e-commerce platforms through APIs. Evaluation results show a significant increase in revenue and customer conversion rates while maintaining competitive pricing. The system also includes interpretability features for transparency and compliance with pricing regulations. This AI-powered solution empowers retailers to automate pricing decisions, improve profitability, and enhance customer satisfaction in highly competitive digital marketplaces.

REFERENCES

1. Tanya Mehra, Saurav Joshi, Competitive Pricing Strategies Using AI in E-commerce Platforms, (2023).
2. Arvind Sharma, Meena Iyer, Intelligent Pricing Algorithms for E-commerce Using AI, (2021).
3. Dhruv Patel, Ananya Roy, Adaptive Pricing Systems with Predictive Analytics in Digital Markets, (2021).

Sales Forecasting Using Time Series and ML

Aswin A[1], Balagurumadhavan G [2]

[1,2]UG Scholar

[1,2]Department of BCA, Sree Muthukumaraswamy College, Kodungaiyur, Tamil Nadu, India, 600118.

ABSTRACTS

Accurate sales forecasting is essential for effective inventory management, financial planning, and strategic decision-making in businesses. This paper proposes a hybrid approach to Sales Forecasting Using Time Series and Machine Learning (ML) techniques. The system leverages classical time series models like ARIMA and Exponential Smoothing along with machine learning algorithms such as Random Forest, XGBoost, and Long Short-Term Memory (LSTM) networks to predict future sales based on historical data. The model captures both linear trends and nonlinear patterns influenced by seasonality, promotions, holidays, and external market conditions. Feature engineering is applied to extract temporal attributes, and ensemble learning techniques are used to improve prediction accuracy. Extensive experimentation on real-world retail datasets demonstrates that the hybrid model outperforms standalone methods in terms of Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE). The system is designed to be scalable, allowing integration with enterprise dashboards for real-time forecasting. This approach not only enhances forecast precision but also supports data-driven decision-making for supply chain optimization and revenue growth.

REFERENCES

1. Raghav Malhotra, Sneha Pillai, Hybrid Time Series and ML Models for Sales Prediction, (2021).
2. Priyanka Reddy, Rohit Anand, LSTM Networks for Sales Forecasting in E-commerce, (2022).
3. Arjun Kapoor, Meenal Shah, Improving Forecast Accuracy Using Temporal Feature Engineering, (2021).

Fake Product Review Detection Using BERT

S Hari Karthick[1]

[1]UG Scholar

[1,2]Department of BCA, Vel Tech Ranga Sanku Arts College, Avadi, Tamil Nadu, India, 600062.

ABSTRACTS

The surge in online shopping has made customer reviews a critical factor in influencing purchasing decisions. However, the presence of fake product reviews undermines trust and misleads consumers. This paper presents a robust solution for Fake Product Review Detection Using BERT (Bidirectional Encoder Representations from Transformers), a state-of-the-art language representation model. The proposed system fine-tunes pre-trained BERT on a labeled dataset of genuine and deceptive reviews to capture deep contextual and semantic patterns often missed by traditional models. Extensive preprocessing is applied to clean and tokenize review texts, and attention-based encoding helps the model distinguish subtle linguistic cues indicative of fake reviews. The system is trained and evaluated using performance metrics such as accuracy, precision, recall, and F1-score, achieving superior results compared to baseline classifiers like SVM and LSTM. Additionally, explainability methods such as LIME and SHAP are integrated to provide transparency in predictions. The model demonstrates strong generalization across multiple product categories and platforms, making it a scalable and effective tool for e-commerce platforms to maintain review integrity and enhance customer trust.

REFERENCES

1. Aditya Deshmukh, Tanya Verma, Semantic Analysis of Deceptive Reviews Using BERT, (2022).
2. Meenal Joshi, Harsh Patel, Contextual Language Models for Fake Review Identification, (2023).
3. Pooja Mehta, Karan Bansal, Enhancing Review Credibility Detection with Fine-Tuned BERT, (2021).

News Headline Classification Using Transformer Models

Balamurugan R[1], Gokul K[2]

[1,2]UG Scholar

[1,2]Department of BCA, Sree Muthukumaraswamy College, Kodungaiyur, Tamil Nadu, India, 600118.

ABSTRACTS

With the growing volume of digital news content, automatic classification of news headlines is essential for organizing, filtering, and recommending relevant information. This paper presents a method for News Headline Classification Using Transformer Models, leveraging advanced natural language understanding capabilities of architectures like BERT and RoBERTa. Unlike traditional models, transformer-based models excel at capturing contextual dependencies and semantic meaning, even from short texts such as headlines. The proposed system is trained on a labeled dataset of headlines across categories like politics, sports, business, technology, and entertainment. The model is fine-tuned to learn nuanced patterns in language, achieving high accuracy and robustness even with overlapping or ambiguous categories. Preprocessing includes case normalization, tokenization, and padding, optimized for transformer input. Performance is evaluated using accuracy, macro F1-score, and confusion matrix analysis, showing that transformer models significantly outperform baseline classifiers such as Naive Bayes and SVM. The approach demonstrates scalability and can be integrated into real-time news applications or content management systems, improving user experience through personalized news categorization and faster content indexing.

REFERENCES

1. Ayesha Khan, Rohit Verma, Headline Classification Using BERT-Based Transformers, (2021).
2. Nishant Rao, Divya Sharma, Multi-Class News Categorization with Pre-Trained Language Models, (2020).
3. Meera Iyer, Sagar Joshi, RoBERTa for Context-Aware News Headline Classification, (2022).

Text Summarization for Legal Documents Using NLP

Alisha Zarin J[1]

[1]UG Scholar

[1]Department of BCA, K.C.S. Kasi Nadar College of Arts & Science, Chennai, Tamil Nadu, India, 600021.

ABSTRACTS

Legal documents are often lengthy, complex, and filled with technical jargon, making it difficult for non-experts and even legal professionals to extract key information efficiently. This paper introduces a system for Text Summarization for Legal Documents Using Natural Language Processing (NLP) to automate the generation of concise and coherent summaries from large legal texts such as case law, contracts, and statutes. The approach utilizes both extractive and abstractive summarization techniques. Transformer-based models like BART and T5 are fine-tuned on legal corpora to generate summaries that preserve legal meaning while simplifying the language. Custom preprocessing pipelines are developed to handle domain-specific challenges such as legal citations, sectioning, and archaic language. The system is evaluated on publicly available legal datasets using ROUGE and BLEU metrics, showing high fidelity to the original content and superior performance over traditional rule-based methods. This solution aims to enhance legal research efficiency, support legal tech applications, and increase accessibility to justice by making complex legal content more understandable and digestible.

REFERENCES

1. Riya Menon, Arjun Das, Automated Summarization of Legal Texts Using NLP, (2021).
2. Sarthak Jain, Meenal Reddy, Transformer-Based Approaches for Legal Document Summarization, (2022).
3. Kavya Shah, Rohit Desai, Extractive and Abstractive Methods for Legal Text Compression, (2020).

AI-Based Resume Screening Tool Using Named Entity Recognition

Nithiya R[1], Ayesha J[2]

[1,2]UG Scholar

[1,2]Department of BCA, Vel Tech Ranga Sanku Arts College, Avadi, Tamil Nadu, India, 600062.

ABSTRACTS

Recruitment processes often involve screening large volumes of resumes, which is time-consuming and prone to human bias. This paper introduces an AI-Based Resume Screening Tool Using Named Entity Recognition (NER) to automate the extraction and evaluation of key candidate information from resumes. The system employs NLP techniques, particularly NER, to accurately identify entities such as names, skills, qualifications, experience, job titles, certifications, and organizations. A pre-trained language model fine-tuned on recruitment-specific datasets enhances the detection of domain-relevant entities, even from unstructured or variably formatted resumes. The extracted data is then matched against job descriptions using semantic similarity and rule-based filters to rank suitable candidates. The tool supports multilingual input, customizable screening criteria, and outputs a structured candidate profile for HR teams. Evaluation results demonstrate high precision in entity recognition and relevance ranking, significantly reducing manual workload and shortlisting time. The proposed solution improves hiring efficiency, ensures fair candidate evaluation, and provides scalable integration with applicant tracking systems (ATS).

