ThinkAI 2024

2nd International Conference on Recent Trends in AI Enabled Technologies

December 27 & 28, 2024

(DEEMED TO BE UNIVERSITY)

Springer

Note: All the accepted papers are published in Springer CCIS book series.

KONERU LAKSHMAIAH EDUCATION FOUNDATION,
OffCampus Aziznagar, Hyderabad, Telangana
https://klh.edu.in/ThinkAI2024/

ThinkAI 2024 Programme Schedule

Day 1 : December 27, 2024

08:00 AM - 08:30 AM	Registration
08:30 AM - 09:00 AM	Inauguration
09:00 AM - 10:00 AM	Keynote 1
10:00 AM - 10:30 AM	Tea Break
10:30 AM - 12:30 PM	Paper Presentation Session 1
12:30 PM - 01:30 PM	Lunch Break
01:30 PM - 02:30 PM	Keynote 2
02:30 PM - 03:00 PM	Tea Break
03:00 PM - 05:00 PM	Paper Presentation Session 2

Day 2 : December 28, 2024

08:15 AM - 09:45 AM	Workshop 1
09:45 AM - 10:15 AM	Tea Break
10:15 AM - 12:15 PM	Paper Presentation Session 3
12:15 PM - 01:15 PM	Lunch Break
01:15 PM - 02:45 PM	Workshop 2
02:45 PM - 03:15 PM	Tea Break
03:15 PM - 04:15 PM	Paper Presentation Session 4
04:15 PM - 04:45 PM	Closing Ceremony

Keynote Speech - 1

Date: 27-12-2024 **Timings**: 09:00 AM - 10:00 AM **Venue**: KLH Auditorium

Dr. Bharath Ramkrishna

Dr. Bharath Ramkrishna is currently working as an Assistant Professor at the Defense Institute of Advanced Technology (DIAT), Pune, Maharashtra, India. Before joining DIAT, he served as a Research Assistant Professor at Ritsumeikan University BKC, Japan. He earned his Ph.D. degree from IIT Hyderabad in the Department of Electrical Engineering. His research interests include computer-aided diagnostics for medical ultrasound imaging systems and autonomous navigation in rural and agricultural scenarios.

Title of the talk

A deeper understanding on regression algorithms

Abstract

Regression algorithms are fundamental tools in machine learning and statistical analysis, enabling the prediction of continuous outcomes based on input data. With numerous algorithms available for regression, such as K-Nearest Neighbors (KNN), Decision Trees, Support Vector Regression (SVR), and Neural Networks, etc. machine learning practitioners often begin with simple linear regression before extending to multivariable regression. However, once a model is learned, we often overlook the deeper insights it can provide about the relationship between independent and dependent variables. In this talk, I will delve into interpreting regression models: exploring whether the learned model is unique, and under what conditions it may not be. I will also discuss techniques to analyze the impact of individual data points on the model, detect outliers, and understand their influence on the learning process.

Keynote Speech - 2

Date: 27-12-2024 **Timings**: 01:30 PM - 02:30 PM **Venue**: KLH Auditorium

Dr. Mohammad Hassan Vali

MOHAMMAD HASSAN VALI received his Bachelor's and Master's degrees from Babol Noshirvani University of Technology, Iran, in 2014 and 2017, respectively. He pursued his PhD thesis from Department of Information and Communications Engineering at Aalto University, Finland. Currently, he is a Postdoctoral researcher at the Department of Computer Science, Aalto University, Finland. His research interests include signal processing using DNNs, particularly representation learning using vector quantization with applications to speech coding, image compression, speech privacy, and interpretability.

Title of the talk

Vector Quantization in Deep Neural Networks for Speech and Image Processing

Abstract

Vector quantization (VQ) is a classic signal processing technique that models the probability density function of a distribution using a set of representative vectors called codebook (or dictionary). Deep neural networks (DNNs) are a branch of machine learning that has gained popularity in recent decades. Since VQ provides an abstract high-level discrete representation of a distribution, it has been widely used in various DNN-based applications such as speech recognition, image generation, and speech and video coding. Hence, a small improvement in VQ can significantly boost the performance of many applications dealing with different data types, such as speech, image, video, and text. This talk mainly focuses on improving various VQ methods within deep learning frameworks, including:

1) Improvement in training: VQ is non-differentiable, and thus, it cannot backpropagate gradients. We proposed a new solution to this issue that works better than state-of-the art solutions, such as Straight-Through Estimator and Exponential Moving Average.

