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Mental Health Prediction Models Using Machine Learning in Higher Education Institution

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ABSTRACT: The mental health of Malaysians has become a big deal today. National Health and Morbidity Survey (NHMS) 2017 says that one in five people in Malaysia has depression; two in five have anxiety, and one in ten have stress. This is based on the results of the survey. Those who go to college or university could also be a part of the community that is affected by the storm. The size of the data without proper management and analysis, and the lack of counsellors, are making the problem even worse. So, this paper focuses on figuring out what causes mental health problems in people who go to college. This study is trying to figure out how to use machine learning algorithms to group students into different types of mental health problems, like stress, depression, and anxiety. The data comes from students at a university in Kuala Terengganu. Decision Tree, Neural Network, Support Vector Machine, Naive Bayes, and logistic regression are some of the algorithms that are used. There are three types of models that are the best at predicting stress, depression, and anxiety: Decision Tree, Support Vector Machine, and Neural Network, respectively.

KEYWORDS: Keywords: Anxiety, Depression, Higher Education, Stress, Mental Health.

I. INTRODUCTION

A hard thing to do now is figure out what causes mental health problems in students, which is not easy. The factors can be influenced by biological, psychological, and environmental issues, as well as other things. It can be hard to figure out what the problem is because symptoms and factors can be similar. This can lead to the doctor misdiagnosing [1], which could harm the patient's psychological health, both emotionally and behaviorally. The World Health Organization (WHO) defines mental health problems or mental disorders as the combination of abnormal thoughts, emotions, behaviour in daily activities, and relationships with others [2]. Machine learning could help people find out more about things and make medical practises better[3].

Mental Health Problem in Higher Education System In Malaysia

[4] The Ministry of Higher Education (MOHE) is in charge of the higher education system in Malaysia. The higher education institutions (HEIs) are in charge of and run the system. They include both public and private institutions that are funded by the government. Both offer certificate, diploma, undergraduate, and postgraduate programmes, as well as other types of programmes. Certificate, Diploma, Bachelor's Degree, Master's Degree, and Doctor of Philosophy are the five levels of higher education that you need to get (PhD). Until December 31, 2018, 552,702 students went to, and 119,345 students graduated from, twenty Public Universities in Malaysia [5]. These higher education institutes help people grow and move out of poverty by producing high-quality graduates who work in high-paying jobs and help the economy and the community [5]. The university is a good place to learn new things, but life at university can be difficult and difficult. However, students can still do very well. In today's world, most students complain about the high level of stress they feel in their university lives, which can make them feel anxious and depressed, especially at the end of the semester. Having to balance assessments, work, and exams makes people more stressed out as they learn more [7]. Students' mental health may also be affected by other things. Students may have a high risk of having mental health problems because of family problems, uncertainty about their future careers, financial problems, and living away from home [8]. It can also be hard for students to balance their lives at school with other things they have to do or want to do [7, 9].

It has been said that students who have symptoms of mental health problems say that they are not getting any treatment and that they won't get help to deal with their emotions. These students don't care about their situation because their

peers also have the same symptoms, and they think this is normal for people who go to college [10]. However, some of them know that they need to get help, but they don't have the courage to do so and worry too much about what other people think [7],[9]- [10]. They are afraid that the stigma of having mental health problems might make people think they're bad or weird, and they worry about the negative effects of being called sick, overly emotional, or crazy [11]. Universities need to come up with new ways to get students to get checked out and get the treatment they need for their mental health problems. [11]-[12] A mental health problem or mental illness is an illness that affects how a person feels and thinks, how they act, and how they communicate with other people. Psychiatrists say mental health problems and illnesses are illnesses that affect someone's emotional state, thought process, and behaviour, or a combination of several illnesses that have to do with their social, work, or family lives [12]. Thus, it can be said that mental health problems have an effect on a person's emotions, thoughts, behaviour, connection with society, and daily tasks. People with mental health problems have anxiety disorders and depression, as well as stress and Schizophrenia [12]. Malaysia has the most common mental health problems in the world. They are depression, anxiety disorders, and stress[13].

