



Summer Training Report

Prepared by

Deivyansh Singh

Under Supervision of

Information System (IS), Mathura Refinery,

Indian Oil Corporation Limited

Duration of Internship: 1st June, 2024 to 31st July, 2024 (8 weeks)

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Acknowledgment

I would like to express my sincere gratitude to Indian Oil Corporation Limited, Mathura Refinery, for providing me with an invaluable opportunity to undertake an internship in the Information Systems Department. The experience gained during this period has been immensely enriching and has contributed significantly to my academic and professional growth.

I am deeply indebted to Mr. SK Pandey, DGM (IS), for his unwavering support, guidance, and encouragement throughout the internship. His expertise and valuable insights have been instrumental in shaping my understanding of the industry and the project.

I would also like to extend my sincere thanks to Mr. Shailesh Sharma, Senior Manager (IS), for his constant support and mentorship. His guidance and constructive feedback have been invaluable in the successful completion of this project.

I am grateful to all the employees of the Information Systems Department for their cooperation and assistance. Their support has created a conducive environment for learning and growth.

Finally, I would like to thank my family and friends for their constant encouragement and belief in me. Their support has been a source of strength throughout this journey.

Deivyansh Singh
Summer Trainee,
Information Systems (IS) Department,
Mathura Refinery

1. Introduction

Indian Oil Corporation Limited (IOCL):

Indian Oil Corporation Limited (IOCL) is a leading national oil refining and marketing company in India, established in 1959. It plays a vital role in the Indian energy sector, with a strong presence across the entire hydrocarbon value chain.

- Industry: Oil and Gas
- Mission: To be a leader in the downstream sector of the Indian oil industry, ensuring secure, uninterrupted supplies of petroleum products to meet growing energy demands of the nation.

Information Systems Department, Mathura Refinery:

The Information Systems Department at Mathura Refinery is responsible for managing and maintaining the refinery's IT infrastructure, applications, and data. The department plays a crucial role in ensuring efficient operations and information flow within the refinery.

Purpose and Objectives of the Internship:

This summer internship at the Information Systems Department of Mathura Refinery aimed to address the need for a more streamlined and efficient system for managing intern tasks. The primary objectives of the internship were:

- To understand the existing workflows and challenges related to intern task management within the department.
- To design and develop an "Intern Task Management System" (ITMS) to improve task assignment, tracking, communication, and reporting.
- To gain hands-on experience with full-stack development using the MERN Stack (MongoDB, Express.js, ReactJS, and Node.js) along with Postman for API testing.
- To contribute meaningfully to the department's operations by providing a user-friendly and efficient tool for managing interns.

2. Internship Experience

My internship at the Information Systems Department of Indian Oil Corporation Limited, Mathura Refinery, was a comprehensive learning experience. The core focus of my role was the development of an Intern Task Management System (ITMS).

My responsibilities included:

- Requirement Gathering: Understanding the existing manual processes for task allocation and tracking, identifying pain points, and translating them into system requirements.
- System Design: Designing the architecture of the ITMS, including database schema, API endpoints, and user interface flow.
- Development: Implementing the front-end using ReactJS, building the backend with Node.js and Express.js, and integrating the two using APIs.
- Testing: Conducting thorough unit and integration testing to ensure system reliability and performance.
- Deployment: Deploying the application on Netlify for accessibility to all stakeholders.
- Documentation: Creating comprehensive documentation for the system, including user manuals and technical specifications.

I primarily worked within the Information Systems Department. My interactions were predominantly with the software development team, where I collaborated with senior developers on the ITMS project. I also had opportunities to interact with other departments to understand the working of refinery and got an idea of the processes that take place in refining crude oil into different products.

Challenges Faced

Developing a full-stack application from scratch was a significant challenge. I overcame this by breaking down the project into smaller, manageable tasks, and leveraging online resources and tutorials. Time management was another challenge due to the concurrent demands of the internship and academic commitments. I prioritized tasks effectively and sought guidance from mentors to ensure timely completion of deliverables.

Other challenges included:

- Encountered issues during development and deployment, which were resolved through troubleshooting and seeking help from colleagues.
- Adapting to the corporate environment and understanding the specific requirements of the oil and gas industry took time. I addressed this by actively observing and learning from colleagues.

Overall, the internship provided a valuable opportunity to apply theoretical knowledge to practical projects, develop technical skills, and gain insights into the operations of a large organization.

3. Skills Developed

The internship at the Information Systems Department of Mathura Refinery provided a platform to acquire and enhance various technical and professional skills. Here's a breakdown of the key skills developed:

- Learned to build full stack web applications from front-end to back-end using MERN Stack.
- Created APIs for data exchange between different parts of the application.
- Managed tasks, deadlines, and teamwork effectively.
- Developed problem solving skills while overcoming challenges and finding solutions.
- Learned to adapt and adjust to new situations and work environments.
- Improved ability to convey ideas and collaborate with others.
- Gained proficiency in building user interfaces.
- Learned to create server-side logic and APIs using Node.js.
- Managed and queried databases for storing application data using MongoDB.
- Utilized for API testing and debugging using Postman.

4. Project Overview

The Intern Task Management System (ITMS) is a web-based application designed to streamline the task allocation, tracking, and management process for interns within the Information Systems Department at Mathura Refinery. The system aims to improve overall efficiency, communication, and accountability by providing a centralized platform for task assignment, progress monitoring, and performance evaluation.

Key Features of the project are:-

- User Management: Enables the creation and management of intern and supervisor accounts, with role-based access controls.
- Task Creation and Assignment: Allows supervisors to create tasks, set deadlines, and assign them to interns.
- Task Tracking: Provides a dashboard for interns to view assigned tasks, track progress, and submit completed tasks.
- Reporting: Generates dashboards to check intern's performance, and overall project progress.

Project Goals:

- Improve task management efficiency within the department.
- Enhance communication and collaboration between interns and supervisors.

- Increase visibility into intern workload and performance.
- Provide a data-driven approach to evaluating intern contributions.

