Task Management System based on MERN Technology

Prof. BHARAT DHAK[1], Ms. ASHWINI CHOPADE[2], Ms. RAINALI RAMTEKE[3], Mr. ANIKET PATIL[4], Mr. AYUSH KUTTARMARE[5]

[1,2,3,4,5]Department of Computer Science and Engineering, P.J.L.C.E Nagpur, India

Abstract -- The necessity of effective communication and task coordination among scattered teams has been brought to light by the growing popularity of remote work. In order to address these issues, a web application called Cloud-Based Task Manager was designed and developed, as presented in this paper. The solution integrates cutting-edge frameworks like Redux Toolkit, Headless UI, and Tailwind CSS to maximize user experience and performance while guaranteeing scalability through the use of the MERN stack (MongoDB, Express.js, React, and Node.js). The Task Manager makes it easy to assign tasks, monitor progress, and work as a team. It has two main user roles: administrators and ordinary users. It has a number of features that improve teamwork, productivity, and organization. This study shows the platform's potential as a successful remote team work management solution by outlining its technological design, salient features, and performance advantages.

Keywords: MERN,

I. INTRODUCTION

The growth of distributed teams and remote work in recent years has brought attention to the necessity of effective technologies that simplify task coordination and promote communication. Spreadsheets and manual tracking systems are examples of traditional task management techniques that are becoming less and less capable of meeting the intricate and rapid needs of contemporary workflows. These antiquated techniques frequently take a long time, are prone to mistakes, and don't offer the flexibility needed for productive teamwork. The job Manager program provides a solution to these problems by centralizing job management, facilitating easy teamwork and increasing efficiency. Whether for administrators who manage team workflows or regular users tasked with carrying out assignments, the Task Manager offers crucial features for effective task assignment, tracking, and collaboration. Developed with the MERN stack—which consists of MongoDB, Express.js, React, and Node.js—this application offers a scalable, robust, and responsive solution appropriate for teams of any size. By integrating contemporary technologies like

Redux Toolkit, Headless UI, and Tailwind CSS, the platform not only ensures seamless user interaction but also improves a user-friendly interface.

The creation, use, and effects of the Task Manager application in supporting efficient team management are examined in this research study. It seeks to show how modern web technologies can be combined to improve task management and create a more structured and effective remote work environment. The Task Manager provides a complete answer to contemporary task management requirements by emphasizing usability, scalability, and real-time collaboration.

II. LITERATURE SURVEY

[1] Sumangala A. Bafna, Pratiksha D. Dutonde, Shivani S. Mamiwar, Monali S. Korvate, Prof. Dhiraj Shirbhare, "Review on Study and Usage of MERN Stack for Web Development" International Journal for Research in Applied Science & Engineering Technology (IJRASET) ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538 Volume 10 Issue II Feb 2022.

This paper [1] explores the MERN stack, which includes MongoDB, Express.js, React.js, and Node.js, offering a unified JavaScript framework for efficient web development. By replacing traditional methods, the stack enables faster deployment and seamless development across both frontend and backend. Each component contributes to scalability, flexibility, and high performance, making MERN a popular choice for modern web applications.

[2] Suyash Kejriwal, Vaibhav Vishal, Aastha Gulati, Gaurav Gambhir A Review of Daily Productivity Growth Using Todo Manager Volume:02/Issue:12/December -2020.

The app [2] aims to analyse daily task efficiency and progress, helping users track their achievements and maintain a consistent streak of completed tasks. It encourages users to stay focused and avoid distractions, like social media, by reallocating time to task completion. This boosts overall productivity and helps users achieve long-term goals more effectively.

[3]J. C. Silva and L. M. Araujo, "Android App Development Applied to Remote Tasks Simplification", *2020 20th International Conference on Computational Science and Its Applications (ICCSA)*, pp. 33-39, 2020.

This study [3] presents a methodology for executing desktop tasks via mobile applications, leveraging Realtime databases, task automation, and mobile interactivity. By combining PyAutoGUI and Firebase, the approach enhances task performance and user experience. The research is demonstrated through a daily task application, showcasing the efficiency of using mobile devices to manage desktop tasks.

[4] Tien Pham, "Building an online shop application with MERN stack", Bachelor's Thesis, November 2020.

This paper analyses [4] the functionalities and core characteristics of the MERN stack, focusing on its application in developing an online shop. It examines each technology—MongoDB, Express.js, React.js, and Node.js—highlighting their individual

roles and relevance within the stack. The thesis also explores modern practices, core concepts, and complementary libraries that enhance the MERN stack, providing a comprehensive understanding of its capabilities and how these technologies work together to build scalable, efficient web applications.

III. PROPOSED SYSTEM

There will be multiple modules in proposed system. Each have unique functionality. Following section illustrate the details of each module.

1. User Registration

A new user starts by navigating to the registration page where they fill in basic details, including their name, email, and password. The registration form validates the inputs to ensure correct data entry.

2. User Login

The registered user accesses the login page, enters their email and password, and submits the form. The server validates the credentials by comparing the hashed password with the stored data in MongoDB. The user is then redirected to the dashboard.

