# VIDYAJHARI

**INFORMATIONTECHNOLOGY MAGAZINE FOR THE**

**YEAR 2020–21**

**VOLUME NO: 13**

**ANNUAL   ISSUE**

# ADITYA

## Institute of Technology and Management

**(An Autonomous Institution)**

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### Department of Information Technology

## VISION

To evolve into a premier engineering institute in the country by continuously enhancing the range of our competencies, expanding the gamut of our activities and extending the frontiers of our operations.

## MISSION

Synergizing knowledge, technology and human resource, we impart the best quality education in Technology and Management. In the process, we make education more objective so that the efficiency for employability increases on a continued basis.

# ADITYA

## Institute of Technology and Management

### (An Autonomous Institution)

## Department of Information Technology

## Vision of the Department

Create high-quality engineering professionals through research, innovation and teamwork for Information Technology services with outstanding faculty, facilities and education.

## Mission of the Department

**M1:** Information Technology program dedicates itself to provide students with a set of skills, knowledge and attitude that will permit its graduates to succeed and thrive as successful information technologists.

**M2:** Enhance overall personality development which includes innovative thinking, Team work, entrepreneur skills, communication skills, employability skills and ethical conduct.

**M3:** Ensuring effective teaching–learning process to provide in-depth knowledge of Inter disciplinary areas.

**M4:** Providing industry interactions through consultancy and sponsored research for the societal needs.

**Dr. K. Someswara Rao**
**Chairman**

## MESSAGE

At AITAM, we are committed to excellence in everything we do. We strive to mould the students in balancing intellectual and practical skills to become leaders in all the fields of Technical know-how and Management. We have created the finest facilities for the students to make the most of their scholastic pursuits. We are closely aligned with the corporate world which ensures exchange of ideas and experiences that keep our curricula focused on current developments and challenges in the field of engineering. We are firmly committed to research and consulting activities to contribute to the development of the discipline of engineering. Our vitality lies in our spirit of innovation. Our strength lies in our pragmatic approach. Our success lies in our will todo.

Sri. L L
NaiduSecretary

**MESSAGE**

Aditya Institute of Technology and Management is founded to meet the increasing demand for competent engineering graduates. Within a short span of its inception, AITAM has grown to be a premier engineering college of its kind and has won laurels and kudos from the industry. The faculty and staff in AITAM are dedicated to providing first-class education that instils strong and potent basic knowledge for sound practice in science and engineering for the well-being of the society. The Institute offers curricula that nurtures creative thinking and prepares students for productive and rewarding careers. The Institute offers programmes that deepen learning experiences of our students and prepare them for successful careers as engineers.

**Prof. V VNageswara RaoDirector**

### MESSAGE

Engineering education at AITAM is indeed a rewarding intellectual experience. The Institute prepares the engineering professionals of tomorrow imbued with insight, imagination and ingenuity to flourish as successful engineers. Our programs are attuned to the needs of the changing times. The classrooms are ultra-modern; the library and labs are cutting-edge; and all the members of the faculty are workaholic professionals and masters in their fields. Not surprisingly, our students are recruited by such renowned organizations as HCL, Satyam, WIPRO, INFOSYS, TCS, Visual Soft, Innova-Solutions and InfoTech. The exceptional dedication of our students, faculty and staff, and our collaborations with Industry and other institutions ensure that the Institute is well-poised to create a unique niche in the horizons of engineeringeducation.

**Dr.A.S.Srinivasa RaoPrincipal**

## MESSAGE

It is only through knowledge that man attains immortality. Knowledge has to expand or grow to remain as knowledge. The road to excellence is toughest, roughest and steepest in the Universe. The world requires and honors only excellence. Available information has to be directed by wisdom and intelligence to create new knowledge. Promotion of creativity is the new role of education. It is only through creative thinking that the present and future problems can be addressed to find dynamic solutions. Technology should be used to help remove poverty from the world. In fact forty per cent of the world's poor are in India. Confidence leads to capacity. It is faith in oneself that produces miracles. Education at AITAM helps build character, strengthen the mind, expand the intellect and establish a culture of looking at problems in a new perspective. The student is put through rigorous training so that he can stand on his own feet after leaving the portals of the Institute.

