



Student Mental Health Prediction

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Abstract: The education system plays a crucial role in shaping individuals' careers, and students' health is an increasingly significant research topic because they are the foundation of our society. Researchers have leveraged various technological advancements to address health issues among schoolchildren and college/university students, with machine learning becoming a commonly used tool. However, to gauge the effectiveness of machine learning and advancements in student health research, a concise review of its impact on student health is needed, which the proposed work aims to provide. The primary objective is to analyze which student health concerns are effectively addressed by machine learning algorithms and the outcomes of these approaches. The project also explores the factors that contribute to poor academic performance in schools, colleges, and universities, and whether machine learning can enhance student health in the future. The main aim of the project is to determine how student health problems affect their academic performance. Unsupervised learning algorithms are applied to process educational data and generate correlations between student health issues and academic performance. In this proposed system, we develop automation for the education sector. The proposed system is a browser-based application designed for a college, developed using Microsoft technologies such as Visual Studio, C#, and SQL Server.

Keywords: Education system, Student health, Machine Learning, Health issues, Correlation, Browser-based application.

I. INTRODUCTION

Mental health disorders are a prevalent issue in the student education sector today. With evolving lifestyles, work cultures, and academic pressures, there is an increased risk of mental disorders among students. Numerous studies have highlighted this concern over the years. Various research efforts have attempted to predict student mental health issues using a range of data science algorithms. Many studies have employed machine learning algorithms to foresee mental health disorders in students at schools or colleges. Several measures can be implemented to support students with stress and promote mental well-being, such as counseling assistance, career guidance, stress management sessions, and health awareness programs. Early identification of students who need such assistance will enhance the effectiveness of these interventions. We aim to facilitate this process by using machine learning techniques to develop a model that predicts the risk of mental disorders and the need for treatment based on a student's professional and personal factors, collected through carefully designed surveys. This approach will not only help lecturers better understand their students but also aid in implementing preventive measures to reduce the likelihood of students leaving school or underperforming. Early prediction of whether a student requires mental health treatment can also be achieved. Numerous factors are associated with student mental health disorders, such as age, gender, study hours, family issues, peer problems, location, and pressures. Identifying these factors is crucial for easily detecting student health disorders. Machine learning, a trending technology, can be used to process mental health datasets and identify students suffering from these disorders. Early prediction of disorders is vital to providing appropriate treatment, helping students overcome health issues and achieve good academic performance. The datasets used in the project are downloaded from reputable websites such as Kaggle (www.kaggle.com) and Data World (www.dataworld.com). Unsupervised learning algorithms are applied to process the training datasets and predict the relationship between student mental health disorders and academic performance. Our proposed system considers various types of mental health disorders, including depression, anxiety, stress, panic disorders, and fear. The system is built as a GUI-based project for a company, using Microsoft technologies for development.

II. SURVEY PAPER

1. Data Mining Applications in Healthcare Sector

Author: M. Durairaj, V. Ranjani

Year: 2013

Description: In this paper, we focus on comparing various techniques, approaches, and tools and their impact on the healthcare sector. The objective of data mining applications is to transform data—comprising facts, numbers, or text that

can be processed by a computer—into knowledge or information. The primary purpose of data mining applications in healthcare systems is to develop an automated tool for identifying and disseminating relevant healthcare information. This paper aims to provide a detailed study of different types of data mining applications in the healthcare sector and to simplify the complexity of studying healthcare data transactions. It also presents a comparative analysis of various data mining applications, techniques, and methodologies used for extracting knowledge from databases generated within the healthcare industry. Finally, the paper discusses in detail the existing data mining techniques, algorithms, and application tools that are most valuable for healthcare services.

Disadvantages

- Requires huge amount data
- Less accurate results

2. Graduate Student Mental Health

Author: Jenny K Hyun and Temina Madon

Year: 2016

Description: This study explored the mental health needs, awareness, and use of counseling services among graduate students at a large university in the western United States. Nearly half of the graduate student respondents reported experiencing an emotional or stress-related issue over the past year, and more than half were aware of a colleague who had faced a similar problem during the same period. Self-reported mental health needs were significantly and negatively correlated with confidence in one's financial status, a strong functional relationship with one's advisor, regular contact with friends, and being married. The utilization of counseling services was positively associated with the presence of depression symptoms, the number of semesters enrolled, and identifying as female. Students who had experienced a significant mental health event in the past year and had higher functional relationships with their advisors were significantly more likely to use counseling services. The findings highlight the need for increased attention to graduate student mental health, particularly the impact of financial confidence on student well-being and the importance of the advisor-student relationship.