REFERENCES

1. Sneha Iyer, Nikhil Bansal, Domain-Specific NER for HR Applications in Resume Filtering, (2023).
2. Tanvi Kapoor, Pranav Malhotra, Scalable AI Resume Review Systems Using NLP Techniques, (2021).
3. Ananya Roy, Vivek Mehta, Resume Screening Automation Using Named Entity Recognition, (2021).

Emotion Detection from Chat Conversations

Santhosh H[1]

[1]UG Scholar

[1]Department of BCA, Sree Muthukumaraswamy College, Kodungaiyur, Tamil Nadu, India, 600118.

ABSTRACTS

Emotion detection from chat conversations is gaining importance in fields such as customer support, mental health monitoring, and human-computer interaction. This paper presents a robust framework for Emotion Detection from Chat Conversations using Natural Language Processing (NLP) and deep learning techniques. The system is designed to classify user messages into emotional categories such as joy, sadness, anger, fear, surprise, and neutral. A pre-processing pipeline is implemented to clean, tokenize, and embed conversational text using contextual word representations like BERT embeddings. Recurrent neural networks (LSTM and BiLSTM) and transformer-based models are used to capture the sequential and contextual nature of dialogue. The model is trained and evaluated on labeled chat datasets, showing high accuracy and F1-scores across all emotion classes. Special attention is given to handling short, informal, and ambiguous messages common in chat platforms. The system also supports multilingual emotion recognition and includes visualization tools to track emotional trends over conversations. This solution can enhance the emotional intelligence of chatbots, support real-time crisis intervention, and improve customer experience by adapting responses to the user's emotional state.

REFERENCES

1. Rohan Mehta, Divya Sharma, Emotion Recognition in Chat Conversations Using Deep Learning, (2021).
2. Sneha Kapoor, Ankit Joshi, Context-Aware Emotion Detection with NLP and Transformers, (2022).
3. Priya Verma, Nikhil Anand, Multilingual Emotion Classification from Dialogue Data, (2020).

Automatic Question Generator for Education Using GPT

Vandhana Sai M[1], Mahalakshmi S[2]

[1,2]UG Scholar

[1,2]Department of BCA, K.C.S. Kasi Nadar College of Arts & Science, Chennai, Tamil Nadu, India, 600021.

ABSTRACTS

The demand for personalized and scalable learning solutions has increased the need for automated educational content generation. This paper proposes an Automatic Question Generator for Education Using GPT (Generative Pre-trained Transformer) to create meaningful and diverse questions from academic text. The system leverages GPT-based language models fine-tuned on educational datasets to generate various question types, including multiple-choice, fill-in-the-blank, and short-answer questions. By analyzing textbook content, articles, or lecture transcripts, the model identifies key concepts and transforms them into grammatically correct and contextually relevant questions. Advanced prompt engineering and post-generation filtering ensure the quality and difficulty level of the generated questions are appropriate for targeted learners. The system supports subject-specific generation across domains such as science, history, and language learning. Evaluations using BLEU scores, human feedback, and educational relevance ratings demonstrate high performance and usability. This approach significantly reduces the manual effort in question paper preparation, supports adaptive learning platforms, and enhances student engagement through dynamic assessment content.

REFERENCES

1. Neelam Verma, Rajeev Bansal, Smart Education Systems with AI-Driven Content Generation, (2021).
2. Aakash Jain, Divya Kapoor, Automatic Assessment Item Creation Using NLP and GPT, (2020).
3. Riya Sharma, Anuj Mehta, Generating Educational Questions Using GPT Language Models, (2021).

Deep Fake Detection Using Deep learning

Dev Anand D[1], Snehavarshini S[2]

[1,2]PG Scholars

[1]Department of Computer Science and Engineering, Bharath Institute of Higher Education and Research (BIHER), Chennai, Tamil Nadu, India, 600073.
[2]Department of Computer Science and Engineering, T.J.S.Engineering College, Chennai, Tamil Nadu, India, 601206.

ABSTRACTS

With the rise of synthetic media, deepfakes—manipulated videos or images generated using deep learning—pose significant threats to security, misinformation, and digital trust. This paper presents a robust framework for Deep Fake Detection Using Deep Learning, focusing on identifying subtle visual and temporal artifacts introduced during deepfake generation. The proposed system utilizes Convolutional Neural Networks (CNNs) for spatial feature extraction and combines them with Recurrent Neural Networks (RNNs) or Temporal Convolutional Networks (TCNs) to capture temporal inconsistencies in videos. The model is trained on large-scale, labeled datasets of real and fake videos, incorporating face-focused preprocessing, frame sampling, and data augmentation for improved generalization. To enhance detection accuracy, the system leverages attention mechanisms and frequency domain analysis to reveal anomalies not visible to the human eye. Experimental results show high precision and recall across diverse manipulation techniques including face swapping, lip-syncing, and expression synthesis. The framework also integrates explainable AI tools to highlight manipulated regions, ensuring transparency and aiding digital forensics. This deep learning-based solution is scalable, adaptable to emerging fake generation techniques, and can be deployed in social media moderation, content verification, and cybersecurity systems.

REFERENCES

1. Arjun Malhotra, Neha Singh, Deep Learning Models for Deepfake Detection, (2021).
2. Sneha Kapoor, Ramesh Iyer, Temporal and Spatial Feature Extraction for Video Manipulation Detection, (2022).
3. Ananya Verma, Rohit Bansal, Visual Forensics with Deep Learning for Deepfake Identification, (2021).

Anomaly Detection in Network Traffic Using Autoencoders

Dharshini V[1]

[1]UG Scholar

[1]Department of BCA, Vel Tech Ranga Sanku Arts College, Avadi, Tamil Nadu, India, 600062.

ABSTRACTS

Detecting anomalies in network traffic is crucial for identifying security threats, system failures, and unauthorized access. This paper introduces an unsupervised learning approach for Anomaly Detection in Network Traffic Using Autoencoders. Autoencoders are neural networks designed to learn compressed representations of input data and reconstruct it with minimal error. By training the model on normal traffic patterns, any significant reconstruction error during testing indicates a potential anomaly. The system processes features such as packet size, flow duration, source/destination IPs, and protocol types from real-world traffic datasets. Deep and variational autoencoders are explored for capturing both linear and nonlinear dependencies in the data. A threshold-based method is applied to flag outliers based on reconstruction loss. Experimental evaluations on benchmark datasets like NSL-KDD and CICIDS show that the model achieves high detection rates with low false positives, outperforming traditional statistical and rule-based techniques. The solution is lightweight, scalable, and can be integrated into intrusion detection systems (IDS) for real-time monitoring. This approach enhances cybersecurity by offering an adaptive, data-driven method for detecting previously unseen attacks and network behavior anomalies.

REFERENCES

1. Raghav Nair, Sneha Mehta, Autoencoder-Based Techniques for Network Traffic Anomaly Detection, (2021).
2. Kunal Joshi, Priya Verma, Deep Learning Approaches for Intrusion Detection Using Autoencoders, (2020).
3. Aniket Bansal, Kavya Iyer, Enhancing IDS Accuracy with Autoencoder-Driven Detection Models, (2021).

AI-Based Phishing Website Detection

Vishnu V[1]

[1]PG Scholar

[1]Department of Computer Science and Engineering, T.J.S.Engineering College, Chennai, Tamil Nadu, India, 601206.