2) Improvement in Interpretability: With the combination of VQ and space-filling curves concepts, we proposed a new quantization technique called Space-Filling Vector Quantization. This technique helps to interpret the latent spaces of DNNs.

3) Improvement in Privacy: We used the Space-Filling Vector Quantization technique to cluster the speaker embeddings to enhance the speaker's privacy in speech processing tools based on DNNs.

Workshop - 1

Date:28-12-2024 **Timings**: 08:15 AM-09:45 AM **Venue**: KLH Auditorium

LLMs: Evolution from Traditional Data Science to Generative AI

Speaker: Dr. Narendra Babu Unnam

Dr. Narendra Babu Unnam did his PhD in Computer Science at IIIT Hyderabad, where he worked under the supervision of Prof. P. Krishna Reddy. During his PhD, his research has been published at top NLP journals and conferences. He is currently associated with Kore.ai as Associate Technical Lead.

Workshop - 2

Date:28-12-2024 **Timings**: 01:15PM-02:45 PM **Venue**: KLH Auditorium

Introduction to Computer Vision for Autonomous Driving

Speaker: Dr. Aditya Arun

Aditya Arun is a PhD candidate in Computer Science at IIIT Hyderabad, where he works under the joint supervision of Prof. C. V. Jawahar at CVIT and Prof. M. Pawan Kumar at OVAL, University of Oxford. His research focuses on weakly supervised learning for visual tasks, with additional interests in probabilistic machine learning, uncertainty quantification, and optimization. He is funded by the Visvesvaraya PhD Fellowship.His research has been published at top computer vision venues such as CVPR, ECCV, BMVC, and TPAMI.

Paper Presentation Session - 1

Date: 27-12-2024 **Timings**: 10:30 AM - 12:30 PM **Venue**: KLH Auditorium

Session Chair: Dr. Sukla Satapathy

Paper ID: 049 , **Timings:** 10:30AM - 10:50AM

Title: Sentiment Analysis Techniques for Social Media and Customer Reviews

Authors: P Ananya, Kommareddy Diana Mary, and Dr. Sudharshan Babu Pandava

Abstract: Sentiment analysis, a key area in natural language processing, involves determining the sentiment conveyed in textual data. This study investigates the application of logistic regression for sentiment classification across diverse datasets, including social media posts, product reviews, and political opinions, each with unique linguistic characteristics. The process begins with data preprocessing to remove noise and irrelevant content, followed by feature extraction using methods like TF IDF and word embeddings. These features are then used to train logistic regression models, classifying text samples as positive, negative, or neutral. Model performance is assessed using metrics such as accuracy, precision, recall, and F1-score. The findings demonstrate the effective ness and practical utility of logistic regression in sentiment analysis, even across varied textual contexts.

Paper ID: 045, , **Timings:** 10:50AM - 11:10AM

Title: Attention-Enhanced EfficientNet for Accurate Skin Cancer Diagnosis: A Deep Learning Approach

Authors: S. Uma, G. Tamilman, Purushottama Rao K, B. N. Karthik, and Kommareddy Diana Mary

Abstract: Skin cancer is currently one of the most common cancers worldwide; its early-stage detection is crucial for effective treatment. This work, therefore, proposes an automated deep learning-based framework to support skin cancer diagnosis. The dataset undergoes pre-processing, a prerequisite to enhance data quality by minimizing noise, increasing contrast, and reducing skin lesion variations. In the proposed work, the EfficientNet architecture offers a fine balance between high accuracy and computational efficiency. Further performance gain emerges from an attention mechanism that enables the model to focus on important lesion features, thereby increasing its ability to distinguish between benign and malignant cases. The model trains and validates on the ISIC dataset, a widely accepted benchmark for skin cancer diagnosis. With an accuracy of 94.7%, the proposed framework demonstrates proficiency in handling various skin lesion types. Additional performance metrics, including precision, recall, F1-score, and AUC-ROC, comprehensively evaluate the system's performance. The results show that the EfficientNet model with an attention mechanism significantly outperforms traditional methods in terms of diagnostic accuracy and reliability. This framework represents an essential tool in dermatological practice, as it enables earlier and more accurate diagnosis of cutaneous malignancies during skin work-ups, leading to improved clinical outcomes through timely treatment.

