iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** IX **Month of publication:** September 2026

DOI: https://doi.org/10.22214/ijraset.2026.84827

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue IX Sep 2026- Available at www.ijraset.com

AI-Integrated Project Management System: A Multi-Tenant Platform for Intelligent Project Monitoring and Task Coordination

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Abstract: ***Effective project management requires coordinated handling of projects, team members, task assignments, deadlines, priorities, and progress information. This paper presents an AI-Integrated Project Management System, a web-based application developed to support project planning, task coordination, progress monitoring, and AI-assisted project interaction within an organization. The system follows a multi-tenant architecture in which users and project data are scoped using an organization identifier. Role-Based Access Control is implemented through two principal roles: Admin and Team Member. Administrators can manage projects, tasks, and team members, while team members can access project information and update the status of tasks assigned to them. The application is implemented using the MERN stack, comprising React with Vite for the frontend, Node.js and Express.js for backend services, and MongoDB with Mongoose for data persistence. JSON Web Tokens are used for authentication. AI functionality is integrated through the OpenAI API using GPT-3.5 Turbo for project summarization, contextual project assistance, and extraction of actionable tasks from meeting notes. No custom machine learning model is trained as part of the implemented system. The implementation demonstrates an application-oriented approach to combining conventional project management functionality with generative AI capabilities.***

Keywords: Artificial Intelligence, Project Management System, Large Language Model, MERN Stack, Task Management, OpenAI API, Multi-Tenant Architecture, Role-Based Access Control.

I. INTRODUCTION

Project management applications are used to organize activities, allocate responsibilities, monitor progress, and coordinate teams. As projects grow in complexity, project managers must handle information distributed across project descriptions, task lists, deadlines, priorities, team assignments, and project discussions. While conventional project management systems provide structured mechanisms for storing and tracking this information, users may still need to manually interpret available data to understand overall project status or convert unstructured discussions into individual actionable tasks.

Artificial Intelligence is increasingly being explored as a supporting technology for project management. Large language models provide opportunities to assist selected activities involving natural language, such as generating summaries from project context, answering questions based on available project information, and identifying actionable tasks from meeting notes.

The present work proposes and implements an AI-Integrated Project Management System that combines core project and task management functionality with AI-assisted operations. The system is designed around organizational data isolation and role-based access. An administrator creates an organization, manages team members, creates projects, delegates tasks, and monitors organization-level information. Team members access assigned work and update task progress through predefined status values.

The implemented AI integration provides three primary capabilities: project summary generation using project information, tasks, progress, and deadline-related context; a contextual AI project assistant; and extraction of actionable tasks from meeting notes. Unlike experimental AI research focused on training predictive models, this work is application-oriented. Therefore, the evaluation emphasizes implemented functionality, workflow support, and system behavior.

II. LITERATURE REVIEW / RELATED WORK

Artificial Intelligence has become an important area of investigation within project management research. Prior literature reviews and empirical studies identify opportunities for AI to support project planning, analysis, decision support, automation, and interpretation of project information [1]–[4]. The literature also highlights challenges associated with AI adoption, including integration, data availability, organizational readiness, and responsible deployment.

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The present work differs from studies centered on new AI algorithms or predictive models. The proposed system implements a practical web application in which a large language model is used for specific natural-language-oriented project management functions. The AI layer is connected to the application's existing project and task data, enabling contextual summarization, question answering, and extraction of actionable tasks from meeting notes.

III. PROPOSED SYSTEM

The proposed AI-Integrated Project Management System is designed as a centralized web application for managing organizational projects and associated tasks. The system combines conventional project management operations with AI-assisted functions that operate on project context and user-provided meeting notes.

The application follows a multi-tenant design based on an Organization Name (orgName). Users, projects, and related operations are scoped to an organization. The system supports two primary user roles: Admin and Team Member. An Admin can register an organization, manage team members, create and manage projects, create and assign tasks, monitor analytics, and use AI-assisted features. A Team Member can access project information and update the status of tasks assigned specifically to them.

The system maintains User, Project, Task, and Comment entities. User stores credentials, role, and organization information. Project stores title, description, deadline, and assigned members. Task stores title, description, priority, deadline, status, project association, and assigned user. Comment is documented as an extensible entity for task-level discussions.

