A

MINI PROJECT REPORT

ON

ONLINE MONITORING OF UNAUTHORIZED CONSTRUCTION ACROSS THE CITY

Submitted to

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

In partial fulfilment of the requirement for the award of the degree of

BACHELOR OF TECHNOLOGY

in

INFORMATION TECHNOLOGY

By

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DEPARTMENT OF INFORMATION TECHNOLOGY

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY & MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
NAAC Accredited Institution with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

June 2025

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DEPARTMENT OF INFORMATION TECHNOLOGY

Date:

CERTIFICATE

This is to certify that the project work entitled **"ONLINE MONITORING OF UNAUTHORIZED CONSTRUCTION ACROSS THE CITY"** work done by **DONIPELLY ADITHYA (227Y1A1266), ANNAM RAHUL REDDY (227Y1A1299) and KURICHETI SIRISHA (227Y1A12B3)** students of Department of Information Technology, is a record of bonafide work carried out by the members under the supervision of **Mrs. KARIMUNNISA SHAIK**. This project is done as a fulfilment of obtaining Bachelor of Technology Degree to be awarded by Jawaharlal Nehru Technological University Hyderabad, Hyderabad. The matter embodied in this project report has not been submitted by us to any other university for the award of any other degree.

DONIPELLY ADITHYA **ANNAM RAHUL REDDY** **KURICHETI SIRISHA**

This is to certify that the above statement made by the candidates is correct to the best of my knowledge.

Date: **(Mrs. KARIMUNNISA SHAIK)**

The Viva-Voce Examination of above students, has been held on……

Project Coordinator Head of the Department

External Examiner Principal/Director

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DECLARATION

We hereby declare that the Mini Project Report entitled, "**ONLINE MONITORING OF UNAUTHORIZED CONSTRUCTION ACROSS THE CITY** " submitted for the B. Tech degree is entirely my work and all ideas and references have been duly acknowledged. It does not contain any work for the award of any other degree.

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ACKNOWLEDGEMENT

We would like to express my sincere gratitude to my guide **Mrs. KARIMUNNISA SHAIK, Assistant Professor**, Information Technology, for her excellent guidance and invaluable support, which helped me accomplish the B. Tech (IT) degree and prepared me to achieve more life goals in the future. Her total support of my dissertation and countless contributions to my technical and professional development made for a truly enjoyable and fruitful experience. Special thanks are dedicated for the discussions we had on almost every working day during my project period and for reviewing my dissertation.

We are very much grateful to my Project Coordinator**, Dr. B. PRAVEEN, Associate Professor,** Information Technology, MLRITM, Dundigal, Hyderabad, who has not only shown utmost patience, but was fertile in suggestions, vigilant in directions of error and has been infinitely helpful.

We are extremely grateful to HOD **Dr. M. NAGALAKSHMI Professor**, MLRITM, Dundigal, Hyderabad, for the moral support and encouragement given in completing my project work.

We wish to express deepest gratitude and thanks to **Dr. R. MURALI PRASAD, Principal, and Dr. P. SRIDHAR, Director** for their constant support and encouragement in providing all the facilities in the college to do the project work.

We would also like to thank all our faculties, administrative staff and management of MLRITM, who helped me to completing the mini project.

On a more personal note, I thank my **beloved parents and friends** for their moral support during the course of our project.

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LIST OF ABBREVIATIONS

HTML	Hyper Text Markup Language
CSS	Cascading Style Sheet
AI	Artificial Intelligence
ML	Machine Learning
GPU	Graphics Processing Unit
API	Application Programming Interface
NMS	Non-Maximum Suppression
FPS	Frames Per Second
OCR	Optical Character Recognition
CNN	Convolutional Neural Network
SSD	Single Shot Detector
TPU	Tensor Processing Unit

LIST OF TABLES

PROGRAM OUTCOMES (POs)

1. **User-Centered Design & Usability**
   - **Outcome**: Develop a mobile application that is intuitive, accessible, and provides seamless navigation for both domestic and international beachgoers.
   - **Key Skills**: UX/UI design, responsive design principles, usability testing, user feedback integration.

2. **Real-Time Data Integration & API Usage**
   - **Outcome**: Implement real-time beach condition data (weather, water quality, tidal movements, etc.) to provide users with up-to-date information for their safety and convenience.
   - **Key Skills**: API integration, working with real-time data, data visualization (graphs, maps), Flutter State Management.

3. **Environmental Awareness & Sustainability**
   - **Outcome**: Increase awareness about beach pollution, water quality, and environmental concerns, encouraging responsible tourism.
   - **Key Skills**: Environmental data handling, promoting eco-friendly behavior through app notifications or tips.

4. **Safety & Risk Management**
   - **Outcome**: Provide safety-related alerts and suggestions (e.g., dangerous currents, weather warnings) to minimize risks and improve the overall safety of beachgoers.
   - **Key Skills**: Location-based services, push notifications, hazard alerts.

5. **Performance Optimization & Scalability**
   - **Outcome**: Build an app with high performance, quick load times, and smooth operation, even when accessed by large numbers of users simultaneously, especially during peak tourist seasons.
   - **Key Skills**: Flutter performance optimization, asynchronous programming, scalable infrastructure for handling large datasets.

6. **Cross-Platform Development & Portability**

   • **Outcome**: Create a cross-platform application that runs smoothly on both iOS and Android, providing a consistent user experience across devices.

   • **Key Skills**: Cross-platform mobile development, Flutter widget mastery, platform-specific adjustments.

7. **Data Security & Privacy**

   • **Outcome**: Ensure the security and privacy of user data (e.g., location, personal preferences) while complying with legal standards and best practices.

   • **Key Skills**: Data encryption, secure data storage, user authentication, GDPR compliance.

PROGRAM SPECIFIC OUTCOMES (PSOs):

1. **Development of Cross-Platform Mobile Applications**

   • **PSO 1.1**: Design and implement cross-platform mobile applications that run seamlessly on both Android and iOS devices using Flutter, ensuring high performance, responsiveness, and consistency across platforms.

2. **Real-Time Data Handling and Integration**

   • **PSO 2.1**: Integrate real-time data sources (weather, water quality, tides) from external APIs into the mobile application, providing users with up-to-date information on beach conditions.

3. **Location-Based Services and Navigation**

   • **PSO 3.1**: Implement location-based services to provide users with personalized, real-time information such as nearby beaches, weather updates, pollution levels, and safety alerts.

4. **User-Centric Design and Experience**

   • **PSO 4.1**: Develop an intuitive and user-friendly interface that prioritizes a seamless and engaging experience for tourists, ensuring accessibility for a wide range of users.

5. **Sustainability and Environmental Awareness Integration**

   • **PSO 5.1**: Integrate features that promote eco-tourism and environmental awareness, including beach cleanliness tracking, pollution alerts, and responsible tourism guidelines.

6. **Safety and Risk Management Features**

   • **PSO 6.1**: Implement safety features such as real-time hazard warnings (e.g., dangerous ix currents, weather disruptions), emergency contact systems, and safety guidelines for beachgoers.

7. **Performance Optimization and Scalability**
   • **PSO 7.1**: Ensure the app is optimized for performance, including fast loading times, minimal battery consumption, and smooth navigation, even under heavy user load during peak seasons.
8. **Data Privacy and Security**
   • **PSO 8.1**: Implement best practices in data privacy and security, ensuring that user information (location, preferences, etc.) is stored and transmitted securely, adhering to relevant legal standards.
9. **Engagement with Stakeholders and Continuous Feedback Integration**
   • **PSO 9.1**: Establish mechanisms for gathering feedback from end-users, local authorities, and environmental experts to continuously improve the app and address user needs and concerns.
10. **Support for Multiple Languages and Localization**
    • **PSO 10.1**: Implement multi-language support and localization features to cater to a diverse user base, offering language options specific to different coastal regions and international tourists.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: Development of an Innovative and Reliable Tourism Solution:
To design and develop a smart, real-time, and user-friendly mobile application using Flutter that enhances the safety, convenience, and overall experience of beachgoers in India.

PEO 2: Promotion of Sustainable and Eco-Friendly Tourism:
To encourage environmentally responsible tourism by integrating features that provide information on pollution levels, cleanliness drives, and eco-friendly travel tips.

PEO 3: Ensuring Safety and Risk Management for Beachgoers:
To integrate safety and hazard alerts into the mobile application, providing real-time warnings about high tides, dangerous currents, weather disruptions, and pollution hazards.

PEO 4: Leveraging Technology for Smart Tourism Development:
To utilize Flutter, AI, IoT, and real-time data integration to create a technologically advanced tourism application.

PROJECT OUTCOMES

1. **Real-Time Beach Condition Monitoring**: The app will provide real-time updates on beach conditions, including weather, tides, water quality, and crowd levels. Tourists can make informed decisions before visiting a beach, improving safety and convenience.

2. **Location-Based Services and Smart Navigation**: GPS integration will allow users to find nearby beaches, get directions, and access safety alerts. Easier navigation and personalized recommendations based on user location.

3. **Enhanced Tourist Safety with Alerts and Emergency Services**: The app will send real-time alerts for high tides, pollution, extreme weather, and safety risks. Reduced accidents and improved emergency response for beachgoers.

4. **Environmental Awareness and Sustainable Tourism**: The app will display pollution levels, cleanliness scores, and eco-friendly tips to promote sustainable tourism. Increased awareness of beach conservation, leading to cleaner and more sustainable coastal tourism.

5. **Multi-Language Support and Accessibility Features**: The app will support multiple languages, making it accessible to domestic and international tourists. A more inclusive tourism experience for people from different backgrounds and abilities.

6. **Local Business and Economy Boost**: Integration of local businesses, hotels, restaurants, and water sports activities into the app. Increased visibility and revenue for local vendors and tourism operators.

7. **Cross-Platform Mobile App with High Performance**: The Flutter-based app will run efficiently on both Android and iOS devices with a smooth UI/UX experience. A seamless, high-performance app accessible to a wide audience.

8. **Secure Data Management and Privacy Protection**: The app will follow data security best practices, including encryption, secure authentication, and GDPR compliance. Users' personal data and privacy will be protected.

9. **Continuous Updates and Scalability**: The app will be designed for future enhancements, allowing integration of new beaches, AI-driven recommendations, and IoT sensors. A scalable solution adaptable to other coastal regions and global tourism markets.

10. **Improved Stakeholder Collaboration**: The project will involve tourism boards, environmental agencies, and local authorities for data accuracy and tourism planning. A collaborative tourism management system benefiting both tourists and local authorities.

COURSE OUTCOMES

CO 1: Understanding Cross-Platform Mobile Development
CO 2: Real-Time Data Integration & API Handling
CO 3: Implementation of Location-Based Services
CO 4: UI/UX Design and User Experience Optimization
CO 5: Safety & Risk Management Features
CO 6: Sustainable and Eco-Friendly Tourism Awareness
CO 7: Performance Optimization & Scalability
CO 8: Multi-Language Support & Accessibility
CO 9: Security & Privacy in Mobile Applications
CO 10: Business & Monetization Strategies
CO 11: Project Management & Agile Development
CO 12: Continuous Learning & Technological Advancements

ABSTRACT

Unauthorized constructions disrupt planned urban development and present challenges for authorities to maintain city infrastructure and enforce regulations. Despite efforts by urban planning bodies and municipal corporations, traditional methods of identifying and addressing such constructions are often inefficient, time-consuming, and fragmented. To overcome these limitations, we propose the "Online Monitoring of Unauthorized Construction Across the City," a transformative web-based application designed to streamline the process of identifying, reporting, and tracking unauthorized constructions using advanced web technologies, machine learning, and real-time data management.

The system enables users including citizens and municipal authorities to report unauthorized construction activities by uploading relevant details and supporting evidence such as images. These reports are stored securely in a centralized database and cross-referenced for validation, while the platform generates real-time updates and alerts, notifying authorities of new incidents and tracking progress on existing cases.

The platform architecture is modular, ensuring scalability, maintainability, and security. The frontend, developed using HTML, CSS, and JavaScript, offers a responsive user interface for smooth reporting and tracking. A backend powered by SQL databases manages user reports and construction data efficiently. Key functionalities include real-time data collection, alert generation, dashboard visualization for progress tracking, and role-based access for authorities and users. With plans for future upgrades, the system is poised to integrate geospatial mapping for location tracking, predictive analytics to identify high-risk areas, and mobile application support to facilitate on-the-go reporting. These enhancements will further improve monitoring efforts and ensure swift interventions against unauthorized urban developments.

