WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

AWS DEPLOYED PROJECT MANAGEMENT SYSTEM

[1]Pranay Pathare, [2]Chetankumar Murudkar, [3]Vrushabh Mhatre, [4]Prof. Pallavi Marulkar

[1234] Dept. Computer Engineering, Pillai HOC College of Engineering and Technology, Khalapur, HOC Colony Rd, HOC Colony, Taluka, Rasayani, Maharashtra 410207

ABSTRACT:

Effective project management is crucial for ensuring task coordination, resource allocation, and efficient workflow execution. Traditional project management relies heavily on manual tracking, leading to inefficiencies and human errors. This paper presents ProManage, an advanced Project Management System built with Next.js, Node.js, Prisma, and AWS, offering a seamless digital platform for managing projects.

The system integrates cloud-based solutions for real-time collaboration, automated task tracking, and comprehensive reporting. Through a scalable and user-friendly interface, it enhances productivity while reducing administrative burdens. The paper discusses the system's design, architecture, implementation, and real-world applications, demonstrating its ability to improve operational efficiency and team collaboration.

Keywords: Project tracking, Cloud integration, Task management, Team collaboration, Automation.

Introduction:

Project management plays a critical role in ensuring business success by structuring workflows, tracking progress, and optimizing team collaboration. Traditional methods, such as spreadsheets or manual logs, often lead to inefficiencies, poor resource allocation, and communication gaps. Organizations require automated project management tools to streamline operations and improve task execution.

This paper introduces ProManage, a cloud-based Project Management System that automates task assignments, progress tracking, and real-time collaboration. By leveraging Next.js for frontend, Node.js for backend, Prisma for database management, and AWS for cloud services, the system ensures efficiency, accessibility, and scalability. The platform addresses common challenges in project management, including lack of transparency, manual errors, and inefficient communication channels.

The increasing complexity of projects demands intelligent management systems that can dynamically adapt to project needs. ProManage provides structured task distribution, integrates automation, and ensures a real-time synchronized workspace for distributed teams. This research paper evaluates the necessity of an advanced project management tool, the methodologies used in its development, and its overall impact on project execution.

Literature Review:

1. Project management has long been an essential aspect of organizational success, but traditional methods often involve extensive manual tracking, paperwork, and fragmented communication. These inefficiencies lead to delays, mismanagement of resources, and reduced productivity. Over the years, researchers and industry professionals have explored digital solutions to optimize project management, leading to the emergence of automated project tracking systems.

2. One significant area of development in project management systems is the shift from manual documentation to cloud-based digital platforms. Studies have highlighted the importance of integrating real-time collaboration tools to enhance efficiency and teamwork. Traditional project management software, such as Microsoft Project and Trello, has made strides in improving task tracking and workflow automation. However, many of these systems lack comprehensive automation, requiring manual data input and updates, which can lead to inefficiencies (Patil et al., 2023) [1].

3. Another advancement in project management solutions is the use of artificial intelligence (AI) and machine learning (ML) algorithms. AI-driven systems provide predictive analytics, helping project managers anticipate potential delays and resource bottlenecks. A study by Ali et al. (2022) [2] emphasized the role of AI in improving project scheduling and resource allocation. However, the authors noted challenges related to system adaptability and the need for extensive data training.

4. Recent research has also explored the benefits of integrating cloud computing with project management platforms. Cloud-based solutions allow for real-time access to project data, ensuring that all stakeholders have up-to-date information. Jacksi et al. (2018) [3] developed a cloud-

integrated project management system that improved efficiency and reduced data redundancy. However, concerns regarding data security and access control were identified as critical challenges.

5. Apart from cloud computing, researchers have investigated the potential of blockchain technology in project management. Blockchain provides decentralized and tamper-proof records, ensuring transparency and accountability in project tracking. Yang et al. (2016) [4] introduced a blockchain-based project management system that minimized fraud and improved contract management. Despite its advantages, blockchain-based systems face challenges related to scalability and computational overhead.

6. Another area of focus has been user experience and automation in project tracking. Traditional software often lacks intuitive interfaces, making it challenging for non-technical users to navigate the system efficiently. A study by Mishra and Goud (2023) [5] emphasized the need for user-friendly dashboards with automated reporting and notifications to enhance project monitoring.