TABLE I. ROLE-BASED RESPONSIBILITIES

User Role	Primary Responsibilities
Admin	Organization setup, team member management, project and task CRUD operations, task delegation, monitoring, analytics, and AI-assisted operations
Team Member	View assigned work and update the status of explicitly assigned tasks

IV. SYSTEM ARCHITECTURE

The proposed system follows a client-server architecture with separate frontend, backend, database, and AI integration layers. The frontend is implemented using React with Vite, React Router, Context API, Tailwind CSS v4, Lucide React, React Markdown, and Axios. The backend is implemented using Node.js and Express.js and exposes REST-based APIs for authentication, user and team management, projects, tasks, analytics, and AI operations. Protected endpoints use bearer-token-based authentication with JSON Web Tokens. MongoDB is used as the primary database with Mongoose for object modeling and database interaction. Project and user information are associated with an organization context through orgName. The AI layer communicates with the OpenAI API using GPT-3.5 Turbo for project summaries, contextual project assistance, and extraction of structured actionable tasks from meeting notes.

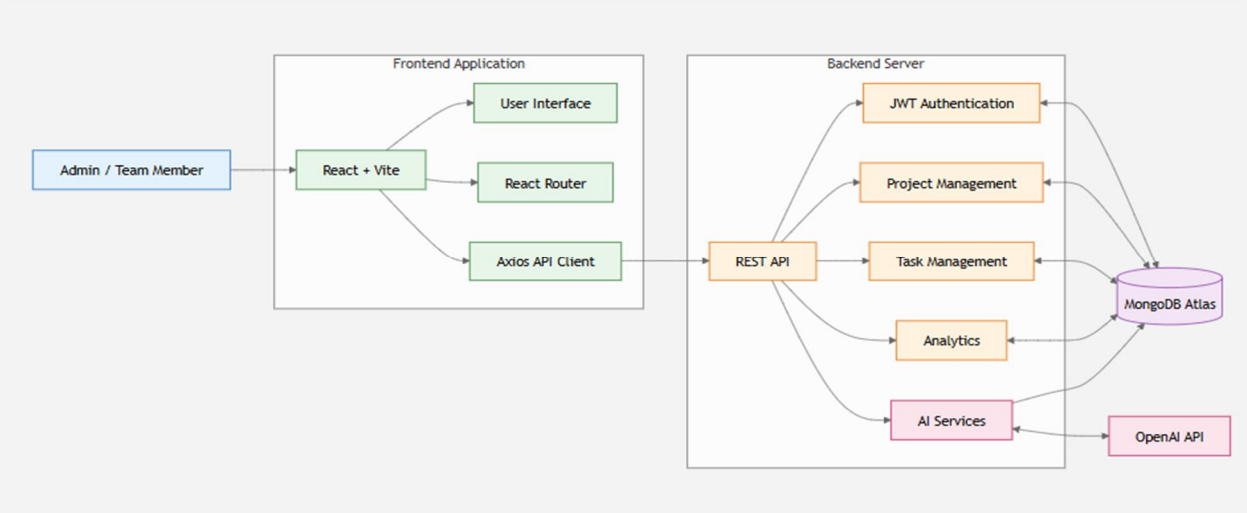


Fig. 1. Overall System Architecture

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue IX Sep 2026- Available at www.ijraset.com

V. METHODOLOGY AND SYSTEM WORKFLOW

The system methodology integrates structured project data management with AI-assisted natural-language processing. The application workflow begins with organization onboarding and authentication, followed by team formation, project creation, task delegation, task execution, progress monitoring, and AI-assisted interpretation of project information.

A. Authentication and Organization Onboarding

The administrator registers and defines an organization name. After authentication, the administrator gains access to the organizational environment and can create team member accounts. Team members receive credentials created by the administrator and log in using their email, password, and organization context. The core flow is: Landing Page → Register → Login → Dashboard.

B. Project Management Workflow

An administrator creates a project by entering relevant project details and associating members where applicable. The created project becomes available through the project management interface and can be accessed through its project details page.

