

# Community Cleanliness Complaint App – Android Application for Swachhta and LiFE

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## Abstract

Cleanliness and effective waste management is a critical components of public health, environmental sustainability, and urban quality of life, particularly in rapidly growing communities. Despite national initiatives such as the Swachh Bharat Mission and Lifestyle for Environment (LiFE), many regions continue to experience persistent sanitation challenges including garbage accumulation, clogged drainage systems, and improper waste disposal practices. These issues are often exacerbated by the absence of a unified and efficient complaint management system. In most cases, citizens rely on manual communication methods such as phone calls or informal reporting, which leads to delays, lack of accountability, poor documentation, and limited transparency in issue resolution processes.

With the increasing adoption of mobile technologies and digital era, there is a great opportunity to modernize civic complaint handling systems. Mobile-based applications integrated with geolocation services, image capture, and cloud-based data management can transform traditional workflows into structured and real-time digital ecosystems. Such systems enable efficient communication between citizens and municipal authorities, support automated complaint tracking, and provide actionable insights for faster and more organized response mechanisms. The integration of role-based dashboards and real-time update of complaint status further enhances operational efficiency and coordination among stakeholders.

This work presents an Android-based Community Cleanliness Complaint App designed to facilitate real-time reporting, tracking, and management of sanitation-related issues. The system allows citizens to submit the complaints with images and location data, while authorities can monitor, assign, and resolve issues through a structured digital workflow. By improving transparency, reducing response time, and encouraging citizen participation, the proposed solution contributes to sustainable urban cleanliness and supports the effective implementation of national environmental initiatives.

## INTRODUCTION

Cleanliness and environmental hygiene are fundamental aspects of sustainable urban development and play a crucial role in safeguarding public health, improving living standards, and maintaining ecological balance. In countries with rapidly expanding urban populations, maintaining clean public space has become very challenging due to raise in waste generation, no proper disposal mechanisms, and limited awareness among communities. Government initiatives such as the Swachh Bharat Mission and Lifestyle for Environment (LiFE) have significantly contributed to promoting cleanliness and environmental responsibility; however, the practical implementation of these initiatives at the grassroots

level continues to face several operational challenges. Issues such as overflowing garbage bins, blocked drainage systems, illegal dumping, and unclean public areas remain common in many regions, negatively impacting both environmental sustainability and quality of life.

One of the primary reasons for the persistence of these challenges is the lack of an efficient, transparent, and accessible complaint management system. In many cases, citizens rely on traditional methods such as phone calls, manual registers, or informal communication to report cleanliness-related issues. These approaches are often unstructured and lack proper documentation, resulting in delayed responses, miscommunication, and limited accountability among authorities. Furthermore, municipal bodies and sanitation departments frequently struggle with tracking complaints, prioritizing tasks, and monitoring resolution progress due to the absence of real-time data and centralized systems. This gap between citizens and administrative authorities creates inefficiencies in sanitation management and reduces overall system effectiveness.

The fast advancement of mobile Apps and the widespread availability of smartphones provide a strong foundation for developing digital solutions that can address these challenges. Mobile-based applications integrated with features such as image capture, geolocation tracking, and cloud-based data storage enable real-time reporting and monitoring of cleanliness issues. Such systems not only provides communication between citizens and authorities but also facilitate structured workflows for complaint handling, task assignment, and status tracking. By leveraging these technological capabilities, it is possible to transform traditional sanitation management processes into efficient, data-driven systems that enhance responsiveness and accountability.

This work prioritize design and development of an Android-based Community Cleanliness Complaint App that provides a comprehensive platform for reporting, tracking, and managing sanitation-related issues. The proposed system enables citizens to submit complaints with images and location details, while allowing administrators to assign tasks and monitor progress through a structured interface. Sanitation workers can receive assigned tasks and update resolution status, ensuring transparency throughout the complaint lifecycle. By integrating mobile technology with a centralized backend system, the platform aims to improve response time, enhance coordination among stakeholders, and promote active citizen participation. Ultimately, the system contributes to building cleaner, more sustainable communities and supports the effective implementation of national cleanliness and environmental initiatives.

## **LITERATURE REVIEW**

Kanchi and Kumar [1] proposed a smart garbage monitoring system using Internet of Things (IoT) sensors to track waste levels in bins and optimize waste collection schedules. Their approach demonstrated that real-time monitoring can significantly improve operational efficiency and reduce unnecessary waste collection trips. However, the system primarily focuses on automated sensing mechanisms and does not actively incorporate citizen participation for reporting diverse cleanliness issues such as illegal dumping or drainage blockages.

