

Web based Smart City Compliant Monitoring and Resolution System

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Abstract— A Web-Based Smart City Complaint Monitoring and Resolution System is an integrated digital solution developed to enhance the efficiency of urban service management. The system provides a user-friendly web interface that enables citizens to register complaints related to public services such as infrastructure, sanitation, water supply, electricity, and traffic management. Each complaint is automatically classified, assigned a unique identification number, and routed to the appropriate municipal authority for prompt action. The proposed system incorporates real-time tracking, allowing users to monitor complaint status throughout its lifecycle. Administrative modules support prioritization based on severity, geographic location, and impact, thereby improving response time and service delivery. A centralized database facilitates data storage, analysis, and reporting, enabling authorities to identify recurring issues and support data-driven decision-making for smart city development. Furthermore, features such as automated notifications, feedback mechanisms, and performance dashboards ensure transparency, accountability, and improved citizen engagement. The implementation of web-based technologies minimizes manual intervention and enhances communication between stakeholders. Overall, the system promotes efficient governance and contributes to the development of sustainable and citizen-centric smart cities.

Keywords— Smart City, Complaint Management System, Web-Based System, E-Governance, Real-Time Monitoring, Data Analytics, Urban Management, Citizen Engagement..

I. INTRODUCTION

Rapid urbanization has led to significant challenges in managing city infrastructure and public services efficiently. As the population in urban areas continues to grow, traditional methods of handling citizen complaints—such as manual registers, phone calls, and in-person visits—have become increasingly ineffective, time-consuming, and prone to delays. These conventional systems often lack transparency, proper tracking mechanisms, and accountability, resulting in unresolved issues and decreased citizen satisfaction. To address these limitations, the concept of smart cities has emerged, focusing on the integration of information and communication technologies (ICT) to improve the quality of urban services and enhance the overall living standards of citizens.

A Web-Based Smart City Complaint Monitoring and Resolution System is designed as a digital solution to bridge the communication gap between citizens and municipal authorities. This system enables users to submit complaints related to various civic issues such as waste management, road maintenance, water supply, electricity faults, and traffic congestion through an online platform. By digitizing the complaint registration process, the system ensures that issues

are recorded systematically and directed to the appropriate departments without delay.

One of the key advantages of this system is real-time monitoring, which allows both citizens and administrators to track the status of complaints from initiation to resolution. The system assigns a unique identification number to each complaint, ensuring easy tracking and follow-up. Additionally, administrative authorities can prioritize tasks based on urgency, location, and severity, thereby improving response efficiency and resource allocation.

The integration of a centralized database further enhances the system's capability by enabling data storage, analysis, and reporting. Authorities can identify recurring problems, monitor departmental performance, and make informed decisions for urban planning and development. Features such as automated notifications, feedback systems, and performance dashboards contribute to increased transparency and accountability.

Overall, the implementation of a web-based complaint monitoring system aligns with the goals of smart city initiatives by promoting efficient governance, reducing manual workload, and fostering active citizen participation. It serves as a scalable and sustainable solution for modern urban management,

ensuring timely resolution of issues and improved quality of life for residents..

II. RELATED WORK

Smartreporter – A Crowdsourced Complaint Resolution System Kurian Binu, Vinay K, Midhun R, Athul V Pillai, Shereena Thampi presents a web-enabled civic engagement platform designed for crowdsourced complaint reporting in smart cities. The system allows citizens to submit geotagged complaints such as potholes, waste issues, and damaged infrastructure using text and images. A key feature is the integration of deep learning models (YOLOv8/YOLOv9) for automatic image-based complaint classification and prioritization. The platform enhances transparency by enabling real-time tracking and efficient routing of complaints to concerned authorities. It supports large-scale citizen participation and improves municipal response time. The architecture is based on modern web technologies and supports scalability and automation. By combining crowdsourcing with AI, the system significantly reduces manual intervention and ensures accurate categorization. Overall, the study demonstrates how intelligent complaint systems can contribute to responsive governance and improved urban service delivery in smart cities.