Anxiety Disorders

Anxiety disorders are marked by a lot of worry and fear, especially when there are problems or decisions to make [13]-[14]. People who have anxiety disorders have a hard time living their lives because they have a lot of anxiety, nervousness, and fear. In unpleasant situations, other symptoms may show up. These include heart palpitations, breathing problems, excessive sweating and tremors or nausea [14], among other things. Anybody can get an anxiety disorder, even if they don't have a specific condition or if they had a lot of bad things happen to them when they were young [15]. Many people have anxiety disorders, like Generalized Anxiety Disorder (GAD), panic disorder, and social anxiety disorder, but there are many different types of anxiety disorders.

Most days, people with GAD are very worried about things like their safety, jobs and social interactions as well as everyday life events [15]. For at least six months [15], they have been worried about these things a lot. They don't want to be in a situation where the outcome isn't clear, and they worry about things that might go wrong. [14]. panic attacks can happen to people who have panic disorder when they feel a sudden surge of fear or anxiety. They get scared and may have heart palpitations, excessive sweating, tremors, shortness of breath, and the feeling that they are out of control.

Phobia is a type of anxiety disorder in which people have a strong fear of certain things or situations [14]. They may be afraid of an object or situation that they don't understand, and they also try to avoid it [14]. As an example, dogs, spiders, and snakes are all animals or insects that are usually harmless. People who have a specific phobia have an extreme and long-lasting fear of a certain item, situation, or activity that is usually harmless. People with social anxiety disorder have a lot of anxiety about how other people will react to their behaviour or attitude, which makes them feel ashamed [14]. Because they don't want to be the centre of attention, they avoid situations that they think might. At least two or more of the following things make people with agoraphobia very afraid. They are afraid to use public transportation, be in open or enclosed spaces or lines, stand in line, be in crowds, and be alone outside the house [14]-[15]. People who have separation anxiety disorder are afraid to be apart from people they are very close to. If they're going to be separated, they might have hallucinations or nightmares about how they're going to split up.

Depression

As a result of the persistent melancholy, a person suffering from depression loses interest and enthusiasm, suffers from feelings of guilt or poor self-worth and is unable to focus [15]. Mood disorders like depression, which the National Institute of Mental Health refers to as "clinical depression," may have major consequences for one's day-to-day functioning, mood and perceptions [13]. Depression is a debilitating illness for both the sufferer and their loved ones. Because it may lead to suicide, it is a major health issue. A depressed person's symptoms include a constant sadness, emptiness, hopelessness, and a loss of interest in hobbies and activities[13],[15].

Persistent depressive disorder (PDD), postpartum depression, and psychotic depression are just a few of the many kinds of depression. Dysthymia, or long-term depression, is a mood illness that lasts for more than two years [15]. People who are diagnosed with persistent depressive disorder may have major depressive episodes along with less severe symptoms, but signs must continue for at least two years in order to qualify [15]. Severe depressive symptoms are common in people with psychotic depression, which is characterised by psychosis, such as delusional thinking or perceptions of sounds or sights that are not apparent to others around them. Disturbing "themes," such as illusions of guilt, poverty, or disease, often accompany the signs and symptoms associated with psychotic depression [15]. Seasonal affective disorder (SAD) is a mood illness that occurs during the winter months when there is less natural sunshine [15]. The onset of winter depression, which is often accompanied by social isolation, excessive sleep, and weight gain, occurs at the same time each year. Bipolar illness is characterised by mood swings that may go from



severe lows to extreme highs, which are recognised as manias in the medical community (when the person is either euphoric or irritable). Hypomania is a milder variant of manic depression[15].

Factors behind Mental Health Problems

Generally, mental health disorders are caused by a combination of biological and social causes [15]. Lack of social support, financial difficulties, and the learning environment are all mentioned in Table 1 as major causes of mental health issues among college students. The absence of social support is described as a lack of community support that leads to an increased level of stress. Having the help of family and friends may make a big difference in a student's success. A lack of social interaction may lead to mental health issues such as depression and anxiety disorder if a student is left feeling alone.