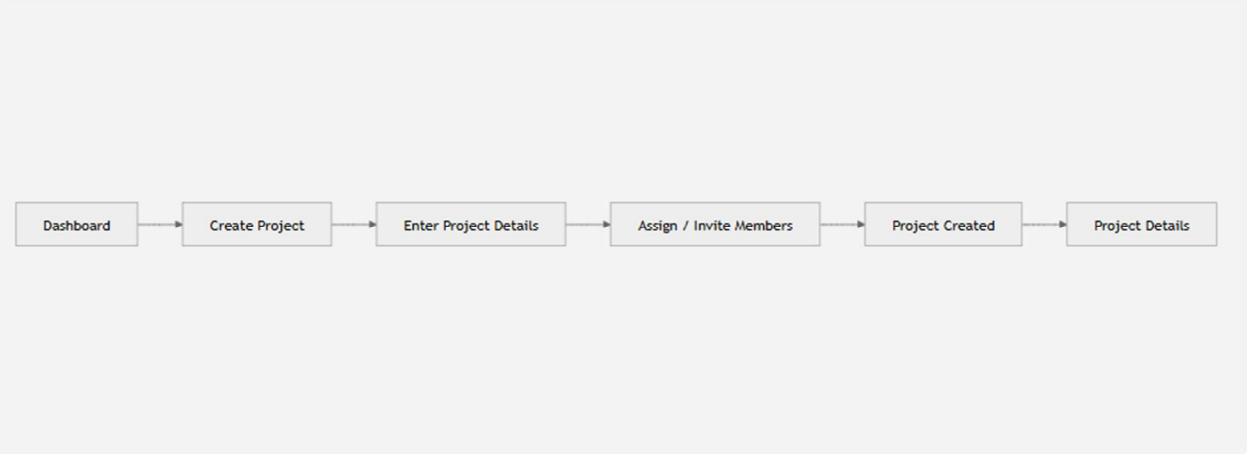


Fig. 2. Project Management Workflow

C. Task Management Workflow

Tasks are created within a project context. During task creation, the administrator specifies task information, assigns the task to a team member, sets priority and deadline information, and saves the task. The workflow follows: Project Details → Create Task → Assign Team Member → Set Priority → Set Deadline → Save Task → Task Appears in Project.

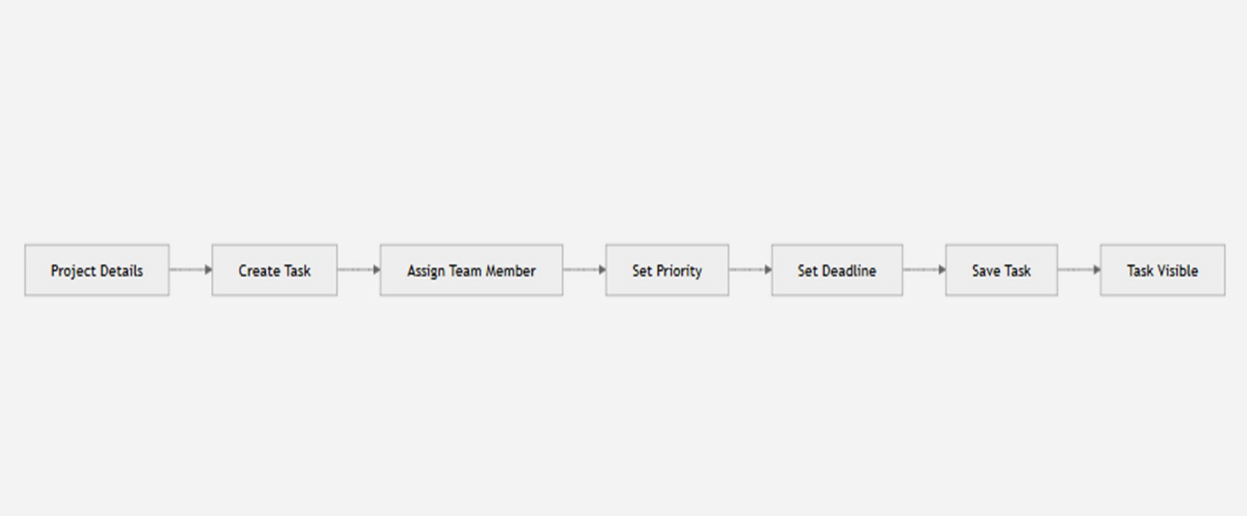


Fig. 3. Task Management Workflow

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D. Task Progress Workflow

A team member accesses assigned tasks through the My Tasks view. Task progress is represented using Todo, In Progress, and Completed. The team member updates the status of tasks assigned to them, and the updated information contributes to dashboard and project progress information.

