iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** IV **Month of publication:** April 2026

DOI: https://doi.org/10.22214/ijraset.2026.80344

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue IV Apr 2026- Available at www.ijraset.com

Report Box (Complaint Management Application)

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Abstract: ***In the era of rapid urbanization, effective management of citizen grievances has become crucial for ensuring responsive governance and sustainable development, particularly in a developing country like India. Municipal authorities frequently encounter a growing number of complaints related to sanitation, water supply, damaged roads, and public infrastructure, while traditional complaint handling methods based on manual records and in-person visits often lead to inefficiencies, delays, and lack of transparency. To address these challenges, the proposed system, ReportBox – A Complaint Management System (CMS), offers a mobile-based digital solution that streamlines the entire grievance redressal process. Built using React Native for cross-platform accessibility and supported by a Node.js backend with MongoDB, the system enables citizens to securely register complaints with GPS-tagged locations and image evidence and track their status in real time. Field workers receive automated task assignments and update progress with proof of resolution, while administrators manage operations through a centralized dashboard for monitoring, analytics, and decision-making. By automating the complete complaint lifecycle, ReportBox enhances efficiency, transparency, and communication, ultimately improving service delivery, increasing citizen satisfaction, and strengthening public trust in governance.***

I. INTRODUCTION

Agriculture plays a vital role in the economic development of a country, especially in a developing nation like India. A large portion of the population depends on agriculture for in the era of rapid urbanization, effective management of citizen grievances has become a cornerstone of responsive governance. Municipal bodies grapple with escalating complaints about civic issues such as sanitation failures, water leaks, damaged roads, and malfunctioning streetlights. Traditional redressal mechanisms relying on manual logs, in-person visits to offices, or fragmented phone calls are plagued by inefficiencies, opacity, and prolonged delays, often leaving citizens frustrated and issues unresolved. This not only erodes public trust but also hampers urban service delivery, underscoring the need for a digitised alternative.

The Complaint Management System (CMS) emerges as a transformative mobile-based platform to bridge this gap, replacing outdated processes with a streamlined, transparent workflow. Built on React Native for cross-platform accessibility and powered by Node.js with MongoDB for robust backend support, CMS facilitates seamless interaction across user roles: citizens, field workers, and administrators. Citizens authenticate via secure OTP, register complaints with GPS- tagged locations and image evidence, and track progress in real-time. Field workers receive automated assignments with notifications, update statuses on-site, and submit proof via before- and-after photos. Administrators oversee a centralised dashboard for task delegation, performance analytics, and trend reporting, ensuring accountability.

By automating the end-to-end complaint lifecycle from submission to resolution CMS minimizes manual interventions, enhances communication through feedback and comments, and fosters citizen engagement. This not only accelerates grievance resolution but also empowers municipal authorities to proactively address recurring issues, ultimately boosting satisfaction and governance efficiency.

II. REVIEW OF LITERATURE

Web-Based Grievance Redressal Systems Early grievance redressal systems were mainly web- based and focused on online complaint submission. Although these systems reduced manual paperwork, they lacked real-time tracking and transparency. Citizens were often unaware of complaint status, leading to delayed resolutions and dissatisfaction.

Citizen Feedback and Governance Applications Nair and Joshi developed a citizen feedback application aimed at improving urban governance. While the system supports feedback collection and analysis, it does not provide complete complaint lifecycle tracking or real-time resolution updates.

Mobile-Based Complaint Management Systems Sharma and Kumar proposed a mobile-based civic complaint application that allows users to report municipal issues easily. However, the application is limited to specific service categories and lacks advanced administrative and monitoring features.

GPS and Image-Based Complaint Reporting Kale and Bansod implemented a complaint reporting system using GPS and image capture to improve location accuracy. Although effective in identifying problem locations, the system does not include modules for field worker assignment and resolution tracking.

Limitations of Existing Systems Most existing systems focus either on complaint registration or feedback collection but lack an integrated, role-based solution. The absence of real-time tracking, limited transparency, and a lack of performance analysis highlight the need for a comprehensive system. The proposed Complaint Management System addresses these limitations by providing an end-to-end mobile based solution.

