

A

PRELIMINARY PROJECT REPORT  
ON  
**“INTERDEPARTMENTAL COOPERATION PLATFORM”**

Submitted in partial fulfillment of Bachelors of Engineering in  
Computer Engineering by Savitribai Phule Pune University Submitted to



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**SANGHAVI COLLEGE OF ENGINEERING,**  
**NASHIK-422202**  
**[2024-2025]**



**Sanghavi College of Engineering, Nashik**

DEPARTMENT OF COMPUTER ENGINEERING

2024-2025

**C E R T I F I C A T E**

This is to certify that the Project Entitled

**“INTERDEPARTMENTAL COOPERATION PLATFORM”**

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Is a bonafide work carried out by Students under the supervision of Prof. Puspendu Biswas and it is submitted towards the partial fulfillment of the requirement of requirements of Bachelor of Engineering (COMPUTER ENGINEERING) Project.

Prof. Puspendu Biswas

Project Guide

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## **ABSTRACT**

The Interdepartmental Cooperation Platform (IDCP) is an innovative digital platform developed to enhance cross-departmental communication, streamline workflows, and improve resource coordination across various government departments. The IDCP centralizes information and facilitates easy access to essential data, such as departmental tenders, project timelines, budget allocations, and resource documentation. Through a user-friendly graphical interface, officials can quickly navigate the portal to retrieve or update project details, monitor the status of ongoing initiatives, and track allocated funds.

A standout feature of the IDCP is its intelligent chatbot, IDCP Bot, which supports real-time interactions, answering common questions and providing instant access to tender details or project summaries. The bot enables quick resolution of inquiries, enhances accessibility, and ensures smooth communication across departments. Additionally, a comprehensive search function empowers users to locate information efficiently by filtering data based on criteria such as tender location, organization, project classification, and status, including details on acceptance, delay, or cancellation.

To support transparency and accountability, the portal includes a robust reporting system, which provides management with up-to-date summaries of project statuses and other metrics critical for administrative decision-making. Real-time updates on project milestones and notifications about project deadlines further enhance the portal's functionality. By centralizing and simplifying communication processes, the IDCP reduces redundancy, shortens response times, and fosters a collaborative environment essential for efficient public service delivery. Ultimately, the Interdepartmental Cooperation Platform represents a significant step toward creating a digitally enabled, interconnected government that supports enhanced productivity and accountability across departments.

## **ACKNOWLEDGMENT**

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# **CHAPTER 1**

## **SYNOPSIS**

### **1.1 PROJECT TITLE**

“CITY SYNERGY” Interdepartmental Cooperation Platform

### **1.2 PROJECT OPTION**

Internal Project

### **1.3 INTERNAL GUIDE**

Prof. Puspendu Biswas

### **1.4 TECHNICAL KEYWORDS (AS PER ACM KEYWORDS)**

#### **1. AI / Machine Learning**

- ML Model

#### **2. Web Technology**

- Frontend  
- Backend

#### **3. Database**

- MySQL

#### **4. Cloud Computing**

- Microsoft Azure  
- Vercel  
- Render

## **1.5 PROBLEM STATEMENT**

Platform for Inter-departmental cooperation (at city level) in Indian Cities, for sharing data & resources, unified phasing, planning and implementation of projects.

### **Idea Description:**

This project proposes the development of a centralized platform designed to improve inter-departmental cooperation at the city level in Indian cities. The platform will facilitate data and resource sharing, enable unified phasing and planning, and optimize project implementation across departments. By reducing redundancy and improving communication through forums and private groups, the system will streamline urban governance, minimize resource misallocation, and reduce delays in project execution.

## **1.6 ABSTRACT**

Urban development in India is often a complex and fragmented process, where multiple city departments work independently on projects that overlap in both scope and objectives. This siloed approach frequently leads to inefficiencies, miscommunication, and a waste of valuable resources. To address these challenges, the proposed platform for inter-departmental cooperation aims to facilitate data sharing, resource pooling, and unified project phasing, planning, and implementation among city departments in Indian cities. The platform is designed as a centralized digital hub that enables seamless interaction and cooperation between departments such as urban planning, water resources, transportation, public health, and environmental services, among others.

The platform will serve as a unified interface where departments can share and access real-time data, collaborate on common projects, and streamline decision-making processes. By integrating data from various sectors, the platform allows for a comprehensive view of urban projects, helping departments identify overlapping initiatives and avoid redundant efforts. This approach promotes resource optimization by enabling departments to allocate human, financial, and infrastructural assets more effectively. Furthermore, unified phasing and planning ensure that projects align with city-wide development goals and timelines, thereby enhancing the overall efficiency and impact of urban initiatives.

A key feature of the platform is its support for multi-layered security and data confidentiality, ensuring that only authorized personnel can access sensitive information.

Additionally, the platform includes tools for project tracking, reporting, and analytics, which enable stakeholders to monitor progress, address bottlenecks, and assess the long-term impact of their initiatives. By fostering a culture of transparency, accountability, and collaboration, the inter-departmental cooperation platform aims to transform the way Indian cities plan and execute urban projects, ultimately improving service delivery and the quality of life for urban residents. The platform holds the potential to serve as a model for other cities globally, providing a blueprint for effective urban governance in the digital age.

## **1.7 GOALS AND OBJECTIVE**

### **➤ GOALS:**

- 1. Enhance Inter-Departmental Collaboration:** Foster effective communication and cooperation between various city departments to streamline the planning, phasing, and implementation of urban projects.
- 2. Optimize Resource Allocation:** Enable city departments to share data and resources efficiently, reducing redundancies and ensuring that human, financial, and infrastructural assets are used optimally.
- 3. Improve Transparency and Accountability:** Promote open and accessible channels for project tracking, reporting, and decision-making to improve transparency across departments and increase accountability in project outcomes.
- 4. Boost Urban Development Efficiency:** Facilitate the synchronized planning and execution of projects across departments to reduce project timelines, mitigate risks, and improve service delivery for city residents.
- 5. Promote Data-Driven Decision Making:** Encourage departments to base their decisions on shared, real-time data insights, enhancing the precision and effectiveness of urban planning.

## ➤ OBJECTIVES

- 1. Create a Centralized Digital Platform:** Develop an accessible online interface that acts as a single point for sharing data, resources, and project details among various departments.
- 2. Enable Real-Time Data Sharing:** Implement secure, multi-layered access to real-time data, allowing departments to easily share, access, and analyze information across sectors such as urban planning, transportation, and public health.
- 3. Establish Unified Project Phasing and Planning:** Design a system that aligns departmental project timelines with city-wide development goals, ensuring consistent and coordinated project implementation.
- 4. Integrate Security Protocols for Data Confidentiality:** Implement advanced security features, including user authentication and data encryption, to ensure that only authorized personnel can access and share sensitive information.
- 5. Facilitate Resource Pooling and Allocation:** Develop tools for resource sharing that help departments leverage each other's assets, reducing duplication and achieving greater cost-effectiveness in urban projects.
- 6. Track and Report Project Progress:** Provide tracking and analytics tools to monitor project milestones, assess delays, and generate reports, thereby improving transparency and facilitating better-informed decision-making.
- 7. Enhance Stakeholder Engagement:** Enable continuous feedback loops between departments and stakeholders, encouraging active engagement and collaborative problem-solving throughout the project lifecycle.
- 8. Promote Long-Term Sustainability:** Ensure that the platform supports sustainable development by incorporating data and analytics tools for evaluating environmental and socio-economic impacts, aligning with broader city sustainability goals.

## **1.8 RELEVANT MATHEMATICAL ASSOCIATED WITH THE PROJECT**

The platform for inter-departmental cooperation in city-level projects relies on various mathematical foundations to support data sharing, resource optimization, and project planning. Key mathematical concepts involved include:

### **1) Linear Algebra**

- **Data Representation:** Matrices and vectors are used to organize, store, and manipulate large datasets, enabling efficient data sharing and analysis.
- **Transformations:** Essential in manipulating data structures, which allows departments to visualize and process information in meaningful ways, such as converting raw data into actionable insights.

