INTERNATIONAL JOURNAL OF HUMAN COMPUTING STUDIES

**Vol. 6 | Issue** 2 **| pp. 9**-23 **| e-ISSN:** 2615 – 8159 **| p-ISSN:** 2615 - 1898
**Available online @** https://journals.researchparks.org/index.php/IJHCS

research parks publishing

# Human Stress Detection Through Sleep by Using Machine Learning

**Rajasekaran G[1*], P.Velavan[1**], B. Vaidianathan[1**]**

[1] Department of Computer Science Engineering, Dhaanish Ahmed College of Engineering, Chennai, Tamil Nadu, India.
*Correspondence rajasekaran@dhaanishcollege.in
**Correspondence velavan@dhaanishcollege.in

**Abstract:** An individual's capacity to learn, concentrate, make sound decisions, and solve problems is all profoundly affected by stress. Recently, researchers in the fields of computer science and psychology have begun to focus on stress detection and modelling. Affective states, the sensation of the underlying emotional state, are used by psychologists to quantify stress. Human stress classification has mostly relied on user-dependent models, which can't adapt to different users' needs. This necessitates a substantial amount of effort from new users as they train the model to anticipate their emotional states. Urgent action is required to address prevalent childhood mental health concerns, which, if left untreated, can progress to more complex forms. Analysis of medical data and problem diagnosis are now areas where machine learning approaches shine. After running Features on the complete set of characteristics, we were able to minimise the number of attributes. We compared the accuracy of the chosen set of attributes on several ML methods..

**Keywords:** Human Stress Detection, Through Sleep, Using Machine Learning, AI researchers, Algorithm Using Python

**Citation:** Rajasekaran G, P.Velavan, B. Vaidianathan. Human Stress Detection Through Sleep by Using Machine Learning. *International Journal for Human Computing Studies*, **2024**, 6*(2)*, 9-23.
https://doi.org/10.31149/ijhcs.v6i2.5 248

Received: 12 November 2023
Revised: 29 November 2023
Accepted: 28 January 2024
Published: 13 March 2024



## 1. Introduction

The term "artificial intelligence" (AI) describes computer systems that are able to learn and do tasks normally performed by people. Any computer system that can learn and solve problems in the same way a human brain can is also considered a mind. Machines that exhibit intelligence in contrast to how people and other animals naturally think are known as artificial intelligence (AI) [7]. The study of "intelligent agents," or systems that can sense their surroundings and act in a way that maximises their chances of accomplishing their objectives, is the primary focus of prominent AI textbooks. Major AI experts disagree with the popular understanding of the word "artificial intelligence" that uses it to represent robots that can learn and solve problems in the same way that humans can. Using historical data to make predictions is the essence of machine learning [8-12]. One branch of AI, machine learning (ML) enables computers to pick up new skills automatically, without human intervention. Implementing a basic machine learning algorithm in Python is a good place to start when learning about machine learning, which is primarily concerned with creating computer programmes that can adapt to new data. In order to train and make predictions, specific algorithms are utilised [13-19].

This process involves feeding an algorithm with training data so that the algorithm may make predictions on new test data using this training data. There are essentially three subfields within machine learning. Learning can be either supervised or unsupervised, and reinforcement learning is one of the latter. If a person needs to classify data before a supervised learning computer can learn it, the programme can be fed the data and the labels together.

Labels are not used in unsupervised learning. It supplied the algorithm for learning. In the end, this algorithm has to figure out how to group the input data. RL also receives feedback from its surroundings, either positive or bad, and uses it to get better [20-24].

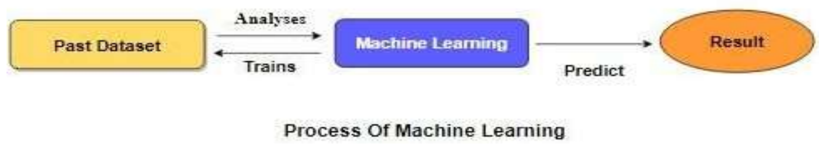


*Figure 1: Process Of Machine Learning [5]*

The ability for computers to comprehend and interpret human speech is known as natural language processing, or NLP. A robust NLP system might learn from human-written sources, including newswire stories, and provide user interfaces that use natural language. Data retrieval, text mining, query response, and machine translation are some of the more basic uses of NLP. In order to build syntactic representations of text, many existing methods rely on word co-occurrence frequencies [25-31]. "Keyword spotting" search tactics are common and easy to scale, but they're also stupid; for example, if you type in "dog," the search engine may only return results that contain the term "dog" and not "poodle." Words like "accident" are used by "lexical affinity" tactics to determine the tone of a document. Combining all of these and other techniques, modern statistical NLP systems can frequently reach satisfactory accuracy at the paragraph or page level [32].

Building a stress detection ML model that can outperform current supervised ML classification models in terms of accuracy in result prediction through algorithm comparison is the primary objective. Patient stress detection integrated with computer-based prediction has the potential to enhance prediction outcomes while decreasing errors, according to the project's scope [33-37]. Given that data mining and other data modelling and analysis techniques can create a knowledge-rich environment, this approach has promise for greatly improving the quality of stress detection prediction. In order to get the most accurate results when forecasting stress, we will be evaluating several supervised algorithms in an effort to build a machine learning model that could one day replace the updatable supervised machine learning classifications and models [38-41].

**Literature Review**

Ykhlef and Alsagri [1] Facebook, Twitter, and Instagram, among others, have changed the world in an irrevocable way. More and more, people are sharing their online identities and revealing their level of connectivity. Social networking offers many great benefits, but it also has some obvious drawbacks. High levels of social media use are associated with an increased risk of depression, according to recent research. Utilizing machine learning techniques, this study seeks to identify Twitter users who may be suffering from depression by analysing their network behaviour and tweets. To achieve this goal, we used characteristics retrieved from a user's network activity and tweets to train and evaluate classifiers that can determine if a user is depressed. The accuracy and F-measure scores for identifying users suffering from depression were found to increase in direct correlation with the number of features utilised. To identify mental health issues like depression early on, this strategy employs a data-driven, predictive approach. The primary contribution of this work is to investigate the characteristics and their effect on depression level detection.

In their study, Sharma et al. observed that Suicide was a factor in the deaths of 78 million persons in 2017, out of a total of 792 million (or over 10% of the world's population) who dealt with a mental illness. Because of the established link between one's home environment and the development or exacerbation of mental health issues, the already severe mental health crisis brought on by the COVID-19 pandemic has taken a quantum leap forward. Furthermore, the ever-present public shame associated with caring about mental health means that persons with mental health illnesses are neglected in terms of diagnosis and treatment in today's culture. Predicting suicidal thoughts (and other diagnostic methods) has recently been attempted in the data science community, however all have met with significant failure. To start, there are a lot of privacy and reusability without consent ethical concerns with large data, particularly when it comes to social media feeds.

The numbers might also be skewed because some persons with mental health diagnoses don't seek treatment. By predicting the response to a separate question—whether or not individuals are seeking mental health treatment—using anonymous datasets, we handle both of these issues in our study. In addition to statistical analysis, we employ a number of machine learning and deep learning classifiers and predictive models to make very accurate predictions.

The third one, Sandhya, These days, people talk about their mental health more in academic settings than in their everyday lives. A person's mental health is measured by their overall well-being. Less physical labour will be required of people as a result of the rising usage of technology. Additionally, workers in any industry are more likely to suffer from mental health issues due to the constant stress they experience on the job. Peer pressure, anxiety, tension, sadness, and countless more are all examples of such weaknesses. Right now, we're using a dataset that contains survey responses from people working in the IT sector. Their responses are used to derive the outcome. Whether or if the individual requires assistance will be the result here. In order to acquire the findings, many machine learning approaches are employed. Additionally, this forecast emphasises the significance of IT workers getting frequent mental health exams to monitor their well-being. A medical service should be offered by the employers, and the affected employees should also profit from it.

Sushmita [4], Professionals are better able to address mental health issues and enhance patients' quality of life when they are diagnosed early. As a result, children's fundamental mental health concerns require immediate attention because, if left untreated, they might progress to more serious disorders. When it comes to medical data analysis and diagnosis, machine learning approaches shine. In order to diagnose five common mental health issues, this study assessed eight different machine learning algorithms using various accuracy metrics. In order to train and test the approaches, a data set of sixty cases is collected. In order to diagnose the problem, twenty-five qualities from the papers are crucial. Applying feature selection techniques to the complete collection of attributes reduced the number of attributes. There was a comparison of the complete and selected attribute sets' accuracy using different machine learning approaches. The outcomes clearly show that the three classifiers—Perceptron, Multiclass Classifier, and LAD Tree—gave superior results, with just a little variation in their performances across the complete set of attributes and the set of attributes.