Target Users:

- Interns
- Supervisors
- Department Management

5. Project Methodology

Project Scope:

The ITMS focused on core functionalities like:

- User management: Registration and login for interns and supervisors.
- Task management: Assigning tasks, setting deadlines, and tracking progress.
- Communication: Messaging between interns and supervisors for clarification or updates.
- Reporting: Generating reports on task completion and intern performance.

Tools and Technologies:

- Frontend: ReactJS (part of MERN Stack)
- Backend: NodeJS with Express (part of MERN Stack)
- Database: MongoDB (part of MERN Stack)
- API Testing: Postman
- Deployment Platform: Netlify
- Development Tool: Vite.js

6. Project Execution

Development Phase

- Frontend Development:
 - Designed and implemented the user interface using ReactJS components, following a component-based architecture.
 - Developed reusable UI components for task cards, task forms, user profiles, and navigation menus.
 - Utilized React Router for navigation between different sections of the application.

- Implemented state management using React Context or Redux (if used) to manage user data, task lists, and application state.
- Backend Development:
 - Set up the Node.js and Express.js server environment.
 - Defined API endpoints for user authentication, task creation, retrieval, updates, and deletion.
 - Implemented user authentication and authorization using appropriate strategies (e.g., JWT, session-based).
 - Developed database models and schemas using Mongoose for user and task data storage.
 - Implemented CRUD operations for user and task data.
- API Integration:
 - Established communication between the frontend and backend using RESTful APIs.
 - Implemented API calls for fetching and updating data.
 - Handled error handling and data validation.
- Testing:
 - Wrote unit tests for frontend and backend components using Jest or similar testing frameworks.
 - Conducted integration testing to ensure seamless communication between frontend and backend.

Project Management and Collaboration

- Utilized version control (Git) to manage code changes and collaborate with team members.
- Held regular team meetings to discuss progress, challenges, and solutions.
- Used project management tools (e.g., Trello, Asana) to track tasks and deadlines.
- Documented the development process, including code comments and design decisions.

Tasks and Responsibilities:

- Designed and developed the user interface (UI) for the ITMS using ReactJS.
- Implemented backend functionalities for user management, task management, and communication using NodeJS and Express.
- Integrated the frontend and backend using APIs.
- Performed unit and integration testing to ensure system functionality.
- Deployed the application on Netlify for accessibility.
- Documented the system architecture and user guide.

Challenges Faced:

- Learning the MERN Stack and building a full-stack application for the first time.
- Balancing development tasks with training sessions.
- Adapting to the professional work environment.

Problem-Solving:

- Actively sought guidance from senior developers and fellow interns to learn the MERN Stack effectively.
- Prioritized tasks and managed time efficiently to meet project deadlines.
- Proactively observed and learned from departmental operations.

Results and Outcomes:

- A fully functional ITMS was developed and deployed, enabling efficient task management for interns.
- Improved communication and collaboration between fellow interns and supervisors.
- Increased transparency and accountability in intern workflows.

Some of the references of the project are as follows:

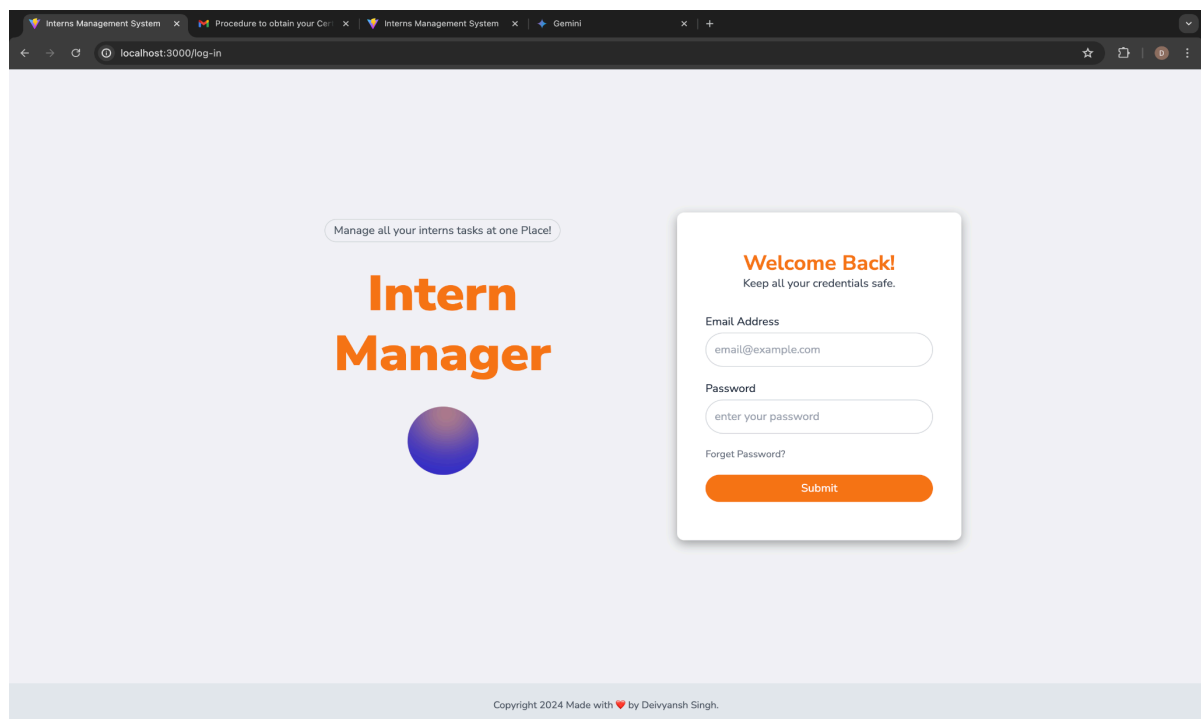


Fig 1: Log-in page

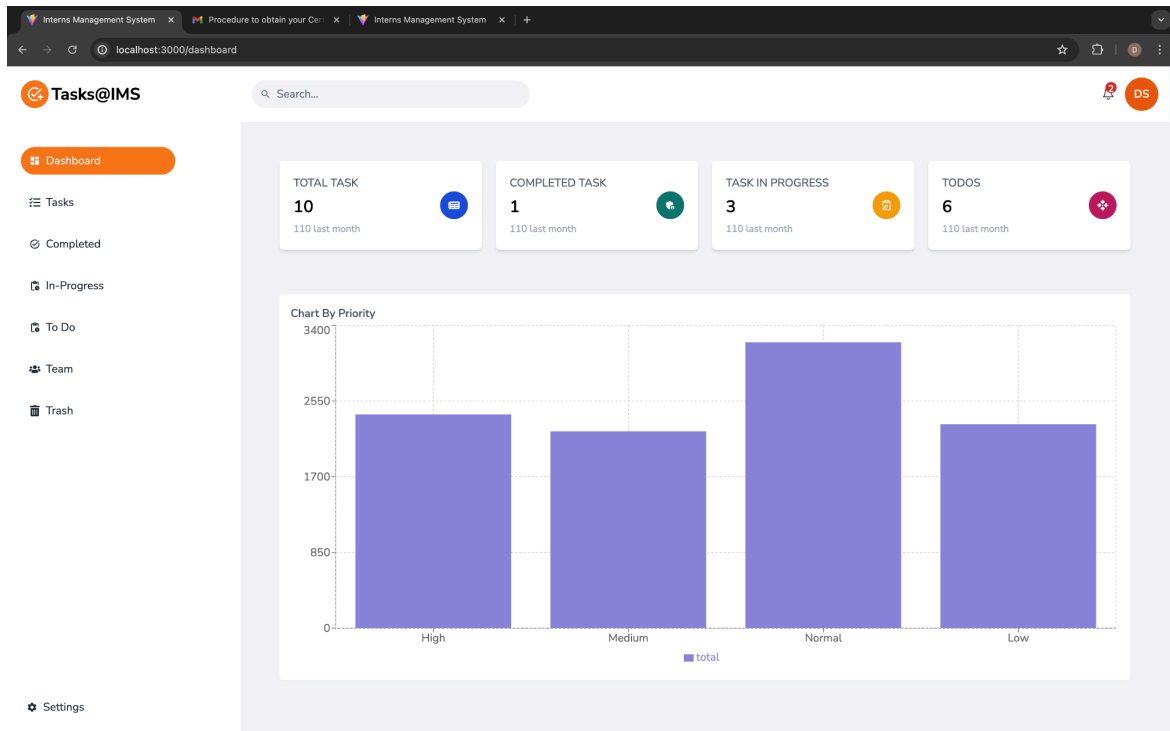


Fig 2: Dashboard page

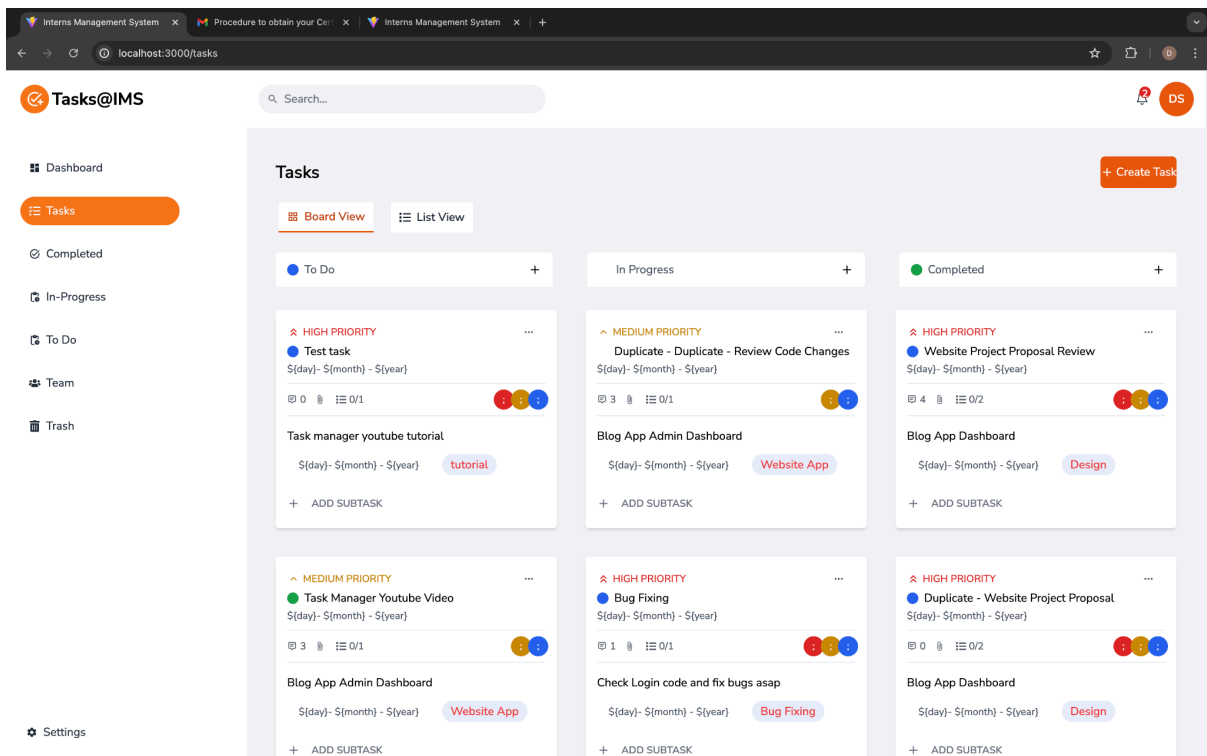


Fig 3: Tasks page (Board View)

