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PREDICTION OF MENTAL HEALTH USING A CLASSIFICATION ALGORITHM

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ABSTRACT_ A person's mental health reveals their emotional, psychological, and social well-being. It has an impact on how a person thinks, feels, and reacts to a situation. Positive mental health allows people to perform more productively and reach their full potential. Mental health is important at all stages of life, from childhood to adulthood. Stress, social anxiety, depression, obsessive compulsive disorder, substance addiction, workplace challenges, and personality disorders are all variables that contribute to mental health concerns that lead to mental disease. To maintain an acceptable life balance, the onset of mental disease should be determined without errors.. We have collected data from online available datasets. The data has been label encoded for better prediction. The data is being subject to various machine learning techniques to obtain labels. These classified labels will then be used to build a model to predict the mental health of an individual. The accuracy of the algorithm will be analyzed before it is used to build the model. We planned to implement classification algorithms such as Decision Tree, Random Forest and Naive Bayes. Our target population is in the working class i.e people above the age of 18.

1.INTRODUCTION

Many people have psychological issues, and these issues have sparked widespread concern in society, as evidenced by the high number of dropout and suicide incidents in recent years. People can experience psychological issues at any stage of life for a variety of intricate reasons. The protection of one's personal safety can be greatly enhanced by early detection of these psychological issues. Technologies like deep learning, data mining, and big data are advancing quickly and becoming more integrated into people's daily lives as a result of the quick development of fields like computer

science and mathematics. In the field of computer science, more and more algorithms are being developed to solve specific problems and, in many cases, outperform conventional approaches.

Indicators like degree centrality and edge betweenness, for instance, are typically used to analyse social networks. While these indicators can better describe some aspects of social networks, they typically only express a portion of the information in social networks and may contain more noise. This problem is very well solved by network representation learning based on deep learning, which typically captures more information in the network for more detailed analysis and identification. In order to identify who are more likely to have psychological issues, this research makes use of machine learning, other technologies, and social network data. Accurate identification can give families and schools the chance to help people as soon as possible and give the proper treatment to address their issues.

Assistance in psychological counselling by psychologists can largely prevent the worsening of psychological issues, lower rates of school dropout and other occurrences, and lower rates of social tragedies. Moreover, more potential social information between views is preserved, a novel approach to effectively using multi view network data is suggested, and a solution to the common issue of label imbalance in such data is put forth. It is suggested to use deep learning technology to identify psychological issues, which also offers guidance for identifying and researching students' psychological issues.

Depression and anxiety are serious conditions that have a global impact on people's health. Men and women of all ages, including children and the elderly, are affected by them. The effects of anxiety and depressive disorders on health and well-being are extensive. Different somatic symptoms like gastritis, acid reflux, palpitations, insomnia or hypersomnia, tremors, significant weight loss or gain, and different psychosocial manifestations like low mood, social withdrawal, decreased workplace productivity, suicidal ideation or attempt, and lack of concentration are all caused by them. A number of other lifestyle disorders, including ischemic heart disease, hypertension, diabetes, unintentional accidents, and intentional harm, are significantly increased by depression and anxiety. Depression and suicidal thoughts are closely related, and depression itself can result in suicide. They are harmed by a variety of communicable diseases, including HIV and tuberculosis. People who experience depression and

anxiety are frequently socially isolated by their families and stigmatized by society. They might not perform as well in workplaces and educational institutions. People are subsequently losing access to economic and social opportunities, which has a negative impact on their quality of life. Economic stress is a pervasive and frequently immeasurable manifestation that feeds a vicious cycle of illness and poverty. Low- and middle-income families are primarily impacted. This highlights the urgent need for policies that address income inequality and provide aid to those who are experiencing financial difficulties .Investing in education and job training programmes can also help people acquire the skills they need to find better- paying employment and raise their standard of living. In addition, reducing poverty rates and increasing consumer spending can benefit the economy as a whole when income inequality is addressed. Implementing policies that promote economic equality can therefore be beneficial for both individuals and society as a whole. Additionally, by easing social tensions and reducing crime rates, reducing income inequality can help create a society that is more stable and peaceful. Therefore, promoting economic equality should be a top priority for both governments andbusinesses.

