A REPORT
ON

CROWD-SOURCED WATER-RELATED PROBLEM

Submitted by,

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Under the guidance of,

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in partial fulfillment for the award of the degree of

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

DATA SCIENCE

At

GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

PRESIDENCY UNIVERSITY

BENGALURU

MAY 2025

PRESIDENCY UNIVERSITY

SCHOOL OF COMPUTER SCIENCE ENGINEERING

CERTIFICATE

This is to certify that the Project report **"CROWD-SOURCED WATER RELATED PROBLEM"** being submitted by ACHANTA HIMA CHANDU bearing roll number 20211CSD0006 in partial fulfillment of the requirement for the award of the degree of Bachelor of Technology in Computer Science and Engineering is a bonafide work carried out under my supervision.

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DECLARATION

We hereby declare that the work, which is being presented in the project report entitled **"CROWD-SOURCED WATER RELATED PROBLEM"** in partial fulfillment for the award of Degree of **Bachelor of Technology** in **Computer Science and Engineering (Data Science)**, is a record of our own investigations carried under the guidance of **Ms. RADHIKA SREEDHARAN, Asst.Professor, School of Computer Science Engineering & Information Science, Presidency University, Bengaluru.**

We have not submitted the matter presented in this report anywhere for the award of any other Degree.

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ABSTRACT

Water scarcity and pollution are critical issues that require prompt action. This project provides a digital platform for users to report water-related problems efficiently. The system categorizes complaints, assigns tasks to workers, and allows real-time monitoring of complaint resolution. By leveraging a structured approach, this system enhances accountability and transparency. The admin can manage complaints, assign work, and track progress. Users can submit complaints with images and location data, while workers receive assignments and update statuses upon completion. This structured approach ensures systematic complaint resolution, benefiting both citizens and authorities. The platform simplifies issue tracking and work delegation, reducing delays in addressing water-related concerns. Through an interactive dashboard, the system offers insights into complaint trends, work efficiency, and unresolved issues. This structured approach improves response efficiency and ensures water-related issues are addressed effectively.

Keywords: Water issues, Complaint tracking, User participation, Task delegation, Efficient resolution.

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Achanta Hima Chandu - 20211CSD0006

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Water problems, such as supply shortages and contamination, need urgent attention. Yet, traditional reporting systems tend to lead to miscommunication and inefficiencies. This project proposes a digital complaint management system where users can report water concerns, facilitating action in time. Organizing the complaint process, this system boosts coordination among users, workers, and administrators, facilitating quicker issue resolution.

1.2 RESEARCH MOTIVATION

Contamination of water and disruption in supplies are critical problems, and very often these trigger public health hazard and environmental risks. Poorly managed complaints and slow response create these issues more severe. In this project, an orderly reporting system of complaints is attempted in order to guarantee improved coordination between administrators, workers, and customers. Efficient filing of problems guarantees efficiency, responsiveness, and accountability in addressing concerns related to water.

1.3 PROBLEM STATEMENT

The current water complaint systems have no systematic framework, leading to mismanagement and untimely resolutions. The users find it difficult to report problems accurately, whereas authorities find it challenging to monitor complaints. Without a systematic approach, water-related issues remain unresolved. This project solves the problem in an effective manner by allowing tracking of complaints, organized assignments, and location-based reporting for effective water issue management.

1.4 DOMAIN INTODUCTION

The project intends to offer an online platform for reporting and settling water-related issues effectively. It simplifies the complaint process through the integration of user submissions, admin management, and worker assignment, ensuring timely issue resolution and encouraging accountability and transparency in addressing water complaints.

This project aims to create a systematic platform for water-related complaint registration and resolution. It allows users to register complaints with accurate location information, enabling workers to resolve problems effectively. The system offers an interactive dashboard to monitor complaint status. The platform is advantageous for both authorities and citizens as it ensures effective issue delegation and systematic problem-solving.

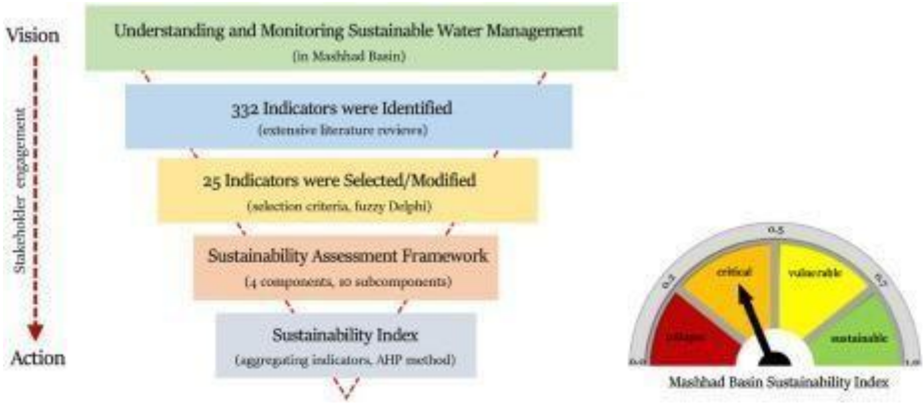


Fig 1.1 Hierarchy of Sustainable Solid Water management image

CHAPTER 2
LITERATURE SURVEY

2.1 INTRODUCTION

Over the recent years, public grievance redress and management, especially those regarding core services such as water supply, have been of particular interest across disciplines. Efficient, precise, and prompt complaint handling mechanisms have become the need of the hour to enhance public service delivery and citizen satisfaction. Scholars have studied a variety of approaches ranging from predictive analytics and fuzzy logic systems to mobile app development to resolve these issues in an integrated manner.

There are attempts to improve the quality of water services using predictive complaint modeling. Junseok Eom et al. (2020) have proposed, for example, a real-time customer satisfaction prediction model using unstructured and structured complaint data and obtained an extremely high accuracy of 98.7% in the early-stage complaint detection of water pollution and supply interruption. Likewise, Santoso Wibowo and Srimannarayana Grandhi (2017) had previously proposed a fuzzy logic-based multi-criteria group decision approach to evaluate the sustainability of urban water services successfully aggregating imprecise and subjective human judgments.

Technically, machine learning models like Random Forest have been employed to forecast complaint trends in the future based on environmental variables, as indicated by D. Roopa et al. (2024). This proactive strategy allows authorities to foresee issues and plan for infrastructure development ahead of time. Aside from data-based solutions, location-based mobile apps have been viable alternatives too. Lakshmi Prasanna Divvela et al. (2023) have suggested a GPS-based complaint app where users can complain easily and the authorities can easily pinpoint areas of issues.

Beyond urban infrastructures, Mahfuzulhoq Chowdhury and Nura Hadi (2023) conceptualized an integrated mobile application for rural village councils that offered not only complaint redress but also medical, IT, and local government services. It is one part of a larger trend towards digitization of service delivery, particularly in poor rural areas, towards greater accessibility as well as administrative transparency. Combined, these studies suggest the increasing role of smart, user-focused platforms and prediction models in correcting public ills, bringing more robust and responsive forms of governance architectures.

2.2 RELATED WORK

[1] Junseok Eom; Taewook Choi; Yungsuk Yoon; Kyung Geun Lee || The Study of Customer Satisfaction Index Characteristic with Local Water Supply Service || 21-23 October 2020

Contents of Water Customer Complaints made up of unformatted text and structured data are received in real-time. The data of the water supply complaints received by this way must be verified and predicted to improve the quality of water service. To solve this problem, the frequency of search terms with the meaning of customer complaints is extracted from the hybrid type water supply to calculate the weight, establish an itemized threshold standard to recognize the areas and contents of civil complaints of positive and negative early on. If the threshold criteria are exceeded, raise an alarm to study how to proactively respond to the causes of the problem was studied to develop a customer satisfaction prediction model with 98.7%. This detects/warn complaints at an early stage, such as accidents in underground communities in certain areas, wide-band water pollution and no water supply. So that through step-by-step action plan mapping of major complaints, water supply accidents and complaints can have an important effect.

[2] Santoso Wibowo; Srimannarayana Grandhi || Evaluating the sustainability performance of urban water services || 18-20 June 2017

This paper formulates multicriteria group evaluation of the sustainability performance of urban water services as a multicriteria group decision problem and proposes a new multicriteria group decision-making method for efficient assessment of the sustainability performance of urban water services. Interval-valued intuitionistic fuzzy numbers are used to model the subjectives and fuzziness of the decision process. Interval-valued intuitionistic fuzzy weighting averaging operator is used for fuzzy information aggregation. Distance-based knowledge measure is used for obtaining positive and negative interval-valued knowledge measure values upon which the ultimate decision can be made. An example is utilized to demonstrate the practicability of the method for solving the urban water services' sustainability performance evaluation problems.

[3] D.Roopa; S.Mathupriya; A. Lazha; R. Prabha || Examining the Structure for Handling and Addressing Consumer Issues within the Water Utilities Industry || 08-09 October 2024

Authorities' reactive approach to water quality issues and infrastructure can cause delays. Predicting future complaints based on environmental factors can help to improve infrastructure and prevent complaints. It is possible to predict the number of complaints for future years by analyzing water-related complaints data and identifying correlations between various environmental factors using machine learning algorithms such as Random Forest. This data can help manage water quality issues and enhance infrastructure. Identifying common difficulties in specific areas can also aid in determining the main cause of a problem and preventing future complaints. In this study, Python libraries are used to examine data on water quality complaints in New York City from 2010 to 2020. The first dataset filtered out water-related searches from a vast dataset, while the second comprised data on water quality and environmental aspects from 2015 to 2021. According to the findings, there is a link between specific environmental conditions and the frequency of complaints. Based on past data, the Random Forest algorithm was used to forecast complaints.

[4] Lakshmi Prasanna Divvela; V Sravanthi; Pethakamsetty Hemannth; Tummalapalli Kesava Sai Avinash || Raise of Complaints on day-to-day issues by the public using Global Positioning System for finding the exact location of the problem || 17-18 March 2023

The problems facing by the public in the sectors of cleanly roads, street lights functioning are increasing day by day. The complaints to solve these issues are need to be addressed in time. For public it will be a hectic task to find the office and follow the procedure for filing a complaint, and for the authorities to find the exact location of the complaint is also an important task. For this, an efficient interface need to be developed, this paper proposes an approach of developing a mobile application which helps the user for raising the complaint and giving the current GPS location. The complaints issued by the users are categorized into various categories like sanitization, road pits etc., which are described in the paper. The authorities can view the complaints based on the category chosen, they could also view the way for the location of the complaint by directing to the Google maps in which the way to destination location is shown automatically.