**Existing System:**

An innovative JCCB-FSC approach to identify decision-making stress. To model the way stressed-out medical students make decisions, we employed the TSST and BART experimental paradigms. Rather than focusing on generalised stress levels, as in earlier studies, our goal was to identify stressful situations during decision-making and offer guidance for future medical personnel on how to identify stressful situations when making decisions. A number of elements influence decision-making, and stress is one of them. As a result, enhancing physicians' decision-making performance requires early stress awareness. One promising method for stress detection is functional near-infrared spectroscopy, or fNIRS. Nevertheless, the majority of earlier research just relied on individual-level fNIRS parameters for categorization, neglecting to account for the connections among brain-corresponding channels that could offer unique features [42-47]. A generalised dataset would be formed by combining stress data from several sources. The data will be loaded, checked for cleanliness, and the dataset will be trimmed and cleaned for analysis in this section of the report. Two halves, the training set and the test set, make up the data set used for making predictions. At most cases, the Training and Test sets are divided into two halves in a ratio of seven to three. Applying the data model built with machine learning algorithms to the training set allows one to make predictions about the test set depending on the accuracy of the test results. Due to its proficiency in pre-processing outliers, irrelevant variables, and a combination of continuous, categorical, and discrete variables, the ML prediction model is able to accurately forecast stress [48-51].

Free and open-source, Anaconda distributes R and Python with the goal of making package management and deployment easier for scientific computing applications (data science, machine learning, large-scale data processing, predictive analytics, etc.). The "Conda" package management system oversees the various package versions. With support for Windows, Linux, and MacOS, the

Anaconda distribution is home to over 1400 prominent data-science tools, and it has over 12 million users. More than 1,400 programmes, including the Conda package management and Anaconda Navigator, make up the Anaconda distribution. Not having to figure out how to install each library separately is a huge time saver. One can install each open source package separately from the Anaconda repository using the conda install or pip install commands that come with Anaconda. As a package manager, pip has many of the same capabilities as conda, and the two may usually complement one another [52-54]. The Conda build command allows users to create custom packages, which can then be shared with others using repositories such as PyPI, Anaconda Cloud, or others. Python 2.7 is pre-installed in Anaconda2 and Python 3.7 is pre-installed in Anaconda3. Nevertheless, any version of Python packaged with conda can be included in new environments.

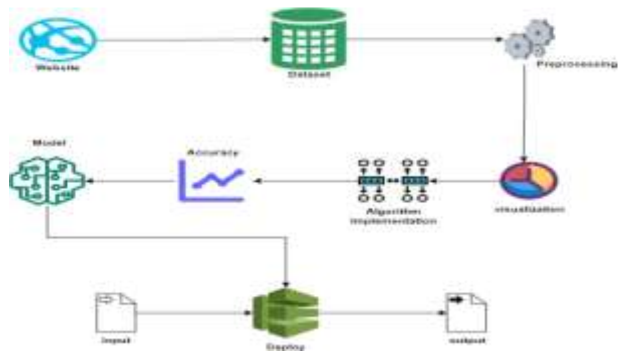


Figure 2: System Architecture [6]

The pre-processing procedure will ensure cleanliness after combining stress data from various sources to create a generic dataset. A labelled data set will be generated by removing noise, null, and unlabeled data. The next step is visualisation, which is the process of creating a visual representation for the user. The user can view the data in the graph model [55-61]. There are two sets of data used for making predictions: training and test. The training set is used to apply the data model that was generated using machine learning techniques. The accuracy of the test results are used to predict the test set. After that, we make a stress level prediction after deploying the model online.

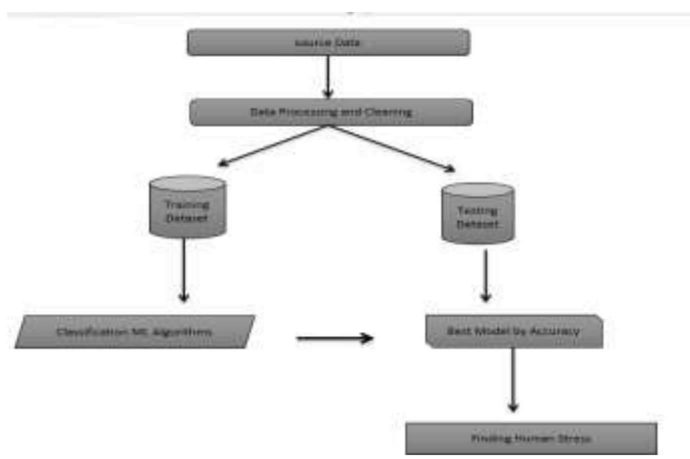


Figure 3: Workflow diagram

The pre-processing procedure will ensure cleanliness after combining stress data from various sources to create a generic dataset. In order to create a labelled data set, the noise, null, and unlabeled data will be eliminated. There are two sets of data used for making predictions: training and test. Applying the data model built with machine learning algorithms to the training set allows one to make predictions about the test set depending on the accuracy of the test results. After that, we make a stress level prediction after deploying the model online. When doing an overarching analysis of system requirements, use case diagrams are taken into consideration. Thus, use cases are used to capture the functions when analysing system requirements. So, in a nutshell, use cases are just organised descriptions of system functions [62-69].

Class diagrams are visual representations of the system's static view that stand in for various components of the application. Class diagrams, then, stand in for the entire system. The class diagram's name ought to provide some useful information about the system's component. Prior to beginning, make a list of all the components and the relationships between them. Every class needs to have its responsibilities (attributes and methods) defined. The diagram will become more complicated if too many characteristics are stated, therefore it's best to keep them to a minimum. Make sure the developer or coder can comprehend the final product by adding comments whenever necessary to explain any part of the diagram. Last but not least, sketch out the diagram on some blank paper and make as many revisions as needed until you have the final version just right [70-75]. A specific system operation is called an activity. To build the executable system utilising forward and reverse engineering methodologies, activity diagrams are utilised, in addition to displaying the dynamic nature of a system. The message component is the sole element that is absent from the activity diagram. It is not possible to see the transmission of messages from one task to another. A flowchart is another name for an activity diagram. The graphics may give the impression of a flowchart, however that is not the case. Parallel, branching, concurrent, and single flows are among the many types shown.

A sequence diagram is a graphical representation of your system's logic flow that can be used for documentation and validation purposes. Analysis and design both make frequent use of them. Dynamic modelling, which seeks to discover your system's behaviour, makes use of sequence diagrams more than any other UML item. Visual representations of activities, interactions, and time are some other dynamic modelling strategies. When it comes to developing contemporary business applications, I believe that sequence diagrams, class diagrams, and physical data models are the three most crucial design-level models. One way to visually portray the interconnections between various entities in an information system is via an entity relationship diagram (ERD), which is sometimes called an entity-relationship model [76-81]. A relational database can be built upon an ERD, a data modelling technique that aids in defining business processes. In addition to assisting with the identification of information system needs throughout an organisation, entity relationship diagrams serve as a visual foundation for database design. Even after a relational database has been deployed, an ERD can be used as a point of reference for future debugging or business process re-engineering. The pre-processing procedure will ensure cleanliness after combining stress data from various sources to create a generic dataset. A labelled data set will be generated by removing noise, null, and unlabeled data. After that, the data is presented to the user in a graph or chart for visualisation purposes; this is known as graph modelling. You can think of the data you collect for making predictions as having two parts: the training set and the test set. The training set was used to train the data model that had been constructed using machine learning methods. The accuracy of the model's predictions was then used to make predictions for the test set. Deploying the model on a web page is the next step [82-89].

The error rate of the Machine Learning (ML) model, which is often believed to be near to the actual dataset error rate, can be obtained using validation approaches in machine learning. Validation methods might not be necessary if the data set is sufficiently big to be statistically representative. The problem with using data samples in real-world circumstances is that they could not be representative of the entire dataset. Determine if the data is a float or an integer, identify any duplicate or missing values, and describe the data type. When modifying the hyperparameters of a model, the data sample is utilised to offer an impartial assessment of the model's fit to the training dataset. Adding a skill from the validation dataset to the model setup makes the evaluation more biassed. If you want to test your model often, you should use the validation set. Machine learning engineers hone the model's hyperparameters with the use of this data [90-94]. The to-do list for data analysis, data gathering, and handling data quality, structure, and content can quickly become overwhelming. Knowing your data and its characteristics can aid in data identification and, in turn, in selecting an appropriate algorithm for model construction.

