

Final Review

CSE-7301 UNIVERSITY PROJECT DASHBOARD FOR REAL-TIME MONITORING OF CONSTRUCTION PROJECTS

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1. Introduction

- **Project Overview:**

Development of an interactive dashboard for construction project management to track and manage task progress. It provides real-time visualizations for project deadlines, task completion status, and overall progress. The dashboard helps managers and stakeholders stay informed, identify potential delays, and ensure timely project completion. Additionally, it enables easy updates and modifications for efficient project tracking and resource allocation.

- **Problem Statement :**

Construction project management lacks a centralized system for real-time task tracking, progress visualization, and resource allocation. This leads to inefficiencies, delays, and difficulties in managing project deadlines and overall workflow.



2. Literature Review (Summary of Research Papers)

1. Using Data Analytics and Visualization Dashboard for Engineering, Procurement, and Construction Project's Performance Assessment :

- **Summary :** The paper explores the use of data analytics and dashboards to improve monitoring and decision-making in Engineering, Procurement, and Construction (EPC) projects. It highlights how integrating real-time data helps optimize performance and enhance project efficiency.
- **Link :** <https://ieeexplore.ieee.org/document/9436728>

2. Data Acquisition and Monitoring Dashboard for IoT Enabled Aquaponics Facility :

- **Summary :** The paper presents a data acquisition and monitoring dashboard for an IoT-enabled aquaponics facility. It focuses on leveraging real-time data to manage environmental factors, optimizing the aquaponics system's performance.
- **Link :** <https://ieeexplore.ieee.org/document/10011594>

3. Developing a Project Status Dashboard for Construction Project Progress Reporting :

- **Summary :** The paper discusses the development of a project status dashboard aimed at improving construction project progress reporting. It focuses on creating a visual tool that enhances the tracking of construction milestones, resource usage, and project timelines, enabling more efficient decision-making.
- **Link :** https://www.researchgate.net/publication/271120959_Developing_a_Project_Status_Dashboard_for_Construction_Project_Progress_Reporting

2. Literature Review (Summary of Research Papers) (continued...)

4. DASHBOARD FOR REAL-TIME MONITORING OF ROAD CONSTRUCTION PROJECTS :

- **Summary :** The paper focuses on developing a real-time monitoring dashboard for highway construction projects, aimed at improving project management. It integrates data analytics for progress tracking, resource management, and cost control, enabling more efficient decision-making. The dashboard helps reduce delays and budget overruns.
- **Link :** <https://philarchive.org/archive/PRADFRv1>

5. A Real-Time Construction Project Monitoring System Based on Internet of Things :

- **Summary :** This paper proposes an IoT-based system for real-time monitoring of construction projects, improving efficiency and safety. It provides real-time data on project status and conditions.
- **Link :** <https://ieeexplore.ieee.org/document/9243607>

6. Development of a Real-Time Construction Monitoring System Using Wireless Sensor Networks :

- **Summary :** The study discusses the development of a monitoring system employing wireless sensor networks to track construction site conditions in real-time.
- **Link :** <https://ieeexplore.ieee.org/document/9381873>

2. Literature Review (Summary of Research Papers) (continued...)

7. Real-Time Construction Site Monitoring Using Wireless Sensor Networks :

- **Summary :** This research explores the application of wireless sensor networks for real-time monitoring of construction sites, focusing on data collection and analysis.
- **Link :** <https://ieeexplore.ieee.org/document/9835356>

8. Design and Implementation of a Real-Time Construction Monitoring System Based on Internet of Things :

- **Summary :** This study designs a system leveraging IoT technology for real-time construction project monitoring. It enables tracking of resources, progress, and safety.
- **Link :** <https://ieeexplore.ieee.org/document/8904312>

9. A Real-Time Monitoring System for Construction Safety Based on Wireless Sensor Networks :

- **Summary :** This work introduces a system that uses wireless sensor networks to monitor safety conditions on construction sites in real-time.
- **LINK :** <https://ieeexplore.ieee.org/document/7385381>

2. Literature Review (Summary of Research Papers) (continued...)

10. Development of a Real-Time Construction Monitoring System Using RFID Technology :

- **Summary :** The study examines the use of RFID technology in developing a real-time monitoring system for construction projects.
- **Link :** <https://ieeexplore.ieee.org/document/7975134>



3. Current Methods and Drawbacks

3.1 Current Methods in Dashbord Development :

1. Manual Tracking and Basic Software :

- **Description:** Projects rely on spreadsheets or basic tools for task tracking.
- **Drawback:** These methods are error-prone and often lead to inconsistencies in data.

