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Stress Level Prediction of College Students Using ML

Akash D[1], Pushpalatha R[2]

[1]Department of Computer Science and Engineering, VTU Centre for PG Studies Mysuru

[2] Assistant Professor, Department of Computer Science and Engineering, VTU Centre for PG Studies Mysuru

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Abstract - College students' mental health is often neglected, which may have serious consequences for their success in academic records. Mental health issues among college students may have far-reaching consequences for both the campus and the students themselves. General counselling, student management systems, and human advisers are just some of the ineffective approaches that institutions are using to track and avoid student stress. Naive Bayes, K-Nearest Neighbor, and Decision Tree are just a few examples of the Machine Learning Algorithms used by the proposed system to determine whether or not a student is experiencing stress and, if student is in stress, the system provide solution for relieving that stress.

***Key Words*:** Machine Learning, Naïve Bayes, K-Nearest Neighbor, Decision Tree, Stress, Stress Free, Prediction

1. INTRODUCTION

Mental health issues such as depression, stress, fear, and worry are all too widespread among today's students. College stress prediction is one of the most important and difficult responsibilities facing educators today There have been several investigations on how to alleviate student anxiety[6,7]. College students often struggle academically because of personal and financial issues at home. College student stress is difficult to detect with the current manual method [8,3,10], college students' mental health is seldom given the attention it deserves. Universities routinely screen for and evaluate the extent of students' mental health issues. It can find no previously unknown connections between the various pieces of psychological data. In this scenario, we are particularly interested in a system that can predict students' levels of stress. Stress may be caused by a variety of factors, including but not limited to one's workload, duties, interpersonal problems, student challenges, and classroom concerns. Machine learning seeks to predict future results based on the available data [5,11]. In order to estimate students' stress levels, we use machine learning techniques; the proposed system will then provide advice in light of these forecasts.

2. LITERATURE REVIEW

The investigation by Disha Sharma and associates [1]. In order to gauge the amount of stress placed on the students datasets was collected using sources like Survey forms, emails, and Google Drive were. Each question included a 5-point Likert scale for students to indicate their level of anxiety.

In [12], Yong Ik Yoon et al. presented a variety of multimedia applications and instruments. By measuring BP, EEG, HR, and RR, this article provides a comprehensive evaluation of a person's physiological responses to stress in the actual world (RR). The SVM technique of data classification was employed in the assessment of the index.

In [4], S. Monisha and coworkers. A Bayes classifier is used to analyse the survey data, and conclusions are drawn with the help of data visualisation programmes. If students' stress levels can be lowered, they may be better able to concentrate on their studies and extracurriculars.

Intelligent online student counselling is suggested by Li [2], Kathiravelu Ganeshan, and others utilising the widely used recommendation system approach of collaborative filtering. The premise around which this method is built is that people who display similar behaviours will also have similar preferences.

Based on the research by Ravinder Ahuja et al. [9], this article examines the correlation between students' usage of the internet and their levels of stress and anxiety during exam periods.The data was given by Jaypee Institute of Information Technology and includes responses from 206 of the institution's students.

3. PROPOSED WORK

This is a specialised system designed for use in academic institutions. The primary goal is to evaluate the student's level of stress. If the student is under stress, the system will determine the level of stress. Naive Bayes, K-Nearest Neighbor, and Decision Tree are machine learning algorithms used by the system to determine if a student is stressed or Stress Free. We have built the real-time software using Visual Studio and SQL Server as shown in Fig4.

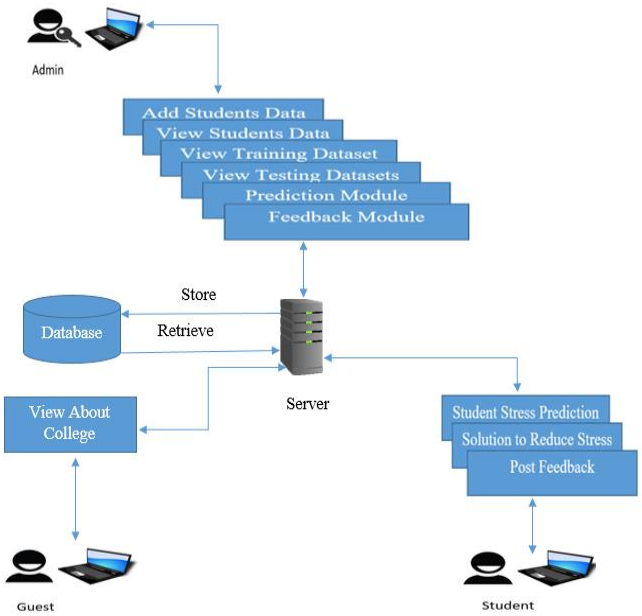

Fig. 4. System Functionality

4. METHODOLOGY

4.1 Information gathering

To begin predicting stress levels, we must first gather stress data. Data gathered from a wide range of sources, concentrating on the attributes like age, socioeconomic background, family structure, study habits, teaching methods, health concerns, particle fix, test schedule, pressure, and level of interaction.