Verma and Gupta [2] developed a mobile-based civic issue reporting application that allows users to submit complaints with images and descriptions. Their work highlighted the effectiveness of mobile platforms in improving transparency and communication between citizens and authorities. While the system improved accessibility, it lacked a structured complaint lifecycle and did not fully address

administrative workflows such as task assignment and resolution tracking.

Sharma and Patel [3] introduced a GIS-enabled complaint redressal system that utilizes geolocation data to accurately map and manage reported issues. Their study emphasized that GPS-based complaint tagging enhances location accuracy and helps authorities respond more efficiently. However, the system requires integration with complex GIS infrastructure, making it less suitable for simple and scalable deployment in resource-constrained environments.

Ashraf et al. [4] conducted a comprehensive review of digital platforms for solid waste management and highlighted the importance of centralized data systems for effective monitoring and planning. Their findings indicate that digital documentation and real-time tracking significantly improve decision-making and long-term sustainability. Nevertheless, the study primarily focuses on theoretical analysis and lacks implementation of a user-centric mobile solution.

Wong [5] explored the significance of user-centric design in public service mobile applications and demonstrated that intuitive and simple interfaces lead to higher user engagement and participation. The study stresses the importance of usability in ensuring widespread adoption of digital systems. However, it does not address backend integration or complaint resolution workflows in detail.

Banerjee [6] examined the role of mobile applications in enhancing citizen participation within smart city initiatives. The research concluded that mobile platforms serve as effective tools for bridging the gap between citizens and governance systems. While the study provides valuable insights into user engagement, it lacks a detailed framework for complaint management and resolution processes.

Gupta and Mehta [7] proposed a mobile-based waste management system aimed at improving urban sanitation through digital reporting mechanisms. Their system demonstrated improved coordination between stakeholders but did not incorporate real-time tracking or a structured status update mechanism for complaints.

Patel and Shah [8] developed an Android-based municipal complaint management system that enables users to report issues digitally. Their approach improved documentation and accessibility; however, it lacked advanced features such as role-based task assignment, real-time updates, and integrated workflow management for efficient issue resolution.

These references collectively highlight the developing importance of digital technologies in addressing urban cleanliness challenges. While existing systems demonstrate improvements in monitoring, reporting, and user engagement, many lack a comprehensive, integrated solution that combines real-time reporting, structured complaint lifecycle management, role-based access control, and transparency. This loopholes forms the foundation for the proposed Community Cleanliness Complaint App, which aims to provide a unified, user-friendly, and efficient platform for managing sanitation-related issues.

## EXISTING SYSTEM

Existing systems for managing community cleanliness and sanitation complaints largely rely on traditional and semi-digital approaches that provide limited support for efficient issue resolution. In many regions, citizens report cleanliness-related problems through phone calls, written applications, or direct communication with local authorities. While these methods allow basic issue reporting, they lack structured documentation, centralized data management, and proper tracking mechanisms. As a result, complaints are often delayed, misplaced, or left unresolved, leading to reduced accountability and dissatisfaction among citizens.

From an operational perspective, municipal authorities and sanitation departments face significant challenges in handling complaints due to the absence of real-time monitoring and integrated management systems. Most existing platforms, including basic web portals, offer only static complaint submission features without providing dynamic updates or workflow automation. Information is frequently scattered across multiple channels, making it difficult for admin to prioritize tasks, allocate resources efficiently, and monitor the status of ongoing issues. This fragmented approach results in inefficiencies, slow response times, and lack of transparency in the complaint resolution process.

In terms of technological implementation, some modern systems have incorporated digital tools such as mobile systems or web-based platforms to improve accessibility. However, many of these solutions focus primarily on complaint submission and do not fully support end-to-end complaint lifecycle management. Features such as real-time status tracking, role-based task assignment, and automated workflow management are often missing or inadequately implemented. Additionally, limited integration of location-based services and multimedia inputs reduces the effectiveness of these systems in accurately identifying and addressing on-ground issues.

## PROPOSED SYSTEM

To address the limitations of existing cleanliness complaint management systems, the proposed system introduces a comprehensive Android-based platform designed to enable efficient reporting, tracking, and resolution of sanitation-related issues. The primary focus of this system is to provide a structured and transparent digital ecosystem that connects citizens, municipal authorities, and sanitation workers through a unified interface. The platform integrates mobile application capabilities, cloud-based backend services to transform traditional manual complaint handling into an organized and technology-driven workflow. By combining image-based reporting, geolocation tracking, and role-based management, the proposed system aims to improve response efficiency, enhance accountability, and promote active citizen participation in maintaining community cleanliness.