[5] Mahfuzulhoq Chowdhury; Nura Hadi || Union Parishad: A Rural Village Council Based Mobile Application For Village Peoples Local, Medical, IT, and Complaint Assistance Services || 10-11 August 2023

The union council performs a significant function to enhance the living standard of rural people by delivering local problem-solving facilities, medical facilities, IT facilities, local jurisdiction facilities, and various complaints-solving assistance facilities. The existing research on union council-based services is based on offline- based service delivery. The offline-based union council service delivery process takes time and is costly. To present a constructive solution, the paper presents an online-based union council mobile app for local problem-solving of rural village peoples, medical facilities, local jurisdiction, IT services, and complain assistant facilities. The distinguishing features of the proposed application include community centre booking, birth certificate apply, government allowance, vaccination application, doctor appointment services, computer training, corruption reporting, local jurisdiction assistance, and online seminar scheduling. The user review response analysis of the application features summarized that over 75% of users are content with the suggested application features and 80% of users are content with the suggested applications dominance over the current issues.

CHAPTER 3

RESEARCH GAPS OF EXISTING METHODS

3.1 EXISTING SYSTEM

Traditional complaint management methods rely on manual logging, phone calls, or emails, leading to inefficiencies. Complaints are often lost or unresolved due to a lack of structured tracking. Without location-based reporting, authorities struggle to pinpoint problem areas. The absence of a centralized platform makes it difficult to assign, monitor, and resolve water-related issues efficiently.

Disadvantages

- Complaints are often misplaced or overlooked due to manual logging.
- No systematic way to track complaint progress or assign responsibilities.
- Users lack real-time updates, causing frustration and uncertainty.
- Authorities struggle to address complaints due to the absence of location data.

3.2 PROPOSED SYSTEM

This system presents a formal digital platform for water-related complaint reporting and resolution. Users are able to file in-depth complaints with photos and location information, and admins allocate tasks to workers. Workers update complaint status when solved. The system has a dashboard for complaint trend tracking and monitoring efficiency. This method simplifies issue reporting, reduces response time, and maximizes complaint resolution.

Advantages

- Complaints are often misplaced or overlooked due to manual logging.
- No systematic way to track complaint progress or assign responsibilities.
- Users lack real-time updates, causing frustration and uncertainty.
- Authorities struggle to address complaints due to the absence of location data.

CHAPTER 4
PROPOSED METHODOLOGY

4.1 METHODOLOGY

Crowd Resource system presents a robust and well-defined digital solution to address the inefficiencies of the traditional complaint reporting systems—especially for water or municipal-related issues. It has been designed to give transparency, efficiency, accountability, and community participation in the complaint process.

The approach is a multi-role step-by-step process that complements modern digital process and public service needs:

Step 1: User Authentication and Registration

- Citizens register and sign in to the system by entering secure credentials.
- The authentication module safeguards authorized users from unauthorized access to complaint submission and tracking capabilities.
- safeguards user-specific dashboards and personal complaint histories.

Step 2: Submitting Complaints

- Authenticated users are able to file complaints through completing a preformatted form.
- The complaint entry on each enables the users to:
- Add a title and description of the issue.
- Include an image as graphical proof.
- Provide location information (e.g., address or coordinates).
- The backend keeps all the entries in an SQLite database and attributes them with timestamp and status tags (e.g., "Pending", "In Progress", "Resolved").

Step 3: Admin Validation and Task Distribution

- Admins use a different portal/dashboard for login
- All complaints are listed in an organized list with filters (e.g., date, location,

status).

- Admins examine new complaints and assign them to assigned workers by area or availability.
- Role-based assignment prevents improper delegation and lack of accountability Admins use a different portal/dashboard for login.
- All complaints are listed in an organized list with filters (e.g., date, location, status).
- Admins examine new complaints and assign them to assigned workers by area or availability.
- Role-based assignment prevents improper delegation and lack of accountability.

Step 4: Worker Task Management and Updates

- Workers who have been assigned receive complaint information, including location and image data.
- Once the issue has been resolved, workers can:
- Mark the complaint status as "Resolved".
- Provide remarks or feedback on the resolution process.
- This complaint status update is displayed live within the system.

Step 5: Complaint Tracking and Notifying in Real-Time

- Any time, from their dashboard, users can check the status of the complaints that they have lodged
- Status change notifications (e.g., assigned, in process, resolved).
- This makes life more transparent and less frustrating to users.

Step 6: Admin Dashboard Analytics

- The admin dashboard features:
- Visualizations for complaint trends (e.g., top areas that were reported on, categories for issues).
- Performance monitoring (e.g., average time to resolution, worker response percentage).

- These findings assist the authorities in making informed decisions and deploying resources optimally.

Step 7: Data Persistence and Security

- The system employs an SQLite database for persistent storage of:
- User data
- Complaint records
- Task assignments
- Status logs
- Environment variables (.env) and backend logic (config.py) are used to secure sensitive information.

4.2 REQUIREMENTS:

Hardware Requirements:

Processor	**13/ Intel Processor**
RAM	**8GB**
Hard Disk	**1TB**

Table 4.1: Hardware Requirements

Software Requirements:

Operating System	Windows 10
JDK	Java
Plugin	Kotlin
SDK	Android
IDE	Android studio
Database	Server script, MySQL

Table 4.2: Software Requirements

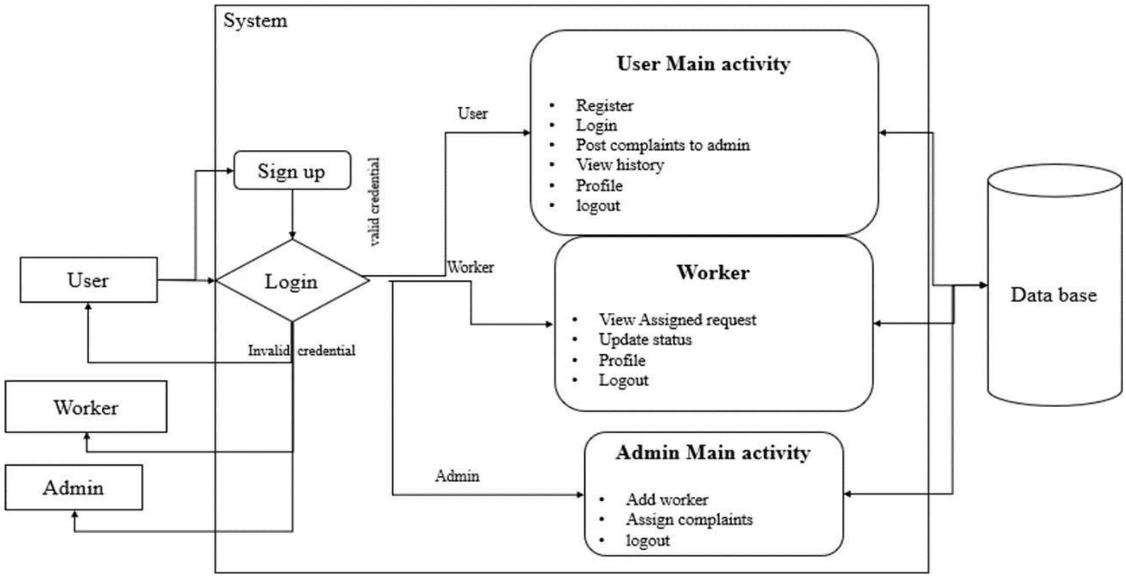


Fig 4.1 Proposed Methodology

CHAPTER 5

OBJECTIVES

1. **To create a web-based platform for crowd-sourced resource sharing**
   - The central focus of this project is to deliver an online arena where users have the ability to upload, explore, and obtain different kinds of resources—academic, material, or digital—contributed by the community. This system is based on reciprocal benefit by supporting users to supply and obtain resources in a group setting.

2. **To enable secure user authentication and session management**
   - A safe login and registration mechanism guarantees users' data and activity are secured. Sessions are handled with the assistance of Flask's session management mechanism, helping maintain access to secured views and operations, ensuring user interactions and personal data are safe.

3. **To create a neat and responsive user interface with HTML and CSS**
   - User interfaces are developed by using HTML templates supplemented with CSS for styling and basic JavaScript for interactivity. The templates are in the templates directory and get rendered by Flask, making the platform accessible, intuitive, and visually appealing.

4. **To organize the backend with Flask for route and view management**
   - The application utilizes Flask—a lightweight yet efficacious web framework—to manage application routing, request processing, as well as template generation. app.py holds the fundamental logic for creating routes and linking them to respective views or handlers.

5. **To store application data with an SQLite relational database**
   - All resource and user data is saved in an SQLite database (database.db), which is lightweight and simple to install. The data is organized in tables and queried using SQL queries or Python-based ORM-like techniques specified in models.py.

6. **To encapsulate data models and queries in a reusable format**
   - To make the code modular and easy to maintain, all data access logic is abstracted out to models.py. This includes functions to create, read, update, and delete database records, allowing consistent and clean data handling throughout the application.

7. **To enable a dynamic resource submission system**
   - Users can submit new resources through web forms. These are validated, processed, and saved in the database. This enables the application to keep on growing and developing continuously with the contributions of users, keeping to its crowd-sourced philosophy.

8. **In order to keep the application configuration safely with environment variables**
   - Delicate information such as database paths, secret keys, or API keys is handled through the use of a .env file, which is loaded by the application through the config.py module. This facilitates configuration and source code separation to improve security and flexibility.

9. **For structuring the project organization for maintainability and collaboration**
   - The directory structure distinguishes well the tasks: static files, templates, backend logic, configuration, and documentation. This organizational approach enhances code readability, debugging, and facilitates the project to work on in collaboration.

10. **To include utility functions for backend activities**
    - utils.py holds the utility functions utilized throughout the backend—for example, input validations, formatting rules, or common data processing functions. This leaves the core application logic in app.py clean and simple.

CHAPTER 6
SYSTEM DESIGN & IMPLEMENTATION

6.1 INTRODUCTION TO SYSTEM DESIGN

6.1.1 INPUT DESIGN:

The input plan is the interface between the data framework and the client. It comprises the creating detail and strategies for information planning and those steps are essential to put exchange information in to a usable frame for handling can be accomplished by assessing the computer to studied information from a composed or printed record or it can happen by having individuals keying the information straightforwardly into the framework. The plan of input centers on controlling the sum of input required, controlling the mistakes, maintaining a strategic distance from delay, dodging additional steps and keeping the method basic. The input is outlined in such a way so that it gives security and ease of utilize with holding the security. Input Plan considered the taking after things:

- What information should be given as input?
- In what should the information be coded or organized?
- The dialog to guide the operating personnel in providing input.
- Techniques for generating input validations and procedures to follow in case of errors.