Paper Presentation Session - 1

Date: 27-12-2024 **Timings**: 10:30 AM - 12:30 PM **Venue**: KLH Auditorium

Session Chair: Dr. Sukla Satapathy

Paper ID: **044** , **Timings:** **11:10AM - 11:30AM**

Title: **Impact of COVID-19 on Stock Market Prediction: A Study Using LSTM and STANN Approaches**

Authors: : **Arya Kulkarni and Umang Patel**

Abstract: Accurately predicting stock market trends is essential for making informed financial decisions, helping investors minimise potential risks and refine their strategies. However, due to unforeseen market volatility and uncertainties caused by global events like the COVID-19 pandemic, this task has become increasingly challenging. This analysis focuses on two advanced models: Long Short-Term Memory (LSTM) and Spatio-Temporal Attention Neural Network (STANN), which are used to forecast stock trends. LSTM networks excel at capturing long term patterns in time-series data, making them an effective tool for predicting future market behaviour. Additionally, the STANN model intro duces spatio-temporal attention mechanisms, offering a novel approach to capturing both spatial and temporal dependencies in stock data. By analysing historical stock price data and their responses to market fluctuations, particularly those resulting from the economic impact of the COVID-19 crisis, our evaluation assesses the performance of these models. The results that we got were quite promising for both the LSTM and STANN models. The MAE calculated using the LSTM model for the Non-COVID (2010-2019) periods were 0.68, 0.52, and 1.2 for the stocks of Apple, Google, and Microsoft respectively. Additionally, the MAE for the COVID period (2010-2024) using the same model were 1.24, 1.43, and 2.76. On the other hand, the MAE values for the stocks using the STANN model were 3.846, 4.436, and 7.68 for the Non-COVID period and 8.077, 11.97, and 18.085 for the COVID period. The results underscore the importance of accurate stock market predictions, especially in times of economic uncertainty caused by the COVID-19 pandemic, and demonstrates the effectiveness of both the LSTM and STANN models in this domain.

Paper ID: **040,** **Timings:** **11:30AM - 11:50AM**

Title: **A Review Potential Gaps in News Article Classification**

Authors:: **Sunkara Naga Sai Ram Vivek and Botsa Kishore Kumar**

Abstract:: News article classification is a critical task in natural language processing that involves categorizing news content into predefined categories based on its textual features. Effective classification of news articles enables better organization, retrieval, and recommendation of information for readers and automated systems. This study presents a comprehensive approach to news article classification using both traditional machine learning techniques and advanced deep learning models. We evaluate the performance of algorithms such as Support Vector Machines (SVM), Naïve Bayes, and Convolutional Neural Networks (CNN) on a di verse dataset of news articles. The results demonstrate that deep learning models, particularly those utilizing word embeddings and convolutional layers, outperform traditional methods in terms of accuracy and precision. The findings underscore the potential of deep learning techniques in handling the complexities of news text and suggest avenues for further research in improving classification performance using hybrid models and domain-specific features.

Paper Presentation Session - 1

Date: 27-12-2024 **Timings**: 10:30 AM - 12:30 PM **Venue**: KLH Auditorium

Session Chair: Dr. Sukla Satapathy

Paper ID: **037,** **Timings:** **11:50AM - 12:10PM**

Title: **DEEP ENSEMBLE TRANSFER LEARNING FRAMEWORK FOR ENHANCED ENDOSCOPIC IMAGE CLASSIFICATION**

Authors: **Sadhvika Chaparla, Toshanlal Meenpal, and Madhu Oruganti**

Abstract: Diseases affecting the gastrointestinal system (GIS) have witnessed a surge in the past decade, attributed to significant lifestyle changes. Gastrointestinal (GI) diseases encompass a wide range of conditions affecting the digestive tract, from mouth to anus. These diseases can result from various causes such as infections, inflammation, dietary factors, genetic predisposition, and lifestyle choices. This research introduces a transfer learning-based ensemble approach in response to the escalating challenge of manual analysis of gastrointestinal tract images, particularly from wireless capsule endoscopy or video capsule endoscopy. Utilizing a transfer learning approach with adjusted fully connected and output layers, we achieved individual accuracy rates of 96.46%, 95.94%, and 95% with deep learning models such as ResNet50, ConvNextBase, and Ef f icientV2M, respectively. Ensemble techniques such as model averaging and weighted averaging were then employed, resulting in outstanding ac curacies of 96.88% and 98.0%, surpassing existing state-of-the-art models.

