International Conference on Intelligent Engineering Approach

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Organized by

S. L. N. College of Engineering, Raichur

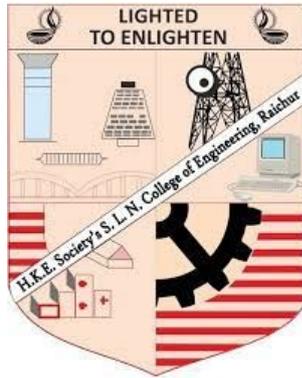## Proceedings of

International Conference on Intelligent Engineering Approach

ICIEA - 2022

In Association with

TIE

Technical Institute For Engineers

H.K.E. SOCIETY'S S.L.N. College of Engineering, Raichur

Yermerus Camp Bus Stop, 2, Yermarus, Karnataka 584135, India

IN ASSOCIATION WITH

Technical Institute For Engineers

International Conference on Intelligent Engineering Approach

ICIEA 2022

International Conference on Intelligent Engineering Approach

ICIEA 2022

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ABOUT H.K.E. SOCIETY'S S.L.N. COLLEGE OF ENGINEERING, RAICHUR

H. K. E. Society's S. L. N. College of Engineering is run by H. K. E. Society of Kalaburgi. Hyderabad Karnataka Education Society popularly known as HKE Society, was established in the year 1958 by Late Sri. Mahadevappa Rampure at Gulbarga. The Society stands differently from others in a way that, it imparts education in the backward areas, with matchable education facilities enjoyed by affluent class in developed areas. The college was started in the year 1979 and offers following Courses awarded by VTU, Belagavi.

UG Courses:
1. Civil Engineering
2. Mechanical Engineering
3. Electronics & Communication Engineering
4. Computer Science and Engineering PG Course
1. MBA (Specializations: Finance, Marketing & Human Resources)

In last four decades College has established itself as a leading Technical Institution in Hyderabad Karnataka region and has achieved many milestones. The strength of the Institute is its Teaching faculty. Seventy-five percent of staff is with teaching experience of 25+ years. This fact is reflected in the University results and career opportunities enjoyed by alumni. The personal care & student counseling off and on campus, make students feel at home and render themselves for complete personality development. Year Long Technical activities and Training programs augment student skills and refine their career competitiveness. Regular Industrial Visits with partial financial assistance from Institute is helping students to take up need based Project works.

ICIEA-2022 conference was organized by the Department of Electronics and Communication Engineering. This department was established in the year 1984 with an intake of 60 students for UG program. The faculty strength of the department is 10, including 1 professor, 2 Associate Professors, 7 Assistant Professors. 2 faculties have completed their Ph.D. in the area of Embedded System and Image Processing. 2 faculties are pursuing Ph.D. at VTU, Belagavi. The department has well equipped research center and two Research Supervisors recognized by VTU, Belagavi. The main objective of the research centre is to provide research facilities for students, faculties and research scholars under doctoral and masters programs to fulfil their research requirements and to support their innovative ideas.

Keynote Speakers, ICIEA - 2022

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ICIEA 2022

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Summarization Tool for Multimedia Data

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Abstract

Text summarization is an important Natural Language Processing problem. Manual text summarization is a laborious and time-consuming task. Owing to the advancements in the field of Natural Language Processing, this task can be effectively moved from manual to automated text summarization. This paper proposes a model named Term Frequency-Inverse Document Frequency (TF-IDF) Summarization Tool which implements a text analytics approach called TF-IDF to generate a meaningful summary. TF-IDF is used to identify the topic or context of the text statistically. As data today is mostly unstructured in nature, this paper aims to explore a combination of NLP techniques such as Speech Recognition and Optical Character Recognition to summarize multimedia data as well. The TF-IDF Summarization Tool is seen to produce summaries with Jaccard's Similarity value of 67% and Rogue-1 of 64.9%, Rogue-2 of 48.2%, and Rogue-L of 56.4% based on a self-developed dataset.

Keywords: Natural Language Processing, Optical Character Recognition, Rogue; Speech Recognition, Text Analysis, Term Frequency-Inverse Document Frequency.

Ooly Instant Logistics

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Abstract

Consumers prefer to order from apps/websites at their ease. The existing solutions have affected the local vendors by providing this ease to the customers. The authors have made a working O2O, B2B logistics system and a deployed web platform ready to deliver products at consumer's ease and provide an online presence for the vendors. OOLY is the proposed model that has remodelled the way people order, transfer items, and move by providing an online presence to the vendors. This review has proved that the Customers get local support from local vendors since the customer knows the shop/vendor. Findings have shown that the Local vendors with an online presence provide the trust for customers and transfer items at ease. The products get replaced at ease without the long existent processes. Authors have succeeded by providing an online presence for vendors and have improved customer satisfaction.

Keywords: Distribution Centre Logistics, Intra-City Logistics, Logistics, O2O, Route Optimization.

Processing of Echocardiographic Images using Segmentation, Feature extraction and Classification for detection of heart abnormality

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Abstract

This article is mainly focused to accurately detecting any abnormality of heart if present using echocardiographic image of the patient. Heart abnormalities are now a days very common not only in India but all over the globe irrespective of age and gender. The detection of abnormality is achieved by using Artificial neural network (ANN) Classifier. However, processing of the image is achieved through preprocessing, segmentation, feature extraction and then achieving classification. Processing of image for removal of noise and enhancement is carried out as Preprocessing of image followed by segmentation. The most significant processing task is segmentation which is discussed in detail and preferable algorithm which overcomes the drawbacks and limitations of previous algorithms is proposed. This algorithm is a solution to all problems faced in previous algorithms. carried out using different techniques, three different segmentation techniques are discussed where algorithm proposed Reaction Diffusion Level Set Segmentation (RDLSS) is better than other three methods also overcome the problems faced in previous algorithms, then feature extraction is done to extract energy features where the novelty of the research is use of symlet, Debauches and Bio orthogonal filters for feature extraction and these features are used to classify the images as normal or abnormal using ANN classifier. The ANN classifier is effective and efficient resulting in accuracies of greater than 98%. The results are also clinically validated by doctors.

Keywords: Artificial neural network, Classification, Discrete Wavelet transform filters, Feature extraction, Level set segmentation, Preprocessing, Segmentation.

Analysing corpus of office documents for macro-based attacks using Machine Learning

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Abstract

Macro-based malware attacks are on the rise in recent cyber-attacks using malicious code written in visual basic code which can be used to target computers to achieve various exploitations. Macro malware can be obfuscated using various tools and easily evade antivirus software. To detect this macro malware, several methods of machine learning techniques have been proposed with an inadequate dataset for both benign and malicious macro codes which are not reproducible and evaluated on unbalanced datasets. In this paper, use of word embedding technique such as Word2Vec embedding is used for code analysis is proposed to analyze and process macro code written in visual basic language to understand and detect the attack vector before opening the documents. The proposed word embedding technique, called Obfuscated-Word2vec is proposed to detect obfuscated keywords, Obfuscated function names from the macro code and classify them as obfuscated or benign function calls which are later used as feature vectors to train models to extract the most relevant features from macro code and even to help the classifiers to detect more accurately as a downloader, dropper malware, shellcode, PowerShell exploits, etc. Experimental results show that proposed method is reproducible and could detect completely new macro malware by analyzing the macro code by the help of Random forest classifier with 82.65 percent accuracy.

