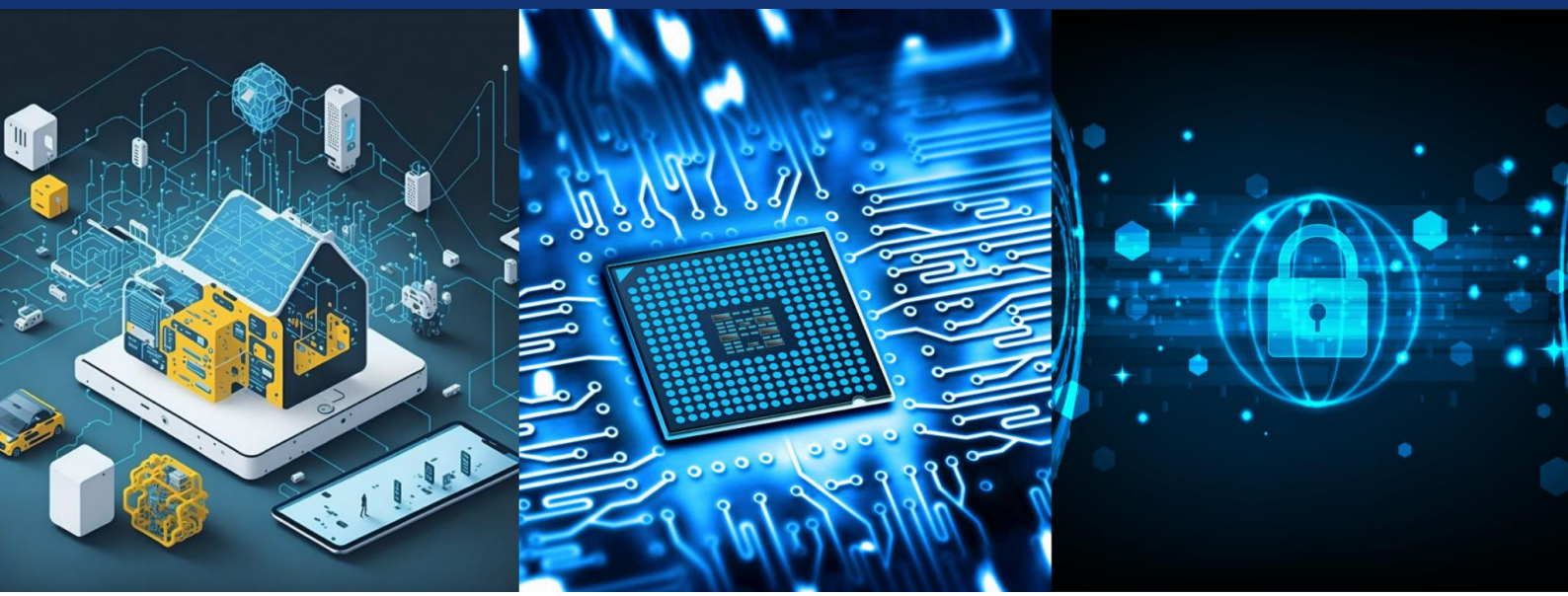
ISSN(O): 2320-9801
ISSN(P): 2320-9798



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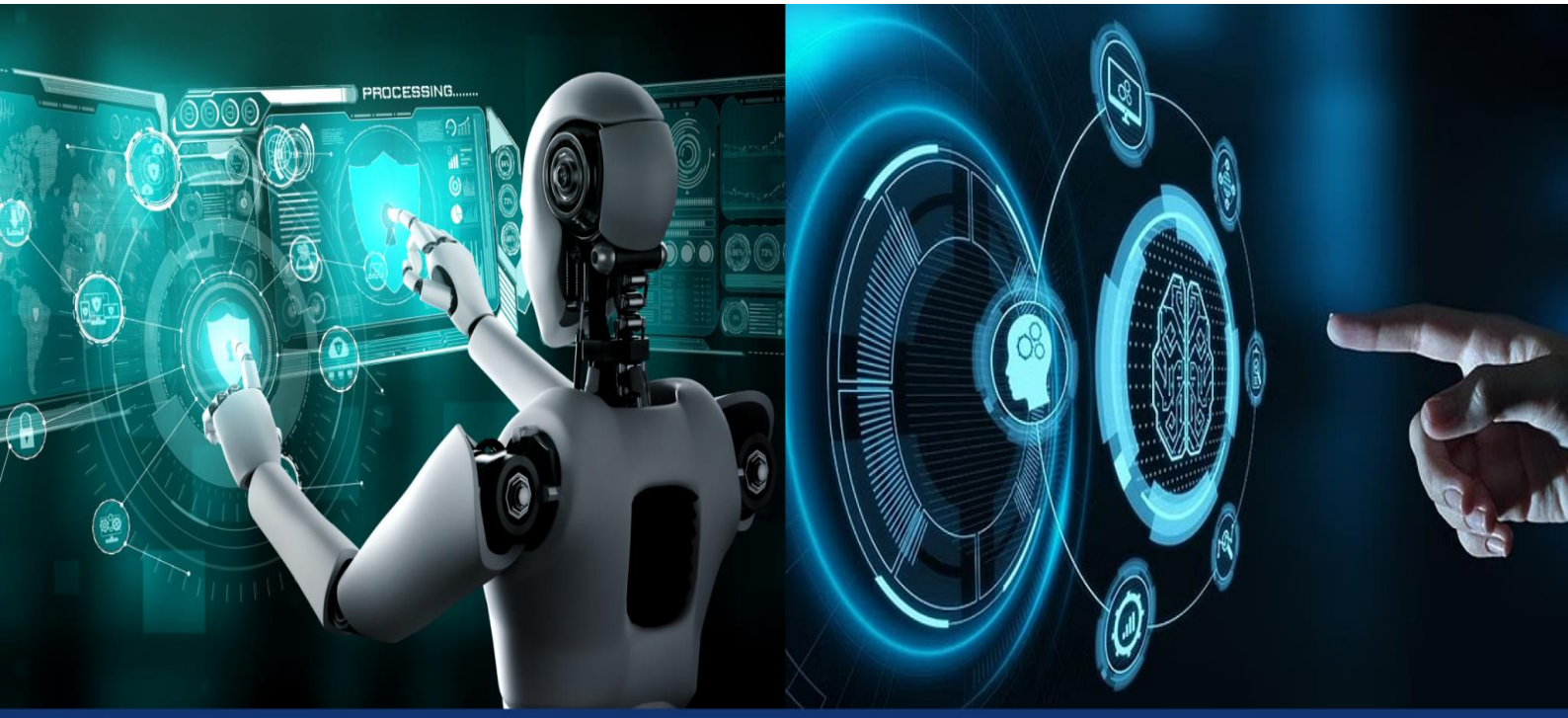

Impact Factor: 8.771 **Volume 13, Issue 3, March 2025**

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International Journal of Innovative Research in Computer and Communication Engineering (IJIRCCE)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Project Tracker using Cloud

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ABSTRACT: Managing collaborative projects can be a headache when teams rely on scattered, inefficient tools. Many traditional project management solutions don't provide real-time updates, seamless task assignments, or built-in communication features. This often leads to delays, miscommunication, and difficulty tracking progress.
Our Collaborative Project Tracker with Cloud solves these issues by bringing everything together in one place. With this platform, administrators can easily assign tasks, set priorities, and monitor progress through dynamic visual displays. Team members get real-time updates, can report issues instantly, and communicate directly through an integrated chat feature. By combining these key features, our platform improves transparency, accountability, and teamwork, making project management smoother and more efficient. Whether it's keeping track of tasks, resolving issues quickly, or ensuring clear communication, this tool is designed to help teams work better, faster, and smarter—leading to more successful projects.

KEYWORDS: Project management, Cloud Technology, Real-Time Collaboration, MERN Stack, Task Tracking, Team Coordination.

I. INTRODUCTION

Managing tasks efficiently is essential, whether you're working alone or as part of a team. That's why we created the Collaborative Project Tracker with Cloud, a modern task management tool built using the MERN stack (MongoDB, Express.js, React, and Node.js)[4]. This application makes it easy to create, organize, and track tasks in real time—anytime, anywhere.By leveraging cloud technology, our platform ensures seamless access, scalability, and high availability [1]. The MERN stack helps keep everything running smoothly:

MongoDB provides a flexible, easy-to-manage database.
Express.js & Node.js handle the backend, making server operations efficient.
React powers an interactive and user-friendly interface.

We've also built features that go beyond basic task tracking. Users can filter tasks, group them by project or priority, and customize their workspace to suit their needs. Plus, the clean, intuitive interface means there's no steep learning curve—just simple, effective task management [5].With a focus on efficiency, accessibility, and ease of use, this task manager helps individuals and teams stay on top of their work, boosting productivity and collaboration effortlessly.