CHAPTER 1
INTRODUCTION

1.1 Problem Statement

The Urban development is growing rapidly, but with it comes the increasing problem of unauthorized constructions that violate zoning regulations and strain city infrastructure. Currently, the detection and management of unauthorized construction activities largely depend on manual inspections, public complaints, and fragmented reporting systems. These traditional methods are inefficient, time-consuming, and often delayed, resulting in challenges for urban planning authorities to maintain transparency, compliance, and effective enforcement. The absence of a centralized, real-time monitoring platform leads to delayed interventions, lack of proper documentation, and difficulty in identifying trends or patterns of violations across the city.

1.2 Objectives

The primary objective of this project is to design and implement an online, real-time monitoring system that enables efficient reporting, tracking, and management of unauthorized construction activities across urban areas. The platform will allow citizens and municipal authorities to upload reports, submit photographic evidence, and track the progress of each case through a user-friendly interface.
A key goal is to provide urban planning authorities with a dynamic, data-rich dashboard that offers real-time insights into reported violations, case statuses, geographic concentration of unauthorized activities, and officer performance metrics. This will assist in identifying critical areas, improving response times, streamlining enforcement actions, and promoting transparency and accountability in urban governance.

1.3 Scope of the Project

The scope of this project includes the design, development, and deployment of a real-time, web-based monitoring system dedicated to tracking unauthorized constructions across the city. The system will integrate a responsive frontend for citizen reporting and authority tracking, a robust backend for secure data storage and processing, and alert mechanisms to notify stakeholders of new violations.

The project will support the upload of images and geolocation information, provide real-time updates on case statuses, and deliver analytical dashboards for performance monitoring and strategic planning. Future scope includes the integration of GIS-based geospatial mapping, predictive analytics for violation trends, and mobile application support for broader accessibility and real-time citizen engagement.

1.4 Methodology

The **Online Monitoring of Unauthorized Construction Across the City** project follows a systematic development methodology to ensure successful and efficient implementation. The project is executed in the following key phases:

Requirement Analysis:

Stakeholder Consultation: Meetings with municipal authorities, urban planning departments, and end-users to gather functional and non-functional requirements.

Database Schema Design: Define tables for users, reports, images, violation statuses, and authority actions using SQL.

System Design:

Architecture Planning: Design a scalable, three-tier architecture separating presentation, business logic, and data storage layers.

Database Schema Design: Utilize Prisma to define and manage the database schema, ensuring efficient data handling.

User Interface Design: Build responsive and accessible web pages using HTML5, CSS3, and JavaScript.

Development:

Frontend Development: Implement a dynamic user interface with real-time updates for reporting and tracking violations.

Backend Development: Develop backend services using Python (Django/Flask) to manage business logic, APIs, and database connectivity.

Authentication Implementation: Incorporate secure login systems for both citizens and administrators.

Testing:

Unit Testing: Test individual modules like form submission, data upload, and case tracking.

Integration Testing: Validate smooth communication between frontend, backend, and database layers.

User Acceptance Testing (UAT): Engage city officials and sample users to ensure the system meets practical expectations.

Deployment:

Environment Setup: Prepare cloud server environments on platforms like AWS or Azure for hosting.

Deployment Execution: Deploy the web application ensuring scalability, reliability, and real-time availability.

1.5 Tools and Technologies Used

The **Online Monitoring of Unauthorized Construction Across the City** system is developed using a powerful and efficient technology stack aimed at achieving high scalability, security, and user-friendliness:

HTML

Next. HTML5 is the core markup language used to structure web pages and provide the basic framework for the application, while CSS3 is utilized to style the visual elements, layout, and responsiveness of the portal. HTML5 provides support for semantic tags, form validation, multimedia embedding, and offline storage, making it ideal for building a robust and user-friendly citizen portal. CSS3 offers advanced styling capabilities, including animations, transitions, flexbox layouts, and media queries, allowing the system to be fully responsive across various devices.

- Built-in routing and page-based architecture.

JAVASCRIPT

JavaScript is a dynamic scripting language used to bring interactivity and real-time functionality to the frontend of the unauthorized construction monitoring system. JavaScript enables dynamic form validations, real-time updates, alert notifications, interactive dashboards, and asynchronous communication with the backend using technologies like AJAX and Fetch API. By leveraging event-driven programming, JavaScript enhances the user experience by reducing page reloads and providing instant feedback on submissions and case updates.

- Catches errors at compile time.
- Real-time form validations and user feedback.
- Event-driven programming for smoother interfaces.

PhpMyadmin

PHP serves as the backend scripting language responsible for handling user authentication, data submissions, image uploads, and administrative workflows. PHP interacts with the database to manage all operations securely and efficiently. Its flexibility and ease of deployment make it ideal for a scalable and cost-effective urban monitoring solution.

- Type-safe database queries.
- Easy schema migrations.
- Clear and maintainable database models.
- Works seamlessly with TypeScript.

GoogleAPI

Google Maps API is integrated into the platform to allow users to submit exact locations of unauthorized constructions, while authorities can track and analyze violation hotspots. The Maps API enhances spatial visualization and makes the reporting process accurate and intuitive.

- Interactive location mapping on forms.
- Real-time address and pin-drop support.

Geospatial analysis for urban violation tracking.

- Custom overlays for identifying hotspot areas.

Google Maps API

Google Maps API is an essential integration within the Online Monitoring of Unauthorized Construction platform, allowing users and municipal authorities to accurately track and visualize the geographic locations of reported violations. By embedding dynamic maps into the application, the system ensures that users can easily pinpoint unauthorized construction sites, thus enhancing the precision and credibility of citizen reports. The API enables features such as address autocomplete, pin-drop functionality, map zooming, and interactive marker placements, offering a seamless experience for users navigating through citywide cases.

In addition to these basic capabilities, Google Maps API supports advanced functionalities such as geocoding, reverse geocoding, clustering of violation markers, and generation of heatmaps to highlight areas with high construction activity. This empowers authorities to prioritize inspections based on geographical data insights rather than random or manual reviews. Furthermore, the mobile responsiveness of Google Maps ensures that the platform remains accessible to users across smartphones, tablets, and desktops without compromising usability.

Moreover, the scalability, security, and continuous updates offered by the Google Maps API make it ideal for real-time urban management solutions. The system benefits from customizable layers, satellite view support, and future compatibility with 3D mapping features, positioning it as a forward-looking tool for smarter urban development oversight. By leveraging these capabilities, the project not only improves the accuracy of reporting unauthorized constructions but also fosters better city planning and efficient resource deployment across administrative zones

1.6 Organization of the Report

This report is organized into eight chapters, each designed to guide the reader through the development and evaluation of the real-time monitoring system for unauthorized construction activities across the city.

Chapter 1: Introduction provides an overview of the project, including the problem statement, objectives, scope, methodology, tools and technologies used, and a brief description of the report's structure.

Chapter 2: Literature Survey / Review explores existing systems, identifies their limitations, introduces the proposed system, and summarizes key findings from related works.

Chapter 3: System Analysis focuses on understanding system requirements through functional and non-functional analysis, feasibility studies, and a high-level design overview of the architecture.

Chapter 4: System Design delves into technical blueprints, including Data Flow Diagrams (DFDs), UML diagrams such as use case and sequence diagrams, database schema design, and interface layouts.

Chapter 5: Implementation details the development phase, describing each system module, relevant code snippets, and the integration and testing processes applied to ensure system robustness.

Chapter 6: Results and Discussion presents the actual outputs of the system, analyzes its performance, and includes comparisons with existing systems where applicable.

Chapter 7: Conclusion and Future Work summarizes the achievements of the project, outlines current limitations, and proposes future enhancements.

Chapter 8: References / Bibliography lists all sources and materials consulted during the project, providing credibility and support for the content presented.

CHAPTER 2

LITERATURE SURVEY

2.1 Existing Systems

Currently, urban development authorities and municipal corporations rely on various manual and semi-digital systems to monitor unauthorized construction activities within cities. Traditional methods primarily include physical inspections, resident complaints, basic permit databases, and scattered reporting through offline channels. Some cities have implemented basic web-based platforms for lodging complaints regarding illegal constructions, but these systems usually lack advanced features like real-time updates, spatial tracking, or integrated reporting tools.

Examples include manual permit tracking through local municipal websites, complaint registration forms on city portals, and basic property record systems managed by town planning departments. These systems enable authorities to issue construction permissions and maintain public access to approved projects. However, the monitoring of unauthorized or illegal constructions often remains disconnected, delayed, and heavily dependent on human intervention. Tools such as GIS-based systems or drone surveillance are being piloted in some metropolitan areas, but widespread adoption remains limited due to costs and technological barriers.

Despite efforts towards digitization, the existing systems mainly emphasize permit management and citizen complaint submission rather than real-time enforcement. There is a noticeable gap in integrating advanced technologies like automated detection, real-time geolocation tracking, and centralized alert mechanisms. The absence of dynamic dashboards, live monitoring, and automated notifications limits the ability of urban authorities to act swiftly on violations. This results in unchecked urban sprawl, delayed corrective actions, and reduced transparency in city planning efforts. Hence, there is a strong need for an intelligent, real-time monitoring platform dedicated to unauthorized construction tracking that leverages modern technologies to bridge the current gaps effectively.

2.2 Limitations of Existing Systems

Despite the availability of basic complaint portals and property record systems, the current approaches to monitoring unauthorized constructions have several critical limitations, particularly in the areas of real-time tracking and centralized enforcement:

1. No Centralized Dashboard:

There is no unified platform where city officials can view, track, and analyze unauthorized construction activities across multiple regions in real time, making city-wide enforcement slow and fragmented.

2. Limited Performance Metrics:

Existing systems lack tools to monitor the number of unauthorized activities, geographic violation trends, or performance metrics of enforcement teams, which hampers strategic planning and accountability.

3. Delayed Identification of Bottlenecks:

In the absence of automated surveillance and instant reporting mechanisms, unauthorized constructions are often detected only after substantial progress, delaying timely intervention and corrective measures.

4. Manual Reporting:

Reports on unauthorized construction activities are typically generated manually based on field inspections or citizen complaints, leading to slower case registration, human errors, and inefficiencies in legal action.

5. Lack of Real-Time Monitoring:

Current systems do not support real-time video analysis or live geolocation tracking, preventing authorities from identifying violations instantly and weakening proactive enforcement efforts across urban regions.

2.3 Proposed System

The proposed system is a comprehensive, web-based real-time monitoring solution designed to detect, track, and manage unauthorized construction activities across urban areas. It aims to overcome the current challenges of manual reporting, delayed detection , oversight.

This platform will integrate citizen reporting, administrative dashboards, automated alerts, geolocation tracking, and analytics, thereby transforming the way urban violations are monitored and managed.

1. Centralized Real-Time Monitoring System:

A dedicated web-based platform will be developed to centralize the reporting and tracking of unauthorized constructions. Citizens can submit detailed reports including images, descriptions, and geolocations, while municipal authorities can monitor live updates, case statuses, and violation trends city-wide.

2. Live Administrative Dashboard:

A role-specific dashboard will be developed for administrators and enforcement officers, offering real-time insights, such as:

Number of cases reported per day/week/month.

Status updates (Reported, Verified, Action Taken, Resolved).

Region-wise and officer-wise violation management statistics.

Automated highlighting of long-pending or escalated cases

3. Role-Based Access Control (RBAC):

Access to different system features will be controlled based on the user's role:

Applicants: View only their application status and receive updates.
Verification Officers: View and verify application data/documents.
Administrators: Full control with visibility into all users, metrics, alerts, and reports.

Scalability & Modularity:

The platform will be designed for future scalability and modularity:

Easy addition of new reporting modules (e.g., illegal land use, environmental violations)

4. Supported Reporting Categories:

Initially, the system will handle real-time monitoring and reporting of:

Unauthorized building construction

Illegal floor extensions

Violation of setback norms and zoning laws.

5. Reporting & Documentation:

Weekly and monthly auto-generated reports will summarize:

Number of unauthorized construction cases reported and resolved

Average response and action-taking time by officers Officer-wise efficiency

Officer-wise performance analysis based on case resolution speed

6. Benefits:

Enhanced transparency and accountability between citizens and municipal bodies

Significant reduction in delays and manual errors in monitoring and enforcement

Better real-time tracking for improved government oversight and resource allocation

Data-driven insights to support smart city planning and urban zoning decisions

Higher citizen satisfaction and trust

2.4 Summary

The project focuses on enhancing the current mechanisms used by urban authorities for monitoring unauthorized construction activities by introducing a real-time, web-based reporting and tracking system. While traditional methods have relied heavily on manual inspections and delayed citizen complaints, they lack a centralized, automated mechanism to track violation status, officer performance, and enforcement efficiency in real-time.

CHAPTER 3
SYSTEM ANALYSIS

3.1 Requirement Analysis (Functional & Non-functional)

1. Functional Requirements:

These are the essential functionalities that the system must perform:

2. User Registration & Login:

Citizens must be able to register and log in to report unauthorized construction activities.