**Dr. B V RamanaHOD, IT Department**

## MESSAGE

Information Technology is a Professional Engineering Discipline that deals with application of computers to store, retrieve, transmit and manipulate data. Our Department has a team of qualified and experienced faculty and staff members and we motivate both faculty and students continuously to improve the quality of education and to maintain its position of leadership in Engineering and Technology. The Department guides the students to develop their Technical skills and motivate them to learn Research Methodology. Our Department has been conducting National workshops and organizing seminars since its beginning to keep the faculty and students with the latest developments in the field of Technical Education. Our Department faculties are actively publishing their research articles in reputed international and national journals and actively participated in various international and national conferences to publish papers.

# B.Tech Project Abstracts

| S.NO | Roll NO.s | Student Names | Titel |
|------|-----------|---------------|-------|
| 1 | 17A51A1222 | SivaKumar Panda | COMPARISON OF PERFORMANCE METRICS OF CLASSIFICATION ALGORITHMS IN SENTIMENTAL ANALYSIS |
| | 17A51A1204 | B. Sowjanya | |
| | 17A51A1206 | B. Kiran Baba | |
| | 17A51A1213 | K. Tanuja | |
| | 17A51A1226 | V. Sivaram | |

**ABSTRACT**

In this project, four different classification algorithms are compared based on their performance in determining the sentiment based on the subjective context of the IMDB Movie Review Data. The Classification Algorithms used are Logistic Regression Classifier, Decision Tree Classifier, Support Vector Machine (SVM) and XGB Classifier. Text data pre-processing including determination of weight of each word has been done using the Term Frequency Inverse Document Frequency (TFIDF) Vectorizer. Sentiment analysis may also know to be opinion mining, which is the process of determining whether the text reflects positive, negative or neutral sentiment. Using this analysis, business managers can acquire deep perception into customer opinions about their product. Customer opinion can bring any changes to a brand's success and the decision to monitor it can be the difference between a well-produced product and a missed opportunity. It can also inform marketing and product strategy by revealing chances to reframe the customer experience. By applying few metrics measures to produce the accuracy and finally, concluded by thecomparativemeasuresofthereviewsfromboththeclassifiersandfinallyamong those classifiers, Logistic Regression Classifier shows the better results.

**Keywords** – Sentiment Analysis, TFIDF, Logistic Regression, SVM, XGB Classifier, Decision Tree.

| S.NO | Roll NO.s | Student Names | Titel |
|------|-----------|---------------|-------|
| 2 | 17A51A1211 | K Manisha | Heart Disease Prediction Using Machine Learning |
| | 17A51A1218 | S Revathi | |
| | 17A51A1224 | T SaiTulasiBabu | |
| | 17A51A1205 | B Vijay | |

## ABSTRACT

With the unchecked increase in the heart stroke rates at early ages, we need to put a system in place to be able to detect the symptoms of a heart stroke at an early stage. Machine Learning provides a best way for predicting heart disease. Machine learning can be implemented in heart disease prediction. This project is about to propose to develop which can predict the vulnerability of a heart disease given basic symptoms like age, sex, cp,fbs etc. Our aim is to develop simple, light weight approach for detecting heart disease by Machine learning techniques. The machine learning algorithm has proven to be the most accurate and reliable algorithm and they are used in the proposed system. Here the proposed work tend to implement two machine learning techniques such as k-nearest neighbours(KNN)algorithm, Random forest used for comparison based on various performance metrics. Depending upon prediction results the patient could be identified as under risk or not. This could helps to find better and efficient approach to diagnose heart diseases at early stage.

**Keywords**:k-nearestneighbors(KNN)algorithm,Randomforest.

| S.NO | Roll NO.s | Student Names | Titel |
|------|-----------|---------------|-------|
| 3 | 17A51A1209 | G.Kalivaraprasad | **Facial Expression Recognition With CNN** |
| | 17A51A1225 | V.Anusha | |
| | 17A51A1202 | A.Harshitha | |
| | 17A51A1215 | P.YaswanthBabu | |

**Abstract**

Facial Expression Recognition is a form of non-verbal communication between two or more peoples. Facial Expression Recognition is actively emerging which recognizes human Expressions. Feelings emitted by expression which others can make judge their state by the expression maintained by humans. To detect the expression of a person, first it is required to detect facial features such as Eye, Nose, Lips, etc. and then classify trained data using suitable classifiers for expression detection. To detect a facial expression system needs to learn the data of expression. Convolutional Neural Network is a Technique that Computer can learn the expressions. By using CNN we can train the data on a computer that can learn the human expression of humans. The FER-2013 dataset is used to train CNN. The input layer of CNN is grayscale image. The output layer which is a binary or labels of digital text. Hidden layer consisting of convolution layers, ReLu layer, pooling layer and fully connected neural network..