### **2) Optimization Theory**

- **Resource Allocation:** Linear programming, integer programming, and other optimization techniques enable the platform to allocate resources effectively across departments, minimizing waste and maximizing utility.
- **Project Scheduling:** Optimization methods are applied to project phasing and scheduling, ensuring timely and cost-efficient project completion.

## **1.9 NAMES OF CONFERENCE /JOURNALS WHERE PAPERS CAN BE PUBLISHED**

### **1) IEEE International Conference on Smart Cities**

- Focuses on technologies, solutions, and management strategies for smart city development, including data sharing and inter-departmental cooperation.

### **2) International Conference on Urban Computing and Smart Cities (ICUCSC)**

- Covers urban data analytics, project planning, and data resource management for city development.

### **3) ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)**

- A premier conference for data mining, with a focus on practical applications, including those in urban environments and public data sharing.

## **1.10 REVIEW OF CONFERENCE /JOURNAL PAPERS SUPPORTING PROJECT IDEA**

- 1. Data Sharing and Interoperability:** Studies from IEEE Smart Cities Conferences highlight how interoperable platforms enable city departments to share data effectively, enhancing coordination in areas like traffic and emergency management.
- 2. Unified Project Management:** Papers from the International Journal of Project Management discuss frameworks for cross-departmental project alignment, showing benefits like reduced redundancies and improved project timelines.
- 3. Data Security and Privacy:** Research in ACM's security journals emphasizes the importance of encryption and access control for secure data sharing, crucial for maintaining confidentiality while enabling inter-departmental collaboration.
- 4. Big Data for Urban Planning:** Insights from the ACM SIGKDD Conference show how predictive analytics can aid in decision-making across departments, improving resource allocation and proactive planning.
- 5. Case Studies on Smart City Platforms:** Real-world cases from Smart City Expo highlight best practices from cities like Barcelona and Amsterdam, offering practical insights into platform design and implementation.

## **1.11 PLAN OF PROJECT EXECUTION**

ID	Task Name	Starting Date	Finishing Date
1	Understanding the concept of Project	26/08/2024	29/08/2024
2	Gather information Resource and Requirement	30/08/2024	05/09/2024
3	Project discussion with project guide and confirmation of topic	06/09/2024	6/09/2024
4	Finalizing the project and resources	07/09/2024	12/09/2024
5	Making a wireframe for concept visualization	13/09/2024	16/09/2024
6	Drawing out the modules that need to be completed	17/09/2024	20/09/2024
7	Begin Development (ML model development)	21/09/2024	26/09/2024
8	Changes are done according to suggestions	28/09/2024	04/09/2024
9	Frontend Development	06/09/2024	11/10/2024
10	Backend Development	13/10/2024	22/10/2024
11	Testing	22/10/2024	25/10/2024
12	Frontend, Backend and Model Integration	27/10/2024	05/11/2024
13	Figuring about Hosting	06/11/2024	09/11/2024
14	Deploying on cloud	09/11/2024	12/11/2024
15	Testing and Documentation	13/11/2024	14/11/2024

Table 1.1: Project Plan Execution

## CHAPTER 2

### TECHNICAL KEYWORDS

#### **2.1 AREA OF PROJECT**

##### **1. Cloud Computing**

- Relevant for enabling data storage, real-time access, and data sharing among city departments.
- Key aspects: Cloud services, scalable architecture, and security in cloud environments.

##### **2. Database Management and Security**

- Essential for managing the vast amounts of data generated by different departments and ensuring that this data is stored securely.
- Key aspects: Data encryption, database querying, access control, and compliance.

##### **3. Data Analytics and Machine Learning**

- Crucial for analyzing shared data, identifying trends, and assisting in city planning and resource allocation.
- Key aspects: Predictive analytics, data processing, anomaly detection, and resource optimization.

##### **4. Urban Planning and Management**

- Necessary for aligning inter-departmental cooperation with urban development goals.
- Key aspects: Project tracking, resource management, phased planning, and collaboration.

##### **5. Interoperability and Systems Integration**

- Critical to enable different departments' systems to work together within the platform.
- Key aspects: APIs, data exchange standards, integration testing, and cross-platform compatibility.

## **2.2 TECHNICAL KEYWORD (AS PER ACM KEYWORDS)**

### **1. Cloud Computing**

- Cloud Services
- Scalability
- Reliability
- Availability
- Cloud Infrastructure
- Distributed Storage and Data Management

### **2. Database Management and Storage Security**

- Data Management Systems
- Data Encryption and Privacy
- Access Control and Security Mechanisms
- Database Activity Monitoring
- Data Privacy and Anonymization

### **3. Data Analytics and Machine Learning**

- Predictive Analytics
- Anomaly Detection
- Big Data Analysis
- Resource Optimization
- Machine Learning Algorithms for Data Processing

### **4. Software and Platform Development**

- Web Application Development
- User Interfaces and Usability Testing
- Software Engineering for Large Systems

## **CHAPTER 3**

### **INTRODUCTION**

#### **3.1 PROJECT IDEA**

This project proposes the development of a centralized digital platform aimed at enhancing inter-departmental cooperation at the city level across Indian cities. In the current urban governance structure, various city departments—such as those handling infrastructure, transportation, health, water resources, and waste management—often work in isolation, leading to inefficiencies in communication, redundant processes, and resource misallocation. This platform seeks to address these issues by providing a secure, centralized repository for real-time data sharing, resource pooling, and unified project planning. Through streamlined communication channels, such as forums and private group messaging, departments can collaborate effectively, share best practices, and make informed decisions. The platform will feature tools for project tracking, allowing departments to monitor progress, assign tasks, and track milestones, helping to reduce delays and ensuring that projects are completed on schedule. Additionally, features like risk management, budget monitoring, and resource allocation will provide transparency and accountability, allowing departments to avoid budget overruns and manage resources efficiently. The platform will also support predictive analytics, enabling departments to anticipate project risks based on historical data, further minimizing delays and improving urban planning outcomes. By fostering a culture of transparency, accountability, and shared knowledge, this platform aims to transform urban governance, leading to faster project execution, cost savings, and a more resilient infrastructure that better meets the needs of growing urban populations. Ultimately, this project represents a step toward smarter, interconnected governance that empowers city departments to work collaboratively, enhancing the quality and efficiency of city administration for the benefit of all residents.

#### **3.2 MOTIVATION OF THE PROJECT**

The motivation behind this project lies in addressing the complex challenges that Indian cities face in achieving efficient, cohesive, and transparent urban governance. Rapid urbanization, growing population demands, and the evolving needs of city residents have placed increasing pressure on city departments to deliver public services effectively. However, siloed

operations and limited inter-departmental communication often lead to inefficiencies, redundant efforts, and resource wastage. Many city projects suffer delays and cost overruns due to a lack of coordinated planning, data-sharing, and real-time collaboration among departments. This results in misallocated resources, reduced transparency, and ultimately, a diminished quality of public services, affecting the daily lives of citizens.

This project is motivated by the vision of transforming these fragmented processes into a unified, collaborative, and technology-driven approach to city governance. By creating a centralized platform, we aim to streamline communication, improve accountability, and enable more effective resource allocation across departments. A digital platform that fosters inter-departmental cooperation not only enhances efficiency but also lays the foundation for more responsive and proactive governance, better equipping cities to manage crises, plan sustainable development, and deliver high-quality public services. This initiative is inspired by the need for resilient and sustainable urban governance models that can keep pace with modern urban challenges and drive Indian cities toward smarter, citizen-centered growth.

### **3.3 LITERATURE SURVEY**

A literature survey on inter-departmental cooperation in urban governance highlights the benefits and challenges of integrating digital platforms to enhance collaboration across city departments. In the context of Indian cities, fragmented operations and limited information sharing between departments often contribute to project delays, misallocated resources, and overall inefficiencies in public service delivery. Studies show that centralized digital platforms can play a transformative role in addressing these issues by facilitating real-time data sharing, improving decision-making, and minimizing redundancy in resource usage.