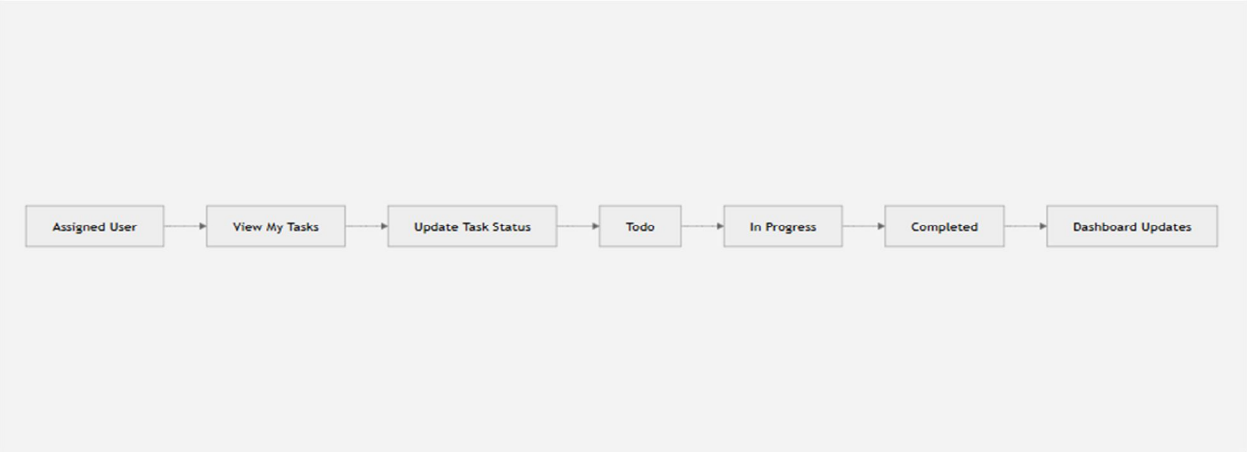


Fig. 4. Task Progress Workflow

VI. IMPLEMENTATION

The system is implemented as a MERN-based web application with RESTful backend services. The authentication module supports administrator registration, user login, profile operations, logout, organization user retrieval, and administrative team member management.

The project module supports retrieval, creation, update, and deletion of organization projects. The task module supports retrieval by project or assigned user, task creation, task updates, and deletion. Team Members are restricted to status updates for tasks explicitly assigned to them, while administrative users have broader management permissions.

The analytics service provides dashboard metrics based on total projects, total tasks, task status aggregations, and task priority aggregations. The AI service provides project summary generation, contextual project chat, and extraction of actionable tasks from meeting notes.

Table II. Major Implemented Modules

Module	Implemented Functionality
Authentication	Registration, login, profile access, and logout
Team Management	Create, update, and delete team member accounts
Projects	Create, retrieve, update, and delete projects
Tasks	Create, assign, prioritize, set deadlines, update status, and delete
Dashboard	Project and task metrics with status and priority aggregation
AI Services	Project summary, contextual assistant, and task extraction

VII. AI-ASSISTED FUNCTIONALITIES

A. AI Project Summary

The project summary feature collects available project context, including project information, tasks, progress, and deadline-related information, and submits this context to the OpenAI API. The generated output provides a high-level textual interpretation of the available project state.

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Fig. 5. AI Project Summary Workflow / Screenshot

B. AI Project Assistant

The AI project assistant accepts a user question. The backend retrieves relevant project data and constructs a prompt containing the available context and the user's request. The generated response is returned to the application. The feature is context-aware at the application level because project information is supplied before response generation.



Fig. 6. AI Project Assistant Workflow / Screenshot

C. AI-Based Task Extraction

The task extraction feature accepts raw meeting notes and requests a structured JSON array of actionable tasks from the OpenAI API. Generated task information can subsequently enter the existing administrative workflow for review, assignment, and persistence. Final task management remains controlled by the application's role-based workflow.