**Keywords:** Machine Learning, CNN, Facial Expression Recognition, Feature Extraction

| S.NO | Roll NO.s | Student Names | Titel |
|---|---|---|---|
| 4 | 17A51A1207 | ChVasundhara | **SENTIMENTAL ANALYSIS ON TEXT DATAUSING CONVOLUTIONAL NEURAL NETWORKTECHNIQUE** |
| | 17A51A1214 | N Jitendra | |
| | 17A51A1217 | RDurgaJahnavi | |
| | 17A51A1201 | A Naveen Kumar | |

**Abstract**

Sentiment analysis on classification of text data is one of the emerging task in natural language processing compare to other. In the main, there is need of big dig for meaningful information from the data present on internet through the sentiment analysis. Deep learning which is already succeeded inspired us, to get fascinate to hold up on sentiment analysis task using deep learning models. Nowadays customer satisfaction is most important thing for business grown-up. So, many companies live and market their products and services that brought to social medias, and at last receive reviews and thoughts directly from their end-user from those social medias platform. Studying every word and text one by one be time-consuming, now there by analyzing the sentiment for all texts gives the companies an overview how positive and negative the user are on a specific subject. In this project, we explore word embedding architecture using algorthim or technique known convolutional neural network (CNN). We are comparing our CNN results with standard machine learning models and evaluate the results in terms of the accuracy, precision, recall, and f1_scorings. We seen CNN with word2vec achieves accuracy more than 92% which remarkably improving the accuracy text classification. The data sets we want to use for this project is Large Movie Review Dataset for Analyzing Sentiment.


**Keywords** Sentimental analysis, Natural Language Processing, Machine Learning Classifiers, Convolutional neural network, Accuracy.

| S.NO | Roll NO.s | Student Names | Titel |
|------|-----------|---------------|-------|
| 5 | 17A51A1227 | W.Appaji | **Machine Learning Models for Detection of Phishing URLs** |
|   | 17A51A1203 | A. Sruthi | |
|   | 17A51A1223 | T. Harish Kumar | |
|   | 17A51A1212 | K. Janaki Rao | |

**Abstract:**

Phishing may be a sort of digital crime where spam messages and spam sites attract users to take advantage of sensitive information on phishers. A phishing site is a typical social designing strategy that emulates trustful uniform resource locators and pages. Due to the rapid climb of the web, users change their preference from traditional shopping to electronic commerce. Nowadays, criminals attempt to find their victims within cyberspace with some specific tricks. By using the anonymous structure of the web, attackers set out new techniques, like phishing, to deceive victims with the utilization of false websites to gather their sensitive information like account IDs, usernames, passwords, etc. This study proposes a real-time anti-phishing system, which uses two different classification models such as Random Forest (RF) and Support Vector Machine (SVM). Consistent with the experimental and comparative results, the Random Forest algorithm gives the performance with the88.85% accuracy rate for detection of phishing URLs. The objective of feature extraction is to collect data and extract the selective features from the URLs.

**Keywords** Phishing Detection, Phishing Website, Machine Learning, Random Forest, Support Vector Machine, Classification, Feature Extraction.

| S.NO | Roll NO.s | Student Names | Titel |
|---|---|---|---|
| 6 | 17A51A1228 | K. SivaParvathi | **DATA CLASSIFICATION BY ENSEMBLE METHODS IN MACHINE LEARNING** |
| | 17A51A1220 | S. SaiSrinivas | |
| | 17A51A1208 | Ch. TarunSai | |
| | 17A51A1210 | I. Pavan Kumar | |

