Smartreporter - A Crowdsourced Complaint Resolution System

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Abstract - This paper introduces the conception and development of a web enabled civic engagement tool for crowdsourced public complaint reporting, drawing on the CitySolution approach. The system allows citizens to report geotagged grievances like potholes, littering, or damaged infrastructure using an easy to use interface that accommodates image and text inputs. Uti- lizing deep learning models, specifically YOLOv8/YOLOv9, the platform conducts real time image classification for the support of automated complaint categorization and prioritization.

Index Terms - Crowdsourced Governance, Public Problem Reporting, YOLOv8, YOLOv9, Geolocation, Web-Based Civic Platforms, Image Classification, Smart City Platforms, Pothol Detection, MERN STACK Framework.

I. INTRODUCTION

The CitySolution framework and is concerned with the development of an inclusive web-based platform that enables citizens to take part in enhancing their cities. The platform is intended to allow citizens to have a convenient and easy to use interface through which they can report a broad spectrum of public matters such as but not limited to potholes on roads, unsupervised garbage pileup, non functioning or damaged streetlights, and water leakage issues in pipes or drainage systems. To provide a more effective reporting system, the system accommodates users submitting image and text inputs, thus providing visual proof as well as descriptive information on the problem. The two-input process ensures that the complainant conveys the nature of the complaint more effectively and reduces room for misinterpretation by authorities. The technology foundation of the project is the use of artificial intelligence (AI), specifically deep learning-driven computer vision models including YOLOv8 and YOLOv9. These models are used to automatically identify, analyze, and categorize complaints in accordance with the nature of issue recorded in the submitted photographs. By employing such cutting-edge AI methods, the platform not only minimizes the necessity of manual classification but also considerably speeds up the entire process.

A   Citizen Empowerment and Urban Engagement

The basis of this project is the empowerment of citizens to be participatory stakeholders of urban development and governance. The process of reporting civic issues has historically been time-consuming and inefficient, with people having to physically go to municipal offices or use helplines that respond after hours. This online platform revamps that process by providing a digital, accessible, and user-friendly interface where people can easily report public issues. By reducing barriers to communication between the citizen and the government, the system generates an environment of cooperation where each citizen has his or her say in deciding on the environment they want to live in. This not only enhances the responsiveness of municipal governments but also encourages citizens to take ownership and responsibility for cleaner, safer, and greener cities. Finally, this people-oriented design makes the individuals not longer mere spectators to urban problems but active facilitators of change.

B   Comprehensive Reporting of Public Issues

The platform is designed to address a wide variety of typical urban issues like potholes, litter and garbage, non-functional or damaged streetlights, and leakage in water pipes and drains. All of these issues, seemingly minor individually, can become major factors affecting public safety, health, and quality of life if not addressed. For example, potholes have the potential to cause accidents, mounds of garbage left behind have the potential to create health risks, and water leaks can mean wastage of valuable resources. So that these issues are properly reported, the system also has a dual-input mode where it can accept text description as well as photographic evidence. The text allows for context information—like the intensity, location address, or time duration of the issue—whereas the image serves as a visual evidence, dispelling doubts. This integration ensures that authorities are provided with clear, accurate, and actionable information, thereby minimizing miscommunication and the ability to prioritize complaints more quickly.

C   Artificial Intelligence Integration

At the technological heart of the project is the convergence of artificial intelligence (AI) and deep learning methodologies, which support automatic classification of problems. Advanced computer vision models, specifically YOLOv8 and YOLOv9, which are current object detection algorithms for their accuracy, speed, and real-time capabilities, are used by the system. These models scrutinize the images provided by users to determine the nature of the problem automatically—whether it is a pothole, garbage dump, streetlight problem, or water leak. This precludes the necessity for manual classification by the municipal workers, which tends to be slow, variable, and subject to human error. Through the use of AI, the system improves issue classification scalability and dependability, making it possible for large numbers of complaints to be quickly processed with precision. Not only does this save time, but it also simplifies workflow for city governments so that they can attend to resolution instead of administrative sorting.