### 1. KEY FEATURES OF THE PROPOSED SYSTEM

**Real-Time Complaint Reporting:** The system enables citizens to report cleanliness issues instantly using their smartphones by uploading images and capturing location details through GPS. This ensures accurate identification of problem areas and reduces ambiguity in complaint descriptions.

**Structured Complaint Lifecycle Management:** The application implements a well-defined complaint lifecycle consisting of stages such as Pending, In-Progress, and Resolved. This structured workflow allows efficient tracking and monitoring of each complaint from submission to resolution.

**Role-Based Access Control:** The system supports multiple user roles, including citizens, administrators, and sanitation workers. Each role is provided with specific functionalities, ensuring proper task allocation, accountability, and secure access to system features.

**Real-Time Status Tracking:** Users can monitor the progress of their complaints through live status updates, improving transparency and keeping citizens informed about the resolution process.

**Administrative Dashboard:** Municipal authorities are provided with a centralized dashboard to view, manage, and assign complaints to sanitation workers. This provides better resource allocation and decision-making.

**Task Assignment for Workers:** workers receive assigned tasks through the system and can update the completion status after resolving the issues, ensuring efficient ground-level execution.

**Cloud-Based Data Management:** The system utilizes cloud services for storing complaint data, images, and user information, ensuring scalability, security, and accessibility across platforms.

## 2. SYSTEM ARCHITECTURE

The developed system follows a modular and scalable architecture that ensures efficient data flow and system reliability. The architecture is divided into multiple layers:

**Data Acquisition Layer:** Collects input data from users in the form of images, location coordinates, and complaint descriptions through the mobile application.

**Data Processing Layer:** Handles data validation, formatting, and storage. It ensures all the information that is submitted is structured and stored securely in the backend database.

**Application Logic Layer:** Implements the core functionalities of the system, including complaint management, task assignment, role-based access control, and status updates.

**Backend Services Layer:** Provides RESTful APIs for communication between the mobile app and the database, ensures seamless data exchange and system integration.

**User Interface Layer:** Offers an intuitive and user-friendly interface for all stakeholders, enabling easy interaction with the system without requiring technical expertise.

## 3. ADVANTAGES OF THE PROPOSED SYSTEM

The proposed system offers a significant improvement over traditional complaint management approaches by providing a fully digital, transparent, and structured workflow. It enhances communication between citizens and authorities, reduces response time, and helps proper documentation of complaints. The integration of real-time tracking improves accountability and allows administrators to monitor performance effectively. Additionally, the user-friendly interface encourages active participation from citizens, leading to better reporting of issues and improved community engagement. The scalable architecture also allows the system to be extended to multiple regions and integrated with future smart city initiatives.

## 4. IMPLEMENTATION APPROACH

The implementation of the proposed system follows a systematic and modular development strategy. Initially, system requirements are identified based on user needs and existing limitations. The mobile app is developed using Android technologies, incorporating features such as image capture, location tracking, and intuitive user interfaces. The backend system is designed using RESTful APIs and cloud-based services to manage data storage, authentication, and communication. Database structures are created to store user information, complaints, and status updates securely. The system undergoes multiple stages of testing, including unit testing, integration testing, and usability testing, to ensure reliability and performance. Finally, this mobile app is made accessible for the users that enables the real-time complaint submitting and also tracking the complaint status over the mobile interface provides for the citizens.

## 5. EXPECTED OUTCOMES

The proposed system delivers a comprehensive digital solution for managing community cleanliness issues. It enables efficient reporting, real-time tracking, and structured resolution of complaints, thereby improving operational efficiency and transparency. The platform supports faster decision-making, reduces delays in issue resolution, and enhances accountability among stakeholders. By encouraging citizen participation and providing a reliable communication channel, the system contributes to improved public hygiene and environmental sustainability. Overall, the solution aligns with national

initiatives such as Swachh Bharat and LiFE and supports the development of cleaner and smarter communities.