Objectives

- Design is the process of transforming a user-focused definition of the input into a computer system. It must be designed to prevent mistakes in the data input process and demonstrate the right way to the management to receive proper information from the computerized system.
- It is achieved by creating user-friendly screens for data entry to handle large volume of data. The goal of input design is to make data entry easy and error-free. The screen for data entry is designed in such a way that all the data manipulates can be performed. It also includes record viewing facilities.
- When the data is entered it will check for its validity. Data can be entered with the help

of screens. Appropriate messages are provided as when needed so that the user will not be in maize of instant. Thus, the objective of input design is to create an input layout that is easy to follow.

6.1.2 OUTPUT DESIGN

A quality output is one, which meets the requirements of the end user and presents the information clearly. In any system results of processing are communicated to the users and to other system through outputs. In output design it is determined how the information is to be displaced for immediate need and also the hard copy output. It is the most important and direct source information to the user. Efficient and intelligent output design improves the system's relationship to help user decision-making.

- The computer output design should go on in a well-thought-out and systematic way; appropriate output needs to be created while making sure that each of the output components is designed in such a way that individuals will find the system can use effectively and conveniently. Analysts should determine the particular output required to address the requirements while computer output is being developed.
- Select methods for presenting information.
- Create document, report, or other formats that contain information produced by the system.

The output form of an information system should accomplish one or more of the following objectives.

- ❖ Convey information about past activities, current status or projections of the
- ❖ Future.
- ❖ Signal important events, opportunities, problems, or warnings.
- ❖ Trigger an action.
- ❖ Confirm an action.

6.2 DIAGRAMS:

6.2.1 UML Diagram

•UML is the Unified Modelling Language. UML is a standard general-purpose modelling language in object-oriented software engineering. The standard is controlled, and was developed by, the Object Management Group.

•The aim is that UML should become a shared language for building object-oriented computer software models. Currently, UML consists of two large components: A Meta-model and a notation. In the future, there might be added to; or linked with, UML some kind of method or process.

•Unified modelling Language is a common language for specifying, Visualization, Building and documenting software system artifacts as well as business modeling and other non-software systems

•The UML is a set of best engineering practices that have been successful in modelling large and complicated systems.

•The UML is a highly crucial component of object-oriented software development and software development itself. The UML primarily employs graphical notations to convey the software project design.

Goals:

The Primary goals in the design of the UML are as follows:

1. Give users a preprocessed, expressive visual modelling Language such that they can create and share meaningful models.
2. Give extendibility and specialization mechanisms to add to the basic concepts.
3. Be language and process independent.
4. Give a formal basis for comprehending the modelling language.
5. Foster growth of OO tools market.
6. Support higher level development constructs like collaborations, frameworks, patterns and components. Integrate best practices.

6.2.2 Use Case Diagram:

A Unified Modeling Language (UML) use case diagram is a behavioral diagram created by and derived from a Use-case analysis. It is used to display a graphical summary of the system's functionality in terms of actors, their objectives (expressed as use cases), and any relationships between those use cases. The primary function of a use case diagram is to indicate what system operations are done for which actor. The actors in the system can be represented by roles.

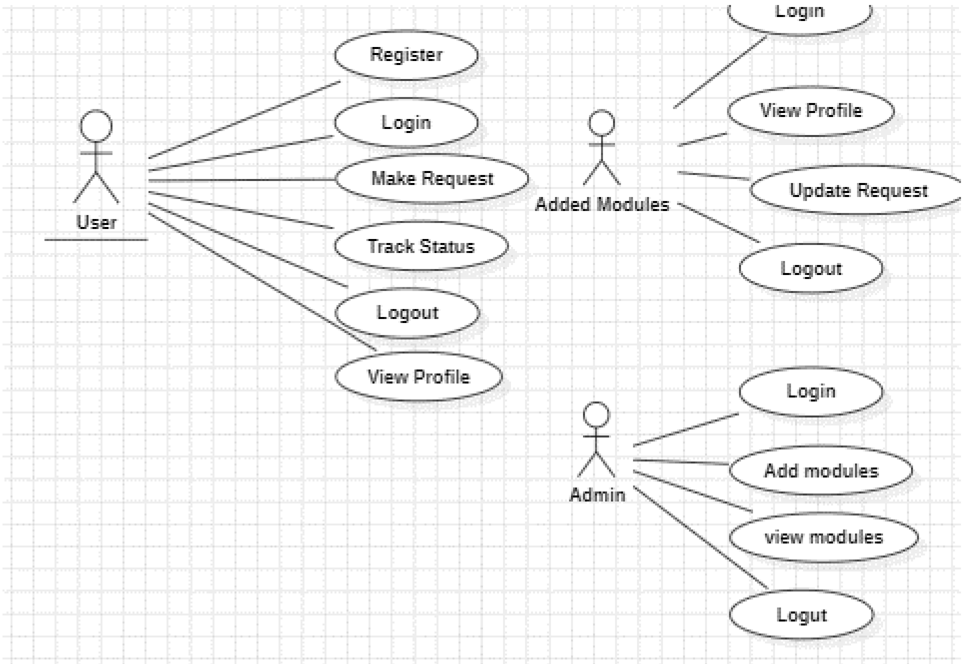


Fig 6.1 Use case Diagram

6.2.3 Class Diagram:

In software development, a class diagram in the Unified Modelling Language (UML) is a kind of static structure diagram that depicts the structure of a system by indicating the system's classes, their attributes, operations (or methods), and the relationships between the classes. It indicates which class holds information.

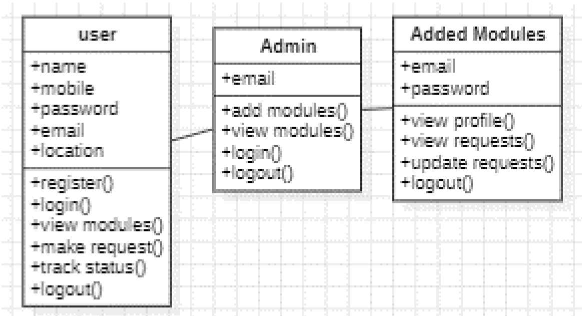


Fig 6.2 Class Diagram

6.2.4 Sequence Diagram:

A Unified Modelling Language (UML) sequence diagram is an interaction diagram that illustrates how processes communicate with each other and in what sequence. It is a Message Sequence Chart form. Sequence diagrams are also referred to as event diagrams, event scenarios, and timing diagrams.

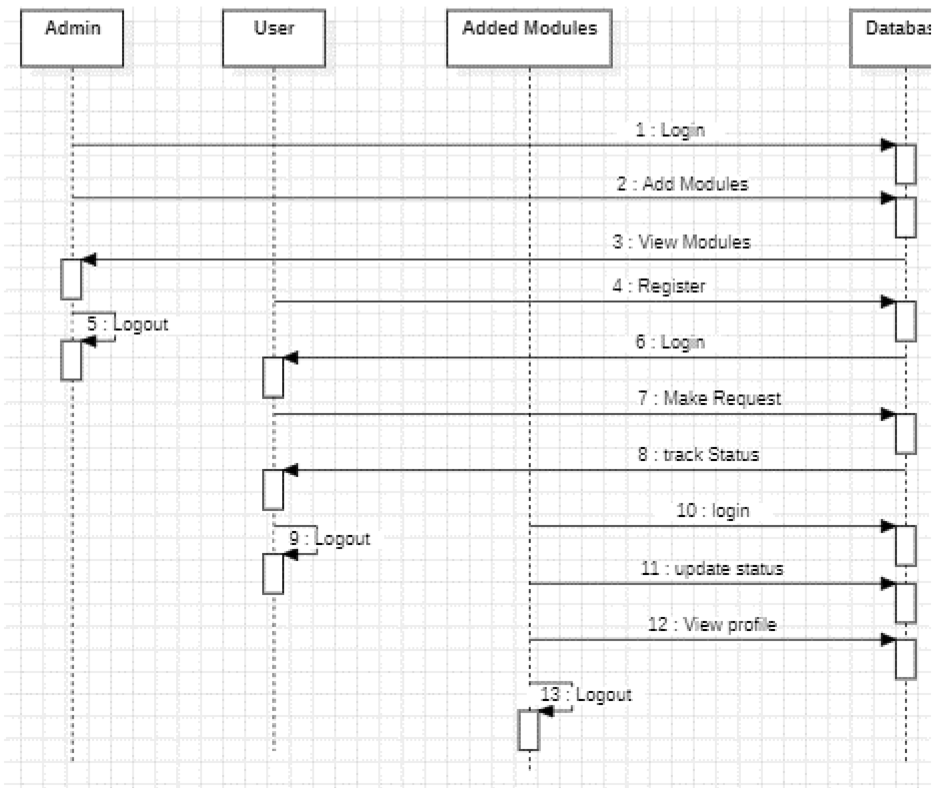


Fig 6.3 Sequence Diagram

6.2.5 Collaboration Diagram:

In collaboration diagram the sequence of calls of the methods is indicated by some numbering technique as below. The number indicates the way the methods are called step by step. We have applied the same order management system to describe the collaboration diagram. The method calls are similar to a sequence diagram. But the fact is that the sequence diagram doesn't describe the object organization whereas the collaboration diagram describes the object organization.