3. Authentication and Authorization

Every subsequent request made by the user includes the JWT token in the request headers to authenticate and authorize actions such as viewing tasks or updating profiles.

4. Admin Features

User Management (Admin-only):

Admins can create additional admin accounts or manage existing ones through the admin panel. They can add or remove team members, granting specific permissions and roles.

Task Assignment (Admin-only):

Admins can assign tasks to individuals or multiple users from the dashboard. Admins can also edit task details, including deadlines and descriptions, or update the task status (e.g., “in progress,” “completed”).

Task Properties (Admin-only):

Admins can assign priority levels (e.g., high, medium, low) to tasks and can label tasks based on their current status (e.g., "to-do," "in progress," or "completed").

Admins can also add sub-tasks to the main tasks to break down large tasks into manageable sections.

Asset Management (Admin-only):

Admins can upload assets related to tasks, such as images or documents, which are stored in the MongoDB database and can be associated with specific tasks.

User Account Control (Admin-only):

Admins have the ability to disable or activate user accounts based on their status (e.g., temporarily disabling an inactive user account).

Admins can permanently delete tasks or move them to trash for recovery or deletion.

5. User Features

Task Interaction (User):

Once logged in, users can view their tasks and change their statuses (e.g., “in progress” or “completed”) based on their current workflow.

Users can also view detailed information about each task, including the task title, description, assigned priority, and any comments.

Communication (User):

Users can communicate within the task by adding comments or engaging in a chat feature that allows real-time communication with team members, discussing task progress or updates.

6. Profile Management

Users can view and update their profile details, such as name, email, and profile picture, directly from their dashboard.

7. Password Management

Users can change their passwords securely through the "Change Password" option in their profile settings.

8. Task Dashboard

The dashboard is the central hub where users can:

See a summary of their tasks, including tasks labelled "To-Do," "In Progress," and "Completed."

Users can filter and sort tasks by status, priority, or deadline.

Admins can see the tasks of all users, while regular users can only view their own tasks.

9. Task Creation and Management

Users can create new tasks by filling out a form with the task name, description, priority, and due date.

10. Task Editing (User/Admin):

Users and admins can edit task details, such as changing the description or updating the status.

11. Task Deletion (User/Admin):

Tasks can be deleted either permanently or moved to the trash for recovery. Admins have the authority to delete tasks from other users as well.

12. Real-Time Communication and Updates

With the help of Socket.io, the task manager supports real-time updates, meaning any changes made to tasks (such as status updates, comments, or file uploads) are immediately reflected across all user interfaces.

13. Logout

To log out, users simply click the logout button, which removes the JWT from local Storage or cookies and redirects them to the login page.

IV. MODULES DESCRIPTION

4.1 Login Module

Using role-based access control (RBAC) and token-based authentication, the Task Manager's Login Module guarantees safe access. Administrators have higher privileges to manage users and tasks, while users log in with their own credentials. The system offers a secure and convenient method of accessing the platform's capabilities by supporting session management, password recovery, and secure password storage.

4.2 Registration Module

Users can safely create accounts and access the platform's services through the Task Manager's Registration Module. Users must enter their username, email address, and password when registering; these credentials are then safely saved using encryption techniques. To avoid mistakes and preserve system integrity, the module makes sure that every input is verified. Users receive a confirmation email to validate their accounts, guaranteeing authentic access, for further protection. Administrators can manage user access levels and permissions inside the platform by assigning varying user privileges through role-based registration. The Task Manager application's safe and customized interactions are built on this module.

V. TECHNOLOGY USED

5.1 Front End

The Task Manager platform's frontend is constructed with contemporary web technologies to guarantee a responsive and easy-to-use user experience. The main framework for creating the user interface is React, which is combined with Vite for quick development and build speeds. Redux Toolkit effectively handles state management, guaranteeing consistent data flow across the application. In order to improve the user interface elements, Headless UI is used to offer easily accessible, adaptable, and unstyled UI elements, enabling a very flexible design. The application is styled using Tailwind CSS, which provides a utility first methodology that encourages quick UI development with a neat and unified design. Together, these frontend technologies offer a seamless, effective, and captivating user experience.

