Predictive Analysis of Student Stress Level Using ML

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Abstract: *College students are suffering from many mental health problems including mental stress, somatization, obsessive, interpersonal sensitivity, depression, anxiety, hostility, fear, paranoia and psychosis, which can bring a lot of negative effects to them. Obviously, the mental health problems of college students not only directly affect their own growth, but also affect the stability of the campus. Most colleges also pay more and more attention to students' psychological crisis monitoring and prevention. All Colleges simply analyze whether students have mental health problems or what kind of problems they have. It cannot find hidden relationships in the psychological data. We need a system to handle the student mental health problems, here we are mainly concentrating on student stress prediction. There are so many factors related to stress such as work load, assignments, family issues, friends issues, attendance, teaching etc. Machine learning is a subject to predict future based on the past data. Using machine learning techniques we predict student stress level and also proposed system will give suggestions based on the stress levels of student.*

Keywords: Psychological Crisis, Mental Health Problems, Machine Learning, Student Stress

I. INTRODUCTION

Students are facing so many mental health problems such as depression, pressure, stress, interpersonal sensitivity, fear, nervousness etc.. Though many industries and corporate provide mental health related schemes and try to ease the workplace atmosphere, the issue is far from control. Stress Prediction in college students is one of the major and challenging tasks in the current education sector. Stress is regarded as a major thing that is used to create an imbalance in the life of every character and it is additionally regarded as a major issue for psychological adjustments and trauma reduction. Numerous studies work on stress management in school students.

The students who are pursuing their secondary and tertiary education are widely facing the on-going stress level issues. It can be many times decided as day to day movements for a hassle-free mind to pay attention to lecturers To decrease the individual stress rate, human societies have been in a position to boost a complete stage of progress in monitoring the stress stage of students and make them score well in academics. Lack of stress administration can result in some drastic injury which can sometimes affect the education completely and can even cause extreme injury to the fitness of the students at a variety of stages. Individual family background has been conceptualized as a major play that has been taking a path from our childhood. Children who are residing in rural or cities are consistently perusing an exclusive environment. The low cast students are normally intended to have low-grade because of financial issues and family issues. The fulfillment of the faculty and students is majorly structured on both faculties instructing and learning at home.Current system is manual process where it is difficult to identify the stress in the college students. There is no automation for students stress prediction.

II. LITERATURE SURVEY

1. An Intelligent Student Advising System Using Collaborative Filtering

Description: We propose a web based intelligent student advising system using collaborative filtering, a technique commonly used in recommendation systems assuming that users with similar characteristics and behaviors will have similar preferences. With our advising system, students are sorted into groups and given advice based on their similarities to the groups. If a student is determined to be similar to a group students, a course preferred by that group might be recommended to the student.

Disadvantages

1. System used to predict suitable course for students and data-set not compatible to predict student results.
2. Not all student behaviors connected to course advising.
3. Students are grouped and then system predicts the suitable course for the students. Grouping lacks over data for prediction.

2. Mining Students' Data for Performance Prediction

Description: The ability to predict a student's performance is very important in educational environments. Students' academic performance is based upon diverse factors like personal, social, Psychological and other environmental variables. A very promising tool to attain this objective is the use of Data Mining. Data mining techniques are used to discover hidden information patterns and relationships of large amount of data, which is very much helpful in decision making. A single data contains a lot of information. The type of information is produced by the data and it decides the processing method of data. A lot of data that can produce valuable information, in education sector contains this valuable information. Which helps the education sector to capture and compile low cost information for this information and communication technology is used. Now-a-days educational database is increased rapidly because of the large amount of data stored in it. The loyal students motivate the higher education systems, to know them well; the best way is by using valid management and processing of the students' database. Data mining approach provides valid information from existing student to manage relationships with upcoming students.

Disadvantages

1. System predicts student performance based on the student behaviors. Datasets not compatible for class results prediction.
2. Used more irrelavant parameters for student performance prediction such as father income, mother income, qualification etc.

3. An Effective Algorithm for Mining Positive and Negative Association Rules

Author: Honglei Zhu, Zhigang Xu

Year: 2008

Description: Recently, mining negative association rules has received some attention and been proved to be useful in real world. This paper presents an efficient algorithm (PNAR) for mining both positive and negative association rules in databases. The algorithm extends traditional association rules to include negative association rules. When mining negative association rules, we adopt another minimum support threshold to mine frequent negative item-sets. With a correlation coefficient measure and pruning strategies, the algorithm can find all valid association rules quickly and overcome some limitations of the previous mining methods. The experimental results demonstrate its effectiveness and efficiency.

Disadvantages

1. Algorithms used here takes more time processing
2. Less efficient results

4. The Application of Association Rules Mining in the Analysis of Students' Test Scores

Author: Jigang Zheng and Jingmei Zhang

Year: 2016

Description: Data mining from large amounts of data to extract efficient, implicit, potential useful knowledge and information, it has in many other areas has been successfully applied. However, the application in the field of education is relatively less. The central work of institutions of higher learning is teaching, the focus is to improve the quality of education, but students are precisely the basis for measuring the quality of teaching. The characteristic of this paper is to apply association rule mining method of university students' grades, previously unknown effects on student achievement factors of mining, to provide some valuable reference for teachers and administrators, to provide the necessary decision

support for teaching and student management, to better carry out teaching, in order to improve the quality of teaching in Colleges and universities.