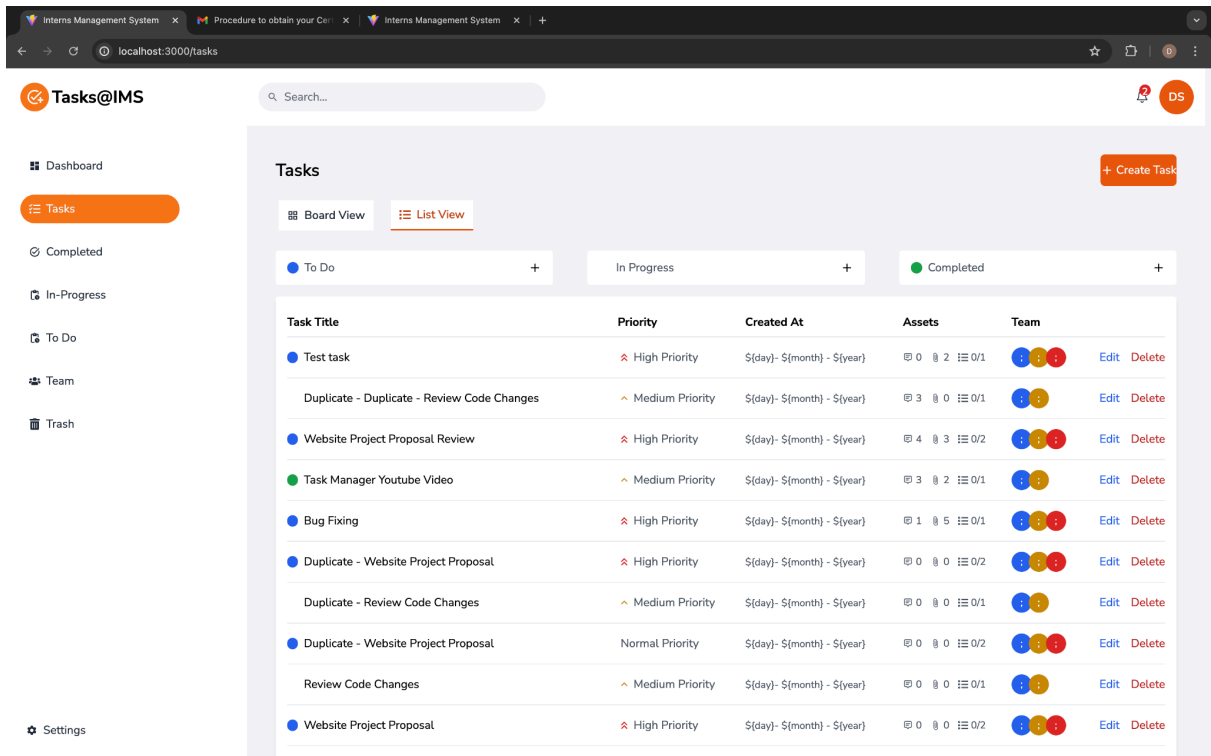


Fig 4: Tasks page (List View)