2. Lack of Real-Time Updates :

- **Description:** Data is manually updated, which can cause delays.
- **Drawback:** Outdated information makes it difficult to make timely decisions and adjustments.

3. Difficulty in Predicting Delays and Resource Shortages :

- **Description:** Managers struggle to forecast potential delays or resource needs.
- **Drawback:** Without detailed task tracking, accurate predictions of delays or shortages are not possible.

4. Limited Interactive Visualizations :

- **Description:** Project progress is presented in static, text-heavy formats.
- **Drawback:** Stakeholders find it challenging to quickly understand the project status, reducing decision-making efficiency.

4. Proposed solution

- A comprehensive construction dashboard integrates real-time project tracking, predictive analytics, and dynamic visualizations into a unified platform.
- The dashboard allows project managers to monitor progress, track resources, and predict potential delays using historical data and machine learning models.
- It features interactive charts like progress bars, Gantt charts, and line graphs to visualize project timelines, resource utilization, and completion percentages.
- Real-time updates and predictive models provide stakeholders with the latest information, enabling faster decision-making and minimizing risks.

5. Objectives

- **Primary Objective :**
To develop an interactive dashboard for construction project management that provides real-time tracking, predictive analytics, and resource management, improving project visibility, decision-making, and overall efficiency.
- **Secondary Objective :**
To enhance communication and collaboration among teams and stakeholders, automate routine tasks, provide data-driven insights, and ensure scalability for future growth, while optimizing project execution and resource allocation.

6. Methodologies

1. Module 1: Data Collection and Integration

- **Data Gathering:** Collect data from project management software, construction databases, and on-site reports.
- **Real-Time Data Integration:** Ensure real-time data flow into the dashboard for accurate decision-making.

2. Module 2: Data Processing and Machine Learning (ML) Models

- **Predictive Modeling:** Use machine learning to predict future trends and project completion times.
- **Risk Assessment:** Implement regression models and neural networks for cost estimation and risk evaluation.

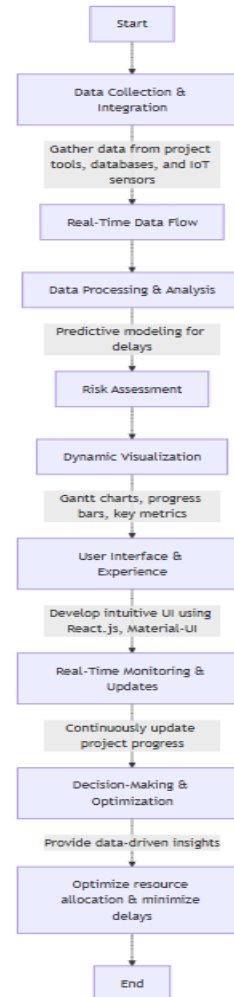
3. Module 3: Dynamic Visualizations

- **Interactive Visuals:** Use JavaScript libraries like Chart.js or Recharts to display data.
- **Visualizing Key Metrics:** Display budget utilization and project progress metrics in an engaging way.

4. Module 4: User Interface and Experience

- **Intuitive Design:** Build a user-friendly interface using React.js and Material-UI components.
- **Customization:** Enable flexibility with customizable features for different construction projects.

