

Smart Project Review System powered by AI

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Abstract - The Smart Project Review System powered by AI is a web application developed to simplify and digitize the evaluation and management of academic and development projects. In many institutions, project review, progress tracking, and feedback management are handled manually or through disconnected systems, which often leads to inefficiencies, delays, and lack of transparency. The proposed web application provides a centralized platform where guides or administrators can review project progress, analyze submissions, and generate evaluation reports. Students can upload project details, track feedback, receive notifications, and improve their work based on AI-driven suggestions. The system ensures organized data management through role-based access control and automated analysis. By integrating project monitoring, evaluation, and intelligent feedback into a single web platform, the application reduces manual effort, improves accuracy, enhances transparency, and strengthens communication between students and evaluators.

Keywords: Smart Project Review System, Artificial Intelligence, Web Application, Project Evaluation, Feedback Analysis.

I. INTRODUCTION

Project development in academic institutions and software environments requires continuous monitoring, evaluation, and feedback to ensure successful outcomes. These activities include project submission, progress tracking, performance evaluation, and feedback management. As the number of students and development projects continues to grow, managing these processes efficiently has become increasingly important.

Traditional project review systems relied heavily on manual documentation and spreadsheet-based tracking methods. These approaches supported basic progress monitoring and evaluation recording but were prone to human error, delayed feedback, and limited transparency. Such systems lacked automation and centralized monitoring capabilities required for handling large volumes of projects effectively [14].

With the advancement of digital technologies, web-based project management platforms were introduced to streamline project submission and evaluation processes. These systems

improved data organization and reporting accuracy. However, their dependence on manual review processes limited intelligent analysis and reduced the efficiency of feedback generation for students and evaluators [8].

The introduction of Artificial Intelligence (AI) technologies further enhanced system capabilities by enabling automated data analysis and intelligent feedback generation. These systems reduced manual evaluation effort and improved consistency in assessment. Nevertheless, many existing solutions primarily focused on isolated functionalities rather than providing a fully integrated project review environment [2], [3].

Research efforts also explored automated evaluation frameworks capable of analyzing project data and generating structured feedback. These systems demonstrated improved accuracy in assessment and reporting. However, they often operated as standalone modules without incorporating complete project lifecycle management features such as tracking, communication, and revision handling [1], [5].

Several studies proposed intelligent assessment systems to provide structured evaluation metrics and performance insights. While these systems improved the quality of feedback and analysis, they did not address additional academic operations such as collaborative review, iterative improvement, or centralized monitoring [7].

Web-based applications were later developed to improve accessibility and enable students to submit and track project progress online. These solutions enhanced user convenience but were frequently limited to basic submission and tracking functionalities and lacked AI-driven insights and automation capabilities [6].

Recent research examined AI-based evaluation and recommendation systems aimed at improving decision-making and feedback quality. Although effective in analysis, these approaches did not integrate comprehensive project management features within a single platform [12].

Studies focusing on intelligent data analysis and predictive modeling introduced advanced frameworks to enhance evaluation accuracy and efficiency. While technically advanced, these systems were primarily designed for analytical purposes rather than complete project management and review workflows [11], [13].

Data processing and scheduling techniques were proposed to optimize large-scale project evaluation systems. These methods enhanced system efficiency and reliability but did not emphasize user-friendly web interfaces for interaction between students and evaluators [15].

More comprehensive frameworks attempted to integrate digital project management with evaluation systems by combining submission tracking with reporting modules. Despite improvements in efficiency and transparency, many of these systems lacked a unified AI-powered web architecture capable of managing multiple project evaluation processes simultaneously [4], [10].

II. METHODOLOGY

The proposed Smart Project Review System powered by AI is designed as a centralized web application to digitize project evaluation, monitoring, and feedback management processes. The workflow begins with user authentication and proceeds through project submission, AI-based analysis, feedback generation, and real-time data synchronization, forming a complete end-to-end project review pipeline.

A. Requirement Analysis and System Design

The initial phase involved identifying core functional requirements of academic and development project environments. The primary modules defined include project submission, AI-based evaluation, feedback generation, progress tracking, and administrative monitoring. Two user roles were established: Administrator (Guide) and Student. A role-based access mechanism ensures controlled system operations and data security. The system architecture follows a client-cloud model, where the web application communicates with backend services for authentication, data storage, and real-time updates.

