

College-NIT POLYTECHNIC

School Management System

Soumya Deshbhartar, Piyush Moon, Prajwal Balki, Sujal Karnase, Prof. Shruti Jambhole

Soumya Deshbhartar, Dept of Computer Engineering, NIT Polytechnic, Nagpur, India

Piyush Moon, Dept of Computer Engineering, NIT Polytechnic, Nagpur, India

Prajwal Balki, Dept of Computer Engineering, NIT Polytechnic, Nagpur, India

Sujal Karnase, Dept of Computer Engineering, NIT Polytechnic, Nagpur, India

Guided by Prof. Shruti Jambhole, Dept of Computer Engineering NIT Polytechnic, Nagpur, India

Abstract -

The rapid growth of digital technologies has significantly influenced the education sector, yet many schools and colleges still rely on manual or semi-digital systems for managing academic data. These traditional methods are time-consuming, error-prone, and inefficient for handling large volumes of student information. This paper presents a School Management System, a web-based platform designed to digitize and centralize academic administration processes. The proposed system enables efficient management of student records, attendance, and academic reports through a secure and role-based access mechanism. The system is developed using modern web technologies such as Next.js for frontend and backend integration, Prisma ORM for database interaction, and a relational database for structured data storage. Key features include user authentication, student CRUD operations, real-time data processing, and dashboard-based management. The platform aims to improve efficiency, ensure data consistency, and enhance administrative productivity in educational institutions.

Keywords: School Management System, Web Application, Next.js, Prisma ORM, Role-Based Access Control, Academic Administration

1. INTRODUCTION

Educational institutions are responsible for managing a large amount of data related to students, attendance, and academic performance. Traditionally, many schools rely on manual record-keeping systems or basic digital tools such as spreadsheets. These approaches are inefficient, time-consuming, and prone to human errors.

With the advancement of web technologies, there is a growing need for centralized and automated systems that can streamline academic administration. Existing solutions provide partial digitalization but often lack proper structure, scalability, and secure access control.

The School Management System aims to address these challenges by providing a web-based platform that centralizes all academic operations. The system allows administrators, teachers, and students to interact with data efficiently through a secure and structured interface. By digitizing academic workflows, the system improves

transparency, reduces redundancy, and enhances overall productivity.

2. PROBLEM STATEMENT

Many educational institutions still depend on manual systems or unstructured digital tools for managing student data, attendance, and academic records. These methods suffer from several limitations:

High chances of human error

Difficulty in maintaining large datasets

Lack of real-time data access

Inefficient report generation

Poor data security and access control

There is a need for a centralized, secure, and scalable system that can efficiently manage academic operations and provide real-time access to information.

3. LITERATURE REVIEW

Recent studies in web-based application development highlight the importance of full-stack technologies in building scalable and efficient systems. Many modern applications use frameworks such as React, Node.js, and database management systems to create interactive and reliable platforms.

Existing systems like web-based event management platforms have successfully centralized data but often rely on passive interaction models where users must manually check updates. These systems lack proactive data handling and advanced automation features.

Additionally, traditional academic management systems either focus heavily on administrative control or lack flexibility for multiple user roles. Many systems do not provide efficient real-time reporting or structured relational data handling.

The proposed system addresses these gaps by implementing a role-based, centralized platform with real-time data interaction, secure authentication, and efficient database management using modern technologies.

4. METHODOLOGY

The proposed School Management System follows a structured and modular development approach using modern web technologies.

4.1 System Architecture

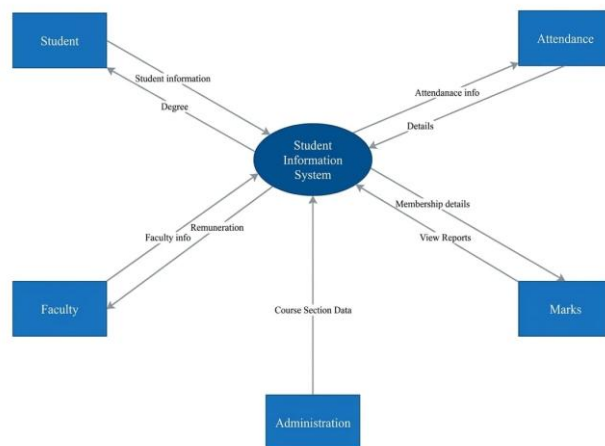
The system follows a three-tier architecture:

Frontend: Developed using Next.js to provide a responsive and interactive user interface

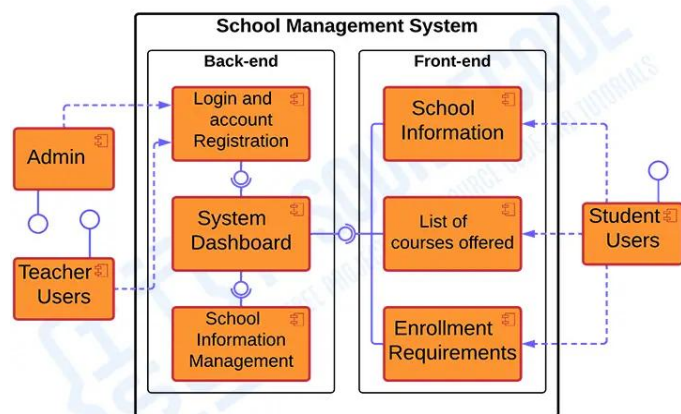
Backend: API routes handle business logic, authentication, and data processing

Database: Relational database managed using Prisma ORM

This architecture ensures scalability, maintainability, and efficient data handling.



SCHOOL MANAGEMENT SYSTEM



COMPONENT DIAGRAM

Fig -1: Technical Architecture

4.2 System Workflow

User logs into the system using secure authentication

Role-based access determines system permissions

Admin manages student records and system data

Teachers update attendance and academic information

Students can view their records and reports

Data is stored and retrieved from the database in real time

4.3 Database Design

The system uses a relational database with structured tables such as:

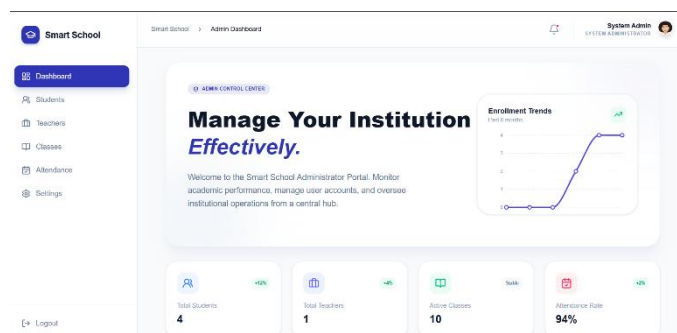
- Users
- Students
- Attendance
- Academic Records

Normalization is applied to reduce redundancy and maintain data integrity.

5. FEATURES AND BENEFITS

Features

- Role-based authentication (Admin, Teacher, Student)
- Student record management (CRUD operations)
- Attendance tracking system
- Dashboard-based user interface
- Real-time data updates