Keywords: Malware, Macros, Olevba, Word2Vec, Random forest, Shelcode.

| Paper ID ICIEA 011 | **Forecasting the Survival Rate of Breast Cancer Patients using a Supervised Learning Method** |

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Abstract

The paper aims to develop a regression model using the NKI breast cancer data set. The methodology used to achieve the objectives includes three variations of regression methods viz., linear, multiple, and polynomial, respectively. Regression analysis is one of the efficient predictive modeling methods that help understand the mathematical relationship between the variables. The multiple and polynomial regression methods also work in line with the linear regression model, but the number of independent variables will be varying. Queries related to health care data are of practical interest. The outcome of the predictive model helps in analyzing the behavior of different features of the breast cancer data set and provides useful insights towards the diagnosis of a patient. 14 out of 1570 useful features of the NKI data set are selected for the regression analysis. With different combinations of independent and dependent variables, it is found that multiple regression performs better with 83% accuracy.

Keywords: NKI Data Set, Predictive Analytics, Regression, Supervised Learning, Survival Rate.

| Paper ID ICIEA 012 | **Exploratory Analysis of Credit Card Fraud Detection using Machine Learning Techniques** |

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Abstract

In today's world, a lot of processes are carried over the Internet to make our lives easier. But, on the other hand, many unauthorized and illegitimate activities that take place over it are causing major trouble for the growth of the economy. One of them being the fraud cases that misguide people and lead to financial losses. Major frauds reported recently occur through the malicious techniques that are made to work on Credit cards that are used for financial transactions over online platforms. Hence, it is the need of the hour to investigate this problem. Several companies have started their study in this regard and have formulated data driven models that use various Machine Learning algorithms and models on datasets to analyse false activity. Several techniques used are Support Vector Machine, Gradient Boost, Random Forest and their mixtures. In this comparative study, the anomaly of class imbalance and ways to implement its solutions are analysed to prove certain results. The effectiveness of the algorithms varies on the set of data and the instance in which it is used. They prove that all algorithms despite of all the calculations show certain imbalance at some point in the study The limitations have also been evaluated and highlighted to help in future. In this study, it is found that although logistic regression had more accuracy but when the learning curves were plotted it signified that the majority of the algorithm under fit while KNN has the ability only to learn. Hence KNN is better classifier for the credit card fraud detection.

Keywords: Class Imbalance, Data-Driven Model, Data Prediction, Illegitimate, Malicious, Vector Machine.

Smart Power Management System for Uninterrupted Power Supplies (UPS) with Priorities

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Abstract

Power saving is the need of the day and in India it is a major issue to be looked into. To get uninterrupted supply nowadays power backups such as inverters and UPS are used commonly. If it is a traditional UPS it is difficult to know remaining power and time till it can supply energy in terms of power. In order to overcome this issue, a design is proposed in the following paper. Working model of microcontroller based intelligent Uninterrupted Power Supply (UPS) system for power management in laboratory is worked upon. The appliances of lab viz. computers, fans, lights are automatically controlled during power failure according to their priority to ensure optimal utilization of UPS power. This work mainly concentrates on two key points. Firstly, calculating possible time of battery run-away and displaying it on user screen; secondly, prioritizing and operating different appliances according user requirement. The results are far satisfactory and can be implemented in real time analysis.

Keywords: Microcontroller, Power failure, Power Management, Real Time Embedded Systems, Uninterrupted Power Supply (UPS).

Fault Detection and Diagnosis of Monopolar Configured VSC Based High Voltage Direct Current Transmission Line

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Abstract

The development of HVDC transmission technology using an MMC has been promoted, by overcoming the drawbacks of traditional VSC technology. The extension of flexible transmission to overhead lines, especially the use of HVDC transmission based on an MMC, raises the issue of DC fault. So identification of fault, clearing the dc fault, and design of fast-acting protection system operating against fault becomes significant. This article provides insights on the monopolar structured MMC and operational characteristics, fault analysis, and a fault protection scheme. DC line faults on HVDC lines using MMC-VSC are major issues; isolation of complete system is not a viable option. It is observed that Pole to ground fault is the most common fault, which leads to generous overcurrent in the AC grid and results in converter valves getting damaged. This article analyzes the response of MMC-HVDC under different DC and AC faults conditions for five-level MMC HVDC systems, to better understand systems under fault. Faults also have an impact on the converter stations' performance. The voltages fluctuate in faulty situations. In comparison to the inverter station, the rectifier station has the most impact. Simulation is performed out in PSCAD software. The correctness and effectiveness of DC and AC fault analysis helps to check the capability of locating fault occurring on HVDC transmission lines quickly and accurately.

Keywords: DCCB, High Voltage Direct Current (HVDC), Hybrid Protection System, Modular Multilevel Converter (MMC) Voltage Source Converter (VSC).

An Experimental Study to Recognize and Mitigate the Malevolent Attack in Wireless Sensors Networks

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Abstract

The Wireless Sensor Network (WSN)is applied in several networking situations. It suffers from dissimilar types of attack because of its meagre security mechanisms. The Sinkhole attack is the most destructive attack of WSN. A Reliable Self Reconfiguration (RSR) mechanism has been suggested in this work to eliminate the malicious sinkhole attack from the network. The proposed reliable reconfiguration (RSR)) system consists of two steps. The malicious node is detected and after detection it is corrected without resource loss by using the reconfiguration mechanism. In this paper, the reconfiguration mechanism for correcting sinkhole attack is applied using the C++ built simulator and factors such as Packet Delivery ratio and energy consumption are obtained for estimation The differences in the energy level have been calculated for the three scenarios i.e., Network without attack, Network with sinkhole attack and Network after Reconfiguration. The proposed Reliable Self-Reconfiguration (RSR) method outperforms the various detection mechanisms in finding and eliminating the sinkhole attack.

Keywords: Attack, Energy, Reconfiguration Mechanism, Sinkhole, Wireless Sensor Networks.

MQTT based Secure Transport Layer Communication for Mutual Authentication in IoT Network

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Abstract

Recent advancements in the communication protocols and the networking technologies have enabled connectivity of a wide range of objects, resulting in the Internet of Things (IoT) network. The protocols like MQ Telemetry Transport (MQTT), as well as Constrained Application Protocol (CoAP) are moderately capable of providing the management of heterogeneous wireless sensor networks even in an environment with very limited bandwidth. In this paper, we develop a lightweight encryption algorithm to obtain reliable secure data transmission between IoT devices. We propose a Secure Reliable Message Communication (SEC-RMC) protocol using Mosquitto MQTT message broker with cryptographic enhancements to offer security services and also provide the mutual authentication in the IoT environment at the transport layer. The proposed scheme decreases the number of messages transmitted between the devices. Also, the authentication scheme provides resistance to DNS hacking, routing table poisoning and packet mistreatment. On comparison with the existing methods, the transmission time has been reduced by 80% in this work.

Keywords: Advanced Message Queuing Protocol, Constrained Application Protocol, Heterogeneous Wireless Sensor Network, Internet of Things, MQ Telemetry Transport, Mosquitto MQTT.

Face Mask Recogniser Using Image Processing and Computer Vision Approach

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Abstract

The world saw a health crisis with the onset of the COVID-19 virus outbreak. The mask has been identified as the most efficient way to prevent the spread of virus [1]. This has driven the necessity for a face mask recogniser that not only detects the presence of a mask but also gives the accuracy to which a person is wearing the face mask. Also, the face mask should be recognised in all angles as well. The goal of this study is to create a new and improved real time face mask recogniser using image processing and computer vision approach. A Kaggle dataset which consisted of images with and without masks was used. For the purpose of this study a pre-trained convolutional neural network Mobile Net V2 was used. The performance of the given model was assessed. The model presented in this paper can detect the face mask with 98% precision. This Face mask recogniser can efficiently detect the face mask in side wise direction which makes it more useful. A comparison of the performance metrics of the existing algorithms is also presented. Now with the spread of the infectious variant OMICRON, it is necessary to implement such a robust face mask recogniser which can help control the spread.

Keywords: Computer Vision, Convolutional Neural Network, Face mask detection, Image processing, Kaggle dataset, Keras, MobileNetV2, Open CV, Tensor-Flow.