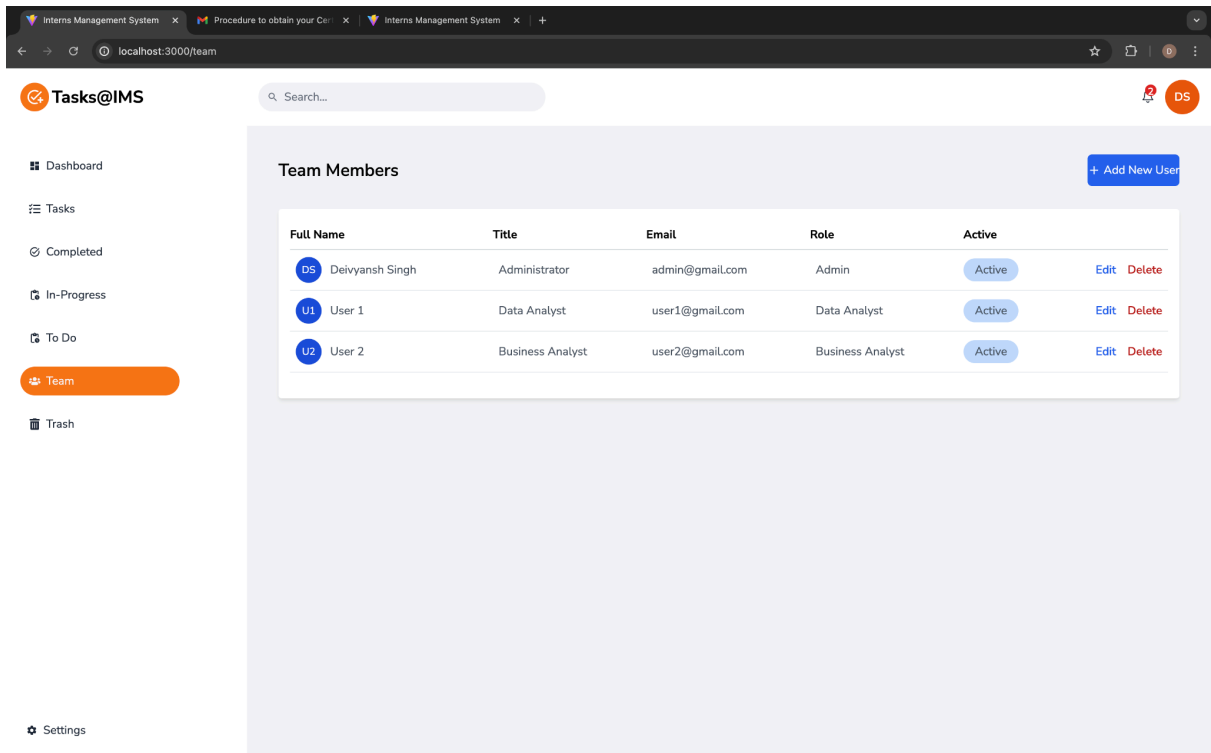


Fig 5: Users page

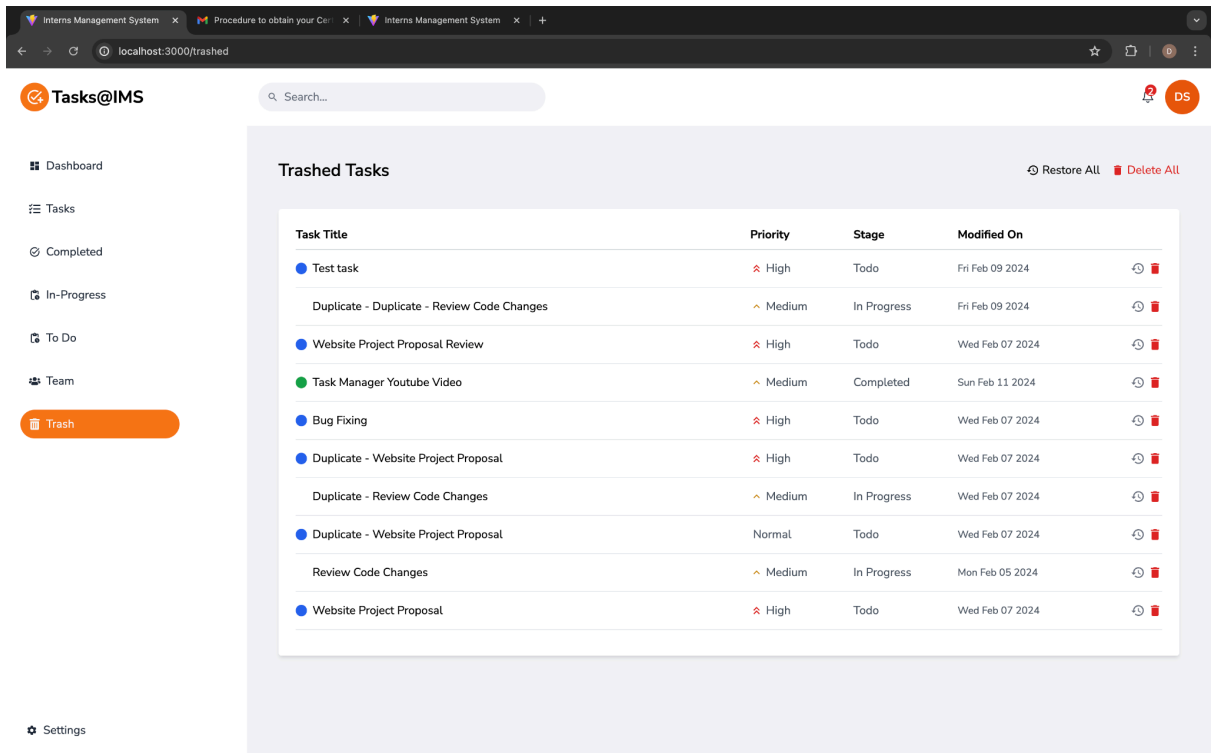


Fig 6: Trash page

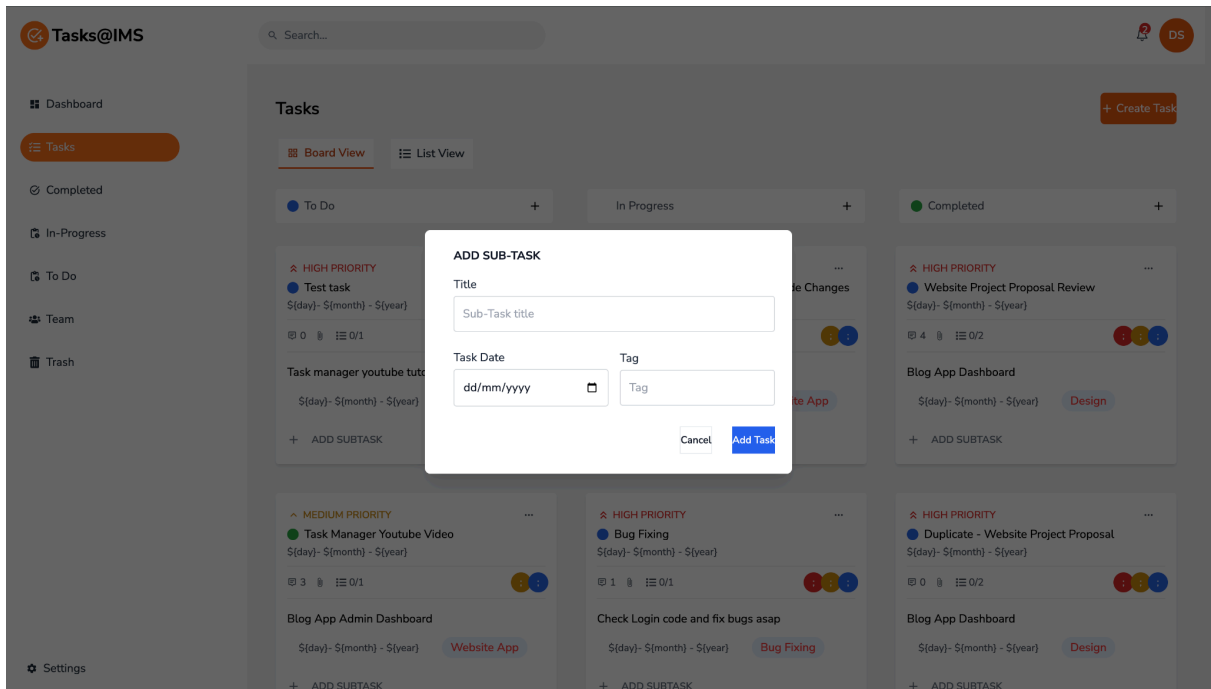


