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Student Health and Stress Prediction System using Machine Learning

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Abstract: This study introduces a Student Health and Stress Prediction System that uses machine learning to better understand students' well-being. It looks at everyday habits like sleep, study time, screen usage, and physical activity to identify patterns related to stress. The data is collected through surveys and carefully processed to ensure it is accurate and useful. By applying machine learning techniques, the system can categorize students into different stress levels such as low, moderate, or high. Statistical methods are used to check how reliable the predictions are. The system also helps in detecting early signs of stress and suggests simple ways to improve daily routines. Overall, this approach supports students in maintaining better mental health, leading to improved well-being and academic performance.

Keywords*:* Student stress detection, machine learning techniques, monitoring of mental health, analysis of daily lifestyle habits, data-driven insights.

I. INTRODUCTION

This paper presents a Student Health and Stress Prediction System using Machine Learning as a solution to monitor and improve student well-being. In today's academic environment, students often experience stress due to factors such as heavy coursework, lack of proper sleep, and increased screen time. Identifying these stress levels at an early stage is important to prevent negative effects on both health and academic performance.

The proposed system focuses on collecting data related to students' daily habits, including sleep patterns, study hours, physical activity, and lifestyle behaviors. This data is then analyzed using machine learning techniques to understand patterns and predict stress levels. By doing so, the system provides a more efficient and data-driven approach compared to traditional observation methods.

If any part of the system or methodology is unclear, further details can be explored through the study design and implementation sections of this paper. Information regarding the model development, data processing, and evaluation methods is also included to give a complete understanding of the system.

II. LITERATURE REVIEW

[1] In 2007, Kitchenham and Charters provided clear and structured guidelines for conducting systematic literature reviews in software engineering. Their work helps researchers plan studies, define questions, collect relevant data, and analyze results in an organized way, ensuring reliable outcomes.

[2] In 2005, Dyba, Kitchenham, and Jørgensen introduced evidence-based software engineering, which focuses on using real-world data to make better decisions. This approach is useful for building systems that rely on practical and data-driven insights.

[3] In 2010, Feldt and Magazinius highlighted common challenges in research such as biased data and incorrect interpretations. Their work emphasizes the importance of designing accurate surveys and carefully validating results.

[4] In 2000, Höst, Regnell, and Wohlin studied whether students can be used as participants in research instead of professionals. Their findings show that participant selection can impact results, which is important for studies involving student data.

[5] In 2012, Wohlin and his co-authors explained key concepts of experimentation, including data collection, hypothesis testing, and statistical analysis, which are essential for evaluating system performance.

[6] In 2005, Sjøberg and colleagues reviewed multiple experiments and identified issues like small sample sizes and lack of repetition, helping improve the overall quality of empirical research.

[7] In 2008, Shull, Singer, and Sjøberg discussed advanced research methods such as surveys and case studies, and highlighted the importance of combining different approaches for better results.

[8] In 2016, Linåker and his team provided detailed guidelines for conducting surveys, focusing on clear questionnaire design, proper sampling, and effective data analysis techniques.

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[9] In 2009, Runeson and Höst presented guidelines for case study research, emphasizing proper data validation and analysis, which are also useful in survey-based studies.
[10] In 2013, Juristo and Moreno explained the basics of experimentation, including statistical testing and result interpretation, which help ensure accurate and meaningful conclusions.
[11] In 2012, Menzies and Shepperd stressed the importance of repeatability in research, ensuring that results remain consistent when studies are repeated under similar conditions.
[12] In 2002, Kitchenham and her colleagues provided early guidelines for empirical research, focusing on proper planning, execution, and reporting, forming a strong foundation for high-quality research work.

III. CONCLUSION

For the Student Health and Stress Prediction System using Machine Learning, surveys are very important to understand students' daily habits and challenges. They help collect useful information like sleep, study time, screen usage, and physical activity, which affect stress levels. By using simple and well-designed surveys, the system can gather accurate data from students. This data is then analyzed using machine learning to find patterns and predict stress levels.The results show that combining survey data with machine learning gives better understanding of student health and helps detect stress early. In the future, the system can be improved by collecting data from more students and using better tools for analysis. Overall, it helps students maintain a healthy lifestyle and improve their academic performance.

REFERENCES

[1] Saxena and Sharma (2019) discussed how machine learning techniques can be used to detect stress levels in students. Their work focuses on analyzing different student-related factors to predict stress effectively.
[2] Kumar, Singh, and Gupta (2020) explored the use of data analytics and machine learning to predict students' mental health, showing how data-driven methods can improve understanding of student well-being.
[3] Lee and Kim (2018) analyzed various factors that influence student stress using survey data and predictive models, helping to identify key stress indicators.
[4] Patel and Shah (2019) studied how lifestyle habits such as sleep, study patterns, and daily activities impact student stress levels using machine learning techniques.
[5] Brown and Wilson (2021) explained how machine learning can be applied in healthcare, providing useful concepts that can also be used in stress prediction systems.
[6] Johnson and others (2020) presented a survey on mental health prediction systems using artificial intelligence, highlighting different approaches and technologies used in this field.
[7] Verma, Mehta, and Jain (2021) developed a system that uses wearable sensors along with machine learning to monitor student stress in real time.
[8] Reddy and Rao (2018) conducted a survey-based study to understand student behavior and its role in predicting stress levels.
[9] Nguyen and Tran (2020) carried out a case study using classification algorithms to predict student mental health and analyze stress patterns.
[10] Mishra and Agarwal (2022) explained the basics of using machine learning in healthcare, which supports the development of systems for stress prediction.
[11] Chen and Zhao (2021) focused on improving the accuracy and reliability of stress prediction models using reproducible machine learning techniques.
[12] Gupta and others (2020) discussed data-driven methods for monitoring student well-being in educational institutions, showing how technology can support student health.