Deepfake Detection in Digital Media Forensics

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Abstract

With the development of technology and ease of creation of fake content, the manipulation of media is carried out on a large scale in recent times. The rise of AI altered videos or Deepfake media has posed a great threat to media integrity and is being produced and spread widely across social media platforms, the detection of which is seen to be a major challenge. In this paper, an approach for Deepfake detection has been provided. ResNext, a Convolutional Neural Network (CNN) algorithm and Long Short-Term Memory (LSTM) is used as an approach to detect the Deepfake videos. The approach and its steps are discussed in this paper. The accuracy obtained for the developed Deep-Learning (DL) model over the Celeb-Df dataset is 91%

Keywords: Celeb-Df, CNN , LSTM , Deepfake , Prediction , ResNext, Deep Learning.

Analysis of SWASTIK-shaped Slotted MSPA Antenna for 5G Sub Band Applications

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Abstract

An analysis of a unique compact planar antenna with a multiband microstrip square patch slotted in the form of Swastik on FR4 substrate is proposed in this paper. The proposed design has a Swastik shaped slot etched on the square radiating patch and the antenna is fed using a microstrip feed line. The FR4 substrate ($\varepsilon r = 4.4$) is used for the simulation analysis. The current flow is altered by the Swastik shaped slot which resonates at the 5 bands (penta band), which are suitable for 5G sub-GHz applications. The antenna has a compact size of $32 \times 32 \times 1.6$ mm3 and has a return loss, S11 of less than -10dB for all resonant five frequencies. The analysis was performed taking into account S11 (Return loss), directivity, antenna gain, and VSWR. In this proposed microstrip patch antenna design, patch is slotted in the shape of Swastik. In order to increase the number of resonant bands and to support multi band operation, the concept of DGS (Defective Ground System) is applied where purposefully the ground is etched out. This paper illustrates the proposed antenna design methodology and its results. The simulation work for the proposed design is carried out using HFSS (High Frequency Structure Simulator) tool.

Keywords: 5G, Defective Ground System(DGS), FR4, Microstrip Patch Antenna (MSPA), Swastik-Shape.

CNN Based Multi-View Classification and ROI Segmentation: A Survey

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Abstract

In today's world, one of the reasons in rise of mortality among people is cancer. A cancerous disease is bound to occur due to the ungovernable growth of certain cells that can scatter to other parts of the body. The different types of cancerous diseases are lung cancer, breast cancer, brain cancer, skin cancer. One among them which is of major concern is the brain cancer. With the emergence of AI-ML techniques, detection of cancerous tumour can be automated. One of the efficient methods for the detection of brain tumour is convolutional neural network. Visual information from various viewpoints is frequently used by humans in their decision-making process. For the recognition of the brain tumour a single image showing an object is insufficient. Multi-view classification aims to improve classification accuracy by combining data from several perspectives into a uniform comprehensive representation for downstream tasks. To aim that it presents a trustworthy multi-view classification, a classification approach that dynamically integrates diverse perspectives at an evidence level, resulting in a new paradigm for multi-view learning. By incorporating data from each view, the method promotes both classification reliability and resilience by combining several viewpoints. The process of segmenting images involves separating areas within a picture into distinct classes in order to identify them and classify them. In CNN there are different architectures like E-Net, T-Net, W-Net to determine the ROI and perform the image segmentation. In order to automate detection of the brain tumour, MRI image segmentation plays vital role. In this paper, a survey on the various image segmentation approaches and its comparison is presented. The main focus here is on strategies that can be improved and optimized over those that are already in use.

Keywords: Brain Tumour, Convolutional Neural Network, MRI Image, Multi-View Classification, ROI Segmentation.

A Review: Data Pre-Processing and Data Augmentation Techniques

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Abstract

This review paper provides an overview of data pre-processing in Machine learning, focusing on all types of problems while building the machine learning problems. It deals with two significant issues in the pre-processing process (i). issues with data and (ii). Steps to follow to do data analysis with its best approach. As raw data are vulnerable to noise, corruption, missing, and inconsistent data, it is necessary to perform pre-processing steps, which is done using classification, clustering, and association and many other pre-processing techniques available. Poor data can primarily affect the accuracy and lead to false prediction, so it is necessary to improve the dataset's quality. So, data pre-processing is the best way to deal with such problems. It makes the knowledge extraction from the data set much easier with cleaning, Integration, transformation, and reduction methods. The issue with Data missing and significant differences in the variety of data always exists as the information is collected through multiple sources and from a real-world application. So, the data augmentation approach generates data for machine learning models. To decrease the dependency on training data and to improve the performance of the machine learning model. This paper discusses flipping, rotating with slight degrees and others to augment the image data and shows how to perform data augmentation methods without distorting the original data.

Keywords: Data Augmentation, Data Cleaning, Data Oversampling, Data Pre-Processing, Data Wraping.

Automated Segregation and Microbial Degradation of Plastic Wastes: A Greener Solution to Waste Management Problems

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Abstract

The increasing accumulation of mess up plastic waste in natural environments creates a serious threat to our oceans, human health, flora and fauna. There is an urgent need to develop new approaches towards the disposal of non-biodegradable waste materials like plastics. It is now possible to develop novel biological treatment strategies concerning non-biodegradable waste (plastics) management because of the increasing literatures on the microbial degradation of the synthetic polymers like plastics. The valuable enzyme sources of microbes are capable of degrading synthetic polymers. The proposed waste segregator and decomposer (WSD) model focuses on the segregation of the non-biodegradable wastes automatically using AI techniques and also to frame an effective degradation strategy for commonly used synthetic plastics using novel microorganisms and associated enzymes.

Keywords: Artificial Intelligence, Plastics, Non-Bio Degradable Wastes, Microbial Degradation, Waste Segregation.

Trust Based Anonymous Intrusion Detection for Cloud Assisted WSN-IOT

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Abstract

A network system called Wireless Sensor Network is made up of wireless sensor node devices that are spread at random (WSN). WSNs are a critical paradigm for the Internet of Things' evolution (IoT). Strong security measures must be done to protect the network from security threats and malicious assaults in order to make it more efficient. To identify and isolate hostile sensor nodes in a cloud-assisted WSN-IoT system, the Trusted Anonymous Lightweight Attacker Detection (TALAD) scheme is presented. The TALAD strategy creates a routing path to the cloud with highly trusted nodes, subject to a desired path length limit. Using the binomial algebraic theorem, the node identities are formed with bogus identities, and the original identity is hidden from the other nodes in the network. If only the forward key and the reverse key string are matched, the nodes' original identities are exposed. The forward and reverse keys are mapped using a context-free grammar rule. Even when a major chunk of the network drops to forward packets, TALAD successfully avoids incursions, according to the simulation results.

Keywords: Binomial Algebraic Theorem, Context Free Grammar Rule, False Identities Mapping Function, WSN-IoT.

Design of Remote Monitored Solar Powered Grasscutter Robot with Obstacle Avoidance using IoT

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Abstract

Arduino UNO-based Solar powered Grasscutter designed to cut healthy grass in places like parks, hotels, public places, etc., The Grasscutter is designed through IoT (Internet of Things) technology, which is controlled remotely through Blynk application supported with Bluetooth module. The proposed model consists of hardware components like Arduino UNO, Solar panel, DC motor, motor driver, rechargeable batteries and Bluetooth module. The designed model is programmed through Arduino IDE to control the operation of the Grasscutter. The control mechanism and movements such as Forward movement, Backward movement, Right movement, Left movement, On mechanism, Off mechanism and Stop function for the Grasscutter prototype. An ultrasonic sensor connected to the head of the model avoids the system from colliding with obstacles while in movement.