**Abstract:**

Nowadays, diabetes has become a common disease to the mankind from young to the old persons. The growth of the diabetic patients is increasing day-by-day due to various causes such as bacterial or viral infection, toxic or chemical contents mix with the food, auto immune reaction, obesity, bad diet, change in lifestyles, eating habit, environment pollution, etc. Hence, diagnosing the diabetes is very essential to save the human life from diabetes. The data analytics is a process of examining and identifying the hidden patterns from large amount of data to draw conclusions. In health care, this analytical process is carried out using machine learning algorithms for analysing medical data to build the machine learning models to carry out medical diagnoses. This project presents a diabetes prediction system to diagnosis diabetes. Moreover, this project explores the approaches to improve the accuracy in diabetes prediction using medical data with various machine learning algorithms and methods. Titanic disaster occurred 100 years ago on April 15, 1912, killing about 1500 passengers and crew members. The fateful incidents still complete the researchers and analysts to understand what can have led to the survival of some passengers and demise of the others.The research attempts to determine the correlation between factors such as age, sex, passenger class, fare etc. to the chance of survival of the passengers. These factors may or may not have impacted the survival rates of the passengers. In this research project, various machine learning algorithms namely K-Nearest neighbour and Decision tree have been implemented to predict the survival of passengers. In particular, this research work compares the algorithm on the basis of the percentage of accuracy on a test dataset. Healthcare industries have large volume databases and titanic tragic ship crash. By using big data analytics we can study huge datasets and find hidden information, hidden patterns to discover knowledge from the data. We predict the accuracy for diabetes dataset and titanic ship crash by using k nearest neighbour (K-NN) and decision tree algorithms in machine learning concepts.

# Abstracts of journals/conferences abstracts (students and faculty)

## "VEHICLE NUMBER PLATE DETECTION USING KIRSCH COMPASS KERNEL EDGE DETECTION TECHNIQUE"

[1]G. Nageswara Rao, [2]M. Vikram, [3]M. Sreeja, [4]Ch. Kiran Krishna, [5]G.Krishna

*Abstract:* Vehicle number plate recognition is that the foremost exhilarating and challenging research topic from past few years. Number plates are of various shapes, size and even have different color in different countries. In India the foremost common vehicle number plates used have yellow or white as background and black as foreground color. General problems faced by the captured image while moving is quite missing all its originality due to the addition of noises and due to the environmental situations. The captured image which is analyzed by our eyes can only see a few lines of the image obtained. So we are in need of the better algorithms for processing. In this paper we proposed a system for localization of number plate for vehicles and segmented the numbers as to identify each number separately. We generally focus on two steps: one is to locate the number plate and second is to segment all the numbers and letters to identify each number separately. Modified Edge detection is an important task for the resulting clear cut image output and it is the midpoint between the image and its background. The developed system first detects the vehicle then captures the vehicle image. Vehicle number plate region is extracted using the image segmentation in a picture. The data which came is used for comparing with some records on database and getting the precise information like vehicle owner details, registration place, address, etc. This whole process is done by using MATLAB, which is used for testing on real image.

*Index Terms-* **Kirsch Kernel Edge detection, Morphological image processing, Bounding Box, Character Segmentation**

# "Oppositional salp swarm algorithm with mutation operator for global optimization and application in training higher order neural networks"

Nibedan Panda & Santosh Kumar Majhi

## Abstract

Effectiveness of any swarm based metaheuristic optimization algorithm focuses on perfect mishmash of operator's castoff for exploration and exploitation. The absenteeism of balance between this two factors leads to deprived performance in terms of attaining global optimum by stagnating in local optimum and untimely convergence. Salp Swarm Algorithm (SSA) is a recently evolved optimization technique, intended to resolve continuous, non-linear and multifaceted real world optimization glitches. For solving complex day to day life problems the explorative strength of existing SSA is not adequate. So, this paper proposes a new improved algorithm termed as OBL-MO-SSA to enhance the performance of existing SSA. Two techniques such as normal distributed mutation operator and oppositional learning concept is embedded to achieve the purpose. Oppositional learning concept ensures the current as well as opposite candidate solutions in the search region simultaneously to evaluate the closer solutions during ongoing evolution process. Mutation operator avoids the arbitrary positions in the search region by choosing lesser and larger mutations for balanced motion in current and opposite directions. The proposed method OBL-MO-SSA improves the exploration and exploitation strength inside search region at the same time exhibiting better convergence speed by successfully avoiding local optima stagnation. To confirm the efficiency of proposed OBL-MO-SSA algorithm, the same is assessed by benchmark problems pertaining to IEEE-CEC-2017. The competence and strength of the proposed OBL-MO-SSA is characterized by using performance metrics, complexity analysis, convergence rate and statistical significance. Friedman and Holms test has been accomplished to substantiate its statistical significance. Furthermore to elucidate complex difficulties, the proposed method used to train higher order neural network (FLANN) by the help of 10 customary datasets preferred from UCI storehouse. The simulated outcomes reveals that the developed OBL-MO-SSA might be cast-off for resolving various optimization complications efficiently.