## METHODOLOGY

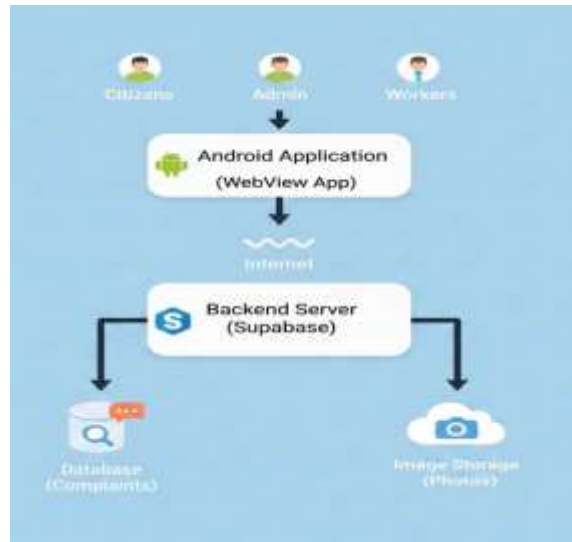
The methodology followed for this work follows a systematic and structured approach to design, develop, and deploy a digital platform for managing community cleanliness complaints. The process begins with identifying real-world sanitation challenges and analysing existing complaint management practices to understand system limitations and user requirements. Based on these insights, a comprehensive solution is designed that integrates mobile application functionality with backend services to enable efficient reporting, tracking, and resolution of cleanliness issues. The methodology ensures a well-defined workflow that enhances system reliability, usability, and performance.

The development process starts with requirement analysis, where user roles such as citizens, administrators, and sanitation workers are defined, along with complaint categories and system functionalities. Following this, system design is carried out to establish the overall architecture, including user interface layouts, database schema, and communication flow between the mobile application and backend services. The application is then developed using Android technologies, incorporating features such as image capture, location tracking, and user authentication. In parallel, the backend system is implemented using RESTful APIs and cloud-based services to manage data storage, complaint handling, and real-time updates.

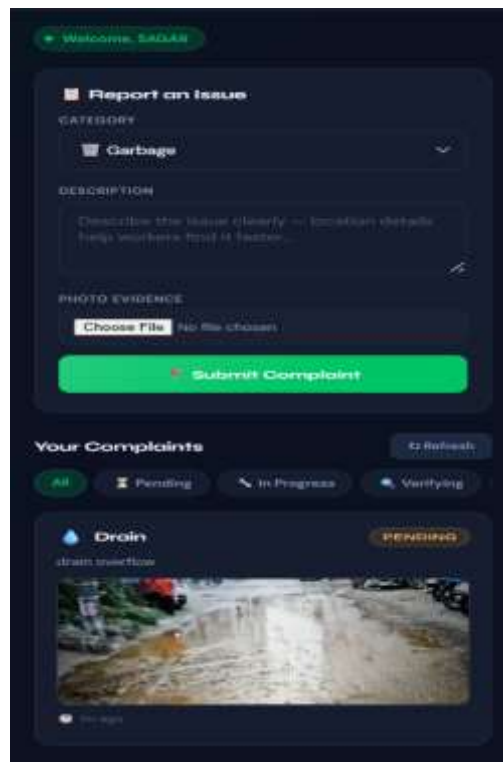
To ensure system effectiveness, testing and validation are performed at multiple levels, including unit testing, integration testing, and usability testing. Finally, the system is made available on a cloud platform, enabling real-time access and scalability. Continuous monitoring and updates are carried out to maintain system performance and adaptability to changing user requirements.

- 1. Requirement Analysis:** This phase involves identifying system requirements by studying existing complaint mechanisms and understanding user needs. User roles, complaint categories, and workflow processes are clearly defined to establish the foundation of the system.
- 2. System Design:** The system architecture is designed by defining the structure of the mobile application and backend services. This includes UI/UX design, database schema creation, and API structure for communication between components.
- 3. Application Development:** The mobile application is developed using Android technologies, incorporating essential features such as user authentication, complaint submission, image upload, and geolocation tracking. The interface is designed to be simple and user-friendly.
- 4. Backend Development:** The backend system is implemented using RESTful APIs to handle data processing, authentication, complaint management, and status updates. Cloud-based storage is used to securely store images and complaint data.
- 5. Testing and Validation:** The system undergoes rigorous testing, including unit testing, integration testing, and usability testing, to ensure accuracy, reliability, and performance under different conditions.
- 6. Deployment:** The application is made available on a cloud platform, and the mobile application is distributed for user access. This ensures scalability and real-time availability of services.