Pandas is a Python package that is used for data cleansing in many different ways. In particular, it can clean data and zeroes in on missing values, the most significant data cleaning activity. It would rather explore and model with less time spent cleaning data. It is possible that some of these references are merely accidental. Sometimes, there may be more fundamental reasons why data is lacking [95-99]. From a statistical perspective, it is critical to be familiar with these various forms of missing data. How to fill in missing values, detect missing values, undertake simple imputation, and employ detailed statistical techniques to missing data is dependent on the type of missing data. Get a handle on where the missing data is coming from before diving into the code [100-106].

*Data visualization:*

Knowledge of how to visually represent data is a must for anyone working in machine learning and applied statistics. The field of statistics is primarily concerned with providing numerical explanations and estimates of data. One of the most useful sets of tools for developing a qualitative comprehension is data visualisation. This can be useful for discovering patterns, corrupt data, outliers, and more as you explore and familiarise yourself with a dataset. Data visualisations, when combined with domain expertise, allow for the expression and demonstration of critical links through plots and charts, which are more engaging and relevant to stakeholders than association or significance metrics [107-113]. It will suggest reading some of the books listed at the conclusion for a more in-depth look into data visualisation and exploratory data analysis, which are separate disciplines in and of themselves. Visual representations of data, such charts and graphs, can sometimes shed light on previously incomprehensible data. In both applied statistics and applied machine learning, the ability to rapidly visualise data samples is crucial. It will teach you how to visualise data in Python using the various plot types and how to use them to have a better understanding of your data.

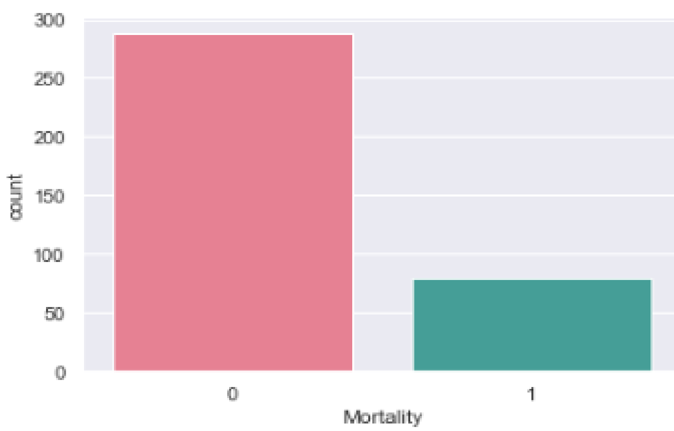


Figure 4: Mortality

Comparing algorithm with prediction in the form of best accuracy result

It is helpful to build a test harness to compare different ML algorithms in Python using sci-kit-learn, and it is essential to compare the performance of these algorithms consistently. By incorporating additional and diverse algorithms into this test harness, it can serve as a model for your machine learning challenges. The performance characteristics of each model will vary. To gauge each model's potential accuracy on unknown data, resampling techniques like cross-validation are employed. Based on these estimations, it should be able to select the top one or two models from your set [114-122]. It is wise to use various methods of data visualisation when we get a new dataset so that we can examine it from multiple angles. When choosing a model, the same idea applies. When deciding which machine learning algorithms to finalise, it's a good idea to employ multiple metrics for their predicted accuracy. One approach is to display the distribution of model accuracies together with its variance, average accuracy, and other features using various visualisation approaches. What follows is a detailed explanation of how to accomplish this in Python with sci-kit-learn. To ensure that machine learning algorithms are tested consistently on the same data, which is essential for fair comparisons, it is necessary to force each algorithm to be evaluated on a consistent test harness [123-127].

***Performance Metrics to calculate:***

**False Positives (FP):** A defaulter is someone who is expected to pay. In cases where the predicted class is yes and the actual class is no. If the projected class indicates that this passenger would live, but the actual class indicates that they did not, then.

**False Negatives (FN):** Someone whose payment is late or nonexistent. If the projected class implies that the passenger will die, but the actual class indicates that the person survived, then the predicted class is wrong.

**True Positives (TP):** A defaulter is someone who is expected to not pay. In other words, both the actual class value and the anticipated class value are yes, since these are the positively predicted values. Take the case where both the actual and anticipated class values suggest that the passenger made it.

**True Negatives (TN):** It is anticipated that the payer will be someone who defaults. This indicates that both the actual and projected classes have the same value of zero, as these negative values indicate accurate prediction. As an illustration, suppose both the actual and anticipated classes inform you that this passenger did not survive.

True Positive rate (TPR) = TP / (TP + FN) False Positive rate (FPR) = FP / (FP + TN)

**Accuracy:** What percentage of all predictions were accurate; in other words, the overall accuracy of the model's defaulter and non-defaulter predictions.

***Accuracy calculation:***

Accuracy = (TP + TN) / (TP + TN + FP + FN)

The simplest natural metric for performance is accuracy, which is just the percentage of observations that were accurately predicted relative to the total number of observations. One could assume that our model is the best if it has a high level of accuracy. Correctness is a wonderful metric, but it works best with balanced datasets in which the numbers of false positives and false negatives are quite close to one another.

**Precision:** The proportion of positive predictions that are actually correct. Precision = TP / (TP + FP)

The total number of positive observations that were accurately predicted relative to the total number of positive observations expected is called precision. This measure provides an answer to the question of how many passengers actually survived out of all those who are marked as having survived. A low false positive rate is associated with high precision. The precision we have, at 0.788, is quite good [128-131].

**Recall:** The percentage of positive values that were accurately anticipated from observations . (The proportion of actual defaulters that the model will correctly predict)
Recall = TP / (TP + FN)

Recall (Sensitivity) - Recall is the ratio of correctly predicted positive observations to all observations in actual class - yes.

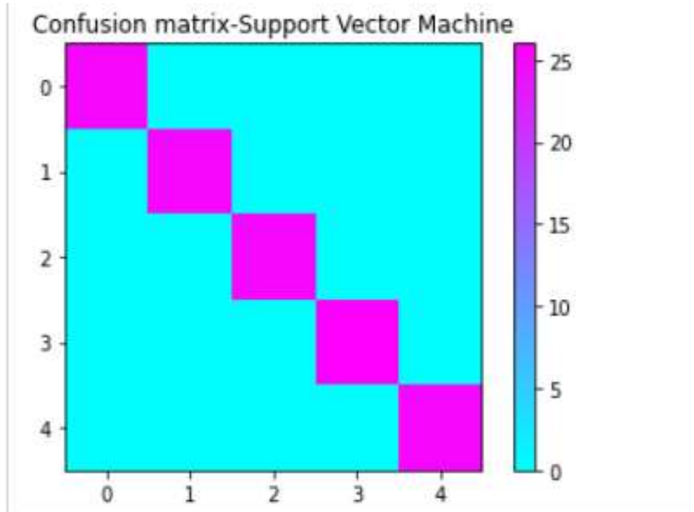


Figure 5: Confusion matrix-support Vector Meachine [5]

When Precision and Recall are combined, they form the F1 Score. Because of this, the score accounts for both the true and false positives. Despite its less intuitive nature, F1 is often more practical than accuracy, particularly in cases of unequal class distribution. When the costs of false positives and false negatives are about the same, accuracy is maximised. Evaluate Precision and Recall simultaneously if the false positive and false negative costs are significantly different.

*General Formula:*

F- Measure = 2TP / (2TP + FP + FN)

*F1-Score Formula:*

F1 Score = 2*(Recall * Precision) / (Recall + Precision)

The below four different algorithms are compared:

SVM:

When it comes to classification and regression, supervised machine learning algorithms like Support Vector Machine (SVM) come in handy. We claim that classification is the optimum approach for regression issues, but the SVM algorithm's goal is to locate a hyperplane in N-dimensional space that clearly assigns a class to each data point. Support vector machines (SVMs) are able to classify data points even when they aren't linearly separable since they map the data to a high-dimensional feature space [132-139]. The data is processed in a way that allows the separator between the categories to be drawn as a hyperplane after it is located. Web pages, email, intrusion detection systems, facial recognition software, gene classification, and handwriting recognition are just a few of the many uses for support vector machines. One of the reasons SVMs are used in machine learning is because of this. Whether your data is linear or non-linear, it can manage the classification and regression tasks [140].