Paper ID: **017,** **Timings:** **12:10PM - 12:30PM**

Title: **Points of Interest Reviews Summarization for YELP Dataset using Natural Language Processing**

Authors: **Ankem Veera Venkata Megha Shyam, Kirtana Pisapati**

Abstract: The paper here describes the method of using NLP to summarize the text reviews of POIs in the Yelp dataset, which is the new way of POI reviews analysis. Although the need to use the Yelp dataset is justified well, the main facets of POI summarization are not explored in detail. Subsequently, for a more refined understanding of the approach, details of the preprocessing steps, NLP tasks, and the algorithms used are explained in greater detail; these include transformer-based models and sequence-to-sequence models. In addition, to support the evaluation, this paper provides explicit definitions for metrics such as ROUGE and BLEU as well as explanation of why these metrics can be used to summarize Yelp reviews. Furthermore, comparison with baseline methodologies has been provided along with the limitation and implication part of the proposed study

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Paper Presentation Session - 2

Date: 27-12-2024 **Timings**: 03:00 PM - 05:00 PM **Venue**: KLH Auditorium

Session Chair: Dr. O. Madhu

Paper ID: 029 , Timings: 03:00PM - 03:20PM

Title: EXPLAINABLE ARTIFICIAL INTELLIGENCE(XAI) IN CARDIAC DISEASE: Using SHAP Technique

Authors: Vikas Kumar, Ravi Kumar Burman, Abhishek Kumar, Nishant Kumar, Md. Shoeib Alam and Pankaj Kumar

Abstract: The paper focuses on the elucidating importance of eXplainable Artificial Intelligence (XAI) to improve the reliability and interpretability of Artificial Intelligence (AI) models for prediction of cardiac diseases. Countering the issue of AI models often being a black box, the paper works with SHAP as one of the most reliable ways to explain predictions made by the machine learning model. The study employs five common machine learning algorithms, namely, Logistic Regression, Random Forest (RF), Support Vector Machine (SVM), Decision Tree, and KNN for evaluating the model's ability to diagnose heart diseases. Cross validation metrics include accuracy, precision, recall, and F1 – score, with Random Forest being the best model with a high accuracy of 90%. The proposed approach to apply SHAP in the Random Forest model also permits the global and the local interpretation of the results, due to the level of detail with which the model indicates how much features contribute. Features which have been selected for predicting heart diseases includes systolic blood pressure, age and maximum pulse rate. This is specifically important in health care domain where doctors need to understand the rational behind the AI diagnosis made which will in turn help in improving the decision-making process as well as patient outcomes. To that end, this study seeks to fill the gap in understanding between high AI performance and clinical acceptance through implementation of XAI. The paper provides directions for future studies to explore deeper learning frameworks and other XAI techniques including LIME and counter factual explanations for superior effectiveness of AI in healthcare facilities.

Paper ID: 013, Timings: 03:20PM - 03:40PM

Title: Enhancing Remaining Useful Life Prediction: A Comparative Study of Classical Machine Learning and Generative AI

Authors:Gundelly Siddartha Yadav and Ravi Katukam

Timings:

Abstract: This research paper endeavours to develop and compare predictive models for estimating the Remaining Useful Life (RUL) of manufacturing and engineering systems through the utilization of sensor data. The datasets employed in this study encompass simulated operational and sensor measurements gathered from machinery subjected to diverse operational conditions and fault modes. The primary objective of this investigation is to ascertain the efficacy of conventional machine learning (ML) techniques, specifically Long Short-Term Memory networks (LSTMs), for time series analysis and RUL prediction. Furthermore, generative AI models, such as Generative pretrained transformers (GPTs), are explored for their potential to augment fault detection and RUL estimation accuracy.