Role-based logins for citizens, field officers, administrators, and super admins.

3. Violation Reporting:

Users can report unauthorized constructions by submitting location details, description, and photographic evidence.

Upload necessary documents and personal information.

4. Application Processing:

Officers can verify documents and update the status of applications.

Admins can assign, review, or escalate applications.

5. Real-Time Monitoring Dashboard:

Admin dashboard displaying real-time statistics on reported cases, region-wise violation data, and officer performance.

Graphs and charts for better data visualization.

6. Alerts and Notifications:

Automated alerts to authorities for pending verifications.

SMS/email notifications to citizens for status updates on their reports.

7. Non-Functional Requirements:

These define system attributes such as performance, usability, and security:

8. Scalability:

The system should handle increasing numbers of applications and users without performance loss.

9. Performance:

Dashboards and application data should update in real-time or near real-time.
System should respond within 2-3 seconds for most actions.

10. Security:

Role-based access control and encrypted data storage.
Secure login using JWT or OAuth2.

11. Maintainability:

Clean code structure using modular development practices.
Easy to update and extend in the future.

12. Usability:

User-friendly interface for applicants and administrators.
Mobile-friendly design for accessibility on all devices.

3.2 Feasibility Study

The operational feasibility of the Online Monitoring of Unauthorized Construction project is strong, as it closely aligns with current municipal reporting workflows while significantly enhancing efficiency and transparency. The system offers real-time tracking, automated notifications, and centralized oversight, allowing faster intervention in case of urban violations. Staff training requirements will be minimal due to the system's simple, user-friendly interface, ensuring a low learning curve and quick adoption by both citizens and government officials.

From a legal and compliance standpoint, the project is well-aligned with municipal governance standards and data protection regulations. The platform ensures that all citizen data and case information is securely stored and accessed only by authorized personnel. Features such as role-based access control, secure authentication, and activity audit trails enhance both privacy and accountability within the system.

The project's adaptability to existing infrastructure, minimal technical barriers, and strong alignment with legal frameworks ensure its successful implementation. The platform's user-centered design ensures that even individuals with limited technical skills can easily report cases or track ongoing investigations, thereby broadening community engagement and improving urban governance practices privacy.

3.3 System Architecture / Design Overview

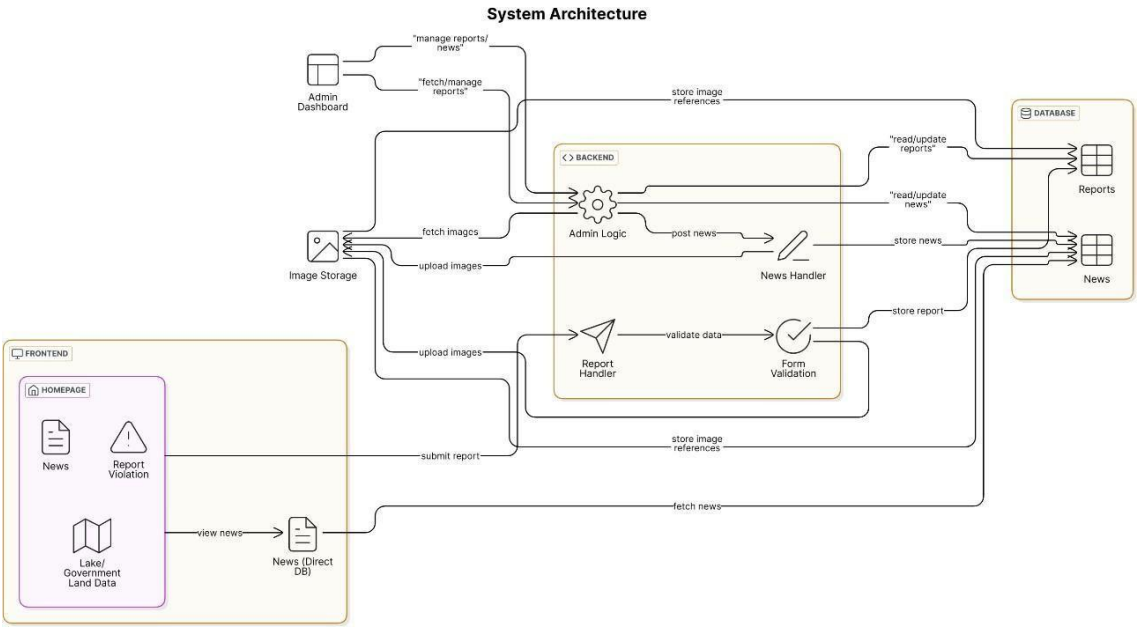


Figure 3.1 System Architecture/Design Overview

The diagram illustrates the layered architecture of the **Unauthorized Construction Monitoring** system, organized into four main components:

1. Citizen Portal (User Interface)

This is the public-facing web application where users (citizens) can register, log in, report unauthorized construction cases, upload evidence (images and documents), and track the status of their submitted complaints.

Officer/Administrator

A role-based dashboard for field officers and administrators to view incoming reports, update case statuses, verify evidence, assign field inspections.

2. Server Layer (Backend)

API Controller: Acts as the main entry point for all frontend requests. It routes API calls to appropriate backend services such as case management, user authentication, or notification dispatching.

Authentication Service: Handles login, registration, and token management using JWT (JSON Web Tokens).

Case Management Service: expansible for creating, reading, updating, verifying, and closing unauthorized construction cases submitted by citizens, along with associated metadata like geolocation, image uploads.

3. Database Layer

A relational database used to store structured data including user profiles, case reports, uploaded images metadata, status logs, role assignments, and region-wise analytics. The database supports ACID-compliant transactions ensuring data integrity and reliability.

4. External Services

Integrated for geolocation capture, address autocompletion, and visualizing reported construction sites on interactive city maps.

Planned future integration for automatic image analysis to detect patterns of unauthorized construction activities from uploaded evidence.

CHAPTER 4

SYSTEM DESIGN

4.1 Data Flow Diagrams (DFD)

A Data Flow Diagram (DFD) is a graphical representation of the flow of data through a system. It shows how input data (violation reports) is transformed into case status outputs through processes, and how data is stored and transferred among different users and modules. DFDs help model the logic and data movement inside the system during the development phase.

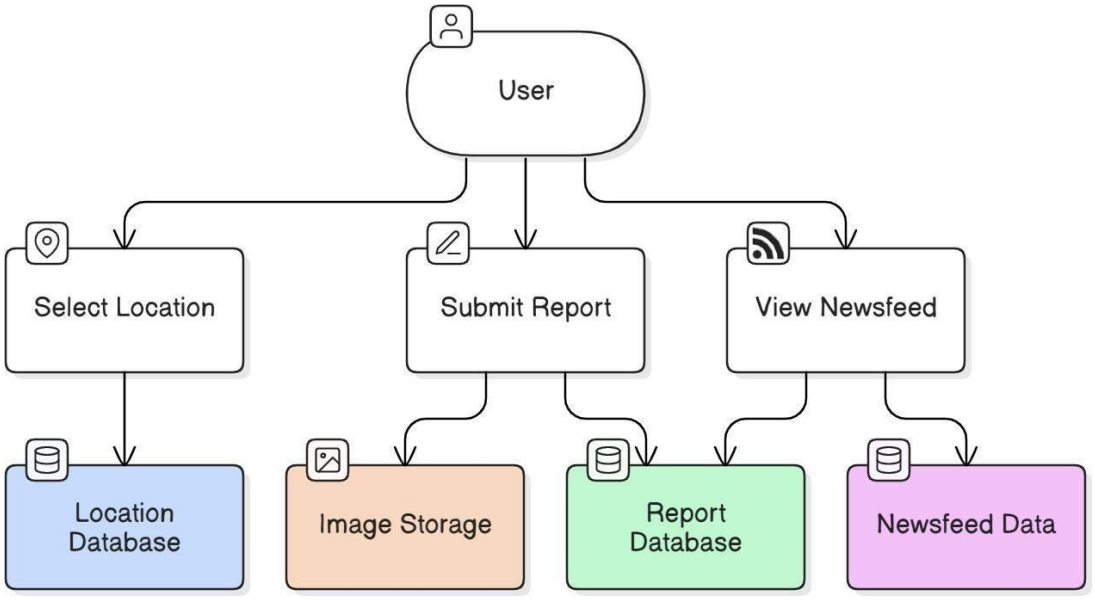


Figure 4.1 Data Flow Diagram

The Data Flow Diagram (Context Diagram) provides a high-level overview of the Unauthorized Construction Monitoring System, representing the entire system as a single process. It highlights the major interactions between external entities (Citizens and Administrators) and the system, along with the primary data flows.

1. External Entities:

Citizen:

Submits reports of unauthorized constructions, uploads site images, and tracks the status of their reports.

Field Officer/Administrator:

Reviews submitted reports, verifies evidence, updates statuses, assigns actions, and monitors citywide activities.

2. **Data Flows:**

From Citizen to System:

Submission of violation reports with location details, descriptions, and photographic evidence.

From System to Citizen:

Status updates (Received, Under Review, Action Taken, Resolved).

From Admin/Officer to System:

Actions such as case verification, status updates, assignment of inspection tasks.

From System to Admin/Officer:

Dashboard analytics, violation heatmaps, pending case alerts, and performance reports

4.2 UML Diagrams

Unified Modelling Language (UML) diagrams are used to **visually represent the design and structure of a software system**. For the system, UML diagrams help stakeholders, developers, and administrators understand how the system behaves, how users interact with it, and how components are structured and communicate internally.

4.2.1 Use Case Diagram

The Unauthorized Construction Monitoring System facilitates interactions between multiple actors and system functionalities:

1. **Citizen**

Citizen:

Register an Account

Login to the Portal
Report Unauthorized Construction
Upload Evidence (Photos/Documents)
Track Report Status.

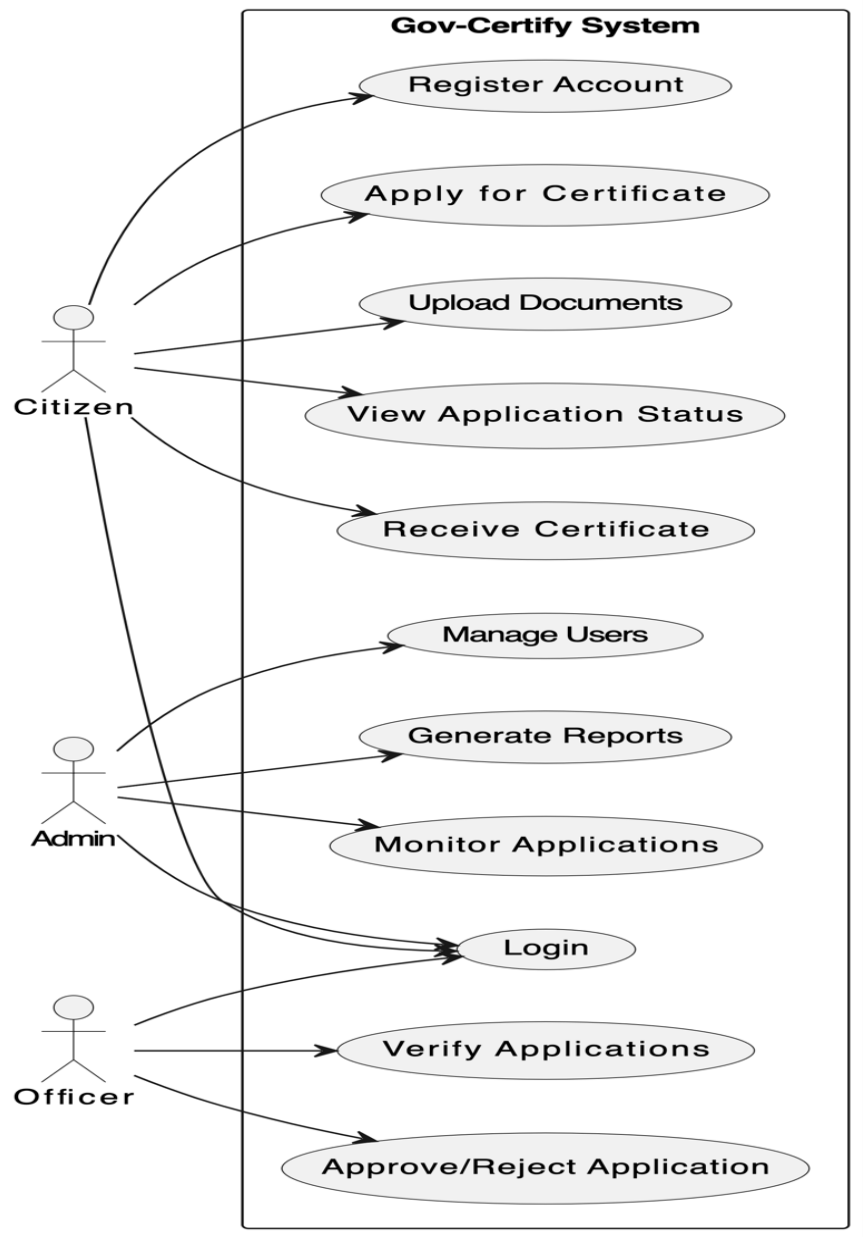


Figure 4.2 Use Case Diagram

2. **Field Officer**:

Login to Dashboard

View Assigned Cases

Verify Reports on Field

Update Case Status (Verified, False Report, Action Taken)

Upload Field Inspection Notes

4.2.2 Class Diagram

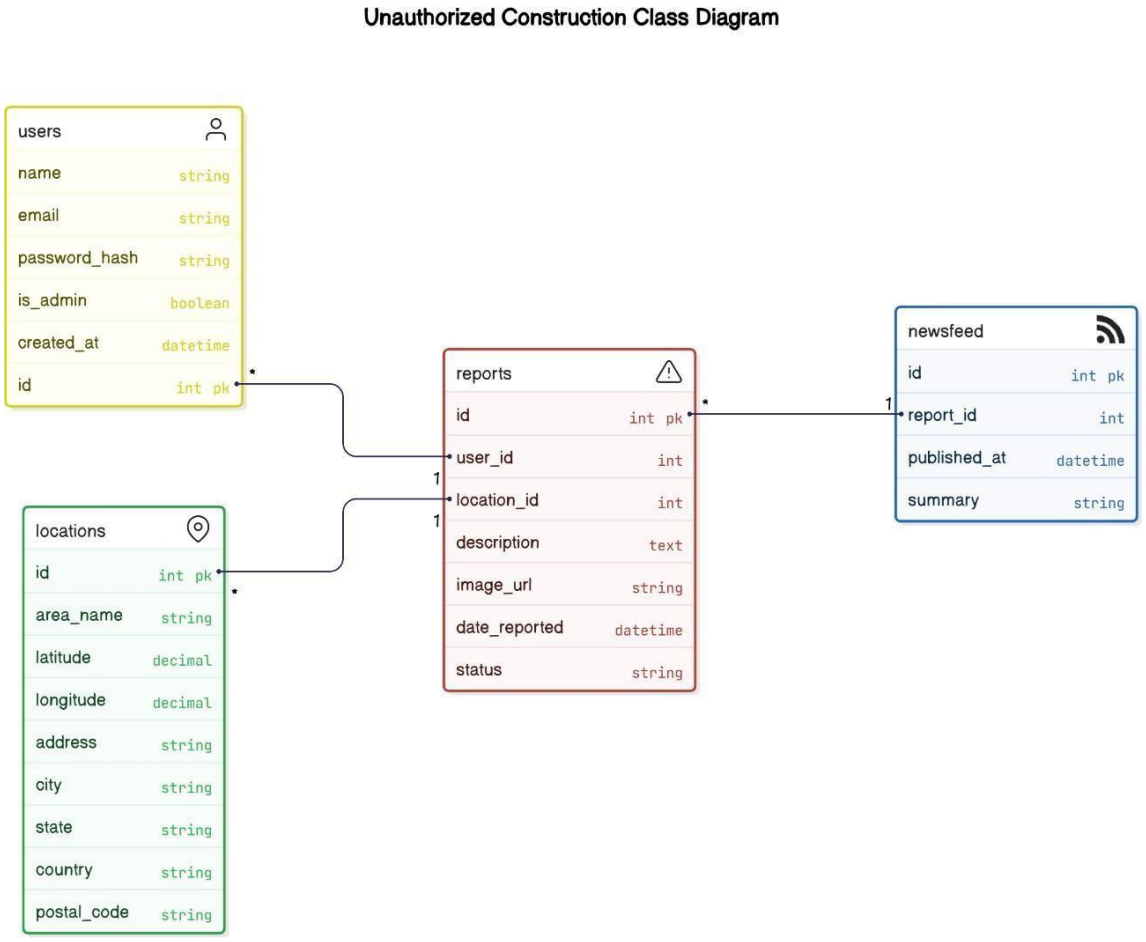


Figure 4.3 Class Diagram

User:

Attributes: User ID, Name, Email, Phone, Role (Citizen/Officer/Admin).

Document:

Represents documents uploaded for a particular application.

Case Action:

Attributes: Action ID, Report ID, Officer ID, Action Taken, Timestamp.

Enumerations: Used to represent the predefined values for user roles, certificate types, and application status.

4.2.3 Sequence diagram

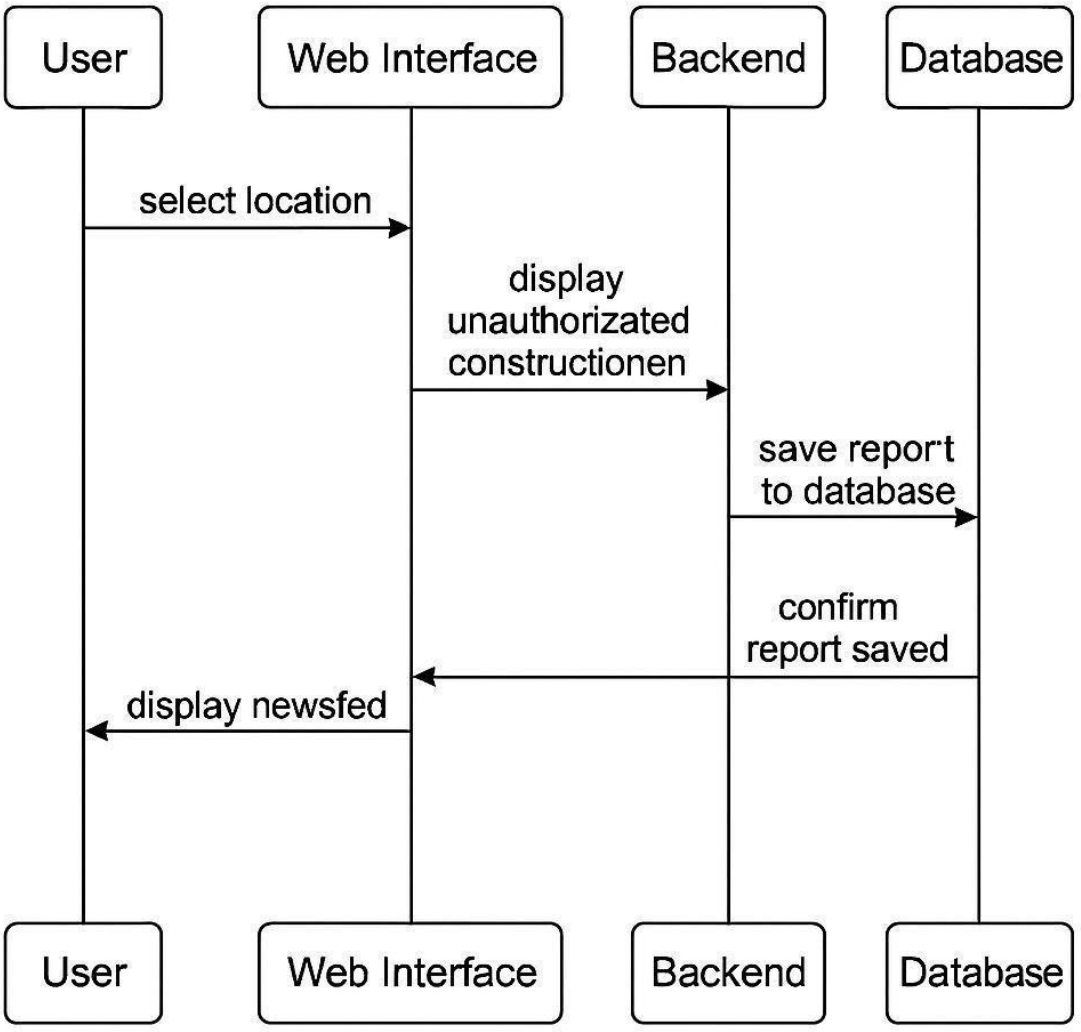


Figure 4.4 Sequence Diagram

The Citizen logs in to the platform.

The Portal sends credentials to the Server for validation.

Upon authentication, the Citizen submits a violation report.

The Server saves the report and associated images in the Database.

The System sends a confirmation back to the Citizen.

Officers are notified and can retrieve the report for field verification.

4.2.4 Activity Diagram

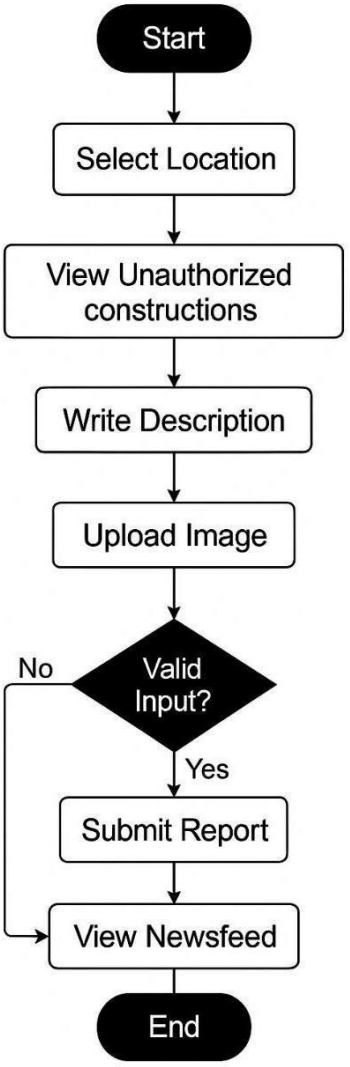


Figure 4.5 Activity Diagram

The process begins when a **Citizen logs in or registers** on the Gov-Certify portal.

The **Citizen fills out the application** form, selects the desired certificate type, and **uploads supporting documents**.

Upon **submission**, the application is routed to the responsible **Officer** for review.

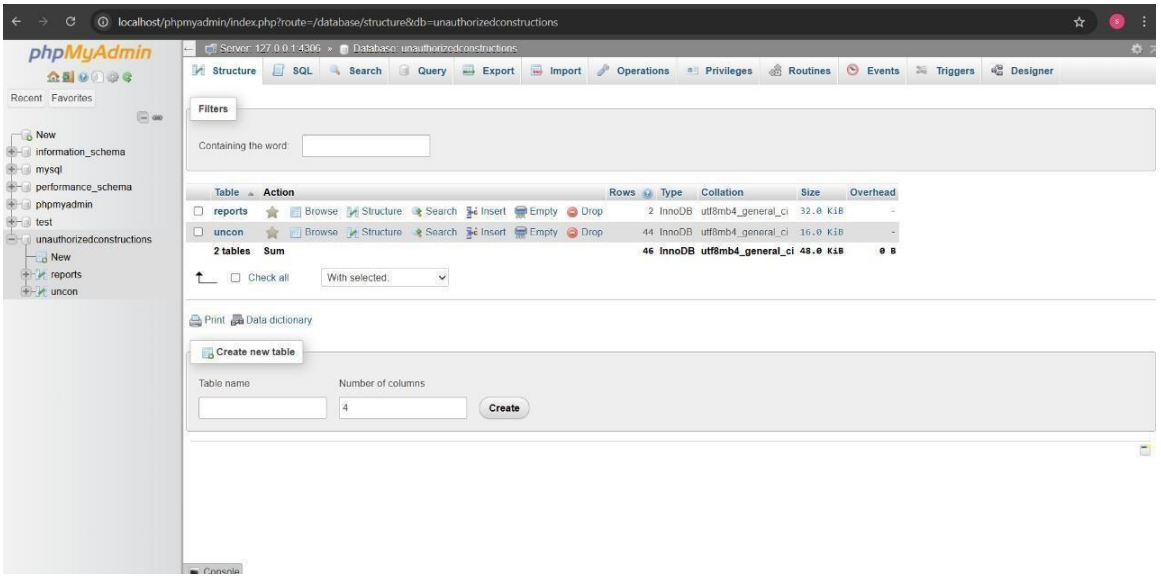
4.3 Database Design

The project uses **MySQL** as its database to store citizen user profiles, unauthorized construction reports, uploaded evidence, officer actions, and system settings. The database is structured into five main tables that interact with each other to manage the entire violation reporting and monitoring workflow.

Users Collection

- Stores applicant, officer, and admin user data.