Keywords: Arduino Uno, Bluetooth Module, DC Motor, Grasscutter, Internet of Things, Solar Panel, Ultrasonic Sensor.

Application of Few-Shot Object Detection in Robotic Perception

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Abstract

An object detection technique for robotic perception plays a vital role for robots to perform the task that it is functioned to do. In this paper, an efficient and accurate method for object detection for robots is proposed. The paper suggests implementing Few-shot object detection network for robotic vision using the Attention network and attention RPN module. The Multi-relation detector is used to compare two frames and eliminate negative objects from the frame which further enforces the suggested model. Using Contrastive training strategy, the robot is trained to exploit the resemblance between the few-shot support frame and query frame to detect the positive objects and eliminate the negative objects. This method is proposed to help robots perceive the object of interest to perform pick, place, and various other actions. This paper utilizes the COCO dataset to train the network which contains close to 1000 different categories. This method would help accelerate industry 4.0 and has potential in a wide range of applications.

Keywords: Attention RPN, Few-Shot Learning, Multi-Relation Detector, Robotic Vision, Robotic Perception.

Explainable Machine Learning in Identifying Credit Card Defaulters

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Abstract

Machine learning is fast becoming one of the central solutions to various real-world problems. Thanks to powerful hardware and large datasets, training a machine learning model has become easier and more rewarding. However, an inherent problem in various machine learning models is a lack of understanding of what goes on 'under the hood'. A lack of explainability and interpretability leads to lower levels of trust in the model's predictions, which means it can't be used in sensitive applications like diagnosing medical ailments and detecting terrorism. This has led to various advances in making machine learning explainable. In this paper various black-box models are used to classify credit card defaulters. These models are compared using different performance metrics, and explanations of these models are provided using a model-agnostic explainer. Finally, the best model-explainer combo is proposed with potential areas of future exploration.

Keywords: Machine Learning, Ensemble Learning, Explainability, Interpretability, DALEX.

Logistic Regression Technique for Prediction of Cardiovascular Disease

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Abstract

One of the most life-threatening disease is cardiovascular disease. Its high mortality rate contributes to nearly 17 million deaths all over the world. Early diagnosis helps to treat the disease in timely manner to prevent mortality. There are several machine and deep learning techniques available to classify the presence and absence of the disease. In this research, Logistic Regression (LR) techniques is applied to UCI dataset to classify the cardiac disease. To improve the performance of the model, pre-processing of data by Cleaning the dataset, finding the missing values are done and features selection were performed by correlation with the target value for all the feature. The highly positive correlated features were selected. Then classification is performed by dividing the dataset into training. testing in the ratio of 90:10, 80:20, 70:30, 40:60 and 50:50. The splitting ratio of 90:10 gives best accuracy as listed below. The LR model obtained 87.10% accuracy.

Keywords: Cardiovascular Disease, Feature Selection, Logistic Regression, Machine Learning, UCI Dataset.

Robust Video Summarization Algorithm using Supervised Machine Learning

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Abstract

The proposed approach uses ResNet-18 for feature extraction and with the help of temporal interest proposals generated for the video sequences, generates a video summary. The ResNet-18 is a convolutional neural network with eighteen layers. The existing methods don't address the problem of the summary being temporally consistent. The proposed work aims to create a temporally consistent summary. The classification and regression module are implemented to get fixed length inputs of the combined features. After this, the non-maximum suppression algorithm is applied to reduce the redundancy and remove the video segments having poor quality and low confidence-scores. Video summaries are generated using the kernel temporal segmentation (KTS) algorithm which converts a given video segment into video shots. The two standard datasets TVSum and SumMe are used to evaluate the proposed model. It is seen that the F-score obtained on TVSum and SumMe dataset is 56.13 and 45.06 respectively.

Keywords: Convolutional Neural Networks, Kernel temporal segmentation, Non maximum Suppression, Redundancy; ResNet-18.

Design of Logic Gates using Reversible Gates with Reduced Quantum Cost

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Abstract

Reversible logic is also called information lossless logic, since the information embedded in the circuits can be recovered, if lost. Research carried out by Landauer and Bennett proved that the energy dissipation would not occur if computation is made reversible. With this aim a number of reversible gates were designed and invented. As examples like- the Fredkin gate, the Toffoli gate, the Peres gate, and the Feynman gate. Reversible logic has extensive applications and is considered as one of the futuristic technologies. But the logic circuit designing is based on logic gates, which are non-reversible. This paper presents design of logic gates using reversible gates. These logic gates help in future implementation of higher end circuits. In this paper an attempt is made to design logic gates using reversible gates and some of the higher end circuits are also designed such as Binary-to-Grey, grey-to-Binary, Adder, Subtractor etc.

Keywords: Ancila Input, Garbage output, Qubits, Quantum cost, Reversible Logic.

QCA : A Survey and Design of Logic Circuits

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Abstract

Quantum Dot Cellular Automata (QCA) is one of the new technologies beyond CMOS. Among various other technologies, this is considered to be most feasible and viable due to its area and power advantages. In this paper the discussion about the origin and progress of research works is carried out with respect to QCA domain. Starting from the basic gate study and designing of Adders few other functional blocks are also discussed. This paper proposes QCA as it is considered as the upcoming technology after the saturation of CMOS technology. QCA is considered so due to its advantages in area, power and timing requirements. This domain is still under research and has not been carried to large extent. Hence the authors have made an attempt in exploring it through designing and have simulated the proposed designs. the working of the design is proved through the simulation results.

Keywords: ALU, Clocking, Fault Tolerance, Majority Voter, Polarizations, QCA, SRAM.

Role of Digital Simulation in Employee Training

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Abstract

The development in the digital world has influenced training programs for the employees; this indicates that skills and information provided by the traditional training programs need up-gradation in the digital environment. Tools of digital technology act handy in the training programs of the employees. These digital technologies such as simulation in training promote creativity and high order thinking among the employees. The main focus of the present study is to indicate the level of effectiveness of digital simulation methods of training in the organization. The study was conducted on two groups of employees from information technology companies based in Bangalore. The first group responded with regards to the training method and the second group of trainees included the digital simulation method of training. The results indicated that the digital simulation method of training was more effective than the traditional method of training. This suggests that the application of digital simulation training tools assists in training programs to train employees in the digital economy.

Keywords: Training Employees, Simulation, Digital Economy, Learning, Gamification.

Design of an Efficient ALU Blocks in Quantum dot Cellular Automata (QCA)

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Abstract

Quantum-dot cellular automata (QCA) is a rising nanotechnology with the potential for quicker speed, smaller size and low power consumption than CMOS based technology. This paper proposes the design of functional blocks for Arithmetic Logic Unit (ALU) and for majority gate (MV) using certain unique QCA characteristics. Previous works were based on the conventional design and have different approaches when compared with QCA method. This paper helps to resolve the conventional method by converting all Boolean logics into a NAND and NOR based majority voter by fixing one of the inputs. The proposed work presents a significant amount of reduction in the cell count, area of the cell, and clock delay phase, compared to previous work in QCA. The experimental result shows a reduction in number of cells is by 35.40%, Area of cells (um2) by 15.88% and clock delay phase by 48.21%. Simulations indicate an appealing performance in terms of area, delay, and complexity. Simulation results are validated using the quantum-dot cellular automata (QCA) Designer 2.0.3 tool.

Keywords: Arithmetic Logic Unit (ALU), Adder, CMOS, Majority gate (MV), Nanoelectronics, Quantum-dot cellular automata (QCA).