III. PROBLEM STATEMENT

The current complaint handling process in many organizations and municipal systems is inefficient, time-consuming, and lacks transparency. Complaints are often recorded manually or through unstructured channels, leading to issues such as loss of data, delayed responses, lack of accountability, and poor tracking of complaint status. Citizens/users face difficulty in submitting complaints, monitoring progress, and receiving timely resolutions.

There is no centralized system to manage complaints, assign them to responsible authorities, track their lifecycle, and maintain communication between users, administrators, and workers. Additionally, the absence of real-time updates, proper categorization, and feedback mechanisms results in low user satisfaction and inefficient service delivery.

Therefore, there is a need to develop a Complaint Management System that provides a digital platform for users to register complaints, enables administrators to manage and assign tasks efficiently, allows workers to resolve issues with proper proof (such as images and updates), and ensures transparency, accountability, and timely resolution of complaints.

IV. METHODOLOGY

1) User Interface Module: Allows citizens to securely register and log in using OTP authentication, submit complaints with descriptions, images, and GPS-based location details, and track the real-time status of their complaints along with notifications and feedback options.

2) Admin Management Module: Enables administrators to view and manage all registered complaints through a centralised dashboard, assign tasks to field workers based on location and priority, monitor resolution progress, and analyse complaint trends for better decision-making.

3) Complaint Resolution Module: Allows field workers to receive assigned complaints with location details, update complaint status in real time, upload before-and-after images as proof of resolution, and communicate with administrators and users during the resolution process.

Table : System Modules Description

Module Name	Description
User (Citizen)Module	This module allows citizens to interact with the system to register and manage complaints.
Admin Module	This module is responsible for managing and monitoring all complaints in the system.
Field Worke Module	This module enables field workers to handle assigned complaints and update their status.
Authentication Module	Handles secure access to the system using login and verification mechanisms.
Complaint Management Module	Core module that manages the complete lifecycle of complaints.
Database Module	Stores all system data securely and efficiently.

A. Requirement Analysis

The Complaint Management System is designed to provide a centralized and efficient platform for handling complaints submitted by users. The system must support user registration and login using OTP based authentication, allowing users to create and manage their profiles and submit complaints with relevant details such as description, category, location, and images. Users should be able to track the status of their complaints and provide feedback after resolution. The system must include an admin module that enables administrators to view, filter, and manage all complaints, assign them to workers or volunteers, and oversee the entire complaint lifecycle.

A worker module is required to allow assigned personnel to view complaints, update their status, upload resolution proof, and mark tasks as completed. The system should also provide real-time notifications for important events such as complaint submission, assignment, and status updates.

Additionally, features like comments, likes, and feedback should be included to enhance user interaction.

Non-functional requirements include high performance, security through role-based access and data protection, user-friendly interface, system reliability, and scalability to support a growing number of users. The system must operate on mobile platforms using technologies such as React Native for frontend, Node.js or .NET for backend, MongoDB for database, and Firebase for notifications, while ensuring continuous availability and efficient complaint resolution.

Table: Technologies Used in the System

Category	Technology
Frontend	React Native (Expo), Tailwid CSS (Native Wind) JavaScript/Typescript
Backend	Node.js, Express.js, Node mailer
Database	MongoDB, Mongoose, MongoDB Atlas

B. System Design

The Complaint Management System is designed using a client-server architecture that ensures efficient communication between the mobile application and the backend services. The frontend is developed using React Native (Expo), providing a user-friendly interface for users, administrators, and workers. The backend is implemented using technologies such as Node.js or .NET, which handle business logic, authentication, and API management. The system uses a MongoDB database to store user information, complaints, categories, assignments, comments, and status updates in a structured format. Authentication is managed through OTP-based verification, ensuring secure access to the system. The application follows a modular design, consisting of separate modules for user management, complaint handling, assignment management, and notifications. When a user submits a complaint, the data is sent to the backend via restful APIs, stored in the database, and made available to administrators for review and assignment.

Once assigned, workers can update the complaint status and upload resolution details, which are reflected in real time to the user. Firebase Cloud Messaging is integrated to provide push notifications for important updates such as complaint submission, assignment, and resolution. The system also supports image storage using cloud services, enabling users and workers to upload and retrieve images efficiently. Role-based access control ensures that users, admins, and workers can only access functionalities relevant to their roles. Overall, the system is designed to be scalable, reliable, and secure, ensuring smooth operation and effective complaint resolution.

