A project proposal for partial fulfilment of the course unit IT3162 –
Group Project for the degree of Information Technology

BuildTrack – Real Time Project Management System

Name of the Students:

Ms. Ariyawansha U.N.S. 2021/ICT/40
Mr. Ahamedh A.L.A. 2021/ICT/50
Mr. Sajan M.M. 2021/ICT/56
Mr. Bandara J.A.H.S. 2021/ICT/81
Ms. Fathima Hima M.F. 2021/ICT/84
Ms. Dewasurendra H.G.S.D 2021/ICT/114

Supervisor:
Dr. S. Kirushanth
Senior Lecturer

Department of Physical Science
Faculty of Applied Science
University of Vavuniya

September 2025

Declaration

We hereby declare that the project proposal submitted for evaluation of the course module IT3162 leading to the award of a Bachelor of Science in Information Technology is entirely our own work, and the contents taken from the work of others have been cited and acknowledged within the text. This proposal has not been submitted for any degree at this University or any other institution.

Ms. Ariyawansha U.N.S. 2021/ICT/40
Mr. Ahamedh A.L.A. 2021/ICT/50
Mr. Sajan M.M. 2021/ICT/56
Mr. Bandara J.A.H.S. 2021/ICT/81
Ms. Fathima Hima M.F. 2021/ICT/84
Ms. Dewasurendra H.G.S.D 2021/ICT/114

I recommend that the project be carried out by the students under my supervision.

Dr. S. Kirushanth
Supervisor
Lecturer / Senior Lecturer
Department of Physical Science
Faculty of Applied Science

Date

Contents

1 Introduction

1.1 Introduction

The construction industry involves managing multiple sites, workers, supervisors, inventory, and progress reporting. Traditional methods such as paper-based tracking or spreadsheets are inefficient and prone to errors. This project proposes a web-based Construction Site Management System that helps construction companies monitor and report progress, manage labor, track inventory, and improve communication. The system will act as a centralized platform to increase efficiency, reduce costs, and enhance transparency.

1.2 Aim and Objectives

Aim:

To design and develop a web-based system that helps construction companies effectively manage construction sites, labor, inventory, and progress reporting.

Objectives:

- To develop a role-based system for administrators, supervisors, and workers.
- To enable task assignment and progress monitoring.
- To implement labor management with attendance and work allocation features.
- To build an inventory tracking system for materials and equipment.
- To integrate report generation for project progress and resource usage.
- To provide a communication channel for supervisors and workers.

1.3 Benefits of this System

- Centralized platform for site and resource management.
- Reduces delays and improves coordination between stakeholders.
- Real-time tracking of tasks, inventory, and workers.
- Provides data-driven insights for decision-making.
- Reduces manual paperwork and reporting errors.

2 Background

2.1 Background

Construction companies often struggle with fragmented communication, manual reporting, and inventory mismanagement. These issues lead to project delays and cost overruns. An integrated system can resolve these problems by combining project management, labour coordination, and material tracking in a single solution.

2.2 Review of the Existing Systems

- **MS Project / Primavera P6:** Designed for large-scale project planning but often too complex and costly for mid-sized construction firms.
- **Zoho Projects / Trello:**Good for task tracking but lack domain-specific features such as inventory or labor management.
- **ERP Systems:** Expensive and not customizable for small-to-medium construction companies.

Thus, there is a need for a lightweight, cost-effective, and domain-specific solution tailored for construction companies.

3 Materials and Methods

3.1 Proposed System Design

The system follows a three-tier architecture:

- Frontend (React): Interactive dashboards, task views, and forms.
- Backend (Node.js + Express): RESTful APIs for data processing and communication.
- Database (MongoDB): Stores users, sites, tasks, inventory, and reports.

3.2 Functional Requirements

- User authentication and role-based access(Admin, Supervisor, Worker).
- Add, update, and monitor construction sites.
- Assign and track tasks for supervisors and workers.
- Maintain inventory records with alerts for low stock.
- Generate daily/weekly progress reports.
- Communication module for supervisors and workers.

3.3 Non-functional Requirements

- Usability: Simple and intuitive UI.
- Scalability: Capable of handling multiple construction sites.
- Security: JWT authentication, encrypted passwords.
- Performance: Fast response times for dashboards and reports.