Integrated Web Based Complaint Management System Chetan Soni, Aarti Harne, Pooja Gowari, Amruta Sankh focuses on developing a centralized web-based complaint management system aimed at improving traditional grievance handling processes. The system allows users to register complaints online and track their progress using a unique complaint ID. It reduces paperwork and enhances transparency by digitizing the complaint lifecycle. The platform ensures proper routing of complaints to relevant departments and enables administrators to monitor resolution status effectively. The study highlights the importance of automation in reducing delays and improving service efficiency. Additionally, it emphasizes secure data handling and user authentication mechanisms. The proposed system improves communication between citizens and authorities while minimizing manual errors. It is particularly useful in organizations and municipal bodies where handling large volumes of complaints is challenging. The paper concludes that web-based systems are essential for modern governance and efficient complaint resolution.

Web Based Public Complaint Service System Mei Ismi Nuryati, Hidayatur Rakhawati, Mita Aulia Maharani, Raihan Rizqi Rahmatulloh, Alun Suyufi, Yuyun Kurniasih proposes a web-based complaint service system designed to

enhance public service efficiency. The system provides an intuitive interface for citizens to submit complaints and monitor their status in real time. It incorporates automated workflows to ensure complaints are processed and forwarded to appropriate departments. The system also includes reporting and analytics features to help administrators evaluate performance and identify recurring issues. A major contribution of this study is its focus on improving transparency and accountability in public services. By digitizing complaint handling, the system minimizes delays and enhances user satisfaction. The authors emphasize the importance of integrating modern web technologies with governance frameworks. The platform also supports feedback mechanisms, allowing citizens to evaluate service quality. Overall, the system contributes to building a responsive and citizen-centric governance model.

Citizen Complaint System for Urban Maintenance Using GIS Mohd Sohel Deshmukh, K. V. Kal introduces a GIS-based complaint system aimed at improving urban maintenance services. The system allows citizens to submit complaints along with location data and images, enabling authorities to identify and resolve issues more efficiently. The integration of Geographic Information Systems (GIS) enhances spatial analysis and helps in prioritizing complaints based on location and severity. The system addresses the limitations of traditional complaint methods, which are often time-consuming and inefficient. By enabling real-time tracking and monitoring, the platform improves transparency and citizen engagement. The study highlights the importance of location-based services in smart city applications. It also emphasizes the role of citizen participation in maintaining urban infrastructure. The proposed system contributes to the gradual transformation of conventional cities into smart cities through digital innovation. Smart Street Light and Anonymous Complaint System Divya Avinash Mahajan, Prashant Mali, Nikita Kor, Vaishnavi Yeole, Prof. Prashant Gawande presents an integrated system combining smart street lighting with an anonymous complaint mechanism. The system uses IoT technology to optimize streetlight energy consumption through motion detection and automated control. In addition, it provides a platform for users to report issues anonymously, enhancing user participation without privacy concerns. The complaint module allows users to submit issues related to public infrastructure, which are then forwarded to relevant authorities. The system improves urban safety, energy efficiency, and service management simultaneously. The study highlights the importance of integrating IoT with complaint systems for smarter urban management. It also demonstrates how anonymous reporting can increase citizen engagement. Overall, the system contributes to sustainable and efficient smart city infrastructure development.

Smart Complaint Management System (ICT-ISPC 2018) Siripen Pongpaichet, Pattamaporn Kormpho, Panida Liawsomboon, Narut Phongoen proposes a smart complaint management system designed to streamline customer complaint handling processes. The system provides a web-based interface for complaint registration, tracking, and resolution. It includes features such as automated notifications, secure data storage, and user authentication. The system architecture ensures efficient data flow between users and administrators. One of the key contributions is the implementation of a structured complaint workflow, which improves response time and service quality. The system also supports data analysis to identify trends and improve organizational performance. The study emphasizes the importance of digital transformation in complaint management. It concludes that automated systems can significantly enhance efficiency and customer satisfaction in both public and private sectors.

