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# Enneaontology: Towards an Enneagram Personality Detection

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**Abstract:** Personality prediction catches research attention nowadays. In social media, attracting more users means getting more advertisements. Enneagram is a personality model which is used by psychiatrists. Enneagram is utilized to understand patients' personalities. This knowledge helps them to give the right support. The current method to realize Enneagram's personality is by using an assessment test. Persons are not interested in performing a test as it is time consuming. Enneagram personality detection system is required. One of the main problems in building Enneagram personality detection systems is knowledge representation absence. Enneaontology provides an ontology for Enneagram. Enneaontology consists of seven classes: Enneagram, feature, desire, key motivation, fear, problem and best classes. Enneaontology contains nine objects: reformer, helper, achiever, individualist, investigator, loyalist, enthusiast, challenger and peacemaker. Enneaontology is designed relative to METHONTOLOGY principles. Enneaontology is evaluated with Enneagram personality detection application. The promising results verify Enneaontology. Enneaontology is the first Enneagram ontology.

**Keywords:** Ontology, Enneagram, Knowledge Representation, Personality Model, Artificial Intelligence, Psychology

# Anomalies Detection on Contemporary Industrial Internet of Things Data for Securing Crucial Devices

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**Abstract:** The Industrial Internet of Things (IIoT) is a framework that enables companies to improve their processes and increase their efficiency by using smart sensors and actuators. It's also used to collect data from various industrial devices and make use of this data to improve their operations. With the help of connected sensors and actuators, companies can save time and. Due to the increasing number of Internet of Industrial Things (IIoT) devices, the data generated by these networks is constantly being analyzed. However, due to the high dimensionality of the data, it can cause fragmentation. Also, data sets collected by IIoT nodes are prone to displaying anomalous events. Unlike traditional networks, which are usually composed of several applications and protocols, IIoT networks are different. They require more stringent security measures to protect the integrity and confidentiality of their data. Due to the unique features of IIoT networks, they are prone to attack. This paper briefly describes the various requirements and challenges faced when it comes to protecting these networks. It also presents evaluation of various machine learning classifiers to detect anomalous behaviours in these networks. Due to the nature of the data that these networks contain anomalies, their analysis is critical to prevent attacks. In this paper, we analyze the usage of various machine learning algorithms to check the efficiency and accuracy of detecting anomalies in data generated by crucial IIoT devices
.

**Keywords:** Industrial Internet of Things (IIoT), Anomaly detection, Machine learning.

# Automatic Sentiment Analysis Scalability Prediction for Information Extraction Using Senti Strength Algorithm

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**Abstract:** The social media networks allowing their customers to feedback and complaining about their opinions on services and products. Sentiment Analysis is a powerful tool that can help the software industry and company to better evaluate user needs and cater the software in a way to maximize the sales potential. One of the studying areas in Natural Language Process (NLP) is sentiment analysis which is concerned for identifying the opinion or mood within a text. For extracting the information from the Social Big Data an automatic process is essential for decision-makers and marketers. For satisfying this requirement, an Automatic Sentiment Analysis saleability prediction for Information Extraction using Senti-Strength Algorithm is presented in this paper. From consumers, data is collected through feedback forms on software product. Presented algorithm validity is proven through comparing the CRbSA (Contrast Rule-based Sentiment Analysis), general word counting and extraction algorithms well-known sentiment information. Accuracy and processing time are two parameters used to analyze the performance of Senti-Strength algorithm and these values are 81.5% as accuracy and 15 ms as processing time. In a marketing system this algorithm is employed for extracting the satisfaction of customers in particular it works as an alarming tool for negative comments.
**Keywords:** Natural Language Processing (NLP), Senti-Strength, Sentiment Analysis, Scalability, CRbSA, reviews.

# Vegetable Plant Leaf Image Classification using Machine Learning Models

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**Abstract:** Vegetables are rich in minerals, vitamins, and calcium. It benefits our body in many ways. To know about the vegetable, firstly need to identify and their classification. the identification of the vegetables can be done with the help of their images. In this paper, 25 categories of vegetable leaf samples are collected, containing 7226 total RGB images. These images go through the machine learning process to train various models. Models such as K-Nearest Neighbours (KNN), Linear Regression (LR), Decision Tree (DT), Support Vector Machine (SVM), Naive Bayes (NB), and Multilayer Perceptron (MLP) are used. After training the models, models are evaluated through accuracy, precision, recall, and F1-score. The result shows that MLP has performed better than another classifier with an accuracy of 90.68%.

**Keywords:** Classification, Performance, Vegetable plant leaf, Image preprocessing, RGB image, Machine learning, Computer vision.

# A Novel SARS-COV-2 Variant Omicron Disseminating Evaluation

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**Abstract:** Omicron is a relatively new form of COVID-19 that has created an unavoidable and life-threatening situation to the entire world since late 2021. Absence of appropriate vaccination, medication, the epidemiological cycle has become more complex. This study primarily concentrates on the analysis of genome sequence for COVID-19 variants. To conduct such analysis, two datasets are collected from Kaggle and GISAID. Using these datasets, the globally existing genome sequences are identified and insights regarding the countries that are carrying significantly higher genome sequence count are provided. This investigation analyses the world-wide virus variants and further identifies that the United States and United Kingdom are the countries where proper inspection should be provided because of the genome sequence count. An adequate idea regarding the mutations of the omicron virus is also considered in this study. To address this issue, recent genome sequence data ranging from February, 2022 to 10th March, 2022 is analyzed to understand how the latest arrival, Omicron, is perturbing the world. This study emphasizes on the constant surveillance of genome sequences among all the countries which in turn will benefit the health care professionals and frontline healthcare workers as well as the Governments can take necessary policies and precautions to combat such pandemic.

**Keywords:** Covid-19, Omicron Variant, Genome Sequence, World Health Organization, Covid-19 Pandemic

# Cryptanalysis of Tiny Encryption Algorithm based on SMT solvers Using HPC

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**Abstract:** Tiny Encryption Algorithm (TEA) is a block cipher algorithm that uses Symmetric key of 128-bits. It performs 32 rounds for encryption/decryption. TEA uses Addition modulo 232, XoR, and Shift operations in its algorithm. We convert TEA algorithm into Non-Linear system of equations and solve the system using Satisfiability Modulo Theory Solvers (SMT) on a Desktop Computer and also on High Performance Computing (HPC) facility. As solving system of equations is NP-Complete problem, we tried solving the system for various number of rounds out of 32 rounds. The Solver Z3(py), a Satisfiability Modulo Theories (SMT) Solver has been chosen to perform algebraic cryptanalysis. We could solve the system up to 5th rounds and found the actual secret key successfully among few solutions of high probable keys which we got from solver within 15576.34 minutes using HPC. Non linearity will increase as number of round increases, so solving high nonlinear system is very difficult. Our aim is to solve a specific kind of nonlinear system of equations. We tried to recover the partial keys for rounds greater than 5 th. Results of the key recovery are present in this paper.

**Keywords:** Block Cipher, Tiny Encryption Algorithm, Satisfiability Modulo Theories (SMT) Solver, Algebraic Cryptanalysis, High Performance Computing.

