



International Journal of Engineering Research and Science & Technology

www.ijerst.org

ISSN : 2319-5991

Vol. 21 No. 4 (2025)



ijerst.editor@gmail.com
editor@ijerst.com

Research Paper

STUDENT PERFORMANCE PREDICTOR AND TRACKER

Vamshi Krishna Enduri
Scholar, Department of MCA
Vaageswari College of Engineering, Karimnagar

DR.Mohammad Sirajuddin
Associate Professor
Vaageswari College of Engineering, Karimnagar

Dr. P. Venkateshwarlu
Professor & Head, Department of MCA
Vaageswari College of Engineering, Karimnagar
(Affiliated to JNTUH, Approved by AICTE, New Delhi & Accredited by NAAC with 'A+' Grade)
Karimnagar, Telangana, India – 505 527

ABSTRACT

Monitoring and improving student academic performance is a critical challenge in modern education. The **Student Performance Predictor and Tracker** is a system designed to analyze, predict, and track students' academic outcomes using **machine learning algorithms** and data analytics. The system collects data from various sources, including **attendance records, assignment scores, examination results, and behavioral patterns**, to generate a comprehensive profile of each student.

By applying **predictive modeling techniques** such as **Linear Regression, Decision Trees, or Neural Networks**, the system forecasts future performance, identifies students at risk of underperforming, and provides actionable insights for educators and administrators. Additionally, the tracker component continuously monitors students' progress over time, offering **visual dashboards, trend analysis, and alerts** to highlight improvements or declines in performance.

This approach enables **personalized academic interventions**, helps in optimizing teaching strategies, and supports data-driven decision-making to enhance overall educational outcomes. By integrating predictive analytics with real-time tracking, the system provides a **proactive and intelligent solution** for improving student success and fostering effective learning environments.

Keywords: Student Performance, Prediction, Machine Learning, Academic Tracking, Data Analytics, Personalized Learning, Early Intervention.

Received: 18-09-2025

Accepted: 21-10-2025

Published: 28-10-2025

INTRODUCTION

In modern education, monitoring student performance and identifying those at risk of underachievement are essential for ensuring academic success and improving learning outcomes. Traditional methods of evaluating students, such as manual grade analysis or periodic assessments, are often **reactive, time-consuming, and limited in providing insights** for early intervention.

The **Student Performance Predictor and Tracker** addresses these challenges by leveraging **machine learning and data analytics** to analyze historical academic data, behavioral patterns, and attendance records. The system uses predictive models to forecast future performance and identify students who may require additional support. It also provides a **real-time tracking mechanism** to continuously monitor student progress, generating

visual dashboards and alerts for educators and administrators.

By integrating predictive analytics with continuous tracking, the system enables **personalized learning interventions, data-driven decision-making, and proactive support** for students. This approach not only helps improve individual academic outcomes but also assists institutions in optimizing teaching strategies, managing resources effectively, and fostering an environment of **enhanced educational success**.

LITERATURE REVIEW

Student performance prediction has been widely studied as an essential tool for improving educational outcomes. Traditional approaches relied on manual evaluation of grades, attendance, and teacher observations, which are often **subjective and limited in providing timely interventions**.

Recent research emphasizes the use of **machine learning algorithms** to predict student performance based on historical data. Techniques such as **Linear Regression, Decision Trees, Random Forest, Support Vector Machines (SVM), and Neural Networks** have been applied to forecast grades, identify at-risk students, and recommend personalized learning strategies. Studies show that combining **academic records, attendance, and behavioral data** improves prediction accuracy compared to using grades alone.

Additionally, **real-time tracking systems** have been developed to monitor student progress continuously, providing visual dashboards and alerts for teachers to take timely action. Integration of predictive analytics with tracking enables **early interventions, personalized feedback, and data-driven educational planning**.

Overall, the literature indicates that **predictive models and tracking systems** enhance student monitoring, support proactive academic guidance, and improve overall learning outcomes.

EXISTING SYSTEM

In existing student performance monitoring systems, academic evaluation is primarily conducted through **manual grading, periodic assessments, and teacher observations**. While these methods provide a basic understanding of

student performance, they are **time-consuming, subjective, and often fail to identify students at risk early**.