Several scholarly works emphasize the importance of data-driven governance and the integration of Information and Communication Technology (ICT) in urban management. For instance, research on smart cities explores the potential of digital platforms to create seamless information flow between departments, enabling a more responsive and transparent governance structure. Studies from global cities such as Singapore, Amsterdam, and Barcelona illustrate how integrated platforms can enhance inter-departmental coordination, leading to optimized project planning and streamlined urban management processes. These cities have successfully implemented centralized systems that allow for unified data storage, planning, and resource management, which Indian cities could replicate to address local challenges.

Moreover, literature on urban project management highlights the effectiveness of unified phasing and planning, particularly in reducing delays and cost overruns in large infrastructure projects. By allowing multiple departments to collaborate on a shared platform, project timelines and responsibilities can be better aligned, minimizing overlaps and improving accountability. Researchers also note that such platforms provide significant value in emergency management, where inter-departmental cooperation is critical for timely and effective response.

A number of case studies specifically address the challenges in the Indian context, where factors like bureaucratic inertia, lack of digital infrastructure, and resistance to change pose obstacles to implementing such collaborative solutions. However, literature suggests that these barriers can be overcome by adopting user-friendly digital interfaces, ensuring data security, and promoting transparency to build trust among stakeholders. Additionally, research on forums and private groups within digital platforms highlights their effectiveness in fostering communication, idea exchange, and feedback, which are essential for a dynamic and adaptable governance model.

In summary, the literature underscores that a centralized digital platform for inter-departmental cooperation could be a significant enabler for Indian cities. By enhancing communication, improving resource allocation, and supporting integrated project management, such a platform aligns with the global trends in smart governance and urban resilience, while also addressing unique local challenges. This project draws from these findings to propose a scalable, collaborative platform that could revolutionize urban governance and improve the quality of public services in India.

### **3.4 SOFTWARE CONTEXT**

This project's software context involves a centralized platform for inter-departmental cooperation in Indian urban governance, utilizing cloud-based data sharing, real-time communication, and project management tools. Key features include secure access-controlled data, unified monitoring dashboards, and cross-departmental forums to enhance collaboration, reduce inefficiencies, and improve project coordination and accountability across government departments.

### **3.5 OUTCOME**

The project outcomes include enhanced inter-departmental collaboration, streamlined resource sharing, reduced project delays, and improved transparency and accountability in urban governance. This platform will facilitate more efficient project planning, execution, and monitoring, ultimately leading to better resource utilization and improved public service delivery in Indian cities.

### **3.6 APPLICATION**

- 1) Infrastructure Development:** Coordinating projects like road, bridge, and facility construction.
- 2) Public Safety:** Facilitating communication between police, fire, and emergency services.
- 3) Sanitation and Waste Management:** Enhancing collaboration for waste collection and sanitation efforts.
- 4) Transportation Planning:** Streamlining traffic management, public transit updates, and route optimization.
- 5) Health and Emergency Response:** Enabling faster response for health services and disaster management.
- 6) Utilities Management:** Coordinating water, electricity, and other essential services across departments.
- 7) Urban Planning and Development:** Assisting in integrated urban project planning and resource allocation.
- 8) Environmental Management:** Supporting sustainable initiatives and environmental monitoring efforts.

### **3.7 HARDWARE RESOURCES REQUIRED**

- CPU: Multi-core processors
- RAM: Minimum 32 GB or Higher
- Storage: SSDs
- User Devices: Desktop, Laptop, Tablet, Smartphone

### **3.8 SOFTWARE RESOURCES REQUIRED**

- Operating System: Windows 10/11
- IDE: Visual Studio Code.
- Front End: ReactJS, TailwindCSS
- Back End: NodeJS, ExpressJS (RESTful API's)
- Database: MySQL
- API's Testing: Thunder Client / Postman
- Cloud computing: Microsoft Azure

## **CHAPTER 4**

### **PROJECT PLAN**

#### **4.1 PROJECT SCHEDULE**

##### **4.1.1 PROJECT RESOURCE**

###### **People:**

4 Group Member as a Developer/Tester

###### **Hardware:**

HDD 40GB and Above

SSD 20GB and Above

RAM 512 and Above

Processor i3 and above

###### **Software:**

Software: Microsoft Visual Studio Code 2019

Tools: ReactJS, NodeJS, Google ReCAPTCHA, Jupiter Notebook, AZURE Cloud.

##### **4.1.2 PROJECT TASK SET**

###### **Major Task in the Project stages are:**

- Task 1: ML Model Creation
- Task 2: Frontend Creation
- Task 3: Backend Creation
- Task 4: Integration
- Task 5: Deploy

## **4.2 TEAM ORGANIZATION**

### **4.2.1 TEAM STRUCTURE**

<b>Name</b>	<b>Designation</b>
Prashant U. Bedade	ML Model
Piyush B. Kale	Web Dev (Frontend)
Chetan P. Darade	Web Dev (Backend)
Chetan V. Jadhav	Deployment

Figure 4.1: Team Structure

# CHAPTER 5

## SOFTWARE REQUIREMENTS

### **5.1 INTRODUCTION**

#### **5.1.1 PURPOSE AND SCOPE OF DOCUMENT**

The purpose of this document is to outline the development, implementation, and operational framework of a centralized digital platform for inter-departmental cooperation in Indian cities. It serves as a comprehensive guide for stakeholders, including project managers, developers, and government officials, detailing the project's objectives, technical requirements, execution plan, and expected outcomes. By providing a structured overview, this document aims to ensure that all parties involved understand the project's goals, operational context, and anticipated benefits.

The scope of this document includes an in-depth exploration of the system's features, technical specifications, and security protocols, as well as guidelines for deployment and future scalability. It also addresses the platform's potential impact on urban governance, efficiency improvements, and enhanced inter-departmental collaboration, making it a critical resource throughout the project lifecycle.

#### **5.1.2 OVERVIEW OF RESPONSIBILITIES OF DEVELOPERS**

The developers in this project hold key responsibilities centered around designing, implementing, and maintaining the centralized platform for inter-departmental cooperation. They will start by working closely with project managers and stakeholders to understand the functional requirements and technical specifications, ensuring a comprehensive design phase. This includes setting up cloud infrastructure for secure data storage, developing user interfaces for data-sharing and project management modules, and integrating real-time communication tools for seamless inter-departmental collaboration.

Additionally, developers will implement access control features to secure sensitive data, design dashboards for monitoring ongoing projects, and optimize backend systems for high performance and scalability. They are also responsible for conducting thorough testing to ensure functionality, usability, and security standards. Post-deployment, developers will oversee

platform updates, address technical issues, and support system scalability as user demand increases. Their role will be vital in creating a user-friendly and efficient system that meets all requirements and facilitates streamlined urban governance.