Paper Presentation Session - 2

Date: 27-12-2024 **Timings**: 03:00 PM - 05:00 PM **Venue**: KLH Auditorium

Session Chair: Dr. O. Madhu

Paper ID: 001, **Timings:** 03:40PM - 04:00PM

Title: **Advancements in Generative AI for Image Classification: Applications, Challenges, and Future Directions**

Authors: **Shubham Sharma, Rashi Chauhan, Abhay Raj Singh, Shantanu Kumar**

Abstract: Generative Artificial Intelligence (AI) has rapidly evolved to become a pivotal force in image classification, extending its influence across the broader landscape of computer vision. This study delves into the advancements in generative models, including Variational Autoencoders (VAEs), Generative Adversarial Networks (GANs), and Diffusion Models, highlighting their significant applications in critical sectors such as healthcare, agriculture, and autonomous systems. Through an exhaustive literature review, this paper investigates how these models have been innovatively adapted to meet the unique challenges of image classification, resulting in enhanced accuracy, robustness, and interpretability of the systems. The research critically evaluates the specific adaptations and improvements brought about by these generative models, documenting their impact on the practical aspects of technology deployment in diverse environments. It further explores the inherent challenges and limitations associated with generative AI, such as issues concerning the interpretability of the models, ethical implications in their application, and the substantial computational costs involved. In addressing these challenges, the study proposes future research directions to refine generative AI's effectiveness and ethical integration. It highlights the need for robust, scalable solutions to mitigate these concerns. The findings of this study underscore the transformative potential of generative AI in revolutionizing image classification within computer vision, suggesting that while significant progress has been made, the journey toward fully realizing the capabilities of these technologies is ongoing. This underscores a dynamic field ripe with opportunities for groundbreaking research and application, poised to redefine the frontiers of artificial intelligence in image processing and beyond.

Paper ID: 073, **Timings:** 04:00PM - 04:20PM

Title: **Efficient Multi-Cancer Detection: A Unified CNN Approach Leveraging Transfer Learning and Depthwise Convolutions**

Authors: **Jagan Mohan Dudala**

Abstract: In recent years, deep learning (DL) techniques, particularly convolutional neural networks (CNNs), have emerged as powerful tools for cancer classification across various imaging modalities. This paper presents a unified CNN architecture for multi-cancer classification, leveraging transfer learning from EfficientNetB0 combined with advanced convolutional techniques, including grouped and depthwise separable convolutions. The model was trained and evaluated on eight different cancer types, achieving accuracy rates ranging from 89.4% to 97.5%. A key strength of the proposed approach lies in its ability to generalize across diverse cancer types while maintaining computational efficiency. Additionally, the model's performance was evaluated using precision, recall, F1-score, and accuracy metrics, highlighting its robustness in addressing the challenges of class imbalance and varying dataset sizes. The results demonstrate the model's effectiveness in multi-cancer classification while identifying areas for future work, such as improving performance on underrepresented cancer types and enhancing generalization across different imaging modalities.

Paper Presentation Session - 2

Date: 27-12-2024 **Timings**: 03:00 PM - 05:00 PM **Venue**: KLH Auditorium

Session Chair: Dr. O. Madhu

Paper ID: 072, **Timings:** 04:20PM - 04:40PM

Title: Lightweight Deep Learning Framework for Efficient Breast Cancer Classification in Ultrasound Imaging

Authors: Anmol Bhatnagar

Abstract: Breast cancer remains a leading cause of mortality among women worldwide, highlighting the critical need for early and accurate diagnosis. This paper presents a deep learning-based model designed for breast cancer classification and tumour segmentation using ultrasound images. The proposed model com bines convolutional layers, residual blocks, squeeze-and-excitation modules, and spatial attention mechanisms to enhance feature extraction and focus on important regions of interest. The model achieves a classification accuracy of 98.95%, significantly outperforming state-of-the-art methods despite having only 0.0716 million parameters, making it highly computationally efficient. In addition to classifying images into benign, malignant, and typical cases, the model accurately segments tumour regions, providing critical insights for clinical decision-making. The lightweight architecture of the model makes it particularly well-suited for real-time applications in medical diagnostics. Future work will aim to extend the dataset and evaluate the model's generalizability across diverse clinical environments and imaging systems.