Some institutions have implemented **basic tracking systems** that record attendance, grades, and assignment submissions. However, these systems typically offer **static reports** and do not provide predictive insights into future performance. They also lack integration of multiple data sources such as behavioral patterns, participation, and engagement, which limits their ability to generate comprehensive performance analysis.

Furthermore, existing tools rarely incorporate **machine learning algorithms** to forecast student outcomes or suggest personalized interventions. As a result, educators are often unable to take **proactive measures**, and remedial actions are delayed until poor performance becomes evident.

Overall, the existing systems are effective only for **historical data analysis** and lack predictive and real-time tracking capabilities, making them inadequate for improving student performance proactively.

PROPOSED SYSTEM

The proposed **Student Performance Predictor and Tracker** system is designed to provide a **comprehensive, data-driven solution** for monitoring, predicting, and improving student performance. It integrates **machine learning algorithms** to analyze academic records, attendance, assignment scores, and behavioral data, enabling the system to **predict future performance** and identify students at risk of underachievement.

The system also includes a **real-time tracking module**, which continuously monitors student progress and provides **visual dashboards, performance trends, and alerts** for educators and administrators. This allows for **early interventions** and personalized support for each student. By combining predictive analytics with continuous monitoring, the proposed system ensures that educators can make **data-driven decisions** and optimize teaching strategies.

Additionally, the platform supports **personalized feedback, automated reports, and academic recommendations**, empowering students to

understand their strengths and weaknesses and improve their learning outcomes. Overall, the proposed system enhances academic performance, fosters proactive educational planning, and provides a **smart, efficient, and scalable approach** to student performance management.

METHODOLOGY

The methodology of the **Student Performance Predictor and Tracker** involves several key steps. First, **data collection** is performed from multiple sources, including students’ grades, attendance records, assignment scores, and behavioral metrics such as class participation and engagement. This data is **preprocessed** to handle missing values, normalize scores, and convert qualitative information into numerical formats suitable for analysis.

Next, **feature extraction** is carried out to identify the most relevant parameters that influence student performance. These features are then fed into **machine learning models** such as **Decision Trees, Random Forest, Support Vector Machines (SVM), or Neural Networks** to train predictive models. The models are validated using historical data to ensure accuracy in forecasting academic outcomes.

Once trained, the system performs **real-time prediction and tracking** of student performance. It continuously monitors new data, updates performance trends, and generates **visual dashboards and alerts** for students and educators. The methodology also includes **report generation** and recommendations, enabling early interventions and personalized learning strategies.

This approach ensures that the system is **automated, accurate, and scalable**, providing actionable insights to enhance academic outcomes and support proactive educational planning.