An Efficient Technique of Resource Scheduling in Cloud using Graph Coloring Algorithm

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Abstract

Cloud Computing has redefined the industrial side of application development and the delivery of software that has a strong base with the creation of both web apps and mobile apps. There is a significant shift in the mindset of technology organizations about the creation of specified services with the introduction of concepts like pay-for-use and subscription-based modeling. The distributed nature of resources makes it easier on the client-side to focus on the business aspects more than the maintenance of infrastructure and integrations scenarios. In a huge setup with a possibility of conflict among resources, it is essential to have a hierarchy that provides optimized execution time of processes and also ensures minimal waiting time of the resources involved in the processes. This paper proposes the use of Graph theory and the concepts of Graph coloring to schedule resources better and, at the same time, have lesser depended on tasks to ensure lesser conflicts among the resources. This paper also explores a scenario that helps understand the use of graph coloring techniques to handle better the dependency of involved processes in a cloud setup provided by the cloud vendors.

Keywords: Cloud Computing, Conflict Management, Constraint Satisfaction Problem, Graph Coloring, Graph Theory, Optimization, Resource Management, Scheduling.

Detection and Classification of Sunspots via Deep Convolutional Neural Network

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Abstract

Sunspots are known to be the most prominent feature of the solar photosphere. Solar activities play a vital role in Space weather which greatly affects the Earth's environment. The appearance of sunspots determines the solar activities and being observed from early eighteenth century. In this work, we have implemented a deep learning model which automatically detects sunspots from MDI and HMI image datasets. Proposed model uses Alexnet based deep convolutional networks to generate promising deep hierarchical features and proposed deep learning approach achieved excellent classification accuracies. Also, model has shown the improved result with MDI data set which is equal to 99.71%, 100%, 100%, and 100 for accuracy, precision, recall, and F-score respectively. This is to construct and build robust and reliable event recognition system to monitor solar activities which are crucial to understanding space weather and for physicists it is an aid for their research.

Keywords: Sunspot, Deep learning, SVM, Alexnet, CNN.

Reconfigurable Fractal Microstrip Antenna with Varactor Diode

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Abstract

In this article, a rhombus shaped fractal microstrip frequency reconfiguration patch antenna is presented. The proposed antenna depending upon the capacitance value of varactor diode resonates at ten distinct frequencies as follows: 1.375GHz, 1.525GHz, 1.725GHz, 2.45GHz, 3.45GHz, 4GHz, 5.3GHz, 5.45GHz, 5.5GHz and 5.825GHz. Design and optimization of microstrip antenna with analysis for different capacitance values of varactor diode is carried out using IE3D simulation tool. The proposed design is realized using FR4 (Dielectric constant $\varepsilon r = 4.4$) substrate with dimension (41X41X1.6) mm3. A single varactor diode inserted upon the slot is used to switch the operating frequency. The proposed design of antenna, both simulated and fabricated is seen to have close agreement, and is appropriate to be used in L, S and C band applications.

Keywords: Antenna, Fractal, Frequency, Reconfigurable, Varactor diode.

A Novel AI Therapy for Depression Counseling Using Face Emotion Techniques

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Abstract

Depression or stress is faced by most of the population throughout the world for multiple reasons and at different stages of life. Due to present busy life cycle, humans get into stress in their daily life, which leads to depression on long term. Stress is faced in education activity, competitive / challenging tasks, work pressure, family consequences, different types of human relation management, health disorders, old age etc. In this paper, a novel Artificial Intelligence therapy for depression analysis is proposed. This research is helpful for Psychologist to conduct counselling for their patients. Machine learning based Face Emotion techniques are used to detect depression level in any patient. This model can be tested for any age / category of patient, who faces depression due to any kind of problem or different sequences of life. To train machine learning algorithm, fer2013 open-source dataset is used. The algorithm was well trained and experiment were conducted on different age people. The results of this proposed algorithm were able to analyze depression more effectively.

Keywords: Deep Neural Network, Depression detection, Face detection, Face Emotion, Healthcare, Image Processing.

Quantitative Approach for Snowy Feature Detection using Polarimetric Analysis

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Abstract

Synthetic aperture radar is an advanced remote sensing and imaging radar. It plays vital role in acquiring high resolution images of earth surface. The capturing of images by synthetic aperture radar is done in any season immaterial of weather conditions. This paper gives the details of the basic feature extraction for the snow images. The two sample images are analyzed to know the feature details of the object under consideration. Analytical details of variation in entropy and the polarization were considered. The scattering mechanism involved in the snow area is analyzed. The details of snow classification based on its layered structure along with its physical nature like moisture involved are presented. The results indicate a high value of entropy of 0.94 for the snow image. The reason for high entropy is because of more surface uniformity in the snow images. The flat surface structured snow basically exhibits the surface scattering mechanism.

Keywords: Feature extraction, Polarimetry, Polarization, Scattering mechanism, Synthetic Aperture Radar.

An Enhancing for Cluster Head Selection Using Fuzzy Logic in Wireless Sensor Network

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Abstract

Extending lifetime for far off sensor coordinate through immaterial human perception is unreasonable. To comprehend this concern assorted researchers come up through assembly methodology which preserve construct up a far-off sensor put together extra adaptable, prolonged life time, proficient imperativeness. Nevertheless, an imposing part of planned computations overstuff the congregation chief in midst of pack diversion plan. Front attitude such a circumstance, proposal of fluffy analysis is superior the circumstance essential authority in distant sensor systematize. Fleecy reasoning is lesion up being additional usual for heap dispersion amongst sensor center points at last extending structure lifetime. Here Type2 fleecy reasoning is planned which handles uncertain level decisions enhanced than sort feathery reasoning. For the most part here essentialness smoothing out provoking extend structure lifetime using gather is cultivated. Likewise, the proposed fleecy reasoning which picks the gathering head just as show how organize life span can be stretched out close via immaterial cluster adversity in the midst of transmission process. Various computation as well as the connected structure lifetime is in like manner showed up through feathery analysis mounting most outrageous structure lifetime appeared differently in relation to other people.

Keywords: Cluster, Fuzzy Logic, Head, Leach, WSN.

Image Steganography Performance Analysis Using Discrete Wavelet Transform and Alpha blending for Secure Communication

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Abstract

The opportunities to exchange information in the current web era have risen. The increased popularity of the media has posed real challenges to security-related issues. Steganography is a technology for the secure exchange of information. A video, audio, or image intended to raise no suspicion may be the carrier. After concealing the secret information, steganography techniques produce an identical cover image. This will prevent outside observers from noticing the existence of secret information. In the proposed work, alpha is a scaling parameter. Cover and payload images of different types and dimensions, live images from a webcam, and predefined images of other formats have been normalized and preprocessed. A Haar Discrete Wavelet Transformation (DWT) is applied to both the cover and payload images. To generate a stego image, the payload image is encrypted and fused with the cover image. The result parameters such as PSNR, MSE, and Entropy are measured.

Keywords: Cover Image, DWT, MSE, Payload Image, PSNR.

An Omicron Variant Tweeter Sentiment Analysis Using NLP Technique

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Abstract

Twitter is a miniature writing for a blog site which gives phase to individuals to share as well as communicate their perspectives about point, activities, items plus other medicinal harms. Tweets can be arranged keen on assorted classes reliant on their significance through the tip looked. NLP for wellbeing linked exploration be at present utilize in combination of tweet keen on positive as well as negative classes reliant on their approach utilizing normal language handling strategy. This paper contain execution of NLP (Bag of words) for message alliance reliant on twitter omicron tweet informational catalog utilizing sentiment preparing information utilizing twitter statistics set as well as suggest a plan to further expand categorization. Utilization of Lemmatization alongside NLP can further expand accuracy of characterization of tweets, via bountiful encouragement, pessimism as well as impartiality score of vocabulary present in tweet. For genuine effecting of this structure python through NLP plus twitter informational compilation be used. In this paper we are concerning feelings exploration in twitter tweet for omicron datasets to arrange the survey of all consumers whether it is positive, negative or impartial.