Paper ID: 070, **Timings:** 04:40PM - 05:00PM

Title: A Systematic Review of Deep Learning Models for Intrusion Detection: From CNN to Hybrid Architectures

Authors: Sairam Durgaraju and Deepan Vishal Thulasi Vel

Abstract: The growing complexity and frequency of cyberattacks necessitate the development of advanced intrusion detection systems (IDSs) capable of accurately identifying malicious activities. In this paper, we explore the application of deep learning (DL) methods, including Convolutional Neural Networks (CNN), Recur rent Neural Networks (RNN), Long Short-Term Memory (LSTM) networks, and hybrid architectures such as CNN-LSTM and DCNN BiLSTM, to enhance the performance of IDSs. Using benchmark datasets—NSL-KDD, CICIDS2017, and UNSW-NB15—, we evaluate the models based on accuracy, F1-score, and false positive rate (FPR). The results demonstrate that hybrid models outperform standalone architectures, achieving up to 98.7% accuracy with a lower FPR, particularly on complex datasets like CICIDS 2017. However, hybrid models present challenges related to computational complexity, limiting their real-time deployment potential. This research highlights the trade-offs between detection accuracy and computational efficiency. It suggests future directions for optimizing model performance in real-world environments through techniques such as model com pression and Explainable AI (XAI). Furthermore, we discuss the implications of these findings for practical deployment in resource-constrained environments such as IoT networks

Paper Presentation Session - 3

Date: 28-12-2024 **Timings**: 10:15 AM - 12:15 AM **Venue**: KLH Auditorium

Session Chair: Dr. T. Hitesh

Paper ID: 068, **Timings:** 10:15AM - 10:35AM

Title: An Optimized Convolutional Neural Network for Accurate and Efficient Detection of Spine Fractures in CT Scans

Authors: Deepan Vishal Thulasi Vel and Sairam Durgaraju

Abstract: Spine fractures pose a serious health risk, and timely detection is critical for preventing long-term complications. This paper introduces a new convolutional neural network (CNN) architecture to detect cervical spine fractures from computed tomography (CT) images. The proposed model incorporates depthwise separable convolutions, residual connections, and a multi-scale feature extraction block, allowing for high accuracy while maintaining low computational complexity. With only 287,723 parameters and a computational cost of 0.57 GFLOPs, the model achieves an accuracy of 99.98%, outperforming several existing state-of the-art methods. Additionally, an ablation study underscores the impact of each architectural component, confirming their contributions to the model's overall performance. These results demonstrate the model's potential for real-time clinical use, offering a fast and accurate tool to assist radiologists in spine fracture detection.

Paper ID: 067, **Timings:** 10:35AM - 10:55AM

Title: Enhancing Mental Health Diagnostics with Advanced Machine Learning Techniques: A Comparative Study

Authors: Deepan Vishal Thulasi Vel and Sairam Durgaraju

Abstract: Machine learning (ML) advancements have significantly transformed various domains, notably enhancing diagnostic accuracy and intervention strategies in mental health. Leveraging the potential of advanced ML algorithms, this study introduces a robust approach to predicting mental health outcomes, emphasizing enhanced accuracy and reliability. Our research tackles the complex nature of mental health data by deploying sophisticated models like the HistGradientBoostingClassifier and integrating ensemble methods. Applying feature engineering further refines the model's capability to discern nuanced patterns in diverse datasets. Our empirical analysis reveals substantial improvements in diagnostic precision, with the HistGradientBoostingClassifier achieving an accuracy up to 99.1%±0.1%andanROCAUCofapproximately 98.96%±0.05%. This significantly enhanced simpler models, which showed accuracies and ROC AUC scores around 67.7%±0.1% and 53.4%±0.5%, respectively. The comprehensive evaluation across varied demographic and clinical settings underscores the models' broad applicability and transferability, ensuring their utility in real-world clinical contexts. The results of this study not only advance the field of mental health diagnostics, but they also pave the way for implementing ML-driven approaches in routine clinical practice. Integrating these predictive models can potentially revolutionize mental health diagnostics by providing timely, accurate, and personalized treatment recommendations, thereby significantly improving patient outcomes. This work sets a foundation for future innovations and underscores the pivotal role of ML in transforming mental health care.