2.LITERATURE SURVEY

2.1 M. I. Jordan and T. M. Mitchell, "Machine learning: trends, perspectives, and prospects," *Science*, vol. 349, no. 6245, pp. 255–260,2015.

Using sophisticated statistical and probabilistic techniques, machine learning aims to create systems that can learn from experience. It is thought to be a very helpful toolfor predicting mental health. It is enabling numerous researchers to gather crucial data and create personalised experiences and automated intelligent systems. These systemscan also be used to optimise decision-making procedures and enhance overall performance in a variety of industries, including finance, marketing, and healthcare. These systems can recognise patterns and make predictions based on data analysis thanks to machine learning algorithms.

2.2 F. Dabek and J. J. Caban, "A neural network based model for predicting psychological conditions," in *Brain Informatics and Health*, pp. 252–261, Springer International Publishing, Berlin, Germany, 2015.

Popular machine learning algorithms like support vector machines, random forests, and artificial neural networks have been used to forecast and categorise future

events. Numerous applications, including speech recognition, image recognition, and natural language processing, have been shown to successfully use these algorithms. Because of their precision and effectiveness, they are essential tools for data analysis and decision-making in many industries. These algorithms can also handle sizable datasets and can be trained to spot intricate patterns in data. As a result, they are increasingly being used to make predictions and guide business decisions in industries like finance, healthcare, and marketing.

2.3 G. Cho, J. Yim, Y. Choi, J. Ko, and S.-H. Lee, "Review of machine learning algorithms for diagnosing mental illness," *Psychiatry Investigation*, vol. 16, no. 4, pp. 262–269, 2019.

The most frequently used approach in many different types of research, studies, and experiments, particularly in the medical field's illness prediction, is supervised learning in machine learning. All data instances in supervised learning should reflect the terms, attributes, and values. As a result, the machine learning algorithm can gain knowledge from the labelled data and produce precise predictions for fresh, untainted data. Unsupervised learning, on the other hand, can be advantageous for finding patterns and connections in massive datasets without the need for labelled data. Unsupervised learning algorithms are particularly useful in scenarios where labelled data is scarce or expensive to obtain. They can also help identify previously unknown patterns and relationships in the data that may not have been apparent otherwise

3.PROPOSED SYSTEM

We intended to use categorization methods like Decision Tree.It will be more accurate than the current one.Classification and regression problems can be solved using Decision Tree. The tree representation is used to solve the problem, in which characteristics are represented on the internal node of the tree and each leaf node corresponds to a class label.

3.1 IMPLEMENTATION

- A supervised learning method called a decision tree can be used to solve classification and regression problems, but it is typically preferred for doing so. It is a tree-structured classifier, where internal nodes stand in for a dataset's features, branches for the decision-making process, and each leaf node for the classification result.
- In a Decision tree, there are two nodes, which are the **Decision Node** and **Leaf Node.** Decision nodes are used to make any decision and

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have multiple branches, whereas Leaf nodes are the output of those decisions and do not contain any further branches.

- It is a graphical representation for obtaining all feasible answers to a decision or problem based on predetermined conditions. It is known as a decision tree because, like a tree, it begins with the root node and grows on subsequent branches to form a structure resembling a tree.
- The CART algorithm, which stands for Classification and Regression Tree algorithm, is used to construct a tree. A decision tree merely poses a question and

divides the tree into sub trees according to the response (Yes/No).

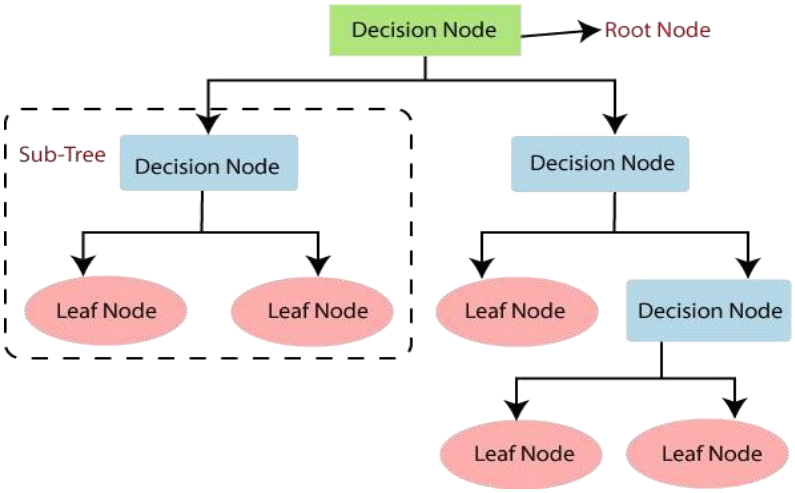
Why use Decision Trees?