## 5.2 USE CASES

### 5.2.1 USE CASE VIEW

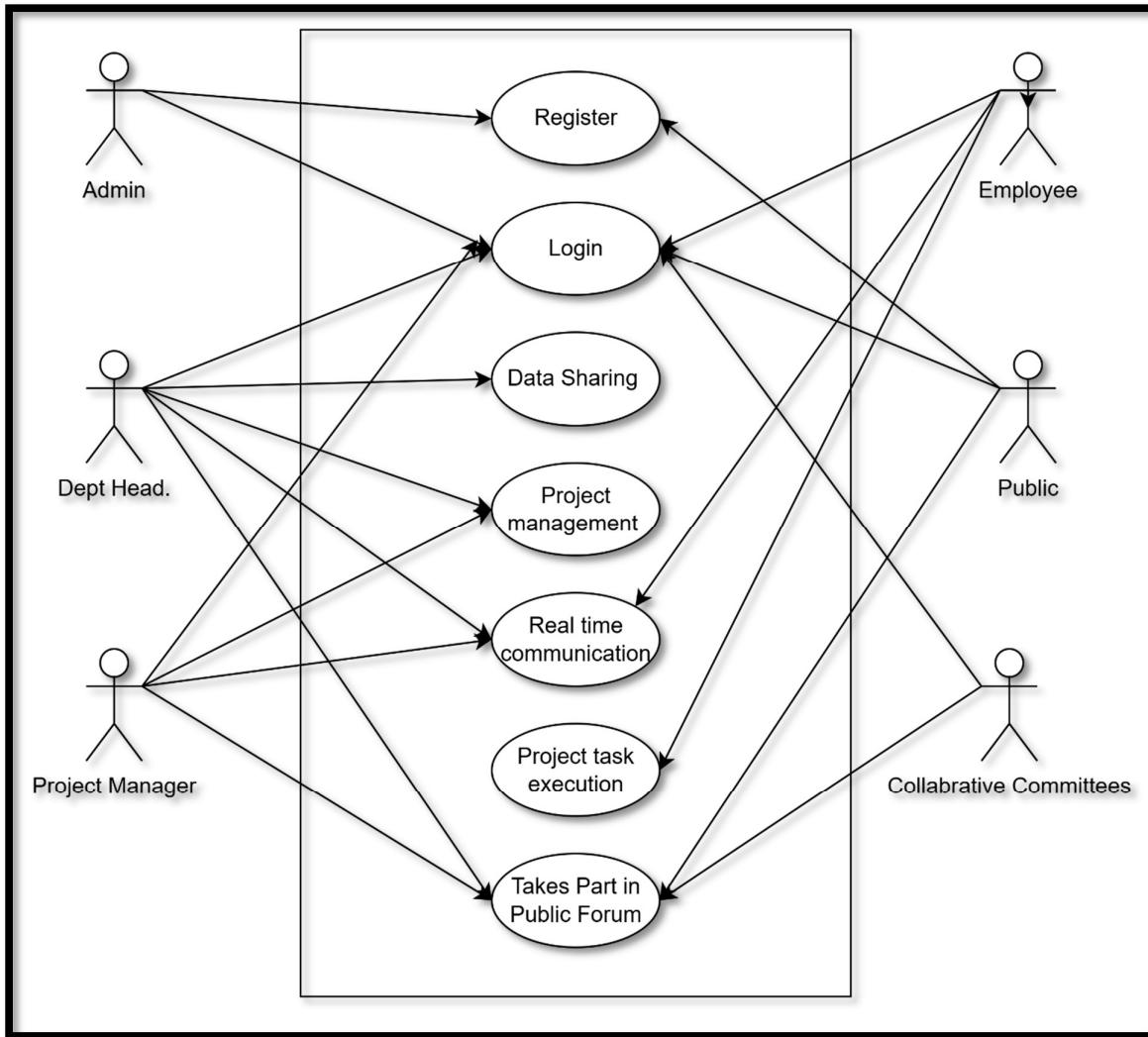


Figure 5.1: Use Case Diagram

### 5.2.2 FLOWCHART DIAGRAM

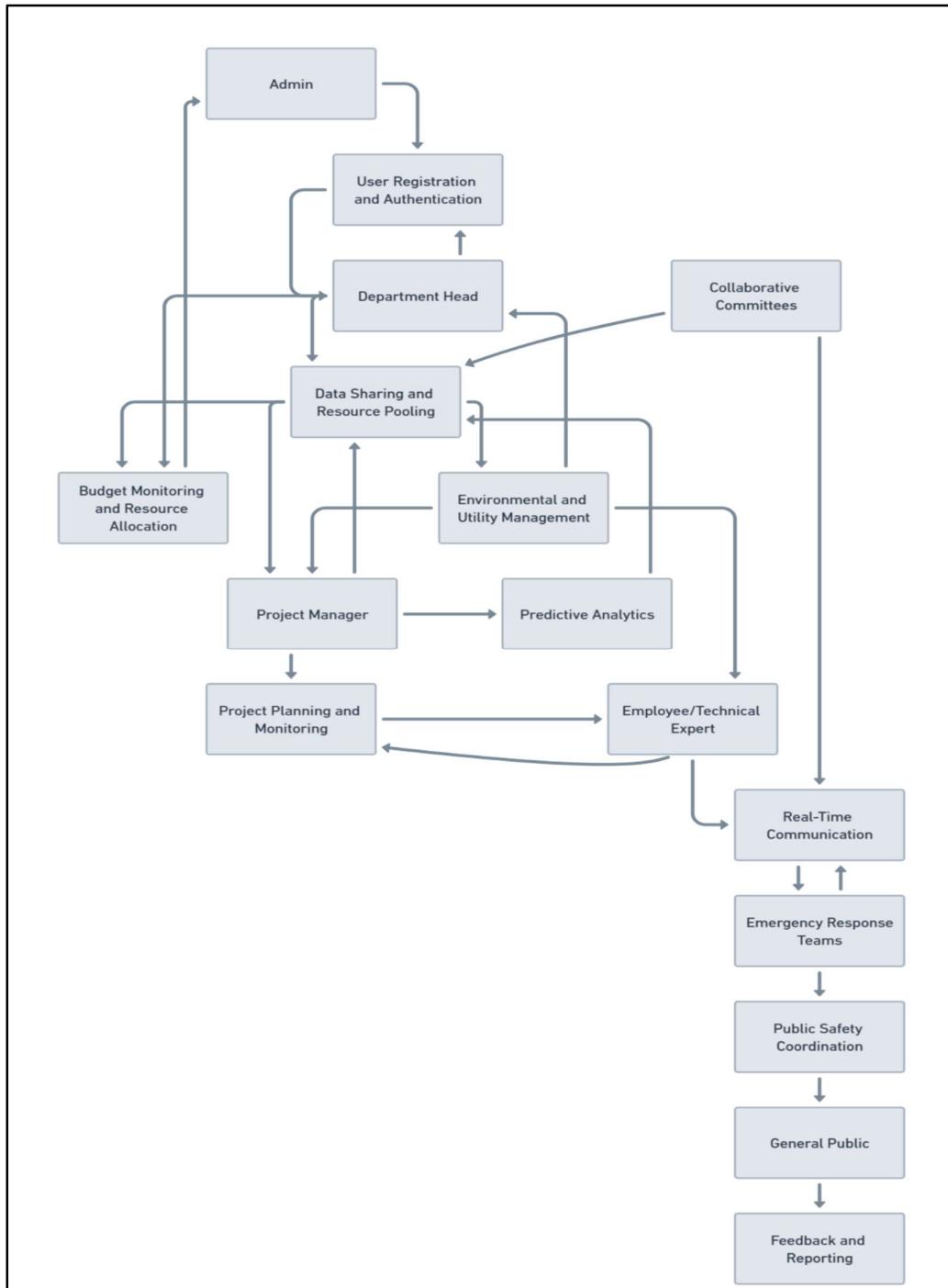


Figure 5.2: Flowchart Diagram

### 5.2.3 DATA FLOW DIAGRAM

#### 5.2.3.1 Level 0 Data flow Diagram

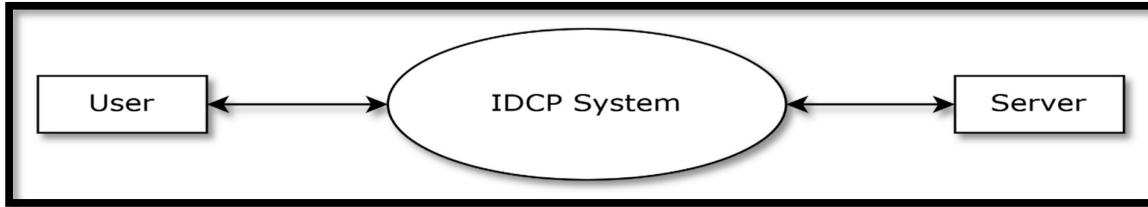


Figure 5.3: Level 0 Data Flow Diagram

#### 5.2.3.2 Level 1 Data Flow Diagram

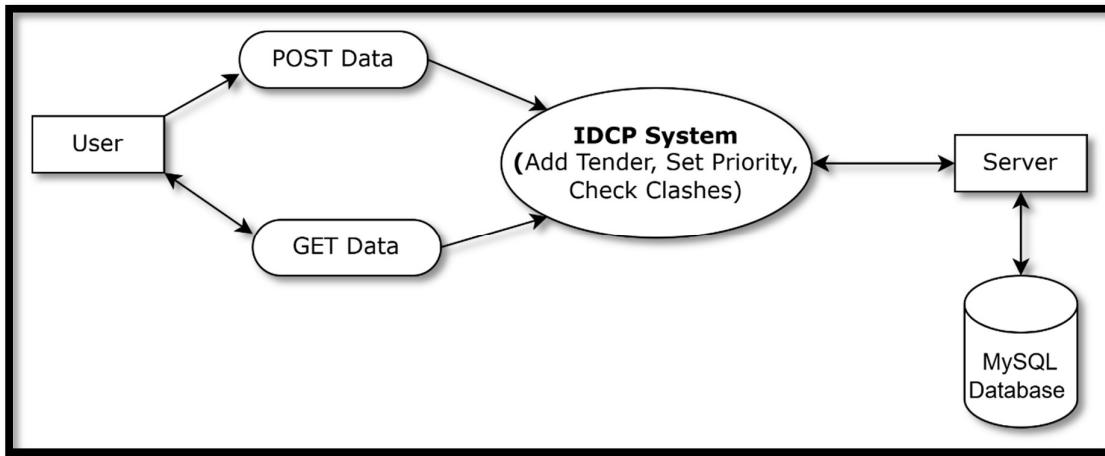


Figure 5.3: Level 1 Data Flow Diagram

### 5.2.4 NON- FUNCTIONAL REQUIREMENTS

- Interface Requirement:** Our project has interface that allows users to access the information of Tenders, Resources and Clashes of tenders on that particular location using the different factors.
- Performance Requirement:** The platform should handle multiple simultaneous user sessions without significant delay. Quick response time for data queries and real-time communication.
- Scalability:** The system must scale horizontally to support an increasing number of users and data load as more departments and projects are added.

4. **Security:** Strong authentication and access controls to safeguard sensitive departmental data. End-to-end data encryption to maintain confidentiality during communication and data transfer.
5. **Usability:** User-friendly interface for ease of use by varied actors, including non-technical users. Multi-language support for diverse user groups.
6. **Maintainability:** The platform should have a modular architecture for easier updates and maintenance. Detailed documentation and automated testing to support quick issue resolution.
7. **Compliance:** Adhere to government data protection laws and regulations. Comply with security standards for handling and processing sensitive information.
8. **Data Integrity:** Mechanisms to ensure the accuracy and consistency of data stored and retrieved.
9. **Scalability:** Ability to handle increased traffic and data without a performance drop.

### **5.2.5 DESIGN CONSTRAINTS**

The design constraints for this centralized digital platform include ensuring data security and compliance with Indian regulations, seamless integration with existing systems, and robust performance for real-time communication and data sharing. The platform must be scalable, user-friendly, and customizable, with multi-language support and accessibility for inclusivity. It should incorporate advanced analytics, backup systems for data recovery, and minimal downtime to support 24/7 operations. Budget considerations must guide cost-effective development, while training and support infrastructure should facilitate user onboarding. Finally, the platform needs to provide reliable data synchronization, adaptability for different departments, and tools for risk management and decision-making.