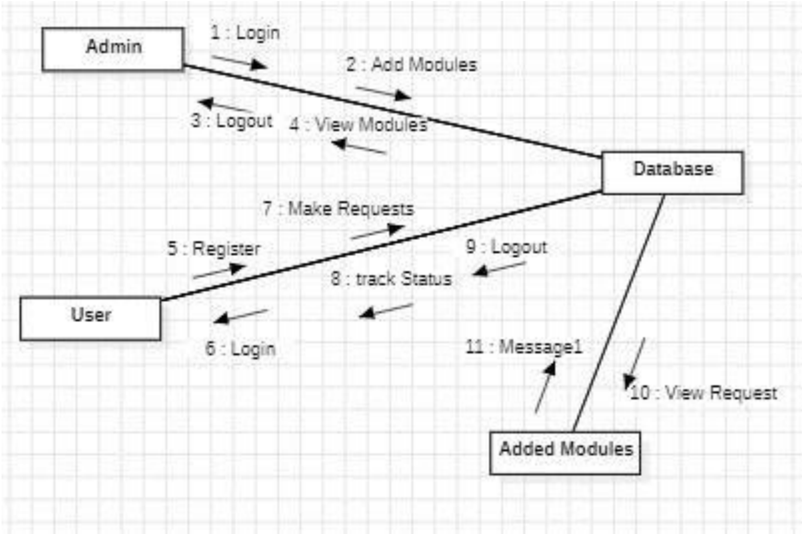
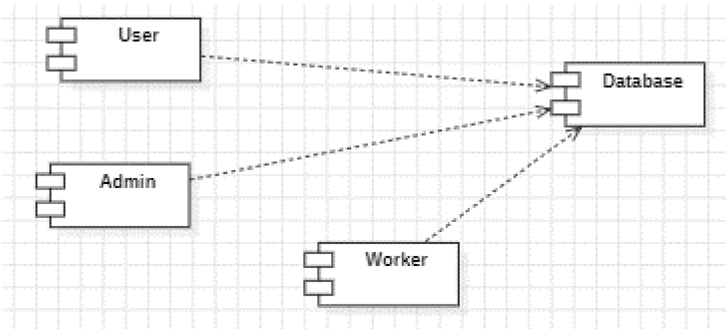


Fig 6.4 Collaboration Diagram

6.2.6 Component Diagram:



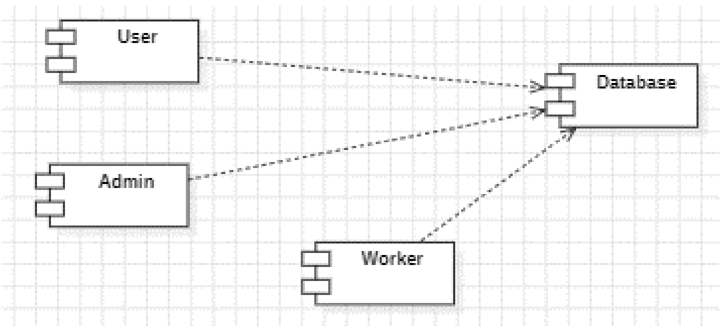


Fig 6.5 Component Diagram

6.2.7 Activity Diagram:

Activity diagrams are visual representations of step-by-step action and sequence of activities with the ability to decide, loop, and execute in parallel. Activity diagrams in the Unified Modelling Language can be used to represent the step-by-step operation and business sequences of system parts. An activity diagram represents the control flow in general.

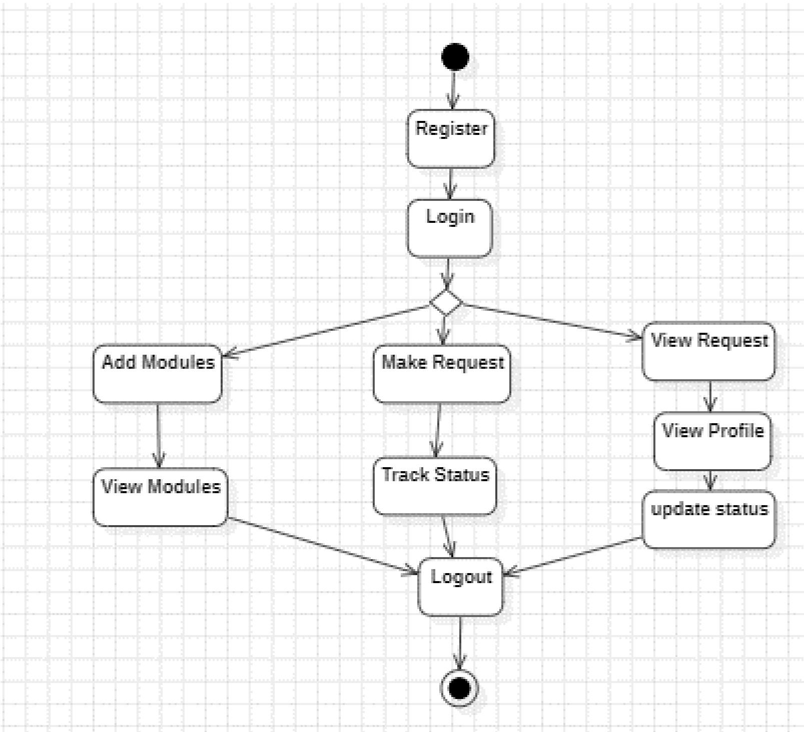


Fig 6.6 Activity Diagram

6.2.8 Deployment Diagram:

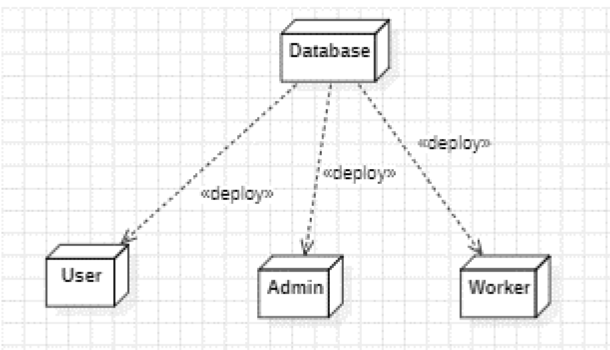


Fig 6.7 Deployment Diagram

6.2.9 ER Diagram:

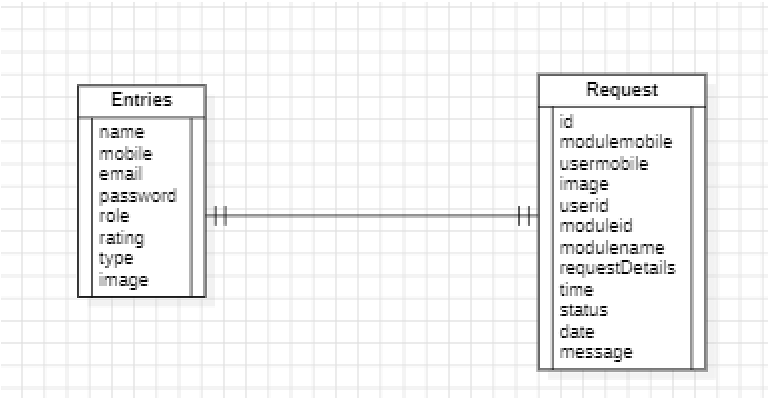


Fig 6.8 ER Diagram

6.2.10 Data Flow Diagram:

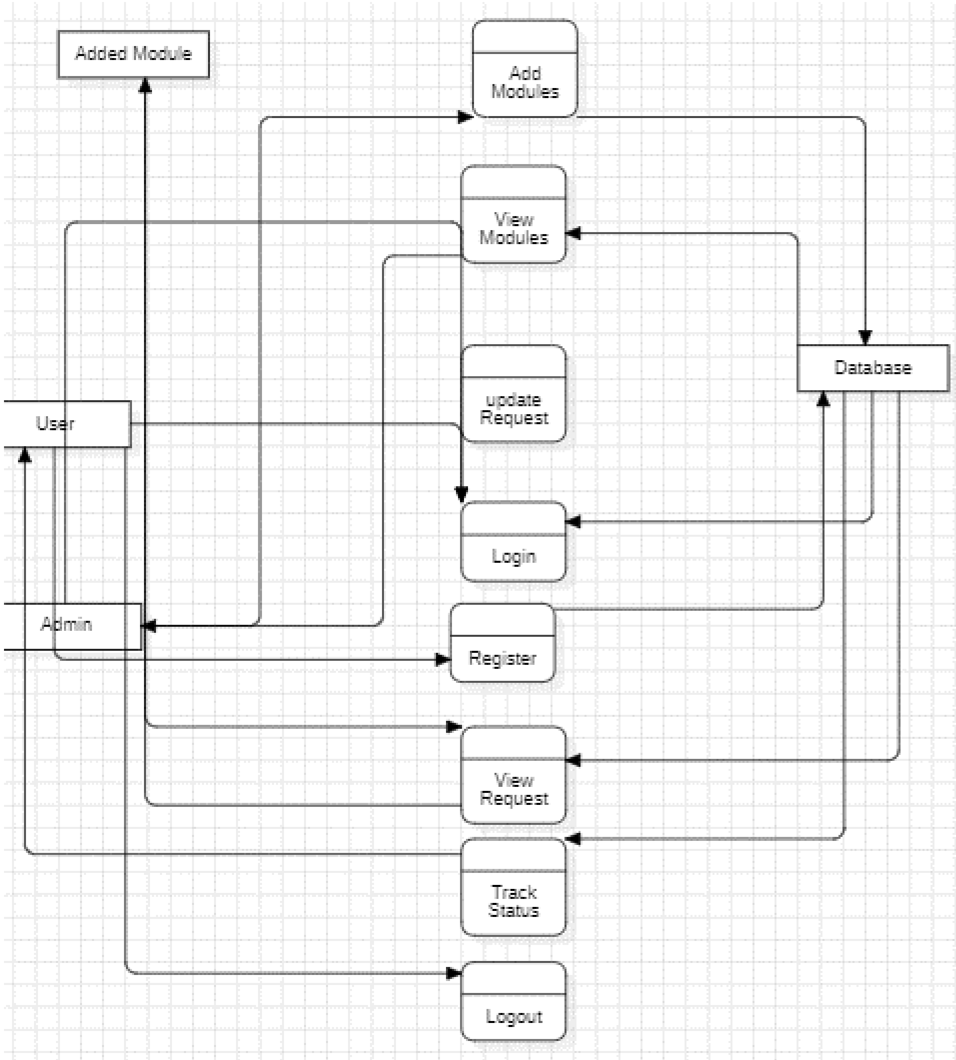


Fig 6.9 Data Flow Diagram

6.3 MODULES:

- **Admin Module:** Admin oversees complaints, distributes work among workers, and monitors complaint status. Admin is able to see complaint trends through a dashboard, facilitating effective management of water issues through systematic observation and assignment of work.

- **User Module:** Users can register, file complaints with photo and location, and track status of complaints. A dashboard provides complaint progress information, enhancing user engagement in effective resolution of water issues.

- **Worker Module:** Complaints are assigned to workers, see issue details, and update status after resolution. They are able to see location data through maps to ensure proper resolution of issues. A dashboard enables them to deal with and monitor assigned complaints efficiently.

6.4 REQUIREMENT ANALYSIS:

6.4.1 Functional and non-functional requirements:

Requirements analysis is a highly critical activity that allows the feasibility of a system or software project to be measured. Requirements are typically divided into two categories: Functional and non-functional requirements.

6.4.1.1 Functional Requirements: These are the demands that the end user explicitly requires as inherent facilities that the system must provide. All these features need to be necessarily included in the system as part of the agreement. These are depicted or expressed in terms of input to be provided to the system, the action performed and the output desired. They are essentially the user requirements given by the user which one can directly observe in the end product, as compared to the non-functional requirements.

6.4.1.2 Examples of functional requirements:

1) Authentication of user whenever he/she logs into the system
2) System shutdown in case of a cyber-attack

6.4.1.3 Non-functional requirements: These are fundamentally the quality limits that the system has to fulfill based on the project agreement. The priority or degree to which these elements are put into effect differs from one project to another. They also refer to them as non-behavioral requirements.