# Diagnosis of Pulmonary Diseases from Chest X-Ray using Deep Learning Approaches

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**Abstract:** In recent years, a severe pandemic has struck worldwide with the utmost shutter, enforcing a lot of stress in the medical industry. Moreover, the increasing population has brought to light that the work bestowed upon the healthcare specialists needs to be reduced. Medical images like chest x-rays are of utmost importance for the diagnosis of diseases such as pneumonia, COVID-19, Thorax, and many more. Various manual image analysis techniques are time-consuming and not always efficient. Deep learning models for neural networks are capable of finding hidden patterns, assisting the experts in specified fields. Therefore, collaborating these medical images with deep learning techniques has paved the path for enormous applications leading to the reduction of pressure embarked upon the health industry. This paper demonstrates an approach for automatic lung diagnosing of COVID-19 (Corona virus) and Thorax diseases from given CXR images, using deep learning techniques. The previously proposed model uses the concept of ResNet-18, ResNet-50, and Xception algorithms. This model gives the highest accuracy of 98% without segmentation and 95% with segmentation. Whereas the proposed model uses CNN and CLAHE algorithms which achieves an accuracy of 99.22% without segmentation and 98.39% with segmentation. Therefore, this model will be able to provide assistance to health workforces and minimize manual errors precisely.

# Performance Analysis of CNN for Patch Based Sclera-Periocular Biometrics

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**Abstract:** Image classification is a process of categorizing images based on features. Features in an image could be identified as a change in pixel intensity or an edge. A color image has the pixel values represented using R,G,and B. Multiple such images are labeled and used for Image classification. The challenging part is to identify the features in such images is a complex task. CNN is a widely used image processing algorithm particularly for image classification. The three layers of CNN- convolution layer, Pooling layer and fully connected layers can be applied to an image for Image processing problems such as Image recognition, object detection and segmentation. In the proposed system, CNN is applied on patch-based Sclera-Periocular images. The model has shown an accuracy of 99.3% for patch-based images. The model was trained on Image patches of size 100x100,50x50 and 25x25.

# Reliable Transmission of Multimedia Data over Wireless Sensor Networks

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**Abstract:** Wireless Multimedia Sensor Networks (WMSNs) is developed as a new class of wireless sensor networks for satisfying the strict Quality of Service (QoS) necessities of an emerging applications. Now a days, there occurs a large requirement to broadcast the video over the network. Therefore, it is necessary to design a routing protocol along with bandwidth estimation and compression approaches for an effective transmission of data. In this paper, the Congestion Aware Tunicate Swarm Algorithm (CATSA) is proposed for an effective routing over the WMSN. Moreover, the Passive Available Bandwidth Estimation (PABE) and Hybrid Compression Approach (HCA) are used to improve the QoS. The PABE used to estimate the bandwidth of the routing path followed by the HCA is used to compress the data for minimizing the resources utilized during routing process. In that, HCA includes a lossless Lifting Wavelet Transform (LWT) and lossy Deep Learning Based Compression (DLC) whereas these approaches are applied according to the estimated bandwidth. The performance of the CATSAPABE-HCA method is analyzed by means of packet loss, End to End Delay (EED), and Peak Signal to Noise Ratio (PSNR).The existing researches such as HRDSS and HSSFF are used to analyze the CATSA-PABE-HCA. The PSNR of the CATSA-PABE-HCA for 150 Kbps of bit rate is 2400 which is high than the HRDSS and HSSFF.

**Keyword:** Congestion aware tunicate swarm algorithm, hybrid compression approach, passive available bandwidth estimation, quality of service, wireless multimedia sensor networks.

# Leader-Follower based Low-degree Formation Control of Fixed-Wing Unmanned Aerial Vehicles in 3D

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**Abstract:** In this paper, we adopt the architecture of the Lyapunov based Control Scheme (LbCS) to propose the motion planner of multiple fixed-wing Unmanned Aerial Vehicles (UAVs) adopting a Leader Follower Strategy. We implement the leader-follower formation type here, where the flock in its predefined shape has to navigate in a workspace cluttered with obstacles with respect to its leader to reach its predefined targets. In the presence of obstacles, the formation gets slightly distorted and rejoins at a safer place, maintaining its low degree of formation. In our case, the obstacles will be spherical fixed obstacles, and the moving aircraft in the swarm itself will become the obstacle for all the other members. A set of nonlinear acceleration-based controllers using a Lyapunov-based control scheme will be derived to successfully achieve this task. The controllers derived from them will help and guarantee the flock's ability to coordinate its motion in a well-planned manner and converge to its desired target while maintaining a low degree of formation and avoiding obstacles. Using computer simulations for virtual scenario, the effectiveness of the proposed nonlinear acceleration control laws will be demonstrated. This will reveal the simplicity and effectiveness of the control technique used. The paper finally ends with a conclusion and future recommendations.

**Keywords:** Lyapunov, UAVs, controllers, low degree formation

# Effective Load Balancing and Load Sharing in Multi-Access Edge Computing For Extreme Network Congestion

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**Abstract:** A multi-access edge computing (MEC) plays a vital role in dealing with the exponential growth of data traffic to avoid network congestion. This is also essential for fulfilling the user requirements of computation resources. MEC network brings cloud functionalities to the edges that are in close proximity to the devices supporting multiple access points. Mobile devices that have resource constraints, can save energy and enrich users' experience using the computation load balancing technique. This paper provides a comprehensive approach to load balancing and load sharing in a MEC environment. We proposed two algorithms for the MEC framework. First is the proactive load rationalization technique that accounts for the load as a function of chaos resolution through user load prediction. The second algorithm is used for the distribution of data across servers in a given geographical region which aims to achieve an equilibrium that ensures no server is overworked while other servers are left idle. Finally, a fine-grained computation-based MEC framework is developed using our proposed algorithms that is capable of load balancing and sharing in extreme network congestion. The ultimate goal is to provide optimal resource services to each user while balancing the load amongst the MEC servers. The simulation results demonstrate the efficiency of our methods in balancing load in the real-time scenario. Moreover, it has the ability to produce minimal load overhead during load failure.

**Keywords:** MEC, Load Balancing, Load Sharing, Failure resolution, Base Stations

# Prediction of Depression in Techies at Workplaces

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**Abstract:** Mental health is nowadays a topic that is most often discussed when it comes to research but least frequently discussed when it comes to personal life. The expanding utilization of innovation will prompt a way of life of less actual work. Additionally, the constant pressure on a worker in the IT industry will make it more defenseless against mental issues. Employees in the tech industry are most vulnerable to such illness as this quick moving industry has huge stakes, which expect individuals to meet considerably better standards. So, it is of extreme importance to develop a prescient predictive model for automated diagnosis of mental illness. We aim to propose a model using Stacking Classifier with the help of feature selection for prediction which outperforms the existing models implemented.

**Keywords:** Mental health, Depression, Workplace, Stacking Classifier, Survey, Accuracy, Recall, Precision, f1 score measures.

# Experimental Validation of Mesa Sine Wave in Stock Price Prediction

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**Abstract:** Rising dissemination of learning algorithms in almost all spheres of life has been witnessed in the last 5 years. In this regard, stock market has provided a huge landscape for data science to introduce computational intelligence in otherwise traditional method of handling the global economy. This study evaluates whether Lead Mesa Sine Wave (LMSW) can be a good marker in stock price prediction. Our results reflect that LMSW cannot be used for stock price prediction. We validate our result using learning algorithms. Moreover we have also observed that the future price prediction using historical closing price data can be used as a dependable marker. Due to the time scale nature of the data, we have used recurrent neural network (specifically Long Short-Term Memory (LSTM)) for our prediction model design. The results from the prediction model exhibit better performance with respect to literary counterparts. We have used three publicly available datasets from Reliance, Infosys, and Grasim for the study. We claim two results in this study − LMSW cannot be used as stock price predictor, and LSTM can be used as a good predictor using historical closing price data.
**Keywords:** Mesa Sine Wave, LSTM, Stock Price Prediction, Learning Algorithms, Closing Price

# Testbed Implementation of MAX-LEACH Routing Protocol and Sink Hole attack in WSN

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**Abstract:** The WSN is a deployment of small sensors which are powered by a small battery. These sensors sense their surroundings according to the application and transfer the data to the BS due to which the energy of these sensors is dissipated. The residual energy of the nodes gradually decreases and this effects the Lifetime of the network. To increase the performance and Lifetime of the WSN, a MAX LEACH Routing protocol was proposed. There are chances of security attacks externally like wear and tear of the nodes and theft of the nodes which are deployed in remote places.But more than that due to the presence of the malicious nodes in the network causes Internal attacks and more damage than the external security attacks. The WSNs are vulnerable to various types of security attacks in every layer. Out of them the most dangerous attack is the Sink hole attack. In this paper we implement the TESTBED of the MAX LEACH Routing protocol and also the Sinkhole attack on the MAX LEACH Routing protocol in the WSN.