Keywords: Covid, NLP, Omicron, Sentiment Analysis, Tweets.

Image Compression and Reconstruction in Compressive Sensing Paradigm

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Abstract

Compressive sensing (CS) is a new branch of research with applications in signal processing, medical imaging, seismology, communications, and a variety of other fields. It assures successful data compression and faithful reconstruction by considering a smaller number of linear measurements compared to its dimensions. In this paper, we have shown CS paradigm for image compression and reconstruction. We have considered the Basis Pursuit (BP), Lp – Reweighted (Least Squares Method), Orthogonal Matching Pursuit (OMP) and Fusion of OMP & BP algorithms to obtain the compressive measurements and faithful reconstruction. The results are analyzed by varying sparsity level and Compression Ratio (CR) and then calculating the Peak Signal to Noise Ratio (PSNR) value. The obtained results show that OMP performs better for standard test images & satellite images and Fusion of OMP & BP performs better for biomedical images.

Keywords: Basis Pursuit, Compressive Sensing, Compression Ratio, Lp – Reweighted, Orthogonal Matching Pursuit, Peak Signal to Noise Ratio.

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Food Classification using Transfer Learning Technique

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Abstract

In the subject of object detection using computer vision, image classification is becoming a prominent and promising aspect. However, studies have just scratched the surface. Till now, the superficials of food image classification in order to assess the nutritional abilities of people of different nationalities, The categorization of their traditional cuisine has a significant influence. Existing models categorize different sorts of foods. These models can only categorize a small number of meals at a given time. However, in a single model, the maximum number of foods must be recognized. This work focuses on the creation of a recognition model that uses transfer learning techniques to categorize various food products into their appropriate categories. Using Efficientnetb0, a transfer learning technique, the developed model classified 101 distinct food kinds with an accuracy of 80%. When compared to other state of art models, our model performed with best accuracy.

Keywords: Food-101, Computer Vision, Transfer Learning, Feature Extraction, EfficientNetB0.

**Paper ID
ICIEA 073**

An Improved Method for Text Detection using Adam Optimization Algorithm

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Abstract

Optical Character Recognition (OCR) is an automatic identification technique which is applied in different application areas to translate documents or images into analysable and editable data. Printed or typed characters are easy to recognize as they have well defined shape and size, but this is not true in case of handwritten text. Handwriting of every individual is different so OCR face difficulty to recognize the characters. In past, researchers have been used different Machine Learning and Artificial Intelligence tools and techniques to analyse handwritten and printed documents and also worked to create an electronic format file from them. It is difficult to reuse this information as it is very difficult to search the content from these documents by lines or words. To solve this problem, OpenCV technique is used in this research work which focuses on training and testing of neural network model to conduct Document Image Analysis. The proposed model is named as J&M model for Text Detection from Hand written images. Implementation of research work is done in Python on MNIST database of handwritten digits. From this research work, 99.5% of training accuracy and 99% of testing accuracy was achieved along with training loss of 1.5%.

Keywords: Artificial Intelligence, Python, OpenCV, Optical Character Recognition, Text Detection.

Dialog Management System based on User persona

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Abstract

Natural language processing (NLP) components are responsible for analysing and contextualising human-like discussions between chatbots or any voice browser or with any live users are known as dialogue management systems (DMS). Dialog management systems, also known as plug-ins, allow the chatbot to complete this functionality with ease. The dialogue management system features a module called the agent for dialogue management that allows the DMS to contextualise information and deliver replies. Chatter-bots frequently employ dialogue management systems, such as ChatScript, to regulate the conversation structure based on themes. In the developed application which emulates the behaviour of a DMS, the functionalities like voice assisted navigation, functional keys implementation, language neutral search are implemented. The system is developed by taking into consideration of user experience as the primary factor. The system facilitates physically disabled users to perform all the above mentioned functionalities using voice commands with approx.90% of accuracy.

Keywords: Chatbot, DMS, NLU, Natural Language Processing, Natural Language Response.

Modelling of Smart Risk Assessment Approach for Cloud Computing Environment using AI & supervised machine learning algorithms

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Abstract

Major backbone of today's competitive and upcoming market is definitely becoming Cloud computing & hence corporate utilize capabilities of cloud computing services. To improve security initiatives by cloud computing service or CRPs, novel types of tools and protocols finds themselves always in demand. In order to build comprehensive risk assessment methodology, extensive literature review was conducted to identify risk factors that may affect cloud computing adoption. In this context various risk factors were identified. After feature selection and identification of risk factors, utilized to select most effective features using linear regression algorithms. Then AI-ML techniques like Decision Tree (DTC), Randomizable Filter Classifier, k-star with RMSE method is used to analyse threats within CC environment. Experimental outcomes depicted that division of dataset to (95%-5%) provided best result out of every remaining partitioning and moreover put forth that DTC algorithm provided best outcomes out of entire data set used in experimental setups.

Keywords: Artificial Intelligence, Cloud Computing (CC), Cloud Security, Machine Learning, Risk Assessment.

Feature Selection from Gene Expression Data Using Simulated Annealing and Partial Least Squares Regression Coefficients

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Abstract

Accurate characterization of the molecular nature of a tumour is important for its effective treatment. Therefore, the classification of tumours is an important research problem. The application of data science and machine learning techniques to the gene-expression data has enabled computational researchers to separate the gene-expression samples into different classes based on the difference in gene-expression patterns. This has also facilitated the discovery of new classes and new disease biomarkers. However, gene-expression data is very high-dimensional and noisy. The number of features is high in comparison to the number of samples. The classes in the data are often imbalanced. Out of thousands of genes, only a few are relevant to the disease. The machine learning approaches for the classification of gene-expression samples need to address all these issues to obtain reliable performance. This paper proposed a method using simulated annealing and partial least squares regression for gene selection from six open-source microarray cancer gene-expression datasets. Selected subset of genes was used to fit support-vector machines, random-forest, voting-classifiers, and multilayer-perceptron classifiers. A comparison with existing methods shows the superior performance of the proposed method.

Keywords: Classification, Partial Least Squares Regression, Simulated Annealing, Support Vector Machines, Regression Analysis.

Improved DC bus utilization of DVR based on Repetitive Controller with THIPWM Technique

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Abstract

A DVR is being used to minimize the power quality problem. The SPWM method has been popularly used in DVR but use of the DC bus is restricted in SPWM, which is critical due to economical as well as power packaging density improvements. The proposed THIPWM scheme has been deduced from SPWM by adding one-sixth of the third harmonic signal in the fundamental signal. Repetitive Controller (RC) with Third Harmonic Injection (THI) technique is applied to achieve better dc-link utilization for medium-low voltage distribution. As an outcome, it's indeed evident that 15% reflects an increment in dc bus utilization as well as the potential to create high voltage AC. The control system comprises a feed-forward as well as feedback run to enhance the transient response & confirm the steady zero error. THD results improve when the THIPWM methodology is being used. PSCAD software is being used for the computation, which generated accurate findings for the THIPWM and Repetitive Control systems approach.

Keywords: DVR, PSCAD, Power Quality Disturbances (PQD), RC, SPWM, THIPW.

Paper ID ICIEA 093

An Effective Approach for Arabic Document Classification Using Machine Learning

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Abstract

Arabic text classification is one application of Natural Language Processing (NLP) that is used to analyze and categorize Arabic text. Analysing text has become an essential part of our lives because of the increasing number of text data which makes text classification a big data problem. Arabic text classification systems become significant to maintain vital information in many domains such as education, health sector and public services. In the presented research work, Arabic text classification model is developed using various algorithms, namely Multinomial NB, SGD, SVM, LSVM, LR, DNN and Deep Learning method using the Al-Khaleej dataset. The experiments are carried out with various models and it is observed that the deep learning models outperform others. The performance of Convolutional Neural Networks (CNN) exceeds the state-of-the-art machine learning method with an accuracy equal to 98. The presented methods will be useful in different domains particularly on social media.