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Paper Presentation Session - 3

Date: 28-12-2024 **Timings**: 10:15 AM - 12:15 AM **Venue**: KLH Auditorium
Session Chair: Dr. T. Hitesh

Paper ID: 066, **Timings:** 10:55AM - 11:15AM
Title: Leveraging Artificial Intelligence for Real-Time Decision-Making in Emergency Healthcare Systems
Authors: Deepan Vishal Thulasi Vel and Sairam Durgaraju
Abstract: The application of artificial intelligence (AI) in emergency healthcare has emerged as a transformative approach to improving response times, patient outcomes, and overall system efficiency. This paper explores the implementation of AI technologies within emergency medical services (EMS), focusing on predictive analytics, real-time data processing, and pattern recognition. Through a comparative analysis with traditional systems, AI-driven models demonstrate a substantial reduction in response times and significant improvements in patient care. The results show that AI-based systems reduce response times by approximately 30% and enhance patient outcomes by an average of 26% compared to conventional methods. Despite the evident benefits, integrating AI in emergency healthcare raises ethical considerations regarding data privacy and fairness. This study provides insights into the operational advantages of AI in EMS and emphasizes the need for further research to address implementation challenges. The findings highlight AI's potential to reshape emergency healthcare, setting a foundation for more responsive, efficient, and effective care in critical situations.

Paper ID: 058, **Timings:** 11:15AM - 11:35AM
Title: Multi-Stream CNN for Salient Object Detection
Authors: Mudassir Rafi, S. Saikeerthan, A. Sahithi, and Sushma Rani Dutta
Abstract: Saliency detection is finding the visually significant and attention grabbing objects present in an image. The present work is about finding saliency detection methods using Multi-Stream Convolution Neural Network. The main aim of this is to train a CNN model which captures the contextual information and multiscale features. Different metrics like f-measure, recall, precision and MAE are used to know how our model is performing with respect to other models. We also used cross dataset evaluation to know how our model is performing with unknown data to know the generalization capabilities. We compared our results with other well-known methods such as IT, MZ and SR which proves the efficacy of our work.

Paper Presentation Session - 3

Date: 28-12-2024 **Timings**: 10:15 AM - 12:15 AM **Venue**: KLH Auditorium
Session Chair: Dr. T. Hitesh

Paper ID: 069, **Timings:** 11:35AM - 11:55AM
Title: Hybrid Machine Learning Approaches for Enhanced Insurance Fraud Detection
Authors: Chetan Sasidhar Ravi, Venkata Sri Manoj Bonam, and Subrahmanyasarma Chitta
Abstract: Insurance fraud poses a significant challenge to the industry, resulting in substantial financial losses each year. This paper investigates the application of various ML models to detect fraudulent insurance claims, including Logistic Regression (LR), K-Nearest Neighbours (KNN), Decision Tree (DT), Random Forest (RF), and Gradient Boosting (GB). Additionally, ensemble techniques such as stacking and majority voting are explored to improve detection accuracy. The results demonstrate that the stacked model outperforms individual models, achieving an accuracy of 0.90 and an AUC-ROC of 0.93. While RF and GB performed well individually, the stacked model provided a more balanced solution, reducing both false positives and false negatives. The findings highlight the importance of model ensembling in improving fraud detection and suggest future work in resampling techniques to address imbalanced data. These results offer practical implications for the insurance industry, where accurate fraud detection is essential to reduce financial risks.

Paper ID: 004,**Timings:** 11:55AM - 12:15PM
Title: UrduDigitsCNN: Bridging the Gap in Numeral Recognition
Authors: Rishabh Dang, Muzafar Mehraj Misgar, and MPS Bhatia
Abstract: Handwritten character recognition poses a significant challenge in pattern recognition due to the extensive variability in individual handwriting styles. This study focuses on the recognition of handwritten Urdu numerals, which is an essential component of the Urdu script. By harnessing the capabilities of machine learning and deep learning techniques, this research tackles the complex patterns found in handwritten numerals. A specialized dataset with 18,702 samples of individual Urdu numerals was compiled to train a Convolutional Neural Network (CNN) model. The model's performance was then assessed using a separate test set consisting of 4,676 samples. The CNN model demonstrated exceptional accuracy in numeral recognition, highlighting its effectiveness as a tool for the automated interpretation of handwritten Urdu numerals.