**Keywords:** WSN, Routing Protocol, Residual Energy, Security attacks, Compromised nodes, Sinkhole, MAX-LEACH.

# An Adaptive Algorithm for Polysemous Words in Natural Language Processing

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**Abstract:** In this research article the supervised adaptive approach for word sense disambiguation is discussed. The most critical and identified problem of natural language understanding is the lexical ambiguity. Lexical ambiguity is introduced by the polysemy words. This paper describes different state of the art techniques to detect ambiguous words from the ambiguous sentence. The word embedding is an important phase of word sense disambiguation and which is succeeded by ambiguous word detection and processed by classification. The different embedding techniques are discussed here and the uniqueness of adaptive word embedding has been proved. There are two standard available datasets OMSTI and WordNet are used for the data processing. This article elaborates the newly generated dataset Adaptive-Lex for disambiguation. There are two important challenges in word sense disambiguation: identifying polysemy words without context information and constructing word embedding for polysemy words with highest sense values. These challenges are addressed with a complex network approach and adaptive word embedding technique. The performance evaluation classifiers are supervised neural network approaches such CNN and DNN.

# CS-FA Nature Inspired Algorithm Based Robust Video Watermarking

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**Abstract:** This paper illustrates a hybrid algorithm that is amalgamation of two bio-inspired algorithms such as Cuckoo search and Firefly optimization algorithms are incorporated to find optimize scaling factor intended for the watermark insertion. This combination is considered as one of the utmost usages in the recent past. The foremost benefit is obtained by combining several features of both the algorithms. SSIM and BER are used to evaluate fitness function in this optimization technique. Contemplating above opportunities, a novel video watermarking method is proposed by using CSFA in DWT, SVD domain. Besides, the watermark security is also improvised using secret sharing method. Experimental tests reveal that the video watermarking approach suggested has a reasonable imperceptibility and an improved robustness against attacks.

# Investigation of MANET Routing Protocols to Enhance QoS for Communication

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**Abstract:** On-demand routing is a primary function of mobile ad-hoc network, and routing broadcasting are utilized network capacity nearly half of network capacity because node frequently change their location and number of time call the route broadcasting methodology that increase the overhead as well as utilization of channel capacity of the network. Due to the large overhead various researchers are work in the field of overhead minimization some of work unassign slot utilization so fully network bandwidth are utilized. But in our proposed work combine the routing, queuing and location mechanism and improve service quality of network. Proposed approach uses multipath routing with QoS measuring methodology that utilized un-assign slot as well as distributed load sharing mechanism which increase network reliability for ad hoc communication. Our proposed QoS measuring technique with enhanced routing protocol is to achieve better reliability. Un-assign slot utilization methodology in multipath environment get more reliable network.

**Keywords:** MPDSR, QoS, MANET, Queue Utilization, Channel Access.

# Leader-Follower based Control of Fixed-Wing Multi-Robot System (MRS) via Split-Rejoin Maneuvers in 3D

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**Abstract:** In this paper, we adopt the Lyapunov- based Control Scheme (LbCS) architecture to propose a motion planner for multiple fixed-wing Unmanned Aerial Vehicles (UAVs). Multiple formations of Multi-Robot Systems have to navigate in a workspace in presence of obstacles with respect to their leaders to reach their pre-defined target. Each formation has its own leader and the followers behave in accordance with their leaders. The formations split in case of obstacles and rejoin at a safer distance. The flock navigates the environment in its pre-defined formation and moves towards its target. In our case, the obstacles will be spherical fixed obstacles and the moving aircraft in the swarm itself becomes the obstacle for all the other members. The individual formation will also avoid other formations. A set of nonlinear acceleration-based controllers using the Lyapunov-based Control Scheme are designed to achieve this task successfully. The controllers presented will guarantee the UAVs coordinate their motion in a well-planned manner and make sure the aircraft converge to their desired target while avoiding obstacles intersecting their path. The computer-generated simulations of a virtual scenario have been looked at where different predefined formations of the flock have been designed. The simulation show the effectiveness of the proposed nonlinear acceleration control laws. The paper finally ends with a conclusion and future work recommendations in this area.

**Keywords:** Lyapunov, fixed-wing UAVs, multi-robot system, flock, splitrejoin

# MR Image Block-Based Brain Tumour Detection using GLCM Texture Features and SVM

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**Abstract:** A brain tumour is a deadly disease, and it is an unwanted cells development in the human brain. In medical technology, brain tumour detection and diagnosis increase the patient's life days. In this manuscript, an effective block-based brain tumour detection method is proposed for MR images. The proposed method has four steps: convert T2W images into 8×8 blocks, Feature extraction, Feature selection and Classification. This method uses the Brain Tumour Segmentation (BRATS)-2013 dataset with High-grade glioma (HGG) and Low-grade glioma (LGG) MRI multimodal on T2-Weighted images. Feature extraction is achieved by GLCM texture features. The Chi-square test method is implemented to rank features in the feature selection process. Finally, the classification process is achieved by SVM, and it has two main phases training and testing. This method uses 90000 blocks for training and 36000 blocks for testing in the combination of HGG and LGG images. The blocks are classified into normal or tumour based on their features during the testing phase. The proposed block-based brain tumour detection method achieves 100% sensitivity, 100% specificity and 100% accuracy in the testing phase.

**Keywords**: Brain tumour, glcm features, chi-square test, classification, svm.


# DFM: Deep Fusion Model for COVID-19 Vaccine Sentiment Analysis

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**Abstract:** The corona virus disease (COVID-19) pandemic has created a lot of healthcare concerns. Over the past two years, health care professionals worked hard to develop numerous vaccines to combat this virus which is truly remarkable. However, a large proportion of the global population is skeptical about the vaccines and the sudden emergence of the new strain of the virus is stirring up mixed emotions causing the use of opinion terms having varying polarities in different contexts which poses a challenge to predict the accurate sentiments from the user-generated data. In this work, a novel architecture namely a Deep Fusion Model (DFM) with a meta-learning ensemble method is proposed for sentiment analysis of public opinions on COVID-19 vaccines and omicron variant on Twitter. The proposed model employed using natural language processing with deep learning models such as LSTM, GRU, CNN, and their various combinations. The purpose of this study is to understand the public opinion around COVID-19 vaccines and omicron variant through the proposed model. In addition, the experiment demonstrated effectiveness with an accuracy of up to 88% in comparison to state-of-the-art models.

**Keywords:** COVID-19, Corona Virus, Deep Learning, Natural Language Processing, Sentiment analysis, Vaccine

# Driver Assistance System for Recognition of Brake and Parking Signal

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**Abstract:** This work presents a driver assistance system to detect brake and parking signals. Vehicle present ahead of the host vehicle performs sudden action such as applying brakes. The host vehicle's driver must respond in real-time to avoid accidents or collisions. Detection of action performed by a leading vehicle using its taillights is implemented with computer vision and machine learning techniques. Features are extracted using Scale Invariant Feature Transform (SIFT) and Accelerated-KAZE (AKAZE). The dimensions are reduced using KMeans clustering and then by Principal Component Analysis (PCA). Five classification models have been trained to evaluate the performance. Random Forest classifier provided the highest accuracy of 82% among all classifiers. Voting Classifier provides final prediction based on five classification model's output. It provided 81% accuracy.