Table 4.1



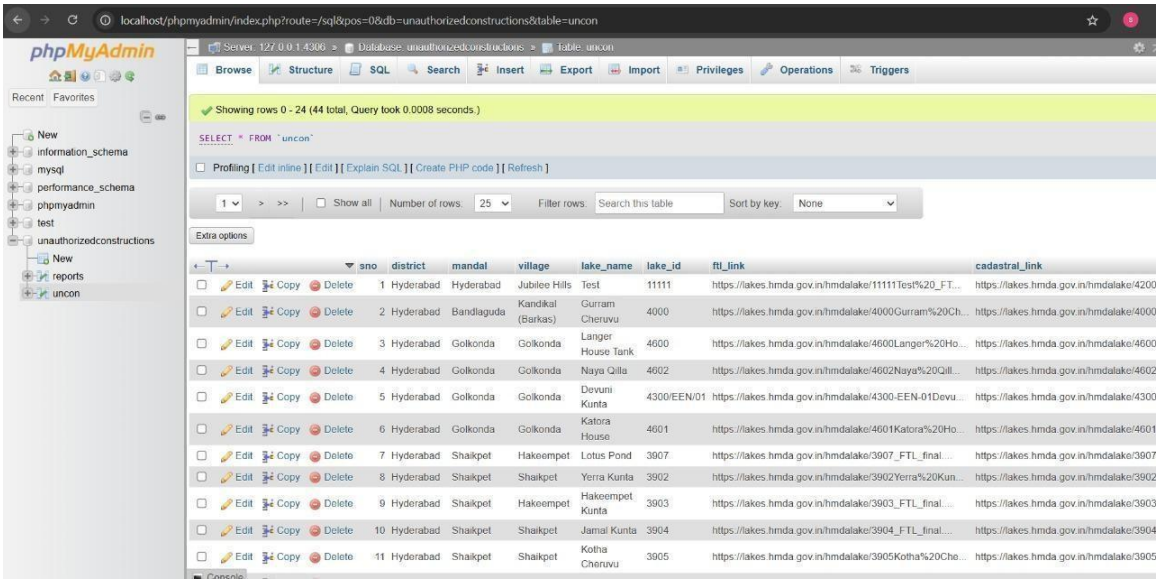
The table shown defines the structure of a **user data model** typically used in a database for a digital certificate issuance system. Each user is uniquely identified by an _id, which is an Objected—a common type used in PHPMY ADMIN for unique identification. The full

Name field stores the user's full name as a string, while the email and phone Number fields hold the user's email address and mobile number, respectively, both of which are also strings. The address field captures the user's residential address.

Applications Collection

- Holds all the quires form data.

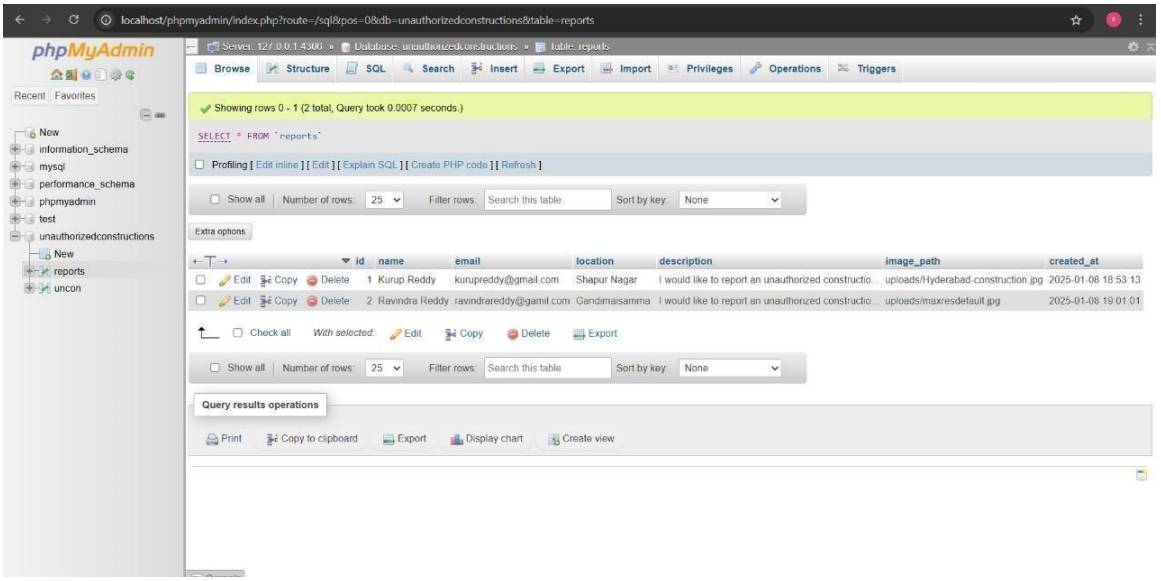
Table 4.2



Unauthorized constructions Data

- Stores paths to uploaded documents (proofs, photos).

Table 4.3



The given table outlines the structure of a **document data model** used to manage uploaded documents in a certificate issuance system. Each document is uniquely identified by an _id of type Object Id. The application Id field references the corresponding application to which the document belongs, linking it via another Object Id. The document Type field specifies the type of document uploaded (e.g., Aadhar), while the file URL field stores the file's path or a cloud link for easy retrieval.

Status Logs Collection

- Tracks the status changes of each application.

Table 4.4

Field	Type	Description
`_id`	ObjectId	Unique log entry ID
`applicationId`	ObjectId	Link to the application
`status`	Enum	New status of the application
`changedBy`	ObjectId	ID of admin/officer who changed it
`timestamp`	Date	Date and time of change
`remarks`	String	Optional notes or rejection reason

Reported of collection

- Stores user reported about unauthorized constructions.

Table 4.5

Field	Type	Description
`_id`	ObjectId	Unique setting ID
`key`	String	Setting name
`value`	String	Value of the setting
`updatedAt`	Date	Last modified time

4.4 Interface Design

The user interface (UI) of the Unauthorized Construction Monitoring platform is designed to provide seamless interaction for both citizens and administrative users. The interface is divided into two main modules: **Citizen Frontend UI** and **Officer/Admin Backend Panel**:

1. Citizen Interface (Frontend UI)

- **Home Page**:

  User can select the location and view unauthorized constructions.

- **Violation Reporting Form**:

  Dynamic multi-step form to collect violation details.
  Google Maps integration to mark exact location.

  Upload sections for multiple supporting images/documents.

  Mandatory field validations (e.g., Location, Description, Proof Upload).

- **Status Tracking Page**:

  Allows users to enter their Report ID and view real-time status progression.

  Progress Bar showing stages: Submitted → Under Review → Action Taken → Resolved.

- **News/Tracking**:

  New users can view the news of unauthorized construction which is reported by the another user.

  Existing users can also can watch updated news of constructions.

2. Admin/Officer Interface

- **Login Dashboard:** ○ Secure login for verification officers and administrators.
  - ○ Role-based views (verifier, approver, super admin).

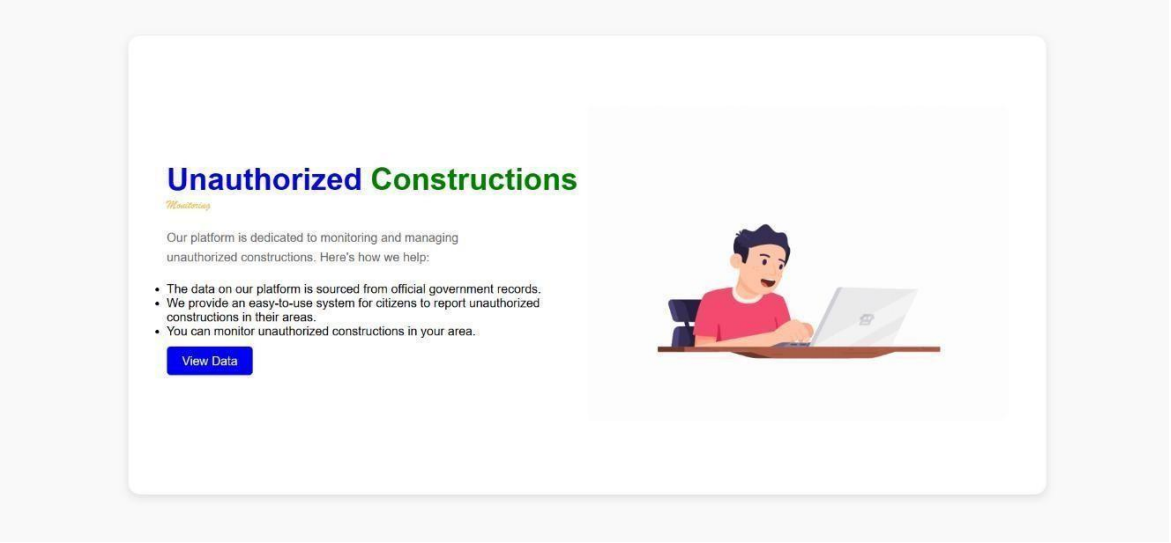


Figure 4.6 Interface Design

3. Administrator Dashboard:

Region-wise visualization of all ongoing and closed violation cases.

Officer performance metrics (number of reports verified, average time per case).

Generation of automated weekly and monthly city violation reports.

4. Performance Monitoring Panel:

Real-time metrics showing:

Total new reports today/this month.

Officer-wise case resolution rate.

Average case closure time.

SLA breach notifications and escalations.

5. After Successful Login

Once logged in, the user is redirected to their personal dashboard.

From there, users can:

Report New Unauthorized Construction with geolocation and evidence uploads.

Track the Status of their previously submitted violation reports.

View Notifications regarding status changes, officer actions, or escalations.

Update Profile Information such as contact details or password.

The Unauthorized Construction Monitoring login interface is a secure and user-friendly entry point for citizens and municipal authorities to access the platform. It features a clean layout with intuitive login forms where users can enter their registered email and password. Additional features such as password visibility toggling, a "Forgot Password" link for easy account recovery, and a registration link for new users ensure smooth navigation.

CHAPTER 5

IMPLEMENTATION

5.1 Flow Chart

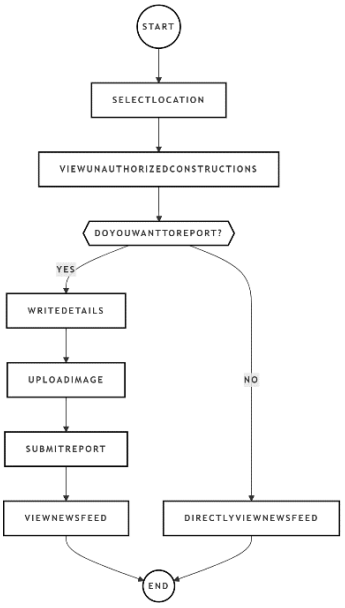


Figure 5.1 Flow Chart

1. **Start**

   The process is initiated when the user opens the Unauthorized Construction Monitoring portal.

2. **User Login/Registration**

   a. Citizens can log in using existing credentials or register as new users by providing their basic details.
   b. Secure login with password encryption ensures data privacy.

3. **Submit Violation Report**

   c. Users select "Report Unauthorized Construction."
   d. They fill out a detailed form including location (via Google Maps), description of the violation, and upload photographic evidence.

4. **Upload Supporting Documents**

e. Citizens can upload multiple images or documents related to the unauthorized construction.

5.Submit Report

f. Upon submission, the report and all supporting documents are forwarded to the backend server for processing.

6. Store Report in Database

a. The system saves user details, violation report data, geolocation, and uploaded images into a secure MySQL database.

7. Notify Admin/Field Officer

a. The system automatically notifies the assigned field officer/administrator that a new case has been submitted.

8. Admin/Officer Reviews Report

a. Officers access the dashboard to review incoming violation reports.
b. They conduct field verifications based on the submitted information.

9. Decision: Is the Report Valid?

a. If valid:
   i. Officer marks the case as "Verified."
   ii. Enforcement action (e.g., notice issue) may be initiated.
b. If invalid:
   i. Officer marks the case as "Invalid" or "False Alarm."

10. Update Case Status

a. The system updates the status of the case accordingly (e.g., Verified, Resolved, Invalid).

11. Notify User

a. The citizen is notified via SMS/email about the updated status of their reported violation.

12. User Checks Real-Time Status

a. Citizens can log in and track the current status of their reports in real-time on their dashboard.

13. End

a. The process concludes with either action taken against the violation or the case being closed after verification

Module Description

1. User Registration & Login Module

b. Allows citizens to create new accounts and log in to submit violation reports.
c. Secure password handling using encryption techniques.

2. Features:

d. Form-based registration with validations.
e. Email/mobile number-based login.
f. Password recovery (Forgot Password option).

3. Violation Reporting Module

g. Enables users to report unauthorized construction activities with detailed descriptions, photos, and geolocations.

Features:

h. Google Maps location tagging.
i. Upload multiple supporting images.
j. Auto-generation of unique Report IDs.

4. Document Upload & Storage Module

k. Handles secure uploads of evidence related to reported cases.