C. Implementation

The Complaint Management System is implemented using a modern full-stack approach, combining a mobile frontend with a robust backend and database. The frontend is developed using React Native with Expo, providing a responsive and user-friendly interface for users, administrators, and workers. Navigation is managed using Expo Router, and UI components are styled using Tailwind CSS for consistency and efficiency.

The backend is implemented using Node.js (or .NET), where restful APIs are created to handle operations such as user authentication, complaint submission, assignment, and status updates. OTP-based authentication is integrated to securely verify users during login and registration. MongoDB is used as the database to store user details, complaints, categories, comments, and assignment data, with Mongoose used for schema modeling and data validation.

The final version is deployed locally for development and testing purposes. The frontend and backend are executed on a local server, while MongoDB is used as a local database for storing application data.

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 14 Issue IV Apr 2026- Available at www.ijraset.com

V. PROPOSED SYSTEM

The proposed Complaint Management System is a digital platform designed to streamline the process of registering, managing, and resolving complaints efficiently. It enables users to submit complaints with relevant details such as category, location, and images, while allowing administrators to monitor and assign tasks to workers. The system provides real-time tracking of complaint status, ensures transparency, and improves communication between users and authorities. With features like notifications, feedback, and role-based access, the proposed system aims to enhance service quality, reduce response time, and provide a reliable and userfriendly solution for effective complaint handling.

A. System Modules

The Complaint Management System is composed of several interconnected modules that work together to provide a smooth and efficient user experience. Each module is designed to handle specific functionalities while maintaining integration with other components of the system.

1) User Module: The User Module allows citizens to register, log in using OTP, and interact with the system. Users can raise complaints, upload images, provide location details, track complaint status, and give feedback after resolution. This module focuses on ease of use and accessibility for all users.

2) Admin Module: The Admin Module is responsible for managing the overall system operations. Administrators can view all complaints, categorize them, assign tasks to field workers, and monitor the progress of each complaint. This module ensures proper control, monitoring, and decision- making.

3) Worker Module: The Field Worker Module enables workers to receive assigned complaints, view detailed information, and update the status after resolving the issue. Workers can also upload proof of completion, ensuring accountability and transparency in the process. Complaint Management Module

4) Notification Module: The Notification Module provides real-time updates to users through push notifications and emails. It keeps users informed about complaint status changes and important system alerts.

B. Features

The Complaint Management System includes several important features that enhance usability, efficiency, and user satisfaction. The system provides easy complaint registration, allowing users to submit issues with images, location, and descriptions. It supports OTP-based authentication, ensuring secure and simple login without the need for passwords. Users can track complaint status in real time, which improves transparency and trust in the system.

The application offers role-based access control, enabling different functionalities for users, administrators, and field workers. It includes GPS-based location tracking for accurate issue reporting and image upload support to provide visual proof of complaints. The system also provides real.

C. Benefits

The Complaint Management System provides several important benefits, including faster resolution of complaints by reducing manual processes and delays. It ensures transparency by allowing users to track the status of their complaints in real time. The system offers centralized management, making it easier for administrators to monitor and handle all complaints efficiently. It improves communication between users, administrators, and workers, while maintaining proper digital records of all activities. With features like real-time notifications, secure authentication, and mobile accessibility, the system enhances accountability and overall user satisfaction by providing a reliable and efficient complaint handling process.

VI. SYSTEM DESIGN AND ARCHITECTURE

The Complaint Management System is designed using a layered client-server architecture that ensures scalability, maintainability, and efficient communication between components. The system consists of a mobile frontend developed using React Native (Expo), which serves as the user interface for users, administrators, and workers. This frontend communicates with the backend through RESTful APIs over secure HTTP protocols.

The backend is implemented using Node.js or .NET and is responsible for handling business logic, authentication, authorization, and request processing. The system follows a modular architecture, dividing functionalities into separate components such as user management, complaint handling, assignment management, and notification services.

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A MongoDB database is used to store all system data, including user details, complaints, categories, comments, and status updates, ensuring flexible and scalable data management. Firebase Cloud Messaging (FCM) is integrated for real-time push notifications, enabling instant communication of important updates. Cloud storage services are used to manage image uploads efficiently.