ABSTRACTS

Phishing websites pose a significant threat to online users by mimicking legitimate platforms to steal sensitive information such as login credentials, credit card details, and personal data. This paper presents an AI-Based Phishing Website Detection system that leverages machine learning algorithms to identify malicious websites in real time. The system analyzes a wide range of features including URL structure, domain age, HTTPS usage, HTML content, and JavaScript behavior. Feature extraction is followed by training classifiers such as Random Forest, Gradient Boosting, and Support Vector Machines to distinguish between phishing and legitimate sites. To enhance prediction accuracy, ensemble methods and deep learning models are also evaluated. The proposed model is trained and validated on publicly available datasets like PhishTank and OpenPhish, achieving high accuracy, precision, and recall. The system is lightweight and capable of integration into browsers or security gateways for live monitoring. Furthermore, it incorporates explainable AI (XAI) to improve transparency and user trust. This solution provides a proactive defense mechanism against evolving phishing tactics and contributes to strengthening web security and user safety.

REFERENCES

1. Rohan Mehta, Anjali Sinha, Detecting Phishing Websites Using Machine Learning, (2021).
2. Sneha Iyer, Kunal Rao, Real-Time URL-Based Phishing Detection with AI Models, (2020).
3. Priya Sharma, Deepak Verma, Intelligent Web Threat Detection Using Ensemble Learning, (2022).

Malware Classification Using Deep Neural Networks

Arun Kumar T[1], Divya Dharshan D[2]

[1,2]UG Scholar

[1,2]Department of BCA, K.C.S. Kasi Nadar College of Arts & Science, Chennai, Tamil Nadu, India, 600021.

ABSTRACTS

Malware continues to be a major threat in the cybersecurity landscape, evolving in complexity and evading traditional detection methods. This paper presents a robust framework for Malware Classification Using Deep Neural Networks (DNNs) to automatically identify and categorize malicious software based on behavioral and static analysis features. The system utilizes raw binary files, opcode sequences, and API call traces to extract meaningful patterns. These features are fed into a deep neural architecture comprising multiple dense layers with dropout and batch normalization to enhance learning and reduce overfitting. The model is trained and evaluated on benchmark datasets such as Microsoft Malware Classification Challenge and Malimg, achieving high classification accuracy across various malware families including trojans, worms, and ransomware. Techniques like one-hot encoding, embedding layers, and learning rate scheduling are incorporated to improve model convergence. The proposed DNN-based classifier demonstrates significant improvement over traditional signature-based and shallow machine learning methods, offering real-time and scalable deployment options for enterprise security systems. This approach contributes to faster, automated malware analysis and supports proactive threat mitigation strategies.

REFERENCES

1. Arjun Menon, Sneha Verma, Deep Neural Network Architectures for Malware Classification, (2021).
2. Riya Kapoor, Kunal Desai, Static and Dynamic Analysis Features for Malware Detection, (2020).
3. Meenal Sharma, Saurav Patel, Multi-Class Malware Family Classification Using DNNs, (2022).

Password Strength Checker Using Machine Learning

Akash M[1], Tharun Kumar S[2]

[1,2]UG Scholar

[1,2]Department of BCA, Vel Tech Ranga Sanku Arts College, Avadi, Tamil Nadu, India, 600062.

ABSTRACTS

Weak passwords are a major vulnerability in digital security, often exploited in brute-force and dictionary attacks. This paper presents an intelligent Password Strength Checker Using Machine Learning to assess the robustness of user-generated passwords beyond traditional rule-based methods. The system is trained on a labeled dataset containing passwords categorized by strength—weak, moderate, and strong—based on factors such as length, character variety, entropy, and resistance to known attack patterns. Feature extraction involves character frequency, presence of dictionary words, and entropy measures. Various machine learning models including Random Forest, Gradient Boosting, and Neural Networks are evaluated for classification performance. The best-performing model is deployed in a user-friendly interface that provides real-time feedback and strength scores, helping users improve their password security. Unlike conventional checkers, the ML-based system learns from real-world password breaches and adapts to evolving attack strategies. The results demonstrate high accuracy in identifying weak passwords and suggest actionable improvements, thereby enhancing cybersecurity awareness and promoting safer user behavior.

REFERENCES

1. Nisha Reddy, Arjun Mehta, Machine Learning-Based Password Strength Classification, (2021).
2. Priya Verma, Kunal Joshi, Adaptive Security Systems: Learning-Based Password Checkers, (2023).
3. Aniket Shah, Meera Nair, Entropy and Behavior Analysis for Password Strength Detection, (2021).

AI-Driven Email Spam Classifier

Arun J[1]

[1]UG Scholar

[1]Department of BCA, K.C.S. Kasi Nadar College of Arts & Science, Chennai, Tamil Nadu, India, 600021.

ABSTRACTS

Email spam remains a persistent cybersecurity threat, often used to distribute phishing links, malware, and fraudulent content. This paper proposes an AI-Driven Email Spam Classifier that employs machine learning and natural language processing (NLP) techniques to effectively distinguish spam from legitimate emails. The system analyzes both email headers and body text using features such as sender reputation, keyword frequency, punctuation patterns, and embedded URLs. A combination of traditional models like Naive Bayes and advanced algorithms such as Support Vector Machines (SVM) and Random Forest is evaluated, along with deep learning approaches using LSTM networks for contextual understanding. The dataset includes labeled emails from sources like the Enron corpus and Spam Assassin, ensuring model generalization across various formats and spam techniques. The proposed classifier achieves high accuracy, precision, and recall, minimizing false positives that could block important communications. The model also incorporates explainable AI tools to help users understand the classification rationale. Designed for integration with email servers and clients, the solution enhances security through proactive spam detection and supports dynamic updates based on new spam patterns.

REFERENCES

1. Meera Sinha, Raghav Deshmukh, AI-Based Email Spam Detection Techniques, (2021).
2. Nikhil Bansal, Priya Menon, Deep Learning Approaches for Email Filtering, (2020).
3. Kunal Iyer, Ananya Sharma, Adaptive Email Filtering Using Machine Learning, (2021).

Loan Default Prediction Using Supervised Learning

Harini R[1], Kalaivani S[2]

[1,2]UG Scholar

[1,2]Department of BCA, K.C.S. Kasi Nadar College of Arts & Science, Chennai, Tamil Nadu, India, 600021.

ABSTRACTS

Predicting loan default risk is a critical task in the financial industry to ensure responsible lending and minimize losses. This paper presents a Loan Default Prediction System Using Supervised Learning techniques that analyze historical borrower data to classify loan applications as high-risk or low-risk. The model is trained using labeled datasets containing features such as credit score, income, loan amount, repayment history, employment status, and debt-to-income ratio. Several supervised algorithms, including Logistic Regression, Random Forest, and Gradient Boosting Machines (GBM), are compared for accuracy, precision, recall, and interpretability. Feature engineering and normalization techniques are applied to handle missing values, imbalanced data, and categorical variables. SHAP (SHapley Additive exPlanations) values are used to interpret the impact of each feature on prediction outcomes. The proposed system achieves high predictive performance and provides valuable insights to loan officers, enabling data-driven decisions. This solution is designed to be scalable for integration into financial platforms, helping institutions reduce default rates while ensuring fair credit access.

REFERENCES

1. Kavya Reddy, Anuj Mehra, Predicting Loan Defaults with Machine Learning Models, (2021).
2. Sneha Shah, Rohan Iyer, Risk-Based Credit Scoring Using Supervised Learning, (2022).
3. Priya Nair, Kunal Joshi, Decision Support Systems for Lending Using Classification Techniques, (2020).

AI Chatbot for Student Assistance Using Intent Detection

Naveen Kumar A[1]

[1]UG Scholar

[1]Department of BCA, Sree Muthukumaraswamy College, Kodungaiyur, Tamil Nadu, India, 600118.

ABSTRACTS

In the modern educational environment, students often require instant and accurate responses to queries related to academics, schedules, resources, and campus services. This paper presents an AI Chatbot for Student Assistance Using Intent Detection, designed to understand and respond to student queries through Natural Language Processing (NLP). The chatbot leverages intent classification models, trained on domain-specific datasets, to accurately identify the purpose behind a student's message. Techniques such as tokenization, embedding (using Word2Vec/BERT), and supervised learning algorithms like SVM and deep learning models (LSTM, CNN) are employed to enhance intent detection accuracy. The system supports multiple intents such as course inquiries, fee details, timetable requests, and campus navigation. A fallback mechanism is included to handle unknown inputs, ensuring seamless user interaction. The chatbot is integrated with educational databases and student portals, providing real-time, personalized assistance. Evaluation metrics such as accuracy, F1-score, and user feedback validate the model's effectiveness. The proposed solution reduces staff workload, improves student satisfaction, and promotes digital engagement in academic institutions.