Real-Time Smart System for Complaint Information System in Campus Musawarman, Halimil Fathi, Ricak Agus Setiawan focuses on a real-time complaint management system developed for campus environments. The system allows users to submit complaints related to infrastructure, services, and code of conduct issues. It features real-time tracking, automated notifications, and secure data handling. The system improves communication between students and administration by providing a centralized platform for grievance redressal. It also includes reporting tools that help administrators monitor complaint resolution performance. The study highlights the importance of real-time systems in improving responsiveness and user satisfaction. By digitizing the complaint process, the system reduces delays and enhances operational efficiency. The proposed model can be extended to smart city applications for large-scale complaint management systems.

Smart Complaint Management System (SCMS) Ranjita K. Agasibagila presents a smart complaint management system designed to address inefficiencies in traditional grievance handling methods. The system provides a centralized platform for registering and tracking complaints related to civic issues such as road damage, water leakage, and waste management. It incorporates features like image upload, location tagging, and automated complaint routing. The system improves transparency by allowing users to monitor complaint status in real time. It also supports efficient resource allocation by enabling administrators to prioritize tasks. The study emphasizes the importance of digital platforms in improving public service delivery. The system enhances communication between citizens and authorities while reducing response time.

Overall, it contributes to the development of smart governance frameworks.

Smart City App for Citizen Complaint Management proposes a mobile-based complaint management application for smart cities. The system enables citizens to report issues such as potholes, streetlight failures, and sanitation problems through a user-friendly interface. It assigns a unique ID to each complaint, allowing users to track progress in real time. The system includes a centralized dashboard for administrators to manage and prioritize complaints. Automation features help categorize complaints based on severity, improving efficiency. The application also supports notifications and feedback mechanisms to enhance user engagement. The study highlights the role of mobile technologies in improving accessibility and responsiveness. It concludes that mobile-based complaint systems are essential for building interactive and citizen-centric smart city ecosystems.

Smart City Complaint Analyzer- A. Reethika, B. Sai Divya, B. Tharun Teja, D. Adhitya, U. S. Bharathi introduces a Flask-based web application for smart city complaint analysis and management. The system enables users to register, log in, and submit complaints across multiple categories such as infrastructure, sanitation, and safety. It features a dashboard for tracking complaint status and an admin panel for managing and analyzing complaints. The system uses a centralized database to store and process data securely. It also supports trend analysis to identify recurring issues and improve decision-making. The study emphasizes the importance of data-driven governance in smart cities. By integrating analytics with complaint management, the system enhances efficiency and transparency. The proposed solution demonstrates how modern web technologies can be used to build scalable and effective smart city systems

III. PROPOSED METHOD

The proposed Web-Based Smart City Complaint Monitoring and Resolution System is developed to offer a reliable, transparent, and scalable approach for handling urban civic issues. It utilizes a centralized web platform that connects citizens, municipal authorities, and various departments, thereby improving coordination and communication. The system replaces conventional manual complaint handling methods with an automated and real-time digital solution, ensuring faster response and improved service efficiency.

The system is structured into three main components: user module, administrator module, and department module. In the user module, citizens can create accounts, log in, and submit

complaints related to public services such as sanitation, road conditions, water supply, electricity, and traffic. Complaints can include detailed descriptions, categories, location information, and supporting images. After submission, a unique complaint ID is generated, allowing users to track progress in real time.

The administrator module serves as the core management unit. Administrators validate and classify complaints, then assign them to the relevant departments. The system includes prioritization features that evaluate complaints based on urgency, severity, and location to ensure timely action. Additionally, administrators can monitor system performance using dashboards and analytical reports.

The department module enables officials to access assigned complaints, update their status, and mark them as resolved. Continuous communication is maintained through automated notifications sent to users regarding progress updates.

A secure centralized database stores all complaint records, facilitating efficient data management and analysis. Features such as feedback systems and performance evaluation enhance accountability. Overall, the system promotes efficient governance, minimizes manual effort, and supports the development of smart and citizen-focused urban environments.

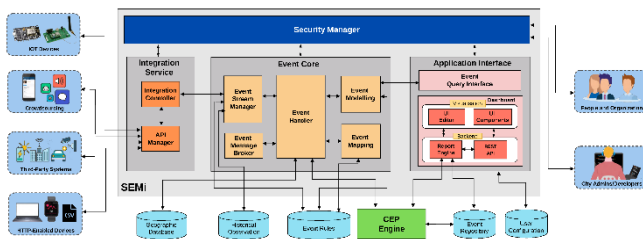


Fig.1. System Architecture

The Web-Based Smart City Complaint Monitoring and Resolution System is organized into several functional modules, each designed to handle specific tasks efficiently and ensure smooth system operation. These modules collectively enable effective communication, processing, and resolution of citizen complaints.