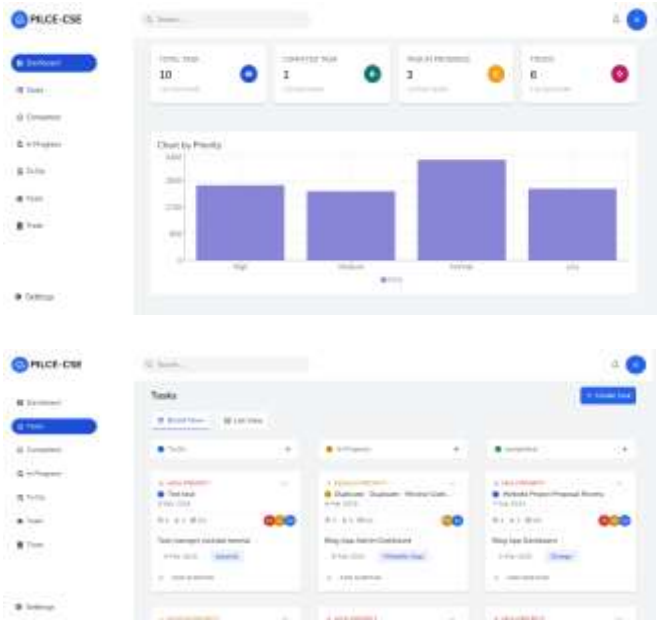
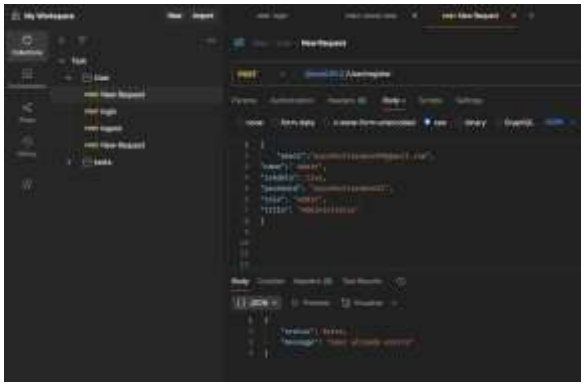


Fig 4.1. Frontend of the Project

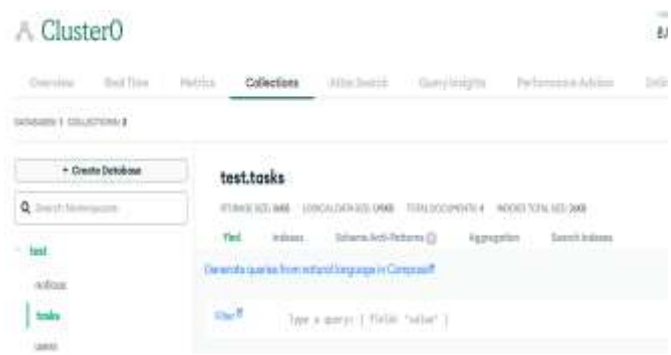
5.2 Backend

Node.js, a well-liked JavaScript runtime environment, and the Express.js framework power the Task Manager platform's backend, creating a dependable and expandable API. Because Node.js guarantees asynchronous, non- blocking application develops. For task management systems, where user data and job types can differ greatly, this flexibility is crucial. Applications that need effective real-time data storage and retrieval, especially in dynamic and expanding environments, are well suited for MongoDB's high availability and horizontal scalability. Furthermore, MongoDB's integrated sharding and replication capabilities guarantee that the platform can manage higher loads and provide a smooth experience for teams working remotely, enhancing performance and data consistency and operations, high-performance data handling and quick task completion are made possible. The development of RESTful APIs is made easier by Express.js, a lightweight and adaptable framework that makes it simpler to accept requests, manage routes, and install middleware for security and authentication. Complex, unstructured data may be handled easily thanks to MongoDB's flexibility with JSON-like documents, which is essential for task management's dynamic nature.



5.3 The Database

The database solution used by the Task Manager platform is MongoDB, a NoSQL database with great scalability that is ideal for managing substantial volumes of unstructured data. MongoDB stores data as adaptable documents that resemble JSON, making it simple to change and adapt the data model as the application evolves, without the need for complex migrations or rigid schemas. This flexibility is especially beneficial for dynamic applications like a Task Manager, where task structures or user roles may frequently change. Additionally, MongoDB's powerful querying capabilities and indexing ensure efficient data retrieval, even with large datasets. Additionally, the platform makes use of MongoDB, a NoSQL database, to efficiently and scalable store and manage user data, tasks, and other application related information.



VI. ADVANTAGES AND APPLICATIONS

1. **Better Teamwork:** A centralized platform for real-time updates and task assignment improves teamwork.

2. **Scalability:** Based on the MERN stack, it guarantees effective management of expanding data and users.

3. **Role-Based Access:** Safe user and administrator permissions that safeguard private information.

4. **User-Friendly Interface:** Tailwind CSS, Vite, and React provide an intuitive design for simple navigation.

5. **Task Organization**: For effective workflow management, tasks are arranged according to priority and status.

6. **Real-Time Updates:** Users can respond and make decisions more quickly since they receive instant updates.

VII. CONCLUSION

To sum up, the Task Manager platform provides a scalable, effective, and intuitive way to manage tasks in a contemporary, remote work setting. The application makes use of the MERN stack and incorporates cutting-edge technologies like Redux Toolkit, Headless UI, and Tailwind CSS to guarantee a smooth user experience and strong performance. By offering a simple and centralized area for job assignment, tracking, and communication, the platform tackles major issues with traditional task management, including inefficiencies, mistakes, and a lack of teamwork. Task classification, role-based access management, and real-time updates improve efficiency, coordination, and teamwork for administrators and users alike. In the end, the Task Manager is an effective tool for streamlining team operations and guaranteeing project success. Its responsive design ensures accessibility across all devices, enabling teams to stay connected and productive from anywhere. With built-in analytics and progress tracking, managers can make informed decisions and optimize workflows. Overall, the platform stands as a comprehensive solution tailored to meet the evolving needs of modern project management.

IX. REFERENCES

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