7. Architecture

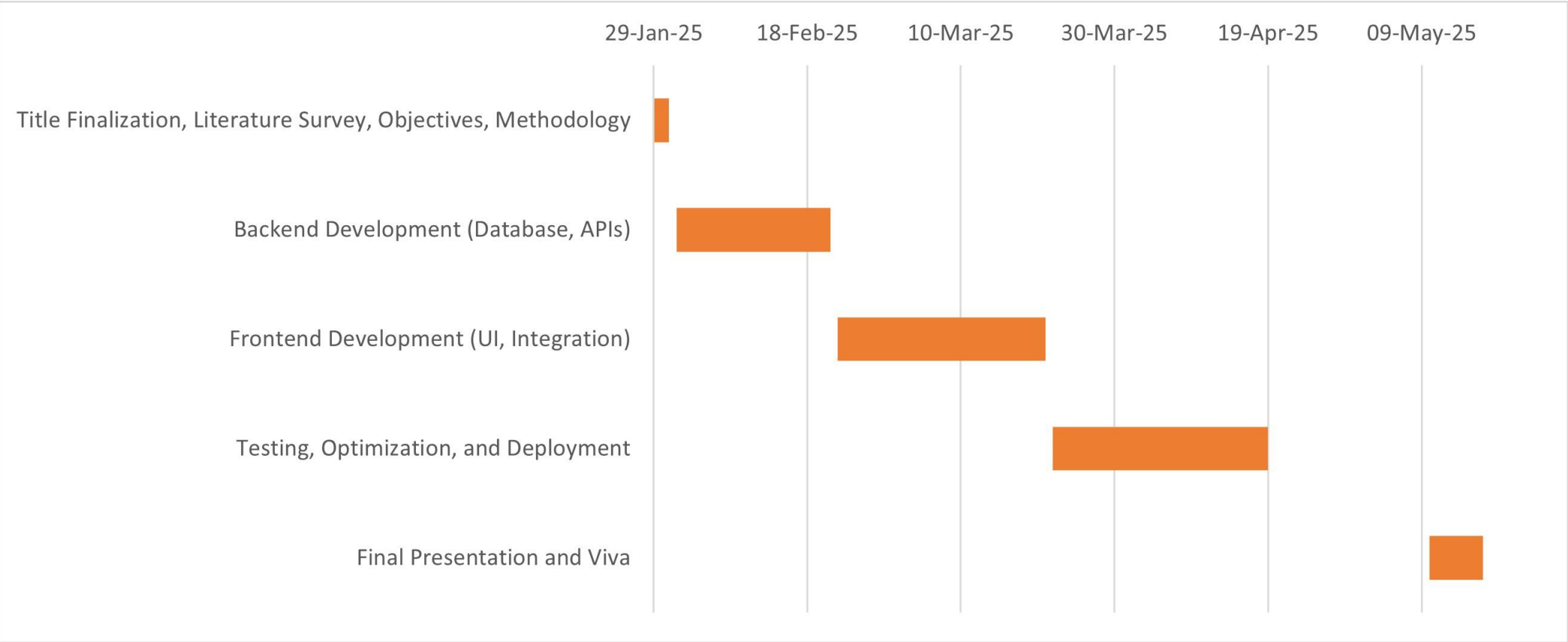


8. Hardware and Software Components

- **React.js**
- **Material-UI**
- **Chart.js**
- **Typescript**
- **Node.js**
- **Express.js**
- **Python**
- **TensorFlow**



9. TIMELINE OF THE PROJECT



10. Expected Outcomes

1. Enhanced Project Visibility

- The dashboard provides real-time tracking of project progress, deadlines, and status, ensuring stakeholders are aligned.

2. Improved Decision-Making

- Predictive models offer insights into potential delays, enabling proactive decision-making to avoid issues.

3. Efficient Resource Management

- Accurate progress tracking allows for better resource allocation and reduces unnecessary costs.