They generally handle concerns such as:

- Portability
- Security
- Maintainability

- Scalability
- Performance
- Reusability
- Flexibility

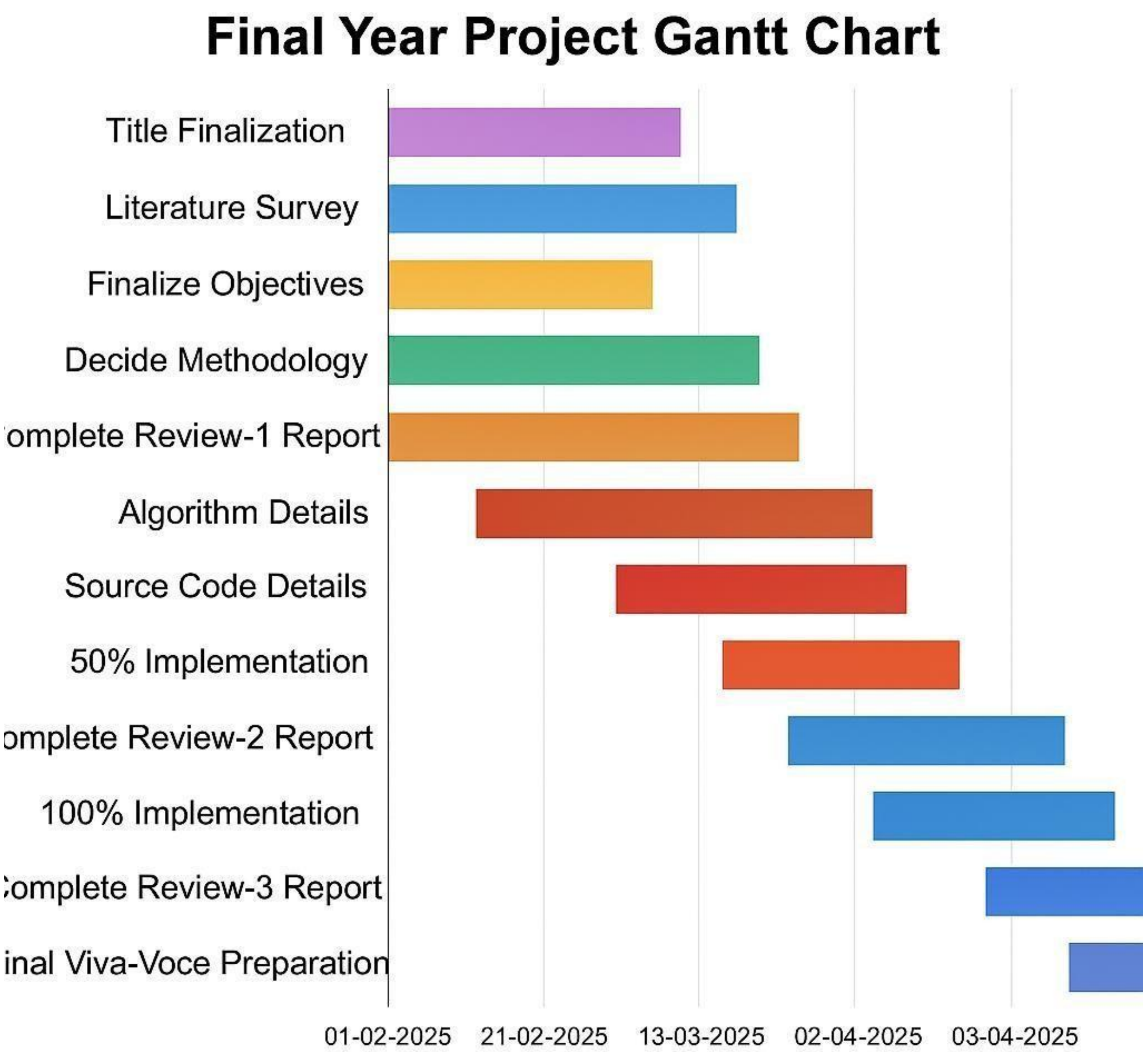
6.4.1.4 Examples of non-functional requirements:

1) Emails must be dispatched with an allowance of at most 12 hours after such a task.
2) The handling of each request must occur within 10 seconds
3) The webpage must load within 3 seconds whenever of concurrent users are > 10000

CHAPTER 7

TIMELINE FOR EXECUTION OF PROJECT

(GANTT CHART)



CHAPTER 8

OUTCOMES

1. Successful Implementation of a Role-Based Complaint Management System

- The project provides a multi-user platform where users, admins, and workers all play unique roles. This organized segregation of access permissions enables:
- Citizens to submit complaints,
- Admins to track and allocate complaints,
- Workers to resolve complaints and change status.
- This is a level of organization that guarantees efficiency, accountability, and seamless flow.

2. Real-Time Complaint Tracking by Users

- Users can monitor the status of their lodged complaints from receipt to completion through a customized dashboard.
- This enhances transparency and minimizes user frustration as opposed to the old, opaque systems.

3. Image and Location-Based Complaint Reporting

- The system enables users to include images and provide location information while filing complaints.
- This increases the credibility and clarity of reports and facilitates workers in locating the precise problem location more effectively.

4. Streamlined Task Assignment by Admins

- Admins can see all complaints and allocate tasks to available workers from the backend.
- The system eliminates the requirement of physical coordination or paper-based tracking, which shortens delays and improves management.

5. Effective Database-Driven Architecture

- Every piece of data, from users to status updates, is held in an SQLite database.
- This provides persistence, rapid retrieval, and well-structured querying for analytical or operational use.

6. Safe User Authentication and Data Privacy

- The project has a secure login system and session handling.
- Sensitive configurations (such as secret keys) are encrypted with environment variables, safeguarding user credentials and personal information.

7. Centralized Dashboard for Complaint Monitoring and Analytics

- Admins have a dashboard with which to track.
- The count of open, allocated, or settled complaints
- Average response times.
- Frequently impacted areas
- This allows for improved planning and resource allocation on the part of municipal authorities or organizations.

8. Complaint Resolution Time Reduction

- By automating the complaint life cycle and eliminating manual bottlenecks, the system facilitates faster complaint assignment and resolution.
- This improves total service efficiency and user satisfaction.

9. Scalable and Modular Web Architecture

- The project is constructed with a modular design in Flask.
- Files such as app.py, models.py, utils.py, and isolated templates/static assets make the project simple to scale—enabling future enhancements such as SMS notifications, map integration, or AI-based issue categorization.

10. Enhanced Civic Engagement and Trust

- By providing citizens with an easy, transparent means of reporting and monitoring issues, the platform promotes civic engagement and builds trust between the public and government agencies.
- This civic-tech model enables the active participation of users in improving their surroundings.

CHAPTER 9

RESULTS AND DISCUSSIONS

The Crowd Resource system successfully addresses significant problems in traditional complaint handling procedures by automating and streamlining the whole process. Having a role-based platform stops users, administrators, and workers from dealing with the system based on their job assignments, removing confusion and improving responsibility. User submissions with enhanced picture uploads and geolocation tagging make complaint records more accurate and usable. The use of Flask and SQLite guarantees that the system is light, scalable, and responsive for web deployment, thus suitable for both urban and rural deployment scenarios.

From testing and mock usage scenarios, the system demonstrated clear gains in efficiency over manual processes. Complaints were logged in real-time, securely stored in the database, and presented on admin dashboards for easy assignment. Admins would allocate complaints to individual workers and the latter would update status on resolution. Users can monitor the status of their complaint in real-time via their personal dashboards, ensuring transparency. The conversation-driven cycle with users reduced average time of resolution and built trust between users and the system. The project is also traceable as each entry of complaint keeps metadata such as timestamp, status history, and response action.

In practice, the platform can not only resolve water issues faster but also generate data-driven insights to guide decision-makers. Dashboards can flag emerging trends in the most common complaint types or complainant areas, supporting better planning for infrastructure. The modular framework allows for enhancements such as integration with mobile platforms, more complex analytics, and support for different languages in the future. In general, the system enhances civic engagement, renders municipal processes effortless, and sets a standard for community-based digital platforms across domains such as sanitation, electricity, and public safety.

CHAPTER 10

CONCLUSION

This project offers an effective platform for water complaint management, simplifying issue reporting and resolution. By allowing users to report location-based complaints, offering structured worker assignments, and providing a complaint-tracking dashboard, it enhances efficiency and accountability. Authorities can track trends, workers can resolve issues systematically, and users get timely updates. The structured approach facilitates quicker resolution and reduces delays, making water issue management more dependable and organized. This system greatly increases public involvement in water issue solving.

To enhance efficiency even further, subsequent upgrades could involve an AI-driven complaint classification system for auto-prioritization. There could be a notification system to keep the users informed about complaint status. Even a chatbot integration for real-time query resolution would boost user interaction. Incorporating predictive analytics would assist authorities in identifying high-risk zones based on complaint patterns. These upgrades will further make the system more responsive, data-driven, and efficient in dealing with water-related matters.

REFERENCES

[1] Cai, X., Wallington, K., Shafiee-Jood, M., & Marston, L. (2018). Advances in Water Resources. ScienceDirect.

[2] Chowdhury, Mahfuzulhoq, & Hadi, Nura. (2023). Union Parishad: A Rural Village Council Based Mobile Application For Village Peoples Local, Medical, IT, and Complaint Assistance Services. August 10-11, 2023.

[3] Divvela, Lakshmi Prasanna, Sravanthi, V., Hemannth, Pethakamsetty, KesavaSai Avinash, Tummalapalli. (2023). Raise of Complaints on Day-to-Day Issues by the Public Using Global Positioning System for Finding the Exact Location of the Problem. March 17-18, 2023.

[4] Eom, Junseok, Choi, Taewook, Yoon, Yungsuk, Lee, Kyung Geun. (2020). The Study of Customer Satisfaction Index Characteristic with Local Water Supply Service. October 21-23, 2020.

[5] Kliskey, A., Williams, P., Griffith, D.L., Dale, V.H., Schelly, C., Marshall, A.M., & Marshall, V.S. (2021). Sustainability. MDPI.

[6] Manfreda, Salvatore, et al. (2024). Advancing River Monitoring Using Image-Based Techniques: Challenges and Opportunities. Hydrological Sciences Journal, 69(6), 657-677.

[7] Pahl-Wostl, C., Gorris, P., Jager, N., Koch, L., Lebel, L., Stein, C., Venghaus, S. (2021). Sustainability Science. SpringerLink.

[8] Roopa, D., Mathupriya, S., Lazha, A., Prabha, R. (2024). Examining the Structure for Handling and Addressing Consumer Issues within the Water Utilities Industry. October 8-9, 2024.