The User Module is the primary interface for citizens interacting with the system. It allows users to register and log in securely using authentication mechanisms. Once logged in, users can submit complaints related to civic issues such as sanitation, road damage, water supply, electricity failures, and traffic problems. The module supports adding detailed descriptions, selecting complaint categories, specifying

location information, and uploading images as supporting evidence. After submission, a unique complaint ID is generated, which enables users to track the status of their complaints in real time. Users can also view complaint history and provide feedback after resolution.

The Administrator Module functions as the central control unit of the system. Administrators are responsible for managing user accounts, verifying and validating incoming complaints, and categorizing them appropriately. This module includes intelligent prioritization features that rank complaints based on urgency, severity, and location. Administrators assign complaints to the relevant municipal departments and monitor their progress through interactive dashboards. They can also generate reports, analyze system performance, and identify recurring issues for better decision-making.

The Department Module is designed for municipal staff responsible for resolving complaints. Department users receive assigned complaints, review the details, and take necessary actions. They can update the complaint status at different stages, such as “in progress,” “pending,” or “resolved.” This module ensures that all updates are reflected in real time, keeping both administrators and users informed. It also helps departments manage workload efficiently.

The Database Module ensures secure storage and management of all system data, including user information, complaint records, and status updates. It supports quick data retrieval and enables analytical processing for reporting purposes.

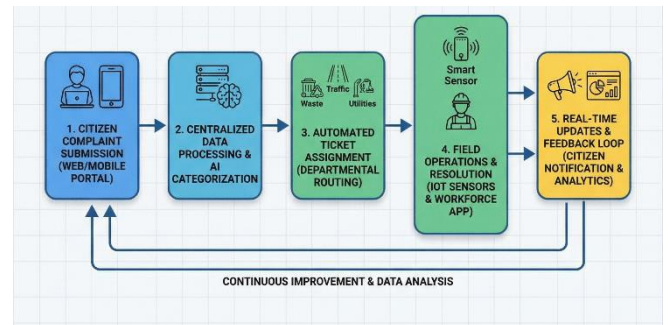


Fig.2. Methodology workflow of Smart City Compliant Monitoring and Resolution System

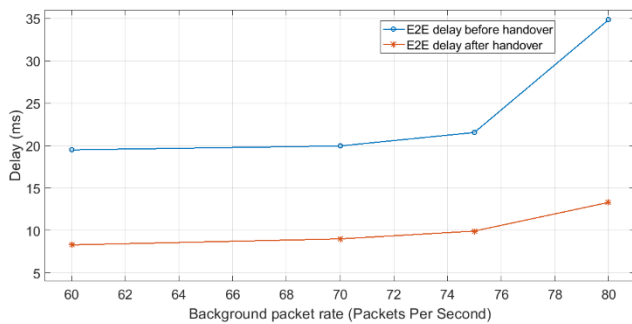
Overall Working Flow of the Proposed System

The Web-Based Smart City Complaint Monitoring and Resolution System follows a structured and transparent workflow to manage complaints effectively from initiation to closure. The process starts when a user registers and logs into the system using a secure web interface. After authentication,

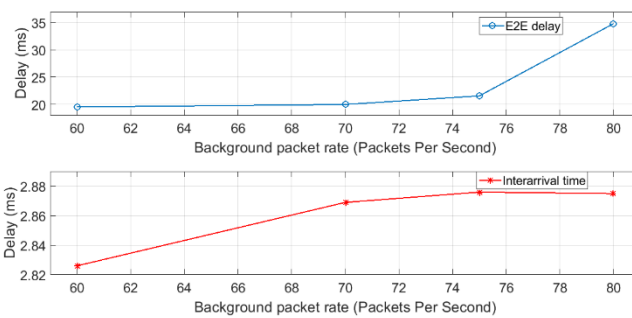
the user submits a complaint by entering details such as category, description, location, and optionally uploading images. Once submitted, the system generates a unique complaint ID and stores the information in a centralized database for further processing.