### **5.2.6 SOFTWARE INTERFACE DESCRIPTION**

The project uses React.js with a Vite template for a fast development environment and optimized builds. App routing is managed with react-router-dom, enabling seamless navigation across the login, register, and dashboard pages without page reloads. These pages are styled using Tailwind CSS, providing a consistent, responsive, and modern design. The login and register pages handle user input, validation, and interaction with backend services, while the dashboard offers user-specific content post-login. This setup ensures a user-friendly, interactive interface with efficient routing and appealing visuals.

## CHAPTER 6

### WORKING AND OUTPUT IMAGES

#### **6.1 DOMAINS AND THE ROLE IN PROJECT**

##### **6.1.1 ARTIFICIAL INTELLIGENCE & MACHINE LEARNING (AIML)**

- **Language Used:** Python
- **Platform Used:** Jupyter Notebook
- **Libraries Used:**
  - a) Pandas
  - b) Tkinter
  - c) Datetime
  - d) Sklearn
  - e) Numpy
  - f) Pickle
  - g) Googletras / Translator
- **Algorithm Used:** Linear Regression Algorithm
- **How the AIML plays a role into project:**

In an Interdepartmental Cooperation Platform (IDCP), AIML (Artificial Intelligence Markup Language) can be integrated with datasets and other systems (like databases, APIs, or spreadsheets) to pull up real-time data and automate processes.

##### **6.1.2 WEB TECHNOLOGY (FRONTEND):**

- **Language Used:** ReactJS, TailwindCSS
- **Platform Used:** VS Code

➤ **How the Frontend plays a role into project:**

We've built the frontend using a Vite template, with routing managed by react-router-dom. The project includes login, register, and dashboard pages, styled with Tailwind CSS.

**6.1.3 WEB TECHNOLOGY (BACKEND):**

➤ **Language Used: NODE JS (EXPRESS JS)**

➤ **Platform Used: VS Code**

➤ **Dependencies Used:**

- a) Express
- b) body-parser
- c) mysql2
- d) dotenv
- e) nodemon
- f) sequelize

➤ **How the Backend plays a role into project:**

We've built the backend using a NodeJS, with using ExpressJS. The project includes login, register, Search and Filter API and Check Clash API.

**6.1.4 CLOUD COMPUTING:**

➤ **Platform Used: Vercel, Render, Microsoft AZURE.**

➤ **How the Cloud Computing plays a role into project:**

We've Use Cloud Computing for Deploying the Frontend on Vercel, Backend on Render and Whole Project on Microsoft Azure.