Disadvantages

1. Less parameter used in the project
2. Less efficient results

5. Data Mining Applications in Healthcare Sector
Author: M. Durairaj, V. Ranjani
Year: 2013
Description: In this paper, we have focused to compare a variety of techniques, approaches and different tools and its impact on the healthcare sector. The goal of data mining application is to turn that data are facts, numbers, or text which can be processed by a computer into knowledge or information. The main purpose of data mining application in healthcare systems is to develop an automated tool for identifying and disseminating relevant healthcare information. This paper aims to make a detailed study report of different types of data mining applications in the healthcare sector and to reduce the complexity of the study of the healthcare data transactions. Also presents a comparative study of different data mining applications, techniques and different methodologies applied for extracting knowledge from database generated in the healthcare industry. Finally, the existing data mining techniques with data mining algorithms and its application tools which are more valuable for healthcare services are discussed in detail.

Disadvantages

1. Requires huge amount data
2. Less accurate results

III. PROPOSED SYSTEM
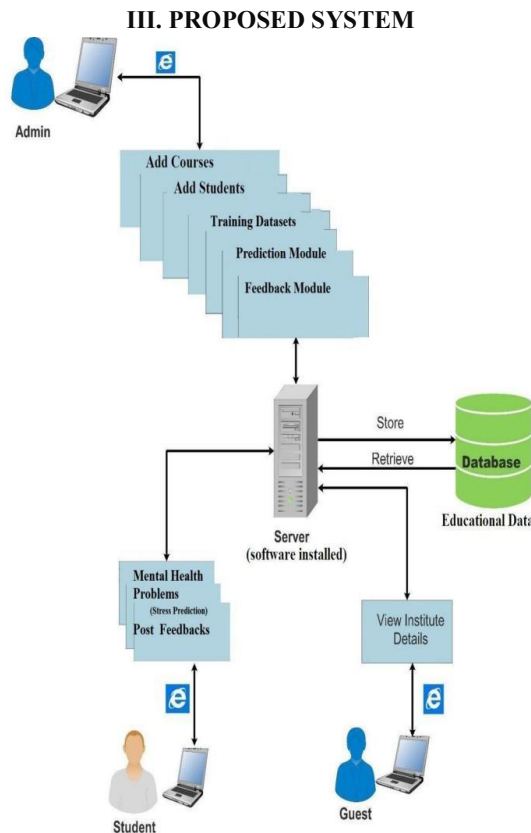
1. Proposed system meant for education sector.
2. Systems finds factors that strongly determine the stress levels.
3. Stress were identified based on gender, family history and availability of health benefits in the education sector.
4. By identifying the stress of students, we can come up with some approaches to reduce stress and create a much comfortable learning place for students.
5. System uses many parameters such as gender, age, family history, provided health benefits, share about illness, tech company, tech role, acquiring leave etc..
6. System uses machine learning algorithms or AI algorithms to find stress of an student.
7. System can be developed as an real time application which is useful for colleges. As *Visual Studio* and *SQL Server* is more supportive with real time application, we use these technologies for application development.
8. Finding the risk factors which affects the student's mental health is the major objective of the system.
9. System also gives suggestions for the students based on the student stress levels.
10. System aims at identifying the factors and predicting the student stress levels and to come up with solutions to reduce the stress level so as to improvise the students performances.

IV. METHODOLOGY

ML concerns with construction and study of system that can learn from data. For example, ML can be used in E-mail message to learn how to distinguish between spam and inbox messages.
There are there types of Machine learning(ML), they are

A. Supervised Machine Learning
Here we have labels and the input is past examples.
Ex: 1-4

B. Unsupervised Machine Learning
Extraction of patterns without labels.
Ex. 5 and 6

C. Semi-Supervised Machine Learning
Mixture of both Supervised and Unsupervised Machine Learning. In the project we use supervised learning techniques to process training data-set. We use Naive Bayes Algorithm to predict student stress level.

Reasons for selecting Naive Bayes;
1. Most of the previous medical research papers uses this algorithms.
2. Survey says efficient algorithm to process medical data.
3. Takes less time for data processing.
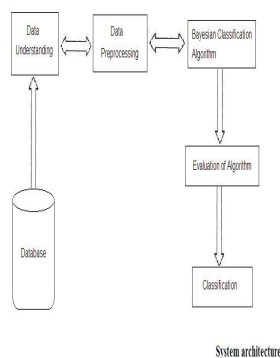4. Works fine for n number of parameters. Number of parameters need not to be fixed.

System architecture

Fig. 4: Block Diagram

V. CONCLUSION

College students are suffering from many mental health problems including mental stress, somatization, obsessive, interpersonal sensitivity, depression, anxiety, hostility, fear, paranoia and psychosis, which can bring a lot of negative effects to them. Machine learning is a subject to predict future based on the past data. Using machine learning techniques we predict student stress level and also proposed system will give suggestions based on the stress levels of student.

VI. FUTURE ENHANCEMENTS

Additional methods like the Naive Bayes classifier can be used to test the efficiency of the model. One can implement deep learning techniques like CNN (Convoluted Neural Networks) and verify how the model performs for the given datasets. A much more specific and vast datasets can be used as a training model since the number of responses is limited in our case.

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