[9] Strobl, Barbara. (2020). Quality of Crowdsourced Water Level Observations. University of Zurich.

[10] Wibowo, Santoso, Grandhi, Srimannarayana. (2017). Evaluating the Sustainability

Performance of Urban Water Services. June 18-20, 2017.

APPENDIX-A
PSUEDOCODE

```
START ReportFlow Application

IF user IS NOT logged in THEN
   DISPLAY Login Screen
   ON login button click:
      CALL API.login(username, password)
      IF login success THEN
         STORE user session (token, userId, role)
         REDIRECT to Dashboard based on role
      ELSE
         SHOW "Invalid credentials" error
      ENDIF
ELSE
   REDIRECT to Dashboard based on stored role
ENDIF

======================
== USER DASHBOARD ==
======================
DISPLAY list of complaints (via RecyclerView)
ON "Add Complaint" button click:
   OPEN Complaint Form
   ON Submit:
      CAPTURE title, description, image, location
      CREATE Report object
      CALL API.submitReport(report)
      IF response is success THEN
         SHOW "Complaint Submitted"
      ELSE
         SHOW "Submission Failed"
      ENDIF
```

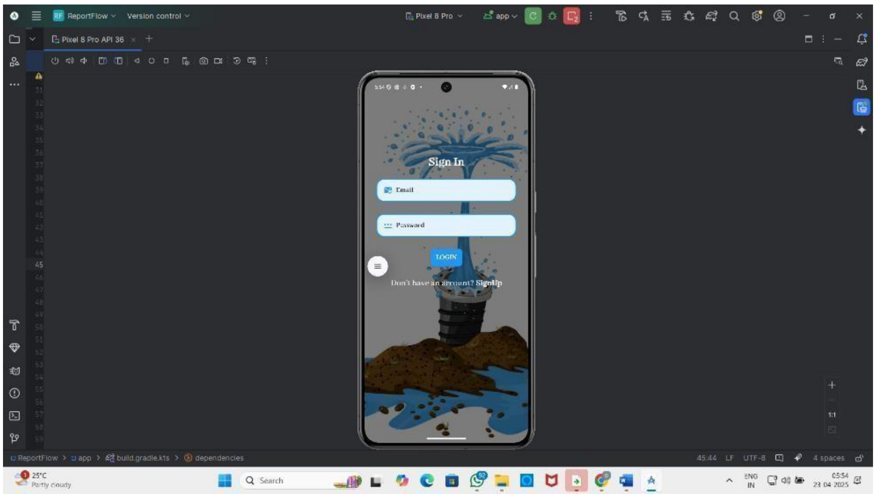
```
ON complaint item click:
   SHOW Complaint Details (title, status, assigned worker, location)
   OPTION: Add Feedback if resolved

======================
== ADMIN DASHBOARD ==
======================
CALL API.getAllReports()
DISPLAY all complaints with status & priority
FOR each complaint:
   SHOW "Assign Worker" button
   ON click:
      SELECT available worker
      CALL API.updateStatus(reportId, newStatus = "Assigned")

   SHOW "Update Status" option:
      SELECT new status → CALL API.updateStatus()

======================
== WORKER DASHBOARD ==
======================
CALL API.getAssignedComplaints(workerId)
DISPLAY complaints with map location and images
FOR each complaint:
   ON click:
      SHOW Complaint Info
      BUTTON "Mark In Progress" / "Mark Resolved"
      CALL API.updateStatus(reportId, newStatus)

======================
== NOTIFICATIONS ==
======================
ON background message received:
```

```
    EXTRACT message content
    DISPLAY system notification with title and intent
    ON notification click:
        OPEN corresponding screen

======================
== LOGOUT ==
======================
ON Logout Button Click:
    CLEAR session data
    REDIRECT to Login Screen

======================
== DATA MODELS ==
======================
CLASS Report:
    reportId, userId, title, description, location, status, timestamp, priority

CLASS Entry:
    entryId, complaintText, mediaFile, dateLogged

CLASS LoginResponse:
    success, token, userId, userType

CLASS CommonResponse:
    status, message

======================
== API INTERFACE ==
======================
INTERFACE API:
    login(username, password) : LoginResponse
    getAllReports() : List<Report>
    submitReport(Report) : CommonResponse
```

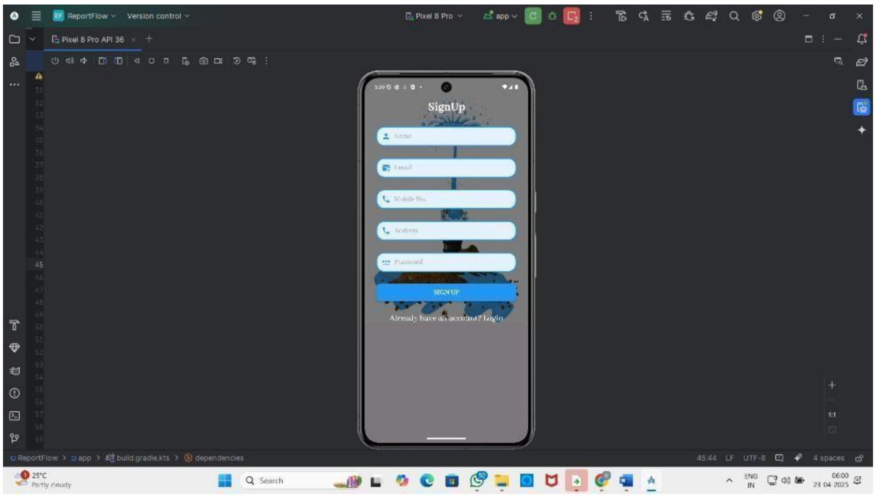
```
    updateStatus(reportId, newStatus) : CommonResponse
    getNotifications() : List<Notification>

=======================
== ADAPTER LOGIC ==
=======================
CLASS ComplaintAdapter:
    onCreateViewHolder() → inflate layout
    onBindViewHolder():
        bind complaint title, date, status
        handle click → show full details
    getItemCount() → return list size

=======================
== FINAL NOTE ==
=======================
App supports:
    - Role-based login (User/Admin/Worker)
    - Complaint registration & management
    - Location & image upload
    - Real-time status updates
    - Notification handling
    - Clean and responsive Android UI
```