Paper Presentation Session - 4

Date: 28-12-2024 **Timings**: 03:15 PM - 04:15 PM **Venue**: KLH Auditorium

Session Chair: Dr. K. Purushottama Rao

Paper ID: 009, **Timings:** 03:15AM - 03:35PM

Title: Developing a Predictive Framework for Smart Energy Trading in Interconnected Microgrids

Authors: Sonal Shirke

Abstract: The utilization of renewable resources has frequently been insufficient, the microgrid ecosystem has lacked proper equilibrium, and previous solutions faced challenges in adjusting to variations in energy supply and demand. The application of intelligent modelling for energy forecasting is crucial in tackling these issues. Therefore, the present research created a novel Red fox based Reinforcement Learning Model (RbRLM) was introduced in this present research work to predict the needed trading features. In the initial phase, data related to smart microgrid energy trading was collected and the system was trained. In addition, an assessment of demand levels and established priorities; in this context, stocks are ranked according to market complexity, risk assessments, and historical patterns. Consequently, a framework for smart contracts and regulatory-adaptive predictive modelling was established, considering elements such as market complexity, information asymmetry, and regulatory constraints. Ultimately, performance metrics including RMSE, MAE, MSE, MAPE, and R2 were assessed and contrasted with other models. The results of the measurements are as follows: MAE 0.09, RMSE 0.16, MSE 0.08, MAPE 0.05 and R2 value 99.5%. The model's error values are significantly lower than those of the existing forecasting methods.

Paper ID: 019, **Timings:** 03:35PM - 03:55PM

Title: Enhancing Water Quality Prediction through Heuristic Algorithm-driven Parameter Optimization

Authors: Anand HS, Resmi NG, Fasila K.A., and Jency Thomas

Abstract: Water quality prediction is pivotal in safeguarding public health, ensuring environmental sustainability, optimizing agricultural productivity, and streamlining industrial operations. This study presents a sophisticated frame work for enhancing water quality prediction by integrating heuristic optimization algorithms with predictive modeling. The approach leverages the computational efficiencies of Genetic Algorithms (GA), Simulated Annealing (SA), and Particle Swarm Optimization (PSO), which emulate natural processes to solve complex optimization problems. These algorithms were employed to optimize model parameters, significantly enhancing predictive accuracy. A detailed comparative analysis evaluated their performance across key water quality parameters, including pH, electrical conductivity (EC), calcium (Ca), magnesium (Mg), sodium (Na), potassium (K), chloride (Cl), carbonate (CO_3), bicarbonate (HCO_3), and sulfate (SO_4), which were used to calculate Water Quality Indices (WQI). Model efficacy was assessed through statistical metrics such as Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), Willmott Index (WI), Nash-Sutcliffe Efficiency (NSE), and the coefficient of correlation (R). Simulated Annealing exhibited superior predictive capabilities, achieving WI = 0.994, NSE = 0.982, MAE = 6.997, RMSE = 11.131, and R = 0.998. Addition ally, Genetic Algorithms excelled in capturing long-term trends, while Particle Swarm Optimization demonstrated remarkable accuracy in modelling short-term fluctuations. Data sourced from Kaggle's open-access repository and validated using Groundwater Department datasets confirmed the robustness and generalizability of the proposed framework, underscoring its potential for practical ap plications in water resource management.

Paper Presentation Session - 4

Date: 28-12-2024 **Timings**: 03:15 PM- 04:15 PM **Venue**: KLH Auditorium

Session Chair: Dr. K. Purushottama Rao

Paper ID: **034,** **Timings:** **03:55PM - 04:15PM**

Title: **VISUALSIGN: VIDEO ACCESSIBILITY THROUGH SIGN LANGUAGE CONVERSION**

Authors: **Shanthi Thangam Manukumar, Sarah P, and Vijayalakshmi Muthuswamy**

Abstract: In today's digital age, access to educational con- tent is crucial for all individuals, regardless of their abilities. However, traditional educational videos of ten present a barrier to accessibility for those who are deaf or hard of hearing. Hence, this project proposes a solution to address this issue by developing a system that automatically generates sign language interpretations for educational videos. Leveraging text extraction and several Natural Language Processing techniques, including the cutting-edge transformer models like BERT (Bidirectional Encoder Representations from Transformers) and T5 (Text- To-Text Transfer Transformer), the system extracts text from video content, processes it, and translates English grammar to sign language grammar, which is then followed by creating a sign language video with the obtained sign gloss. Through a comprehensive methodology, the project explores the implementation of the system, including the extraction process, translation, sign language video generation, and integration of technologies, highlighting its potential to enhance accessibility and inclusivity in educational settings. Additionally, the project also explores SiGML (Sign Gesture Markup Language) for representing sign language gestures and expressions in a standardized format, ensuring interoperability and compatibility with existing sign language resources.