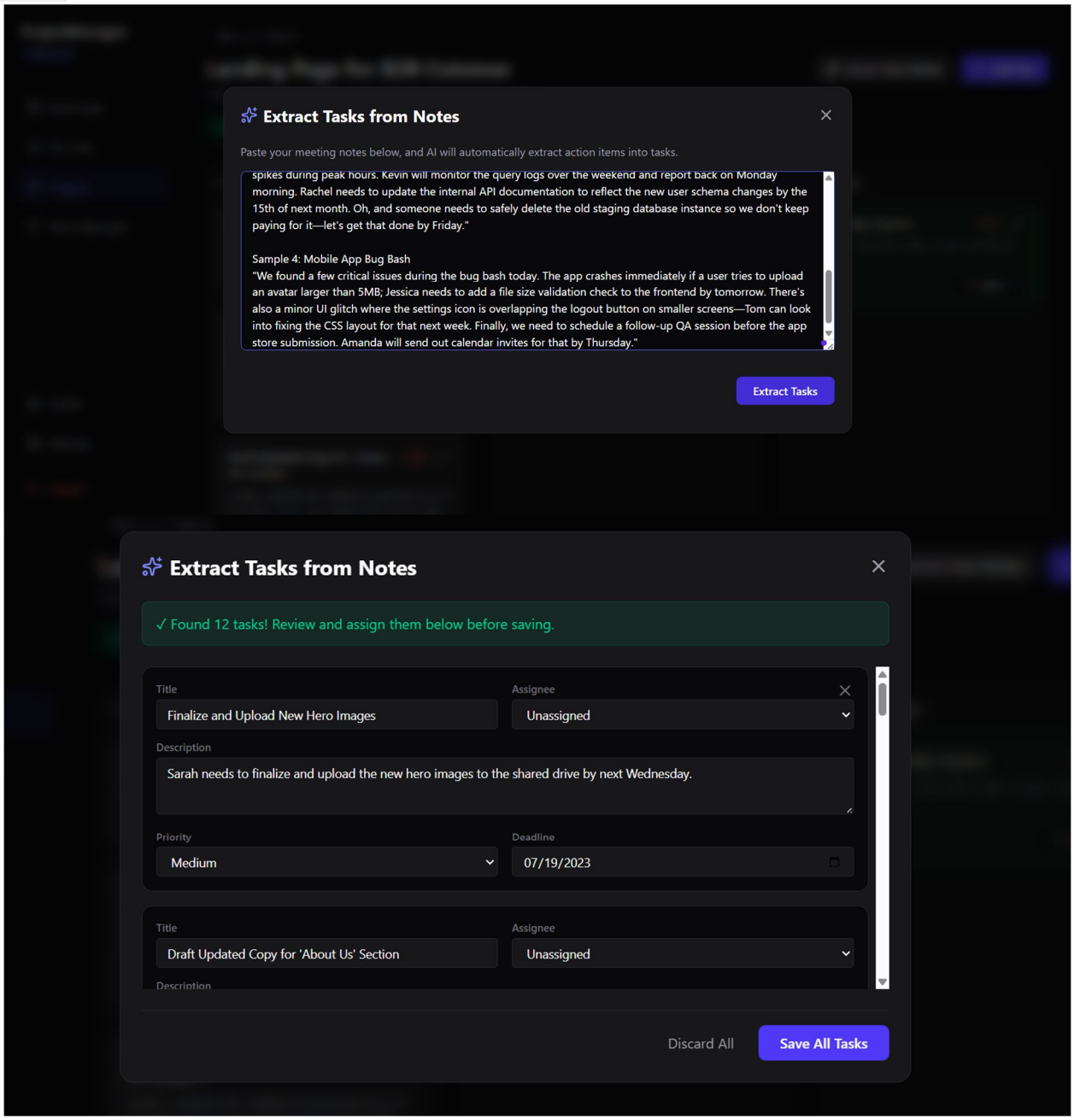


Fig. 7. AI-Based Task Extraction

VIII. RESULTS AND DISCUSSION

The evaluation of the proposed system is based on implemented functionality and workflow coverage because the available project documentation does not provide controlled experimental datasets, benchmark measurements, model evaluation metrics, or user-study statistics.

The implemented application supports the major stages of an organizational project management workflow. An administrator can register an organization, create team member accounts, create projects, and delegate tasks. Team members can authenticate, view assigned tasks, and update task status. The dashboard aggregates project and task information through total counts and status- and priority-based aggregations. The AI integration extends the system in three functional directions. The project summary feature transforms available project context into a high-level textual summary. The AI assistant enables natural-language interaction with project-related information supplied by the backend. The task extraction feature transforms unstructured meeting notes into structured actionable task information.

AI functions are integrated as assistance mechanisms around the core project management system. Project data management, task assignment, access control, and task status workflows remain controlled by the application. Extracted tasks are subsequently reviewed, mapped to team members, and saved through the task management process rather than being treated as automatically authoritative project records.

The results should not be interpreted as evidence of predictive superiority, improved task completion rates, or quantified productivity gains because no such experimental measurements are available. Instead, the demonstrated outcome is the functional integration of project management workflows and AI-assisted natural-language operations within a single web application.