4.2 Data Preparation

After reviewing the stress data, we only asked for the most relevant information. Because it is unnecessary to enter all data and would take too long if it were, just the required data is extracted.

4.3 Supervised Learning in ML Algorithms

4.3.1 Naive Bayes

Naive Bayes computes the result set using probability parameters. Determine the probabilities associated with each attribute value. Here is the Naive Bayes probability formula as an illustration.

$$P = (n\_c+m) / (n+m)$$

The number of matching qualities in the training set, denoted by n. How many qualities shared by the test and training sets and were labelled "yes" in the final result (n c), how many possible classification outcomes there were (p), and how many parameters were considered (m). For each class, multiply the probability by p. Here, we use the scores obtained by multiplying the attribute scores by p to classify the information. Apply a comparison to assign the value of each attribute to one of many possible buckets.

4.3.2 Knn Algorithm

Using the K-NN technique, we can classify recent information by how well it matches previous records. This indicates that the K-NN method may be used to classify fresh data rapidly and accurately.

$$d = sqr ((x2 - x1) ** 2 + (y2 - y1) ** 2)$$

The steps of this algorithm include : Explore the data set you were given. Figure out what k is, Euclidean geometry should be used for distance calculations. Look for the k-Nearest Neighbors that have the fewest neighbours and the most outputs. Our k value, which is equivalent to 10% of the training dataset, is calculated as follows.

4.3.3 Decision Tree

It is a tree-like classifier, with "leaf" nodes standing in for the final classification decision. the benefit of each characteristic a (in terms of frequency of occurrence), Assuming excellence is the most prevalent trait, A judgement node may be constructed from a best by gathering nodes (records) with matching attribute values. Iteratively count the outcomes, or sub-nodes, using the patient list, and assign a label to the new node based on the highest count.

4.4 Datasets

Using Excel, I merged information from many sources, including Kaggle and Data World. There have been around 1,500 separate record looksups. We extract and split the necessary data in accordance with the guidelines. Due to the time and effort required to input all data, just the necessary information is eliminated for processing.

5 RESULTS

Naïve Bayes Algorithm has given the highest accuracy the Student actual test dataset Stress level and Predicted test dataset outcome of the Stress level are not giving much difference, correctly classified is 94.5 % and mean absolute error that is 5.4 % that is shown in Fig1

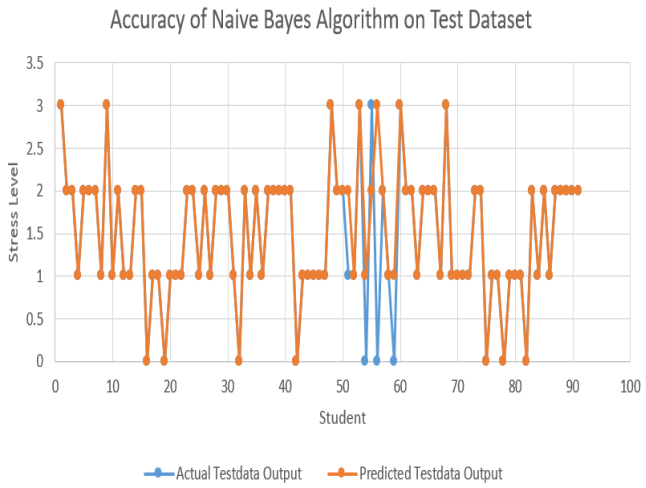

Fig - 1: Performance of Naïve Bayes

In KNN algorithm Actual Testdata stresslevel and Predicted Test data stresslevel are 80.2% Lie on same point and 19.7 lie on different point as show in Fig2