Fig 7: Adding Tasks

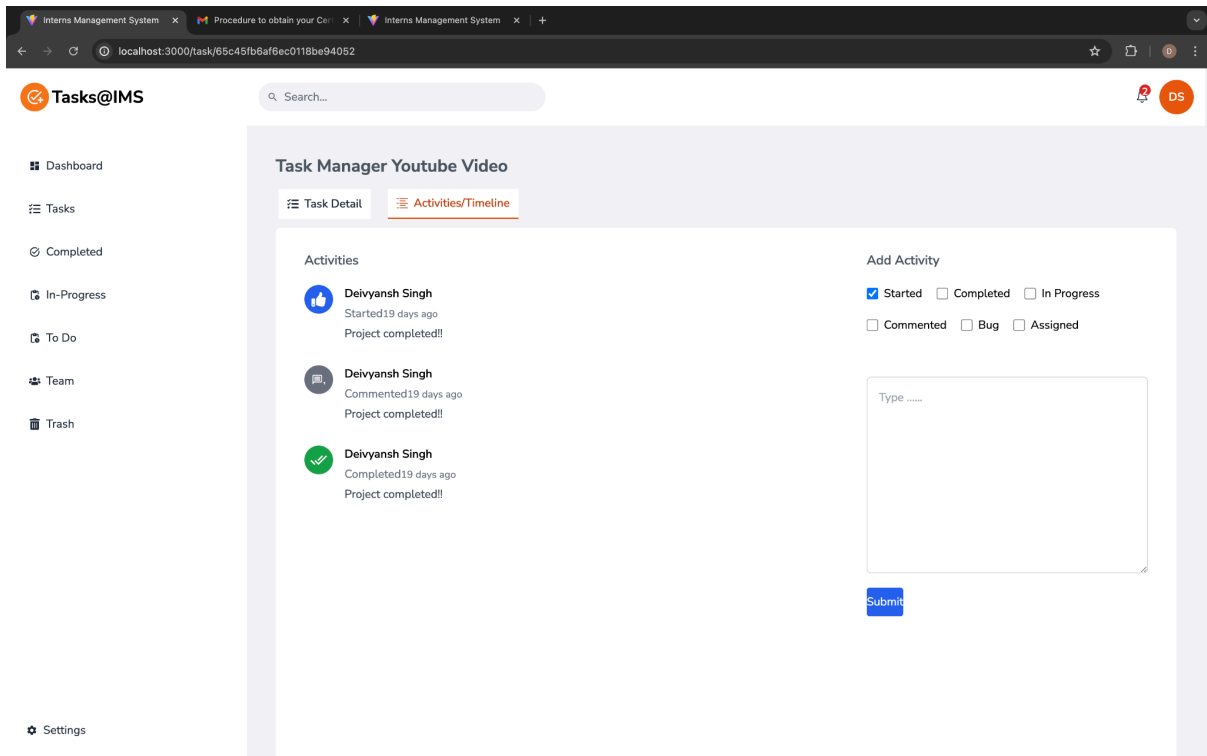


Fig 8: Activities/Timeline page

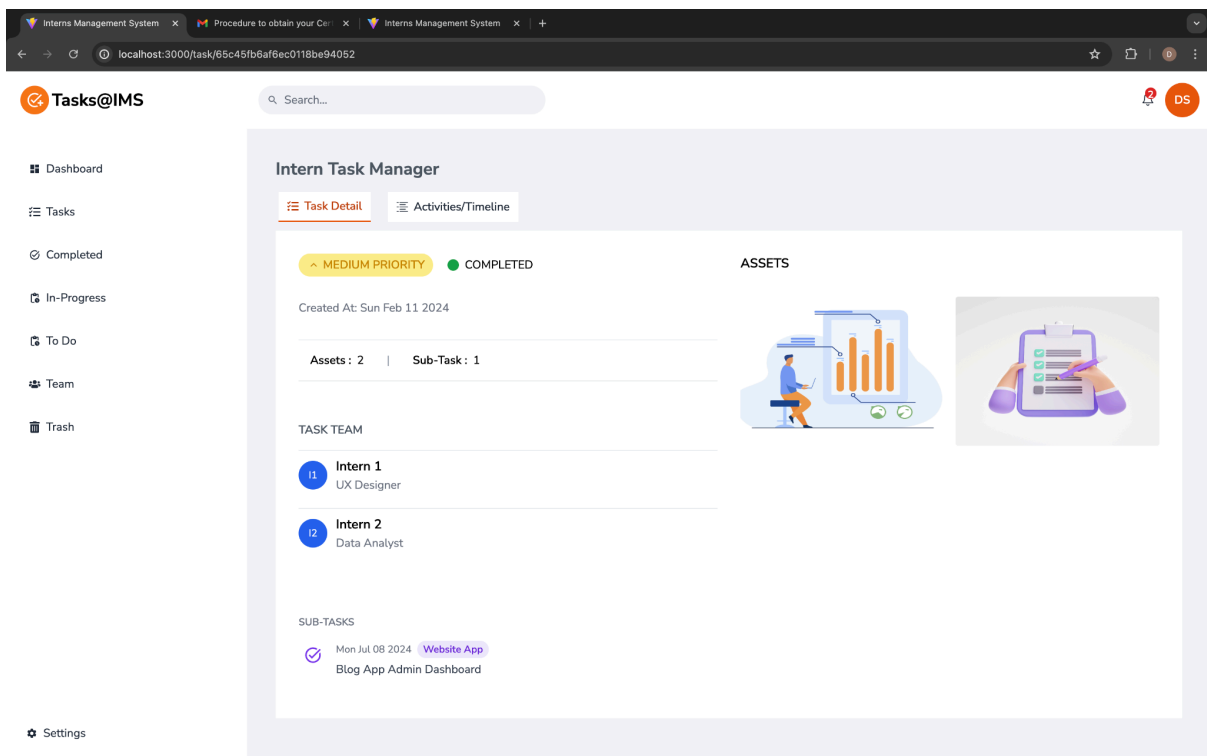


Fig 9: Task/Team Details page