**Keywords:** Driver Assistance System, Computer Vision, Machine Learning, Brake Signal Detection, Parking Signal Detection

# DEEC based Meta-Heuristic Unequal Clustering Scheme for Energy Sustenance of Heterogeneous Nodes in WSN

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**Abstract:** Wireless Sensor Network (WSN)is becoming denser and more heterogeneous each and every day, with the overwhelming impact of technologies like IoT. Managing the energy and maintaining the lifetime longevity of the heterogeneous WSN is a challenging task. Unequal clustering is one of the imperative solutions for maintaining energy efficiently, ideal for minimizing hotspot problem in WSN. Heterogeneity of nodes in WSN needs apposite attention to avoid energy depletion of low energy nodes. This paper proposes the novel algorithm, Clustering of Heterogeneous Nodes with Bat Algorithm (CHNBA), that integrates the uniform energy dissemination protocol, Distributed Energy Efficiency Clustering (DEEC) with unequal clustering. The location of Cluster Head (CH) is optimized using the bio-inspired improved Bat Algorithm. DEEC has high ability to assure heterogeneity performance and clustering stability, while optimized unequal clustering ensures energy efficiency resulting in prolonged network lifetime. The effectiveness of the algorithm was experimented using Matlab simulations. The results proved that the protocol, CHNBA, is effective for the energy sustenance of a network. It outperforms the existing clustering protocols in energy efficiency, network lifetime, throughput, packet delivery ratio and stability.

**Keywords** – Heterogeneous WSN, Unequal Clustering, Competition Radius, Residual energy, Cluster Head, Stability

# Grid Based Path Finding Using Ant Colony Optimization Algorithm

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**Abstract:** The unique behavior of ants has inspired a number of methods, and Ant Colony Optimization (ACO) method has been the most successful general-purpose optimization technique. The ant colony metaheuristic has been shown to be effective in solving complex problems such as combinatorial problems and NP-Hard problems, frequently producing the best solution in the shortest time. However, ACO has received insufficient attention as a way of solving problems with optimal solutions that can be found using other approaches. The path finding problem is without a doubt one of the most important areas of navigation and telecommunications. Ants release chemical substances known as a pheromone in the ground while searching for food to mark a path that is preferred by them and other ants will get a hint about which path to follow from the strong smell of pheromone. The ACO algorithm uses a similar mechanism. So, in ACO, solutions to an optimization problem are being created by a group of artificial ants by exchanging information on their quality using a communication mechanism that is similar to actual ants. In this paper, an approach to implement the ACO algorithm for path finding in a 2D grid as the search space has been proposed.

**Keywords:** Ant Colony Optimization, Path finding, 2D Grid

# Improving Classification Based Log Analysis using Vectorization Techniques

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**Abstract:** IT infrastructure components are exposed to miscellaneous anomalies or failures as they flourish swiftly in scale and usage. The identification of failures is possibly managed by system logs produced on the execution of logging statements. A recent highly advantageous technique is to observe the system's behavior and identify the anomalous log entries to take corrective actions. However, current methods focus on classifying logs but overlook the nature of data. This paper proposes the log analysis system contingent on natural language processing (NLP) techniques considering logs as natural language text. This model is trained through TF-IDF, Polarity Score and Word2Vec as vectorization techniques and conventional machine learning classifiers, suitable to group records as per the assigned level. The efficacy of the proposed model was validated on various IT infrastructure logs. Experimental results demonstrate that sentiment analysis is possibly the encouraging technique for analyzing complex, huge and irregular system logs.

**Keywords:** Log analysis, NLP, ML, Classification.

# Deployment and Serving ML models using Kubeflow and KfServing

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**Abstract:** Network data is the data that is moving across the network. Due to the rise of network data its utilization is rising. This made the development of predictions using Machine Learning algorithms. In this paper, building and deploying the trained LSTM and prophet model using Kubeflow is proposed, and the trained model is served with the help of KfServing which will quickly provide an inference of the model. By utilizing the URL generated from KfServing, the model is tested. Kubeflow and KfServing are present in the ML PaaS framework. This paper uses the Key Performance Indicator (KPI) as the dataset that is obtained by performing the pre-processing to the counter value obtained from the network data and the paper provides affirmation on whether the framework supports both the algorithm or not. Another objective of this paper is to deploy the logs into the Docker Container instead of the virtual machine. The container of the pod contains the output of the training, inference of the model (URL) that has a path where the trained model is stored, and the predicted dataset. A robot framework is used to automate this process, where the whole tasks are divided into subtasks. Each task is executed only after the execution of the previous task. It is monitored for continuous integration in the Jenkins tool.

**Keywords:** Machine Learning, LSTM (Long Short-Term Memory), Prophet, Kubeflow and KfServing, Docker Container Environment, Jenkins.

# Lung Cancer Classification using Cross Stage Partial Network: A New Enhanced Learning Capability of CNN

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**Abstract:** State-of-the-art approaches have been enabled by Neural networks to attain accurate results on tasks such as detection of objects which are related to computer vision but the success of these approaches relies on computational resources that are costly and hinders people who prefer cheap devices to advanced technology. A network named Cross Stage Partial Newtork(CSPNet) is proposed in this paper to diminish the problem that requires computations based on heavy inference in the view of network architecture. This problem is caused due to the duplicate gradient information that is present within the network optimization. The maintenance of the variability of gradients by the proposed networks is done by combining feature maps both at the beginning and the end of a network stage, the computations is reduced by 20% with equal or even greater accuracy on the image dataset of Chest CT-Scan. The implementation of CSPNet is quite easy and also standard in nature to deal with architectures that are built on DenseNet and ResNet

**keywords:** Cross Stage Partial Network (CSPNet), Convolutional Neural Networks (CNN), DenseNet, ResNet, ResNeXt,.

# Emoji Creation from Facial Expression Detection Using CNN

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**Abstract:** This paper implements a deep learning model to classify human facial ex-pressions and map the expression with the corresponding emojis.The model uses facial expressions that express the emotions of humans as input to the model. Then the input is classified and mapped to the respective emoji. Emojis are majorly used to represent verbal cues. Emojis have been the most important part of online interactions through messages, gathering ratings and reviews of products, and for many more purposes.Theareas of computer vision and deep learning have evolved, and it is now easier to recognize facial expressions. The interpersonal relations between humans are affected by facial expressions. The identification of human facial expressions plays an important role in computer-human interactions. It may also be used in understanding the behaviors of humans. It is easier for humans to identify emotions through facial expressions, but it is difficult for a deep learning model to detect emotions. As an outcome of the rapid development in machine learning, it became possible to recognize emotions through the facial expressions of humans.

# IoT-based Telemedicine Health Monitoring System with a Fuzzy Inference-based Medical Decision Support Module for Clinical Risk Evaluation

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**Abstract:** This paper discusses the design and implementation of an Internet of Things (IoT)-based telemedicine health monitoring system (THMS) with an early warning scoring (EWS) function that reads, assesses, and logs physiological parameters of a patient such as body temperature, oxygen saturation level, systemic arterial pressure, breathing patterns, pulse (heart) rate, supplemental oxygen dependency, consciousness, and pain level using Particle Photon microcontrollers interfaced with biosensors and switches. The Mandami fuzzy inference-based medical decision support system (FI-MDSS) was also developed using MATLAB to assist medical professionals in evaluating a patient's health risk and deciding on the appropriate clinical intervention. The patient's physiological measurements, EWS, and health risk category are stored on the Particle cloud and Thing Speak cloud platforms and can be accessed remotely and in real-time via the internet. Furthermore, a RESTful application programming interface (API) was developed using GO language and PostgreSQL database to enhance data presentation and accessibility. Based on the paired-samples t-tests obtained from 6 sessions with 10 trials for each vital sign per session, there were no significant differences between the clinical data obtained from the designed prototype and the commercially sold medical equipment. The mean differences between the compared samples for each physiological data were not more than 0.40, the standard deviations were less than 2.3, and the p-values were greater than 0.05. With a 96.67% accuracy, the FI-MDSS predicted health risk levels that were comparable to conventional EWS techniques such as the Modified National Early Warning Score (mNEWS) and NEWS2, which are used in the clinical decision-making process for managing patients with COVID-19 and other infectious illnesses.

