IntelliEdu: An AI-Based School Management Software for Smart Educational Administration

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***Abstract*—The increasing use of digital technologies in education has created a need for school management systems that can do more than store and process information. Traditional systems generally support routine activities such as maintaining student records, attendance, examinations, fees, and staff information, but they provide limited support for analyzing educational data and identifying students who may require additional attention. The proposed AI-Based School Management Software aims to address this gap by combining school administration with Artificial Intelligence and data analytics.**

The system provides a centralized web-based platform for administrators, teachers, students, parents, and staff. It manages important activities including student admission, attendance, examination and result management, fee management, timetable scheduling, library administration, staff management, and parent communication. The system uses role-based access to ensure that users can access information according to their responsibilities.

Artificial Intelligence is used to analyze academic records, attendance patterns, examination results, and other available student information. The analysis can help identify learning trends, predict academic performance, recognize students who may be at academic risk, and provide useful information for timely intervention. The system also supports analytical dashboards, automated notifications, and chatbots-based assistance.

The proposed solution helps reduce manual work, improve data consistency, simplify administrative processes, and support informed decision-making. By integrating AI with conventional school management functions, the system provides a foundation for smarter and more efficient educational administration. Future improvements can further enhance the platform through advanced machine learning, personalized learning recommendations, mobile applications, cloud deployment, facial-recognition attendance, and AI-assisted educational services.

***Index Terms*—Academic Analytics, Machine Learning, Artificial Intelligence, Decision Support System, Educational Administration, Educational Technology, School Management Software, Smart Education, Student Performance Prediction, Web Application.**

I. INTRODUCTION

Modern educational institutions handle a large amount of information related to students, teachers, attendance, examinations, fees, staff, libraries, and communication. Managing these activities through manual methods or separate systems can require considerable time and effort and may make it difficult to maintain consistent and easily accessible

information. The development of integrated School Management Software provides a way to bring these activities together through a centralized digital platform.

With the growth of Artificial Intelligence, educational software can move beyond basic record management and provide intelligent analysis of available academic data. AI can identify patterns in historical information, support prediction, and assist users in making informed decisions. In a school environment, data such as attendance, examination results, assignments, and academic history can be analyzed to understand student progress and identify students who may need additional support.

The AI-Based School Management Software is proposed as a centralized web application that combines regular school management activities with AI-based capabilities. The system is designed to support administrators, teachers, students, parents, and staff through role-based access. It includes major functions such as student admission, attendance management, examination and result management, fee management, timetable scheduling, library management, staff administration, and parent communication.

The AI component adds intelligent features such as student performance analysis, performance prediction, identification of academic risks, analytical dashboards, and chatbot assistance. These features are intended to help teachers and administrators understand student-related information more effectively and take timely action. The centralized database also supports consistent and secure information sharing among authorized users.

II. LITERATURE SURVEY

The integration of Information and Communication Technology (ICT) into the education sector has significantly transformed the way educational institutions manage academic and administrative activities. School Management Systems (SMS) have become an essential component of modern educational organizations by digitizing operations such as student admission, attendance monitoring, examination management, fee collection, library administration, timetable scheduling, and communication between teachers and parents. Although these systems have improved efficiency and reduced paperwork, many existing solutions still function as traditional data management platforms without incorporating intelligent analytical capabilities. As Artificial Intelligence (AI) continues to evolve, researchers have increasingly focused on integrating AI into educational management systems to provide predictive analytics, intelligent automation, and personalized educational support.

Early research in school management primarily concentrated on developing centralized database systems capable of storing and managing institutional records. These systems simplified administrative tasks by replacing manual registers with digital databases, improving data accessibility, reducing storage requirements, and minimizing clerical errors. However, their functionality was generally limited to record maintenance, report generation, and transaction processing. Decision-making continued to rely heavily on human interpretation of the stored data, limiting the ability of educational institutions to identify patterns or predict future academic outcomes.

Several researchers have explored web-based school management applications to improve accessibility and operational efficiency. These applications provide role-based access for administrators, teachers, students, parents, and staff members through centralized online platforms. Cloud-based deployment enables users to access educational information from multiple devices and locations while ensuring data synchronization and availability.

Such systems have significantly improved communication among stakeholders by providing online attendance records, examination results, digital assignments, fee payment status, and notification services. Despite these improvements, many web-based solutions still depend on manual analysis of educational data and lack intelligent decision-support mechanisms.