APPENDIX B

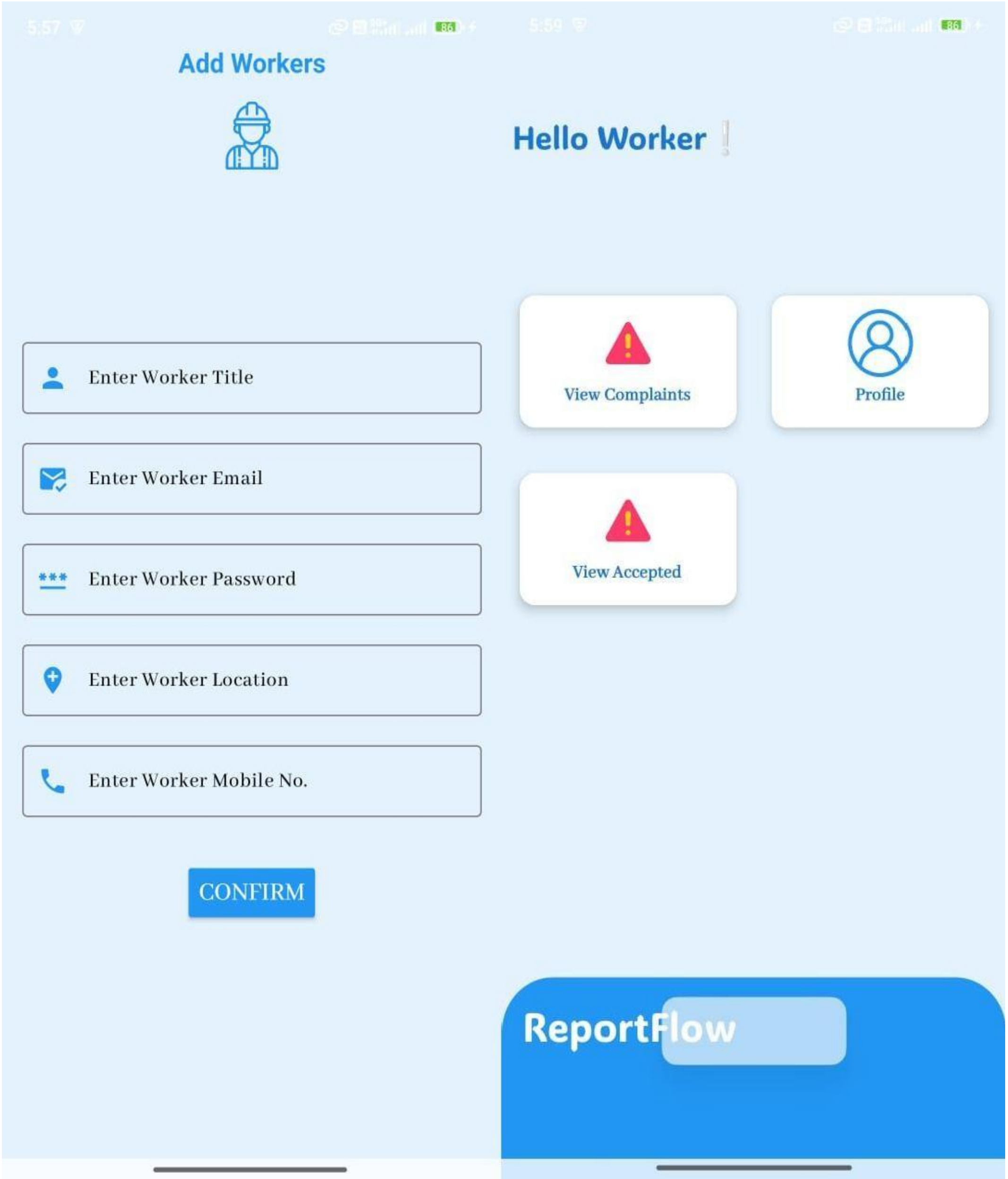
SCREENSHOTS



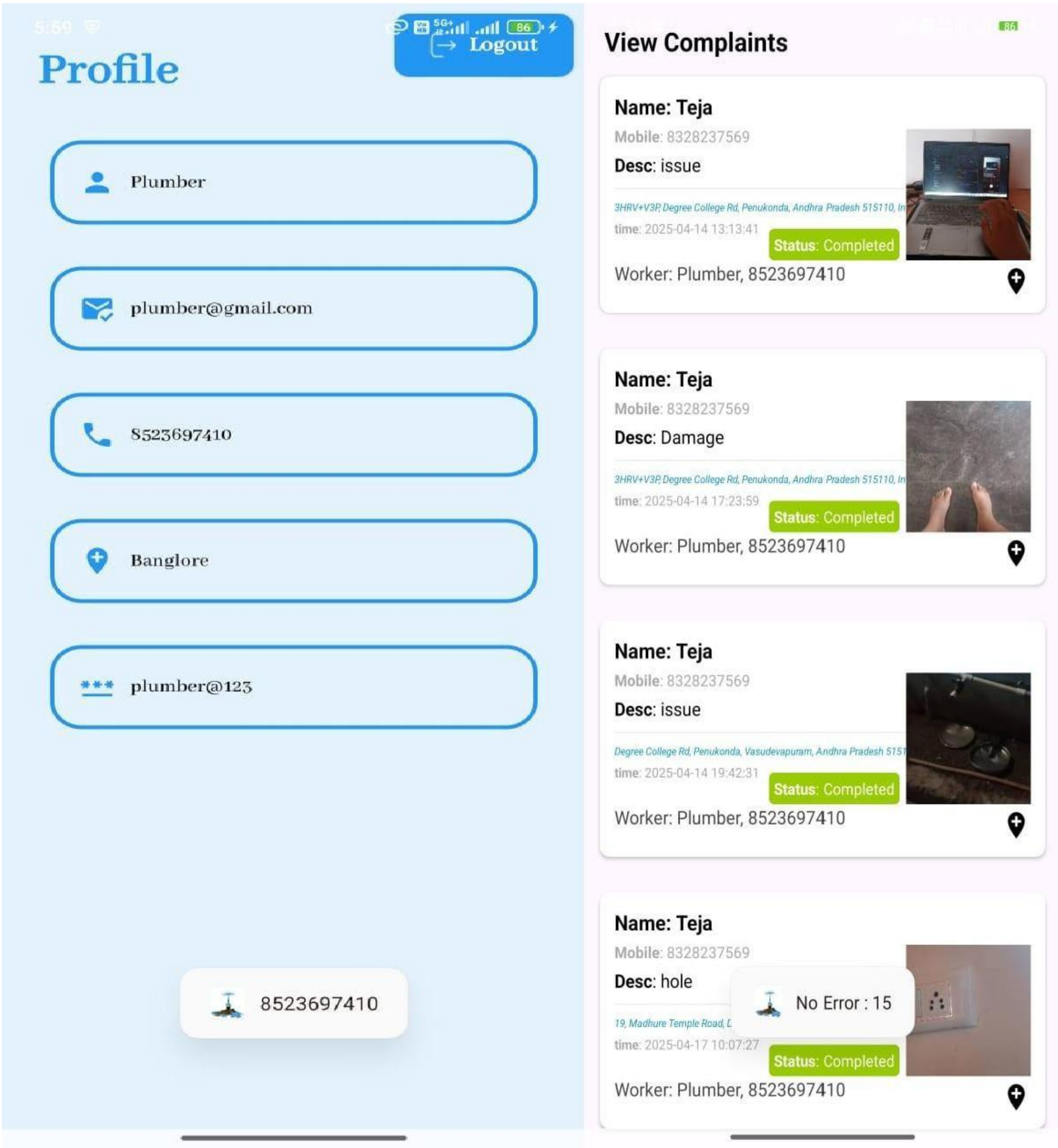
Scr 1 Sign In Page



Scr 2 Sign Up Page



Scr 3 Worker Interface



Scr 4 Complaints Interface

APPENDIX-C

ENCLOSURES

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Crowd-Sourced Water-Related Problem

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Crowd-Sourced Water-Related Problem

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***Abstract*— Water pollution and scarcity are the most pressing issues in rural India, fueled by resource overexploitation, inadequate systems, and poor monitoring. Existing water data collection systems are sluggish, decentralized, and non-localized, leading to delayed action and poor governance. This paper presents a new, scalable crowd-sourced digital platform to democratize water monitoring to facilitate real-time, community-led data submission using web and mobile interfaces. The platform is based on role-based design, with it dividing the users into contributors, verifiers, or administrators, and therefore any data collected is highly validated. Geotagging, media upload, and metadata such as water level and quality status give more tangible, context-rich data sets. Backend is written in Kotlin and Gradle with modular, secure, and API-centric design for best deployment in low-bandwidth and low-resource environments. By incorporating easy reporting, multi-level authentication, and storage extension features, the system addresses key shortcomings of existing citizen science models—i.e., lack of authentication, accessibility to rural areas, and sustainable longevity.**

Keywords*— Crowd-sourced data, Water resource monitoring, Participatory sensing, Role-based access control, Rural water management, Kotlin backend, Geotagged reporting, Citizen science platform, Environmental data validation, Mobile water monitoring, Decentralized data collection, Community engagement, RESTful APIs, Smart governance, Water quality reporting.

I. INTRODUCTION

India's water crisis is as much a crisis of mismanagement, unbridled exploitation, and de-centralized data systems as a crisis of scarcity. Rural peoples, who are largely reliant on groundwater and monsoon water bodies, are frequently excluded from national monitoring due to logistical, economic, and technological limitations. Therefore, localized data on water quality, availability, and consumption are sparse or outdated, which constrains meaningful intervention.

Government-initiated monitoring systems are likely to depend on periodic manual surveys and infrastructure-intensive installations, which are not scalable and maintainable. Additionally, community members—who are most directly affected by water problems—are seldom empowered to provide data or participate in resource management choices.

Over the past few years, advances in mobile connectivity and digital literacy have opened up new possibilities for participatory governance. Crowd-sourced data collection platforms, particularly in the health and environmental sectors, have proven that local communities can offer rich, real-time information if provided with the appropriate tools and support.

But most current crowd-based water monitoring systems have technical and operational limitations. These are inadequate verification processes, weak backend security, inability to scale to other regions, and weak offline or low-bandwidth support. Additionally, very few systems cater to the requirement of differentiated roles and levels of access to data quality and accountability.

This paper illustrates a novel solution that combines a role-based digital platform for water monitoring with Kotlin-based backend services. The system enables real-time submission of geotagged water data by citizens, with verifiers and administrators ensuring the integrity and utility of the submitted data. With modular architecture and light-weight APIs, the platform is made deployable locally, cost-effective, and scalable geographically. By integrating community participation into the very fabric of its design, this platform not only encourages improved data collection but also heightened awareness, transparency, and co-management of water resources. The ultimate aim is to offer a model replicable by NGOs, academic communities, or governments seeking to democratize water resource management.

II. LITERATURE REVIEW

Recent research emphasizes the increasing role of citizen engagement in water monitoring using mobile and digital tools. A mobile app for groundwater census in South

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Africa facilitated community-based data collection, prioritizing geolocation and mobile convenience. It did not have integrated data validation mechanisms and real-time feedback.[1]

In the Indian context, the National Water Development Agency has implemented a number of digital water governance initiatives that emphasize automation, data integration, and centralized command systems. These kinds of models are more relevant to policy-level interventions and do not relate to community-level participatory data schemes. [2]

A study in Europe investigated the application of citizen science in monitoring the environment's water. Such systems incorporate IoT sensors and mobile devices for public engagement at large scale. Though effective, they consume a lot of resources and perhaps may not find use in remote or economically underprivileged regions like in India. [3]

Another Indian research suggested a GIS-supported participatory model for water resource management. The system supported rural users in submitting data via mobile phones but did not include role-based authentication and secure verification levels, which confined its scalability and governance uses. A sensor-based review of water monitoring frameworks compared the advantages of real-time environmental information using embedded devices. Although promising, these models are challenging in terms of deployment expense, technical know-how, and maintenance, particularly in low-resource contexts [10].

Those works together illustrate a key omission: although there are digital solutions for monitoring water, most lack role-based workflows, cannot be used in rural settings, or need extensive hardware infrastructure. This project bridges those gaps through the provision of a role-driven, mobile-accessible, and extensible backend solution for participatory water governance.

III. SYSTEM ARCHITECTURE

1. Frontend Layer: The frontend is built with mobile-first design to be able to support Android smartphones, prevalent even in rural areas. It can be later extended to a responsive web interface for admin or dashboard views. Key features are: User Authentication and Role-based Navigation: The app dynamically loads different functionalities based on login credentials for Users, Verifiers, or Admins.

Report Submission Interface:

- Geolocation Capture: Utilizes GPS modules to automatically assign the user's location.
- Media Uploads: Images (e.g., of contaminated sources, tank overflows) to add visual context.
- Custom Metadata Forms: Input of water quality (e.g., color, smell), availability status, source type (well, tap, canal), and comments.

Offline Caching: Data cached locally in areas with poor network and synchronized upon reconnection.

2. Backend Layer: The backend is developed in Kotlin with the Gradle build system for performance, flexibility, and seamless integration with JVM-based ecosystems. It adheres to the Model-View-Controller (MVC) pattern, providing clean separation of data, logic, and interfaces.

Important Features:

- Authentication Module:
- Provides secure login (session-based or JWT).
- Role mapping: Admin, Verifier, User.
- Secure password hashing and session management.

API Controllers:

- Written based on RESTful principles.
- Endpoints encompass user management (/register, /login, /update-role), report submission (/submit-report, /fetch-reports), and verification workflows (/verify-report, /flag-report).

Validation and Workflow Engine:

- Regular user submissions go into a pending queue.
- Verifiers view a dashboard with batch and map views to accept, flag, or comment on submissions.
- Verified data is tagged with a confidence level or reviewer comments for admin monitoring.

Notification Service:

- Optional module that notifies verifiers/admins of new reports within their locality or role scope.

Admin Dashboard APIs:

- Facilitate user analytics, data trends, and system monitoring overall.

3. Database Layer: The persistence layer of the system is capable of supporting scalable storage of structured and unstructured data.

- Preferred Engines: PostgreSQL (to support complex relational queries and GIS functionality) or Firebase Realtime DB (to support light installations and real-time synchronization).

Stored Data Includes:

- Users: Role, contact information, login credentials (hashed securely).

- Reports: Text information (e.g., metadata), location, timestamps, verification status.
- Media Files: Image URLs or blobs (depending on storage backend—Firebase Storage or local/cloud S3).
- Verification Logs: Inspect timestamps, reviewer, status history, comments.

IV. METHODOLOGY

Crowd Resource system presents a robust and well-defined digital solution to address the inefficiencies of the traditional complaint reporting systems—especially for water or municipal-related issues. It has been designed to give transparency, efficiency, accountability, and community participation in the complaint process. The approach is a multi-role step-by-step process that complements modern digital process and public service needs:

Step 1: User Authentication and Registration

- Citizens register and sign in to the system by entering secure credentials.
- The authentication module safeguards authorized users from unauthorized access to complaint submission and tracking capabilities.
- safeguards user-specific dashboards and personal complaint histories.