## 6.2 OUTPUT IMAGES

### 6.2.1 ML

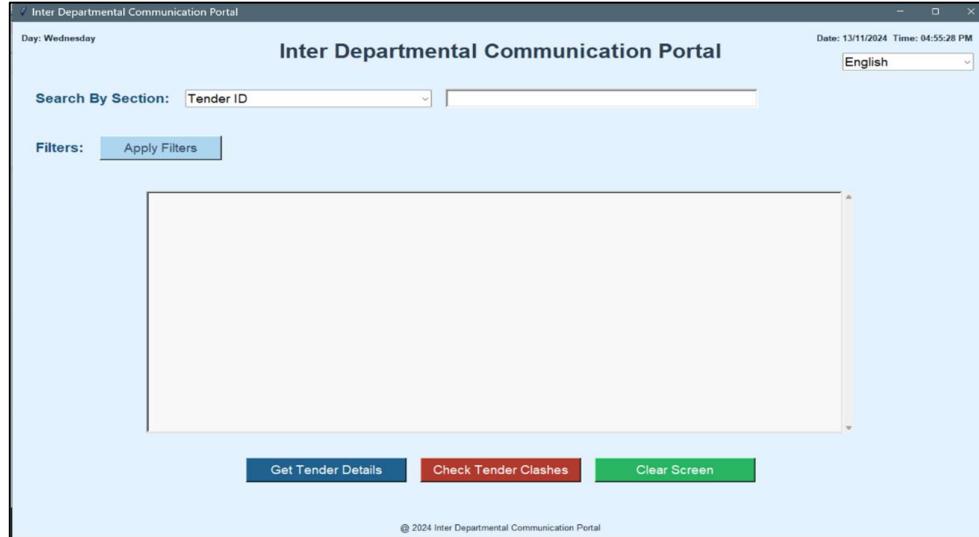


Figure 6.1: ML model Interface for Filter the Data

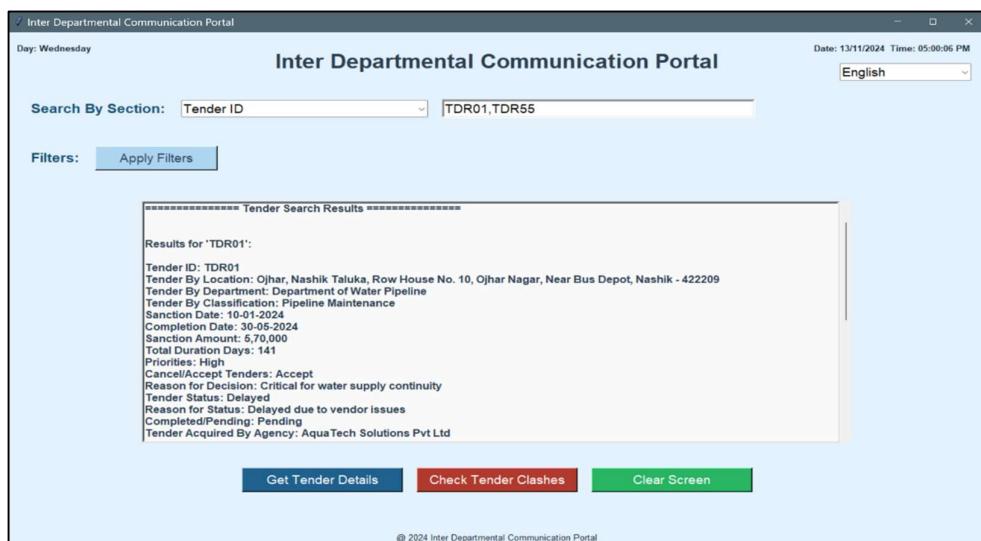


Figure 6.2: ML model Interface for Detecting Clash of tenders

## 6.2.2 WEB TECHNOLOGY

### 6.2.2.1 FRONTEND

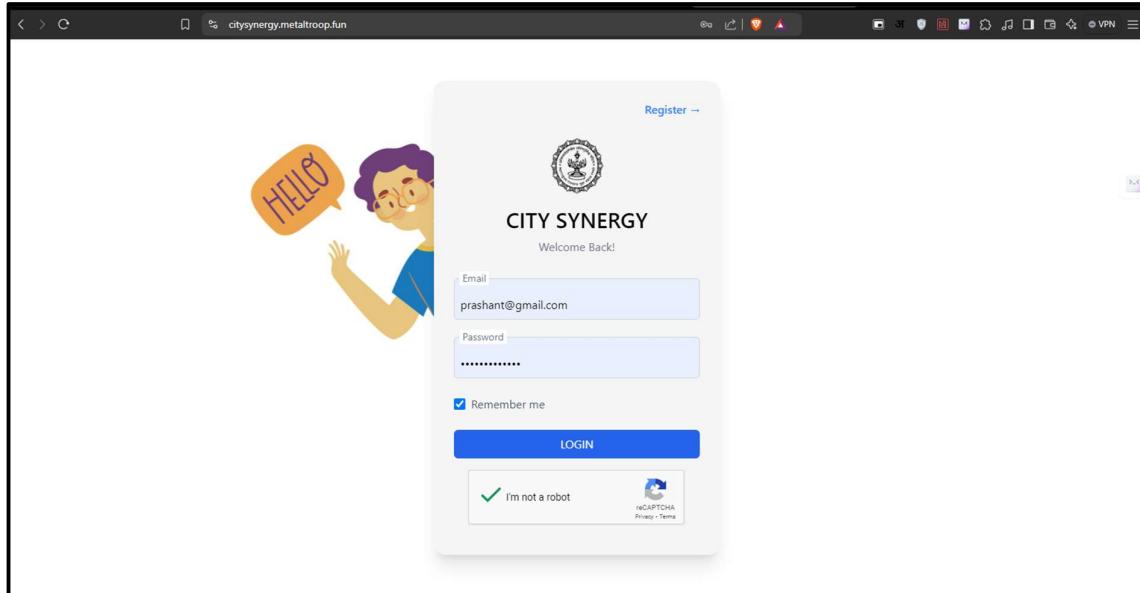


Figure 6.3: Login Page

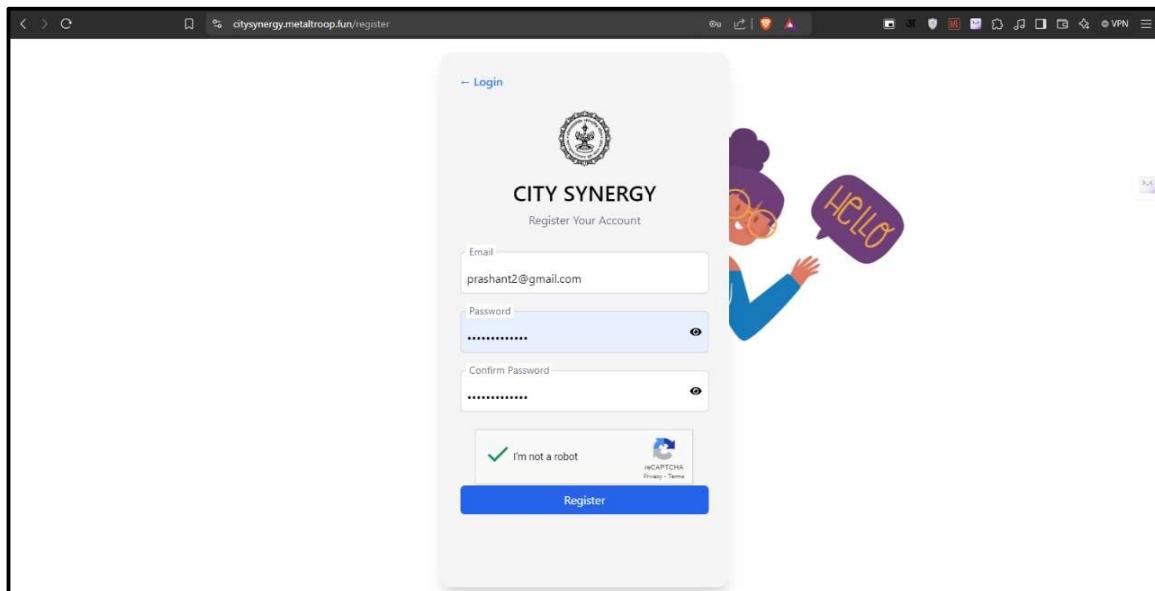
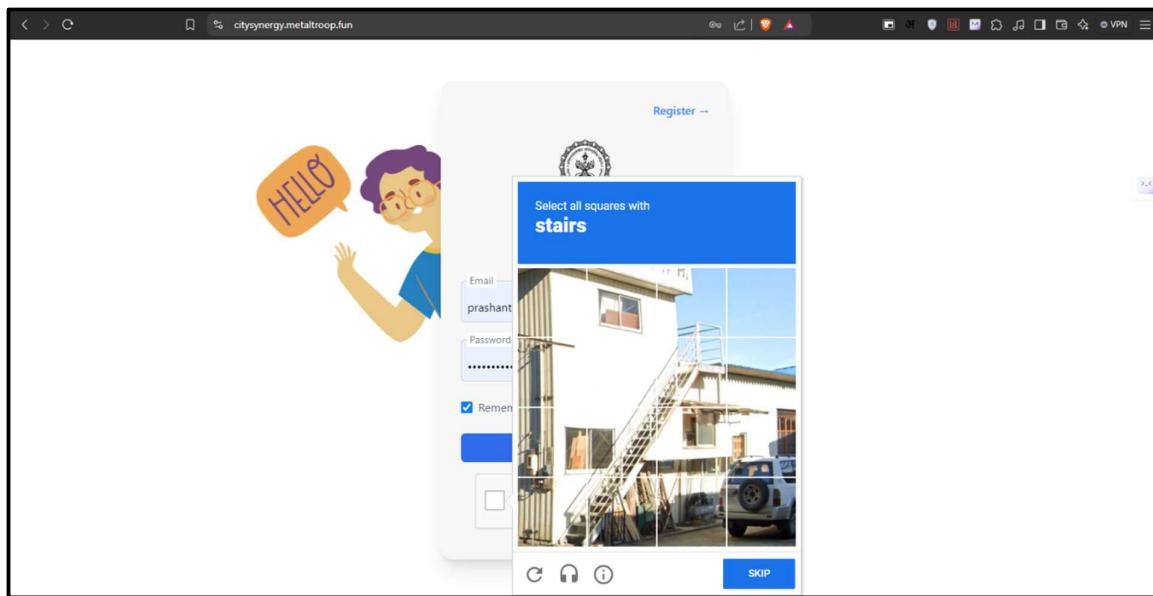