# HDMFRTDB: Design of a High-Efficiency Deep Learning Classification Model for Fruit Ripeness-Type Differentiation via Bioinspired Optimization

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**Abstract:** Fruits have a tendency to change their visual appearance based on their internal composition. Thus, unripe fruits have different visual appearance than ripe ones, while disease infected fruits have different appearance than healthy ones. Nowadays artificial fruit ripening is growing at a tremendous pace, which is done to produce fruits faster for the ever-increasing population-led demands. But these fruits are not healthy, and cause a wide variety of health & mental issues for regular consumers. Thus, high-efficiency identification of these fruits based on their visual appearance is needed, which will assist everyday consumers to check their fruits before buying or consuming them on regular basis. To perform this task a wide variety of clinical methods are proposed by researchers, and most of them either have limited accuracy, or cannot be used for different fruit types. To overcome these limitations, the contribution of this paper is design of a novel high-efficiency deep learning classification model for fruit ripeness-type differentiation via bioinspired optimization, which is proposed in this text. The proposed model initially uses a Contrast Limited Adaptive Histogram Equalization (CLAHE) enhancement method with LAB color-space based CNN Model to accurately classify fruits. Based on this classification, a bioinspired model based on Grey Wolf Optimization (GWO) and Particle Swarm Optimization (PSO) is used for identification of fruit-ripeness classes. These include, naturally ripened, artificially ripened, and unripe categories, which will assist normal consumers to identify fruit categories via a cloud-based subscription model. The proposed model has high-speed due to use of pre-trained VGGNet-19, You Look Only Once (YoLo V2), and Mobile V Net2 models, which assist in high-efficiency classification. These models were selected because of their higher accuracy on multiple dataset scenarios. The proposed model was tested on various fruit databases including Fruits 360, Fresh Fruit Database, and ILSVRC2014 datasets. Based on this evaluation, it was observed that the proposed model showcased 15.4% better accuracy, 8.3% lower delay, 9.5% better precision, and 6.2% better recall than existing methods. It was also observed that the proposed model was capable of estimating fruit ripeness-type with 94.5% accuracy across 5 different fruit types. The model was also deployed over cloud for general purpose testing & evaluation, and it was observed that the model was capable of processing fruit images under 500ms, which makes it capable of high-speed deployments. Due to this high performance, the proposed model is useful for a wide variety of clinical and real-time use cases.

**Keywords:** Fruit, Ripe, Artificial, Natural, Processing, Performance, Delay, Accuracy, Precision, Recall, Histogram, Enhancement, Healthy, LAB, CNN, GWO, PSO

# Emotion Based Music Recommendation System to Generate a Dynamic Playlist

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**Abstract:** Music plays significant role in every individual life. People often get confused with the large set of music library which songs they have to listen to based on current mood and this is time consuming process, very tedious and need manual work. Different types of algorithms have been introduced for automating the music library. However, the existing algorithms used are slow and less accurate. This proposed system algorithms in view of facial expression will create a playlist consequently thereby reducing the work and time engaged with delivering the cycle physically. In terms of accuracy emotion extraction algorithm gives around 80-90% for real time images, 95-100% for the static pictures. In this way, it yields better exactness concerning execution and computational time and lessens the planning cost, contrasted with the algorithms utilized in the literature survey. Playlist is created, based on the detected feature.

**Keywords:** Music Recommendation, Emotion, Facial Expression

# A Computer Vision Method for Detecting the Lanes and Finding the Direction of Travelling the Vehicle

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**Abstract:** Road lane detection is very important in the driving assistance systems and it enhances the vehicle's active safe driving.This project is based upon the computer vision techniques. The boundaries are detected and radius of curvature is displayed on the screen, apart from this the direction of the vehicle is also detected from the video that is given as input. The lane is captured with the camera that is present on the top of the vehicle. By using the camera distortion coefficient we have to rectify the distortion present in the set of images. Using this distortion coefficient convert the distorted image into undistorted image. To convert the undistorted image into binary image we use hsv (hue, saturation, color) thresholding. By using perspective transformation the picture is converts to bird's eye from the binary undistorted picture. Later we will find the left curvature and the right curvature and distance from the axis of the road and vehicle. So finally, we wrap the input with the detected lane and display the radius of curvature.
**Keywords:** Camera calibration, Perspective transformation, Hough transform Radius pf curvature.

# Ensembled Machine Learning Techniques for DDoS Detection in SDN

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**Abstract:** Software Defined Networking (SDN) focuses on overcoming the drawbacks of traditional networks and offers the advantage of flexibility in managing the networks. On the other hand, this new paradigm makes networks susceptible to attacks. DDoS is one of those significant attacks. DDoS makes resources unavailable to legitimate users, and one of the mechanisms that attackers follow is the TCP-SYN flood to launch the DDoS attack. The TCP SYN flood attack takes advantage of the three-way handshake to exhaust the web server's resources. We proposed an approach to detect DDoS attacks in SDN based on an ensemble technique. Our proposed approach uses stacking model, combining bagging and boosting models as ensemble techniques. we implemented our proposed approach on dataset. We have generated our own dataset containing the required features. We show that our proposed approach gives better accuracy than existing models in the literature. We validated our proposed approach on both generated dataset and existing dataset.

 **Keywords:** Software Defined Networks, DDoS Attacks, Ensembled Techniques, Stacking Model

# Classification of Cotton Leaf Diseases using Transfer Learning- DenseNet-121

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**Abstract:** Farmers growing cotton will have a great help of the cotton yield is predicted accurately and helps in making decisions such as crop insurance, how much to store, investments, requirement of fertilizers, water etc. Generally, yield is measured by means of sample surveys using destructive sampling of cotton fields and will take enormous time, cost for the labor is high. As we know that these cotton plants are affected by various bacterial and fungal diseases based on the climate conditions resulting in the decline of cotton productivity. Plants are prone to numerous diseases. In the cotton plants the mostly affected part is the leaf that damages the plant resulting in the damage of the entire crop. In order to detect the diseases of the cotton leaf, image processing and machine learning techniques are employed. In the existing work DEEP learning technique CNN is employed for feature extraction which is used to detect plant diseases. There is an issue with the accuracy of these traditional CNN algorithms. The Experimental results achieved showed that the proposed model i.e., DenseNet-121 pre-trained Model is capable of classifying different leaf images in the dataset with higher classification accuracy of 91%. This transfer learning technique uses ImageNet weights to detect the diseases of cotton plant accurately.The abstract should summarize the contents of the paper in short terms, i.e. 150-250 words.

**Keywords:** Cotton Leaf Disease, DenseNet-121, Convolutional Neural Network.

# Student Interaction on Moodle for a Foundation Course at a Tertiary Institute in Fiji

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**Abstract:** In this paper, we examine which interaction(s) students engage in the most on Moodle in a Pre-degree (English Foundation) course in a tertiary institute in Fiji. A mixed method research approach was used to collect data. Quantitative data was collected and analysed for students' interaction on Moodle with the content, teacher, other learners, learning environment, assessment, and feedback on assessment. Qualitative data was examined to explore students' interaction with the institution. It was found that students interacted mostly with the learning environment than the other forms of interaction, as this included the total number of times students logged into the course (LLFXX) Moodle page. Their interaction with the assessment and feedback on assessment was also higher than the content, teacher and other learners. Therefore, it can be concluded that students' interaction was high for assessment related interactions (assessment and feedback on assessment).