# "Detection of Brain Tumour by integration of VGG-16 and CNN Model"

1K. Sarath Chandra, 2A. Sai Priya, 3S. Durga Maheshwari, 4Dr. B. Ramesh Naidu

**Abstrac**t: Medical science has incredibly succeeded and grew to become excellent in modern years. Technology is altering the world of medicine. Numerous upgrades and new preferences are already in the market and they all elevated fitness care drastically. But human beings, flip out to be scared when they hear cancer. The main objective of our project is to detect the brain cancer by using Convolutional Neural Network (CNN) and VGG16. A Convolutional Neural Network is a classification of deep neural networks, most often utilized to analyze visual imagery. CNN is now the go-to model on every image associated problem. The principal gain of CNN model is it mechanically sense the essential feature barring human supervision. There are many CNN models are there like VGG-16,ResNet model. Amongst the nice performing CNN models, VGG is terrific for its simplicity. VGG-16 incorporates sixteen layers, a crucial CNN model comes to the notion if one wishes to use an off-the-shelf model for a task. Our paper intends to locate out the brain tumour with the utilization of VGG-16, Convolutional Neural Network model architecture and weights train the model for this problem. The performance will be evaluated on accuracy. The information set we desire to use in our work is Brain MRI images for Brain Tumour Detection.

Index Terms: Convolutional Neural Network(CNN), VGG-16,Accuracy, Classification

# "Breaking Down and Reduplication of Information in Cloud for Best Overall Performance and Protection"

G. NageswaraRao B. Venkateswarlu G. JagadeeswaraRao

## Abstract:

As an increase in the usage of the database, the data security and storage of data become a very big issue. To overcome this, cloud computing comes first. All the data will be stored in a third-party location and retrieve whenever the user wants to access it. In order to achieve this, we came up with "Disintegration and reduplication of data in cloud for safety and security." In this methodology, when the user sends the file on the cloud server it gets fragmented. Fragmentation is a process of dividing the file into some fragments in a way that it is impossible to attack the total file at a time. Each node stores a single fragment of a particular file. The main aim of this work is to give security, protection, and performance against all types of attacks.

## Keywords

Fragmentation Reduplication Cloudsecurity Encryption DecryptionPerformance

# "Effectiveness of Swarm-Based Metaheuristic Algorithm in Data Classification Using Pi-Sigma Higher Order Neural Network"

Nibedan Panda, Santosh Kumar Majhi

**Abstract:**

In this paper, Salp Swarm Algorithm (SSA) is employed in training the Higher Order Neural Network (HONN) for data classification task. In machine learning approach, to train artificial neural network is considered a difficult task which gains the attention of researchers recently. The difficulty of Artificial Neural Networks (ANNs) arises due to its nonlinearity nature and unknown set of initial parameters. Traditional training algorithms exhibit poor performance in terms of local optima avoidance and convergence rate, for which metaheuristic based optimization emerges as a suitable alternative. The performance of the proposed SSA-based HONN method has been verified by considering various classification measures over benchmark datasets chosen from UCI repository and the outcome obtained by the said method is compared with the state-of-art evolutionary algorithms. From the outcome reported, the proposed method outperforms over the recent algorithms which confirm its supremacy in terms of better exploration and exploitation capability.

