"An Innovative Application to Predict Student Mental Health Problems using ML"

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Abstract

Nowadays most of the peoples are suffering from many diseases, mental problems etc. These kind of diseases or problems increasing rapidly, as-specially college students are facing so many Several types of psychological conditions such depression, anxiety, somatization, internal sensitivity, etc..... These mental health problems may lead to poor academic performance and also may lead to student's death. Making a project relevant for the educational sector is a difficult task. Identification of several influences on a student's conduct during learning in addition academic performance. The suggested method seeks to identify relationship between mental health challenges that college students are experiencing. The generation of today is dealing with a variety of mental health issues, including depression, anxiety, somatization, internal sensitivity, etc... The program resolves these issues and aids in resolving the student's health issues. A student's performance can be improved by identifying their issues and contributing variables.

Introduction

College students have an array of mental health issues, such as somatization, obsessive, interpersonal sensitivity, melancholy, anxiety, anger, fear, paranoia, and psychosis, which can have a severe impact on their lives. Numerous approaches for association rule mining applied to examine the connections between the issues from the mental health datasets. We can develop this as application useful for educational sector. We use efficient technologies such as "*visual studio*" and "*SQL server*" for application development.

Most data science algorithms are based on mathematical and statistical principles. The main advantage of using machine learning instead of standard software is that there isn't a written code that tells the system how to choose the best object from two options because it's difficult to handle every circumstance on an object. Machine learning works for that. It mostly makes use of the information offered to make informed decisions, makes forecasts for the future, or find abnormalities. Now, people use it in a numerous applications, including autonomous cars, virtual assistants, search engine results, identifying objects, advertising, predictive analysis, etc. It is subdivided into three subfields called machine learning techniques are Supervised Learning, Unsupervised Learning, and Reinforcement Learning. The system makes predictions employing algorithms from data science.

Related Works

1. "An Intelligent Student Advising System Using Collaborative Filtering "

Description: We suggest a web-based, intelligent student advising system that makes use of collaborative filtering, a technique utilized in recommendation systems that makes the assumption that users with comparable traits and behaviors will have similar preferences. Our style of advising divides students into groups and provides guidance based on how closely they resemble

the groups. If a student is determined to be similar to a group student, a course preferred by that group might be recommended to the student.

Disadvantages

1. System used to anticipate the most appropriate course for students and an incompatible dataset to forecast student performance.

2. Not all student behaviors related to course counseling.

3. System estimates which course is best for the students after grouping them. For prediction, grouping lacks sufficient data.

2. "Mining Students' Data for Performance Prediction"

Description: In educational settings, it is crucial to capable of forecast a student's performance. Academic achievement of students is founded on various elements, including psychological, social, and environmental variables. Data mining is a particularly promising tool for achieving this goal. Data mining methods are employed to discover vast amounts of data include obscured data patterns and correlations, which is very much helpful in making decisions. A single data contains a lot of information. The type of information results from the data and it decides the processing method of data. A lot of information data that can yield useful insights in the 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 since the substantial amount of data that is stored there. 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 strategy provides reliable data from current students to handle interactions with prospective students.

Disadvantages

1. Based on the students' habits, the system forecasts their academic achievement. Dataset incompatible with predicting class results.

2. used more pointless variables to antici-pate student success, such as parents' money, education level, etc.

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

Author: Honglei Zhu ,Zhigang Xu

Year: 2008

Description: Lately, Negative association rule mining has drawn some interest and been shown to be practical in the actual world. This Paper offers a successful (PNAR) algorithm for both positive and negative mining database association rules. The algorithm

expands on conventional association rules to incorporate the rule of negative association. When analyzing rules of unfavorable association, To be able to mine frequently negative item sets, we introduce another minimal support threshold. 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 Results from experiments show that it is both effective and efficient.

Disadvantages

- The algorithms employed here require greater processing time.
- Less effective outcomes

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 is a technique that successfully extracts implicit knowledge and information from enormous amounts of data. It has been used successfully in many other fields. However, there isn't a lot of application in the subject of education. Teaching is the primary responsibility of higher education institutions, and while the goal is to raise the standard of instruction, students serve as the best gauge of a teacher's effectiveness. The association rule mining approach used in this

paper sets it apart. used to levels of university students, previously unrecognized effects on student achievement elements, to provide some valuable reference for to better carry out instruction and manage students, teachers and administrators must give the necessary guidance for decisions. This will increase the standard of instruction in colleges and universities.

Disadvantages

- Using fewer parameters in the project
- Less efficient results

5. "Data Mining Applications in Healthcare Sector"

Author: M. Durairaj, V. Ranjani

Year: 2013

Description: This paper includes committed to compare several strategies, approaches and different tools and its impact on the healthcare sector. To what end Data mining software transforms data into facts, figures, or text that can be processed by a computer to information or knowledge. The fundamental data mining's purpose software in medical systems are to create an automated tool for finding and sharing pertinent medical 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 applicable techniques for extracting knowledge from database produced by the field of medicine. Lastly, the most recent In-depth discussion is given on data mining methods, data mining algorithms, and technologies that are more beneficial for healthcare services.