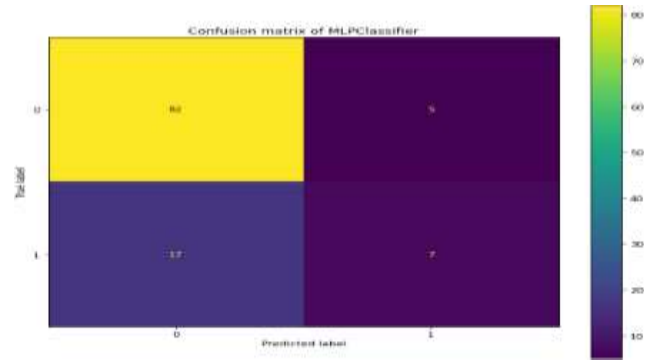


Figure 6: Module Diagram

The acronym "MLP" refers for "Multi-layer Perceptron," a type of classifier that uses a Neural Network. When it comes to classification, MLP Classifier is different from other methods like Support Vectors or Naive Bayes Classifiers. It all comes down to the underlying Neural Network. The implementation of MLP Classifier does not require any more effort than that of Support Vectors or Naive, which is a commonality with Scikit-other Learn's classification methods. To train a classifier on the original dataset, an AdaBoost meta-estimator first fits a copy of the classifier on the same dataset with the weights of the mistakenly classified instances changed so that succeeding classifiers concentrate on challenging situations. If you want your machine learning algorithm to perform better, you can use AdaBoost [141-147]. People who aren't very good at learning can benefit the most from it. When applied to a classification task, these models produce results that are slightly better than chance. A one-level decision tree is the most popular and appropriate method for AdaBoost. Learners progress in a sequential manner, which is the basis of its operation. Every learner after the first is a direct descendant of an earlier learner. Basically, it's a way to turn weak learners into strong ones. Although it differs slightly, the AdaBoost algorithm follows the same basic idea as boosting.

Introduction The data is continually split according to a given parameter in Decision Trees, a kind of Supervised Machine Learning (in which you describe the input and its associated output in the training data). Decision nodes and leaves are the building blocks of the tree [148-154]. There are many real-world similarities to trees, and it turns out that trees have impacted several areas of machine learning, including regression and classification. A decision tree is a graphical and explicit representation of decision-making and decision-making processes that can be utilised in decision analysis. Classification and regression are two applications of decision trees, which are supervised learning methods that do not rely on parameters. Using data attributes to infer simple decision rules, the goal is to build a model that can predict the value of a target variable [155-156].


Figure 7 : Decesion Tree

***Conclusion***

The process of analysis began with the cleaning and processing of the data, followed by the investigation of missing values, exploratory analysis, and, eventually, the construction and evaluation of the model. On the public test set of algorithms with better accuracy scores, the algorithm with the highest accuracy score will be found. The first one is utilised in the application whose purpose is to assist in determining the human stress that the patient is experiencing. An example of a micro web framework that is created in Python is Django. This framework is considered to be a micro-framework due to the fact that it does not require any specific tools or libraries. It does not have a database abstraction layer, form validation, or any other components that are similar to those that are provided by pre-existing third-party libraries. The Django framework, on the other hand, allows for the addition of extensions that can add application functionalities as if they were built into the framework itself. Additionally, there are extensions available for object-relational mappers, form validation, upload handling, a variety of open authentication protocols, and a number of utilities that are commonly associated with frameworks.

**References**


[1] H. S. Alsagri and M. Ykhlef, "Machine learning-based approach for depression detection in twitter using content and activity features," IEICE Trans. Inf. Syst., vol. E103.D, no. 8, pp. 1825–1832, 2020.

[2] M. Sharma, S. Mahapatra, A. Shankar, and X. Wang, "Predicting the utilization of mental health treatment with various machine learning algorithms," WSEAS Trans. Comput., vol. 19, pp. 285–291, 2021.

[3] M. Sandhya, "Prediction of Mental Disorder for employees in IT Industry"," International Journal of Innovative Technology and Exploring Engineering (IJITEE), 8(6S), pp. 374–376, 2019.

[4] M. Sumathi and D. B., "Prediction of mental health problems among children using machine learning techniques," Int. J. Adv. Comput. Sci. Appl., vol. 7, no. 1, 2016.

[5] T. Sanjay, K. Rahulkaran, B. N. Kumar, and K. Anitha, "Intrusion detection prediction using data science technique," Int. J. Res. Appl. Sci. Eng. Technol., vol. 11, no. 5, pp. 2578–2585, 2023.

[6] P. Khandagale, A. Utekar, A. Dhonde, and P. S. S. Karve, "Fake job detection using Machine Learning," Int. J. Res. Appl. Sci. Eng. Technol., vol. 10, no. 4, pp. 1822–1827, 2022.

[7] Ramesh Babu P, E. Sreenivasa Reddy, "A Comprehensive Survey on Semantic based Image Retrieval Systems for Cyber Forensics," International Journal of Computer Sciences and Engineering, Vol.6, Issue.8, pp.245-250, 2018.

[8] Putchanuthala, R.B. and Reddy, E.S., "Image retrieval using locality preserving projections," IET Journal of Engineering, Vol. 2020 Issue. 10, pp. 889-892, 2020.

[9] Ramesh Babu P, E. Sreenivasa Reddy, "A Novel Framework design for Semantic based Image retrieval as a Cyber Forensic Tool," International Journal of Innovative Technology and Exploring Engineering, Vol.8, Issue.10, pp.2801-2808, 2019.

[10] Ramesh Babu P, E. Sreenivasa Reddy, "A Design of Eigenvalue based CNN tool for Image Retrieval," International Journal of Engineering and Advanced Technology, Vol.8, Issue.6, pp.2230-2236, 2019.

[11] P. Ramesh Babu, R. Nandhi Kesavan, A. Sivaramakrishnan, G. Sai Chaitanya Kumar, "EmoGAN Label-Changing Approach for Emotional State Analysis in Mobile Communication using Monkey Algorithm", ICTACT Journal on Communication Technology, vol. 14, no. 4, pp. 3050–3056, Dec. 2023

[12] D. C. J. W. . Wise, S. . Ambareesh, R. . Babu P., D. . Sugumar, J. P. . Bhimavarapu, and A. S. . Kumar, "Latent Semantic Analysis Based Sentimental Analysis of Tweets in Social Media for the Classification of Cyberbullying Text", Int J Intell Syst Appl Eng, vol. 12, no. 7s, pp. 26–35, Dec. 2023.

[13] Y. K. . Aluri, B. . Aruna Devi, N. A. . Balaji, V. . Dakshinamurthi, R. . Babu P., and S. . Rajeyyagari, "Dry Eye Disease Classification Using AlexNet Classifier", Int J Intell Syst Appl Eng, vol. 12, no. 7s, pp. 263–271, Dec. 2023.

[14] M. . Srinivasan, K. . HC, S. . Govindasamy, M. A. . Rasheed, R. . Babu P., and P. . Sultana, "Energy Efficient Routing Using Support Vector Machine in Wireless Sensor Networks", Int J Intell Syst Appl Eng, vol. 12, no. 7s, pp. 320–325, Dec. 2023.

[15] B. S. . Rao, K. . Meenakshi, K. . Kalaiarasi, R. . Babu P., J. . Kavitha, and V. . Saravanan, "Image Caption Generation Using Recurrent Convolutional Neural Network ", Int J Intell Syst Appl Eng, vol. 12, no. 7s, pp. 76–80, Dec. 2023.

[16] R. B. P, P. T. Anitha, W. Dibaba and R. Boddu, "Mitigation of Attacks Using Cybersecurity Deep Models in Cloud Servers," 2023 International Conference on Disruptive Technologies (ICDT), Greater Noida, India, 2023, pp. 202-205.

[17] D. . Kavitha, S. . Shobana, S. . Rajkumar, G. R. . Reddy, R. . Babu P., and P. . Mukherjee, "Hyperspectral Image Classification Using Dimensionality Reduction Deep Networks", Int J Intell Syst Appl Eng, vol. 12, no. 7s, pp. 81–86, Dec. 2023.

[18] S. I. Ansarullah, S. Mohsin Saif, S. Abdul Basit Andrabi, S. H. Kumhar, M. M. Kirmani, and D. P. Kumar, "An intelligent and reliable hyperparameter optimization machine learning model for early heart disease assessment using imperative risk attributes," J. Healthc. Eng., vol. 2022, pp. 1–12, 2022.

[19] S. I. Ansarullah, S. M. Saif, P. Kumar, and M. M. Kirmani, "Significance of visible non-invasive risk attributes for the initial prediction of heart disease using different machine learning techniques," Comput. Intell. Neurosci., vol. 2022, pp. 1–12, 2022.

[20] M. M. Kirmani and S. I. Ansarullah, "Classification models on cardiovascular disease detection using Neural Networks, Naïve Bayes and J48 Data Mining Techniques," International Journal of Advanced Research in Computer Science, vol. 7, no. 5, 2016.

[21] M.M. Kirmani, & S.I. Ansarullah, "Prediction of heart disease using decision tree a data mining technique". Int. J. Comput. Sci. Netw, 5(6), 2016.