4. Scalability and Streamlined Communication

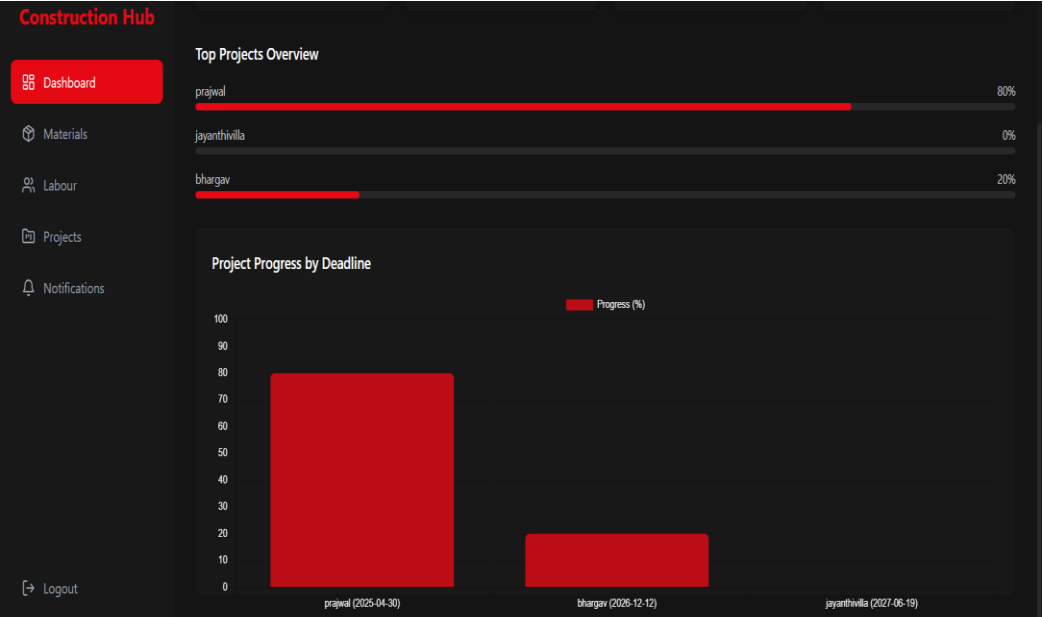
- The platform supports smooth communication and can scale as the business grows, handling more projects and users.

11. Conclusion

The construction dashboard project offers an integrated solution for efficient project management, addressing challenges like resource allocation and progress tracking. It utilizes predictive models and machine learning to forecast delays and optimize outcomes. The platform streamlines communication, automates tasks, and provides insights for better decision-making. Its scalability ensures continued effectiveness as the business grows.



Outputs



Construction Hub

Dashboard

Materials

Labour

Projects

Notifications

Materials Management

Track and manage all construction materials

+ Add Material

4 Total Materials

2 In Stock

1 Low Stock

1 Out of Stock

Search by name or location...

Name	Quantity	Unit	Status	Location	Actions
Cement	1000	bags	In Stock	Warehouse A	<div></div> <div></div>
Steel Bars	500	tons	In Stock	Warehouse B	<div></div> <div></div>
Bricks	50	pallets	Low Stock	Warehouse A	<div></div> <div></div>
Sand	0	tons	Out of Stock	Warehouse C	<div></div> <div></div>

Outputs

Construction Hub

Dashboard

Materials

Labour

Projects

Notifications

Logout

Labour Management

Add Worker

Worker Name

Worker Role

-- Select Project --

Add Worker

Worker List

John Doe

Role: Foreman

Project: prajwal

Status: Assigned

Jane Smith

Role: Worker

Project: None

Status: Available

Projects

All your construction projects at a glance

Add New Project

prajwal

2025-04-30 20000 sq ft 1 Workers

10 Units 3 Rooms 2 Bathrooms

2 Balconies 6 Floors 6 Parking

2 Common Areas 18 Lifts

Progress 80%

Assigned Workers 1 Workers

John Doe Foreman assigned

Cement Bags Qty: 10000 Rate: ₹400 ₹4,000,000

Bricks Qty: 200000 Rate: ₹7 ₹1,400,000

jayanthivilla

2027-06-19 2400 sq ft 0 Workers

3 Rooms 3 Bathrooms 3 Balconies

2 Floors 50 Garden Swimming Pool

Basement 2 Garage

Progress 0%

Assigned Workers 0 Workers

No workers assigned to this project

Cement Bags Qty: 1200 Rate: ₹400 ₹480,000

Bricks Qty: 24000 Rate: ₹7 ₹168,000

bhargav

2026-12-12 5000 sq ft 0 Workers

1 Units 4 Rooms 3 Bathrooms

3 Balconies 4 Floors 4 Parking

5000 Common Areas 1 Lifts

Progress 20%

Assigned Workers 0 Workers

No workers assigned to this project


Cement Bags Qty: 2500 Rate: ₹400 ₹1,000,000

Bricks Qty: 50000 Rate: ₹7 ₹350,000

Git-hub Link

- <https://github.com/Prajwalreddy2909/ConstructionHub>





Thank
You!



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