The complaint is then directed to the administrator module, where it is reviewed and validated. The administrator classifies the complaint and assigns it to the appropriate municipal department based on its type. During this stage, the system may apply prioritization criteria such as urgency, severity, and geographic location to ensure that critical issues receive immediate attention.

Following assignment, the complaint is handled by the respective department. Department officials examine the complaint details, take necessary action, and update the status at various stages such as “pending,” “in progress,” and “resolved.” These updates are instantly reflected in the system, enabling users to monitor the progress in real time.



(a)



(b)

Throughout the workflow, users receive automated notifications regarding important updates, including complaint submission, assignment, and resolution. Once the issue is resolved, users are informed and can provide feedback on the service received.

All complaint records are maintained in the database for future reference. Administrators can analyze this data, generate reports, and identify recurring issues, supporting better planning and continuous improvement in urban service management.

$$P = w_1U + w_2S + w_3L$$

This equation is used to calculate the priority level of a complaint in the system. Here, P represents the overall priority score, U denotes urgency, S indicates severity, and L represents location importance (such as high-traffic or critical zones). The terms w_1 , w_2 , and w_3 are weight factors assigned to each parameter based on system requirements. By adjusting these weights, administrators can control how much influence each factor has on prioritization. For example, emergency complaints like water leakage in hospitals may be given higher urgency weight. This equation helps automate decision-making, ensuring that critical complaints are resolved faster. It reduces manual effort and improves efficiency by systematically ranking complaints. Overall, it supports better resource allocation and faster response times in smart city management systems.

$$T_r = \frac{W}{R \times E}$$

This equation estimates the expected time required to resolve a complaint. Here, T_r represents resolution time, W is the workload or complexity of the complaint, R denotes available resources (such as staff or equipment), and E represents efficiency of the department handling the issue. A higher number of resources and better efficiency reduce the overall resolution time. Conversely, complex complaints with higher workload increase the time required. This formula helps administrators predict delays and manage expectations effectively. It can also assist in resource planning by identifying departments that need additional support. By integrating this equation into the system, authorities can improve scheduling, reduce backlog, and ensure timely service delivery. It plays a crucial role in maintaining service quality and citizen satisfaction.

$$R_c = \frac{N_r}{N_t} \times 100$$

This equation calculates the percentage of complaints successfully resolved within a given time period. Here, R_c represents the resolution rate, N_r is the number of resolved

complaints, and N_{tis} is the total number of complaints received. The result is multiplied by 100 to express it as a percentage. This metric is important for evaluating system performance and departmental efficiency. A higher resolution rate indicates better service delivery and effective complaint handling, while a lower rate highlights inefficiencies or delays. Administrators can use this measure to compare performance across departments and identify areas needing improvement. It also supports transparency by providing measurable indicators of success. Overall, this equation is essential for monitoring the effectiveness of the smart city complaint management system.

V. CONCLUSIONS

The Web-Based Smart City Complaint Monitoring and Resolution System provides an effective and structured solution for managing civic issues in modern urban environments. By replacing traditional manual methods with a centralized digital platform, the system enhances transparency, efficiency, and accountability in complaint handling. It enables citizens to report issues بسهولة and track their progress in real time, thereby improving communication between the public and municipal authorities. The integration of modules such as user, administrator, and department ensures a well-coordinated workflow, reducing delays and minimizing human errors.

The system's ability to prioritize complaints based on urgency, severity, and location significantly improves response time and ensures that critical issues are addressed promptly. Additionally, features such as automated notifications, feedback mechanisms, and performance dashboards contribute to better service delivery and increased citizen satisfaction. The use of a centralized database further supports data analysis, helping authorities identify recurring problems and make informed decisions for urban planning.

Overall, the proposed system aligns with the objectives of smart city initiatives by promoting efficient governance and citizen participation. It not only simplifies complaint management but also contributes to building a responsive, reliable, and technology-driven urban infrastructure. The system demonstrates how web-based solutions can transform traditional governance into a more dynamic and user-centric model.

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