[22] V. R. Umapathy et al., "Emerging biosensors for oral cancer detection and diagnosis—A review unravelling their role in past and

present advancements in the field of early diagnosis," Biosensors (Basel), vol. 12, no. 7, p. 498, 2022.
[23] P. M. Natarajan, V. R. Umapathy, A. Murali, and B. Swamikannu, "Computational simulations of identified marine-derived natural bioactive compounds as potential inhibitors of oral cancer," Future Sci. OA, vol. 8, no. 3, 2022.
[24] P. M. Natarajan, V. R. Umapathy, A. Murali, and B. Swamikannu, "Computational simulations of identified marine-derived natural bioactive compounds as potential inhibitors of oral cancer," Future Sci. OA, vol. 8, no. 3, 2022.
[25] P. Manickam Natarajan, "Dental Bioinformatics – Current Scope and Future perspectives," Res. J. Pharm. Technol., pp. 2351–2356, 2022.
[26] B. Juala Catherine Jebaraj, P. Birla Bose, R. Manickam Natarajan, and A. Gurusamy, "Perception of dental interns on the impact of their gender during training period and future dental practice-cross sectional survey in dental colleges in Chennai," India. Journal of Positive School Psychology, vol. 2022, no. 5, pp. 1045–1050.
[27] E. Zanardo and B. Martini, "Secure and Authorized Data Sharing among different IoT Network Domains using Beez blockchain," in 2024 27th Conference on Innovation in Clouds, Internet and Networks (ICIN), 2024, pages 122–129.
[28] E. Zanardo, "Learningchain. A novel blockchain-based meritocratic marketplace for training distributed machine learning models," in Software Engineering Application in Systems Design, Cham: Springer International Publishing, 2023, pp. 152–169.
[29] H. Lakhani, D. Undaviya, H. Dave, S. Degadwala, and D. Vyas, "PET-MRI Sequence Fusion using Convolution Neural Network," in 2023 International Conference on Inventive Computation Technologies (ICICT), 2023, pp. 317–321.
[30] F. Ahamad, D. K. Lobiyal, S. Degadwala, and D. Vyas, "Inspecting and Finding Faults in Railway Tracks Using Wireless Sensor Networks," in 2023 International Conference on Inventive Computation Technologies (ICICT), 2023, pp. 1241–1245.
[31] D. Rathod, K. Patel, A. J. Goswami, S. Degadwala, and D. Vyas, "Exploring Drug Sentiment Analysis with Machine Learning Techniques," in 2023 International Conference on Inventive Computation Technologies (ICICT), 2023, pp. 9–12.
[32] C. H. Patel, D. Undaviya, H. Dave, S. Degadwala, and D. Vyas, "EfficientNetB0 for Brain Stroke Classification on Computed Tomography Scan," in 2023 2nd International Conference on Applied Artificial Intelligence and Computing (ICAAIC), 2023, pp. 713–718.
[33] V. Desai, S. Degadwala, and D. Vyas, "Multi-Categories Vehicle Detection For Urban Traffic Management," in 2023 Second International Conference on Electronics and Renewable Systems (ICEARS), 2023, pp. 1486–1490.
[34] D. Vyas and V. V Kapadia, "Evaluation of Adversarial Attacks and Detection on Transfer Learning Model," in 2023 7th International Conference on Computing Methodologies and Communication (ICCMC), 2023, pp. 1116–1124.
[35] D. D. Pandya, S. K. Patel, A. H. Qureshi, A. J. Goswami, S. Degadwala, and D. Vyas, "Multi-Class Classification of Vector Borne Diseases using Convolution Neural Network," in 2023 2nd International Conference on Applied Artificial Intelligence and Computing (ICAAIC), 2023, pp. 1–8.
[36] D. D. Pandya, A. K. Patel, J. M. Purohit, M. N. Bhuptani, S. Degadwala, and D. Vyas, "Forecasting Number of Indian Startups using Supervised Learning Regression Models," in 2023 International Conference on Inventive Computation Technologies (ICICT), 2023, pp. 948–952.
[37] S. Degadwala, D. Vyas, D. D. Pandya, and H. Dave, "Multi-Class Pneumonia Classification Using Transfer Deep Learning Methods," in 2023 Third International Conference on Artificial Intelligence and Smart Energy (ICAIS), 2023, pp. 559–563.
[38] D. D. Pandya, A. Jadeja, S. Degadwala, and D. Vyas, "Diagnostic Criteria for Depression based on Both Static and Dynamic Visual Features," in 2023 International Conference on Intelligent Data Communication Technologies and Internet of Things (IDCIoT), 2023, pp. 635–639.
[39] H. Gupta, D. Patel, A. Makade, K. Gupta, O. P. Vyas, and A. Puliafito, "Risk Prediction in the Life Insurance Industry Using Federated Learning Approach," in 2022 IEEE 21st Mediterranean Electrotechnical Conference (MELECON), 2022, pp. 948–953.
[40] S. Dave, S. Degadwala, and D. Vyas, "DDoS Detection at Fog Layer in Internet of Things," in 2022 International Conference on Edge Computing and Applications (ICECAA), 2022, pp. 610–617.
[41] D. D. Pandya, A. Jadeja, S. Degadwala, and D. Vyas, "Ensemble Learning based Enzyme Family Classification using n-gram Feature," in 2022 6th International Conference on Intelligent Computing and Control Systems (ICICCS), 2022, pp. 1386–1392.
[42] V. B. Gadhavi, S. Degadwala, and D. Vyas, "Transfer Learning Approach For Recognizing Natural Disasters Video," in 2022 Second International Conference on Artificial Intelligence and Smart Energy (ICAIS), 2022, pp. 793–798.
[43] J. Mahale, S. Degadwala, and D. Vyas, "Crop Prediction System based on Soil and Weather Characteristics," in 2022 Sixth International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud)(I-SMAC), 2022, pp. 340–345.
[44] M. Shah, S. Degadwala, and D. Vyas, "Diet Recommendation System based on Different Machine Learners: A Review," in 2022 Second International Conference on Artificial Intelligence and Smart Energy (ICAIS), 2022, pp. 290–295.
[45] B. Trivedi, S. Degadwala, and D. Vyas, "Parallel data stream anonymization methods: A review," in 2022 Second International Conference on Artificial Intelligence and Smart Energy (ICAIS), 2022, pp. 887–891.
[46] D. D. Pandya, N. S. Gupta, A. Jadeja, R. D. Patel, S. Degadwala, and D. Vyas, "Bias Protected Attributes Data Balancing using Map Reduce," in 2022 6th International Conference on Electronics, Communication and Aerospace Technology, 2022, pp. 1540–1544.
[47] R. Baria, S. Degadwala, R. Upadhyay, and D. Vyas, "Theoretical Evaluation of Machine And Deep Learning For Detecting Fake News," in 2022 Second International Conference on Artificial Intelligence and Smart Energy (ICAIS), 2022, pp. 325–329.
[48] P. Bam, S. Degadwala, R. Upadhyay, and D. Vyas, "Spoken Language Recognization Based on Features and Classification Methods: A Review," in 2022 Second International Conference on Artificial Intelligence and Smart Energy (ICAIS), 2022, pp.