Features:

l. Supports various formats (JPG, PNG, PDF).
m. Stores links to uploaded files in the database.
n. Organized folder structure by report ID.

5. Admin & Officer Dashboard Module

o. Role-specific dashboards for officers and administrators.

Features:

p. View, verify, and update violation reports.
q. Filter cases by status, region, or report date.
r. Officer remarks and field inspection uploads.

6. Real-Time Monitoring Module

s. Provides live data analytics and citywide violation tracking.

Features:

t. Real-time statistics on submitted and verified cases.
u. Alerts for pending actions beyond SLA deadlines.
v. Officer-wise performance tracking.

7. Status Tracking Module

w. Allows citizens to monitor the status of their reported cases at any time.

Features:

x. Step-based visual progress (Submitted → Verified → Action Taken → Closed).
y. SLA timer showing expected resolution times.

5.2 Code Snippets

```
import <div class="content">
    <h2>Select District to View Data</h2>
    <form action="" method="POST">
      <label for="district">Choose a
district:</label>
      <select name="district" id="district">
        <option
value="Hyderabad">Hyderabad</option>
        <option value="Rangareddy">Ranga
Reddy</option>
        <option          value="Medchal-
Malkajgiri">Medchal-Malkajgiri</option>
      </select>
      <input type="submit" value="View Data">
    </form>

    <?php
    // Database connection details
    $host = 'localhost:4306'; // Double-check if
this is the correct port
    $dbname = 'unauthorizedconstructions';
    $username = 'root';
    $password = '';
```

```
try {,
 $conn = new
PDO("mysql:host=$host;dbname=$dbname"
, $username, $password);
    $conn-
>setAttribute(PDO::ATTR_ERRMODE,
PDO::ERRMODE_EXCEPTION);POST };
```

Report Code:

```
<div id="report" class="content">
    <h1>Report Unauthorized Constructions</h1>
    <form id="reportForm" action="" method="post" enctype="multipart/form-data">
    <label for="name">Name:</label>
    <input type="text" id="name" name="name" required>

    <label for="email">Email:</label>
    <input type="email" id="email" name="email" required>

    <label for="location">Location:</label>
    <input type="text" id="location" name="location" required>

    <label for="description">Description:</label>
    <textarea id="description" name="description" rows="4" required></textarea>

    <label for="image">Upload Your Image:</label>
    <input type="file" id="image" name="image" accept="image/" required>
```

```
    <button type="submit">Submit</button>
</form>
```

5.3 Integration and Testing

The integration and testing phase ensure that the Unauthorized Construction Monitoring System operates as a smooth, reliable, and bug-free platform. Various modules — like user registration, violation reporting, admin verification, and real-time status tracking — are tested individually and collectively.

Modules to Integrate:

- User Authentication System (PHP sessions + Role-Based Access Control)
- Violation Reporting and Evidence Upload
- Officer Dashboard for Verification
- Admin Panel for City-Wide Monitoring
- Notification System (Email/SMS Alerts)
- MySQL Database for Report and User Management

1. Testing Strategy

Testing ensures that each module functions correctly and integrates seamlessly with others. The project uses both manual and automated testing strategies.

2. Unit Testing

Testing ensures that each module of the Unauthorized Construction Monitoring System functions correctly and integrates seamlessly with other modules. The project uses a combination of **manual testing** and **automated testing** techniques to validate system functionality, performance, and reliability:

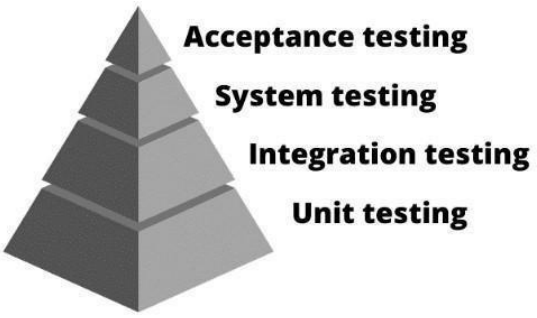


Figure 5.2 Unit Testing

3. Integration Testing:

Integration testing is the phase where all the individual modules of the *Gov-Certify* system—such as user registration, login, certificate application, admin dashboard, and certificate download—are combined and tested as a group. While unit testing ensures that each part of the code works on its own, integration testing checks how these parts communicate with each other.

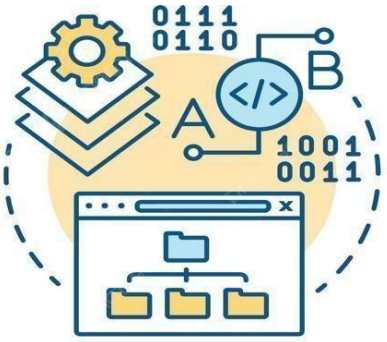


Figure 5.3 Integration Testing

One of the key components of integration testing in the Unauthorized Construction Monitoring System is the connection between the user registration/login module and the MySQL database.

When a citizen signs up or logs in, the system must correctly process the data and either store or retrieve the credentials from the database.

When a user fills out the report form and uploads images, these inputs should be

validated, securely stored, and linked to the correct database records.
Integration testing ensures that every violation report correctly stores the violation details, location coordinates, and uploaded documents without data mismatch or loss.

Another critical integration point is the officer dashboard, where field officers review citizen reports and update case statuses.
Testing is essential to verify that officer decisions such as "Verified", "Action Taken", or "Invalid Report" are properly recorded and reflected in the system database.
Status changes must immediately update in both the officer's admin panel and the citizen's status tracking page.

Finally, the notification system responsible for sending emails or SMS alerts to citizens must be integrated and tested thoroughly.
It must be confirmed that database status changes correctly trigger notification events, and that the messages are delivered to the right users without delay or error.

4. End-to-End (E2E) Testing:

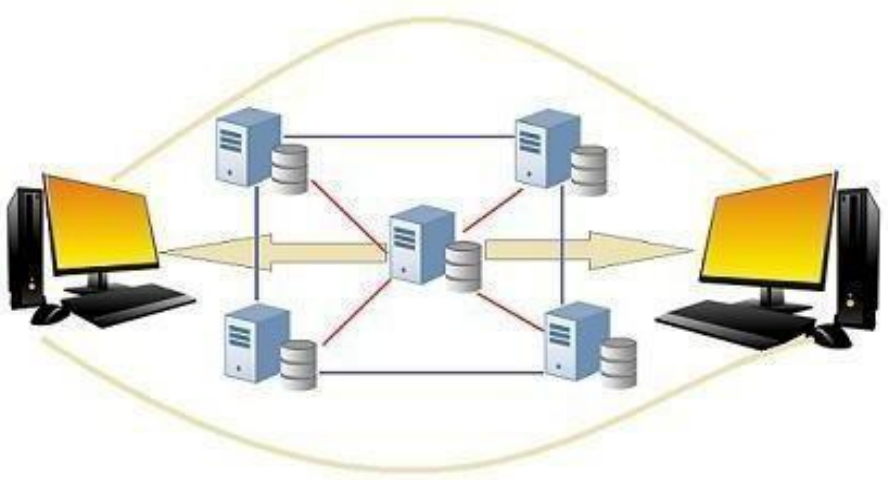


Figure 5.4 End-to-End Testing

End-to-End (E2E) Testing is a comprehensive software testing method that validates the entire functional flow of the Unauthorized Construction Monitoring System — starting from the **user interface (UI)** through the **backend server** and down to the **database layer**, and back again.

CHAPTER 6

RESULTS AND DISCUSSION

6.1 Output Screens

The Unauthorized Construction Monitoring System is a web-based application designed to streamline the tracking, reporting, and management of unauthorized constructions in urban areas.

1. User Pages:

Login Page
Registration Page
Home Page
About Us Page
Contact Us Page
Report Unauthorized Construction Page
Track Your Report Page
Government Land Records Page
Latest News & Updates Page

2. Report Submission Workflow:

Violation Details Form Page
Location Marking Page (Google Maps API)
Evidence Upload Page
Summary & Confirmation Page
Report Submission Success Page

3. Admin Pages:

Admin Dashboard (Citywide Reports Overview)

View and Verify Reports Page

Manage Officers and Users Page

Land Records Management Panel

News/Updates Management Page

Testcase1: User Interface

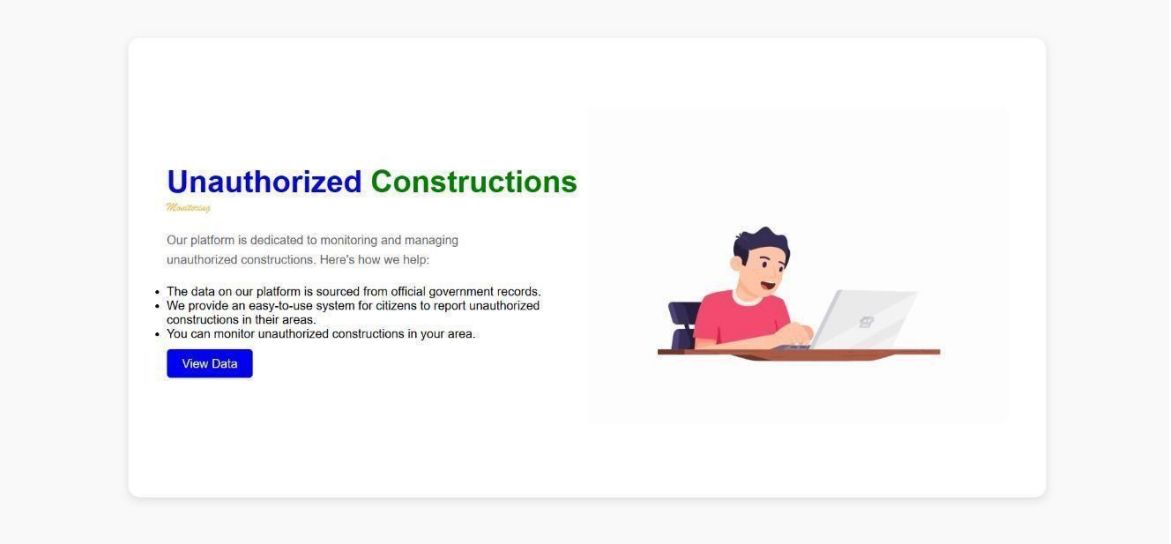


Figure 6.1 User Interface

The main page of the Unauthorized Construction Monitoring System serves as a welcoming and intuitive entry point for users looking to report illegal constructions or explore government land records online. Designed with user-friendliness in mind, the platform's mission is clear: to simplify citizen participation in urban governance by providing a fully digital and streamlined alternative to traditional complaint mechanisms.

By offering services online, the platform empowers citizens to save time, easily submit reports, and play an active role in protecting public spaces without the need to physically visit government offices.

The landing page effectively communicates this vision through simple language, clean layout, and organized structure, ensuring that even first-time users — especially those with limited digital experience — can navigate the system with confidence., highlighting its role in enhancing transparency, citizen engagement, and efficiency within municipal services

Testcase2: Database of lakes and Govt Data

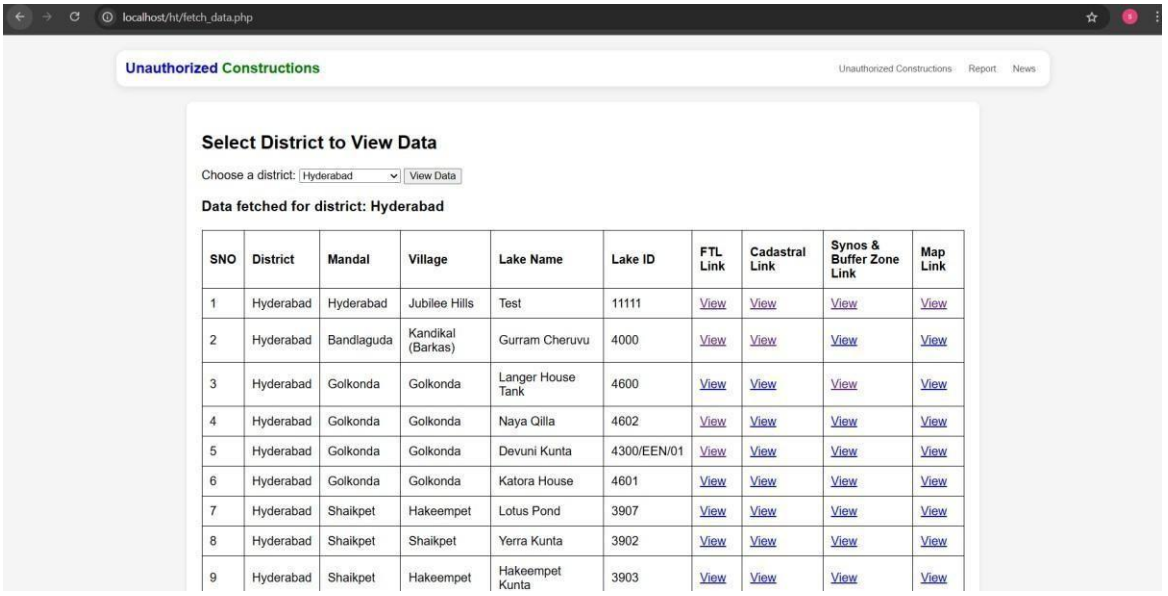


Figure 6.2 Database of Government Land Records

This page provides access to a centralized database containing official government land records across different districts. Citizens can select a district and retrieve detailed information about public lands, reserved areas, and ownership details. This transparency helps prevent unauthorized constructions by enabling the public and authorities to cross-check land ownership before new structures are built. By offering open access to verified government data, the system ensures better compliance with land usage policies and assists in faster identification of illegal activities on government-owned or protected lands