**Keywords:** e-learning, interaction, LMS, Moodle.

# A Privacy Oriented Neural Collaborative Filtering based Framework for Recommender System

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**Abstract:** Recommender System (RS) are growing rapidly and participating in Deep Learning to provide high quality of recommendations. RS are used to select the best choice for user what they might like. In recent years, it is obvious that various RS have been proposed for a little while. This field is buzzing with innovation to be sure. Deep RS is a model which is trained for recommendations based on interaction with a neural network. The properties which make neural architecture effective are end–to-end differentiable and provide learning biases to input data type. We propose a framework named as Privacy Preserve Neural Collaborative Filtering (NCF) by using Differential Privacy (DP). In this paper, we use General Matrix Factorization and Multi-layer Perception Network which is apply on real world data sets for experimentation. We also compare of our framework with other models that are based on matrix factorization and implicit feedback. To measure the performance evaluation we use parameters such as: MAP, NDGC, Precision and Recall. For measuring the DP Performance, Optimal Renyi Differential Privacy (RPD) order is considered which shows the effectiveness of the proposed framework.

**Keywords:** Recommender system, Collaborative filtering, Privacy, Neural network, Deep learning

# BERT based approach for Suicide and Depression Identification

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**Abstract:** With the advent of the Internet, there is an increasing requirement for sophisticated and intelligent systems that can operate efficiently handle the identification on social media about health-related issues, such as depression and suicide recognition. The data generated by social media users is unstructured and unreliable. The text representation and deep learning algorithms used, however, it gives only a limited amount of information's as well as expertise regarding the various user-supplied texts. We started with BiLSTM (Bidirectional Long Short- Term Memory) with progressed towards Transformer models similar as BERT (Bidirectional Encoder Representations from Transformers). In our research, we discovered that they perform considerably superior to traditional Deep Learning architectures such as Bi-LSTM and BERT. We have designed our own data collecting platform using Reddit, one of the majority popular social networking sites. Finally, we have used BERT plus Bi-LSTM to efficiently evaluate as well as notice indicators of depression plus suicide in social media posts.

**Keywords:** BERT, Bi-LSTM, Depression, Suicide, Reddit

# MG-Net: Multiple Person and Gadget Detection for Online Exam Proctoring System

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**Abstract:** Recently, the education system has shifted from traditional classroom teaching to online or blended mode. Main challenge to education system is Exam Proctoring. One of the important limiting factors in the field of education is the inability to proctor online examinations. Manual Proctoring through webcam is expensive and labor intensive. In this paper, we proposed MG-Net which automatically detects multiple persons and gadgets in the frame and alerts the proctor. The convolution operations were performed along with residual blocks to improvise the performance if the model over existing systems. Our model is trained using COCO dataset. Our model is tested on the customised dataset and performs well with 92.8 accuracy.

**Keywords:** MG-Net, proctoring, residual block, softmax, convolution.


# Customer Segmentation Using K Means Clustering

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**Abstract:** In this paper, tells about the customer segmentation of today's fast-paced world of marketing, where the focus has shifted from product to customer, customer service management may be seen as a key to attaining revenue growth and profit. The communication system that exists between companies and their consumers is referred to as customer relationship management. In the commercial world, customer experience management is necessary. Maintaining a productive connection with business clients is crucial since a business transaction demands more decision-making and professional purchasing effort than a consumer purchase. Most scientists use data mining to examine numerous techniques to segmenting customers using a variety of clustering algorithms in a variety of businesses. In the realm of data analytics, there are a variety of approaches used in the segmentation process. It guarantees that marketers concentrate their efforts on the customers who are most likely to react. Additionally, after a successful customer segmentation procedure, businesses may be able to employ more effective marketing tactics, lowering investment risk. We utilise the k-means clustering technique to categorise customers based on their worth in this article. Once that, after a certain amount of time has elapsed, a change evaluation is performed. This research is unique in that it takes into account the duration and trend of customer value changes in order to increase the accuracy of forecasts based on previous customer behaviour.

**Keywords:** K-Mean Algorithm, Customer Relationship Management, Data Mining, Customer Segmentation

# Automated Gesture Recognition and Speech Conversion Tool for Speech Impaired

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**Abstract:** By translating hand gestures into a series of words or speech, Sign Language Recognition (SLR) aims to improve communication between deaf and dumb people and the general public. Despite the fact that this activity has a sig-nificant societal impact, it is nevertheless challenging due to the complexity and wide variation of hand behavior. Existing SLR techniques use hand-composed pieces to characterize sign language movement and develop division models based on those aspects. It's difficult to create reliable features that respond to a wide range of hand movements. The goal of this project is to develop a sign lan-guage recognition project using CNN and predict the output in the form of text and audio.

**Keywords:** Indian Sign Language, Machine Learning, CNN

# Development of Wearable and Portable Cardiac Arrest Prediction System

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**Abstract:** The research is founded on a medical engineering strategy for the creation of a cost-effective Cardiac Arrest Prediction Device. These gadgets have previously been invented and are in use in developed nations, but in underdeveloped nations it is difficult for families of all socioeconomic classes, from the lower to the middle class, to afford them. The paper focuses on development of a device that will primarily concentrate on medical-grade, real-time cardiac arrest prediction by continuously monitoring the heart rate of the user and alerting him to any abnormalities so that he can take the appropriate safeguards as soon as possible. The device will be based on the fundamental properties of ECG signals, will take readings from the electrodes, and will notify the user via smartphone notifications. The ST/T slope algorithm has been implemented to calculate the average values from the acquired data. The next edition of the device will emphasize a centralized monitoring system that will provide the user with access to all of his data at any time or location. Checking the status using the mobile device's application will provide several advantages. This technology will provide low-cost cardiac arrest prediction, allowing anyone to utilize it with confidence.

**Keywords:** Cardiac Arrest · Prediction · Portable

# Political Optimizer based Automated Machine Learning for Skin Lesion Data

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**Abstract:** Today in the age of information revolution, everything is being automated. Machine Learning is needed for every industry to boost growth in business, health, agriculture, and everyday life. As Machine Learning is creating its importance in every industry, wherever there is scope for information generation, practicing Machine Learning is less than 40% in real-life. This is mainly because of the challenges while creating, implementing, and deploying Machine Learning models which require expertise. In this scenario, Automated Machine Learning tools allow everyone without knowledge of coding to use insights from Machine Learning models. In this paper, an efficient model has been designed and developed for skin lesion imagery classification. The research work undertaken in this paper is to tune hyperparameters using political optimizer for constructing efficient classifier. The proposed model is gauged on ISIC-17 dataset and average accuracy, sensitivity, specificity were 97.86, 0.9736, 0.9878 respectively. The proposed model has been evaluated with existing classification techniques SVM and BPN for comparative analysis and it has been justified per the experimental outcomes that the classifier model with political optimizer for hyperparameter tuning proposed in this paper performs better than the SVM and BPN models.

**Keywords:** Automated Machine Learning, Machine Learning Pipelines, Political Optimizer, Hyperparameter Tuning, Machine Learning Model Training.


