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Educational Based Software System to Find how Student Mental Health Factors Correlations with their Academic Performance using ML

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Abstract: Education system plays a vital role in any one's carrier. Students' health is an important research topic today because they are the cornerstone of our society. Researchers have used various technological breakthroughs to address schoolchildren's and college/university students' health issues, and machine learning is now frequently employed [1]. However, to understand the efficacy of machine learning and progress in student health research, a concise review of the influence of machine learning on student health is required, which the proposed work provides [3]. The primary objective is to examine which of the students' health concerns are efficiently addressed by machine learning algorithms and the outcomes of the approaches. The project also discusses what leads students to perform poorly in schools, colleges, and universities and if machine learning will improve student health in the future. The main aim of the project is to find how student health academic problems effects their performances. supervised learning algorithms applied to process the educational data and generates correlation between student health problems and academic performances. In this proposed system we develop automation for education sector [5]. Proposed system is a browser-based application meant for a college developed using Microsoft technologies such as Visual Studio, C# and SQL Server.

Keywords: mental health factor, academic performance.

I. INTRODUCTION

The main Mental Health disorders are a common issue among student's education sector today. With changing lifestyle and work cultures, studies, there is an increase in the risk of mental disorders among the students. Several studies in the past have raised concerns over the same. Many research works tried to predict student mental health problems using many data science algorithms. Many works used machine learning algorithms to predict mental health disorders of students at schools or colleges. Several steps can be taken to help students with stress for mental well-being like counselling assistance, career guidance, stress management sessions, and health awareness programs. Early identification of students who will be needing such a help will improve the chances of such measures being successful. We hope to ease this process by using machine learning methods to develop a model to predict the risk of mental disorders experienced and if treatment is required by an individual by taking some of his/her professional and personal factors as parameters collected in the form of carefully drafted surveys [8]. Such an approach will not only help lecturers to understand better about their students but also help in taking preventive measures to decrease the chance of an student leaving the school/college or underperforming. We can also perform early prediction if a student requires treatment for his mental health or not. There are many factors associated with student mental health disorders such as age factor, gender factor, study hours, family issues, friend's issues, location, pressures etc.… it is important to identify such factors to identify the student health disorders easily.

II. RELATED WORK

[1] This paper Data Mining Applications in Healthcare Sector Author: M. Durairaj, V. Ranjani Year: 2021 Description: In this paper, we have focused to compare a variety of techniques, approaches and different tools and its impact on the healthcare sector.

[2] The paper Graduate Student Mental Health Author: Jenny K Hyun and Temina Madon Year: 2018 Description: This study examined the mental health needs, knowledge, and utilization of counselling services among graduate students at a large university in the western United States. Almost half of graduate student respondents reported having had an emotional or stress-related problem over the past year, and over half reported knowing a colleague who had had an emotional or stress related problem over the past year.

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[3] The Mental health problems in college freshmen Author: Ronny Bruffaerts, Philippe Mortier, Glenn Kiekens and Randy P. Auerbach Year: 2019 Description: The college years are a developmentally crucial period when students make the transition from late adolescence to emerging adulthood (Arnett, 2000). Epidemiological studies suggest that 12–50% of college students meet criteria for one or more common mental disorders (Blanco et al., 2008;.

[4] The study's Research on the College Students' Psychological Health Author: Sichuan Judicial And Police Officers Professional College, Deyang Year: 2020 Description: In recent years, college students' psychological problems are becoming more and more prominent, and due to the lack of high-quality resources in mental health education, it is difficult to meet the needs of students. In this paper, the author analyses the college students' psychological health management based on data mining and cloud platform [17]. Cloud computing is the latest network application technology, its advantage lies in the integration of resources, it can integrate mental health education resources into the cloud and share each other's quality resources. Through the analysis of college students' psychological health management system, we puts forward some measures to promote the management of college students' psychological health.

[5]LS Summary Current system is manual counselling where college people sit with students and does counselling to know or to understand their mental health problems. Nowadays a greater number of students are suffering from mental health disorders such as depression, fear, stress, anxiety, panic disorders etc... There is no automation software in the current education sector for student mental health prediction and many research papers on this topic-built machine learning models and shown results but these implementations are not suitable in real time. All existing research works uses the static datasets which are not real time implementations.

III. PROPOSED SYSTEM

In our System is a real time application with machine learning model to find the relationship between student mental disorders with the academic scores. System is a GUI based software meant for education sector. System can be accessed by lecturers and students using browsers as system is application. a browser-based Training datasets collected from a college and real time data used in the project work. System uses many factors such as gender, age, panic disorders, fear, stress, low academic scores, average scores, high scores etc. System uses efficient Supervised learning algorithms to process the datasets such Navi Bayes Algorithm, System meant for college and build using full stack development technologies such as visual studio, SQL server, HTML, CSS, JS and jQuery.