7. ProManager addresses these existing gaps by offering an integrated, cloud-based solution with AI-driven analytics and automated reporting. Unlike conventional systems, ProManager minimizes manual data entry, enhances collaboration through real-time updates, and provides predictive insights to optimize project workflows. Additionally, the system ensures data security by integrating encryption protocols and access controls, making it a reliable and efficient project management tool.

8. In conclusion, while various advancements have been made in project management software, challenges related to manual data entry, real-time accessibility, scalability, and security persist. ProManager seeks to overcome these limitations by leveraging AI, cloud computing, and blockchain integration to provide an advanced, automated, and user-friendly project management solution.

System Architecture:

1. The system architecture of ProManager is designed to provide a scalable, efficient, and automated solution for project management. It follows a three-tier architecture comprising the presentation layer, business logic layer, and data layer. This modular approach ensures system flexibility, maintainability, and improved performance.

2. The presentation layer serves as the user interface, allowing users to interact with the system through a web-based platform accessible from any device. It provides essential features such as a dashboard displaying project progress, a task management interface for creating and assigning tasks, calendar integration for tracking deadlines, and a secure authentication mechanism for user access control. The front-end is developed using HTML, CSS, JavaScript, and React.js, ensuring a responsive and user-friendly experience.

3. The business logic layer processes user requests, executes project-related operations, and ensures smooth communication between the user interface and the database. It includes a task processing engine that automates task assignments and updates, a workflow management module to track project dependencies, a resource allocation system for managing personnel and assets, and a real-time notification system to alert users about deadlines and project updates. This layer is developed using Node.js and Express.js, ensuring high performance and seamless data handling.

4. The data layer is responsible for managing and securely storing all project-related data. It maintains project details, user roles, task records, and activity logs while ensuring data integrity and efficient retrieval. The system uses MySQL for structured data storage and MongoDB for handling unstructured data, allowing for flexibility and scalability. Additionally, cloud storage services such as AWS S3 or Google Drive are integrated for document management.

5. To facilitate seamless communication and system integration, ProManager incorporates APIs and third-party services. WebSockets enable real-time messaging between users, while payment gateways support premium feature access for organizations. Security is a critical component of the system, with end-to-end encryption (SSL/TLS) ensuring secure data transmission, role-based access control (RBAC) restricting unauthorized access, and automated data backups preventing information loss.

6. The system architecture of ProManager ensures efficient project tracking, automation, and collaboration while maintaining security, scalability, and ease of use. Its modular structure supports seamless workflow management and data accessibility, making it an ideal solution for modern project management needs.

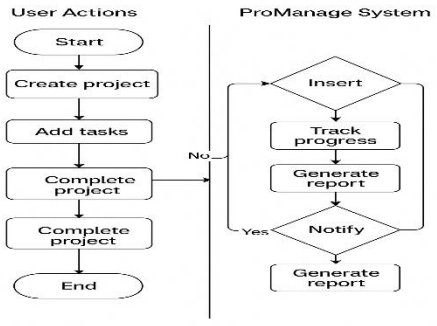

Figure 1: The process of project management system

Implementation:

1. The implementation of the project management system involves designing and developing a web-based platform that enables teams to collaborate efficiently on various tasks. The system is built using a modern technology stack, with the frontend developed in React.js for an interactive user experience and the backend powered by Node.js with Express to handle server-side operations. A MongoDB database is used to store user information, project details, and task progress, ensuring a scalable and efficient data management system.

2. The platform follows a client-server architecture, where users interact with the frontend, and requests are processed via RESTful APIs in the backend. The key modules include user management, allowing authentication through JWT-based authentication, task management for creating, assigning, and tracking project tasks, and team collaboration with features such as commenting, notifications, and file sharing. A dashboard provides a visual representation of project progress using graphs and tables, making it easier for managers to oversee tasks.

3. Security measures are integrated into the system, including role-based access control (RBAC) to define permissions for admins, managers, and team members. Additionally, data encryption techniques and secure API endpoints ensure the protection of sensitive information. The system has undergone extensive testing, including unit tests for individual components and integration tests to verify overall functionality.