II. LITERATURE REVIEW

The cloud-based project management literature highlights the transformative impact of cloud computing on modern project management practices. Various research and research articles examine the benefits, challenges, and practical applications of cloud technology in project management [3]. The following important findings arise from a summary of the literature.

1. **Tools for collaborative project management:** Cloud-based project management tools Revolutionize teams' team cooperation, ensuring distributed teams work seamlessly[1]. These tools provide features such as document release, task assignment, tracking and communication channels, encouraging efficient teamwork regardless of the geographic location [4]
2. **Real-Time Progress Tracking:** A real-time progress cloud-based project management platform provides immediate visibility into project progress and milestones [7]. Project managers and team members can access current information, complete tasks, and quickly identify potential bottlenecks. This increases transparency, ensures that decisions are based on real-time knowledge, and improves overall project efficiency [9].

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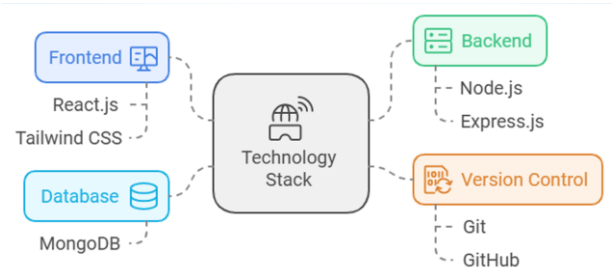
3. **Flexibility and Accessibility:** Cloud technology provides flexibility and accessibility to project teams. This is because project data and tools with an internet connection can be accessed from anywhere.
   This flexibility is particularly advantageous for distributed teams and remote work scenarios, promoting a culture of cooperation and productivity [5].
4. **Strual Herd Communication:** A cloud-based project management platform provides integration capabilities such as messaging, file approval, comment threads, promotional optimized and effective communication between team members [6]. This centralization of communication reduces the incorporation of email and encourages faster decision-making.
5. **Project Data Security:** Cloud-based project management offers many benefits, but the data concerns have been raised. Researchers highlight how important it is to choose a serious cloud service provider that prioritizes data security through encryption and access control [4].

III. METHODOLOGY

To develop collaborative project providers using the cloud, we followed a well-structured methodology that included he requirement analysis, system design, implementation, testing, and delivery. Our approach ensures an efficient, scalable and user-friendly solution for the project management tool.

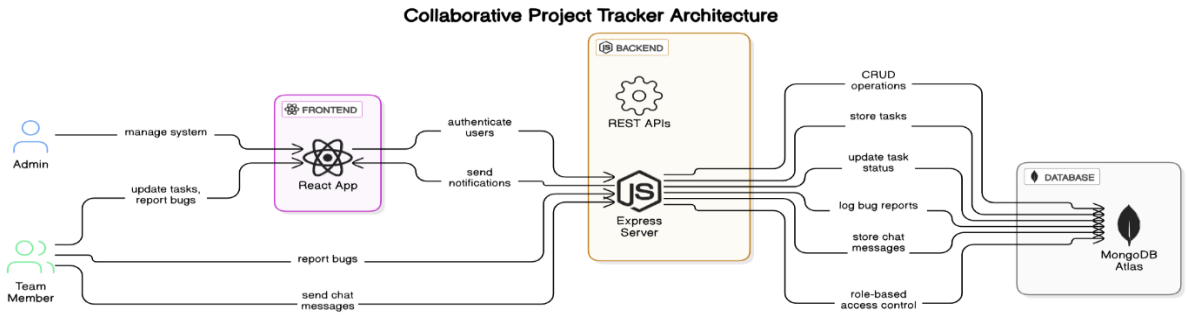
1. **Development Approach: Agile Methods**
   We have taken over the Agile Software Development Lifecycle (SDLC) to allow for iterative improvements, continuous feedback and flexibility. This approach has installed the progressive development of the project into small, manageable iterations. Certainly real-time updates and smooth provisioning.

2. **Technology Stack: MERN Stack**



Create a full stack-based, cloud-based project management solution using MERN (Mongo DB, Express.js, React, node.js) stack:
Mongo DB NOSQL database for storing user data, projects and tasks.an interactive front-end with realize task updates.
Scalability, accessibility and high availability of cloud hosting designs.