# Tree Cutting Sound Detection using Deep Learning Techniques Based on Mel Spectrogram and MFCC Features

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**Abstract:** This paper presents an approach that classifies the process of tree cutting events in a forest based on sounds detection. In the forest environment consists of different types of sounds generated with different frequencies from various directions. CRNN model provides accurate results through multi dimensional data input through which can learn various audio features for predicting the real time scenarios. In this Research CRNN has implemented for performing sound event classification and predict the real time scenarios in better way. Multiple features such as MFCCs and Mel Spectrogram are extracted from each sound sample for generating the prediction rate. In our research we have taken three classes of dataset related to tree cutting such as: axe knocking, saw cutting and tree falling. And the rest of the sounds are considered as noise class and is added to false ratio. The performance obtained through the proposed model has generated an accuracy of 93.4% on our newly proposed datasets which is better than existing methodologies of forest environmental sound detection.

**Keywords:** CNN, RNN, CRNN, MFCC, Mel Spectrogram.

# Vision-Based System for Detection of Petrol Pump and Charging Station

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**Abstract:** This work presents a method for detection of fuel and charging stations. Automobiles may run out of fuel and leave people stranded. Detection of fuel and charging stations play an important role in driver assistance system. This paper uses combined approach of computer vision technique and machine learning algorithms. Proposed system alerts users by sending an audio message when fuel stations are detected. Combination of Binary Robust Invariant Scalable Key points (BRISK) and Oriented FAST and rotated BRIEF (ORB) methods are deployed for extraction of features. A blend of K-Means and Principal component analysis (PCA) is used for reducing size of the feature vector. Accuracy of Soft voting method with five classifiers is 77.90%. Random forest algorithm provided higher accuracy of 82.26% and 83% F1 score.

**Keywords:** Driver Assistance System, Detection of Charging Station, Detection of Petrol Pump, Machine Learning

# Emotion Analysis Using Convolutional Neural Network

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**Abstract:** Facial expressions convey a lot of information visually rather than articulately. From the past few years, Facial Expression Recognition is a challenging task in computer vision for Human-Machine Interaction as the way of expressing the emotions varies significantly. Nowadays, deep learning techniques own a big success in various fields including computer vision. From the background analysis we found that the recognition of emotions is still difficult, and it relies on some advancements in image preprocessing and computer vision techniques. In the proposed system some Image enhancement techniques are being used along with CNN. The main objective of Facial Expression Recognition (FER) systems is to detect an expressed emotion and recognize the same based on geometry and appearance features. The proposed Facial Expression Recognition system is performed in four-stages consisting of pre-processing, face detection, feature extraction, and expression recognition using different variants of convolutional neural networks (CNN) and OpenCV to identify the seven key human emotions such as anger, disgust, fear, happiness, sadness, surprise and neutrality. The proposed system can be used in applications containing behavioral analysis on humans.

**Keywords:** Convolutional Neural Network (CNN), Facial Expression, Emotion analysis.

# kNOw PCOS

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**Abstract:** Polycystic Ovarian Disease (PCOD), also known as Polycystic Ovary syndrome (PCOS) is a very common condition affecting 5% to 10% of women in the age group 12–45 years. Due to busy schedules, proper diet and exercise are the least things that are taken care of. Besides bad lifestyle, poor quality of food is also one of the main reasons for poor health quality. The principal features of PCOS include no ovulation, irregular periods, acne and hirsutism. If not treated, it can cause insulin resistant diabetes, obesity and high cholesterol leading to heart disease. PCOS is also a common and treatable cause of infertility. Many diseases can be cured by taking a course of medication within a stipulated time but treatment of PCOS deals with a continuous process where diet and physical activities should be monitored. The aim of this work is to develop a flutter based mobile application which predicts the presence of PCOS in women using machine learning by considering the clinical parameters or ultrasound scans. The application also gives suggestions regarding diet and exercises and also tracks the PCOS level. A user dashboard is provided where each user can sign up, create a profile, and track the progress & improvement of health status. The mobile application ensures the data integrity and confidentiality of user's data.

**Keywords:** PCOS, PCOD, symptoms, Random Forest Algorithm, CNN, machine learning, suggestions

# Factors Affecting Interaction on Moodle: An Empirical Study Based on TAM

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**Abstract:** In this paper, we looked at the factors that affect students' interaction on Moodle. These factors were assimilated into Technology Acceptance Model (TAM) to explore if the mentioned factors actually affected the actual usage of Moodle. A qualitative method research approach was used to collect data. Students filled in a questionnaire with open ended questions for the purpose of this research. Data was collected and the identified factors were categorized according to the segments of TAM. The factors were divided under perceived usefulness, perceived ease of use, attitude toward using and behavioral intention to use. It was found that the factors did have an effect on students' interaction on Moodle.

**Keywords:** e-learning, interaction, Moodle, TAM.

# Metacart - Decentralized Social Media Marketplace to incentivize creators and ensure user data privacy

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**Abstract:** Metacart is an ad-free, tracking-free, and creator-friendly web3-based social media powered by Cryptocurrencies and NFTs. Unlike current social media applications that track user activity, we ensure data privacy by leveraging decentralized IPFS storage. We use Ethereum-based tokens to facilitate content monetization through Micro-Tipping. This feature enables users to support their favorite creators by tipping apart from liking and sharing. We democratize digital asset ownership by minting each post into an NFT with just a click, which subsequently can be traded on our own NFT marketplace. Utilizing our proprietary Dynamic Pricing Algorithm, which gauges the value of the assets intelligently based on virality and engagement, we determine the price of NFT. In all the transactions, we use our tokens built on Ethereum to carefully construct healthy web3 business models that leverage tokenomics to create value for every party in a positive sum manner

**Keywords:** Block chain, Smart Contracts, Decentralization, Web3, Social Media, NFT Marketplace, Non-Fungible Tokens, Micro-tipping, Tokenomics, Intelligent Pricing Models, Intellectual Property Pro

# High-Speed Low Area 2D FIR Filter using Vedic Multiplier

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**Abstract:** In this paper, a novel two dimensional (2D) finite impulse response (FIR) filter is proposed using Vedic multiplier architecture. Several multipliers, like Vedic, array, Booth, and Wallace tree, are employed in the construction of filters to reduce filter area, and power consumption. The VM lowers the partial products (PP) in multiplication among various multipliers. As a result, multiplication happens more quickly. The VM uses a sutra known as "Urdhva Tiryakbhyam," which is based on ancient mathematics. Two techniques to maximize speed, area, and power are suggested in this research. The first technique makes use of a VM (VM) predictor block and the second method is based on reusable block for the VM. The proposed novelty design is coded by Verilog HDL and synthesized using Xilinx 14.7 tool. The proposed design results are compared with existing designs. The number of slices required for 2D FIR using VM is less when compared with FIR with normal multiplier.

**Keywords:** Digital filter, half adder, Vedic multiplier, signal processing, full adder

# Classification of Cotton weeds in the Cotton farms using Deep Transfer Learning Techniques

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**Abstract:** In current world, the automated weed control systems must important to identifying and locating the weeds from the main plant. In order to improve the production of main plant, the weeds must be identified and treated at the beginning stage. In recent years, Deep learning algorithms gives the better performance for the various complex tasks like image processing, audio and video processing, etc.,. This research paper presents the idea of classifying the various weeds from the main plant using various pre-trained models. The cotton plant was chosen as the main plant with one of its weeds Carpetweeds, Eclipta, Morning glory, and Ragweed was chosen. But one of the major problems in real world scenario is the soil, dust, etc., present in between of main plant and the weed. So this paper proposed a methodology to segment the weeds and main plant images from others at very first stage of process. Then the segmented images fed into the pre-trained CNN models like VGG16, ResNet50, InceptionV3, MobileNet and InceptionResNetV2 for the classification task.