Table 1 Comparison Factor of Mental Health among Higher Education Students

Factor	Reference
Lack of Social Support	[10, 14, 17, 19, 20]
Financial Problem	[10, 14, 17, 18, 22]
Learning Environment	[10, 14, 17, 18, 21]
Being Female	[14, 16, 18, 19]
Family Problem	[10, 18, 22]
Peer Relationship	[10, 17, 20]

Mental health issues may be caused by faulty functioning of nerve cell circuits or pathways that link the brain areas, which can be caused by heredity and other causes. To understand one's social environment, one must understand one's relationship to their physical and cultural surrounds. A person's connection with their family, friends, coworkers and the local community [16], the absence of social support, and discrimination in the job are all factors in this situation. People's financial condition is reflected in their socioeconomic surroundings. People with poor financial status are more susceptible to stress and worry, which may lead to mental health issues [16]. University life, exams, and learning styles are all part of the learning environment. Being a woman, living far away from home, and having a history of mental health issues are just a few of the other characteristics that contribute to a person's likelihood of being addicted to the internet. An important aspect in students' mental health issues is their inability to maintain a healthy work-life balance while still attending school. If they don't do well in class, they might lose their scholarship or have the amount lowered. Toward the conclusion of the semester, particularly during the test time, the level of tension will rise[10].

Related Studies using Machine Learning Algorithms

Machine learning is a branch of computer science that studies how computers pick up new skills and information by analysing large amounts of data. In the subject of machine learning, computers may learn without being explicitly programmed [3, 27]. supervised learning, unsupervised learning, semi-supervised learning, and reinforcement learning are all examples of machine learning. For the classification of mental health issues, supervised learning is the most often used data mining approach, according to Table 2.

Table 2 Comparison Factor of Mental Health among Higher Education Students

Author	Techniques	Variables	Significances
[18]	Random forest, NB, SVM, KNN	Perceived Stress Scale (PSS) questionnaire	The accuracy of random forest 83.33%, NB 71.42%, SVM 85.71% and KNN 55.55%
[24]	DT, SVM, ANN, BN	Outgoing activity, toileting activity, sleeping activity, disease, mental status (GDS)	DT 95.1%, SVM 75.6%, ANN 96.7%, BN 92.7%
[25]	KNN, SVM BN	Depression level, sex, grade, major, technical, novel, amusing, psychological	Mild depression: DT 94.3%, SVM 75.6%, ANN 96.2%, BN 91.3%
[26]	Random forest, random tree, MLP, SVM	Age, MMSE score, neurological condition, depression (GDS), MoCA test	Severe depression: DT 99.4%, SVM 99.5%, ANN & BN 100%



A support vector machine (SVM), a decision tree, and a neural network are some of the most often used techniques. In general, the accuracy of these three models is over 70%, with robust generalisation capabilities that avoid overfitting[27]-[28].

II. METHODS

Based on the Cross-Industry Standard Process for Data Mining, the project's structure has been adopted (CRISP-DM). The CRISP-DM framework's issue and data comprehension, modelling, and model assessment cycles have been updated for the CRISP-DM framework. The main sources of information are the World Health Organization (WHO) [15], the National Institute of Mental Health (NIMH) [13], and the American Psychiatric Association [12]. Depression Anxiety Stress Scale (DASS21) and the World Health Organization 40 Quality of Life survey are used to obtain data (WHOQOL). To gauge a student's degree of stress, sadness, and anxiety, the DASS-21 survey is employed. Modeling will focus on stress, sadness, and anxiety in the first phase.. If a student is experiencing mental health issues, the WHOQOL is used to factor them in.

Selected Factors

Positive feelings, memory, self-esteem, appearance, negative feelings, personal connection, social support, safety, home environment, money, leisure, and religion are among the 15 elements in WHOQOL that have been chosen. It is divided into three components: a demographic profile, a DASS-21 segment, and a WHOQOL segment that includes questions on psychological well-being, social relationships, the physical environment, and one on spirituality/religion/personal beliefs. The WHOQOL segment is divided into five areas. More than 600 students from a Terengganu university participated in the survey. Everyone who takes part in the survey answers the following questions: "Not at all," "A little," "A moderate amount," "A lot," "Very much," and "Extremely much" (indicating high, positive perceptions).