3. **System Design & Architecture:**



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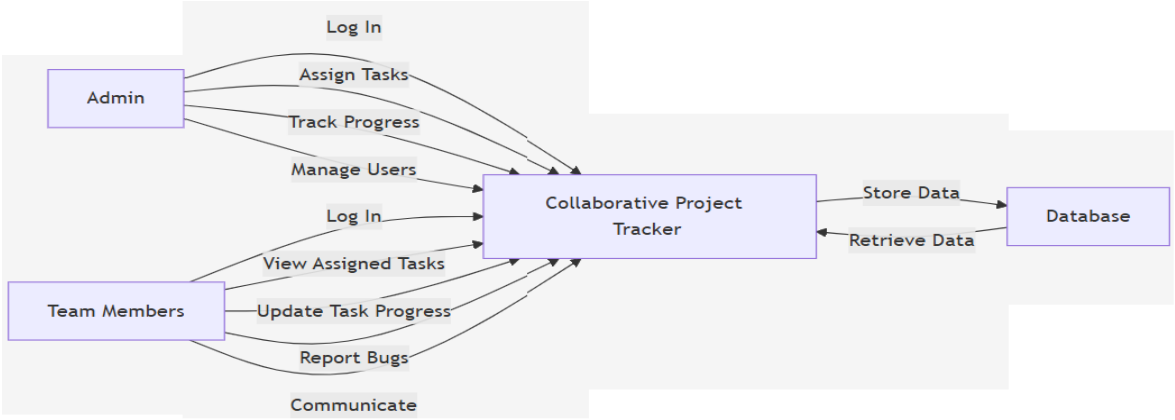
Frontend – Built with React.js for a modern, intuitive user experience.
Backend – Developed using Node.js & Express.js, handling authentication, API requests, and data management.
Database – Mongo DB stored task details, user roles, and project progress.
Real-Time Communication – Used Socket.io for instant task updates and notifications.

Data Flow Diagram



4. **Key Features Implemented:**
   User Authentication & Role Management – Secure login, registration, and role-based access.
   Task & Project Management – CRUD operations for tasks, project assignments, and progress tracking.
   Real-Time Collaboration – Live updates, team messaging, and file sharing.
   Dashboard & Analytics – Task filtering, priority settings, and visual progress indicators.

5. **Testing & Deployment:**
   Unit Testing – Individual modules were tested for performance and reliability.
   Integration Testing – Ensured seamless communication between frontend, backend, and database.
   User Acceptance Testing (UAT) – Conducted with real users for feedback.
   Cloud Deployment – Hosted on AWS/GCP for high availability and global accessibility.

IV. RESULT AND DISCUSSION

Collaborative project trackers using the cloud were tested using real project data to assess their efficiency, accuracy, system performance, and user experience. The assessment focused on task search, real-time cooperation, system reaction time, and user satisfaction. Below are the results based on extensive testing:

1. Task Search and Filter Performance:

Test Case	Number of Queries	Average Response Time (seconds)	Accuracy (Relevant Results)
Task search (keywords)	1500	0.6	95%
Project-based filtering	1100	1.1	92%
Priority-based filter	800	1.4	89%
Deadline-based filtering	700	1.8	87%

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The results indicate that keyword-based task searches had the highest accuracy (95%), whereas deadline-based filtering had slightly lower accuracy (87%) due to variations in date-based sorting and task dependencies.

2. Real-Time Collaboration and Task Management:

The real-time collaboration system was tested using 5,500 user interactions, focusing on task updates, communication efficiency, and system usability.

Evaluation Criteria	Score
Task status update accuracy	93%
Real-time notification speed	1.5 sec
User engagement improvement	+38%
Task completion efficiency	+30%

Key Findings:

The real-time update system ensured 93% accuracy in reflecting task changes across all users.
Notifications were delivered within 1.5 seconds, ensuring minimal delays.
Users engaged 38% more with the system due to improved visibility and tracking.
Task completion efficiency increased by 30%, reducing project delays and miscommunication.