Disadvantages

- Requires huge amount data
- Less accurate results

Difference between Existing Works and Proposed Work

- ❖ Many existing research works presented an idea of identifying students' mental health problems in education sector, but no implementation is done.

- ❖ In many existing works implementations is done but The algorithms utilized were not developed; instead, they drew from libraries of pre-made algorithms and other resources. But in the suggested system, the algorithm is programmed, which implies that we create our own logic for it and verify the outcomes.

- ❖ Many research works uses less amount of training data-sets, in the system we suggest huge data-sets for processing.

- ❖ All existing works uses PYTHON or R Language or Ready Data science tools for prediction and which works for static datasets, however, in the suggested system, we implement the concept for dynamic datasets (real time application).

- ❖ All existing works are just model development, can't be used in real time. Here We created this idea as a live

application. using front-end design as "*visual Studio*" and back-end engineering as "*SQL Server*" and C# as programming language.

❖ Proposed system is an real world application with model using Microsoft technologies useful for education sector.

Methodology

The more well-known, well-known, and straightforward data science technique is association (or relation). Here, we make a straightforward relationship between two or more things, often of the same type to identify patterns.

For instance, Market-basket analysis, where we track people's buying habits, If we see that a customer consistently buys cream when they purchase strawberries, we can propose that they consider purchasing cream the next time they purchase strawberries.

In our project, Association Learning Algorithm "*Apriori Algorithm/ Eclat Algorithm*" is employed to foresee the connection between behavioral and mental health issues using the educational dataset.
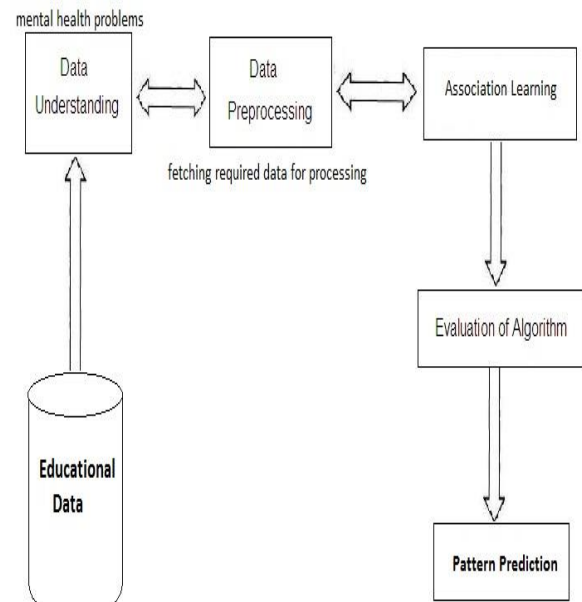
System architecture

Useful Parameters for the Project

● Male

● Female

● Somatization

● Obsessive-Compulsive

● Interpersonal sensitivity

● Depression

● Anxiety

● Hostility

● Fear

● Paranoid ideation

● Psychoticism

Project Outcome

TABLE V. PARTIAL POSITIVE ASSOCIATION RULES

Positive association rules	Confidence
obsession⇒anxiety	92.01%
obsession⇒paranoid	89.23%
obsession , anxiety⇒depression	86.25%
interpersonal relationship sensitiveness, fear⇒paranoid	80.39%
interpersonal relationship sensitiveness, anxiety⇒obsession, depression	77.50%
obsession, depression ⇒interpersonal relationship sensitiveness, anxiety	78.25%
male⇒somatization, obsession, and paranoid	85.63%
female⇒anxiety and interpersonal relationship sensitiveness	89.00%

TABLE VI. PARTIAL NEGATIVE ASSOCIATION RULES

Negative association rules	Confidence
obsession⇒¬hostility	97.35%
¬interpersonal relationship sensitiveness⇒anxiety	87.22%
anxiety, paranoid⇒obsession, ¬hostility	79.83%
female, ¬paranoid⇒¬hostility, obsession	77.32%
male, somatization, ¬depression⇒anxiety, paranoid	70.56%

Experiment Results

Conclusion

Creating a project that will benefit the educational sector is a difficult task. Proposed system aims at identifying mental health issues and each other faced by the college students. Today's generation facing lots of mental health problems such as depression, anxiety, somatization, intern personal sensitivity etc... System finds the solution for these problems and helps to solve the student's health problems. Identifying student's problems and factors can improve the student performances.

Future Enhancements

- We can add an enhancement where system finds the current problems faced by the students using data science techniques.

- We can add parent module where parents can view and review the problems faced

by the students and can come up with some solutions.

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