Table 3 Attributes for data collection

Group	Attribute	Attribute value	Number of attributes
Demographic	Gender, Age, Program, Part, CGPA [3.50 - 4.00, 3.00 – 3.49, 2.20 – 2.99, 2.00-2.19 and below 2.00], Financial Support	Nominal	7
DASS-21 (Target/Output)	S1 – S21	Numeric	21
WHOQOL Section A: Psychological	A1.1, A1.2, A1.3 A2.1, A2.2, A2.3, A2.4 A3.1, A3.2, A3.3, A3.4 A4.1, A4.2, A4.3, A4.4 A5.1, A5.2, A5.3, A5.4	Numeric	19
Section B: Social Relationship	B1.1, B1.2, B1.3, B1.4 B2.1, B2.2, B2.3, B2.4	Numeric	
Environment	C1.1, C1.2, C1.3, C1.4 C2.1, C2.2, C2.3, C2.4 C3.1, C3.2, C3.3, C3.4 C4.1, C4.2, C4.3, C4.4	Numeric	12
University Life	D1.2, D1.3, D1.4 D2.1, D2.2, D2.3, D2.4 D3.1, D3.2, D3.3, D3.4	Numeric	11
Spirituality/Religion/ Personal Beliefs	E1.1, E1.2, E1.3, E1.4	Numeric	4
Total of attributes			82



Labeling and Representation of data According to equation 1 for Stress Score, 2 for Depression Score, and 3 for Anxiety Score, the goal values of stress, depression, and anxiety are produced:

$$Stress_{score} = S1 + S6 + S8 + S11 + S14 + S18 \tag{1}$$

$$Depress_{score} = S3 + S5 + S10 + S13 + S16 + S17 + S21 \tag{2}$$

$$Anxiety_{score} = S2 + S4 + S7 + S9 + S15 + S19 + S20 \tag{3}$$

Table 4 shows how the scores are correlated with various degrees of stress, sadness, and anxiety. The desired variables are nominal qualities with labels for normal, mild, moderate, severe, and very severe for each Stress Level, Depression Level, and Anxiety Level.

Table 4 Levels of Mental Health Types

Score/No of Samples/Level	Normal	Mild	Moderate	Severe	Extremely severe
Stress	0 – 7	8 – 9	10 – 13	14 – 17	Above 18
No. of Samples	377	87	113	43	9
Depression	0 – 5	6 – 7	8 – 10	11 – 14	Above 15
No. of Samples	373	100	54	64	38
Anxiety	0 – 4	5 – 6	7 – 8	9 – 10	Above 11
No. of Samples	261	119	84	66	99

Preparing datasets for modelling involves two primary steps. Table 3 shows the actual values for each characteristic in the survey, as seen in this example. Attributes A1.1 through E1.4, as well as nominal values for demographic characteristics, are included in the dataset. Next, the WHOQOL components are averaged to achieve the average WHOQOL score. Equations 4, 5, and 6 provide the method for calculating the average WHOQOL score based on three different types of criteria.

$$positive_feeling = \frac{A1.1 + A1.2 + A1.3}{3} \tag{4}$$

$$personal_relationship = \frac{B1.1 + B1.2 + B1.3 + B1.4}{4} \tag{5}$$

$$safety = \frac{C1.1 + C1.2 + C1.3 + C1.4}{4} \tag{6}$$

Machine Learning Algorithms

Decision Tree, Neural Network, Support Vector Machine, Naive Bayes, and Logistic Regression are all used in this study's modelling phase, which is repeated for numerous trials using SPSS Modeler. For the prediction model, which is described in equation (7), a Chi-squared Automation Interaction Detection (CHAID) decision tree was built, which is represented in equation (7), where y is the actual value and y' is the predicted value. Close to zero means there is a



statistically significant difference between two groups. There is no substantial difference between the two groups if a value close to 1 is recorded. For the next tree split, we will use the predictor variable with the least adjusted p-value, which means that the predictor variable that will result in the most significant split will be used.

$$Chi - squared\ value = \sqrt{\frac{(y - y')^2}{y'}} \tag{7}$$

The input layer, the hidden layer, the connection weight, and the output layer are all components of a neural network. A processing layer known as the "hidden layer" is responsible for converting input into output. The weight of a connection is a measure of the input's strength. This algorithm includes functions for summarising and transforming data in both the input and hidden layers at each node. The input variables are represented as nodes in the input layer. As a result, the neural network for predicting anxiety level is shown in figure 1 as the output variable of a prediction issue. Naive Bayes is a classification technique that relies on probabilistic theory. Bayes Theorem is used to calculate the likelihood of A occurring, given that B has already happened, in equation (8) In this case A is the hypothesis and B is proof, which assumes that the variables are independent.

$$P(A|B) = \frac{P(B|A)P(A)}{P(B)} \tag{8}$$

Above,

- P(A|B) is the posterior probability of class (A is target variable) given predictor (B is attributes).
- P(A) is the prior probability of class.
- P(B|A) is the likelihood which is the probability of predictor given class.
- P(B) is the prior probability of predictor.