Keywords: Text Mining, Arabic language, Text Pre-processing, Representation, Document classification.

Paper ID ICIEA 094

Leaf and Skin Disease Detection using Image Processing

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Abstract

Agricultural production is something on which the economy significantly relies. Leaf diseases in agriculture are the key issue for every nation, as the food demand is expanding at a rapid speed due to a rise in population. Skin disorders are usually seen in animals and humans, it is a particular sort of illness caused by germs or infection. Early and accurate identification and diagnosis of leaf and skin diseases are vital to keeping them from spreading. Image processing techniques can be used for disease detection which involves mathematical equations and mathematical transformations. For humans eyes image is a mixture of RGB colour, because of these colours we can extract some of the features from the image, but modern computer stores image in a mathematical format which means computer sees the image as numbers, hence after evaluating the image as a number arrays or matrix we will perform various transforms on them, these transforms will extract specific details from the picture, before transforming the image must go under various operation like feature adjustment which is also carried out mathematically. The project is implemented using K-Means Clustering and Support Vector Machine Algorithm in MATLAB through which we can detect and distinguish different types of leaf and skin diseases.

Keywords: Algorithm, Classification, Feature extraction, Plant Leaf Diseases, Segmentation, Training.

| Paper ID ICIEA 096 |

Movie Recommendation and Sentiment Analysis Using Machine Learning

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Abstract

In the modern world, where technology is at the forefront of every industry, there has been an overload of information and data. Thus, a recommendation system comes in handy to deal with this large volume of data and filter out the useful information which is fast and relevant to the user's choice. This paper describes an approach to a movie recommendation system using Cosine Similarity to recommend similar movies based on the one chosen by the user. Although the existing recommendation systems get the job done, it does not justify if the movie is worth spending time on. To enhance the user experience, this system performs sentiment analysis on the reviews of the movie chosen using machine learning. Two of the supervised machine learning algorithms Naïve Bayes (NB) Classifier and Support Vector Machine (SVM) Classifier are used to increase the accuracy and efficiency. This paper also gives a comparison between NB and SVM on the basis of parameters like Accuracy, Precision, Recall and F1 Score. The accuracy score of SVM came out to be 98.63% whereas accuracy score of NB is 97.33%. Thus, SVM outweighs NB and proves to be a better fit for Sentiment Analysis.

Keywords: Cosine similarity; Movie recommendation; Naïve Bayes; Sentiment analysis; Support Vector Machine.

| Paper ID ICIEA 098 |

An Overview on Detection, Counting and Categorization of Silkworm Eggs using Image Analysis Approach

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Abstract

Image processing techniques have grown more important in the field of sericulture in the modern era, as the rapid growth of computer vision technology also provides a platform for image processing applications to obtain a better image. This review article provides an overview of the various types of algorithms used to count, classify, and detect silkworm eggs, whether the silkworm eggs are fertilized (hatched) or unfertilized (unhatched), using image processing approaches. The literature review, analysis, and in-depth research explains the strengths and limits of the study and identify potential research problems. Modern tools and techniques for automatically counting, categorizing, and identifying silkworm eggs are being deployed, according to data gathered by previous researchers. A number of algorithms were used for automatic counting, categorizing, and detecting, however, the results were not accurate. As a result, in the field of sericulture, modern tools have proven essential to fully automatic counting, classifying, and detecting.

Keywords: Algorithms, Counting, Detecting, Image Processing Technique, Silkworm Eggs.

Fake News Detection on Hindi News Dataset

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Abstract

With the increase in social networks, more number of people are creating and sharing information than ever before, many of them have no relevance to reality. Due to this, fake news for various political and commercial purposes are spreading quickly. Online newspaper has made it challenging to identify trustworthy news sources. In this work, Hindi news articles from various news sources are collected. Preprocessing, feature extraction, classification and prediction processes are discussed in detail. Different machine learning algorithms such as Naïve Bayes, logistic regression and Long Short-Term Memory (LSTM) are used to detect the fake news. The preprocessing step includes data cleaning, stop words removal, tokenizing and stemming. Term frequency inverse document frequency(TF-IDF) is used for feature extraction. Naïve Bayes, logistic regression and LSTM classifiers are used and compared for fake news detection with probability of truth. It is observed that among these three classifiers, LSTM achieved best accuracy of 92.36%.

Keywords: Fake News, Hindi news dataset, Logistic Regression, LSTM, Naive Bayes, TF-IDF.

Prediction of Research Trends using LDA based Topic Modeling

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Abstract

Change is the only constant. In many sectors, a change is being witnessed that is getting increasingly rapid. This carries a plethora of new innovation possibilities with it. This necessitates well-founded data about trends, future developments and their consequences. This study seeks to catch the new directions, paradigms as predictors with an association of each topic which will be discovered through topic modeling techniques like LDA with BoW. For this, empirical analysis on 3269 research articles from the Journal of Applied Intelligence was done, which were gathered during a 30-year span. The inferred topics were then structured into a way suitable for performing predictive analysis. This is significant in the sense that it will help to predict what technology will be encountered in the future, as well as how far human's ability to innovate and discover things may lead this world to. The final model using TF-IDF scores has outperformed the baseline model by a margin of 41%.

Keywords: Applied Intelligence, LDA, Probabilistic Approach, TF-IDF, Topic Modeling.

Paper ID ICIEA 107

Plant Leaf Disease Detection using Computer Vision and Machine Learning Algorithms

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Abstract

Agriculture provides food to all the human beings even in case of rapid increase in the population. It is recommended to predict the plant diseases at their early stage in the field of agriculture is essential to cater the food to the overall population. But it unfortunate to predict the diseases at the early stage of the crops. The idea behind the paper is to bring awareness amongst the farmers about the cutting-edge technologies to reduces diseases in plant leaf. Since tomato is merely available vegetable, the approaches of machine learning and image processing with an accurate algorithm is identified to detect the leaf diseases in the tomato plant. In this investigation, the samples of tomato leaves having disorders are considered. With these disorder samples of tomato leaves, the farmers will easily find the diseases based on the early symptoms. Firstly, the samples of tomato leaves are resized to 256x256 pixels and then Histogram Equalization is used to improve the quality of tomato samples. The K-means clustering is introduced for partitioning of dataspace into Voronoi cells. The boundary of leaf samples is extracted using contour tracing. The multiple descriptors viz., Discrete Wavelet Transform, Principal Component Analysis and Grey Level Co-occurrence Matrix are used to extract the informative features of the leaf samples. Finally, the extracted features are classified using machine learning approaches such as Support Vector Machine (SVM), Convolutional Neural Network (CNN) and K-Nearest Neighbor (K-NN). The accuracy of the proposed model is tested using SVM (88%), K-NN (97%) and CNN (99.6%) on tomato disordered samples.

Keywords: Convolutional Neural Networks, Discrete Wavelet Transform, Principal Component Analysis, Nearest Neighbor, Leaf Disease.

Paper ID ICIEA 108

Modeling & Designing of Smart Energy Meter for Smart Grid Applications

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Abstract

Privatization of the power sector has nearly closed the monopoly in the electricity market and enhanced competition among different power companies. This leads to the development of automation in power systems. Innovation tends to implementation of a new concept of smart meters in the smart grid. Conventional grid is facing power losses in distribution sector with an increase in losses leads to an increase in per-unit cost of electricity. A new concept of renewable energy in the smart grid comes into the picture while taking into consideration of reduction in carbon footprints. The smart meter is uncomplicated to handle and supply on-time details of utilization of energy and its price. It lowers energy demand by ensuring proactive utilization of electrical energy and reducing carbon emissions. Substitution of conventional energy meters with intelligent meters not only implements smart technology but helps in the mutual benefits of utility companies and consumers. The concept of Advance metering infrastructure replaces by automatic meter reading. Installation of an intelligent meter is the first step in the nation to implement smart metering. Keeping in view about losses such as tampering, malicious activities by a consumer, delay in billing leads to enhancement of compulsory smart meters policy in the entire nation. In this paper mathematical modeling of single-phase smart energy meter being presented and estimation of both power and energy in terms of active, reactive, and apparent by energy computation chip. Simulation of single-phase intelligent meter is performed on Proteus simulator and its results are presented.