Figure 6.4: Register Page



**Figure 6.5: ReCAPTCHA**

A screenshot of a web browser displaying the "Tender Dashboard". The dashboard has a light gray background with several sections. At the top left is a search bar with the placeholder "Location" and a dropdown menu showing "ozar". Below the search bar is a "Search &amp; Filter Tenders" section containing a "Filter Columns" dropdown menu with several checked options: "Tender ID", "Tender By Location", "Tender By Department", "Tender By Classification", and "Sanction Date". There is also an unchecked option for "Completion Date". Below the filter menu is a "Search &amp; Filter" button. To the right of the search section is a "Check Clashes" button. A "Clash Result" table is shown, listing six tenders with their details: TDR17, TDR19, TDR28, TDR66, TDR67, and TDR68. The table includes columns for Tender ID, Pincode, Sanction Date, Completion Date, and Priority. The "Tenders List" section contains a table with three rows of tender data. The columns are "Tender ID", "Location", "Department", "Classification", and "Status". The tenders listed are TDR18, TDR41, and TDR75. At the bottom of the dashboard are navigation buttons for "Previous", "Page 1", and "Next".

**Figure 6.6: Tender Dashboard**

### 6.2.2.2 BACKEND

POST <http://localhost:3001/auth/register> Send

Query Headers 2 Auth Body 1 Tests Pre Run

JSON XML Text Form Form-encode GraphQL Binary

```
1 {
2   "username": "exampleUser2",
3   "password": "securePassword123",
4   "conform_password": "securePassword123"
5 }
6
```

Status: 201 Created Size: 236 Bytes Time: 124 ms Response ▾

```
1 {
2   "message": "User registered successfully",
3   "user": {
4     "id": 5,
5     "username": "exampleUser2",
6     "password": "$2a$10$uWgCcfSLf1ds3kF84YH/r.z2u93tr7qCxnnZvxIZ5yoYdDdwv3Gku",
7     "updatedAt": "2024-11-13T17:37:23.851Z",
8     "createdAt": "2024-11-13T17:37:23.851Z"
9   }
10 }
```

Figure 6.7: Register API

POST <http://localhost:3001/auth/login> Send

Query Headers 2 Auth Body 1 Tests Pre Run

JSON XML Text Form Form-encode GraphQL Binary

```
1 {
2   "username": "exampleUser1",
3   "password": "securePassword123"
4 }
5
```

Status: 200 OK Size: 213 Bytes Time: 123 ms Response ▾

```
1 {
2   "message": "Login successful",
3   "token": "eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9
4 .eyJpZCI6NCwidXNlc5hbWUiOiJleGFtcGx1VXNlcjEiLCJpYXQiOjE3MzE1MTk0MTQsImV4cCI6MTczMTUyMzAxNHB45r9Ed4kLRB
5 -2MIEwAmdJTs15HuXfernWr4BjtJdjcI"
```

Figure 6.8: Login API

The screenshot shows a Postman request to `http://localhost:3001/api/tenders/filter`. The request body is a JSON object:

```

1  {
2      "search_by": "Tender_By_Location",
3      "search_term": "Nashik",
4      "filter_columns": ["Tender_ID", "Tender_By_Location", "Tender_By_Department", "Completion_Date",
5                          "Total_Duration_Days"]
6  }

```

The response status is 200 OK, size is 23.55 KB, and time is 37 ms. The response body contains two items:

```

1  [
2      {
3          "Tender_ID": "TDR01",
4          "Tender_By_Location": "Ojhar, Nashik Taluka, Row House No. 10, Ojhar Nagar, Near Bus Depot, Nashik",
5          "Tender_By_Department": "Department of Water Pipeline",
6          "Completion_Date": "2024-05-30",
7          "Total_Duration_Days": 141
8      },
9      {
10         "Tender_ID": "TDR02",
11         "Tender_By_Location": "Dhulewadi, Nashik Building No. 15, Dhulewadi Society, Near Market Area, Nashik"
12     }
13 ]

```

**Figure 6.9: Filter API**

The screenshot shows a Postman request to `http://localhost:3001/api/clashtenders/checkclashes`. The request body is a JSON object:

```

1  {
2      "pincode": "422101"
3  }

```

The response status is 200 OK, size is 3.73 KB, and time is 557 ms. The response body contains a list of clashes:

```

1  {
2      "clashes": [
3          "clashes": [
4              {
5                  "Tender_ID": "TDR88",
6                  "Tender_By_Department": "Department of Disaster Management",
7                  "Pincode": "422101",
8                  "Sanction_Date": "2024-04-06",
9                  "Completion_Date": "2024-08-25",
10                 "Priorities": "High"
11             },
12             {
13                 "Tender_ID": "TDR78",
14                 "Tender_By_Department": "Department of Housing",
15                 "Pincode": "422101",
16             }
17         ]
18     }
19 }