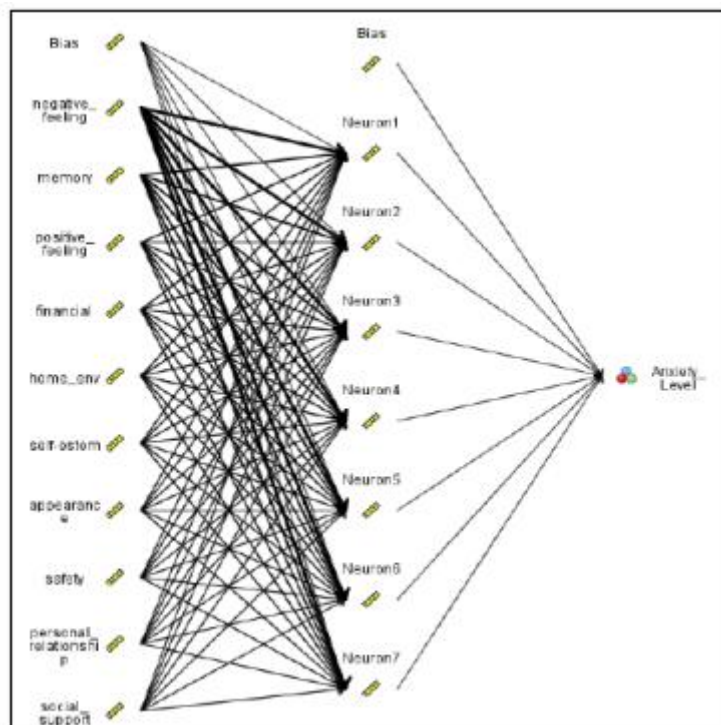


Figure 1 Neural network for anxiety level

To tackle classification difficulties, Logistic Regression incorporates the idea of probability, but also employs a more complicated technique known as the Sigmoid function. The model representation in logistic regression is an equation



(9). To forecast an output value, independent values (x) are integrated linearly using weights or coefficient values (y). a good illustration of a logistic regression equation is:

$$y = \frac{e^{b_0+b_1 \cdot x}}{1 + e^{b_0+b_1 \cdot x}} \tag{9}$$

where y is the predicted output, b0 is the bias or intercept term and b1 is the coefficient for the single input value (x) Classification, regression, density estimation, novelty detection, and other applications may all benefit from support vector machines (SVMs). In order to create a prediction model, SVM uses categorization algorithms. It is the goal of the SVM method to locate an N-dimensional hyperplane that can clearly classify the data. Many potential hyperplanes may be found when two sets of data points are separated. here, you'll find the hyperplane equation (10):

$$w^T x + b = 0 \tag{10}$$

where w is a weight vector, x is input vector and bis bias.

This is done by maximising the classifier's margin in order to distinguish two sets of data points from one other. This means that in order to maximise the margin, we must ensure that there are no data points between two lines in ||w|| equations (11) and (12).

$$w^T x + b \geq 0 \text{ for } d_i = +1 \tag{11}$$

$$w^T x + b \leq 0 \text{ for } d_i = -1 \tag{12}$$

where, d is margin of separation. It is a separation between the hyperplane and the closest data point for a given weight vector w and bias b.

Performance Measures

Each algorithm with a feature selection procedure tests multiple models for each kind of mental health issue (stress, depression, and anxiety, for example). Accuracy, specificity, and precision are used to assess each model. The best prediction model is then picked.

$$Accuracy = \frac{TP + TN}{Total\ Sample} \tag{13}$$

$$Sensitivity = \frac{TP}{TP + FN} \tag{14}$$

$$Specificity = \frac{TN}{TN + FP} \tag{15}$$

$$Precision = \frac{TP}{TP + FP} \tag{16}$$

III. RESULT AND DISCUSSION

This section shows the dashboard results for descriptive analysis and the algorithm results for modelling. The dashboard shows the distribution of pupils based on the outcomes. Models are built and fine-tuned until they are as accurate as possible throughout the modelling process.