System Model

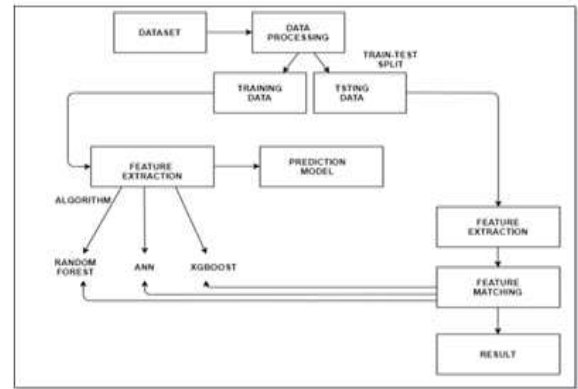
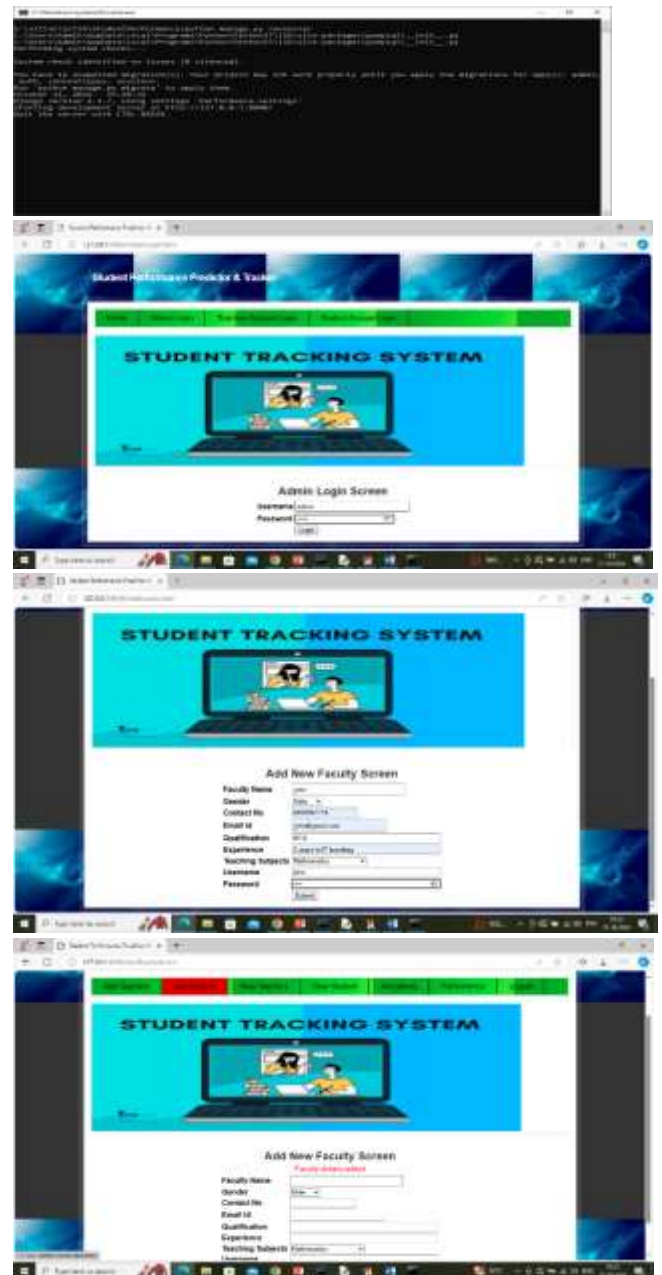
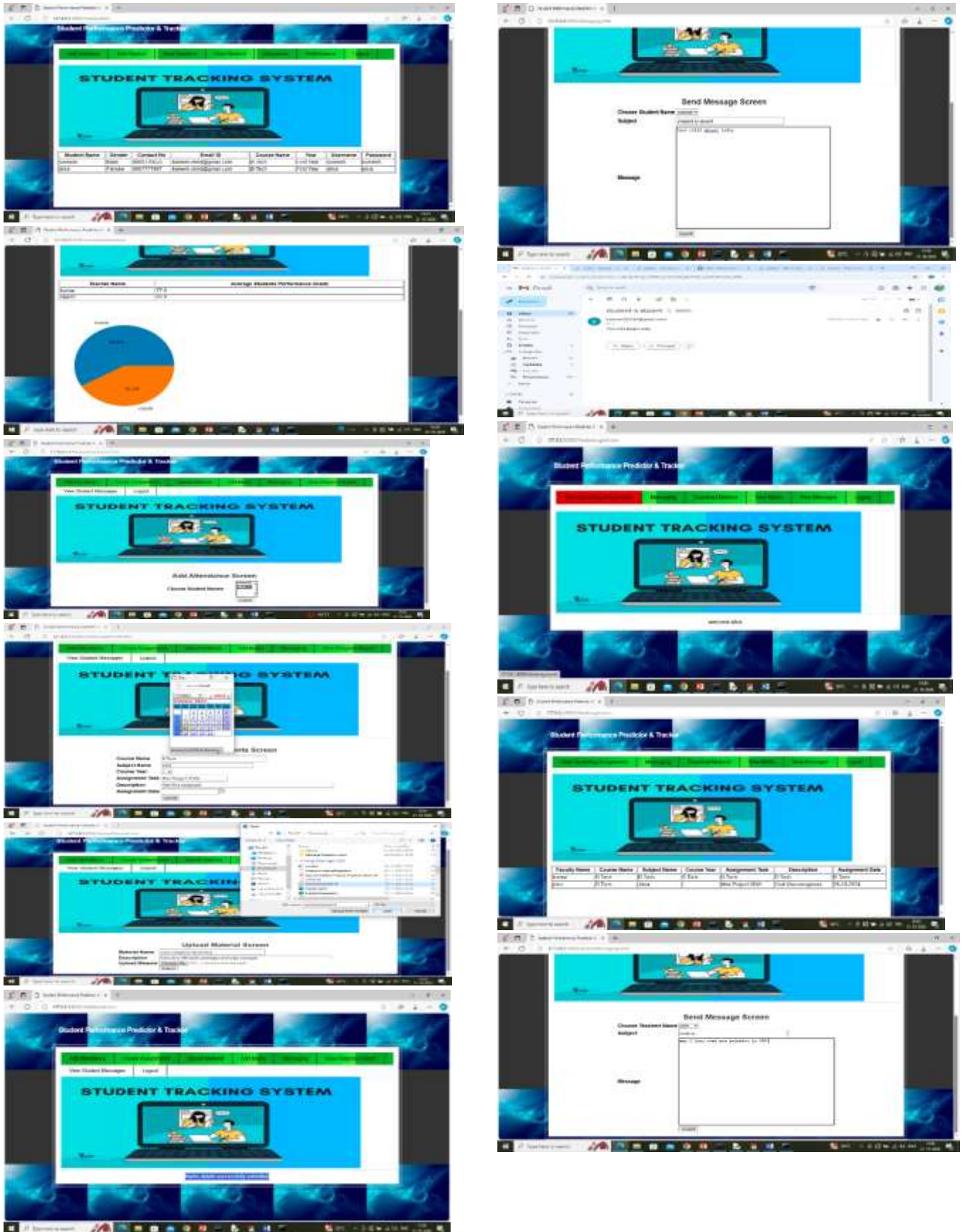