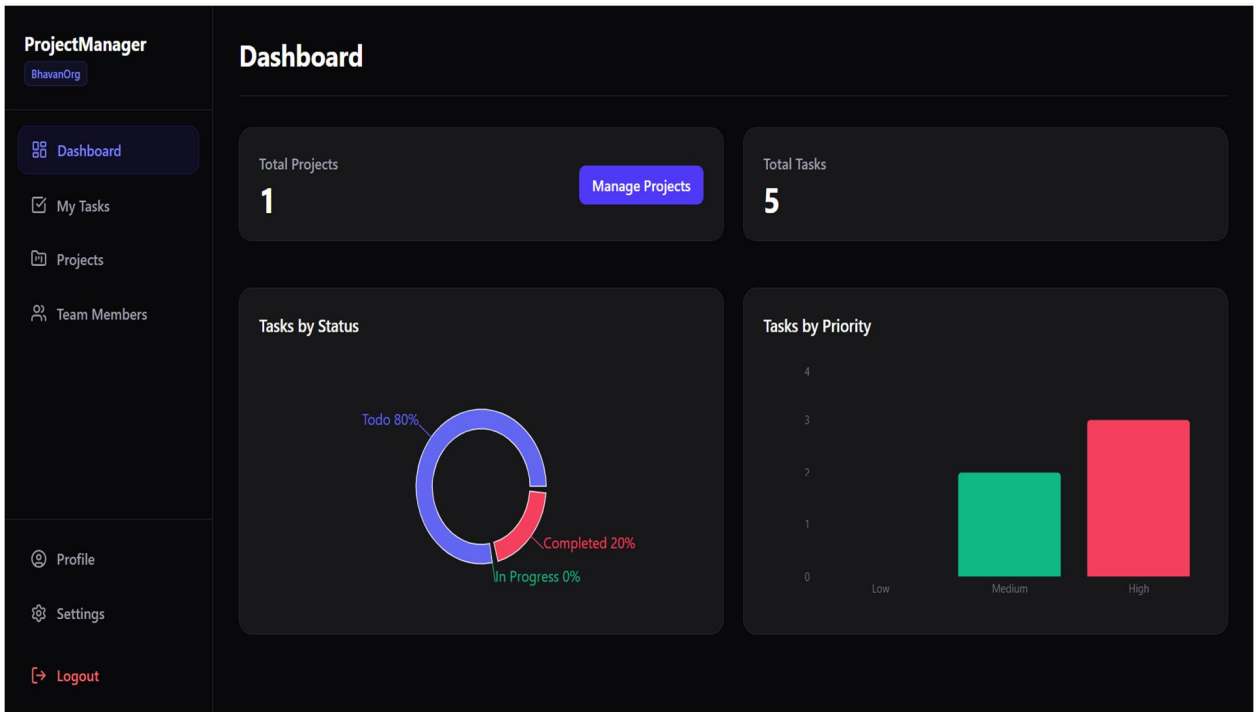


Fig. 8. Application Dashboard Screenshot

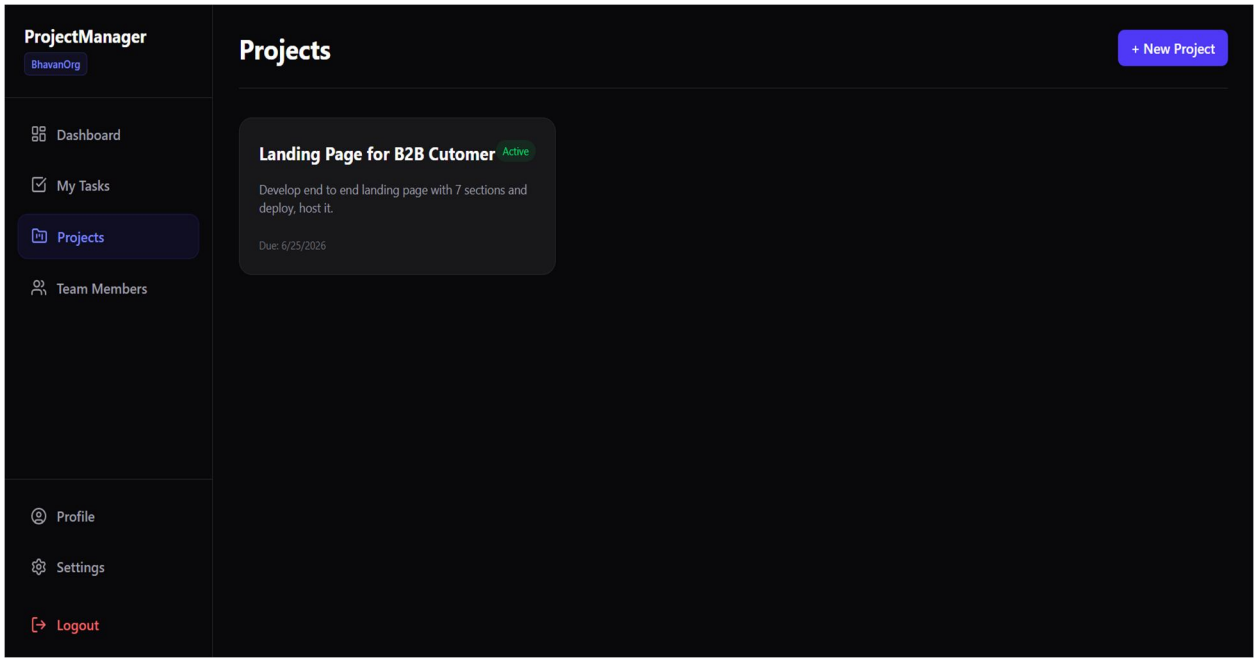


Fig. 9. Project Details and Task Management Screenshot

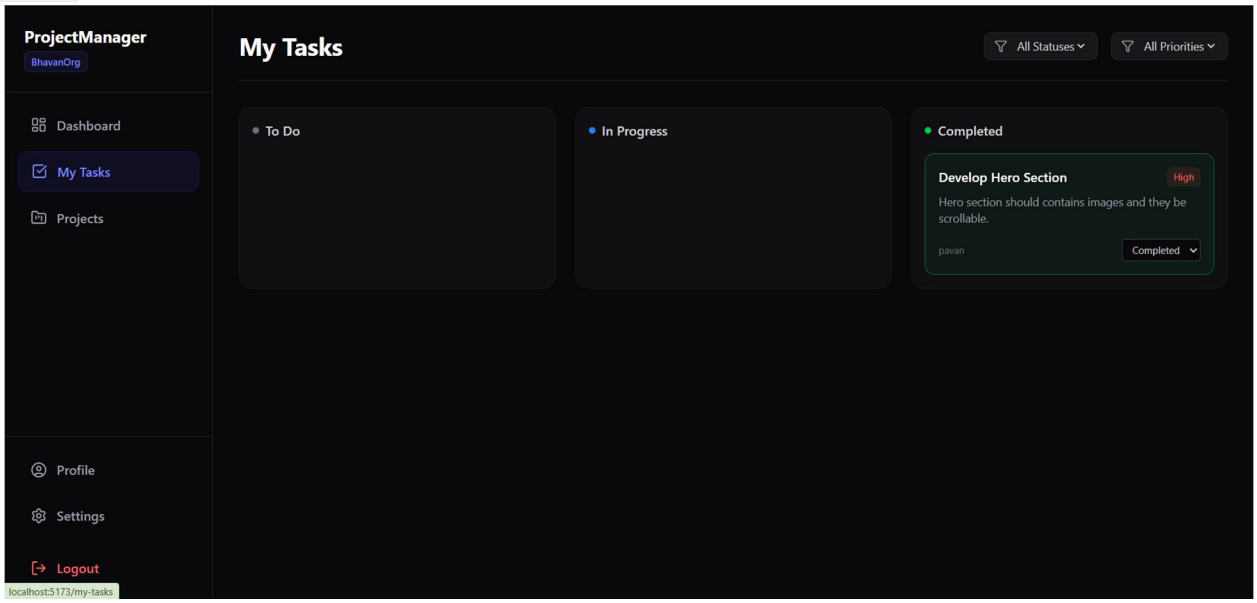


Fig. 10. My Tasks / Kanban View Screenshot

IX. ADVANTAGES AND LIMITATIONS

A. *Advantages*

The system provides a unified environment for authentication, team management, projects, tasks, dashboard analytics, and AI-assisted features.

Role-based access separates administrative and team member responsibilities, while organization-based scoping supports separation of organizational data and workflows.

AI-assisted summarization, contextual project interaction, and conversion of meeting notes into structured tasks provide practical support for information interpretation and task identification.

B. *Limitations*

The AI capabilities depend on an external AI service, and AI-generated outputs should be reviewed by authorized users before being treated as final project decisions.

The system does not train or claim to train a custom predictive machine learning model. The supplied documentation also does not provide benchmark datasets, quantitative performance experiments, or user-study results.

The implementation status of the Comment/Timeline feature is not sufficiently established by the supplied materials to claim it as a confirmed core feature.

X. CONCLUSION AND FUTURE SCOPE

This paper presented an AI-Integrated Project Management System, a web-based application designed to combine conventional project management operations with AI-assisted natural-language capabilities. The system is implemented using React with Vite, Node.js, Express.js, MongoDB, Mongoose, and JWT-based authentication. Its multi-tenant architecture scopes users and projects according to organization information, while role-based access separates administrative and team member responsibilities.