868–873.
[49] Patel, S. Degadwala, and D. Vyas, "Lung Respiratory Audio Prediction using Transfer Learning Models," in 2022 Sixth International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud)(I-SMAC), 2022, pp. 1107–1114.
[50] V. K. Singh, S. Pandey, S. Degadwala, and D. Vyas, "DNA and KAMLA Approaches in Metamorphic Cryptography: An Evaluation," in 2022 Second International Conference on Artificial Intelligence and Smart Energy (ICAIS), 2022, pp. 1173–1178.
[51] D. D. Pandya, G. Amarawat, A. Jadeja, S. Degadwala, and D. Vyas, "Analysis and Prediction of Location based Criminal Behaviors Through Machine Learning," in 2022 International Conference on Edge Computing and Applications (ICECAA), 2022, pp. 1324–1332.
[52] S. Patel, H. Patel, D. Vyas, and S. Degadwala, "Multi-Classifier Analysis of Leukemia Gene Expression From Curated Microarray Database (CuMiDa)," in 2021 2nd International Conference on Smart Electronics and Communication (ICOSEC), 2021, pp. 1174–1178.
[53] S. Degadwala, B. Patel, and D. Vyas, "A review on Indian state/City Covid-19 cases outbreak forecast utilizing machine learning models," in 2021 6th international conference on inventive computation technologies (ICICT), 2021, pp. 1001–1005.
[54] S. Degadwala, D. Vyas, M. R. Hossain, A. R. Dider, M. N. Ali, and P. Kuri, "Location-Based Modelling And Analysis Of Threats By Using Text Mining," in 2021 Second International Conference on Electronics and Sustainable Communication Systems (ICESC), 2021, pp. 1940–1944.
[55] S. Degadwala, D. Vyas, U. Chakraborty, H. Biswas, and A. R. Dider, "Moving Object Inpainting using Deep Learning," in 2021 5th International Conference on Trends in Electronics and Informatics (ICOEI), 2021, pp. 1701–1704.
[56] S. Degadwala, D. Vyas, U. Chakraborty, A. R. Dider, and H. Biswas, "Yolo-v4 deep learning model for medical face mask detection," in 2021 International Conference on Artificial Intelligence and Smart Systems (ICAIS), 2021, pp. 209–213.
[57] S. Degadwala, D. Vyas, and H. Dave, "Classification of COVID-19 cases using fine-tune convolution neural network (FT-CNN)," in 2021 International Conference on Artificial Intelligence and Smart Systems (ICAIS), 2021, pp. 609–613.
[58] S. Degadwala, S. A. Musa, D. Vyas, and P. Mitra, "IoT Defence: An Internet Based Remote Area Monitoring and Control System," in 2021 5th International Conference on Electronics, Communication and Aerospace Technology (ICECA), 2021, pp. 487–491.
[59] S. Degadwala, U. Chakraborty, P. Kuri, H. Biswas, A. N. Ali, and D. Vyas, "Real-Time Panorama and Image Stitching with Surf-Sift Features," in 2021 6th International Conference on Inventive Computation Technologies (ICICT), 2021, pp. 1111–1115.
[60] S. Degadwala, D. Vyas, H. Biswas, U. Chakraborty, and S. Saha, "Image captioning using inception V3 transfer learning model," in 2021 6th International Conference on Communication and Electronics Systems (ICCES), 2021, pp. 1103–1108.
[61] H. Dave, V. Patel, J. N. Mehta, S. Degadwala, and D. Vyas, "Regional Kidney Stone Detection and Classification In Ultrasound Images," in 2021 Third International Conference on Inventive Research in Computing Applications (ICIRCA), 2021, pp. 1108–1112.
[62] N. Ramprasadi, P. Shah, and D. Vyas, "Hybrid Approach For Real Time Crowd Activity Identification Using Segmentation," in 2020 4th International Conference on Intelligent Computing and Control Systems (ICICCS), 2020, pp. 390–394.
[63] S. Degadwala, D. Vyas, H. Dave, and A. Mahajan, "Visual social distance alert system using computer vision & deep learning," in 2020 4th International Conference on Electronics, Communication and Aerospace Technology (ICECA), 2020, pp. 1512–1516.
[64] S. Degadwala, U. Chakraborty, S. Saha, H. Biswas, and D. Vyas, "EPNet: Efficient Patch-based Deep Network for Real-Time Semantic Segmentation," in 2020 3rd International Conference on Intelligent Sustainable Systems (ICISS), 2020, pp. 611–615.
[65] Reddy, A. R. P., & Ayyadapu, A. K. R. (2021). Securing Multi-Cloud Environments with AI And Machine Learning Techniques. Chelonian Research Foundation, 16(2), 01-12.
[66] Reddy Ayyadapu, A. K. (2022). Privacy-Preserving Techniques in AI-Driven Big Data Cyber Security for Cloud. Chelonian Research Foundation, 17(2), 188-208.
[67] Ayyadapu, A. K. R. (2022). Secure Cloud Infrastructures: A Machine Learning Perspective. International Neurourology Journal, 26(4), 22-29.
[68] Ayyadapu, A. K. R. (2023). Enhancing Cloud Security with AI-Driven Big Data Analytics. International Neurourology Journal, 27(4), 1591-1597.
[69] Reddy Ayyadapu, A. K. (2023). Optimizing Incident Response in Cloud Security with Ai And Big Data Integration. Chelonian Research Foundation, 18(2), 2212-2225.
[70] Reddy, A. R. P., & Ayyadapu, A. K. R. (2020). Automating Incident Response: Ai-Driven Approaches To Cloud Security Incident Management. Chelonian Research Foundation, 15(2), 1-10.
[71] Reddy, A. R. P. (2021). Machine Learning Models for Anomaly Detection in Cloud Infrastructure Security. NeuroQuantology, 19(12), 755-763.
[72] Reddy, A. R. P. (2021). The Role of Artificial Intelligence in Proactive Cyber Threat Detection In Cloud Environments. NeuroQuantology, 19(12), 764-773.
[73] Reddy, A. R. P. (2022). The Future of Cloud Security: Ai-Powered Threat Intelligence and Response. International Neurourology Journal, 26(4), 45-52.
[74] Reddy, A. R. P. (2023). Navigating the Cloud's Security Maze: AI and ML as Guides. International Neurourology Journal, 27(4), 1613-1620.
[75] B. Senapati and B. S. Rawal, "Adopting a deep learning split-protocol based predictive maintenance management system for

industrial manufacturing operations," in Lecture Notes in Computer Science, Singapore: Springer Nature Singapore, 2023, pp. 22–39.
[76] B. Senapati and B. S. Rawal, "Quantum communication with RLP quantum resistant cryptography in industrial manufacturing," Cyber Security and Applications, vol. 1, no. 100019, p. 100019, 2023.
[77] B. Senapati et al., "Wrist crack classification using deep learning and X-ray imaging," in Proceedings of the Second International Conference on Advances in Computing Research (ACR'24), Cham: Springer Nature Switzerland, 2024, pp. 60–69.
[78] B. Naeem et al., "Heart disease detection using feature extraction and artificial neural networks: A sensor-based approach," IEEE Access, vol. 12, pp. 37349–37362, 2024.
[79] R. Tsarev et al., "Automatic generation of an algebraic expression for a Boolean function in the basis ∧, ∨, ¬," in Data Analytics in System Engineering, Cham: Springer International Publishing, 2024, pp. 128–136.
[80] R. Tsarev, B. Senapati, S. H. Alshahrani, A. Mirzagitova, S. Irgasheva, and J. Ascencio, "Evaluating the effectiveness of flipped classrooms using linear regression," in Data Analytics in System Engineering, Cham: Springer International Publishing, 2024, pp. 418–427.
[81] R. Mahadasa and P. Surarapu, "Toward Green Clouds: Sustainable practices and energy-efficient solutions in cloud computing," Asia Pac. J. Energy Environ., vol. 3, no. 2, pp. 83–88, 2016.
[82] P. Surarapu, R. Mahadasa, and S. Dekkati, "Examination of Nascent Technologies in E-Accounting: A Study on the Prospective Trajectory of Accounting," Asian Accounting and Auditing Advancement, vol. 9, no. 1, pp. 89–100, 2018.
[83] M. Mandapuram, R. Mahadasa, and P. Surarapu, "Evolution of smart farming: Integrating IoT and AI in agricultural engineering," Glob. Disclosure Econ. Bus., vol. 8, no. 2, pp. 165–178, 2019.
[84] R. Mahadasa, D. R. Goda, and P. Surarapu, "Innovations in energy harvesting technologies for wireless sensor networks: Towards self-powered systems," Asia Pac. J. Energy Environ., vol. 6, no. 2, pp. 101–112, 2019.
[85] R. Mahadasa, P. Surarapu, V. R. Vadiyala, and P. R. Baddam, "Utilization of agricultural drones in farming by harnessing the power of aerial intelligence," Malays. J. Med. Biol. Res., vol. 7, no. 2, pp. 135–144, 2020.
[86] P. Surarapu et al., "Quantum dot sensitized solar cells: A promising avenue for next-generation energy conversion," Asia Pac. J. Energy Environ., vol. 7, no. 2, pp. 111–120, 2020.
[87] S. R. Yerram et al., "The role of blockchain technology in enhancing financial security amidst digital transformation," Asian Bus. Rev., vol. 11, no. 3, pp. 125–134, 2021.
[88] Varghese, J. R. P. K. Ande, R. Mahadasa, S. S. Gutlapalli, and P. Surarapu, "Investigation of fault diagnosis and prognostics techniques for predictive maintenance in industrial machinery," Eng. Int., vol. 11, no. 1, pp. 9–26, 2023.
[89] Hati, Ananda Shankar, and Chatterjee, T. K., "Current monitoring Instrumentation system for detecting airgap eccentricity in mine winder motor", International Journal of Applied Engineering Research, vol. 10, no. 22, pp. 43000-43007, 2015.
[90] Hati, Ananda Shankar, "Vibration monitoring instrumentation system for detecting airgap eccentricity in mine winder motor" Journal of Mine Metals and Fuels, vol. 64, no. 5&6, pp. 240-248, May-June 2016.
[91] S. A. Haider et al., "Energy-Efficient Self-Supervised Technique to Identify Abnormal User over 5G Network for E-Commerce," IEEE Transactions on Consumer Electronics, vol. 2024, pp. 1–1.
[92] V. Chunduri, A. Kumar, A. Joshi, S. R. Jena, A. Jumaev, and S. More, "Optimizing energy and latency trade-offs in mobile ultra-dense IoT networks within futuristic smart vertical networks," Int. J. Data Sci. Anal., 2023.
[93] Jafar, O. A. Alzubi, G. Alzubi, and D. Suseendran, "+ A Novel Chaotic Map Encryption Methodology for Image Cryptography and Secret Communication with Steganography," International Journal of Recent Technology and Engineering, vol. 8, no. IC2, 2019.
[94] Kumar, S. Singh, K. Srivastava, A. Sharma, and D. K. Sharma, "Performance and stability enhancement of mixed dimensional bilayer inverted perovskite (BA2PbI4/MAPbI3) solar cell using drift-diffusion model," Sustain. Chem. Pharm., vol. 29, no. 100807, p. 100807, 2022.
[95] Kumar, S. Singh, M. K. A. Mohammed, and D. K. Sharma, "Accelerated innovation in developing high-performance metal halide perovskite solar cell using machine learning," Int. J. Mod. Phys. B, vol. 37, no. 07, 2023.
[96] L. Karn et al., "B-lstm-Nb based composite sequence Learning model for detecting fraudulent financial activities," Malays. J. Comput. Sci., pp. 30–49, 2022.
[97] L. Karn et al., "Designing a Deep Learning-based financial decision support system for fintech to support corporate customer's credit extension," Malays. J. Comput. Sci., pp. 116–131, 2022.
[98] R. B. M. Saleh, S. Venkatasubramanian, N. R. R. Paul, F. I. Maulana, F. Effendy, and D. K. Sharma, "Real-time monitoring system in IoT for achieving sustainability in the agricultural field," in 2022 International Conference on Edge Computing and Applications (ICECAA), 2022.
[99] Goswami, A. Das, K. I. Ogaili, V. K. Verma, V. Singh, and D. K. Sharma, "Device to device communication in 5G network using device-centric resource allocation algorithm," in 2022 4th International Conference on Inventive Research in Computing Applications (ICIRCA), 2022.
[100] K. Sharma and R. Tripathi, "4 Intuitionistic fuzzy trigonometric distance and similarity measure and their properties," in Soft Computing, De Gruyter, 2020, pp. 53–66.
[101] K. Sharma, B. Singh, M. Anam, K. O. Villalba-Condori, A. K. Gupta, and G. K. Ali, "Slotting learning rate in deep neural networks to build stronger models," in 2021 2nd International Conference on Smart Electronics and Communication (ICOSEC),