D. Architecture

The system architecture of the Complaint Management System is based on a client-server model that ensures efficient communication and data flow between all components. The frontend is developed as a mobile application using React Native with Expo, providing a user- friendly interface for citizens, administrators, and field workers. The backend is built using Node.js and Express.js, which handle business logic, API requests, authentication, and complaint processing through RESTful APIs. MongoDB is used as the database to store user information, complaint details, and status updates in a flexible and scalable manner.

E. System Flow

The system flow of the Complaint Management System begins with user authentication, where the user logs in or registers using an OTP-based verification process. After successful login, the user accesses the dashboard and can raise a complaint by selecting a category, adding a description, uploading an image, and providing GPS-based location details. Once submitted, the complaint is stored in the database with a unique identifier. The administrator reviews the complaint through a centralized dashboard, categorizes it if needed, and assigns it to a suitable field worker. The assigned worker receives a notification, views the complaint details, and proceeds to resolve the issue on-site. After completing the task, the worker updates the complaint status and uploads proof of resolution. The system continuously updates the status, allowing the user to track progress in real time. Notifications are sent at each stage to keep all stakeholders informed. Finally, the complaint is marked as resolved and closed, and the user can provide feedback and rating, completing the workflow.

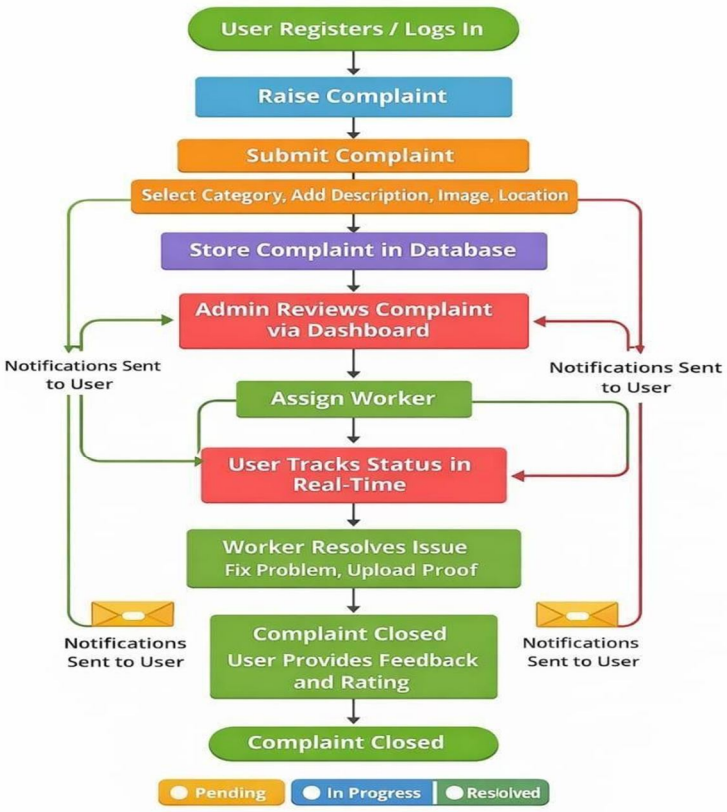

Fig: User Interaction Flow of Report Box

F. Database Design

The database design of the Complaint Management System is structured to efficiently store, manage, and retrieve all system data using MongoDB. It follows a NoSQL, document-oriented approach that allows flexibility in handling structured and unstructured data. The system includes collections for users, complaints, feedback, and notifications. The user collection stores personal details and role information, while the complaint collection maintains all complaint-related data such as category, description, image, location, status, assigned worker, and timestamps. A mechanism is used to track status updates throughout the complaint lifecycle, ensuring transparency and proper record management. The feedback collection stores user ratings and comments after complaint resolution, and the notification collection manages alerts and updates sent to users. Relationships between different collections are maintained through unique identifiers, enabling efficient data linking and retrieval. Overall, the database design ensures scalability, consistency, and reliable performance for real-time complaint management.