III. PROPOSED SYSTEM ARCHITECTURE & METHODOLOGY

The proposed AI-Based School Management Software is a comprehensive web-based application designed to automate academic, administrative, and communication processes while incorporating Artificial Intelligence (AI) to support intelligent

decision-making. Unlike traditional school management systems that primarily focus on maintaining records, the proposed solution analyzes institutional data to generate meaningful insights, predict student performance, automate repetitive tasks, and improve overall operational efficiency. The system provides a centralized platform that connects administrators, teachers, students, parents, and non-teaching staff through secure role-based access, ensuring smooth coordination and effective information sharing.

independently while sharing information through a centralized database. This modular approach improves maintainability, scalability, and future expansion. All users access the system through a responsive web interface, allowing seamless operation on desktop computers, laptops, tablets, and smartphones. Secure authentication mechanisms ensure that users can access only the information relevant to their assigned roles.

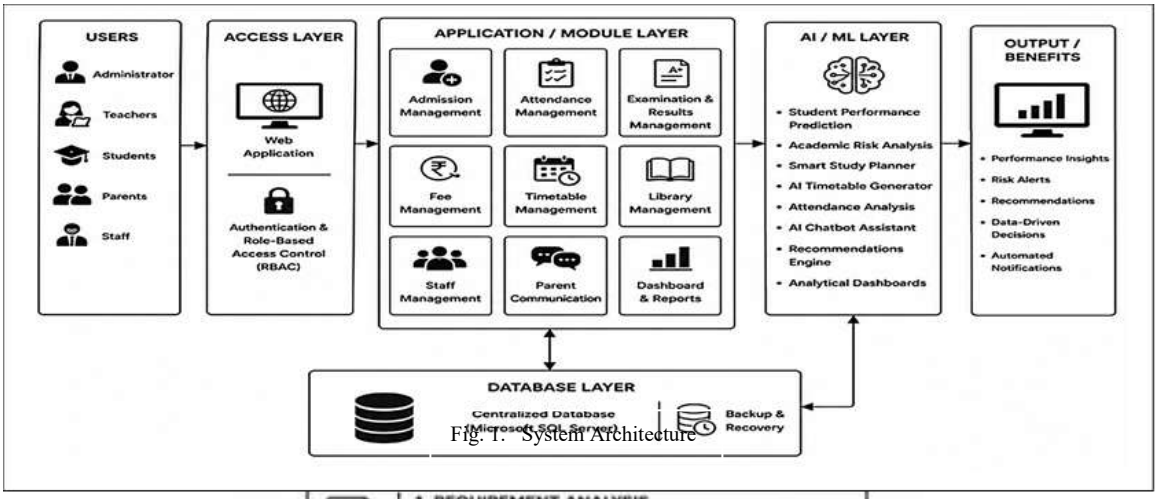


Fig. 1. System Architecture

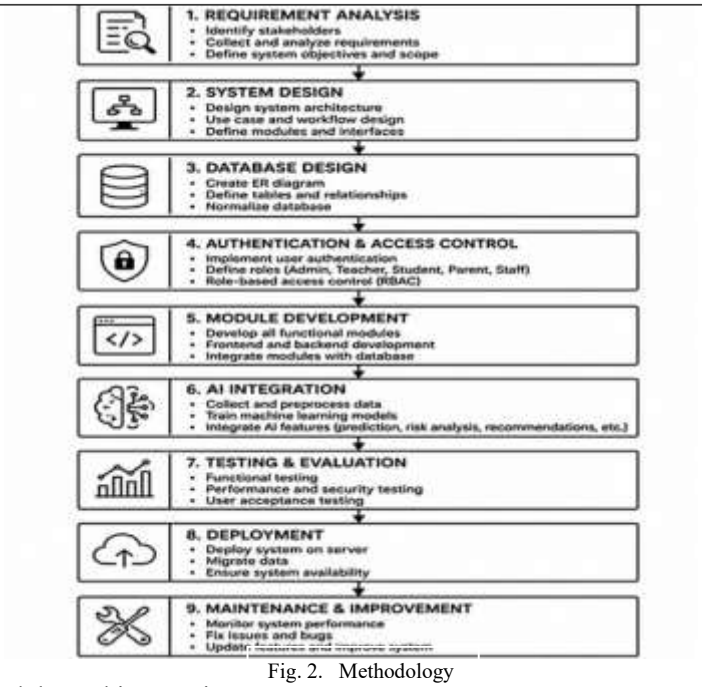


Fig. 2. Methodology

The software follows a modular architecture in which each functional component operates

IV. IMPLEMENTATION & RESULTS

A. Implementation

The implementation was carried out through the following major stages:

1) Requirement Analysis

The functional and non-functional requirements of the school management system were identified and analyzed.

2) System Desgin

The overall architecture, user roles, module relationships, and application workflow were designed.

3) Database Design

A centralized Microsoft SQL Server database was designed to store student, teacher, attendance, examination, fee, library, and academic information securely.

4) User Authentication Module

Role-based authentication was implemented so that users can access only the information and functions permitted for their roles.

5) Student Management Module

The system supports student admission and centralized student record management.