Keywords: Digital Signal Processing, Low Pass Filter, Microcontroller, Sigma Delta Modulator, Smart Grid, Smart Meter.

An Optimal Cluster & Trusted Path for Routing Formation and Classification of Intrusion Using Machine Learning Classification Approach in WSN

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Abstract

Generally, wireless sensor networks (WSN) are being utilized in wide range of fields like queue tracking, military applications, environmental applications, and so on. This approach is an attempt to focus on the detection of attack with the utilization of machine learning and optimization strategies. Primarily, system model is initiated and the nodes are deployed randomly based on the size of network. The cluster formation will be carried with the use of energy competent Particle swarm optimization depending on the passive clustering mechanism (ECPSO-PCM) strategy. By means of spatial correlation, a correlation groups will be formed. The probability of transmission is then estimated by taking into account the spatial correlation, quality of link among CH and cluster member node, and the node's residual energy of the network. The management of trust is employed by the selection of cluster head. If the node i consist of the criteria for trust coverage, then this node is chosen as cluster head. If this condition is not satisfied, then it is chosen as cluster member. The optimal range of cluster paths for effective transmission of data is carried by means of Computation of optimal cluster path using Bio-inspired Hierarchical order chicken swarm optimization (BIHO-CSO) at which the distance and residual energy are major constraints. Once the optimum and trusted path is chosen, the classification and detection of attack is carried by means of Recursive Binary partitioning decision tree classifier (RBP-DT). The performance analysis is made and the attained outcomes are compared with traditional approaches to validate the supremacy of the presented scheme.

Keywords: Bio-inspired Hierarchical order Chicken Swarm Optimization (BIHO-CSO), Energy Competent Particle Swarm Optimization depending on the Passive Clustering ECPSO-PCM, Recursive Binary partitioning decision tree classifier (RBP-DT), Trust Management,Wireless Sensor Networks (WSNs).

Importance of Statistics to Data Science

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Abstract

This paper is mainly discussed on importance and contribution of statistics to Data science and how it emerges as the most important factor to solve realistic problems which contains huge amount of data processing. There are various methods in statistics which help Analysis in data science which will be explained in detail. This work also emphasizes on importance of Data Science in this present technology. Statistics is proved to be an important discipline in regulating the work analyzed in the field of Data Science. This work compare various statistical approaches with This outlines the numerous potential data analysis approach processes which helps in examining the influence of quantitative statistical measures on data collection and optimization, data interpretation, data processing and modelling, testing and presenting and Various challenges faced in the process of data science using statistics is given in brief. Here there is a numerous way to enhance the data science techniques with the help of statistics methodologies.

Keywords: SVM. Random Forests. Linear Regression. ANN.

Higher Order Degree of Freedom Controller for Load Frequency Control of Multi Area Interconnected Power System with Time Delays

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Abstract

In this paper, a seagull optimization algorithm (SOA) based 3-Degree-of-freedom (DOF) proportional-integral-derivative (3DOFPID) controller is suggested for load frequency control of multi-area interconnected power system (MAIPS). The considered MAIPS comprises of two areas with Thermal-Hydro-Nuclear generation units in each area. Analysis has been carried out by subjugating area-1 of MAIPS with a step load disturbance (SLD) of 10%. The sovereignty of presented SOA tuned 3DOFPID in regulating the stability of MAIPS is revealed upon comparing with the performances of 2DOFPID and conventional PID controllers. MIPS is analyzed dynamically without and with considering the nonlinear realistic constraint of communication time delays (CTDs) to demonstrate its impact on load frequency control performance. Simulation results disclosed that, MAIPS dynamical behavior is slightly more deviated up on considering CTDs and is justified.

Keywords: 3DOFPID Controller, 10%SLD, CTDs, MAIPS, Seagull Optimization Algorithm.

Apache Hadoop based Effective Sentiment Analysis on Demonetization and Covid-19 Tweets

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Abstract

In Recent, Twitter is the well-known public Network acquires a huge number of tweets. Sentiment analysis in twitter data are tremendously valuable in social media observing as it allows getting an overview of extensive global opinion in certain issue. This data are utilized for industrial, government, social and economic approaches by analyzing the tweets as per the requirement of the user. Processing and storing these data are more complicated to analyze. Hadoop is a distributed environment which process with Big and Huge variety of dataset which supports processing components that collectively called Hadoop Ecosystem. In this paper, regular tweets are analyzed by sentiment analysis technique in Hadoop Eco system. Dataset are taken from Kaggle data repository. This research has done by Apache Pig in Demonetization and Covid 19 twitter dataset.

Keywords: Apache Pig, Covid-19 and Demonetization Twitter Data, Twitter Sentiment Analysis (TSA), Hadoop Distributed File System (HDFS).

Recent Trends in Wireless and Optical Fiber Communication

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Abstract

The broad spectrum of optical wireless communication meets the needs of high-speed wireless communication, which is optical wireless communication's primary advantage over traditional wireless communication technologies. Optical fiber communications, as significant use of laser technology, are vital facilitators for the contemporary information era. With the rise of new technologies such as the Internet of Things, big data, cloud computing, virtual reality, and artificial intelligence, there is an increasing need in society for high-capacity data transmission, raising the bar for optical fiber communication technology. Many new technologies are coming our way, which has made our lives a lot simpler. But now that this new technology has arrived, we've run out of patience. To do whatever in the shortest possible period. Furthermore, in today's fast-paced society, sluggish walkers are quickly left behind while the rest of the world keeps moving forward. Many innovative methods for speeding up and simplifying our work have been identified. With optical fiber technology, our scientists have achieved a breakthrough, allowing us to go from one place to another in a matter of seconds. Wireless optical fiber communication networks are discussed in this research. This study also illustrates the many difficulties that optical fiber installation and processing face.

Keywords: Bit error rate (BER) performance, Channel characterization, Free-space optical (FSO) communication, Relay-assisted transmission, RF/FSO technology.

Analysis and Design of Overcurrent Protection for Grid-Connected Microgrid with PV Generation

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Abstract

This paper aimed to demonstrate the reliability of the Over Current protection (OCP) scheme in protecting microgrids with inverter interfaced RES for low voltage distribution networks. To prove this reliability, the PSCAD/EMTDC simulation software was used to conduct simulations for the OCP scheme, while comparing throughout grid-connected mode with and without PV generation, as well as in island mode. The computations are carried out using a model of a CIGRE low voltage distribution system. The OCP average relay tripping time for SLG faults through grid mode without PV has been 0.131s, & 0.121s for LLL faults. With regards to PV generators, the average relay tripping time increased to 0.199s & 0.135s, including both. This is due to the fault current contributed by PV generation inclusion, which restricts the current seen by the predefined OC relays. The findings revealed that some OC relays failed to trip in island mode causing a loss of coordination and a decrease in fault currents. The system was further tested for different generation levels (15%, 57%, and 81%) in island mode and gave a negligible difference in average tripping time for different generation levels.

Keywords: Distributed generation (DG), Energy Storage (ES), Micro-Grid (MG), Overcurrent Protection (OCP), PSCAD/EMTDC, Renewable Energy Sources (RES).