The most important thing to keep in mind when developing a machine learning modelis to select the best algorithm for the dataset and problem at hand. The two rationales for employing the decision tree are as follows: Decision trees are typically designed to mimic how people think when making decisions, making them simple to comprehend. Because the decision tree displays a tree-like structure, the logic behind it is simple to comprehend.

Decision Tree Terminologies:

Root Node: The decision tree's root node is where it all begins. The entire dataset is represented, which is then split into two or more homogeneous sets.

Leaf Node: Leaf nodes are the final output nodes, after which the tree cannot be



further divided.

Splitting: The division of the decision node/root node into sub-nodes in

accordance with the specified conditions is known as splitting.

Branch/Sub Tree:A branch or sub tree is a tree created by slicing another tree.

Pruning: Pruning is the process of removing the tree's undesirable branches.

Parent node/child node:The root node of the tree is referred to as the parent node, and the other nodes are referred to as the child nodes.

How does the Decision Tree algorithm Work?

In a decision tree, the algorithm begins at the root node and works its way up to predict the class of the given dataset. This algorithm follows the branch and jumps to the following node by comparing the values of the root attribute with those of the record (real dataset) attribute. The algorithm compares the attribute value with the other sub-nodes once more for the following node before continuing. It keeps doing this until it reaches the tree's leaf node.

- Step 1: According to S, start the tree at the root node, which holds the entiredataset.
- Step 2: Utilize the Attribute Selection Measure to identify the dataset's topattribute (ASM).
- Step 3: Subset the S to include potential values for the best attributes.
- Step 4: Create the decision tree node that contains the best attribute . Use the subsets of the dataset generated in step 3 to iteratively create new decisiontrees in

step 5. Continue along this path until you reach a point where you can no longer categorize the nodes and you refer to the last node as a leaf node

4.RESULTS AND DISCUSSION

A decision tree is used to build the model after data processing and cleaning. The model made a prediction about the person's mental health, and it did so with reasonable accuracy.To further improve prediction accuracy, the decision tree model can be enhanced by adding additional machine learning techniques like random forests or neural networks. The model can also be used to pinpoint important causes of workplace mental health problems, giving employers important information about how to handle these problems.These methods can lessen the possibility of over-fitting and improve the model's generalization. Additionally, the decision tree model's findings can guide focused interventions to enhance workplace mental health.

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Accuracy

	precision	recall	f1-score	support
0	0.92	0.68	0.78	191
1	0.74	0.94	0.83	187
accuracy			0.81	378
macro avg	0.83	0.81	0.80	378
weighted avg	0.83	0.81	0.80	378