REFERENCES

1. Riya Menon, Kunal Shah, Intelligent Chatbot Systems for Student Support Using NLP, (2021).
2. Aniket Rao, Sneha Deshmukh, Intent-Based Query Handling in Educational Chatbots, (2022).
3. Priya Sinha, Rohit Verma, AI-Powered Campus Assistants Using Intent Detection Models, (2020).

Real-Time Traffic Prediction Using ML

Baskar R[1], Shyam L[2]

[1,2]UG Scholar

[1,2]Department of BCA, Jaya College of Arts and Science, Chennai, Tamil Nadu, India, 602024.

ABSTRACTS

Efficient traffic management is essential for reducing congestion, travel time, and environmental impact in urban areas. This paper presents a Real-Time Traffic Prediction System Using Machine Learning (ML) that forecasts traffic flow and congestion levels by analyzing historical and live data from GPS, road sensors, and traffic cameras. The system extracts key features such as vehicle count, speed, road type, time of day, and weather conditions to train predictive models. Algorithms including Random Forest, XGBoost, and LSTM are implemented and compared for short-term traffic forecasting. LSTM networks, due to their temporal memory capability, are particularly effective in capturing traffic patterns and fluctuations over time. The model is deployed on a real-time data stream to continuously update predictions, supporting integration with navigation systems and traffic control infrastructure. Evaluation on real-world datasets shows high prediction accuracy and responsiveness. This solution empowers city planners, logistics providers, and commuters with timely traffic insights, contributing to smarter urban mobility and reduced transportation delays.

REFERENCES

1. Raghav Mehta, Sneha Reddy, Predictive Traffic Modeling Using Machine Learning, (2021).
2. Kunal Joshi, Priya Desai, LSTM-Based Real-Time Urban Traffic Forecasting, (2022).
3. Tanvi Sharma, Arjun Rao, Data-Driven Road Traffic Prediction Systems, (2020).

Enhancing Communication Security Through Machine Learning and Streamlit

Lokesh K[1], Kaviya M[2]

[1,2]PG Scholars

[1]Department of Computer Science and Engineering, Bharath Institute of Higher Education and Research (BIHER), Chennai, Tamil Nadu, India, 600073.
[2]Department of Computer Science and Engineering, T.J.S.Engineering College, Chennai, Tamil Nadu, India, 601206.

ABSTRACTS

The effectiveness of many machine learning methods for identifying spam in SMS and email interactions is examined in this study's abstract. Our study assesses each method's performance using Multinomial Naive Bayes, Random Forest, Support Vector Classifier, and Extra Tree Classifier. Preprocessing labelled datasets and extracting relevant features for model training are part of the study. Additionally, interaction with the Google Spreadsheet API and Google Drive API is implemented to help with real-time analysis and decision-making. Comprehensive testing and assessment are used to provide insights into the scalability, computational efficiency, and algorithm performance. The results further the progress of digital environment communication security and spam detection.

REFERENCES

1. S. Smadi, N. Aslam, L. Zhang, Detection of online phishing email using dynamic evolving neural network based on reinforcement learning, (2018).
2. Y. Cohen, D. Gordon, D. Hendler, Early detection of spamming accounts in large-scale service provider networks, (2018).
3. A. Wijaya, A. Bisri, Hybrid decision tree and logistic regression classifier for email spam detection, (2016).

Automatic Attendance System Using Face Recognition

Sneha G[1], Ramya S[2]

[1,2]UG Scholar

[1,2]Department of BCA, Vel Tech Ranga Sanku Arts College, Avadi, Tamil Nadu, India, 600062.

ABSTRACTS

The shift to automated attendance systems in educational and corporate environments has underscored the need for contactless, reliable methods. This paper presents the design and development of an Automatic Attendance System Using Face Recognition, combining advanced computer vision techniques with a user-friendly interface. Using a high-resolution camera and a Raspberry Pi platform, our system captures real-time images, detects faces via Haar cascades, and performs recognition with a lightweight CNN model optimized for embedded deployment. Attendance is granted only after verifying consistent presence across multiple frames, minimizing false positives from transient appearances. The recognized attendance data is logged to a secure database and can be exported to common formats such as Excel or CSV for administrative convenience. The system architecture emphasizes modularity, comprising separate components for image acquisition, recognition, and data management—making it adaptable to scale across multiple classrooms or offices. Testing across various lighting and pose conditions reveals over 98% recognition accuracy with recognition times under 150 ms per face. User feedback confirms reductions in administrative workload and proxy attendance. In conclusion, this system demonstrates a robust, scalable, and efficient alternative to traditional roll-call or RFID-based methods, offering enhanced privacy, hygiene, and operational accuracy.

REFERENCES

1. A. Rao, A. Kamsin, N. Zainal, AttenFace: A real-time attendance system using face recognition, (2022).
2. U. R. Ughade, S. M. Gikwad, A. N. Yeole, Automatic attendance system using face recognition, (2023).
3. O. T. Tolulope, F. Oyediji, A. Oyebiyi, Development of an attendance management system using facial recognition technology, (2024).

Credit Card Fraud Detection System

Balachandran M[1], Akash S[2]

[1,2]UG Scholar

[1,2]Department of BCA, K.C.S. Kasi Nadar College of Arts & Science, Chennai, Tamil Nadu, India, 600021.

ABSTRACTS

Credit card fraud poses a persistent and evolving challenge to modern financial systems, driven by the increasing complexity of fraud patterns and the low frequency of fraudulent transactions. This paper presents a robust Credit Card Fraud Detection System leveraging a hybrid deep learning approach to accurately detect fraudulent activities while minimizing false alerts. The proposed system integrates a Convolutional Neural Network (CNN) for spatial feature extraction and a Long Short-Term Memory (LSTM) network to capture temporal dependencies within transaction sequences. To address class imbalance inherent in financial datasets, the model incorporates SMOTE for oversampling alongside cost-sensitive learning. A comprehensive feature selection using Genetic Algorithm further enhances model performance by reducing dimensionality and improving interpretability. Evaluation on a benchmark European cardholder dataset (284,807 transactions, 492 fraudulent) demonstrates the system achieves an accuracy of 99.8%, precision of 0.99, recall of 0.98, and an F1-score of 0.99, outperforming traditional methods such as SVM, Random Forest, and Logistic Regression. Furthermore, real-time deployment tests show inference latency under 50 ms per transaction, suitable for high-throughput environments. This system offers a scalable, real-time fraud detection solution that balances accuracy and efficiency, aiding financial institutions in safeguarding transactional integrity without degrading user experience.

REFERENCES

1. M. Zhu, Y. Zhang, Y. Xiang, Enhancing credit card fraud detection: neural network with SMOTE rebalancing, (2024).
2. N. Upadhyay, N. Bansal, D. Rastogi, F. Chaturvedi, Credit card fraud detection using CNN and LSTM hybrid model, (2023).
3. T. Nguyen, H. Tahir, M. Abdelrazek, A. Babar, Deep learning methods for credit card fraud detection, (2020).

Driver Drowsiness Detection Using OpenCV and ML

Mageshwari H[1]

[1]UG Scholar

[1]Department of BCA, Vel Tech Ranga Sanku Arts College, Avadi, Tamil Nadu, India, 600062.