Disadvantages

- Only Few mental health problems are focused
- Less efficient results

3. Mental health problems in college freshmen

Author: Ronny Buffers, Philippe Mortier, Glenn Kiekens and Randy P. Auerbach

Year: 2018

Description: The college years represent a critical developmental stage where students transition from late adolescence to emerging adulthood (Arnett, 2000). Epidemiological studies indicate that 12–50% of college students meet the criteria for one or more common mental disorders (Blanco et al., 2008; Hunt & Eisenberg, 2010; Verger et al., 2010). Although differences between college students and their non-college peers are generally understudied, available evidence suggests that college students are at a slightly lower risk of mental disorders (Auerbach et al., 2016; Blanco et al., 2008). Nonetheless, mental disorders in early adulthood are linked to long-term negative outcomes in later adulthood, including persistent emotional and physical health issues (Scott et al., 2016), relationship dysfunction (Kerr & Capaldi, 2011), and labor market marginalization (Niederkröthaler et al., 2014; Goldman-Mellor et al., 2014). These long-term adverse outcomes may be influenced by mental health problems that arise during the college years, as this period is a peak time for the first onset of a wide range of mental disorders.

Disadvantages

- Algorithms used here takes more time processing
- Less Parameters used
- Uses tools for data processing

III. SUMMARY

The current system for counseling is manual, involving college staff meeting with students to understand their mental health issues. Nowadays, an increasing number of students are suffering from mental health disorders such as depression, fear, stress, anxiety, and panic disorders. There is no automated software in the current education sector for predicting student mental health issues. Although many research papers have developed machine learning models and presented results on this topic, these implementations are not practical for real-time application. Existing research often relies on static datasets, which do not reflect real-time conditions.

Limitations

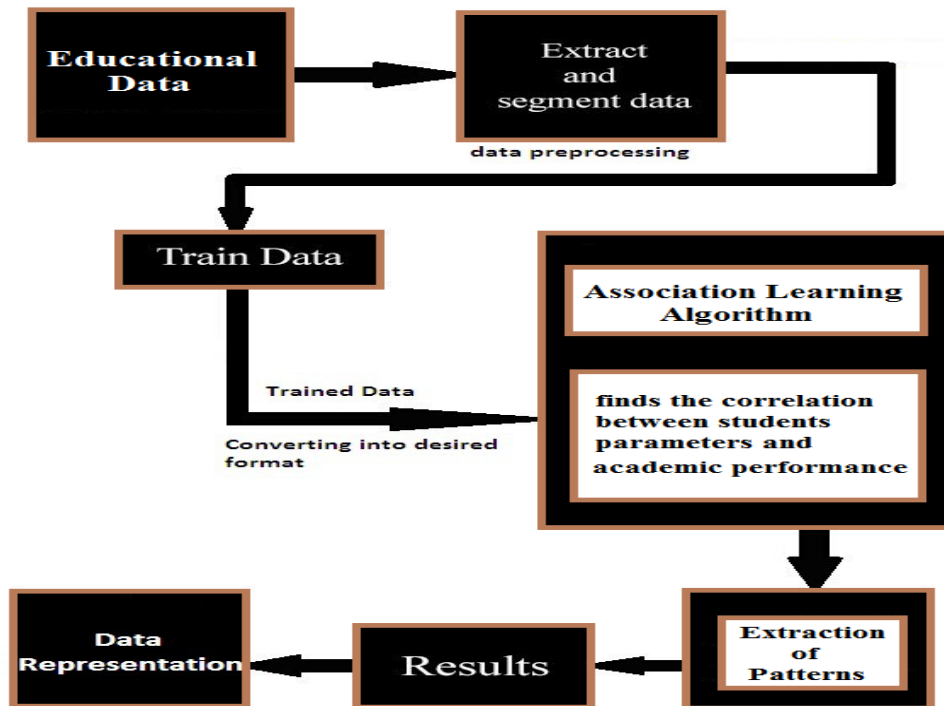
- Student Counselling System
- Manual Process
- More time required and expensive
- Less reliable
- ML Models built
- No real time implementations

1. Proposed System

- 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 a browser-based application.
- Training datasets downloaded from reputed website www.kaggle.com
- System uses many factors such as gender, age, panic disorders, fear, stress, low academic scores, average scores, high scores etc...
- System uses efficient unsupervised learning algorithms to process the datasets such as FP growth algorithm, Apriori algorithm or ECLAT algorithm or SFIT algorithms.
- System meant for college and build using full stack development technologies such as visual studio, SQL server, HTML, CSS, JS and jQuery.

IV. METHODOLOGY

Association (or relation) is likely the most well-known and straightforward data science technique. It involves identifying simple correlations between two or more items, often of the same type, to detect patterns. For instance, in market-basket analysis, where we track people's purchasing habits, we might find that a customer always buys cream when they buy strawberries. Consequently, we could suggest that the next time they buy strawberries, they might also want to buy cream. In our project, we use association learning algorithms such as the Apriori Algorithm, Eclat Algorithm, or SFIT Algorithm to predict the relationship between students' mental health issues and their performance using an educational dataset.



V. CONCLUSION

Student mental health has a significant impact on individuals in their daily lives. Students, in particular, are a crucial group as they often face numerous mental health issues for various reasons. The major concern is that these issues can affect both their mental and physical well-being. Additionally, students are increasingly becoming addicted to electronic gadgets, which has become unavoidable. This project employs machine learning techniques to illustrate how mental health problems affect student academic performance. Various parameters are used to identify the association between gadget usage and academic performance. Efficient algorithms are utilized to predict educational patterns.

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