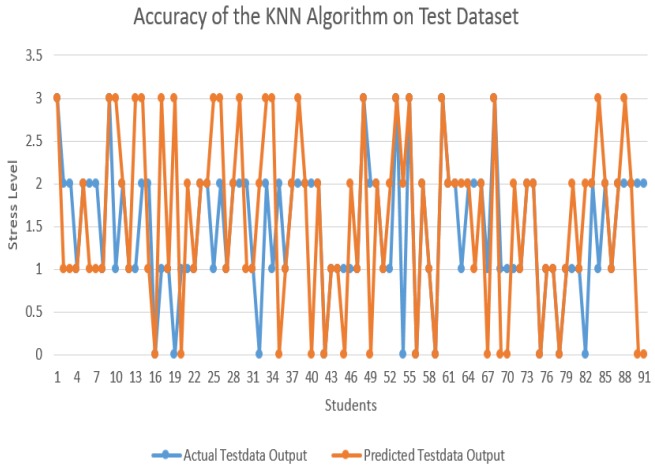

Fig - 2: Performance of KNN

In Decision tree algorithm the performance the algorithm and correctly classified is 62.6 % and Mean absolute error is 37.3% so we can see the Actual Test dataset and the Predicted Test dataset Stress Level are having difference as shown in Fig3. So we can see in naïve graph the difference is not more. We have done comparison between three algorithm as shown in Fig5

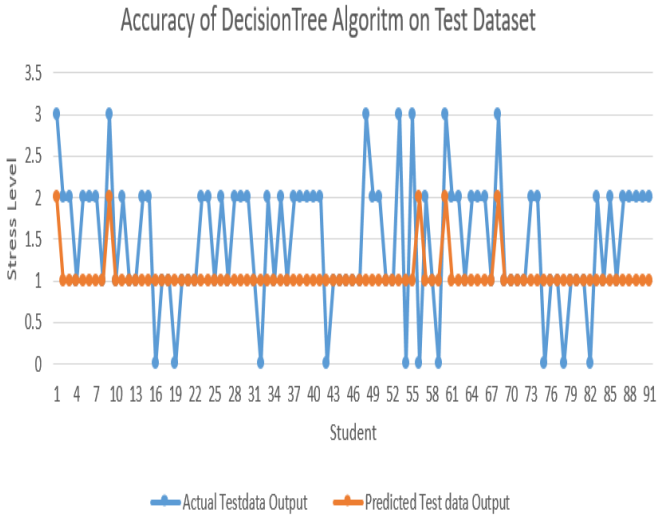

Fig - 3: Performance of Decision Tree

Constraint	Naive Bayes Algorithm	KNN Algorithm	Decision Tree Algorithm
Accuracy	94.5%	80.2%	62.6%
Time (milli secs)	8379	3725	2050
Correctly Classified	94.5%	80.2%	62.6%
Mean Absolute Error	5.4%	19.7%	37.3%

Fig - 5: Algorithms performance

This software may be used by students to keep track of their stress levels. If a student is suffering stress, they may enter their data and click the "Predict Stress Level" option to get recommendations on how to deal with it as shown in Fig6. The administrator has access to both the test and training datasets, as well as the outputs of the algorithm.

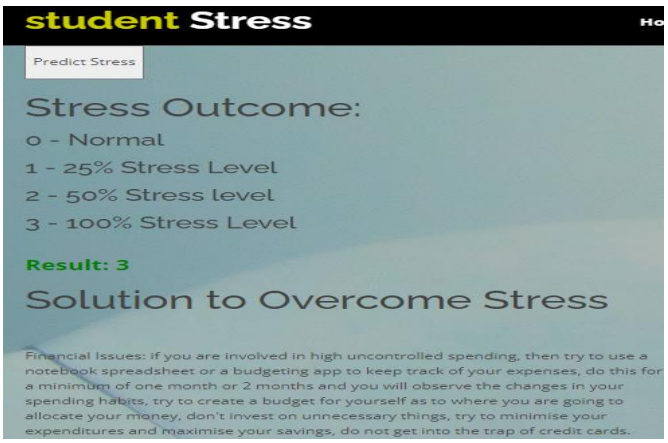

Fig - 6: System recommendation

CONCLUSION

College student stress have a huge impact on student academic progress as well as on college. Most institutions are also investing more in identifying the first indicators of mental health issues within their student and in offering appropriate. Schools have several methods for identifying and labelling students with mental health difficulties but there is no proper solution provided to students by existing system. So the proposed system uses machine learning approaches, we can predict the stress level and if the student in stress , create a system that makes suggestions based on students levels of stress also analyse the relative efficiency of different algorithms and conduct comparative study.

FUTURE ENHANCEMENT

Android apps of the proposed web application can be developed, can create a system that may identify the specific parameters effecting stress levels. It can be implemented in the corporate field to reduce employee stress, addition of Potential stress parameters include total sleep time and test performance. Implemented in hospitals so doctors better measure their patients' emotional distress, can increase the efficiency of the model using other algorithms.

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