D   Streamlined Resolution and Impact on Urban Governance

Aside from complaint collection and classification, the platform also serves as a facilitator of the resolution process. The moment the issues are classified, they are automatically forwarded to the corresponding municipal department or local authority where it is supposed to be acted upon. Road-related complaints, for instance, are forwarded to the Public Works Department, whereas garbage-related issues are forwarded to the sanitation department. This focused assignment decreases delays brought about by misdirected grievances and ensures issues are resolved by the correct teams in a timely manner. Furthermore, AI-based dashboards and tracking systems give both authorities and citizens live status updates on complaints, thereby enhancing transparency and accountability. In time, the system can produce useful data-driven insights—such as the location of trouble-prone areas, forecasting recurring issues, and assisting city planners in allocating resources more wisely. Essentially, the project not only leads to quicker problem-solving but also enhances general urban governance, supporting greater public trust in systems, and building smarter, responsive cities.

E   Real-Time Tracking and Feedback System

The site also has a real-time tracking mechanism where citizens can track the progress of their reported grievances. After a complaint is made, it gets entered into a central dashboard, where both the citizen and the authorities can view its status. Citizens are informed and updated as the problem is reviewed, allocated, and closed by the concerned munici- pal department. This openness encourages the trust between authorities and citizens since the users are no longer left in   the dark about the outcome of their grievances. Secondly, the feedback system enables citizens to leave ratings or comments after resolution, giving important information about service quality and allowing authorities to refine their responsiveness even further.

F   User-Friendly Interface and Accessibility

One of the most important things in this project is the creation of a very intuitive and user-friendly interface that can be easily utilized by people of all ages and technical levels. The interface is developed so that users can easily report problems with just a few steps, and even people with low digital skills can effectively use it. Interoperability features like interactive maps, image upload via drag-and-drop, and step-by-step reporting templates are integrated to facilitate ease of use. Through the focus on accessibility, inclusivity is promoted, where marginalized groups and remote residents are able to report civic issues without restriction. The design philosophy further enhances the platform's overall impact and reach, further promoting community participation in upkeep of public infrastructure.

G   Data Analytics and Urban Planning Insights

Aside from the direct resolution of complaints, the platform is also an effective tool for data-informed urban planning. By compiling complaint data over time, the authorities can detect patterns and trends, like repeat cases of problems in particular neighborhoods, high problem areas at their peak, or seasonal issues. This provides guidance in setting priorities for resource allocation, preventive maintenance planning, and long-term urban development strategy implementation. In addition, analytics from AI classification models can benefit city planners in predictive maintenance, foretelling issues before they become serious and lowering downtime for infrastructure. Ultimately, this feature turns complaint data into actionable intelligence, which enables municipal authorities to make well-informed decisions that optimize the efficiency and sustainability of city government.

II.   LITERATURE   REVIEW

Smart city complaint management is now a major research area because of the inefficiency of the classical manual systems that tend to be delayed and non-transparent. For this purpose, mobile-based and AI-based solutions have been studied to make complaint handling automated and enhance the efficiency of governance.Shama et al. [1] introduced*CitySolution*, a mobile system consisting of independent citizen and authority applications to facilitate systematic reporting and surveillance of complaints. Through the integration of deep learning models, the system is able to automatically classify issues like potholes, waste management, and infrastructural defects, thus lowering the workload and increasing response speed. Their

dual-app design further enhances communication between officials and citizens, ensuring accountability in service delivery. CitySolution in general demonstrates the feasibility of merging mobile crowdsourcing with deep learning to design scalable, transparent, and citizen-driven urban service platforms.