ABSTRACTS

Driver drowsiness detection is vital for road safety, as fatigue significantly increases the risk of accidents. This paper presents a real-time Driver Drowsiness Detection system that combines OpenCV-based facial landmark tracking with classical machine learning classifiers. Using a standard webcam, the system captures live video, applies Haar cascade detection to locate the face and eyes, and calculates the Eye Aspect Ratio (EAR) to quantify blink patterns. Key features such as blink duration, blink frequency, and head pose are extracted in real time and fed into a Support Vector Machine (SVM) classifier trained to distinguish between alert and drowsy states. To enhance robustness, the model incorporates adaptive thresholding to compensate for varying lighting conditions and individual facial differences. Extensive testing under different lighting and driver head movements demonstrates an average detection accuracy of 96%, with false alarms under 3%. Alerts are issued via auditory signals when prolonged eye closure or frequent yawns are detected. The modular architecture supports future integration with additional sensors (e.g., yawning detection via mouth aspect ratio or steering pattern analysis). Our system offers a lightweight, low-cost, and scalable solution suitable for in-vehicle deployment, reducing dependency on hardware-intensive deep learning models while achieving strong performance in typical driving scenarios.

REFERENCES

1. K. Venkat Reddy, T. Ramaswamy, S. Harshith Kumar, Driver drowsiness detection using OpenCV and Raspberry Pi, (2022).
2. R. Patel, S. Mehta, Real-time driver drowsiness detection using OpenCV and eye aspect ratio, (2021).
3. N. Sinha, J. Minj, P. Patre, A driver drowsiness detection using machine learning and OpenCV, (2023).

Self-Driving Car Simulation Using Reinforcement Learning

Prethish P D [1]

[1]UG Scholar

[1]Department of Computer Science and Engineering, SRM Institute of Science and Technology, Ramapuram, Tamil Nadu, India, 600089.

ABSTRACTS

This paper explores the development of a self-driving car simulation platform using reinforcement learning (RL) to train and evaluate autonomous driving policies in virtual environments. We integrate the CARLA simulator with a deep RL pipeline, employing both Deep Q-Networks (DQN) and Proximal Policy Optimization (PPO) to learn lane following, obstacle avoidance, and speed regulation. Agents receive raw RGB camera inputs and simulate physical controls in real-time. To address sparse reward challenges, we implement a shaped reward function that considers lane deviation, collision avoidance, and smooth acceleration. We also apply domain randomization—varying weather, traffic density, and lighting conditions—to enhance the robustness and generalizability of learned policies. Evaluation shows agents trained with PPO outperform DQN, achieving 95% lane-keeping accuracy and reducing collision rates by 40% compared to baseline heuristics. We further validate sim-to-real transfer potential via preliminary real-world testing in a scaled model vehicle, with 88% adherence to lane boundaries. Our modular framework supports rapid algorithm comparison and extension to sensor fusion scenarios (e.g., LiDAR, depth camera). This RL-centric simulation approach demonstrates promise for accelerating autonomous vehicle development by providing a controlled yet realistic testing environment before real-world trials.

REFERENCES

1. S. Wang, D. Jia, X. Weng, Deep reinforcement learning for autonomous driving in TORCS environment, (2018).
2. B. Osiński, A. Jakubowski, P. Miłoś, et al., Simulation-based reinforcement learning for real-world autonomous driving, (2019).
3. J. Hossain, Autonomous driving with deep reinforcement learning in CARLA simulation, (2023).

License Plate Detection System Using YOLO

Mohamed Akeem A[1], Santhosh S[2]

[1,2]UG Scholar

[1,2]Department of BCA, K.C.S. Kasi Nadar College of Arts & Science, Chennai, Tamil Nadu, India, 600021.

ABSTRACTS

Automated detection of vehicle license plates is a cornerstone technology for intelligent transportation systems and law enforcement. This work introduces a License Plate Detection System Using YOLO, designed for high-precision, real-time implementation. We employ YOLOv5 for object detection and integrate EasyOCR for text extraction, enabling seamless recognition of license plate letters and numbers. The model is trained on a custom dataset featuring diverse lighting, angle, and occlusion scenarios to boost robustness. To enhance performance, data augmentation (rain, blur, perspective transforms) is employed during training, ensuring the system can handle adverse conditions. The two-stage pipeline—with YOLOv5 detecting plates and EasyOCR reading characters—achieves a detection accuracy of 95% and OCR accuracy of 90% on a test set of 5,000 images, while maintaining an average inference time of 30 ms per frame. Benchmarked against traditional image-processing methods, our system demonstrates superior speed and accuracy. A lightweight deployment prototype on an edge device (NVIDIA Jetson Xavier NX) confirms model viability in real-world applications. This system offers an effective, scalable solution for applications ranging from toll collection to parking management and traffic surveillance.

REFERENCES

1. R. Laroca, L. A. Zanlorensi, Efficient and layout-independent license plate detection using YOLO, (2019).
2. M. Paul, K. Rafidha Rehiman, Automated license plate recognition using YOLOv8 and EasyOCR, (2025).
3. Arjan Chakravarthy, A comparison of YOLO models for license plate detection, (2021).

Smart Vehicle Accident Detection and Alert System

Karthick P[1], Hari Haran T[2]

[1,2]UG Scholar

[1,2]Department of BCA, Vel Tech Ranga Sanku Arts College, Avadi, Tamil Nadu, India, 600062.

ABSTRACTS

This paper presents a Smart Vehicle Accident Detection and Alert System, combining sensor fusion, computer vision, and IoT connectivity to enable rapid detection and response to road accidents. When an incident occurs, accelerometers and gyroscopes mounted onboard detect a sudden impact, while a YOLO-based vision module analyzes real-time video streams for crash patterns and collision estimates. Sensor fusion algorithms increase reliability by corroborating physical and visual signals. Upon confirmed detection, the system automatically transmits GPS coordinates and incident details via GSM to emergency services and preset contacts within seconds, greatly reducing response time. Real-world simulations demonstrate over 95% detection accuracy and emergency notifications sent within an average of 8 seconds—substantially faster than manual reporting. Deployed on a Raspberry Pi edge platform with low-bandwidth communication, the system proves both cost-effective and scalable. By integrating multiple detection modalities and leveraging fast alerting mechanisms, this system offers a robust and affordable solution to improve accident response outcomes, especially in remote or under-resourced regions.

REFERENCES

1. S. Sarker, M. S. Rahman, M. N. Sakib, An approach towards intelligent accident detection, location tracking and notification system, (2019).
2. V. S. Bhanote, A. K. Pandey, A. Iqbal, Smart vehicle monitoring and accident detection system, (2024).
3. S. S. Kare, D. T. Bhandalkar, Accident detection and alert system using deep learning, (2023).

Pedestrian Detection in Real-Time Using Deep Learning

Sam Astine A[1]

[1]UG Scholar

[1]Department of BCA, Velammal Institute of Technology, Avadi, Tamil Nadu, India, 601204.

ABSTRACTS

This paper introduces a Pedestrian Detection in Real-Time Using Deep Learning system leveraging YOLO-based architectures optimized for edge deployment. The system ingests live video feeds, performs preprocessing with adaptive illumination correction, and detects pedestrians using a lightweight YOLO variant designed for speed and accuracy. To further enhance detection in crowded or occluded environments, we integrate a semantic self-attention module that refines feature maps based on segmentation cues. Experiments conducted on diverse urban and surveillance datasets demonstrate detection accuracy of 92% at speeds over 30 fps on resource-constrained devices such as Jetson Nano. The model effectively segments and tracks pedestrians in real-time, enabling prompt alerts for safety-critical applications. A robust non-maximum suppression strategy minimizes duplicate detections, while post-processing handles occlusions and overlaps. The modular design supports multi-input streams and easy extension to multi-class detection (e.g., cyclists, vehicles). By balancing performance, latency, and deployment cost, this system provides a practical solution for intelligent transportation systems, urban security, and smart surveillance.

REFERENCES

1. C. Kyrkou, Efficient and layout-independent pedestrian detection using YOLO-peds, (2020).
2. D. Yang, J. Zhang, S. Xu, Real-time pedestrian detection via hierarchical convolutional feature, (2018).
3. M. Alfikri, R. Kaliski, Real-Time Pedestrian Detection on IoT Edge Devices: A Lightweight Deep Learning Approach, (2024).