Testcase3: Services

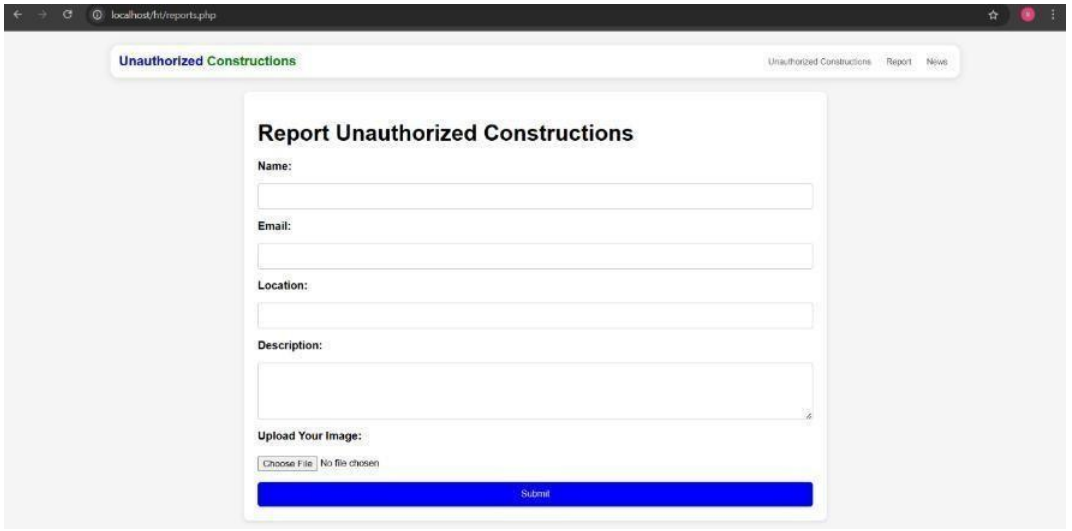


Figure 6.3 online reporting for Unauthorized Constructions

The main categories include: The services section of the platform provides a clean and organized overview of the options available to users

Report Unauthorized Construction

View Land Ownership Records

Read Latest Municipal News

Track Status of Previous Reports

The report submission form empowers citizens to become active participants in urban monitoring by allowing them to report illegal construction activities around them. Users can enter key details such as the type of violation, exact location (with Google Maps integration), a short description, and upload photographic evidence or supporting documents. Mandatory fields and easy-to-use interfaces ensure complete and accurate reporting. Once submitted, reports are immediately stored in the system and forwarded to municipal officers for verification. This citizen-driven reporting system plays a crucial role in detecting unauthorized constructions early and initiating timely legal action

Testcase4 News and Updates Section

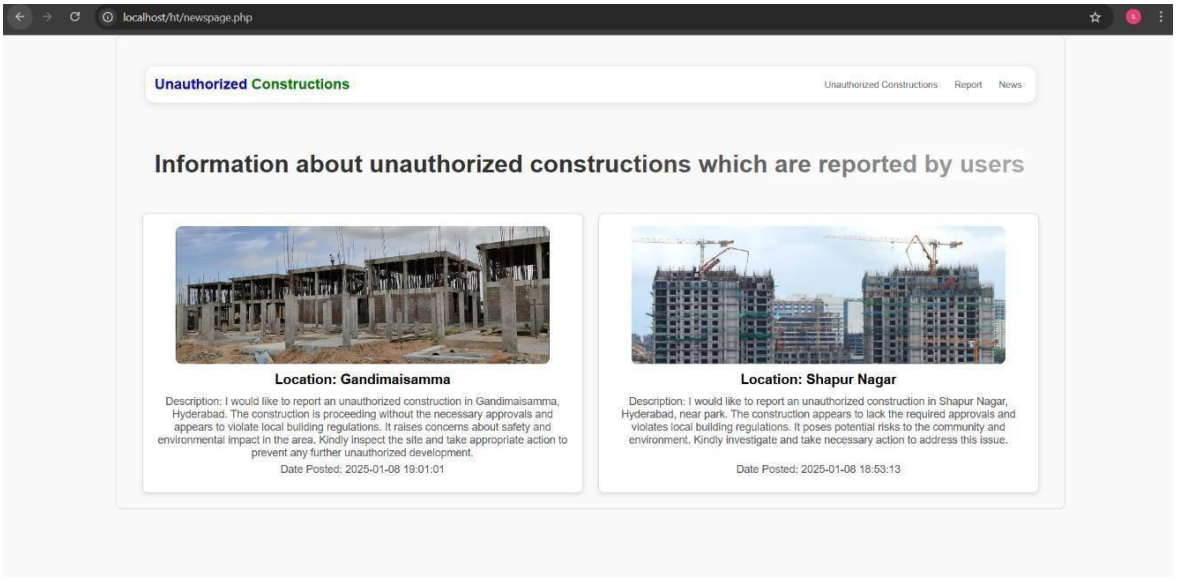


Figure 6.4 News section

The report submission form is a multi-step dynamic form designed to capture complete details necessary for verifying a complaint.

Fields include:

The News and Updates section acts as a communication platform between the municipal authorities and the public. Here, citizens can find information about the status of previously reported violations, enforcement actions taken by authorities, upcoming city planning initiatives, and successful resolutions of complaints. Regular updates build public confidence in the system and promote active participation. Citizens can track how their complaints have been addressed, encouraging continuous engagement with urban governance processes and ensuring transparency at every step

Testcase5 Viewing Original Government Land Maps

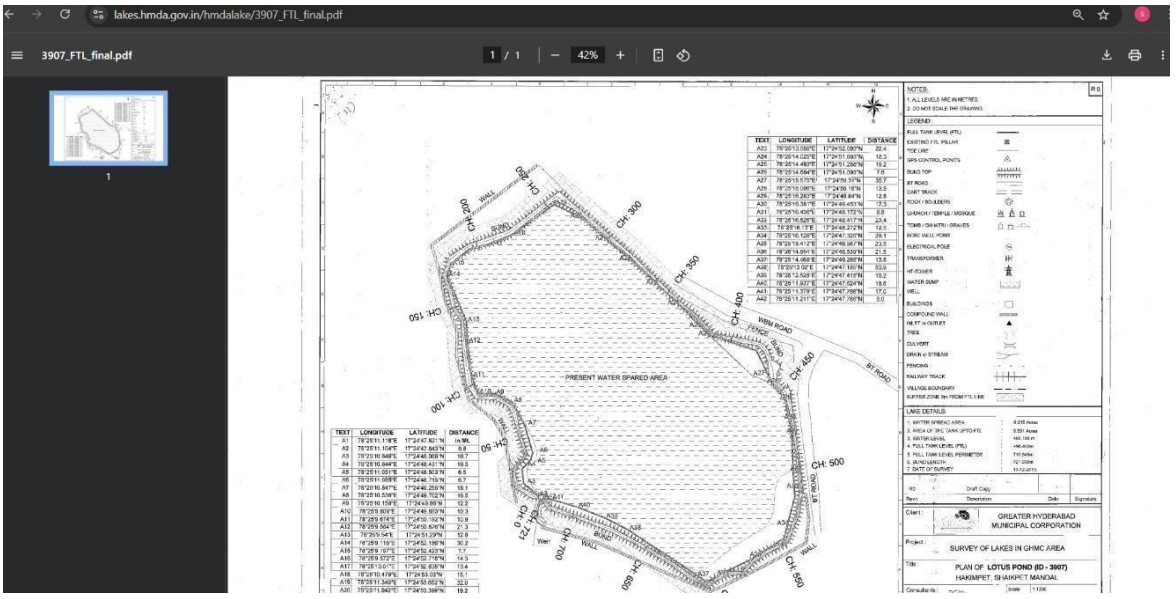


Figure 6.6 Viewing Original Government Land Maps

This feature provides access to the original, officially issued government land maps. By clicking on specific links, users can view detailed land ownership information, zoning boundaries, and protected areas. It helps citizens verify whether a reported construction falls under unauthorized zones, government properties, or restricted lands.

Access to authenticated government maps enhances the reliability of the reporting process and supports urban planning departments in taking swift and legally sound enforcement actions. It also educates the public about land usage rights and city regulations:

Report ID

Date of Submission

Reported Location (Map View)

Uploaded Evidence (Photos/Documents)

Officer Comments

Status Dropdown (Pending, Verified, Action Taken, Rejected

Testcase6: Location Viewing after clicking link

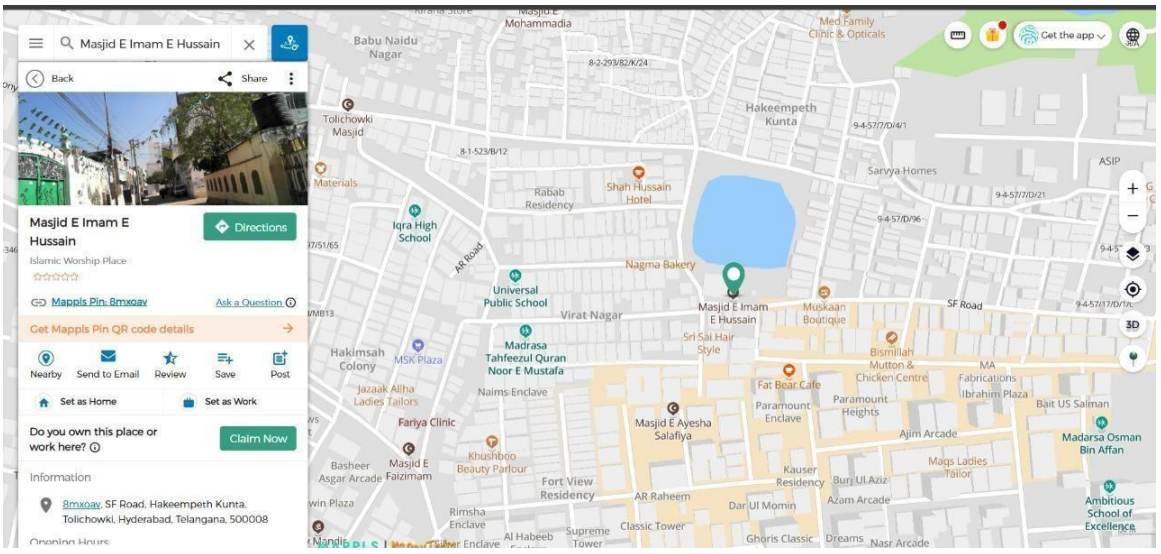


Figure 6.6 Viewing Location of Reported Violation

The location viewing feature allows users to pinpoint the exact geographical location where an unauthorized construction was reported. Integrated with Google Maps, it provides a visual reference for better understanding and verification.

Users and authorities can view the map, assess the surroundings, and plan further inspection or enforcement activities accordingly.

This geospatial visualization ensures that reports are not just textual complaints but are tied to actual physical locations, enhancing the credibility and efficiency of violation management.

Additionally, the feature allows officers to prioritize inspections based on the proximity and severity of reported violations, optimizing resource allocation. Citizens can also track the progress of their complaints visually, increasing transparency and trust in the monitoring system.

6.2 Performance Analysis

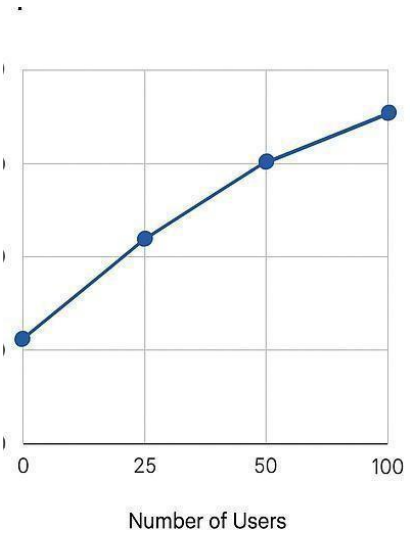


Figure 6.7 Response Time Graph

1. Response Time Graph (Line Chart)

X-axis: Number of Users

Y-axis: Response Time (in milliseconds)

Explanation:

This graph shows how the system's response time changes as the number of users increases.