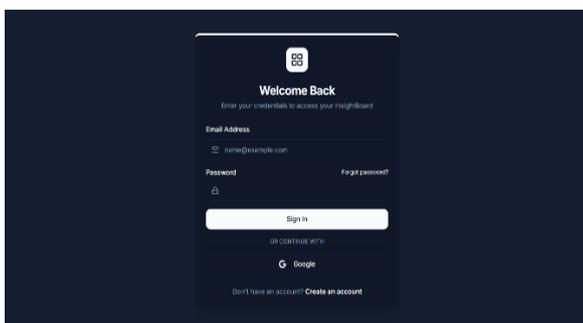


Figure 1: User Authentication Interface of the Smart project review System

B. Frontend Development

The web application interface is developed using modern web technologies such as React (Next.js) to ensure responsive design and smooth user interaction. Separate dashboards are designed for administrators and students. The administrator interface enables project review, feedback management, and performance monitoring, while the student interface allows project submission, progress tracking, and feedback viewing. Component-based architecture and state management techniques are used to maintain efficient navigation and user experience.

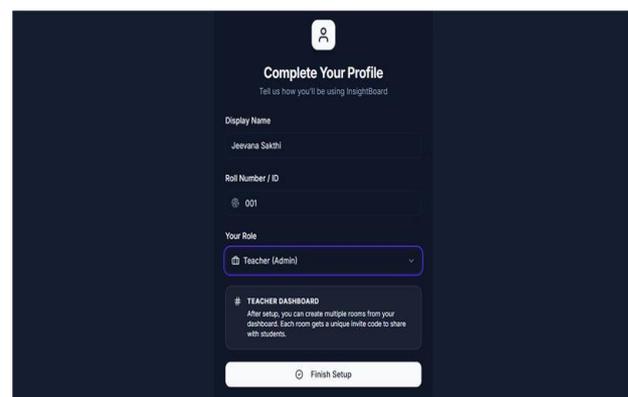


Figure 2: Selection of role

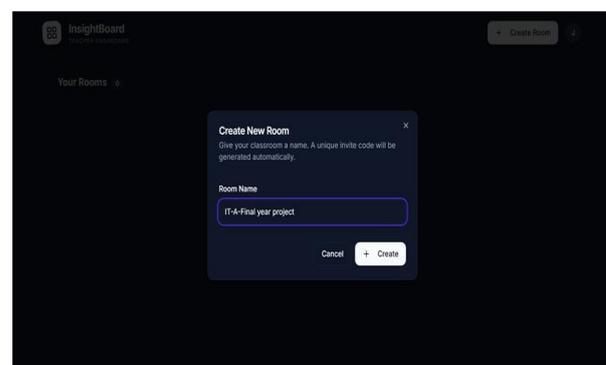


Figure 3: Create new room dashboard

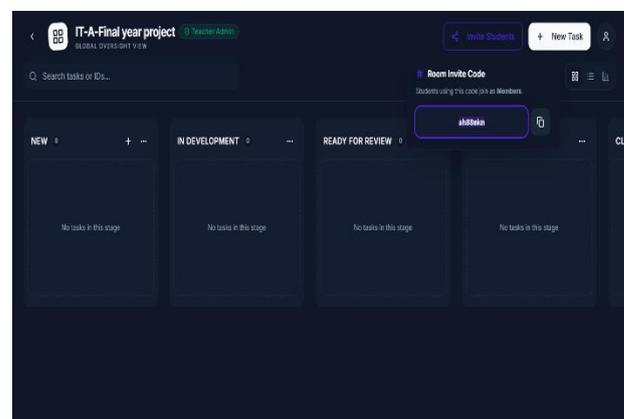


Figure 4: Admin Dashboard

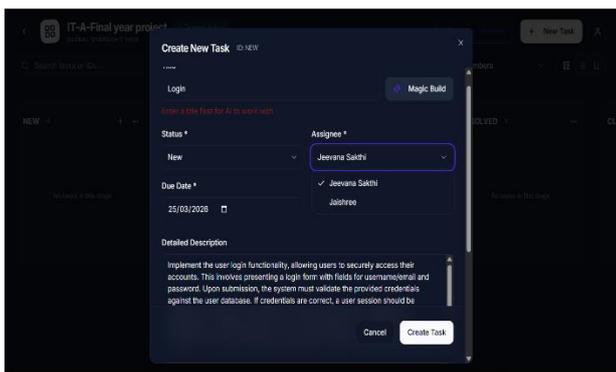


Figure 5: Task creation

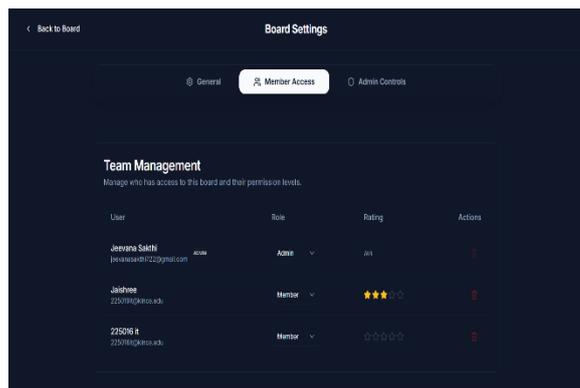


Figure 7: Feedback and team management screen

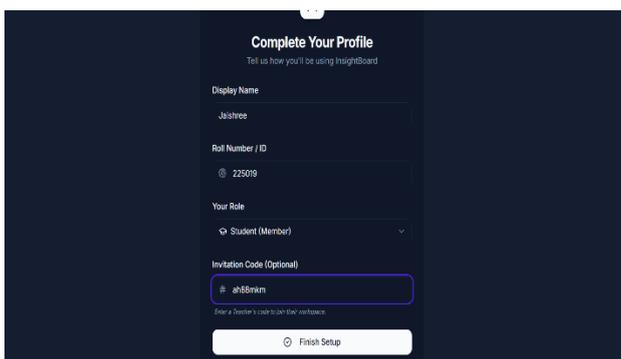


Figure 6: Student joining screen

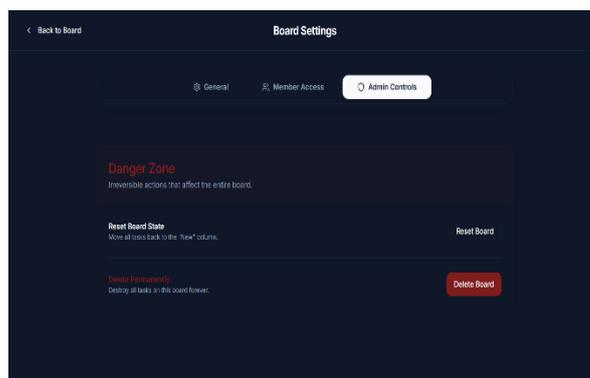


Figure 8: Admin controls

C. Backend Integration with Firebase

The backend infrastructure is implemented using Firebase services for authentication, cloud storage, and database management. Firebase Authentication ensures secure login using role-based credentials. Cloud Firestore is used as a real-time NoSQL database to store user details, project submissions, evaluation data, and feedback information. Real-time synchronization ensures that any updates in project status or feedback are instantly reflected across the system.

D. Project Review and Feedback Workflow

The system includes a structured review module where students can submit project details through the web application. Each submission is stored in the database with timestamps and status indicators. Administrators can review submissions, provide feedback, and update evaluation status. AI-generated insights assist in improving the quality and speed of the review process, ensuring effective communication between students and evaluators.



Figure 9: Student progress screen

E. AI-Based Task Description Generation

The system incorporates an AI module to automatically generate task descriptions based on user input. The AI processes the given task title or keywords and produces a structured and meaningful description to assist users in defining project tasks more clearly. This feature helps users save time and reduces the effort required in manually writing detailed descriptions. The generated content ensures consistency, improves clarity, and enhances the overall quality of project documentation within the system.