0.8068783068783069

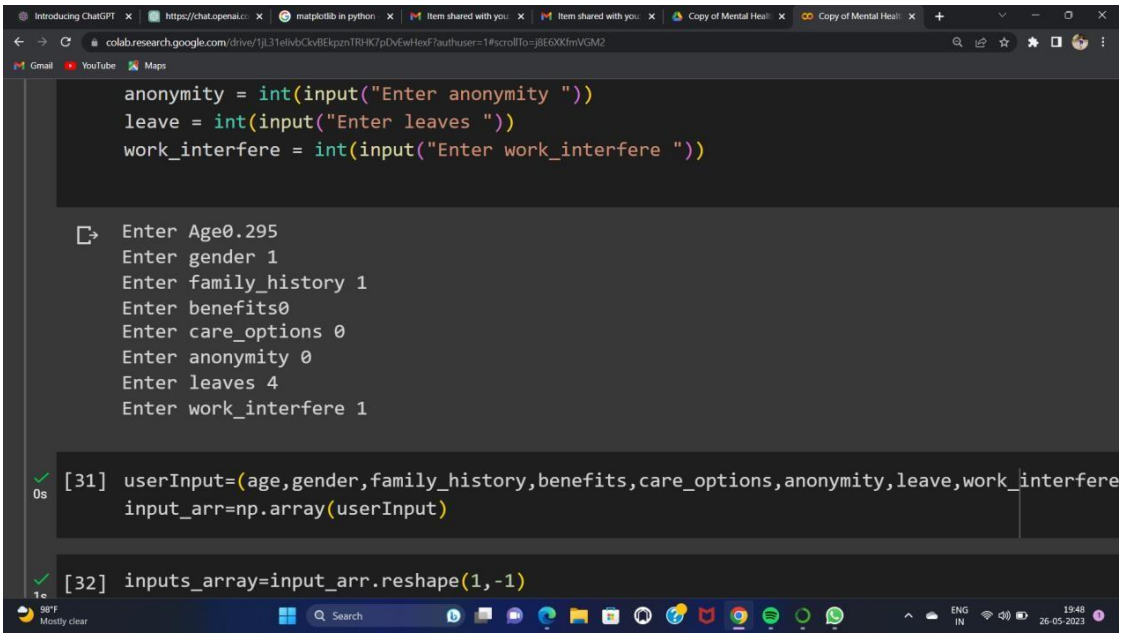

Fig 1:Input values

In the above figure we have take input values based on theses values we have topredict the user is in normal state or suffering with mental health issue.

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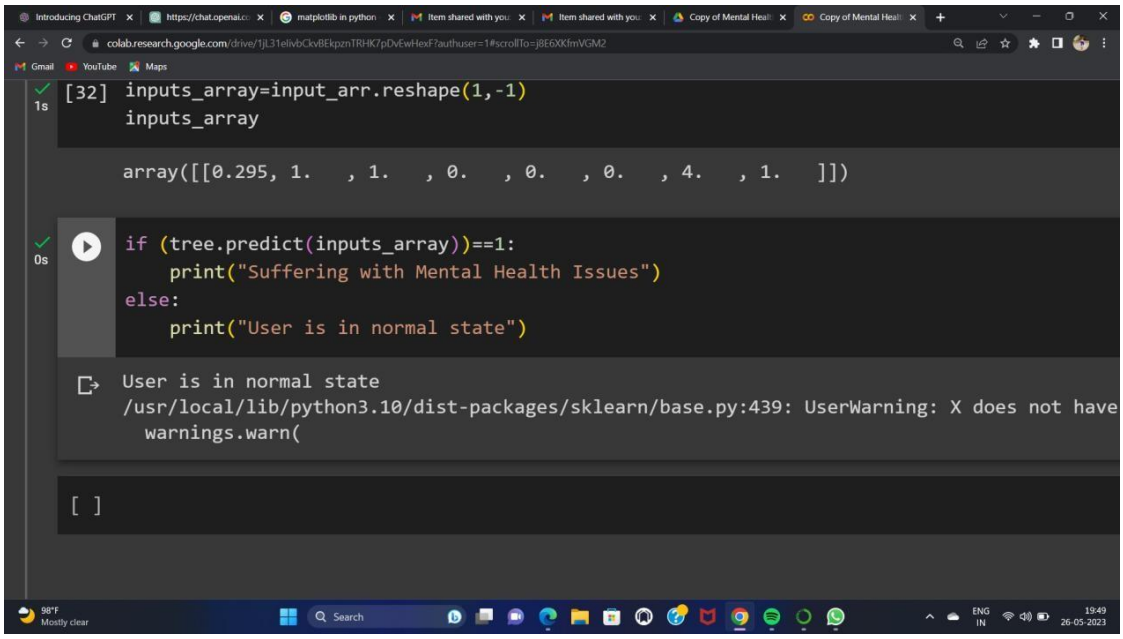

Fig 2:Output

In this figure based on the above given inputs user is normal state.

5.CONCLUSION

The model's ability to predict whether a user will experience mental health problems is helpful in determining what actions need to be taken. This forecast can be useful in spotting potential mental health problems early on and offering suitable interventions to stop them from getting worse. It can also help medical professionals create individualized treatment plans for patients based on their anticipated state of mental health.It is possible to anticipate behavioral changes that might signify the beginning of mental health issues by analyzing the data from wearable technology and social media. This may result in earlier interventions and improved patient outcomes

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