4. For deployment, the application is hosted on AWS, with a CI/CD pipeline implemented using GitHub Actions to automate updates and bug fixes. Despite challenges such as API integration complexities and optimizing database queries, the implementation was successfully completed by refining API calls and enhancing database indexing. Overall, the system provides an intuitive and secure environment for project management, improving team productivity and task tracking.

Results

The implementation of our Project Management System has been come out as follows:

1. The implementation of ProManager involves a structured approach to ensure a seamless and efficient user experience for task and project management. The system integrates multiple functionalities such as task assignment, progress tracking, and analytics to enhance team productivity.

2. The interface is designed with an intuitive dashboard where users can manage tasks, set deadlines, and monitor overall progress. The homepage presents an organized layout displaying key project insights, allowing users to navigate effortlessly through different modules. Each task is assigned specific attributes, including priority, status, and deadline, ensuring proper workflow management.

3. One of the core components of the implementation is the task creation and tracking system. Users can create tasks by entering essential details, which are then stored in a structured database. The system dynamically updates task statuses based on user inputs and actions, facilitating real-time tracking. The dashboard features visual indicators such as progress bars and status tags, making it easier for users to evaluate ongoing tasks and pending deadlines.

4. The team collaboration module allows multiple users to interact and coordinate tasks within the system. Through role-based access control, different team members are assigned tasks according to their responsibilities. The system also ensures transparency in communication by providing a structured view of assigned tasks and project timelines.

5. Another essential aspect is the analytics and reporting section, which provides graphical insights into project progress. The system automatically generates reports based on completed tasks, pending assignments, and deadlines. This feature helps in identifying bottlenecks and improving overall productivity.