Secure API-based communication

Benefits

- Reduces manual work and human errors
- Improves data accuracy and consistency

Enables quick report generation

Enhances data security

Provides centralized academic management

6.RESULT

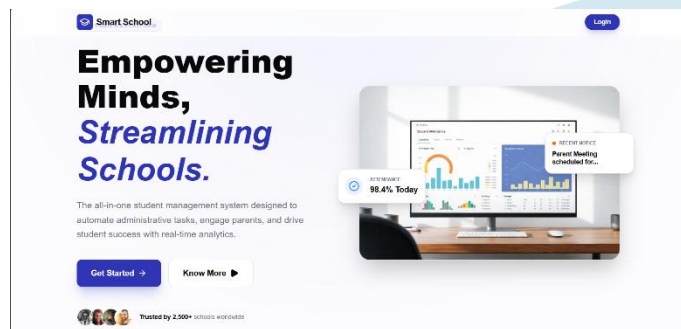


Fig -1 Home page

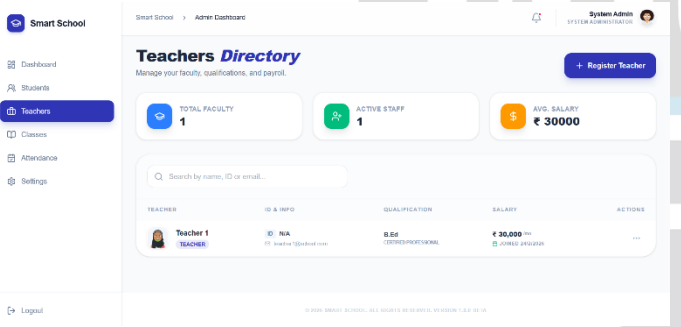
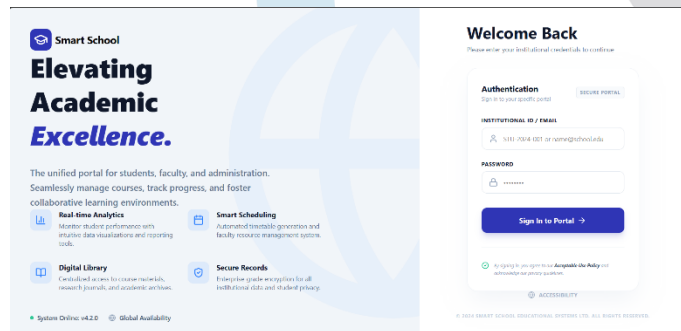


Fig -5:Teacher module page

7.CONCLUSION

This paper presented the design and implementation of a School Management System aimed at improving academic administration processes. The system provides a centralized and secure platform for managing student data, attendance, and reports.

By using modern web technologies and a structured architecture, the system ensures scalability, reliability, and efficient performance. The implementation demonstrates that digital solutions can significantly improve administrative workflows in educational institutions.

8. FUTURE SCOPE

Mobile application development

Fig -2: Login and sign up page

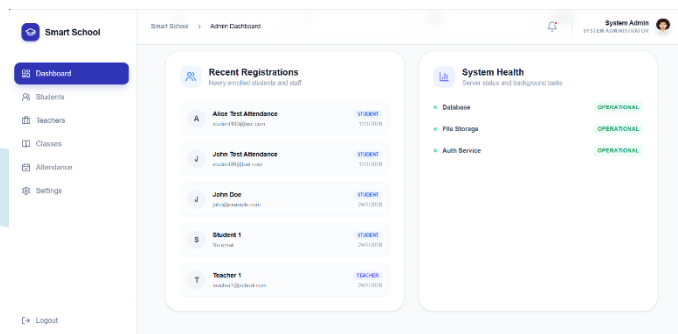


Fig -3: Admin

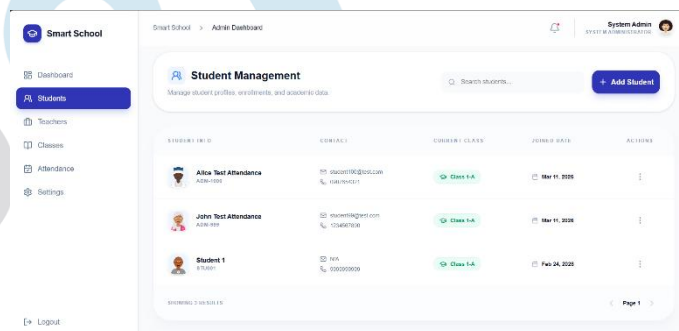


fig -4: Student module page

Advanced analytics dashboard

Automated report generation (PDF)

Integration with biometric attendance systems

Cloud-based backup and recovery

Multi-school support system

AI-based performance analysis

9. REFERENCES

- [1] A. Patil et al., "Web-Based E-Commerce System Using MERN Stack," IEEE, 2021.
- [2] R. Sharma et al., "Scalable Web-Based Shopping Cart System," IJCA, 2018.
- [3] M. K. Singh et al., "Online Buying and Selling System," IJRET, 2020.
- [4] S. Kulkarni et al., "College-Based Online Trading Platform," IJSRCSEIT, 2021.
- [5] Web-Based College Event Management System Study