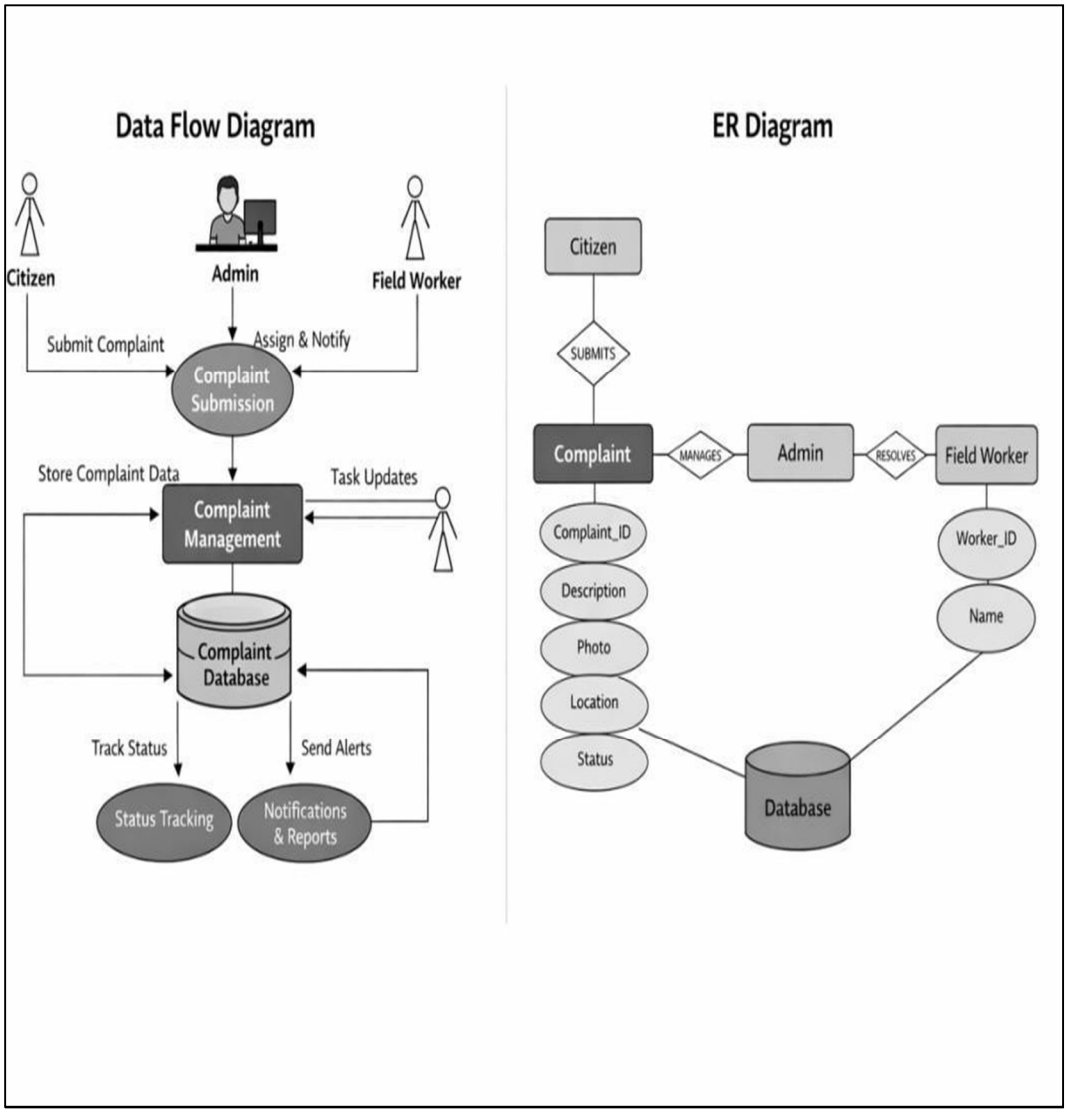

Fig: Data Flow

VII. ANTICIPATED OUTCOMES

The implementation of the Complaint Management System is expected to significantly improve the efficiency and effectiveness of handling complaints. It will enable faster resolution of issues by streamlining the complaint submission and assignment process.

The system will enhance transparency, allowing users to track the progress of their complaints in real time. It is anticipated to improve communication between users, administrators, and workers, leading to better coordination and accountability.