# "Effectiveness of Backpropagation Algorithm in Healthcare Data Classification"

**Ch Chandra Sekhar, Nibedan Panda, B. V. Ramana, B. Maneesha, and S. Vandana**

**Abstract :**

Nowadays, researchers are trying to reveal better consequences by actingon machine learning (ML) algorithms. The notion behind this study is to represent thefundamental machine learning algorithms and its applicability in current scenario. Back propagation is considered as one of the classic supervised algorithms for training and classifying the feed forward neural networks. The concept of back propagation used as a means in neural networks for transmitting entire error back to lessen theloss is termed as back propagation network (BPN). We have considered BPN forclassification as it is flexible, less complex, and performs better with noise-free data. The experimental analysis has been carried out by gathering dataset from UCIstorehouse. Popular datasets like cancer, diabetes, heart, and liver are chosen forstudy. The classifier efficiency has been shown by observing its lower RMSE valueand better accuracy with other factors also. By developing a BPN-based classifiersystem, it may ascertain physicians to deal with health-related problems.

**Keywords** Machine learning ·Neural network ·Back propagation neural network ·Classification ·Optimization

# "Sentiment Analysis Using Semi Supervised Machine Learning Technique"

Abinash Tripathy,Alok Kumar Jena

## Abstract:

The sentiments of the users are expressed in the form of views or comments, in favor or against of any item, a product or a movie, etc. These reviews may be labeled or unlabeled. Labeled reviews are easier to process in compare to that of unlabeled once. Using Semi supervised machine-learning technique; the unlabeled reviews can be labeled. In this approach, with the help of small amount of labeled reviews, a large volume of unlabeled review can be labeled. In this paper, a step-by-step approach is adopted to label the unlabeled dataset. In order to perform this task, Support Vector Machine (SVM) technique is used. In order to access the results in each steps, the performance of the used technique is evaluated using different parameters like precision, recall and accuracy and thus, overall process can move forward.

### Keywords

Semi supervised machine learning technique Labeled review Unlabeled reviews Support vector machine

# "Efficiency measure of Machine Learning Algorithms on Liver Disease Diagnosis"

DrBendiVenkataRamana

Department of IT, Aditya Institute of Technology and Management, Tekkali, A.P, India.

ABSTRACT

The death rate in India is high due to Liver disease as a result of bad lifestyle, storage food, uncontrolled blood sugar, obesity, smoking, and consumption of alcohol and inhale of harmful gases. Earlier detection can reduce death rates and it also helps the doctors to give the proper treatment to the patients. The liver disease datasets are analyzed by using Machine learning algorithms for the accurate disease diagnosis. The datasets were collected and annotated from Visakhapatnam, Vijayawada and Tirupathi based on the major geographical regions of Andhra Pradesh that are North Coastal Andhra Pradesh, Central Andhra Pradesh and Rayalaseema respectively. Three datasets are named Visakhapatnam dataset, Vijayawada dataset and Tirupathi dataset based on geographical region. Visakhapatnam dataset contains 12 attributes and has 499 samples. Vijayawada dataset contains 12 attributes and has 600 samples. The Tirupathi dataset contains 7 attributes and has 243 samples. The selected Classification Algorithms that are Naive Bayes, Decision Tree, Random Forest, Support Vector Machines and Multi-Layer Perceptron are castoff for scrutinizing their efficacy based on Accuracy, Precision, Sensitivity, Specificity, F-Measure, ROC-Area, FPR, MAE, RMSE, RRSE, Kappa Statistic and Building Time in classifying liver patient's dataset. Classification performance is very high in the Decision Tree classification algorithm for Visakhapatnam and Tirupathi datasets, whereas Classification performance is very high in the Random Forest classification algorithm for the Vijayawada dataset. Building time is more for MLP in the Vijayawada dataset. This study motivated for the development of the Liver Diagnosis App using the Decision tree algorithm.

Keywords Classification algorithms, liver datasets, performance

# "Analysis of Geographical effect of various regions on Liver disease"

DrBendiVenkataRamana

Department of IT, Aditya Institute of Technology and Management, Tekkali, A.P, India

ABSTRACT

Statistical Analysis plays a significant role in population comparison to investigate the geographical effect on liver diseases. In this study the common attributes ALP, DB, SGOT, SGPT and TB were considered from the three datasets for the population comparison. Three data sets were assessed using analysis of variance and multivariate analysis of variance and significance level observed for the statistical analysis is $\leq 0.05$ for the corresponding confidence level is 95%. The Significant values in the ANOVA and MANOVA analysis indicates there is more significant difference among three liver datasets that means there is a geographical effect on liver diseases.