Step 2: Submitting Complaints

- Authenticated users are able to file complaints through completing a preformatted form
- The complaint entry on each enables the users.
- Add a title and description of the issue.
- Include an image as graphical proof.
- Provide location information (e.g., address or coordinates).
- The backend keeps all the entries in an SQLite database and attributes them with timestamp and status tags (e.g., "Pending", "In Progress", "Resolved").

Step 3: Admin Validation and Task Distribution

- Admins use a different portal/dashboard for login.
- All complaints are listed in an organized list with filters (e.g., date, location, status).
- Admins examine new complaints and assign them to assigned workers by area or availability.
- Role-based assignment prevents improper delegation and lack of accountability Admins use a different portal/dashboard for login.
- All complaints are listed in an organized list with filters (e.g., date, location, status).
- Admins examine new complaints and assign them to assigned workers by area or availability.
- Role-based assignment prevents improper delegation and lack of accountability.

Step 4: Worker Task Management and Updates

- Workers who have been assigned receive complaint information, including location and image data.

➢ Once the issue has been resolved, workers can:

- Mark the complaint status as "Resolved".
- Provide remarks or feedback on the resolution process.
- This complaint status update is displayed live within the system.

Step 5: Complaint Tracking and Notifying in Real-Time

- Any time, from their dashboard, users can check the status of the complaints that they have lodged
- Status change notifications (e.g., assigned, in process, resolved).
- This makes life more transparent and less frustrating to users.

V. CONCLUSION

This project offers an effective platform for water complaint management, simplifying issue reporting and resolution. By allowing users to report location-based complaints, offering structured worker assignments, and providing a complaint-tracking dashboard, it enhances efficiency and accountability. Authorities can track trends, workers can resolve issues systematically, and users get timely updates. The structured approach facilitates quicker resolution and reduces delays, making water issue management more dependable and organized. This system greatly increases public involvement in water issue solving. To enhance efficiency even further, subsequent upgrades could involve an AI-driven complaint classification system for auto-prioritization. There could be a notification system to keep the users informed about complaint status. Even a chatbot integration for real-time query resolution would boost user interaction.

Incorporating predictive analytics would assist authorities in identifying high-risk zones based on complaint patterns. These upgrades will further make the system more responsive, data-driven, and efficient in dealing with water related matters.

VI. FUTURE WORK

Adoption of Blockchain Technology:
For greater transparency and trust in data verification processes, future versions of the platform can incorporate blockchain-based report submission verification. This unalterable ledger can ensure secure tracking of water data—from field submission to verification and final use in decision-making. Validation processes can be made automatic through the use of smart contracts, and token-based incentives can be given for reliable contributors [1][2].

Sophisticated AI and Machine Learning Models:
It can be augmented with deep learning models to enable intelligent processing of uploaded videos and images for automatic detection of water source problems (e.g., leakage, contamination, overflow). Large annotated data sets can be used to train models in order to enhance classification accuracy and detect water degradation patterns, abuse, or seasonality patterns [3].

Scalability to Urban and Rural Markets:
Though originally conceived for rural deployment, the platform is scalable to urban slums with high population density and far-flung villages. In the urban setting, the system can be blended with smart city infrastructure; in the rural setting, light-weighted deployment with low-hardware (e.g., SMS- or USSD-based modules) can provide reach and functionality in low-connectivity conditions [4].

Predictive Water Resource Monitoring:
Through the utilization of historical as well as live data, the platform can use forecasting models for predicting water shortages, pollution hazard, and replenishment based on rainfall. All these predictions would help local authorities in advance water conservation planning, particularly during months of drought or monsoon season [5].

Circular Resource Management Linkages:
Expansion in the future can also include the integration of the platform with water recycling and reuse infrastructure, including greywater recycling plants, groundwater recharge plants, and rainwater harvesting systems. This allows for an end-to-end water lifecycle strategy, merging data capture with water circularity practice sustainably [6].

Sole Mobile Application for Community Engagement:
A richer mobile app can be developed to provide personalized dashboards, reminder for submission, gamified rewards for active users, multilingual capabilities, and a learning center on water quality, conservation measures, and source protection. The status update in real-time will facilitate maintaining community engagement [7].

Energy-Efficient Sensing Integration:
To additionally automate reporting of water quality and quantity, low-power IoT sensors can be integrated with the platform. They can be solar-powered and installed on tanks, wells, or streams to automatically send turbidity, pH, or flow rate data, reducing the workload of manual reporting [8].

Monitoring Industrial Wastewater and Contaminants:
A sophisticated extension would be capable of monitoring industrial wastewaters and agricultural runoff for the detection of chemical pollutants in water supplies. Chemical sensors and special modules could be employed for the detection of toxic levels of nitrates, fluorides, heavy metals, or pathogens [9].

Policy Integration and Government Compliance:
The platform can be synchronized with national and regional water management policies (e.g., Jal Jeevan Mission, Swachh Bharat Abhiyan). The integration of real-time monitoring data with municipal dashboards facilitates regulatory compliance, transparency, and policy-making [10].

Behavioral Analysis and Community Motivation:
With behavior models and gamification, subsequent releases can observe how feedback, rewards, and peer comparison affect communities. Point systems, recognition incentives, and leaderboards can motivate sustainable behavior and enhance submission consistency [11].

Dynamic Resource Routing and Allocation:
Depending on intensity and frequency of water complaints received from a specific location, AI-based dynamic routing systems can help NGOs and local authorities in decision-making about resource allocation—technical support, maintenance personnel, or provision of clean water [1][2].

Climate-Specific Tailoring:
These can be tailored to accommodate region-specific climatic conditions—e.g., dust-proofing hardware components for dry regions or waterproofing and corrosion-proofing for coastal and flood-prone areas. UI designs can also be tailored to accommodate cultural contexts and language preferences [3].

Integration with Renewable Energy Systems:
The use of solar-powered edge nodes and mobile devices can reduce energy usage and make deployments more sustainable. In areas with poor electricity availability, such integration of renewables will ensure constant service and reduced maintenance costs [4].

Hazardous and Emergency Event Reporting:
Other modules can help citizens report immediate emergency water incidents—like chemical spills, contamination of floods, or unexpected dry wells. Authorities can be informed through SMS or push

notification modules, allowing more rapid intervention [5].

Real-Time Feedback Mechanism for Users: The inclusion of bi-directional communication channels will allow users to flag data inaccuracies, suggest improvements, or flag unresolved issues. This user feedback loop will enhance platform reliability, build trust, and allow users to take ownership of their local water resources [6].

Internationalization and Localization: For worldwide deployment, the system may be designed to accommodate different languages, units of measurement, water quality codes, and communal structures. Customer-specific APIs and config modules would enable the platform to be deployed in other geographies with a certain amount of adaptation [7].

Intelligent Integration with GIS Mapping Tools: The integration of heatmaps and geospatial dashboards will provide graphical displays of reporting density, water scarcity trends, and high-risk zones. This will facilitate graphical planning and resource allocation by NGOs and administrators [8].

Citizen Science and Education Outreach: A follow-up publication would provide educational modules and toolkits to facilitate water quality monitoring for school and college levels. Participation by citizen science can provide more integrated, broader dataset while increasing water literacy [9].

Collaborations with Research and Environmental Agencies: The system can be brought into alignment with databases maintained by research institutions, water boards, and meteorological offices. Collaborative modeling, long-term research, and larger-scale water planning efforts can be enabled by data-sharing partnerships [10].

VII. REFERENCE

[1] S. Adamala, "An overview of big data applications in water resources engineering," Mach. Learn. Res., vol. 2, no. 1, pp. 10–18, 2017.

[2] T. H. Assumpcao, A. A. Popescu, J. R. O'Hara, and A. D. Chapman, "Citizens' campaigns for environmental water monitoring: Lessons from field experiments," IEEE Access, vol. 7, pp. 134601–134620, 2019.

[3] X. Cai, K. Wallington, M. Shafiee-Jood, and L. Marston, "Advances in Water Resources," ScienceDirect, 2018. [Online]. Available: https://www.sciencedirect.com

[4] S. R. Dennis, I. Dennis, and T. Mongala, "Mobile App for Hydrocensus and Groundwater Monitoring," 2022.

[5] A. Kliskey, P. Williams, D. L. Griffith, V. H. Dale, C. Schelly, A. M. Marshall, and V. S., "Sustainability," 2021. [Online]. Available: https://www.mdpi.com

[6] S. Manfreda et al., "Advancing river monitoring using image-based techniques: challenges and opportunities," Hydrological Sciences Journal, vol. 69, no. 6, pp. 657–677, 2024.

[7] C. Pahl-Wostl, P. Gorris, N. Jager, L. Koch, L. Lebel, C. Stein, and S. Venghaus, "Sustainability Science," 2021. [Online]. Available: https://link.springer.com

[8] A. Seth, "Digital Participatory Tools for Water Resource Management in Rural Communities in India."

[9] B. Strobl, Quality of crowdsourced water level observations, Ph.D. dissertation, Univ. of Zurich, 2020.

[10] N. E. Thomas, Information and awareness as a means to develop water supply systems in rural and peri-urban Bangladesh, M.S. thesis, Delft Univ. of Technology, 2020.

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SUSTAINABLE DEVELOPMENTS GOALS (SDGs)

1. SDG 6: Clean Water and Sanitation

- Ensure universal and equal access to clean and affordable drinking water.
- Improve water quality by stopping pollution, halting dumping, and minimizing release of toxic chemicals.
- Enables individuals to report instances of contaminated or inadequate water supply.
- Prevents swift action by authorities, therefore, compromising water safety and sanitation.
- Monitors risk areas, permitting pre-emptive action.

2. SDG 11: Sustainable Cities and Communities

- Strengthen sustainable and inclusive urbanization and increase capacity for participatory planning and government.
- Restrict the urban area's per capita negative environmental impact.
- Facilitates communities to play an active part in improving water infrastructure.
- Fosters transparency and accountability in urban water services.
- Uses geolocation to automate city resource deployment.

3. SDG 16: Peace, Justice, and Strong Institutions

- Develop effective, accountable, and transparent institutions.
- Ensure responsive, inclusive, participatory, and representative decision-making.
- Provides an open complaint system to the people.
- Encourages institutional trust by being free of corruption, miscommunication, and delay.
- Fosters public involvement in decision-making and feedback procedure.

4. SDG 9: Industry, Innovation, and Infrastructure

- Invest in quality, reliable, sustainable, and resilient infrastructure.
- Enhance research work and develop technological capacity.
- Uses advanced digital infrastructure for water management. Promotes scalable and intelligent civic technology solutions.