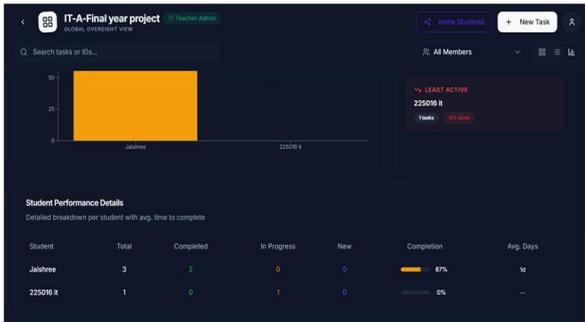


Figure 10: Student performance details

F. Testing and Deployment

Functional testing was conducted to verify authentication security, accuracy of project evaluation, AI response reliability, and database consistency. Real-time data synchronization and error handling mechanisms were validated under simulated usage conditions. After successful validation, the web application was deployed for operational use, ensuring stable, secure, and scalable performance in academic environments.

III. SYSTEM ARCHITECTURE

The Smart Project Review System powered by AI follows a client–cloud architecture designed to ensure scalability, real-time synchronization, and secure data management. The system consists of three primary components: the web application (frontend), Firebase backend services, and an AI module for task description generation. These components interact to provide a seamless end-to-end project review and management solution.

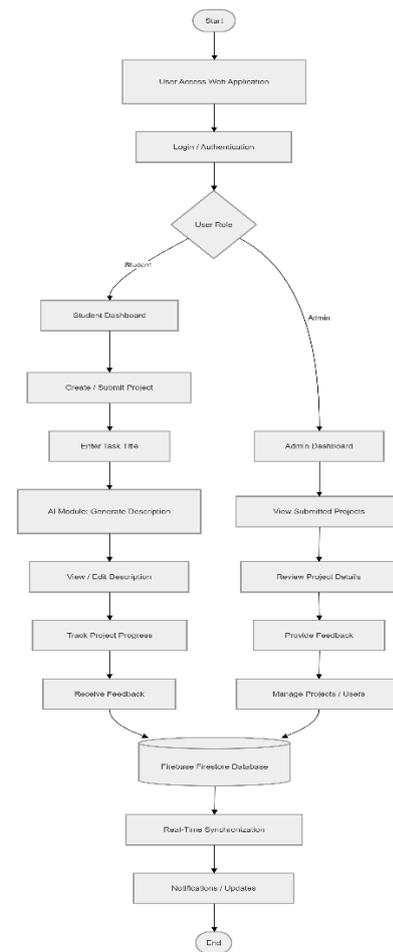


Figure 11: Overall System Architecture and Process Flow

A. Client Layer – Web Application

The client layer is developed using modern web technologies such as React (Next.js), enabling a responsive and interactive user interface. The application provides separate dashboards for administrators (guides) and students based on role-based authentication. Users interact with the system to perform operations such as submitting projects, generating task descriptions using AI, tracking progress, and viewing feedback. The web application communicates with backend services through secure API calls. All user actions, such as project submission or AI-based description generation, trigger corresponding updates in the cloud database.

B. Backend Layer – Firebase Services

Firebase serves as the backend infrastructure supporting authentication, database management, and real-time data synchronization.

- **Firestore Authentication** manages secure login and role-based access control.
- **Cloud Firestore** acts as a centralized NoSQL database storing user profiles, project data, task details, and generated descriptions.
- **Real-time synchronization** ensures that updates made by

users are instantly reflected across the system without manual refresh.

This cloud-based backend eliminates the need for dedicated server maintenance and enhances system scalability.

C. AI Integration – Task Description Module

To enhance user productivity, the system integrates an AI module for automatic task description generation. When a user provides a task title or keywords, the AI processes the input and generates a structured and meaningful description. This generated content is displayed to the user and stored in the database for future reference. This integration improves documentation quality, reduces manual effort, and ensures consistency in task creation across the system.

D. Data Flow Overview

The system workflow begins with user authentication. After login, users access their respective dashboards. Students can submit project details and create tasks, where AI assists in generating task descriptions. These details are stored in Firestore and are accessible to administrators for review. Administrators can monitor project progress and provide feedback, which is updated in real time. All interactions, including project updates and AI-generated content, are synchronized across the system. This structured architecture ensures secure communication between components, efficient data management, and reliable service delivery in academic project environments.