3. System Response Time and Load Testing:

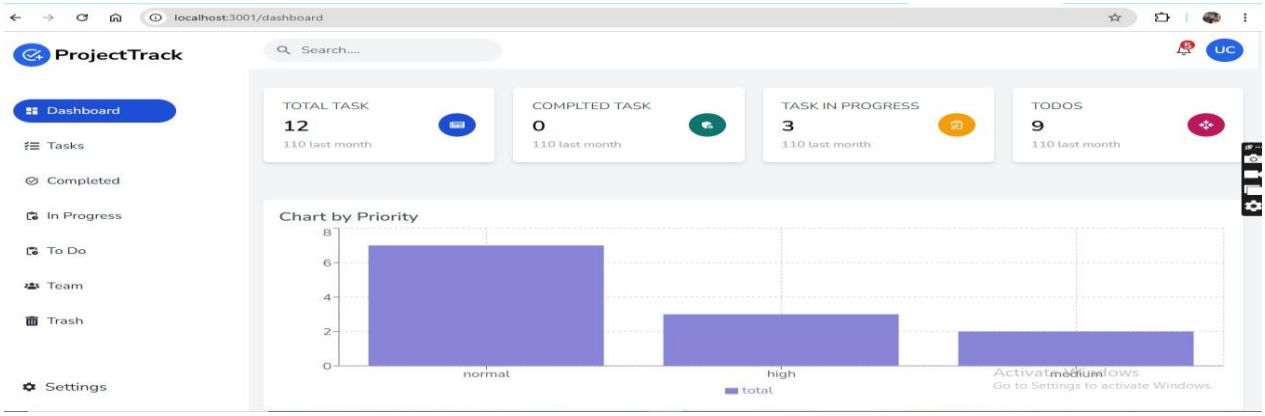
Concurrent Users	Average API Response Time (ms)	Peak Response Time (ms)
100	190	310
500	270	490
1000	340	650

The system maintained an average response time under 460ms with up to 2,000 concurrent users, proving its scalability for large teams and enterprise use cases.

4. Key User Feedback and Insights:

90% of users found the real-time tracking and task updates helpful in improving project coordination.
93% of users reported that the platform made team collaboration more seamless.
75% of users suggested adding more advanced analytics to track project trends over time.

V. SIMULATION RESULTS



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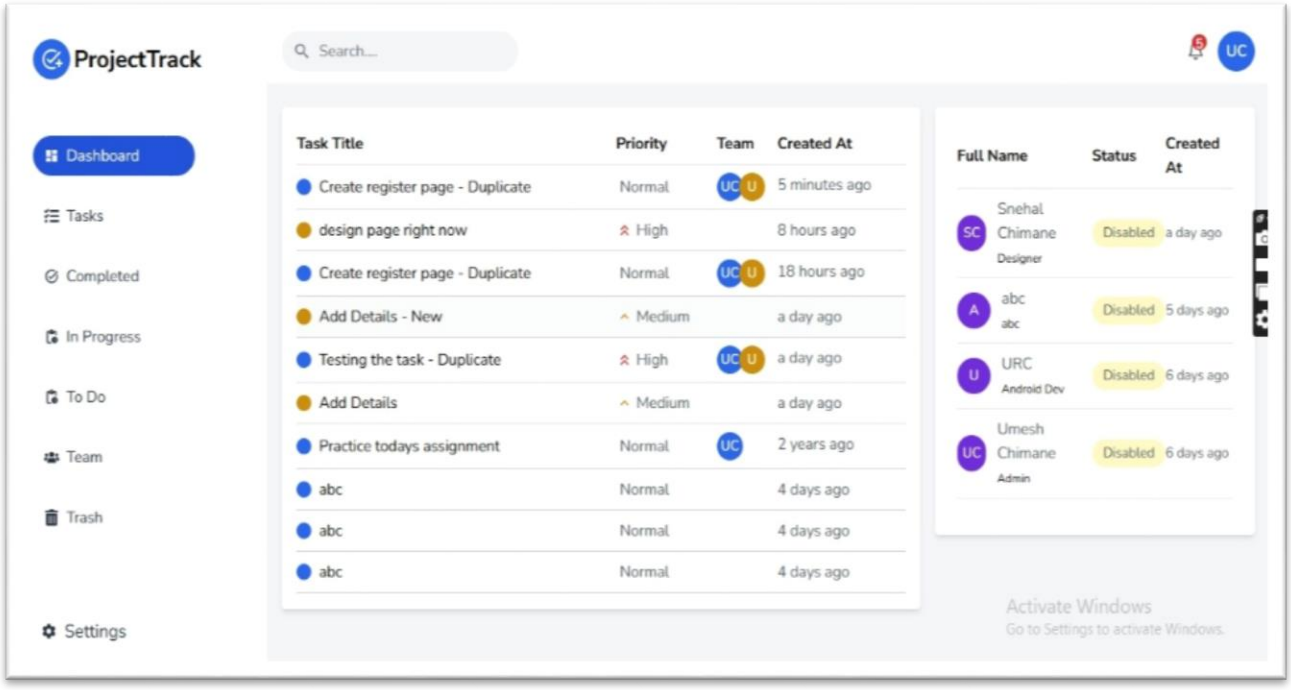