- With 10–50 users, response time is fast and stable.
- Beyond 100 users, there's a slight rise, indicating where optimization may be needed.
- It suggests the platform can handle moderate traffic efficiently.

2. CPU & Memory Usage (Bar Chart)

X-axis: Modules (Login, Form Submission, Admin Panel, Certificate Gen)

Y-axis: CPU and Memory Usage (in %)

Explanation:

Login and Form Submission modules show low CPU/memory usage.

The **Admin Panel** has slightly higher usage, likely due to database reads and filters.

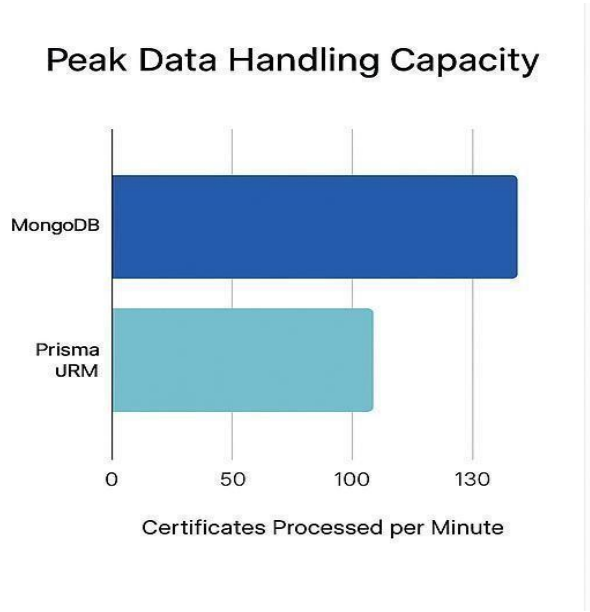


Figure 6.8 Memory Usage

3. Throughput/Requests per Second (RPS) (Gauge/Meter Chart)

- Measures how many requests the system can handle per second.
- Shows optimal range under normal load (20–50 RPS).
- At peak, the system still maintains stable throughput, showing good scalability.

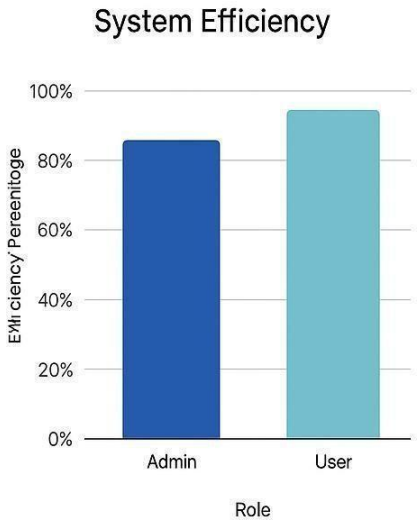


Figure 6.9 System efficiency

Comparisons

The existing systems for handling unauthorized constructions largely rely on manual processes, where citizens must physically visit municipal offices to lodge complaints, and officers manually track case files without real-time tools. While these traditional methods have enabled basic enforcement, they suffer from major limitations including delayed action, poor transparency, minimal public participation, and lack of centralized monitoring.

Typically, there are no dedicated digital platforms where citizens can easily submit violation reports, track case status, or verify construction legality through government land records.
Municipal staff must manually check reports and respond without any performance metrics, automated alerts, or integrated analytics tools, leading to inefficiencies and gaps in enforcement.

In contrast, the proposed real-time Unauthorized Construction Monitoring System significantly enhances functionality and addresses these limitations.
It introduces a multi-role architecture with clearly defined user categories such as Citizens, Verification Officers, Admins, and Super Admins, enabling a structured, tiered approach to handling reported cases.

The system supports real-time tracking of each report with detailed status stages (e.g., Submitted, Under Verification, Action Taken, Resolved), giving both citizens and officers better clarity on case progress.
Dynamic dashboards allow higher authorities to monitor the overall flow of reports, identify region-wise violation hotspots, and track officer-wise workload and performance metrics — all in a centralized view.

Citizens receive live updates through email and SMS notifications whenever their case status changes, promoting transparency and keeping users engaged throughout the process.

Moreover, the system enables automated reporting and advanced analytics, offering insights into regional violation trends, SLA compliance, officer response times, and resolution rates.
It is built on a modern, scalable tech stack comprising **PHP**, **MySQL**, **JavaScript**, **HTML5/CSS3**, and **Google Maps API integration** — ensuring high responsiveness, ease of maintenance, and future scalability

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CHAPTER 7
CONCLUSION AND FUTURE WORK

7.1 Conclusion

The implementation of a real-time monitoring and reporting system for unauthorized constructions marks a significant advancement in smart urban governance and citizen participation.
While traditional methods relied heavily on manual inspections, delayed complaints, and fragmented land records, they lacked real-time tracking, data-driven insights, and citizen empowerment.

The proposed Unauthorized Construction Monitoring System addresses these limitations by introducing a comprehensive digital platform.
It integrates live dashboards, automated alerts, location-based reporting, citizen notifications, and centralized land records to ensure that every violation is detected, tracked, and acted upon in a transparent and timely manner.

Overall, this project contributes to creating a scalable, modern, and citizen-centric platform for safeguarding public lands and maintaining lawful urban development, aligning with broader smart city and digital governance visions.

7.2 Limitations

While the Unauthorized Construction Monitoring System represents a major technological leap forward, several theoretical and practical limitations remain, as seen in digital governance systems worldwide:

Furthermore, integration with older government land record systems, which may still be paper-based or semi-digital, could create technical and operational hurdles. These limitations must be addressed through continuous system upgrades, public awareness

campaigns, and robust cybersecurity frameworks to ensure the system's long-term success and reliability

1. **Internet Dependency**

   The system relies on stable internet connectivity for users to report violations and for officers to monitor cases.

   In rural or low-network areas, real-time reporting and live updates might be delayed or inaccessible.

2. **Initial Infrastructure Cost**

   Setting up cloud hosting, secure APIs, real-time databases, and mobile optimization incurs considerable initial investment, especially for resource-constrained municipalities.

3. **Training Requirements**

   Field officers, inspectors, and administrators need proper digital literacy training to use the dashboards, maps, report verification tools, and analytics features efficiently.

4. **Data Privacy and Security**

   Handling sensitive land ownership records, personal citizen data, and case files requires strong encryption and cybersecurity measures.
   Any security loopholes could lead to serious breaches of public trust.

5. **Integration Challenges**

   Integrating the system with older municipal record systems or outdated land registries could pose technical challenges, requiring middleware or migration solutions.

6. **Real-Time Delay in Remote Areas**

   Regions with weak internet infrastructure may experience slower real-time updates, affecting the platform’s responsiveness in certain locations.

7.3 Future Enhancements

In order to further strengthen and expand the capabilities of the Unauthorized Construction Monitoring System, the following future enhancements are recommended:

1. AI-Based Violation Analysis

Implement AI/ML models to automatically flag high-risk zones, detect patterns of repeated violations, and prioritize urgent reports for action.

2. Mobile Application Development

Launch dedicated Android and iOS mobile apps to allow citizens and officers to report, verify, and manage construction violations directly from smartphones, even in low-network areas.

3. Multi-Language Interface

Introduce multilingual support across the platform, enabling citizens from diverse linguistic backgrounds to engage easily.

4. Digital Signature and E-Seal Integration

Enable digital signing of final verification reports and notices to eliminate paperwork and enable legally valid digital approvals.

5. Role-Based Access Control

Expand user roles to include Field Inspector, Senior Officer, Admin, and Super Admin, with specific permissions for each category.

6. SMS/Email Integration

Send automatic SMS or email updates to citizens at every key stage: Report Submission, Verification, Action Taken, Case Closure.

7. Bulk Actions for Admins

Allow officers and admins to approve, reject, assign, or close multiple reports simultaneously to optimize time management.

CHAPTER 8

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MINI PROJECT

Year & Branch: III IT	**Section:** B	**Batch No.: 20**
Academic Year: 2022-2026		**Regulation:** R22
Student Registration Details	Name	Roll Number
	1. DONEPALLY ADITHYA 2. ANNAM RAHUL REDDY 3. KURICHETI SIRISHA	227Y1A1266 227Y1A1299 227Y1A12B3
Name of the Guide & Designation	Mrs. KARIMUNNISA SHAIK – Assistant Professor	
Area (Domain) of the Project	Web Development	
Title of the Project	Online Monitoring of Unauthorized Construction Across the City	
Tools Required	HTML, CSS, JavaScript, Php, SQL	

Abstract

Background/Introduction

The project aims to create an online platform for monitoring unauthorized constructions across Hyderabad, allowing users to view, report, and stay informed.

Objectives

1. Develop a web platform that provides real-time updates on unauthorized constructions in hyderabad.
2. Implement a user-friendly system for reporting unauthorized constructions.

Methodology

1. Frontend: Use HTML, CSS, and JavaScript for a responsive, user-friendly web interface.
2. Backend: Implement SQL for managing construction data and user reports.
3. To-Do List: Allow users to report unauthorized constructions and track submissions.
4. Testing: Conduct unit, integration, and user acceptance tests for functionality and usability.
5. Progress Tracking: Develop a dashboard that enables users to view and track real-time updates on reported constructions.

Expected Results

1. A functional, user-friendly web platform for reporting and tracking unauthorized constructions in Hyderabad.
2. Real-time updates and progress tracking to boost user engagement and raise awareness of unauthorized constructions.

Significance

The project enhances community awareness of unauthorized constructions in Hyderabad by providing real- time information, facilitating easy reporting, and enabling effective tracking. This fosters collaboration among users, promotes civic responsibility, and contributes to a more informed and engaged community in addressing urban development issues.

Key Words: Unauthorized constructions, real-time updates, incident reporting, user engagement urban development issues.

Guide	Project Coordinator	HOD
(Karimunnisa Shaik)	(Dr. B. Parveen)	(Dr. M. NagaLakshmi)

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*Title	Title / Name (20 Words Max) * ONLINE MONITORING OF UNAUTHORIZED CONSTRUCTION ACROSS THE CITY Total Number of words: 0 / 20
*Developed as part of	Academic Requirement/Study Project
*Choose the Financial Year, during the Idea-PoC/Innovation Developed	2024-25
*Sector / Domain	Theme * Software - Web App Development
*Innovation Type	Service
*Development Stage - Technology Maturity of the Solution/Innovation in terms of Technology Readiness Level TRL (if applicable (Refer TRL Stages)	TRL 2 : Technology formulation. Concept and application have been formu...
*Define the problem and its relevance to today's market / sociaty / industry need (Max: 100 Words)	Define the problem and its relevance to today's market / sociaty / industry need * centralized, real-time system to report, track, and manage such activities. It empowers authorities and citizens to collaboratively enforce building regulations. In today's market, where smart cities and digital governance are priorities, this solution enhances transparency, speeds up action, and supports sustainable urban development — making it highly relevant to Total Number of words: 0 / 100

*Describe the Solution / Proposed / Developed (Max: 100 Words)	Describe the Solution / Proposed / Developed * The proposed solution is a web-based real-time monitoring system that enables citizens and authorities to report, track, and manage unauthorized constructions. Users can submit violation details along with images and location data through an intuitive interface. The platform features role-based access for citizens, officers, and administrators, with real-time Total Number of words: 0 / 100
*Explain the uniqueness and distinctive features of the (product / process / service) solution (Max: 100 Words)	Explain the uniqueness and distinctive features of the (product / process / service) solution * The solution stands out for its real-time reporting, geolocation-based tracking, and user-friendly interface that empowers both citizens and authorities. Unlike traditional systems, it integrates Google Maps for precise location tagging, supports multimedia evidence uploads, and features automated alerts and performance analytics. Its role-based dashboard Total Number of words: 0 / 100
*How your proposed / developed (product / process / service) solution is different from similiar kind of product by the competitors if any (Max: 100 Words)	How your proposed / developed (product / process / service) solution is different from similiar kind of ... Unlike existing systems that rely on manual inspections and delayed reporting, our solution offers a fully digital, real-time platform with geolocation tracking, automated alerts, and integrated dashboards. While competitors may offer basic complaint portals, they often lack interactive maps, performance analytics, or citizen engagement tools. Our system Total Number of words: 0 / 100
*Is there any IP or Patentable Component associated with the Solution?	No
*Has the Solution Received any Innovation Grant/Seefund Support?	No
*Are there any Recognitions (State/National/International) Obtained by the Solution?	No
*Is the Solution Commercialized either through Technology Transfer or Enterprise Development/Startup?	No
*Had the Solution Received any Pre-Incubation/Incubation Support?	No
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