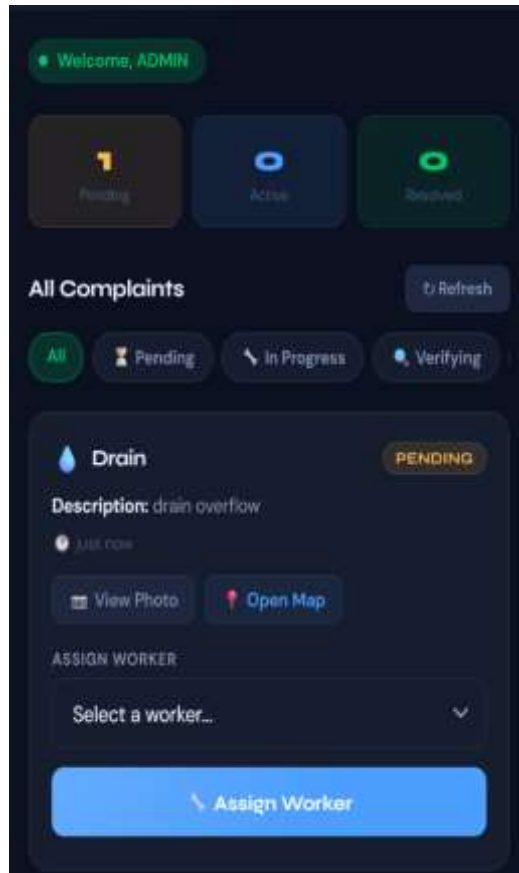
- 7. Real-Time Data Integration:** The system continuously updates complaint data and status updates in real time that ensures the users receive the most current information and enabling efficient monitoring.
- 8. System Evaluation:** The final system is been evaluated based upon the performance, usability, and effectiveness in resolving complaints. Feedback is collected to improve system functionality and user experience.



## System Architecture INTERFACE DESIGN



**Fig 1. Citizen dashboard**



**Fig 2. Admin dashboard**



**Fig 3. Worker dashboard**

## **FUTURE WORK**

The proposed Community Cleanliness Complaint App establishes a strong foundation for digital complaint management and improved urban sanitation; however, several enhancements can be explored in future work to further extend its functionality, scalability, and impact. One important development is that integration of the advanced Internet of Things (IoT) sensors technologies for real-time waste monitoring. By incorporating smart bins equipped with sensors, the system can automatically detect waste levels and generate alerts, reducing dependency on manual reporting and improving efficiency in waste collection processes. Additionally to all these improvements the integration of Geographic Information Systems (GIS) can enable advanced mapping and visualization of complaint data, allowing authorities to identify high-risk areas and optimize resource allocation.

Another significant area of improvement involves the incorporation of artificial intelligence and data analytics for predictive and intelligent decision-making. ML or DL models can be applied to analyse historical complaint data, identify patterns, and predict potential problem areas, enabling proactive maintenance and prevention of cleanliness issues. The system can also be enhanced by introducing image-based analysis using computer vision techniques to automatically classify types of complaints, such as garbage overflow or drainage blockage, thereby reducing manual effort and improving accuracy. Furthermore, the platform can be expanded to include multilingual support and voice-based interaction, making it more accessible to users with different linguistic backgrounds and varying levels of digital literacy.

Future versions of the system may also focus on expanding its scope to integrate with broader smart city infrastructures and government platforms. With continuous updates, adaptive learning mechanisms, and integration of emerging technologies, the system has the potential to evolve into a comprehensive intelligent urban management platform that contributes to long-term environmental sustainability and efficient governance.

## **CONCLUSION**

This work presents the design and development of an Android-based Community Cleanliness Complaint App aimed at addressing the persistent challenges associated with traditional sanitation complaint management systems. Existing approaches largely depend on manual communication methods and fragmented digital platforms, which often result in delayed responses, lack of transparency, and inefficient coordination among stakeholders. These drawbacks highlights the need for a structured and technology-driven solution that can effectively bridge the gap of communication between citizens and municipal authorities.

The proposed system demonstrates how mobile technologies and cloud-based backend services can be integrated to create a unified platform for real-time reporting, tracking, and resolution of cleanliness-related issues. By enabling citizens to submit complaints with images and geolocation data, and allowing administrators to manage and assign tasks through a structured workflow, the system enhances operational efficiency and accountability. The inclusion of real-time status updates and role-based access further improves transparency and ensures effective communication among all stakeholders involved in the complaint lifecycle.

A key contribution of this work lies in the development of a user-centric and scalable application that simplifies the complaint management process while maintaining reliability and performance. The use of

modern development approaches, including RESTful APIs and cloud storage solutions, enables efficient data handling, seamless integration, and adaptability to future enhancements. This approach reduces system complexity while ensuring a robust and responsive application environment.

Overall, the proposed platform highlights the potential of digital solutions in improving urban cleanliness management and promoting sustainable environmental practices. By transforming traditional complaint systems into an interactive and transparent digital ecosystem, the application contributes to faster issue resolution, increased citizen participation, and improved public hygiene. This mobile based app aligns with national initiatives such as Swachh Bharat Mission and Lifestyle for Environment (LiFE), and provides a scalable framework for developing cleaner, smarter, and more sustainable communities.

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