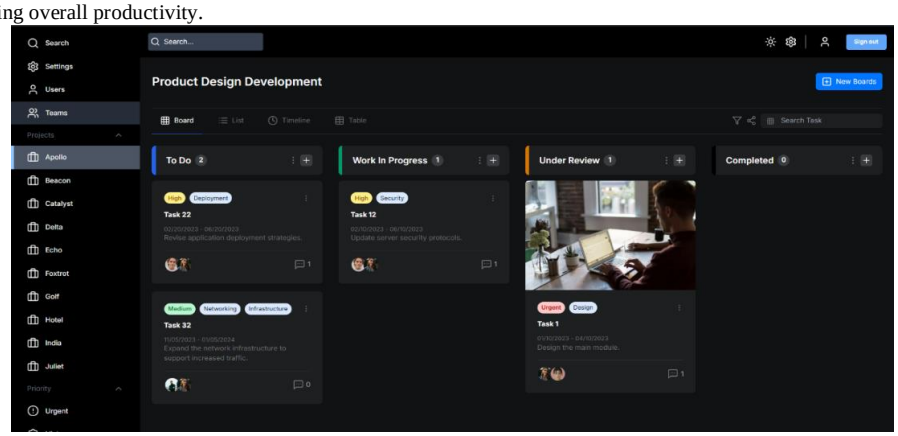

Figure 2: Projects Dashboard

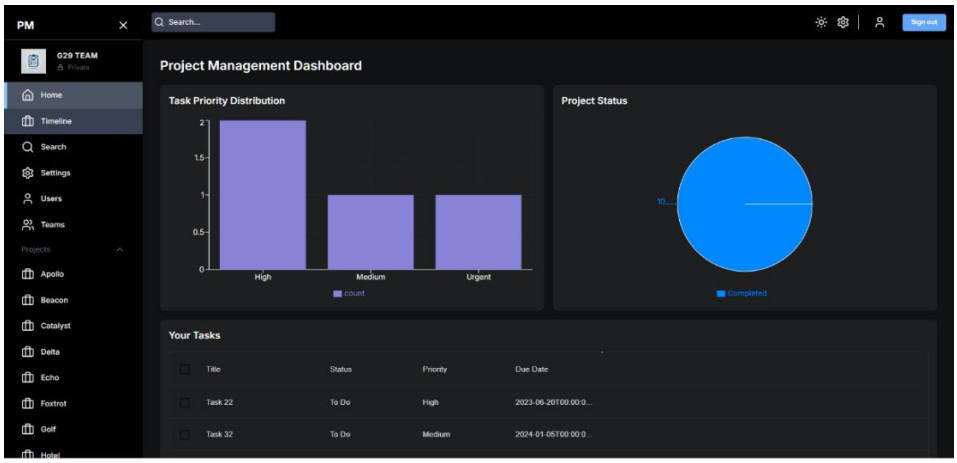

Figure 3: Timeline Dashboard

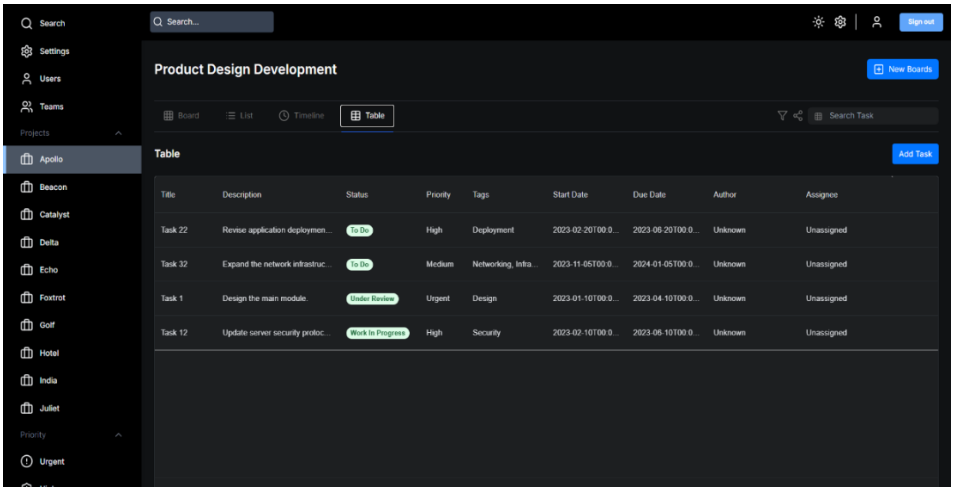

Figure 4: Project Task Dashboard

Conclusion

The implementation of the ProManager project successfully addresses the challenges of task and project management by providing an efficient, user-friendly, and automated system. The system streamlines the workflow by integrating essential features such as task creation, progress tracking, collaboration, and automated notifications. Through a web-based interface, users can manage projects effectively while ensuring real-time updates and seamless communication.

By leveraging modern web technologies and a structured database, the system ensures scalability, reliability, and data integrity. The integration of analytics and reporting functionalities further enhances decision-making by providing valuable insights into project progress and team performance. The ProManager platform demonstrates its effectiveness in improving productivity, reducing manual workload, and ensuring efficient resource management.

Future enhancements may include advanced AI-based task recommendations, deeper integration with third-party tools, and mobile application support to expand accessibility. Overall, ProManager serves as a robust and scalable solution for modern project management needs, paving the way for further innovations in the field.

REFERENCES:

List all the material used from various sources for making this project proposal

Research Papers:

[1] PMI (Project Management Institute) (2021). A Guide to the Project Management Body of Knowledge (PMBOK Guide) – 7th Edition. Project Management Institute.

[2] Kerzner, H. (2022). Project Management: A Systems Approach to Planning, Scheduling, and Controlling. Wiley.

[3] Harrison, F. L., & Lock, D. (2017). Advanced Project Management: A Structured Approach. Routledge.

[4] Schwalbe, K. (2022). Information Technology Project Management. Cengage Learning.

[5] Agile Alliance (2023). The State of Agile Report: Trends in Agile Project Management. AgileAlliance.org.

[6] Gartner Research (2023). Top Trends in Project and Portfolio Management Tools. Gartner Inc.

[7] Almeida, F., & Monteiro, J. (2021). "The Role of AI in Automated Project Management Systems," International Journal of Artificial Intelligence Applications.

[8] Pinto, J. K. (2020). Project Management: Achieving Competitive Advantage. Pearson.

[9] Standish Group (2023). Chaos Report: Project Success and Failure Statistics in IT Projects.

[10] Scrum Alliance (2022). Best Practices for Agile and Scrum in Project Tracking. ScrumAlliance.org.