```

**Figure 6.10: Check Clash API**

### 6.2.3 CLOUD COMPUTING

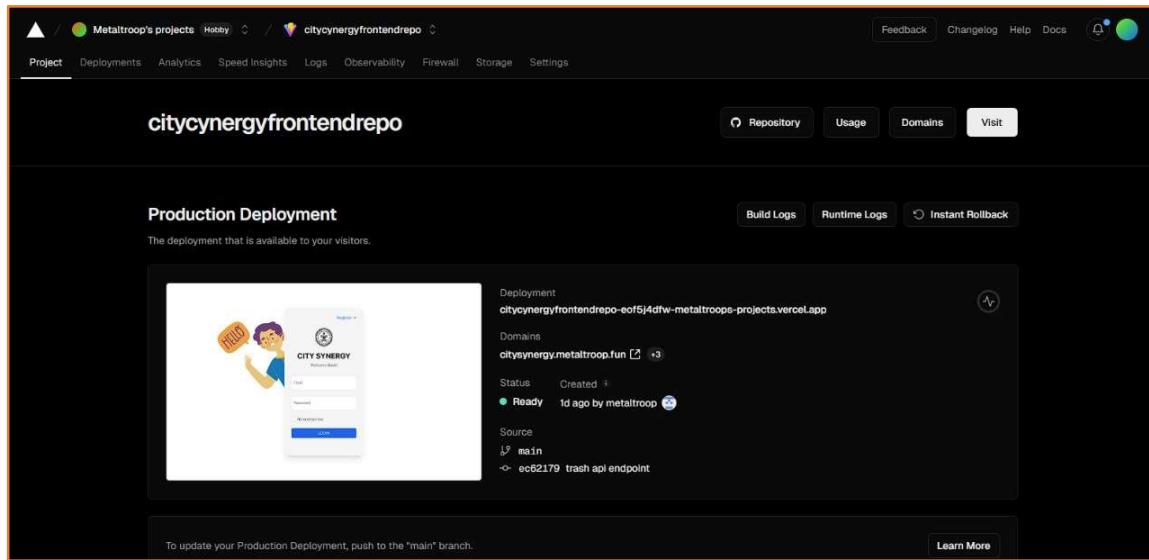


Figure 6.11: Vercel Frontend Hosting

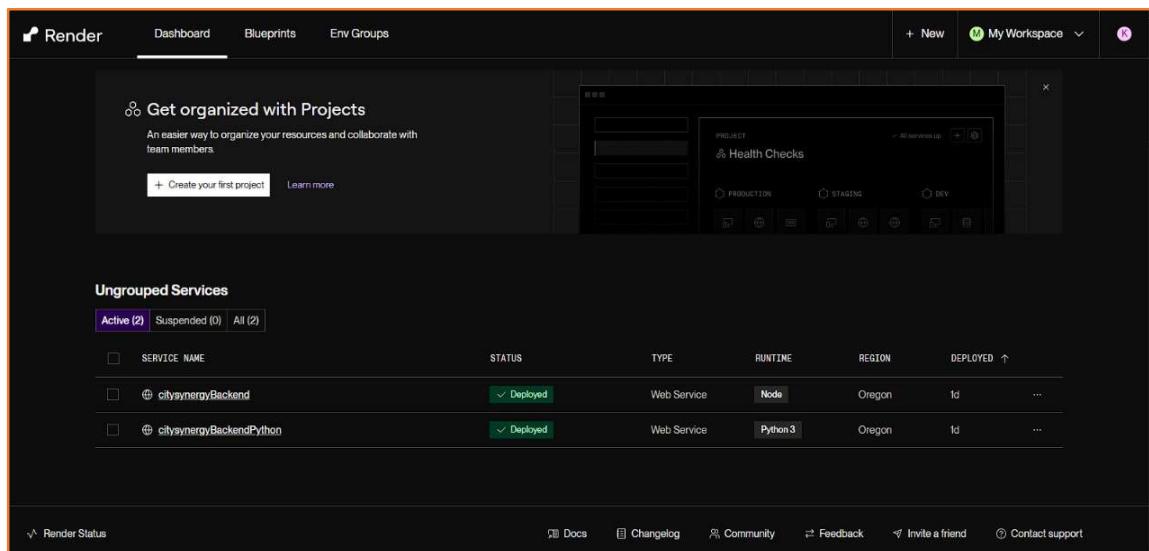
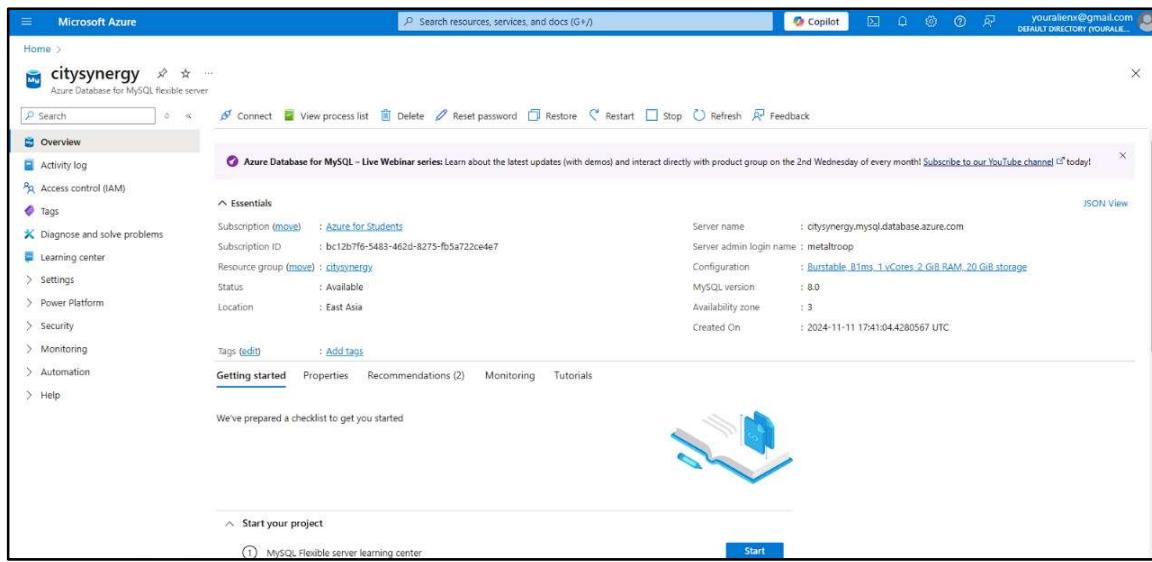


Figure 6.12: Render Backend Hosting



**Figure 6.13: Azure Database Hosting**

## CHAPTER 7

### TESTING

#### 7.1 Register page

Step No.	Test Case	Expected Result/Output	Actual Result
1	Input a valid email	The email field accept input	“Email Accepted successfully”
2	Enter valid password	The password field accept input	Password Accepted
3	Enter same password in confirm password	Input Accepted	Confirm password accepted
4	Verify CAPTCHA	Click tic on checkbox	Verified <input checked="" type="checkbox"/>
5	Click Register button	User Register Successfully	“User registered successfully”
6	Email field is blank	Please enter email	Please enter email address
7	Password and confirm password are not match	Passwords do not match	Passwords do not match

Table 7.1: Register Test Case Table

#### 7.2 Login Page

Step no.	Test Case	Expected Result/Output	Actual Result/Output
1	Email invalid but password valid	Invalid username or password	Invalid username or password
2	Email valid but password invalid	Invalid username or password	Invalid username or password
3	Email and password both valid	Login successful	Login successful and JWT Token generated
4	Email and password both invalid	Invalid username or password	Invalid username or password
5	Click Login button	Login successful	Login successful and JWT Token generated

Table 7.2: Login Test Case Table

### 7.3 Tender Dashboard (Search & Filter Tender)

<b>Step no.</b>	<b>Test Case</b>	<b>Expected Result/Output</b>	<b>Actual Result/Output</b>
<b>1</b>	Section not selected	Search and Filter Failed	Search and filter failed
<b>2</b>	Search field in empty	Search and Filter Failed	Search and Filter Failed
<b>3</b>	Filters are not selected	Search and Filter Failed	Search and Filter Failed
<b>4</b>	Section is selected filter column are selected but search value is invalid	Missing required fields in request body	Search and Filter Failed
<b>5</b>	Section is selected filter column are selected and search value is valid	200 OK and Tender list is displayed	200 OK and Tender list is displayed
<b>6</b>	Click on “Search & Filter” button	200 OK and Tender list is displayed	200 OK and Tender list is displayed

Table 7.3: Tender Dashboard (Search and Filter Tenders) Test Case.

### 7.4 Check Clashes

<b>Step no.</b>	<b>Test Case</b>	<b>Expected Result/Output</b>	<b>Actual Result/Output</b>
<b>1</b>	Invalid Pincode	Failed to check clashes	Failed to check clashes
<b>2</b>	Empty Pincode field	Failed to check clashes	Failed to check clashes
<b>3</b>	Valid Pincode	Clash Result Displayed	Clash Result Displayed
<b>4</b>	Click on “Check Clashes” button	Clash Result Displayed	Clash Result Displayed

Table 7.4: Tender Dashboard (Check Clashes) Test Case.

## **CHAPTER 8**

### **SUMMARY AND CONCLUSION**

The Interdepartmental Cooperation Platform is designed to enhance communication and streamline tender management across government departments. It centralizes tender information with a user-friendly interface, allowing stakeholders to track, filter, and manage tenders from various sectors like agriculture, health, and public works. Key features include "Tender By Location," "Amount Sanction," and "Tender Status," along with search and category-based filtering for tenders. The platform supports multi-level access, secure data input, notifications, and automated alerts for overlapping projects. Integrated with databases and APIs, it ensures real-time updates for informed decision-making and efficient resource management, fostering transparency and collaboration.

## **CHAPTER 9**

### **REFERENCES**

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4. <https://smartcities.gov.in/>
5. <https://nashiksmartcity.in/project/>
6. <https://mahatenders.gov.in/nicgep/app>