Descriptive Analysis of the Factors

According to the curve in figure 2, 71% of the students in this data set are female. Data collection records that responded to the DASS-21 survey are shown on the dashboard. Second, third, and fourth graphs indicate how many pupils are female, male, or female/male/male/male. According to the findings, almost half of the children report typical levels of stress, despair, and anxiety throughout the school year. There are just a few pupils that have a high degree of stress and sadness. More than a hundred pupils, on the other hand, report having moderate to severe levels of worry. It's safe to infer that since they're still getting used to university life, the students are worried about their futures. Male and female anxiety levels are shown in a pink and a blue bar in Figure 2 based on the severity of their anxiety levels.

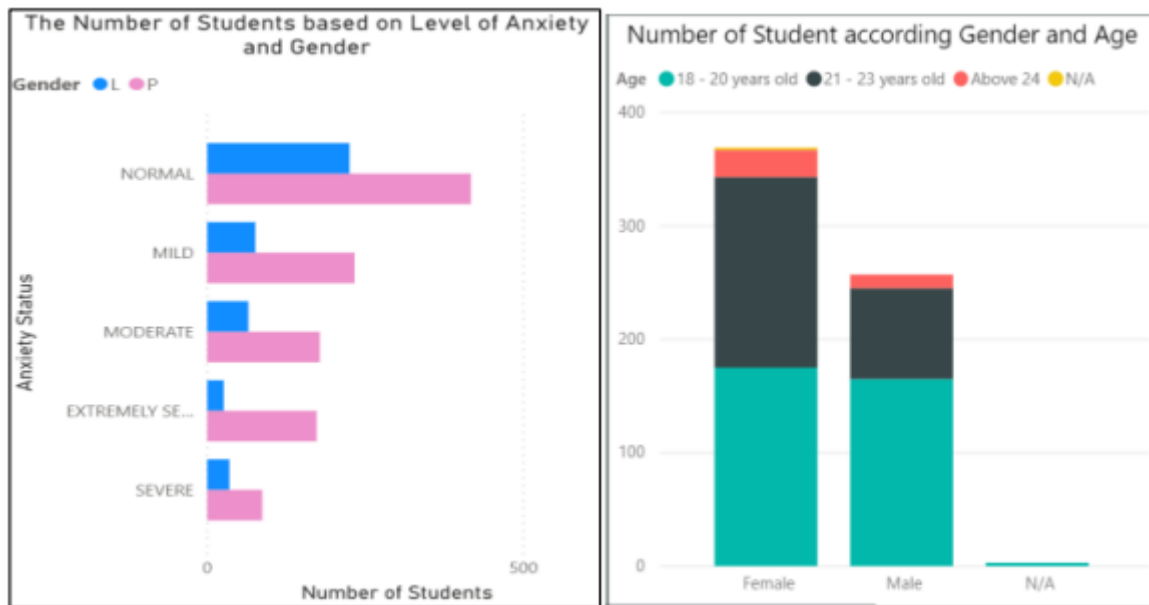


Figure 2 Distribution of sample

Comparison of Algorithms in Prediction of Stress Level

The CHAID Decision Tree (DT) is the best method for classifying stress. This variable has five possible values: normal, mild, moderate, severe, and very severe (the extreme end of the severity spectrum). These stress levels are further subdivided into two groups. The 0 indicates that the kids do not suffer from mental health issues as a result of stress. There are three degrees of severity: mild, moderate, and severe, which indicate that kids may be at risk for mental health issues due to stress. There are 464 examples of Stress Level, and there are 156 samples of Stress Level (0). An 18-attribute list was narrowed down to six for ranking purposes.

Table 5 shows the maximum accuracy, sensitivity, specificity, and precision acquired by the decision tree model during testing, at 84.44 percent, 54.84 percent, and 93.27 percent, respectively.

Table 5 Comparison of different algorithms

Algo	Accuracy	Sensitivity	Specificity	Precision
DT	84.44	54.84	93.27	70.83
MLP	80.00	51.61	88.46	57.14
NB	74.81	41.94	84.62	44.83
SVM	82.22	51.61	91.35	64.00
LR	82.96	51.61	92.31	66.67

In the end, the best model for stress prediction is a decision tree model with six attributes: good emotion, memory, negative feeling (the most important predictor), personal connection, leisure, and religion. Decisions are made based on a tiny modification in the decision tree for each component.