Parameters

• Gender • Pressure • Family Issues • Fear • Anxiety • Obsession • Paranoid • Nervousness • Injury • Interpersonal sensitivity • Stage fear • Stress

IV. METHODOLOGY

A. Implementation Steps

In our project work both supervised learning and unsupervised learning algorithms used to process educational datasets. Supervised learning technique used to predict individual student result prediction based on mental health problems. Unsupervised learning algorithm used to find the educational patterns. Association (or relation) is probably the better known and most familiar and straightforward data science technique. Here, we make a simple correlation between two or more items, often of the same type to identify patterns.

Naïve Bayes Algorithm Steps

Step 1: Scan the data-set (storage servers)

Step 2: Calculate the probability of each attribute value. [n, n_c, m, p] Here for each attribute we calculate the probability of occurrence using the following formula. (Mentioned in the next step). For each class (label) we should apply the formula.

Step 3: Apply the formula P(attributevalue(ai)/subjectvaluevj)=(n_c + mp)/(n+m)
Where: n = the number of training examples for which v = vj
nc = number of examples for which v = vj
and a = ai p = a priori estimate for P(aijvj)
m = the equivalent sample size

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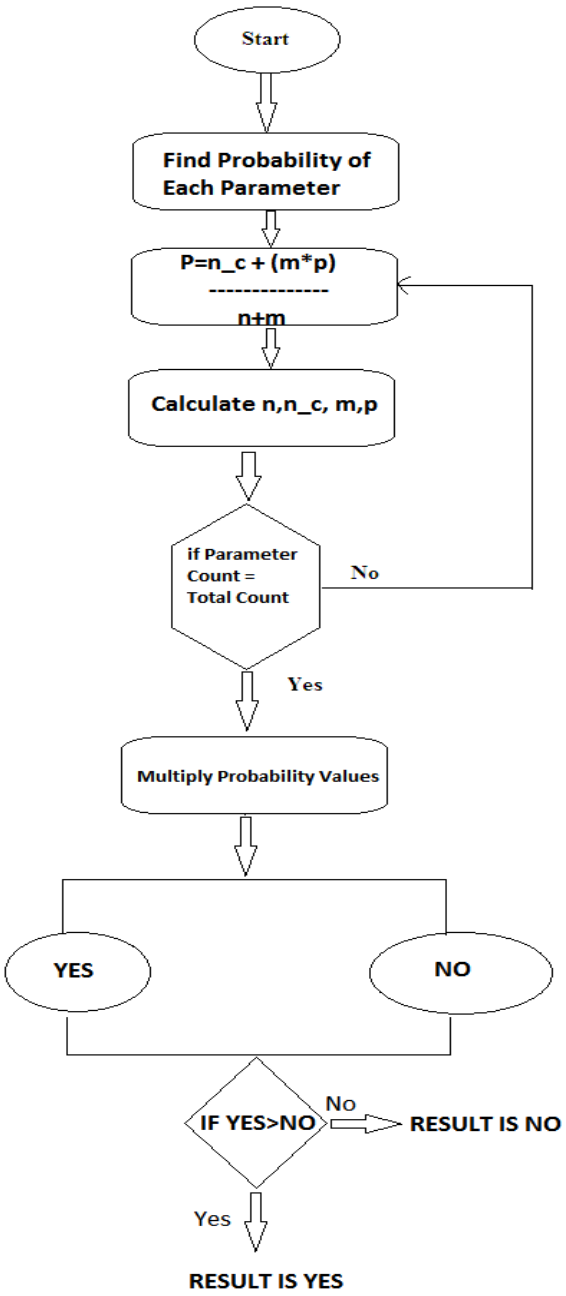
Step 4: Multiply the probabilities by p. For each class, here we multiple the results of each attribute with p.

Step 5: Compare the values and classify the attribute values to one of the predefined sets of class.

B. **Flowchart of Implementation**



FLOW OF NAIVE BAYES ALGORITHM

Fig. 1 Flow of implementation

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V. IMPLEMENTATION

Here we build a real time application useful for the society. This project build using Microsoft technologies. Educational datasets trained using Naive Bayes algorithm and we got very good results. Naive Bayes algorithm is programmed in such a way that, it works for dynamic datasets. Naive Bayes algorithm logic is written and it's our own library. We are getting around 78% of accurate results and it takes around 2500 milli seconds for prediction.

Constraint	NB Algorithm
Accuracy	**88** %
Time (milli secs)	**2606**
Correctly Classified (precision)	**78** %
Incorrectly Classified (Recall)	**12 %**

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Table 1: Naïve Bayes Model Acuarry

VI. CONCLUSION

The system Student mental health have a major impact on people in their day-to-day life. Among all, students are the important one, as they suffer from many mental problems because of many reasons. The major impact is that it can affect the students' mental and physical health. Students are getting addicted to these electronic gadgets as it becomes inevitable. This project work uses machine learning techniques to demonstrate how mental problems effect student academic scores. Many parameters used to find association among use of gadgets and student academic performance. Efficient algorithms used to predict educational patterns.

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