Keywords Statistical Analysis, liver datasets, population comparison

# "Solving traveling salesman problem using hybridization of rider optimization and spotted hyena optimization algorithm"

Madugula Murali Krishna[a] Nibedan Panda[1] Santosh Kumar Majh

**Abstract**

Traveling Salesman Problem (TSP) is the combinatorial optimization problem, where a salesman starting from a home city travels all the other cities and returns to the home city in the shortest possible path. TSP is a popular problem because the instances of TSP can be applied to solve real-world problems, the implication of which turns TSP into a typical test bench for performance evaluation of novel algorithms. In the current years, different optimization algorithms inspired by biological groups have become very familiar. A combined intelligence of diverse social insects like bees, ants, birds, termites, fish, etc. has been analyzed to introduce multiple meta-heuristic algorithms in the field of swarm intelligence. The main intent of this paper is to develop a hybrid algorithm for solving the TSP robustly and effectively. In order to attain this challenging point, the objective model considered in this research work is the minimization of the distance of the salesman traveling through entire cities. Here, the optimal solution pertains to solve the TSP is to minimize the distance travelled by the salesman, which is determined based on the new hybrid optimization algorithm. This proposal plans to integrate the two well-performing optimization algorithms like Rider Optimization Algorithm (ROA) and Spotted Hyena Optimizer algorithm (SHO) to frame the new algorithm, Spotted Hyena-based Rider Optimization (S-ROA). Finally, the experimental results obtained by the hybrid algorithm to solve these TSP cases are benchmarked against the results obtained by using state-of-the-art algorithms and prove the competitive performance of the proposed model.

# "Fusion of intelligent learning for COVID-19: A state-of-the-art review and analysis on real medical data"

WeipingDing[a]JanmenjoyNayak[b]H.Swapnarekha[bc]AjithAbraham[d]BighnarajNaik[e]DaniloPelusi[f]

**Abstract:**

The unprecedented surge of a novel coronavirus in the month of December 2019, named as COVID-19 by the World Health organization has caused a serious impact on the health and socioeconomic activities of the public all over the world. Since its origin, the number of infected and deceased cases has been growing exponentially in almost all the affected countries of the world. The rapid spread of the novel coronavirus across the world results in the scarcity of medical resources and overburdened hospitals. As a result, the researchers and technocrats are continuously working across the world for the inculcation of efficient strategies which may assist the government and healthcare system in controlling and managing the spread of the COVID-19 pandemic. Therefore, this study provides an extensive review of the ongoing strategies such as diagnosis, prediction, drug and vaccine development and preventive measures used in combating the COVID-19 along with technologies used and limitations. Moreover, this review also provides a comparative analysis of the distinct type of data, emerging technologies, approaches used in diagnosis and prediction of COVID-19, statistics of contact tracing apps, vaccine production platforms used in the COVID-19 pandemic. Finally, the study highlights some challenges and pitfalls observed in the systematic review which may assist the researchers to develop more efficient strategies used in controlling and managing the spread of COVID-19.

# "Competitive Deep Learning Methods for COVID-19 Detection using X-ray Images"

H. Swapnarekha, HimansuSekharBehera, Debanik Roy, Sunanda Das & JanmenjoyNayak

**Abstract:**

After the World War II, every country throughout the world is experiencing the biggest crisis induced by the devastating Coronavirus disease (COVID-19), which initially arose in the city of Wuhan in December 2019. This global pandemic has severely affected not only the health of billions of people but also the economy of countries all over the world. It has been evident that novel virus has infected a total of 20,674,903 lives as on 12 August 2020. The dissemination of the virus can be regulated by detecting the positive COVID cases as soon as possible. The reverse-transcriptase polymerase chain reaction (RT-PCR) is the basic approach used in the identification of the COVID-19. As RT-PCR is less sensitive to determine the novel virus at the beginning stage, it is worthwhile to develop more robust and other diagnosis approaches for the detection of the novel coronavirus. Due to the accessibility of medical datasets comprising of radiography images publicly, more robust diagnosis approaches are contributed by the researchers and technocrats for the identification of COVID-19 images using the techniques of deep leaning. In this paper, we proposed VGG16 and MobileNet-V2, which makes use of ADAM and RMS prop optimizers for the automatic identification of the COVID-19 images from other pneumonia chest X-ray images. Then, the efficiency of the proposed methodology has been enhanced by the application of data augmentation and transfer learning approach which is used to overcome the over fitting problem. From the experimental outcomes, it can be deduced that the proposed MobileNet-V2 model using ADAM and RMSprop optimizer achieves better accomplishment in terms of accuracy, sensitivity and specificity when contrasted with the VGG 16 using ADAM and RMS prop optimizers.