6) Teacher, Parent and Staff Management

Separate modules were designed to manage teacher, parent, and staff-related information.

4) Attendence Management

Attendance records are digitized and analyzed to support academic monitoring and identify attendance-related patterns.

5) Examination and Result Management

Examination records, student results, and report generation are managed through the system.

6) Fee Management

Fee records and payment tracking are maintained digitally, reducing the need for manual record keeping.

7) AI Module

Python-based AI and machine learning components are used to analyze attendance, examination performance, assignments, and academic history. The AI module supports student performance prediction, identification of academic risks, and analytical recommendations.

8) AI Chatbot and Communication

An AI-powered chatbot is included for instant query resolution, while automated notifications support communication between the school, students, teachers, and parents.

9) Dashboards and Reports

Analytical dashboards and reports provide administrators and teachers with useful information for monitoring institutional and student performance.

B. Results

The implemented system successfully combines conventional school management functions with AI-based capabilities. The major results obtained are:

1) Successfully developed a web-based AI-Based School Management Software.
2) Automated student admission and record management.
3) Implemented secure role-based login for different users.
4) Digitized attendance management and enabled AI-based attendance analysis.
5) Automated examination, result, and report generation.
6) Implemented fee management and payment tracking.

V. ADVANTAGES OF THE PROPOSED SYSTEM

A. Centralized Data Management

All student, teacher, attendance, examination, fee, library, and academic records are maintained in a centralized database, making information easier to manage and access.

B. Intelligent Academic Performance Analysis

The system analyzes attendance, examination scores, assignments, and classroom activities to monitor individual student performance.

C. Early Prediction of Student Performance

Machine learning techniques can use historical academic data to predict future student performance and identify students who may need additional academic support.

D. Automation of Administrative Activities

Routine activities such as student registration, attendance recording, timetable preparation, fee management, report card generation, and library management are automated, reducing manual effort.

E. Improved Accuracy and Data Consistency

Centralized data storage reduces duplicate records and minimizes errors associated with manual record keeping.

F. AI-Assisted Decision Support

Intelligent dashboards and analytical reports help administrators and teachers monitor student and institutional performance and make better data-driven decisions.

G. Role-Based Access and Security

Administrators, teachers, students, parents, and staff can access information according to their assigned roles, improving security and privacy.

H. Better Parent Communication

Automated notifications, attendance alerts, progress reports, examination updates, and fee reminders help parents stay informed about their child's academic activities.

I. Reduced Paperwork and Workload

Digital management of school records reduces dependence on physical registers and decreases the administrative workload.

VI. FUTURE ENHANCEMENT

The proposed AI-Based School Management Software provides a strong foundation for intelligent educational administration. In the future, the system can be enhanced with advanced technologies and additional features to make it more intelligent, personalized, secure, and accessible.

Advanced Machine Learning Models

More advanced machine learning models can be integrated to improve the accuracy of student performance prediction.

Personalized Learning Recommendations

The AI system can provide personalized learning recommendations based on each student's strengths, weaknesses, academic performance, attendance, and learning pace.

Facial Recognition-Based Attendance

Facial recognition technology can be integrated to automate student and staff attendance and reduce manual attendance entry.

Voice-Enabled AI Assistant

A voice-based AI virtual assistant can be developed to help students, teachers, and parents access information using voice commands.

Mobile Application

Android and iOS applications can be developed to provide convenient access to school services from mobile devices.

Cloud-Based Deployment

The system can be deployed on cloud infrastructure to provide remote access, better scalability, centralized backups, and improved availability.

Learning Management System Integration

The software can be integrated with Learning Management Systems such as Moodle and Google Classroom to provide a more complete digital learning environment.

VII. CONCLUSION

The AI-Based School Management Software provides an intelligent and centralized solution for managing academic, administrative, and communication activities in educational institutions. The system combines traditional school management functions with Artificial Intelligence to overcome the limitations of conventional systems, particularly in predictive analysis, personalized support, and data-driven decision-making.

The proposed system automates important activities such as student admission, attendance management, examination processing, fee management, timetable scheduling, library administration, staff management, and communication between schools and parents. A centralized database with role-based access helps maintain data accuracy, security, and efficient information sharing among different users.

The integration of AI enables the system to analyze student attendance, examination results, assignments, and academic history. This helps identify learning patterns, predict academic performance, recognize students who may require additional support, and provide useful analytical information to teachers and administrators.

Overall, the project demonstrates that Artificial Intelligence can significantly enhance school management by reducing manual work, improving

data accuracy, supporting timely decision-making, and strengthening communication between schools, students, teachers, and parents. With future enhancements such as advanced machine learning, facial-recognition attendance, mobile applications, cloud deployment, AI-based question generation, and NLP-based answer evaluation, the system can become a more comprehensive and adaptive platform for smart educational administration.

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