2021.
[102] K. Sharma, B. Singh, M. Anam, R. Regin, D. Athikesavan, and M. Kalyan Chakravarthi, “Applications of two separate methods to deal with a small dataset and a high risk of generalization,” in 2021 2nd International Conference on Smart Electronics and Communication (ICOSEC), 2021.
[103] Geo Francis and S. Sheeja, “A Novel RDAE Based PSR-QKD Framework for Energy Efficient Intrusion Detection," 2022 International Conference on Knowledge Engineering and Communication Systems (ICKES), Chickballapur, India, 2022, pp. 1-6,
[104] E. Geo Francis and S. Sheeja, “An optimized intrusion detection model for wireless sensor networks based on MLP-CatBoost algorithm,” Multimedia Tools and Applications, 2024.
[105] E. Geo Francis and S. Sheeja, “Intrusion detection system and mitigation of threats in IoT networks using AI techniques: A review,” Engineering and Applied Science Research, 2023, vol. 50, no. 6, pp. 633–645.
[106] E. Geo Francis and S. Sheeja, “SHAKE-ESDRL-based energy efficient intrusion detection and hashing system,” Annals of Telecommunications, 2023.
[107] E. Geo Francis and S. Sheeja, “Towards an Optimal Security Using Multifactor Scalable Lightweight Cryptography for IoT," 2022 3rd International Conference on Communication, Computing and Industry 4.0 (C2I4), Bangalore, India, 2022, pp. 1-6.
[108] E. Geo Francis, S. Sheeja and E. F. Antony John, “IoT Intrusion Detection Using Two-Tier-Convolutional Deep-Learning Model," 2023 International Conference on IoT, Communication and Automation Technology (ICICAT), Gorakhpur, India, 2023, pp. 1-7.
[109] E. Geo Francis, S. Sheeja and Joseph Jismy, “A Three-layer Convolution Neural Network Approach for Intrusion Detection in IoT," 2023 Eleventh International Conference on Intelligent Computing and Information Systems (ICICIS), Cairo, Egypt, 2023, pp. 261-268.
[110] A. Ogunmola, M. E. Lourens, A. Chaudhary, V. Tripathi, F. Effendy, and D. K. Sharma, “A holistic and state of the art of understanding the linkages of smart-city healthcare technologies,” in 2022 3rd International Conference on Smart Electronics and Communication (ICOSEC), 2022.
[111] Kannan, M. Pattnaik, G. Karthikeyan, Balamurugan, P. J. Augustine, and Lohith, “Managing the supply chain for the crops directed from agricultural fields using blockchains,” in 2022 International Conference on Electronics and Renewable Systems (ICEARS), Tuticorin, India, pp. 908-913, 2022.
[112] Sharma and D. K. Sharma, “A Study of Trend Growth Rate of Confirmed Cases, Death Cases and Recovery Cases of Covid-19 in Union Territories of India,” Turkish Journal of Computer and Mathematics Education, vol. 13, no. 2, pp. 569–582, 2022.
[113] Nallathambi, R. Ramar, D. A. Pustokhin, I. V. Pustokhina, D. K. Sharma, and S. Sengan, “Prediction of influencing atmospheric conditions for explosion Avoidance in fireworks manufacturing Industry-A network approach,” Environ. Pollut., vol. 304, no. 119182, p. 119182, 2022.
[114] A. Alzubi, O. A. Alzubi, A. Singh, and T. Mahmod Alzubi, “A blockchain-enabled security management framework for mobile edge computing,” Int. J. Netw. Manage., vol. 33, no. 5, 2023.
[115] J. A. Alzubi, O. A. Alzubi, M. Beseiso, A. K. Budati, and K. Shankar, “Optimal multiple key-based homomorphic encryption with deep neural networks to secure medical data transmission and diagnosis,” Expert Syst., vol. 39, no. 4, 2022.
[116] J. A. Alzubi, R. Jain, O. Alzubi, A. Thareja, and Y. Upadhyay, “Distracted driver detection using compressed energy efficient convolutional neural network,” J. Intell. Fuzzy Syst., vol. 42, no. 2, pp. 1253–1265, 2022.
[117] J. J. Lohith, A. Abbas, and P. Deepak, “A Review of Attacks on Ad Hoc On Demand Vector (AODV) based Mobile Ad Hoc Networks (MANETS),” International Journal of Emerging Technologies and Innovative Research, vol. 2, no. 5, pp. 1483–1490, 2015.
[118] Kaliyaperumal, A. Rahim, D. K. Sharma, R. Regin, S. Vashisht, and K. Phasinam, “Rainfall prediction using deep mining strategy for detection,” in 2021 2nd International Conference on Smart Electronics and Communication (ICOSEC), 2021.
[119] J, A. Manoj, G. Nanma, and P. Srinivasan, “TP-Detect: trigram-pixel based vulnerability detection for Ethereum smart contracts,” Multimed. Tools Appl., vol. 82, no. 23, pp. 36379–36393, 2023.
[120] Lohith J J and Bharatesh Cahkravarthi S B, “Intensifying the lifetime of Wireless Sensor Network using a centralized energy accumulator node with RF energy transmission,” in 2015 IEEE International Advance Computing Conference (IACC), Bangalore, India, pp. 180-184, 2015.
[121] Lohith, K. Singh, and B. Chakravarthi, “Digital forensic framework for smart contract vulnerabilities using ensemble models,” Multimed. Tools Appl., 2023, Press.
[122] Yuvarasu, A. Balaram, S. Chandramohan, and D. K. Sharma, “A Performance Analysis of an Enhanced Graded Precision Localization Algorithm for Wireless Sensor Networks,” Cybernetics and Systems, pp. 1–16, 2023.
[123] Al-Najdawi, S. Tedmori, O. A. Alzubi, O. Dorgham, and J. A. Alzubi, “A Frequency Based Hierarchical Fast Search Block Matching Algorithm for Fast Video Video Communications,” International Journal of Advanced Computer Science and Applications, vol. 7, no. 4, 2016.
[124] A. Alzubi, I. Qiqieh, and J. A. Alzubi, “Fusion of deep learning based cyberattack detection and classification model for intelligent systems,” Cluster Comput., vol. 26, no. 2, pp. 1363–1374, 2023.
[125] P. Dwivedi and D. K. Sharma, “Application of Shannon entropy and CoCoSo methods in selection of the most appropriate engineering sustainability components,” Cleaner Materials, vol. 5, no. 100118, p. 100118, 2022.
[126] P. P. Dwivedi and D. K. Sharma, “Assessment of Appropriate Renewable Energy Resources for India using Entropy and WASPAS Techniques,” Renewable Energy Research and Applications, vol. 5, no. 1, pp. 51–61, 2024.