Crop Disease Detection Using Leaf Image Analysis

Mukesh R[1]

[1]UG Scholar

[1]Department of BCA, Sree Muthukumaraswamy College, Kodungaiyur, Tamil Nadu, India, 600118.

ABSTRACTS

This paper introduces Crop Disease Detection Using Leaf Image Analysis, a deep-learning-driven framework designed for timely and accurate identification of plant diseases. Utilizing a customized convolutional neural network (CNN) optimized for edge deployment, the system receives leaf images captured via mobile or field cameras, applies preprocessing steps like color normalization and segmentation, and processes them to detect multiple disease classes. To enhance robustness, data augmentation methods including rotation, scale, and lighting variations are applied during training. The model employs transfer learning from ResNet-50, fine-tuned on a curated dataset of healthy and diseased leaves representing fungal, bacterial, and viral infections. Evaluation results show an average accuracy of 97%, precision of 0.96, recall of 0.95, and an F1-score of 0.955 across 10 disease categories. Real-time inference runs under 120 ms per image on mid-range smartphones. Additional post-processing integrates class-wise confidence thresholds to reduce false positives. Our solution facilitates scalable disease detection and field deployment, supporting farmers in rapid diagnostics and management. The modular architecture allows future expansion to include geographic metadata, temporal trend analysis, or integration with IoT-based environmental sensors.

REFERENCES

1. Amit K. Pathak, P. Saikia, S. Dutta, Development of a Robust CNN Model for Mango Leaf Disease Detection and Classification, (2024).
2. D. I. Lee, J. H. Lee, S. H. Jang, S. J. Oh, I. C. Doo, Crop Disease Diagnosis with Deep Learning-Based Image Captioning and Object Detection, (2023).
3. N. Ahmed, H. M. S. Asif, G. Saleem, Leaf Image-based Plant Disease Identification using Color and Texture Features, (2021).

Forest Fire Detection Using Satellite Data and AI

Manish Kumar U[1], Vimal C[2]

[1,2]UG Scholar

[1,2]Department of Computer Science and Engineering, SRM Institute of Science and Technology, Ramapuram, Tamil Nadu, India, 600089.

ABSTRACTS

This study introduces a novel Forest Fire Detection Using Satellite Data and AI system that combines deep learning algorithms with multispectral satellite imagery for early and accurate wildfire detection. Leveraging Sentinel-2 and MODIS datasets, our system preprocesses raw data through atmospheric correction and spectral index computation (e.g., NDFI), then feeds it into a custom lightweight CNN optimized for remote-sensing inputs. To enhance robustness, the model employs spatial–temporal feature extraction, capturing both current and historical context for fire anomaly detection. Evaluated on a benchmark dataset comprising high-resolution labeled fire events, the system achieves an F1-score of 0.94 and a recall of 0.92. Temporal consistency filtering reduces false positives in cloudy or smoke-affected scenes. Integration with an alerting module enables near real-time notifications to firefighting agencies, with detection latency under 4 minutes. Edge compatibility tests demonstrate successful deployment on satellite ground stations with limited computational resources. The proposed framework offers a scalable, efficient solution for global wildfire surveillance, supporting early intervention and improved disaster response in remote and high-risk regions.

REFERENCES

1. Anjitha Paul, Jency Varghese, AI-Based Forest Fire Detection Using Satellite Imagery: Challenges, Advances, and a Framework for Real-Time Alarm Systems, (2025).
2. X. Chen, Y. Zhang, M. Wang, Comparative Study of Machine Learning Methods for Mapping Forest Fire Areas Using Sentinel-1B and 2A Imagery, (2024).
3. Kathiravan Thangavel, Dario Spiller, Autonomous Satellite Wildfire Detection Using Hyperspectral Imagery and Neural Networks: A Case Study on Australian Wildfire, (2023).

AI-Powered Waste Segregation System

Balaji V[1], Kishore J[2]

[1,2]UG Scholar

[1,2]Department of BCA, Velammal Institute of Technology, Avadi, Tamil Nadu, India, 601204.

ABSTRACTS

This paper presents an AI-Powered Waste Segregation System that automatically classifies household and industrial waste into recyclable categories using deep learning and computer vision. Leveraging a lightweight CNN model inspired by VGG16 architecture and optimized through transfer learning, the system processes images captured by an RGB camera mounted above disposal bins. Preprocessing steps include color normalization and background removal, while data augmentation techniques improve robustness under variable lighting and occlusion conditions. The model is trained to distinguish between categories such as paper, plastic, metal, glass, organic, and electronic waste. Evaluation on a custom dataset of 15,000 labeled waste images demonstrates an overall classification accuracy of 97%, with individual class precision ranging from 95% to 99%. Deployment tests on embedded platforms like Raspberry Pi and Jetson Nano achieved real-time performance at 25 fps, enabling on-device inference without cloud dependency. Post-detection mechanisms trigger actuators to direct items into correct bin compartments, and the system sends notifications about bin fullness via IoT integration. By automating segregation at the source, our solution reduces contamination, improves recycling rates, and lowers labor costs. This scalable and modular system has potential for large-scale implementation in smart homes, campuses, and municipal waste management infrastructures.

REFERENCES

1. Y. Ruparel, L. Chaudhary, A. Rathod, AI-Based Smart Bin for Efficient and Sustainable Waste Classification, (2024).
2. M. S. Nafiz, S. S. Das, ConvoWaste: An Automatic Waste Segregation Machine Using Deep Learning, (2023).
3. Y. Narayan, DeepWaste: Applying Deep Learning to Waste Classification for a Sustainable Planet, (2021).

Air Quality Prediction System Using ML

Navin Babu S[1], Pugazhenthi M[2]

[1,2]UG Scholar

[1,2]Department of BCA, Sree Muthukumaraswamy College, Kodungaiyur, Tamil Nadu, India, 600118.

ABSTRACTS

This study presents an AI-Powered Air Quality Prediction System that harnesses advanced machine learning techniques and multi-source environmental data to forecast air pollution indices with high accuracy. By combining historical pollutant concentrations, meteorological parameters, and regional emission inventories, the system constructs a robust input feature set. A hybrid deep learning model—integrating Convolutional Neural Networks (CNN) for spatial pattern recognition and Long Short-Term Memory (LSTM) networks for temporal dependencies—forms the prediction core. To optimize model performance, hyperparameters are fine-tuned using a physics-informed framework, which incorporates diffusion and advection principles to guide learning. Evaluated on urban datasets from January 2017 to December 2023, the system achieves an average F1-score of 0.92 and substantially outperforms baseline models (e.g., SARIMA, Random Forest), reducing mean absolute error by over 15%. Deployment-ready, the system delivers hourly AQI forecasts within seconds on edge-compatible hardware, supporting early-warning alerts for city planners and public health agencies. Through its scalable architecture and hybrid modeling strategy, this work provides a practical template for real-time, region-specific air quality monitoring and prediction.

REFERENCES

1. Q. Zhang, J. C. K. Lam, Y. Han, Deep-AIR: A hybrid CNN-LSTM framework for fine-grained air pollution forecasting, (2020).
2. Z. Geng, X. Fan, X. Lu, FuXi-Air: Multimodal ML-based urban air quality forecasting, (2025).
3. H. Sun, J. Fung, W. Chen, Development of LSTM broadcasting framework for regional air pollution forecasting improvement, (2022).

Energy Consumption Prediction Using Machine Learning

G Saravanan[1]

[1]UG Scholar

[1]Department of BCA, Vel Tech Ranga Sanku Arts College, Avadi, Tamil Nadu, India, 600062.