**Keywords:** Image Segmentation, Weed Classification, Machine Learning, Deep Learning

# Beam Pattern Configuration Control Unit for a 24 X 24 Reconfigurable Array of Photo Detector-based Pixels

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**Abstract:** A versatile control unit to read 24 X 24 array of photo detector-based pixels is presented. The purpose is finding the center of the non-diffractive beam incident on the pixel. A 24 X 24 array of photodetector-based pixels is read out based on a system consisting of decoder and a multiplexer. A decoder is used to activate a particular row of pixels. All pixels of a single row are read, values are fed into multiplexer and a single pixel value is read out. Input to decoder and select lines of multiplexer are from a sequence generator. The design of sequence generator is based on different beam patterns as required by the user. A state machine to read out user defined pattern, in a 24 X 24 array of photodetector-based pixels is implemented using Verilog HDL. The implemented design demonstrates read out of set of pixel values for two different beam patterns.

**Keywords:** Non-diffractive beam, Photodetector, System-on-chip

# Analysis of Clustering Algorithms for Facility Location Allocation Problems

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**Abstract:** Problems with facility location include selecting where to site a facility in order to meet the specified constraints most effectively. Choosing a production site that minimizes total weighted distances between suppliers and consumers, where weights represent the difficulty of carrying goods, is sometimes a challenging task. Numerous approaches and algorithms have been created to address location-related issues. In this research, we employ a clustering-related strategy to solve these location allocation problems. This strategy has already been applied in a variety of research projects employing clustering-based algorithms distinct from those we employed in our study. In this study, we are allocating locations for park facilities using Possibilistic C-Means clustering and Fuzzy Possibilistic C-Means clustering algorithms. To illustrate the most ideal method/algorithm, we compare the results acquired after selecting the optimal location using different clustering techniques.

**Keywords:** Fuzzy logic, Facility location problems, Fuzzy clustering.

# Biometric Based Key Handling using Speeded Up Robust Features

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**Abstract:** The Biometric recognition process involves identification/ verification based on individual's biometrics. During this process, the security and privacy needs to be protected against intruders and attackers. Biometric Cryptosystem (BCS) handles the issues related to security and privacy, where" Biometric" handles verification and "Cryptosystem" handles security by encryption. Almost every BCS method makes use to key for implementing their core functionality. This paper discusses a novel method for biometric based key handling using Speeded Up Robust Features (SURF). The data is encrypted/decrypted using the derived key. The biometric key is retrieved during the enrollment stage, which then encrypts the data. After a successful biometric match, the secret is decrypted during the authentication phase. On three databases: AMI (ear), FACES (face), and UBIPr (iris), the suggested method is compared to state-of-the-art methods. The metrics used to evaluate the performance of proposed method include: Number of Pixel Change Rate, Unified Average Change Intensity, Peak Signal-to-Noise Ratio, Correlation, Mean Square Error, Mean Absolute Error, Structural Similarity, Normalized Root Mean Square Error etc. The quantitative and qualitative results of the proposed method are better with state-of-the-art methods.

**Keywords:** Key handling · Biometric cryptosystem · SURF.

# Magnitude Based Weight Pruned Automated Convolute Neural Network to Detect and Classify the Plant Disease

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**Abstract:** Agriculture systems are constantly vulnerable to pathogenic viruses and the diseases caused by them, posing a threat to a country's food security. Farmers often find it challenging to find the diseases in the plants at an early stage before it destroys the plant completely. In the proposed research work, an intelligent deep convolutional neural network for leaf image classification is developed, which can recognize 38 different types of plant diseases that are prevalent in 14 unique plant species. According to the complexity of the classification problem, various hyper parameters such as the number of epochs, batch size, hidden layers for feature extraction, dropout layers for regularization, and the number of neurons in each dense layer has been carefully designed in such a way that the model is neither overfitting nor underfitting, thus building an optimized deep CNN model. The developed CNN model for plant disease detection has an overall accuracy of 95 % on the validation dataset. Further, magnitude-based weight pruning is carried out to reduce the network size by 66.7% and the overall accuracy is increased by 2%. Out of 33 test images, the model has predicted the plant diseases with an overall accuracy of 93.9% on the previously unseen test dataset. Thus, farmers would be highly benefitted from the proposed less complex weight pruned CNN model as it predicts plant diseases using the concept of feature extraction with high accuracy, if a diseased leaf image of a plant is given as an input.

**Keywords:** Convolutional Neural Network, Magnitude-based weight pruning, Plant health, Hyper parameters tuning, Feature extraction.

# Understanding the insights of Privacy Policies using BERT

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**Abstract:** Privacy policies are the documents designed by an organisation to store and handle user's personal information. These documents are often long, full of legal terms and complex to understand. While reading and understanding the clauses before agreeing is mandatory in the privacy policy very few user take time to read them. User share sensitive and crucial personal information to access the content or the product of that organization without knowing policies due to the reading complexity of the privacy policy document. Rather than reading the whole policy document, an approach might be followed to know the gist of the privacy policy in least time by simply knowing the answer of specific questions users are concern about. In this work, we propose a question-answering based approach to know the answer of specific concerned questions from a privacy policy. The current work focused at the kinds of questions users are likely to pose to such a system shown by promising prior research works. We conduct experiments of our proposed approach on a corpus of privacy policies covering different types of organisations and reported our evaluation result.

**Keywords:** Privacy policy, Summarization, Question-answering system, Machine learning, Natural Language Processing.

# Breast Cancer Detection using Deep Learning Model

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**Abstract:** Early detection of breast cancer is a challenging task. It is the major source of death among the leading and underdeveloped countries. The detection of breast cancer at earlier stages helps patients suffering from the disease to get proper treatment. Considering this aspect, the approach using deep learning architectures had been proposed to detect the presence of breast cancer given the cytology images. Transfer learning method is used in terms of building pre learned model to improve the performance of the proposed approach. Using average pooling classification, the images were divided into malignant and benign cells Three architectures of CNN combined in the proposed work for better prediction and accuracy.

**Keywords:** Convolutional Neural Network, Breast Cancer, Deep Learning, Transfer Learning

# Classification of Family Domain of Amino Acid Sequences using CNN-LSTM

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**Abstract:** As diseases become more and more resistant and adaptive, protein classification is crucial to identify and create cures or vaccines for the diseases. Proteins interact with other macromolecules, playing a central role in many biological processes. Investigating protein function often involves structural studies or biochemical studies, which require time consuming efforts. So, classifying a protein in a virus or such can help researchers to determine the basis of the disease, which can in turn elucidate methods to prevent and treat the disease. The proposed approach uses a CNN-LSTM architecture for the main purpose of identification. LSTMs have an advantage over RNNs in that they do not suffer from the vanishing gradient problem. LSTMs are very good at processing long sequences without losing any gradient value. Coupled with this, a CNN is employed to deep-extract the features present in the protein sequence. The dataset used here is based on real-time data of researchers, who conduct various tests on proteins and the results are archived together as a whole dataset. The same classification task is performed using a Fast text architecture and the performances are compared and analyzed to infer the most efficient and accurate architecture.

**Keywords:** Protein sequences, LSTM, CNN.

# A Performance Evaluation of Situational-Based Fuzzy Linear Programming Problem for Job Assessment

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**Abstract:** The motive of job evaluation is to elucidate the relative work that the role of different jobs makes towards different organizational objectives. Various methods are used to solve problems related to job evaluation as ranking method, factor comparison method and many more. In the present paper various jobs are evaluated in fuzzy environment. Fuzzy mathematical model is developed to solve various problems in job evaluation by using suitable methods. The objective of the paper is to locate various problems in evaluation of jobs and then solve the problems using Fuzzy mathematical method. An endeavour has been done to solve the job-related problems by numerical and equations.

**Keywords:** Job evaluation, fuzzy number, fuzzy linear programming problems, and optimization.