Comparison of Algorithms in Prediction of Depression Level

Finally, models for predicting depression are created using feature selection. During the modelling process, eleven characteristics are chosen. It's important to note that the eleven characteristics are: negative emotions, low self-esteem and high positive emotions; social support; memory and religious belief; safety; leisure time and relationships with others; and a specific programme. With 332 samples, the target variable has a value of 1 indicating depression and a value of 0 indicating non-depression. This variable has five possible values: normal, mild, moderate, severe, and very severe (the extreme end of the severity spectrum). The goal value is converted into two different levels of depression. Students with scores of 0 do not have depression, even if their symptoms are moderate or normal. There are three degrees of severity: mild, moderate, and severe, which indicate that the pupils are at risk for developing mental health issues related to depression. The linear SVM technique is used to model Depression Level as the target property. Accuracy is 88.55%, sensitivity 64.52%, specificity 95%, and precision is 80.00% for testing as indicated in Table 6. Comparatively, the SVM model has the best accuracy and precision. As a result of re-running the experiment, the following results were obtained: accuracy (82.99 percent), sensitivity (61.29%), specificity (89.54%), acuity (63.3 percent).

Table 6 Comparison of different algorithms

Algo	Accuracy	Sensitivity	Specificity	Precision
DT	83.70	61.29	90.38	65.52
MLP	84.44	48.39	95.19	75.00
NB	77.04	32.26	90.38	50.00
SVM	88.15	64.52	95.19	80.00
LR	87.41	61.29	95.19	79.17

Because of this, the Support Vector Machine (SVM) model has been chosen as the best model for predicting depression. People with and without depression may be easily distinguished using the SVM model.

Comparison of Algorithms in Prediction of Anxiety Level

Anxiety may be modelled via the use of modelling. Predictors of Anxiety Level's relevance include memory, positive feelings, financial and home environments, self-esteem and self-confidence, looks, safety, personal relationships, social support, and CGPA. Anxiety Level (1 = Anxiety with 300 samples and 0 = Not Anxiety with 194 samples) is the goal variable for anxiety prediction. This variable has five possible values: normal, mild, moderate, severe, and very severe (the extreme end of the severity spectrum). There are now two levels of anxiety: zero and one. Students with anxiety levels that are considered normal or moderate are designated with the number 0, suggesting that they do not have any mental health issues. There are three degrees of severity: mild, moderate, and severe, which indicate that adolescents are at risk for mental health issues related to anxiety. Various models' evaluations are shown in Table 7.

Table 7 Comparison of different algorithms

Algo	Accuracy	Sensitivity	Specificity	Precision
DT	65.93	45.45	85.00	67.57
MLP	68.89	60.00	75.00	62.26
NB	60.00	43.64	71.25	53.33
SVM	63.70	45.45	76.25	56.82
LR	71.85	47.27	88.75	74.29

In terms of accuracy, specification, and precision, the Logistic Regression (LR) model has the greatest value, however it has a low sensitivity value. Although its accuracy is lower than that of an ANN MultiLayer Perceptron (MLP), it is more sensitive and has greater specificity, specificity, and precision than an ANN MLP (68.89% vs. 60.00%).

IV. CONCLUSION

This research proposes methods for predicting mental health in higher education institutions using machine learning. There are three major mental health difficulties that students in higher education face, and we begin by describing them

and the variables that contribute to them. By utilising the attribute's score to categorise people in the dataset, we demonstrate how DASS-21 data may be utilised for modelling purposes. In the meanwhile, the WHOQOL measures were employed as input variables in the feature selection method modelling of health issues. Different machine learning methods may be used to simulate the health issue. The absence of social support, financial issues, and a poor learning environment were shown to be the most frequent reasons in this research. Decision Tree and Support Vector Machine are the most accurate models for stress and depression, respectively. Two models, linear regression and neural networks, provide reasonable results for anxiety, ranging from 68% to 88% accuracy. Algorithms can learn more about mental health issues in the future and enhance their performance by collecting more data.

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