IV. RESULT AND DISCUSSION

The Smart Project Review System powered by AI was successfully developed and tested using modern web technologies such as React (Next.js) as the frontend framework and Firebase as the backend infrastructure. The system was evaluated based on functionality, performance, usability, and reliability under real-time conditions.

A. Functional Testing Results

All core modules of the application were tested individually and collectively to ensure proper functionality. The authentication module successfully implemented secure login and role-based access control for administrators (guides) and students. Firebase Authentication effectively managed user identity verification and prevented unauthorized access. The project management module enabled students to submit project details and manage tasks efficiently. All project data and task information were stored in Cloud Firestore and were instantly accessible due to real-time synchronization. Students were able to view updates, track progress, and access generated content without delay.

The AI-based task description module was tested for generating meaningful and structured descriptions from user-provided inputs. The generated outputs were consistent and improved the clarity of task documentation. All AI-generated data was successfully stored and retrieved from the database, demonstrating smooth integration between the AI module and

backend services. The project review module allowed administrators to monitor submitted projects and provide feedback. Updates made by administrators were reflected immediately in the student dashboard, ensuring transparency and efficient communication.

B. Performance Evaluation

The system exhibited efficient real-time performance. Data retrieval and updates through Firebase Firestore occurred with minimal latency. Since Firebase operates on a cloud-based infrastructure, the system maintained consistent performance even during multiple simultaneous user interactions. The use of modern web frameworks ensured smooth rendering of the user interface and responsive navigation across different devices and browsers. The average response time for major operations such as project submission, AI description generation, and feedback updates remained within acceptable limits for web applications.

C. Usability Analysis

The web application interface was designed with simplicity and clarity in mind. Users were able to navigate between modules easily due to intuitive dashboard layouts and well-structured components. Role-based dashboards reduced complexity by displaying only relevant features to administrators and students.

D. System Reliability and Security

Firebase Authentication provided secure access control, ensuring that only authorized users could access the system. Sensitive data such as user information and project details were handled through secure APIs, reducing the risk of data breaches. Cloud-based storage improved data reliability by eliminating risks associated with local system failures. Real-time database synchronization minimized inconsistencies in project data and ensured accurate and up-to-date information across the system. The integration of AI features was stable and did not affect overall system reliability.

V. PERFORMANCE ENHANCEMENT

The performance of the Smart Project Review System powered by AI is enhanced through the use of modern web and cloud technologies such as React (Next.js), Firebase, and AI-based processing modules. The frontend framework enables the development of a high-performance web application with a responsive user interface and fast rendering, ensuring a seamless user experience across different devices and browsers. Firebase provides a real-time cloud database, enabling instant data synchronization between students and administrators. This reduces delays in updating project details, task descriptions, feedback, and overall progress tracking.

Cloud-based storage and automated backend processing significantly minimize manual errors and improve system reliability. The integration of AI for task description generation enhances efficiency by reducing the time required

for manual documentation and ensuring consistency in task creation.

By leveraging real-time data handling, intelligent automation, and cloud infrastructure, the system improves operational speed, reduces user effort, and enhances overall system efficiency compared to traditional manual project review methods.

VII. CONCLUSION

The Smart Project Review System powered by AI successfully demonstrates how modern web technologies can streamline project evaluation and management processes through a centralized web-based platform.

The developed application eliminates traditional manual documentation methods and reduces errors associated with conventional project tracking systems. Real-time database synchronization ensures instant updates of project details, task descriptions, and feedback, improving transparency between students and administrators. Secure authentication and controlled access mechanisms further enhance system reliability and user trust.

The integration of AI for automatic task description generation improves the quality of project documentation and reduces manual effort. The results confirm that the proposed system offers improved operational efficiency, simplified project tracking, and enhanced user experience. The cloud-based architecture also ensures scalability, making it suitable for academic institutions and development environments of varying sizes. In conclusion, the implementation proves that a web-based, AI-integrated project review system can significantly modernize project management practices while maintaining accuracy, efficiency, and ease of use.

Furthermore, the proposed system demonstrates the potential of integrating Artificial Intelligence with modern web technologies to enhance academic project management processes. The AI-driven task description generation feature not only improves the quality and consistency of project documentation but also assists users in better understanding and structuring their work.

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