ABSTRACTS

This paper presents an Energy Consumption Prediction System Using Machine Learning, designed to forecast energy usage in buildings and smart grids by harnessing advanced hybrid models. The system integrates historical energy consumption data, weather conditions, occupancy schedules, and grid information. A hybrid CNN–LSTM architecture is implemented: CNN layers extract spatial features and correlations, while LSTM layers capture temporal dependencies. To further improve performance, an attention mechanism guides the model to focus on the most relevant time steps. Model training incorporates feature selection and hyperparameter tuning informed by physics-based constraints such as thermal inertia and occupancy dynamics. Evaluated on datasets covering residential and commercial buildings from 2017 to 2024, the system achieves an average R^2 of 0.97 and reduces RMSE by over 15% compared to traditional methods like SARIMA and Random Forest. Inference runs in under 100 milliseconds, enabling near real-time forecasts suitable for demand response and energy management systems. This modular framework supports multi-horizon forecasting (hourly, daily), scalable edge deployment, and seamless integration with IoT sensors, offering a robust solution for predictive energy management in sustainable smart grids.

REFERENCES

1. A. Mishra, H. R. Lone, A. Mishra, DECODE: Data-driven Energy Consumption Prediction leveraging Historical Data and Environmental Factors in Buildings, (2023).
2. Y. Wang, X. Yang, Cloud Computing Energy Consumption Prediction Based on Kernel Extreme Learning Machine Algorithm Improved by Vector Weighted Average Algorithm, (2025).
3. Y. H. Abdulameer, A. A. Ibrahim, Forecasting of Electrical Energy Consumption Using Hybrid Models of GRU, CNN, LSTM, and ML Regressors, (2025).

Voice Cloning and Speech Synthesis Using AI

Anand Kumar A[1], Nirmal Raj E[2]

[1,2]UG Scholar

[1,2]Department of Computer Science and Engineering, SRM Institute of Science and Technology, Ramapuram, Tamil Nadu, India, 600089.

ABSTRACTS

This paper introduces a Voice Cloning and Speech Synthesis Using AI system that achieves high-fidelity, real-time voice reconstruction using minimal speaker data. The proposed architecture integrates a speaker encoder trained via transfer learning for capturing voice identity, a Transformer-based text-to-spectrogram generator, and a GAN-enhanced vocoder to produce natural, expressive speech. Employing zero-shot learning, it adapts to unseen voices with only a few seconds of audio input, enabling rapid cloning without lengthy retraining. Advanced preprocessing—such as silence trimming and normalization—enhances embedding quality. Objective evaluations using metrics like PESQ, STOI, and Mel Cepstral Distortion confirm significant improvements in speech quality and speaker similarity over baseline models. The system also supports emotion transfer and style adaptation by integrating extra conditioning signals. Tested both on cloud and edge platforms, inference latency remains under 200 ms, making it suitable for virtual assistants, audiobooks, and accessibility tools. Ethical considerations around deepfake misuse are addressed via optional cryptographic watermarking. Overall, this system demonstrates a scalable, efficient, and versatile voice cloning solution ready for real-world deployment.

REFERENCES

1. F. Inamdar, S. Ambesange, Voice Cloning Using Artificial Intelligence and Machine Learning: A Review, (2023).
2. G. Ruggiero, E. Zovato, Voice Cloning: a Multi-Speaker Text-to-Speech Synthesis Approach based on Transfer Learning, (2021).
3. U. Verma, P. Padmanaban, Speech Cloning: Text-To-Speech Using VITS, (2024).

AI-Based Video Summarization Tool

K Nithishwaran[1]

[1]UG Scholar

[1]Department of BCA, Sree Muthukumaraswamy College, Kodungaiyur, Tamil Nadu, India, 600118.

ABSTRACTS

This paper introduces an AI-Based Video Summarization Tool that delivers concise and meaningful video summaries by combining transformer-based attention mechanisms with multimodal feature fusion. Utilizing RGB frame sequences and accompanying audio cues, the system employs frame-level encoding followed by a multi-head self-attention module to model temporal and semantic relationships across video segments. A reinforcement learning layer optimizes summary quality by balancing diversity and representativeness, guided by feedback from user-annotated preferences. Training leverages public datasets such as SumMe and TVSum, achieving a 12% improvement in F1-score over baseline LSTM-based approaches and reducing summary length by 45% while preserving key content. Inference runs at 25 fps on an edge-enabled platform, enabling real-time processing of live or recorded streams. The modular architecture supports feature augmentation (e.g., text from transcribed speech) and fine-tuning for domain-specific applications like lecture or security footage summarization. This tool provides an effective, scalable, and adaptable solution for automatic video condensation, improving content accessibility and reducing viewing times for diverse user needs.

REFERENCES

1. M. Hamza Eissa, H. Farouk, K. Eldahshan, A. Abozeid, Video Summarization with Neural Networks: A Systematic Comparison of State-of-the-Art Techniques, (2025).
2. K. Zhou, Y. Qiao, T. Xiang, Deep Reinforcement Learning for Unsupervised Video Summarization with Diversity-Representativeness Reward, (2017).
3. M. Otani, Y. Nakashima, E. Rahtu, J. Heikkilä, N. Yokoya, Video Summarization using Deep Semantic Features, (2016).

Real-Time Language Translator Using NLP

Abinesh M[1], Kavinithi S[2]

[1,2]UG Scholar

[1,2]Department of BCA, Velammal Institute of Technology, Avadi, Tamil Nadu, India, 601204.

ABSTRACTS

This paper presents a Real-Time Language Translator Using NLP system leveraging state-of-the-art neural machine translation (NMT) and speech processing technologies for live multilingual communication. The system features speech-to-text, translation, and text-to-speech modules optimized for low latency via Transformer-based architectures inspired by Google's GNMT and Whisper-style encoders. It supports zero-shot translation across multiple languages, requiring minimal fine-tuning and enabling real-time performance under 300 ms per utterance. Context-aware translation is achieved through interactive attention mechanisms, while domain adaptation handles noise and colloquial speech. Evaluated on conversational datasets, the system achieves BLEU scores comparable to offline models, with user satisfaction in pilot tests exceeding 90%. Seamless integration with mobile and desktop platforms is enabled through efficient on-device inference and optional cloud synchronization. Ethical safeguards include privacy-respecting local processing and user-controlled translation contexts. The proposed tool empowers real-time, cross-lingual communication for meetings, travel, and accessibility, marking a significant advancement in practical NLP applications.

REFERENCES

1. A. Mudgal, S. Dwivedi, Development of a Multilingual Real-Time Translator Using NLP, OCR, and Deep Learning, (2025).
2. K. Tekwa, Real-Time Machine-Translated Instant Messaging: A Brief Overview with Implications for Translator Training, (2020).
3. L. Tang, T. Shu, English Language Translation Machine System Based on Human-Computer Interaction, (2024).

Music Genre Classification Using ML

Megala M[1], Jeson J[2], Kesavan S[3]

[1,2,3]UG Scholar

[1,2,3]Department of BCA, Jaya College of Arts and Science, Chennai, Tamil Nadu, India, 602024.

ABSTRACTS

This paper introduces a Music Genre Classification Using ML system that leverages a hybrid deep learning architecture combining Convolutional Neural Networks (CNN) for feature extraction from spectrograms and Recurrent Neural Networks (RNN) to capture temporal dynamics in music signals. Audio samples are preprocessed into Mel-spectrograms, followed by data augmentation techniques such as pitch shifting and time stretching to improve generalization. The CNN layers extract spatial patterns, while bidirectional GRUs capture sequential dependencies. Additionally, handcrafted features like MFCCs and chroma vectors are fused into the network to enhance accuracy. Evaluated on the GTZAN dataset and an extended Free Music Archive (FMA) subset, the model achieves an average classification accuracy of 95%, outperforming benchmark approaches including pure CNN, pure RNN, SVM, and Random Forest models. Inference time is under 100 ms per audio clip, supporting near-real-time implementation. Ablation studies illustrate the impact of each component and feature set. The system's modular architecture can be extended to include new genres and accommodate streaming scenarios. This work demonstrates how combining deep learning and feature engineering improves the effectiveness of music genre classification in practical applications like music retrieval and recommendation systems.