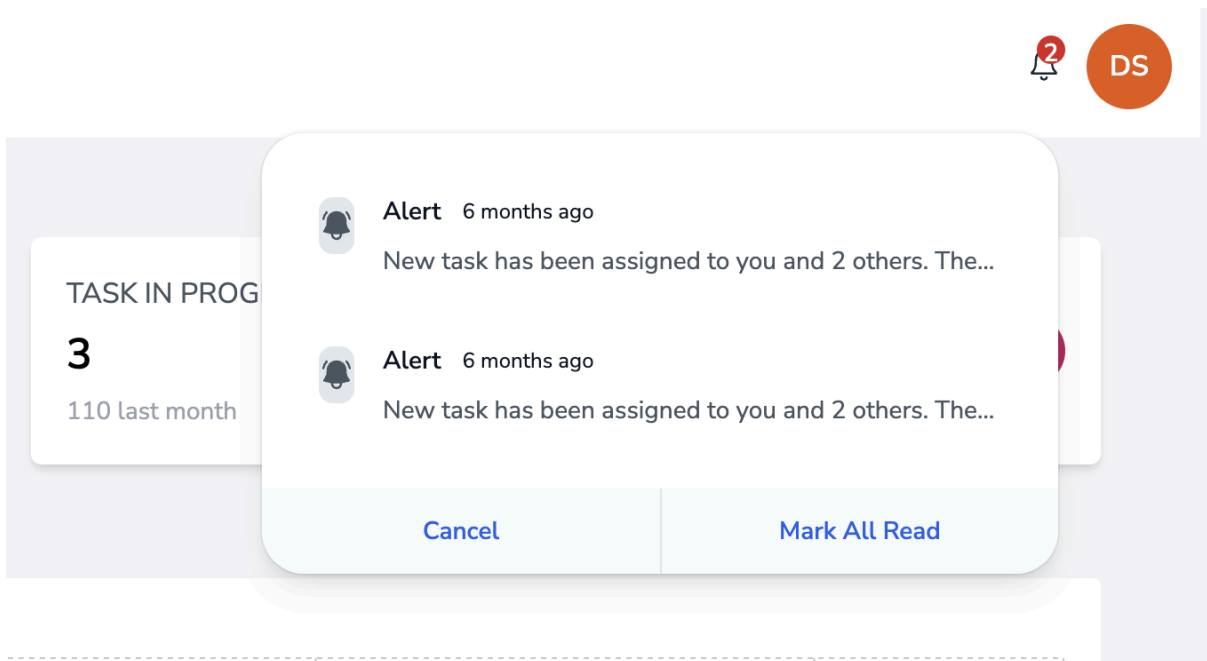


Fig 10: Notification Center

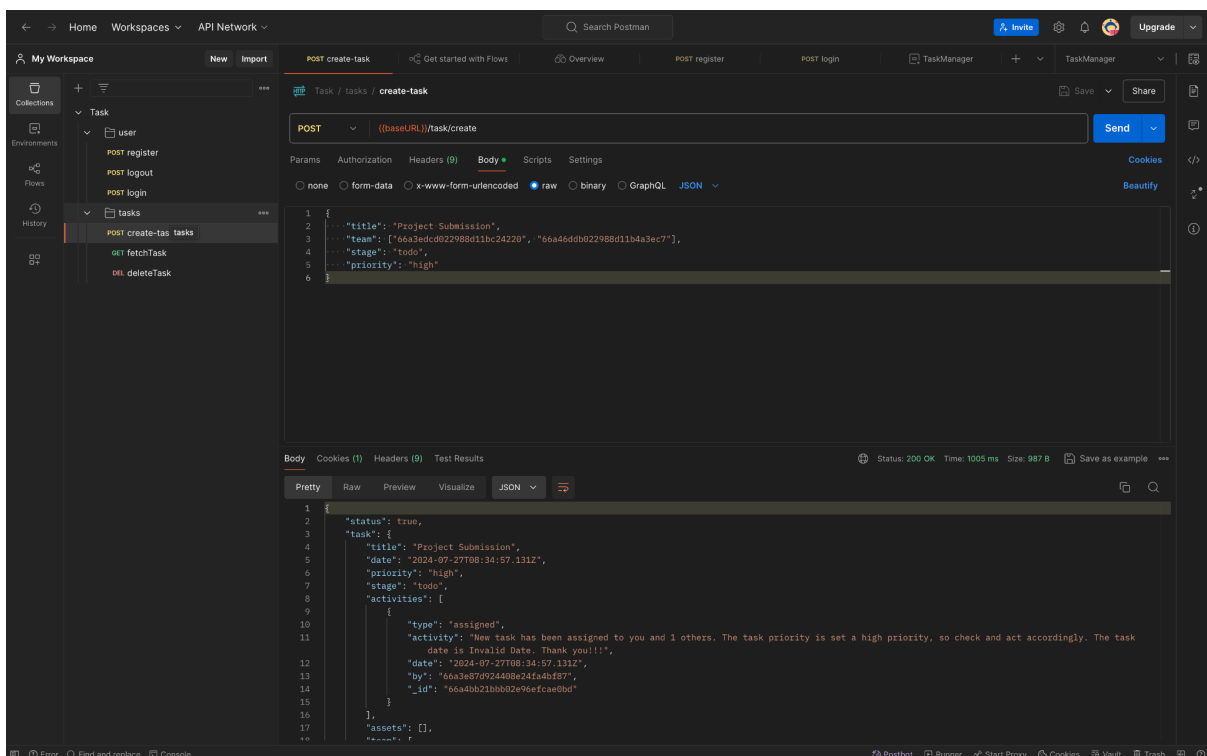


Fig 11: API Testing through Postman (when task is added)