# "An impact study of COVID-19 on six different industries: Automobile, energy and power, agriculture, education, travel and tourism and consumer electronics"

JanmenjoyNayak, Manohar
Mishra, BighnarajNaik, HanumanthuSwapnarekha, KorhanCengiz, VimalShanmuganathan

**Abstract:**

The recent outbreak of a novel coronavirus, named COVID-19 by the World Health Organization (WHO) has pushed the global economy and humanity into a disaster. In their attempt to control this pandemic, the governments of all the countries have imposed a nationwide lockdown. Although the lockdown may have assisted in limiting the spread of the disease, it has brutally affected the country, unsettling complete value-chains of most important industries. The impact of the COVID-19 is devastating on the economy. Therefore, this study has reported about the impact of COVID-19 epidemic on various industrial sectors. In this regard, the authors have chosen six different industrial sectors such as automobile, energy and power, agriculture, education, travel and tourism and consumer electronics, and so on. This study will be helpful for the policymakers and government authorities to take necessary measures, strategies and economic policies to overcome the challenges encountered in different sectors due to the present pandemic.

# "Covid CT-net: A deep learning framework for COVID-19 prognosis using CT images"

H. SwapnarekhaHimansuSekharBeheraJanmenjoyNayak&BighnarajNaik

**Abstract:**

In 21st century, the surge of novel coronavirus (COVID-19) with its origin in Wuhan city of south China has caused a devasting effect not only on the public health but also on the economy of the countries all over the world. Early identification of the disease is the only significant way of combatting with COVID-19 infection. Though RT-PCR (Reverse Transcription Polymerase Chain Reaction) is the basic approach adopted, it has certain limitations such as less sensitivity, consumes more time and availability of limited number of kits. Therefore, analysis of radiological images using deep learning approaches is used as an alternative way to recognize the coronavirus epidemic at the initial stage. Most of the existing works use pretrained Convolutional Neural Network (CNN) prototypes and extremely large processing resources for the prognosis of covid infection from medical radiography images of lung. In this research, a novel framework utilizing deep convolutional neural network consisting of three convolutional layers, three max-pooling layers and one fully connected layer and RMSprop optimizer has been proposed to interpret COVID-19 from CT (computer tomography) images. Further, the efficiency of the proposed work has been enhanced by using the techniques such as data pre-processing and data augmentation. The efficacy of the proposed deep CNN model along with pre-trained CNN models such as DenseNet121, VGG16 (Visual Geometry Group), MobileNetV2, Xception and InceptionV3 has been evaluated on 1252 COVID CT images and 1240 non-COVID CT images. Furthermore, the empirical outcomes show that the suggested deep CNN is a robust approach and achieves better accuracy than the other competitive methods.

# "Deep Learning for COVID-19 Prognosis: A Systematic Review"

H. Swapna Rekha    Himansu Sekhar Behera Janmenjoy Nayak Bighnaraj Naik

**Abstract:**

In the twenty-first century, the novel coronavirus (COVID-19) with its origin in the city of Wuhan has been spreading expeditiously and infecting more than 4.9 million population of the world as of May 19, 2020. As it is inducing serious threat to the global health, it is necessary to develop accurate prediction models and early diagnosis tools of COVID-19 to empower healthcare specialist and government authorities to control the spread of the pandemic. The latest advances in the intelligent computing particularly deep learning approaches are providing a wide range of efficient methods, paradigms and tools in the interpretation and prophecy of COVID-19. In this paper, a perspective research on the ongoing deep learning approaches has been carried out. In this study, an analysis of the different approaches of deep learning techniques in the forecasting, classification and detection of COVID-19 has been performed. The main motive of this research is to facilitate the researchers and technocrats with some critical research briefing that may further assist in developing more adequate prototypes for the analysis and diagnosis of COVID-19.

**Keywords**

COVID-19 Deep learning Coronavirus

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