Fig 3 System Architecture

Results and Discussions







CONCLUSION

The **Student Performance Predictor and Tracker** system provides an effective and intelligent solution for monitoring, predicting, and enhancing student academic performance. By integrating **machine learning algorithms** with real-time tracking and data analytics, the system enables educators to identify at-risk students early, deliver personalized interventions, and optimize teaching strategies. Continuous monitoring through dashboards and alerts ensures that students receive timely guidance to improve their learning outcomes. Overall, the proposed system promotes **data-driven decision-making, proactive academic support, and improved educational performance**, making it a valuable tool for students, teachers, and educational institutions.

REFERENCES

1. Romero, C., & Ventura, S. (2010). *Educational data mining: A review of the state of the art*. IEEE Transactions on Systems, Man, and Cybernetics, Part C, 40(6), 601–618.

2. Peña-Ayala, A. (2014). *Educational data mining: A survey and a data mining-based analysis of recent works*. Expert Systems with Applications, 41(4), 1432–1462.
3. Kotsiantis, S. B., Pierrakeas, C., & Pintelas, P. (2004). *Predicting students' performance in distance learning using machine learning techniques*. Applied Artificial Intelligence, 18(5), 411–426.
4. Baker, R. S. J. d., & Inventado, P. S. (2014). *Educational data mining and learning analytics*. In Learning Analytics (pp. 61–75). Springer.
5. Bhardwaj, B. K., & Pal, S. (2011). *Data mining: A prediction for performance improvement of students using classification*. International Journal of Computer Science and Information Technology, 3(6), 106–110.
6. Pandey, U., & Pal, S. (2011). *Data mining: A prediction for performance of students*. International Journal of Computer Science and Technology, 2(2), 1–5.
7. Asif, R., Merceron, A., & Pathan, M. M. (2014). *Mining students' data for performance prediction*. International Journal of Information and Education Technology, 4(1), 65–69.
8. Kotsiantis, S., Pierrakeas, C., & Pintelas, P. (2003). *Predicting students' performance in distance learning using machine learning techniques*. Applied Artificial Intelligence, 18(5), 411–426.
9. Yadav, S. K., & Pal, S. (2012). *Data mining: A prediction of performer or underperformer using classification*. International Journal of Computer Applications, 39(14), 31–34.
10. Ramesh, R., & Kumar, R. (2017). *Student performance prediction using data mining techniques*. International Journal of Computer Applications, 164(9), 22–27.