The implemented system supports organization onboarding, team member management, project creation, task assignment, priority and deadline handling, task status updates, assigned-task retrieval, and dashboard-level aggregation. AI functionality is integrated through the OpenAI API using GPT-3.5 Turbo for generating project summaries, providing contextual project assistance, and extracting structured actionable tasks from meeting notes.

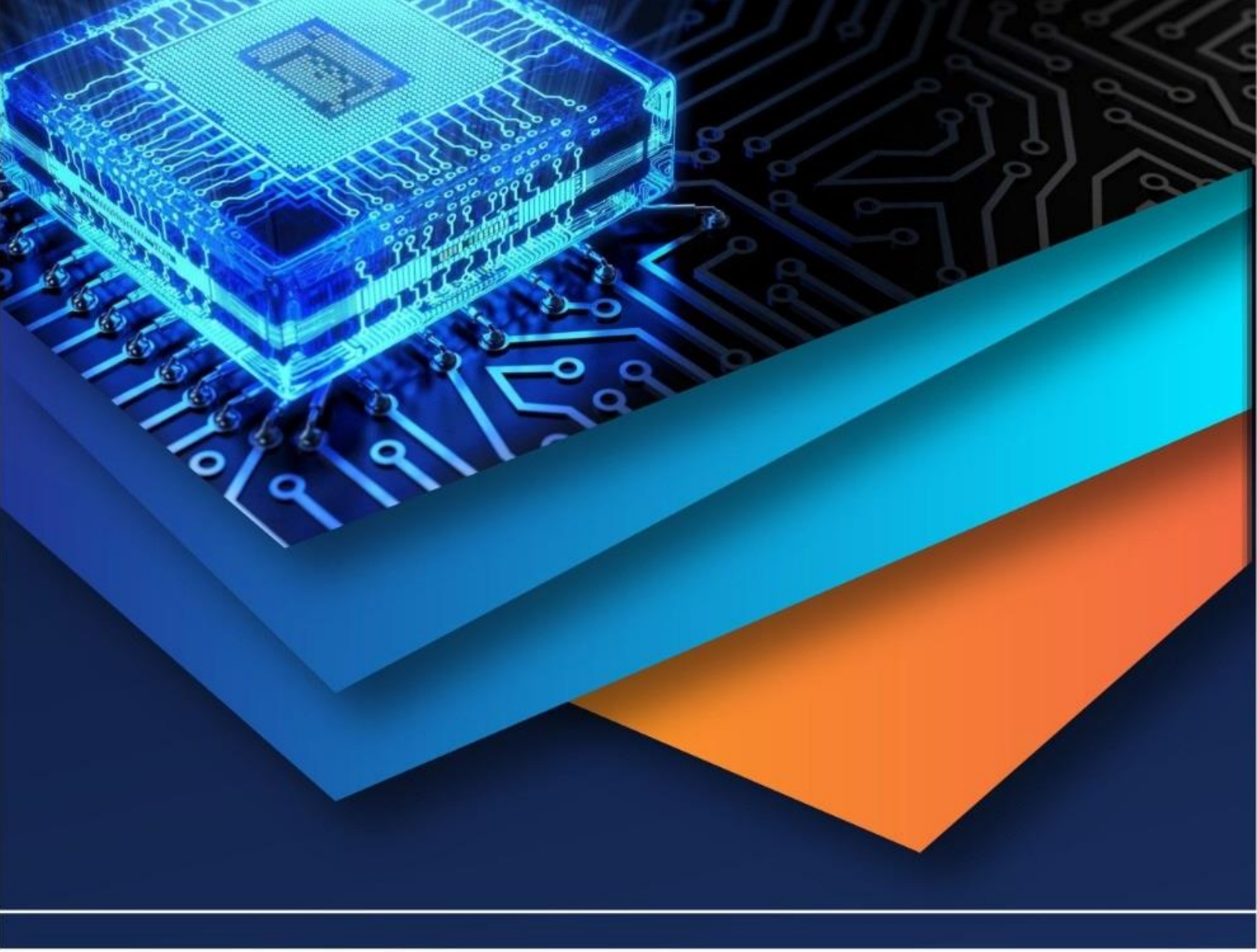
Future work may extend the system with additional collaboration capabilities, enhanced task-level discussions, notification mechanisms, richer analytics, more advanced AI models, improved contextual retrieval, integration with external collaboration platforms, and formal usability or performance evaluations.

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