REFERENCES

1. S. Chatterjee, S. Ganguly, A. Bose, H. Prasad, A. Ghosal, Audio Processing using Pattern Recognition for Music Genre Classification, (2024).
2. C. Dabas, A. Agarwal, N. Gupta, V. Jain, S. Pathak, Machine Learning Evaluation for Music Genre Classification of Audio Signals, (2020).
3. L. Gupta, G. Meedinti, A. Popat, B. Perumal, Music Genre Classification Using Federated Learning, (2023).

Fake News Detection Using Deep Learning

Ezhil Arasan K[1], Rajesh M[2], Ram Kumar G[3]

[1,2,3]UG Scholar

[1,2,3]Department of BCA, Jaya College of Arts and Science, Chennai, Tamil Nadu, India, 602024.

ABSTRACTS

This paper introduces a Fake News Detection Using Deep Learning system that automatically analyzes textual content to identify misinformation with high accuracy. The proposed framework combines Convolutional Neural Networks (CNN) to extract local semantic features and Bidirectional Long Short-Term Memory (Bi-LSTM) layers to capture contextual dependencies in sequences. Preprocessing includes tokenization, stopword filtering, and embedding of words using pre-trained vectors. To further enhance performance, the model integrates attention mechanisms that highlight key parts of the text most relevant to detection. Evaluated across benchmark datasets like ISOT and Liar, the system achieves accuracy exceeding 96%, outperforming baseline methods such as SVM and traditional LSTM models. Ablation studies reveal the importance of each component—CNN, Bi-LSTM, and attention—in improving detection robustness. Additionally, the model maintains inference latency under 50 ms per article, making it suitable for deployment in real-time monitoring systems. The architecture is modular and supports extension to multimodal inputs (e.g., social context or user metadata). Ethical considerations include limiting bias via balanced training and providing explainability through attention visualization. In summary, this deep learning-based system delivers a scalable, efficient, and interpretable solution for real-time fake news detection.

REFERENCES

1. S. M. Jaybhaye, V. Badade, A. Dodke, Priyanka Lokhande, Fake News Detection Using LSTM Based Deep Learning Approach, (2023).
2. E. D. Ajik, G. N. Obunadike, F. O. Echobu, Fake News Detection Using Optimized CNN and LSTM Techniques, (2023).
3. Sneha Singhania, Nigel Fernandez, Shrisha Rao, 3HAN: A Deep Neural Network for Fake News Detection, (2023).

AI Based Human Detecting Robot for Environment Disaster Management

S Saran[1], S Rakesh[2], Dr. S Meena[3]

[1,2]UG Scholar, [3]Assistant Professor

[1,2,3]Department of Electronics and Communication Engineering, Vels University, Chennai, Tamil Nadu, India, 600117.

ABSTRACTS

Natural disasters such as earthquakes, landslides, floods, and building collapses often leave victims trapped under debris, making search and rescue operations complex and time-sensitive. To address these challenges, we propose an AI-Based Human Detecting Robot for Environmental Disaster Management, an intelligent robotic system designed to aid rescue teams by autonomously detecting and locating survivors in disaster-stricken areas. This system integrates ESP32-CAM, ESP8266, and various sensors to efficiently monitor affected regions. The ESP32-CAM module provides real-time video streaming via a web server, enabling remote surveillance of disaster zones. The ESP8266 module, paired with proximity sensors, helps detect human presence, while a metal sensor is used to identify metallic objects, such as collapsed structures or debris. A GPS module ensures accurate location tracking of detected survivors, and upon identification, the system sends real-time alerts with location details to the Blynk app, allowing emergency responders to take immediate action. The robotic platform autonomously navigates through disaster sites, reducing the risk for human rescuers and increasing the efficiency of search operations. This AI-driven approach enhances disaster response by leveraging IoT, machine learning, and automation, ultimately saving lives, minimizing rescue time, and improving emergency response effectiveness.

REFERENCES

1. D. Navya Narayana Kumari, P. David, N. Sai Krishna, M. Nagaraju, N. Bhargavi Deepika, AI Based Human Detecting Robot for Earthquake Rescue Operation, (2024).
2. N. Papyan, M. Kulhandjian, H. Kulhandjian, L. Hakob Aslanyan, AI-based Drone Assisted Human Rescue in Disaster Environments, (2024).
3. R. Kumar, C. Kalpavi, L. Pavan Singh, S. Rajeev, S. Suhas, Human Detection Robot for Disaster Management, (2023).

IOT Based weather Prediction System

Kirubakaran[1]

[1]UG Scholar

[1]Department of BCA, Sree Muthukumaraswamy College, Kodungaiyur, Tamil Nadu, India, 600118.

ABSTRACTS

This paper presents an IoT-Based Weather Prediction System that integrates multi-sensor data from distributed low-cost weather stations and applies machine learning for accurate short-term forecasts. Equipped with temperature, humidity, pressure, and wind sensors, the networked IoT devices relay real-time data to a cloud platform via MQTT. A hybrid model combining LSTM for temporal sequence learning with Gradient Boosting Regressors for spatial calibration is employed. Environmental factors such as diurnal cycles and seasonal shifts are integrated as auxiliary features. Data preprocessing includes anomaly detection and smoothing, while cross-validation is used for robust model evaluation. Testing across multiple sites over a year reveals a mean absolute error reduction of 12% compared to ARIMA baselines. Forecasts for the next 3 hours are delivered with sub-minute latency, enabling actionable alerts for urban management and agriculture. The system is scalable and modular, accommodating additional sensors and forecast horizons. By combining IoT infrastructure with advanced ML models, this work demonstrates a cost-effective, decentralized solution for localized weather forecasting, supporting data-driven decision-making in smart city and agri-environment contexts.

REFERENCES

1. K. G. Dath, K. E. Krishnaprasad, T. S. Pushpa, T. P. Shailaja, IoT weather forecasting using ridge regression model, (2023).
2. A. B. Agarwal, R. Rajesh, N. Arul, Spatially-resolved hyperlocal weather prediction using IoT sensor networks and ML, (2023).
3. S. Velmurugan, V. Balaji, IoT based smart irrigation system using soil moisture and weather prediction, (2020).

ABOUT THE CONFERENCE

International Conference on Global Trends in Engineering and Technological Advancement (ICGTETA'25) serves as a distinguished platform uniting researchers, industry experts, academicians, and students from various disciplines to exchange knowledge and explore advancements in engineering and technology.

This conference is dedicated to fostering interdisciplinary collaboration, encouraging innovative thinking, and facilitating the dissemination of impactful research and ideas. Through this shared forum, ICGTETA '25 offers participants the opportunity to present their work, engage with emerging global trends, and establish valuable academic and industry networks.

Designed to inspire progress and excellence, ICGTETA '25 plays a vital role in shaping the future of technological innovation and research-driven development.

INTERNATIONAL CONFERENCE ON GLOBAL TRENDS IN ENGINEERING AND TECHNOLOGICAL ADVANCEMENT (ICGTETA'25)

Published By:

Gojan School of Business and Technology

80 Feet Road, Edapalayam, Alamathi Via,
Redhills, Chennai-600052
Mail: icgteta25@gsbt.edu.in
Website: gsbt.edu.in

ABOUT THE CONFERENCE

International Conference on Global Trends in Engineering and Technological Advancement (ICGTETA'25) serves as a distinguished platform uniting researchers, industry experts, academicians, and students from various disciplines to exchange knowledge and explore advancements in engineering and technology.

This conference is dedicated to fostering interdisciplinary collaboration, encouraging innovative thinking, and facilitating the dissemination of impactful research and ideas. Through this shared forum, ICGTETA '25 offers participants the opportunity to present their work, engage with emerging global trends, and establish valuable academic and industry networks.

Designed to inspire progress and excellence, ICGTETA '25 plays a vital role in shaping the future of technological innovation and research-driven development.

INTERNATIONAL CONFERENCE ON GLOBAL TRENDS IN ENGINEERING AND TECHNOLOGICAL ADVANCEMENT (ICGTETA'25)