VIII. RESULTS AND DISCUSSION

The implementation of the Complaint Management System demonstrates significant improvements in the efficiency and transparency of complaint handling. The system successfully enables users to register complaints easily, track their status in real time, and receive timely updates through notifications. Administrators are able to manage and assign complaints efficiently, while workers can update progress and provide resolution proof, ensuring accountability.

The centralized database maintains accurate records, reducing data loss and manual errors. During testing and usage, the system showed reliable performance, quick response times, and smooth interaction between modules. The discussion highlights that the digital approach overcomes limitations of traditional methods by improving communication, reducing delays, and enhancing user satisfaction. Overall, the system proves to be effective, scalable, and suitable for real-world implementation in complaint management scenarios.

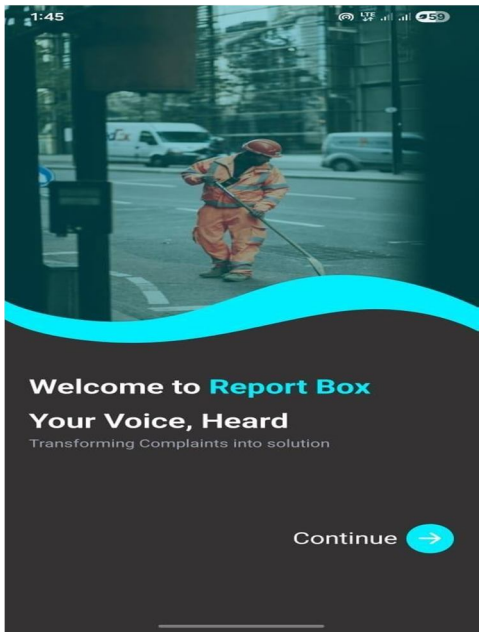

Fig: Welcome Page

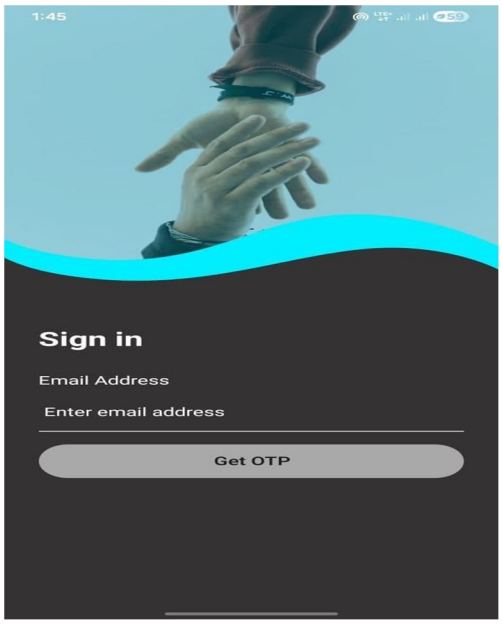

Fig: Sign-in Page

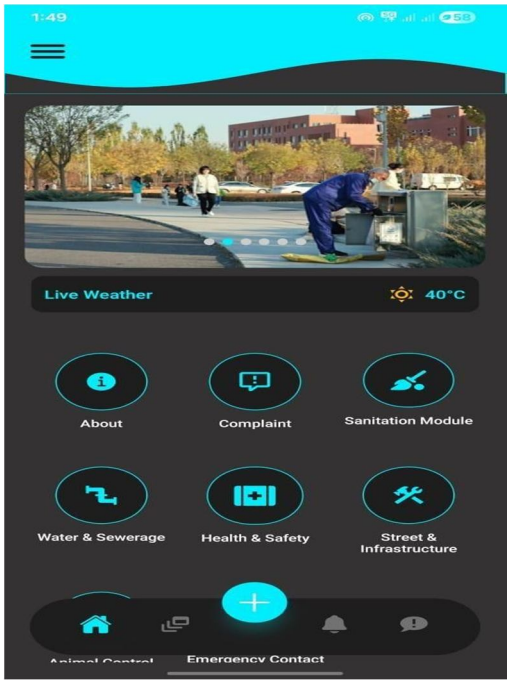

Fig: Home Dashboard Page

Fig: Raise Complaint Page

IX. CONCLUSION AND FUTURE WORK

A. *Conclusion*

The Complaint Management System provides a digital and efficient approach to municipal grievance redressal. It enables citizens to register complaints with image evidence and GPS location, while role-based access allows administrators and field workers to manage and resolve issues effectively. The system improves transparency, reduces resolution time, and enhances citizen satisfaction.