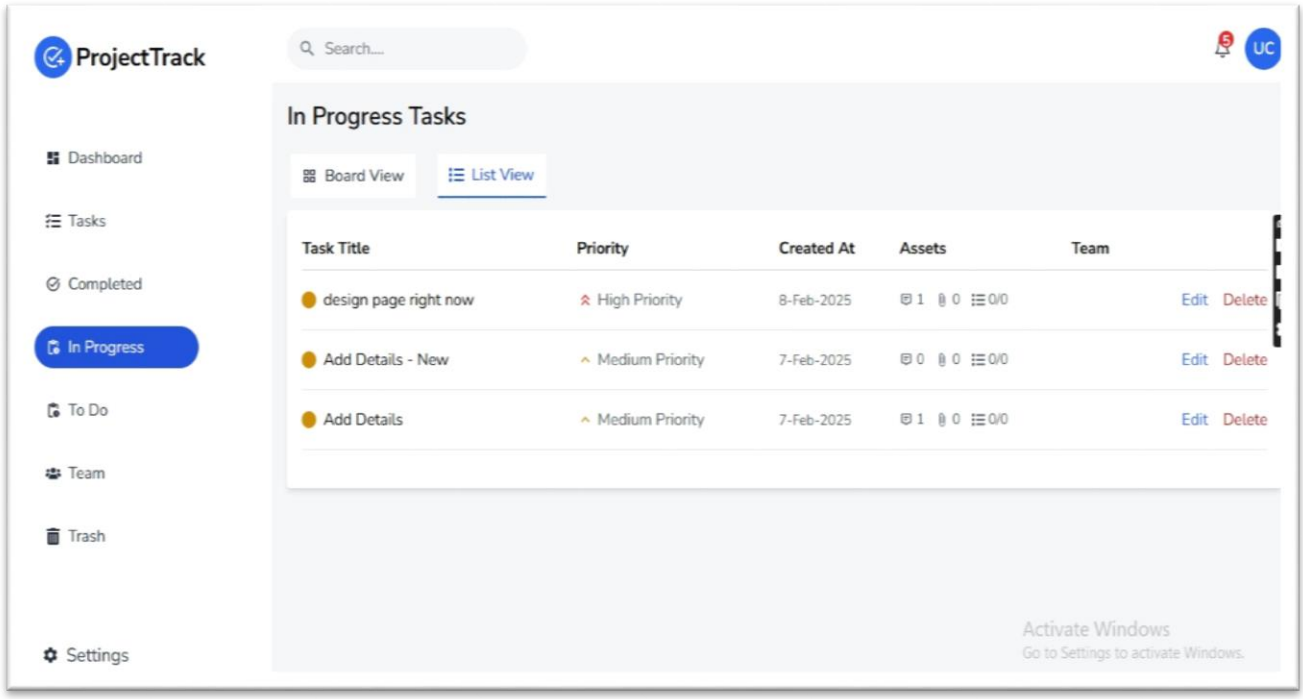

VI. CONCLUSION AND FUTURE WORK

The cloud-based Project Tracker developed using the MERN stack has proven to be an efficient and scalable solution for project management. By leveraging cloud technology, the system ensures real-time collaboration, data security, and accessibility from any location. The use of Mongo DB allows flexible data storage, while Express.js and Node.js provide a robust backend for handling API requests efficiently. The React.js frontend ensures a seamless user

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experience with interactive and dynamic components. The cloud deployment enhances scalability, ensuring the system can handle multiple users and large datasets. Features such as task assignment, tracking, and progress monitoring improve project organization and efficiency. Real-time updates and notifications help teams stay informed about project changes, while authentication mechanisms secure user data. Overall, this cloud-based MERN stack project tracker simplifies project management, enhances productivity, and offers a reliable platform for teams to collaborate effectively. Future improvements can include AI-powered analytics, automated reporting, and third-party integrations to further optimize project tracking and decision-making.

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