3.4 Use Case Diagram

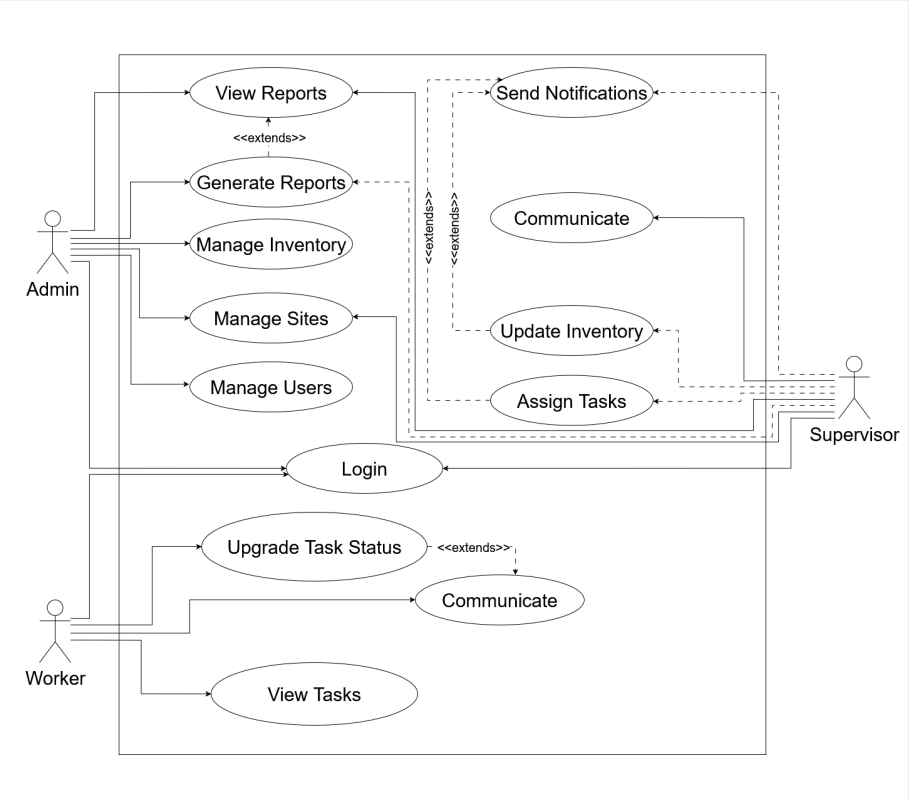

Figure 1: Use Case Diagram for BuildTrack System

3.5 Tools and Technologies

- Frontend: React.js, Tailwind CSS / Material UI
- Backend: Node.js, Express.js
- Database: MongoDB Atlas(Cloud with MongoDB Atlas)
- Version Control: GitHub/Git
- Deployment: Vercel/Netlify (frontend), Heroku/DigitalOcean (backend)
- Project Management: Trello/Jira for tracking tasks

4 Expected Results

4.1 Brief Description of the Expected System

A fully functional web application where construction companies can log in, manage multiple sites, assign tasks, monitor labor, track inventory, and generate reports. Improved efficiency and productivity compared to manual methods. The expected system, BuildTrack, will provide a dashboard-based interface for construction companies. Admins can manage multiple projects, supervisors can update progress, and workers can view assigned tasks. Inventory will be updated in real-time, and automated reports will be generated to assist decision-making.

5 Timeline of the Project

5.1 Displays the work plan by developing the Gantt chart.

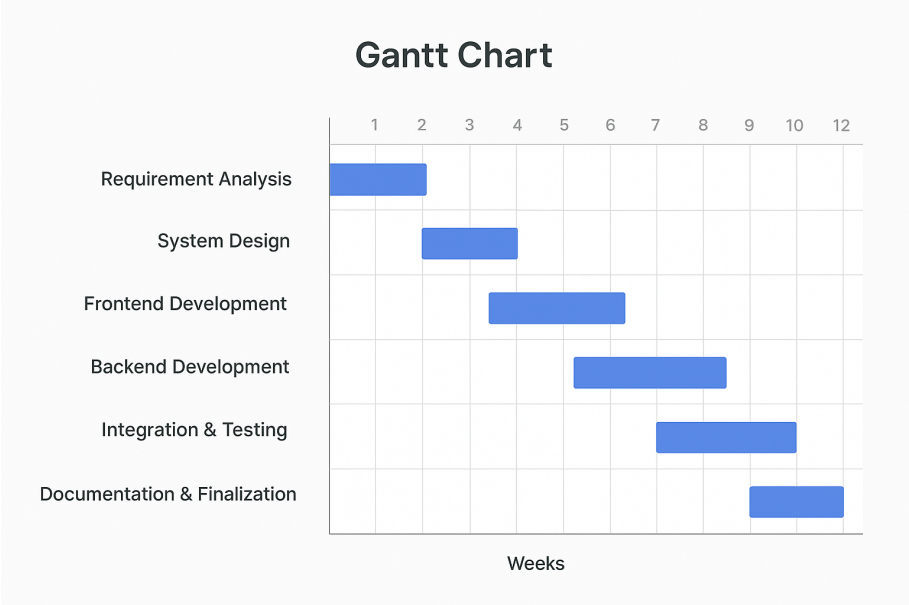

Figure 2: Gantt Chart for Build Track System

References

[1] Sommerville, I. (2016). *Software Engineering*. Pearson Education.

[2] MongoDB Documentation. (2025). `https://www.mongodb.com/docs/`

[3] React Official Documentation. (2025). `https://react.dev`

[4] Node.js Documentation. (2025). `https://nodejs.org/docs`