[127] P. P. Dwivedi and D. K. Sharma, "Evaluation and ranking of battery electric vehicles by Shannon's entropy and TOPSIS methods," Math. Comput. Simul., vol. 212, pp. 457–474, 2023.
[128] P. P. Dwivedi and D. K. Sharma, "Selection of combat aircraft by using Shannon entropy and VIKOR method," Def. Sci. J., vol. 73, no. 4, pp. 411–419, 2023.
[129] P. S. Venkateswaran, F. T. M. Ayasrah, V. K. Nomula, P. Paramasivan, P. Anand, and K. Bogeshwaran, "Applications of artificial intelligence tools in higher education," in Advances in Business Information Systems and Analytics, IGI Global,USA, pp. 124–136, 2023.
[130] P. Sindhuja, A. Kousalya, N. R. R. Paul, B. Pant, P. Kumar, and D. K. Sharma, "A Novel Technique for Ensembled Learning based on Convolution Neural Network," in 2022 International Conference on Edge Computing and Applications (ICECAA), IEEE, 2022, pp. 1087–1091.
[131] R S Gaayathri, S. S. Rajest, V. K. Nomula, R. Regin, "Bud-D: Enabling Bidirectional Communication with ChatGPT by adding Listening and Speaking Capabilities," FMDB Transactions on Sustainable Computer Letters., vol. 1, no. 1, pp. 49–63, 2023.
[132] R, Steffi., S. Suman Rajest, R. Regin, and Shynu T. 2023. "Detection Of Prominent Objects by The Use of Deep Learning". Central Asian Journal of Mathematical Theory and Computer Sciences 4 (5), 62-82.
[133] Regin, S. Suman Rajest, Shynu T, & Steffi. R. (2023). The Application of Machine Learning to the Prediction of Heart Attack. International Journal of Human Computing Studies, 5(4), 5-25. Retrieved from https://journals.researchparks.org/index.php/IJHCS/article/view/4259
[134] Singh et al., "Smart healthcare system with light-weighted blockchain system and deep learning techniques," Comput. Intell. Neurosci., vol. 2022, pp. 1–13, 2022.
[135] Abukharis, J. A. Alzubi, O. A. Alzubi, S. Alamri, and T. O. Tim O\'Farrell, "Packet error rate performance of IEEE802.11g under Bluetooth interface," Res. J. Appl. Sci. Eng. Technol., vol. 8, no. 12, pp. 1419–1423, 2014.
[136] S. Parthasarathy, A. Harikrishnan, G. Narayanan, L. J., and K. Singh, "Secure distributed medical record storage using blockchain and emergency sharing using multi-party computation," in 2021 11th IFIP International Conference on New Technologies, Mobility and Security (NTMS), 2021.
[137] S. Samadi, M. R. Khosravi, J. A. Alzubi, O. A. Alzubi, and V. G. Menon, "Optimum range of angle tracking radars: a theoretical computing," Int. J. Electr. Comput. Eng. (IJECE), vol. 9, no. 3, p. 1765, 2019.
[138] S. Silvia Priscila, S. Suman Rajest, R. Regin, Shynu T, & Steffi. R. (2023). Classification of Satellite Photographs Utilizing the K-Nearest Neighbor Algorithm. Central Asian Journal of Mathematical Theory and Computer Sciences, 4(6), 53-71.
[139] S. Suman Rajest, S. Silvia Priscila, R. Regin, Shynu T, & Steffi. R. (2023). Application of Machine Learning to the Process of Crop Selection Based on Land Dataset. International Journal on Orange Technologies, 5(6), 91-112.
[140] S. Suman Rajest, Shynu T, R. Regin, & Steffi. R. (2023). A Visual Approach for Detecting Tyre Flaws That Makes Use of The Curvelet Characteristic. International Journal on Orange Technologies, 5(4), 17-40. Retrieved from https://journals.researchparks.org/index.php/IJOT/article/view/4264
[141] S. Suman Rajest, Shynu T, R. Regin, & Steffi. R. (2023). The Use of Deep Learning Methods for the Detection of Diseases in Plant Leaves. Central Asian Journal of Theoretical and Applied Science, 4(3), 67-91.
[142] S. Venkatasubramanian et al., "An Advanced Ticket Manager - Fuzzy Logic Based Aodv Routing Protocol (TM-FLAODV) In MANET", Skybold report, Vol 18, No 3 (2023),| pp. 233-249
[143] S. Venkatasubramanian, Jaiprakash Narain Dwivedi, S. Raja, N. Rajeswari, J. Logeshwaran, Avvaru Praveen Kumar, "Prediction of Alzheimer's Disease Using DHO-Based Pretrained CNN Model", Mathematical Problems in Engineering, vol. 2023, Article ID 1110500, 11 pages, 2023.
[144] S.Venkatasubramanian, A.Suhasini, S.Hariprasath, " Maximization Of Network Lifetime Using Energy Efficient Super Clustering Protocol Based On Ldha-Tsro In MANET", Journal of Data Acquisition and Processing, 2023, 38 (3), pp. 523-537 .
[145] Sholiyi A., O'Farrell T., Alzubi O., and Alzubi J., "Performance Evaluation of Turbo Codes in High Speed Downlink Packet Access Using EXIT Charts", International Journal of Future Generation Communication and Networking, Vol. 10, No. 8, August 2017.
[146] Shynu T, S. Suman Rajest, R. Regin, & Steffi. R. (2023). Data Mining-Based Point of Sale with Auto-Source Triggering and Business Reports. Central Asian Journal Of Mathematical Theory And Computer Sciences, 4(2), 116-141.
[147] Srinivasa, D. Baliga, N. Devi, D. Verma, P. P. Selvam, and D. K. Sharma, "Identifying lung nodules on MRR connected feature streams for tumor segmentation," in 2022 4th International Conference on Inventive Research in Computing Applications (ICIRCA), 2022.
[148] Steffi. R, S. S. Rajest, R. Regin, Shynu T, & S. S. Priscila. (2023). Analysis of an Interview Based on Emotion Detection Using Convolutional Neural Networks. Central Asian Journal of Theoretical and Applied Science, 4(6), 78-102.
[149] Steffi. R, S. Suman Rajest, R. Regin, & Shynu T. (2023). The Identification and Classification of Rash Conditions Compared to Skin Cancer . European Journal of Life Safety and Stability (2660-9630), 27, 4-27.
[150] Sudheesh et al., "Analyzing sentiments regarding ChatGPT using novel BERT: A machine learning approach," Information (Basel), vol. 14, no. 9, p. 474, 2023.
[151] Sudheesh et al., "Bidirectional encoder representations from transformers and deep learning model for analyzing smartphone-related tweets," PeerJ Comput. Sci., vol. 9, no. e1432, p. e1432, 2023.
[152] T, S., Rajest, S. S., Regin, R. and R, S. (2023) "Protection of User Profiles in Social Networks From Unauthorized Access", Central

Asian Journal of Theoretical and Applied Science, 4(4), pp. 32-50.

[153] T, Shynu, S. S. Rajest, R. Regin, and Steffi. R. 2023. "OTP As a Service in the Cloud Allows for Authentication of Multiple Services". International Journal on Orange Technologies 5 (4), 94-112.

[154] Chen, J. Blasco, J. Alzubi, and O. Alzubi "Intrusion Detection". IET Publishing, vol. 1, no. 1, pp. 1-9, 2014.

[155] K. Nomula, R. Steffi, and T. Shynu, "Examining the Far-Reaching Consequences of Advancing Trends in Electrical, Electronics, and Communications Technologies in Diverse Sectors," FMDB Transactions on Sustainable Energy Sequence, vol. 1, no. 1, pp. 27–37, 2023.

[156] Venkatasubramanian, S., Hariprasath, S., "Aquila Optimization-Based Cluster Head Selection and Honey Badger-Based Energy Efficient Routing Protocol in WSN", Proceedings of the International Conference on Intelligent Computing, Communication and Information Security. ICICCIS 2022. Algorithms for Intelligent Systems. Springer, Singapore, pp 273–290.