

TITLE:

STUDENT ATTENDANCE & PERFORMANCE ANALYSIS USING MERN STACK

DOMAIN:

Web Development and Data Analysis

TEAM MEMBERS:

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OBJECTIVE:

To design and develop a web-based system to analyze student attendance and academic performance data, providing insights through interactive dashboards, helping educators identify trends, improve academic outcomes, and take data-driven decisions.

ABSTRACT:

This project proposes a **Student Attendance & Performance Analysis System** developed using the **MERN stack** (MongoDB, Express.js, React.js, Node.js). Educational institutions often face challenges in managing and analyzing large volumes of student attendance and marks data efficiently. Manual tracking is error-prone and time-consuming, with limited scope for deriving useful insights.

The proposed system enables admin or faculty to add and manage student profiles, upload or enter attendance and marks, and automatically generate insightful visual reports. The system performs essential data analysis such as calculating attendance percentages, comparing marks across subjects and exams, and highlighting students with low attendance or poor performance for timely intervention. Charts and graphs are displayed using Recharts or Chart.js, providing a clear, visual representation of key metrics.

Role-based access ensures only authorized personnel can manage or view data, maintaining confidentiality. This modern approach promotes transparency, reduces administrative workload, and helps improve overall student performance by transforming raw data into meaningful, actionable insights.

EXISTING SYSTEM:

Currently, most institutions rely on manual registers or basic spreadsheet systems to track attendance and marks. Such systems lack proper analytics and visualization features, making it difficult to identify patterns and students who need support. Manual processes are prone to errors, duplication, and poor data security. Insights are limited to raw numbers, providing little help in academic decision-making.

PROPOSED SYSTEM:

The proposed system overcomes the limitations of manual tracking by providing:

- Centralized student data management.
 - Automated calculation of attendance percentage and marks analysis.
 - Visual dashboards to interpret student performance trends.
 - Alerts for students with low attendance or scores.
 - Role-based access control for data privacy and security.
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Benefits:

- Time-saving and accurate.
 - Easy to update and retrieve records.
 - Insightful charts and graphs for quick decision-making.
 - User-friendly interface for admin and staff.
 - Helps faculty take corrective actions promptly.
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SYSTEM REQUIREMENTS

Software requirements:

- Operating System: Windows 7 & above
- Backend: Node.js, Express.js
- Frontend: React.js, Axios, Recharts/Chart.js, CSS
- Database: MongoDB Atlas
- Web Server: Vercel (Frontend) & Render/Heroku (Backend)

Hardware requirements:

- Processor: Intel Pentium III or above
 - RAM: 256 MB & above
 - Hard Disk: 20 GB & above
 - Monitor: SVGA Colour Monitor
 - Keyboard: Multimedia Keyboard
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PROBLEM STATEMENTS

1) Problem: Difficulty in tracking individual student attendance accurately and quickly.

Solution: Automate attendance entry and calculation. Display student-wise attendance percentage visually.

2) Problem: Hard to identify students with poor marks and inconsistent performance.

Solution: Analyze subject-wise and test-wise marks. Generate charts to compare and highlight low performers.

3) Problem: No easy way to correlate attendance and performance for actionable insights.

Solution: Display correlation charts that help faculty identify students at risk due to poor attendance.

4) Problem: Manual data handling is time-consuming and error-prone.

Solution: Store data securely in MongoDB with CRUD operations. Automate calculations and summary generation.

5) Problem: Limited access control leads to data misuse.

Solution: Use JWT authentication and role-based access to ensure only authorized staff can add or edit records.