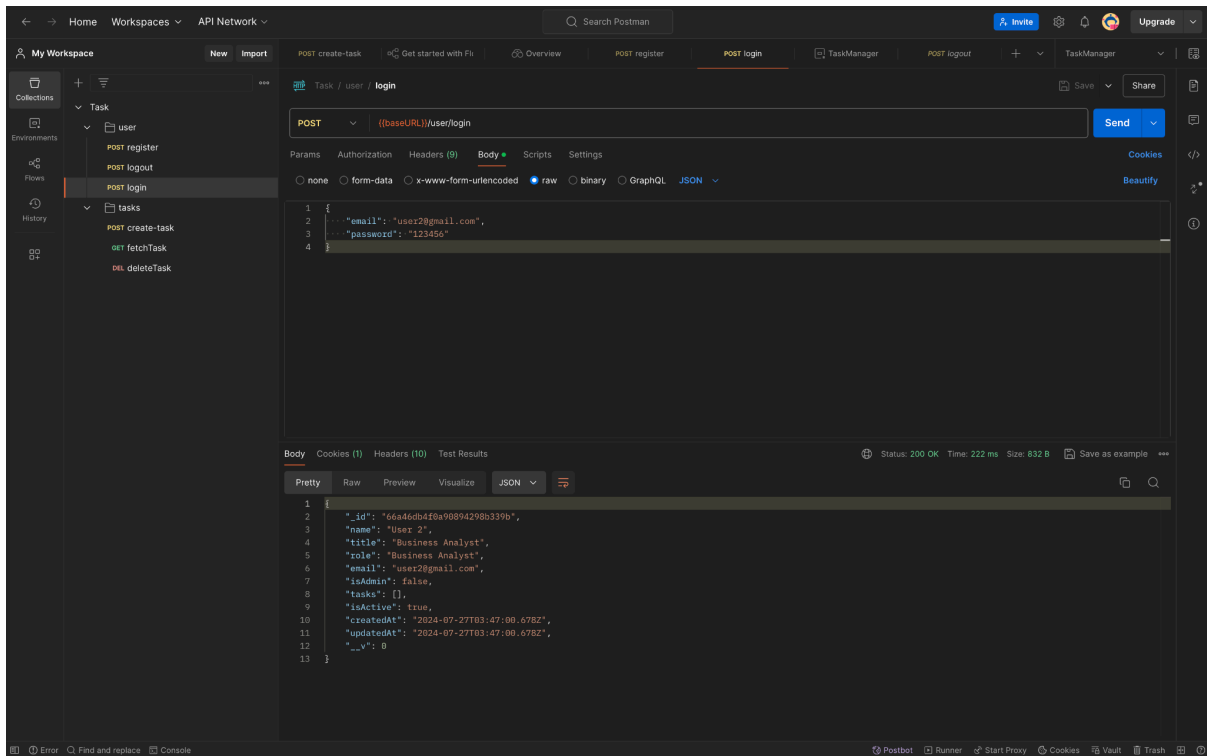


Fig 12: API Testing through Postman (when user logs)

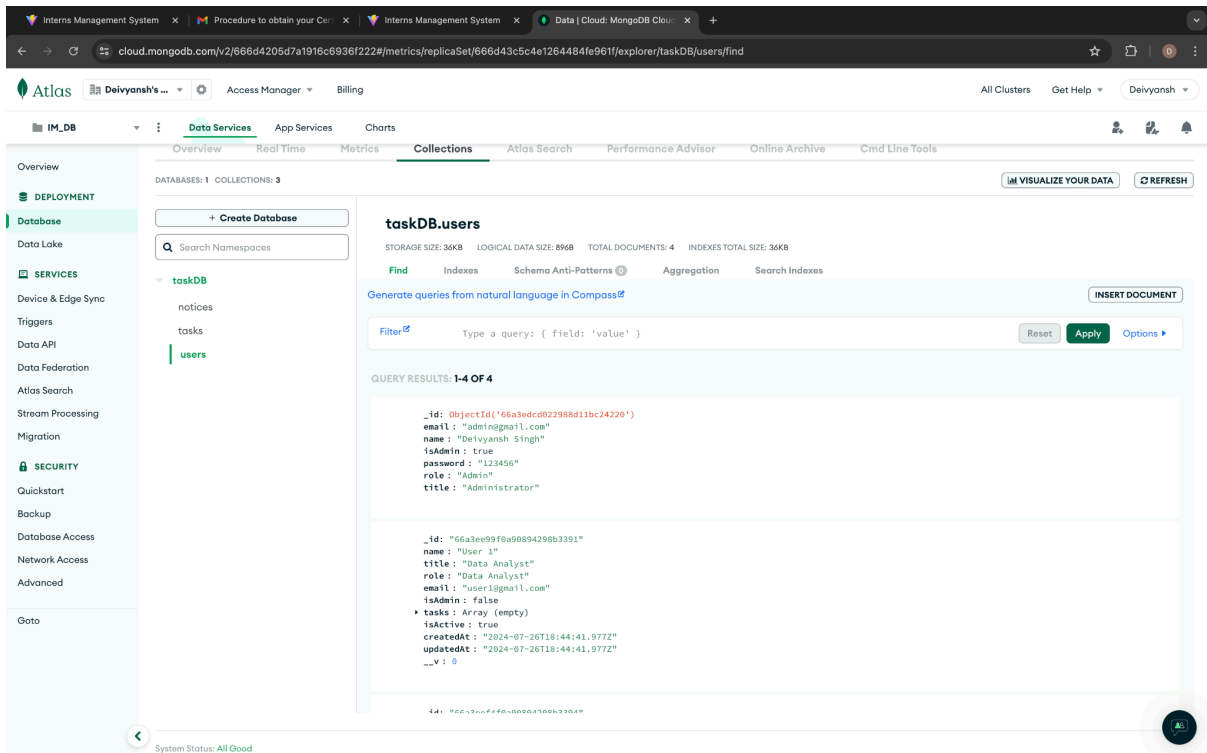


Fig 13: Database Management through MongoDB

7. Conclusion

The development and implementation of the Intern Task Management System (ITMS) has successfully addressed the need for a streamlined and efficient task management process within the Information Systems Department at Mathura Refinery. By leveraging the MERN stack and following agile development methodologies, the ITMS has been designed to improve communication, accountability, and overall productivity among interns and supervisors.

The project has not only fulfilled its primary objectives but has also provided valuable insights into the challenges and opportunities within the department's IT infrastructure. The ITMS serves as a foundation for future enhancements and integrations, such as performance evaluation modules, automated reporting, and integration with other departmental systems.

The internship experience has been instrumental in developing a comprehensive understanding of full-stack development, project management, and problem-solving skills. The opportunity to contribute to a real-world project at IOCL has been invaluable in preparing for a career in the IT industry.

I am grateful for the support and guidance provided by the Information Systems Department throughout the internship. The knowledge and experience gained will undoubtedly contribute to my future endeavors.

8. References

Github code for the project

[1] Project Code (<https://github.com/striver-24/Intern-Management-System>)

MERN Stack

[1] MongoDB (<https://youtu.be/c2M-rlkkT5o?si=NkZEVtsAhDPQcAoi>)

[2] Express & Node.js (https://youtu.be/Oe421EPjeBE?si=jlCXX8oI_Z3dP4t5)

[3] React.js (<https://youtu.be/bMknfKXIFA8?si=oqTTDLAAOvN0-jt3>)

Postman

[1] Postman (<https://youtu.be/VywxIQ2ZXw4?si=LKFdmhYRgcqAHSON>)