B. *Future Work*

Future enhancements include AI-based automatic complaint categorisation, multilingual support for wider accessibility, and integration with smart city dashboards. Additional features such as chatbot assistance, analytics-based performance tracking, and heatmap visualisation can further improve system scalability and effectiveness.

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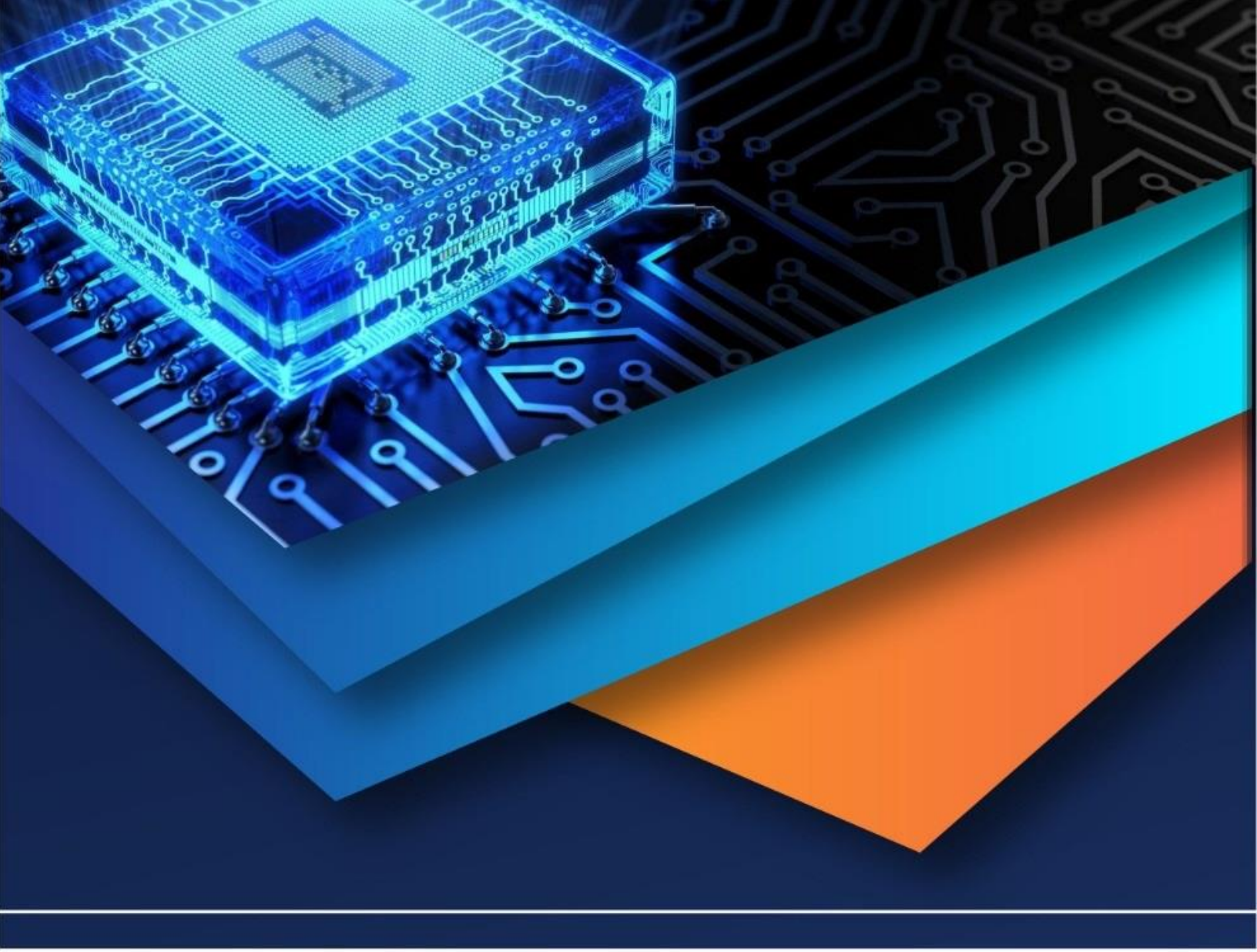

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