Farhatun Shama et al [2] looked into the evolution of citizen reporting systems as part of Indonesia's smart city efforts, specifically looking into Makassar's initiatives. Their research emphasizes the value of citizen participation as a key driver of the effectiveness of digital reporting portals. The authors discovered that although technological infrastructure and mobile platforms facilitate structured reporting, various challenges like limited citizen awareness, digital literacy, and follow-up accountability minimize the overall effect of these systems. The article highlights that the citizen reporting frameworks cannot thrive using technology alone but must find the force of strong governance, social trust, and institutional preparedness. This effort provides insightful social and policy contributions to complaint handling, in addition to technical ones grounded in AI and mobile app development.

Suhatati Tjandra et al [3] suggested a mechanism for automatically directing citizen complaints to the respective government departments based on the K-Nearest Neighbor (KNN) algorithm. The method relies on the minimization of human error and delays typically experienced in conventional complaint-handling processes through the use of supervised machine learning for text categorization. The system proved that effective and simple algorithms such as KNN could deliver accurate classification of complaints when trained against well-structured data. The authors, however, pointed out that such models are highly sensitive to data quality and require periodic updates to be effective as new types of complaints arise. This paper is an initial effort to incorporate machine learning into e-governance models, setting the stage for more sophisticated models like deep learning methods in subsequent research.

Mr. Faris Abdulrahman et al [4] created *Fix-It*, a lean complaint handling system that incorporates an Android app with a web-based interface to improve the citizens' and service providers' interaction. The system allows reporting, tracking, and monitoring the status of complaints by the users, while service providers have the facility to manage and update real- time progress. In contrast to conventional manual or scattered systems, Fix-It aims to achieve a lean platform that not only reduces response time but also enhances transparency in resolving public grievances. The research shows the significance of synergizing web and mobile technologies towards developing accessible solutions, although it also points towards possible scalability issues when implemented in urban areas with more varied service demands.

S. Balakrishnan et al [5] suggested an online grievance management system that makes use of image identification and location tracking to make municipal problem reporting more efficient. The platform enables citizens to take and upload photographs of problems like potholes, trash spills, or broken infrastructure that are classified automatically by using recognition algorithms. By integrating visual data with location, the platform enables the authorities to receive correct and context-embedded information, minimizing ambiguity while processing complaints. The research proves the possibility of image-based methods for smart city management, while also reporting limitations in image quality, diversity of the dataset used, and live processing for mass deployment.

Amanpreet Dhoor et al [6] implemented *FixTheCity*, a web and mobile complaint report system for enhancing the engagement of citizens and government. The system enables complaints to be filed with augmented GPS information, photographs, and live status updates, guaranteeing more precise and visible reporting. By adding location-aware functionalities and multimedia evidence, FixTheCity increases the credibility of citizen reports as well as the effectiveness of city responses. While successful as a prototype for civic engagement, the research also points to challenges of long-term adoption such as prolonged user participation and integration into already established government infrastructures.

Lovely Singh Bhadouria et al [7] presented an online complete plaint management system with the intent to simplify grievance processing and curb corruption in public admin- istration. Their online solution automates complaint routing to the right departments and escalates unresolved complaints to higher levels of authority, allowing for accountability and timely resolution. The system also generates performance reports for departments that promote transparency and assist in monitoring service quality. The research illustrates how automation of complaint management can help save time, reduce manual intervention, and improve the efficiency of governance functions.

Andre A. F. Silva et al [8] proposed UpCity, a comprehen- sive cyber-physical system that utilizes citizen feedback, IoT sensors, and drone images for problem detection and reporting of urban issues. The system integrates data collection based on human-centered and sensor-based monitoring to deliver an integrated approach to smart city governance. By aggregating multiple sources of data, the system improves reliability in detecting issues like infrastructure damage or mismanagement of waste. This research showcases the promise of convergence between cutting-edge technology and civic engagement in developing more effective, transparent, and responsive urban governance opportunities.

Indhitya R. et al [9] came up with a web and mobile complaint service information system intended to enhance the efficiency and prioritization of complaint processing within a university setting. The system supports users in lodging complaints via multiple avenues while equipping administra- tors with capabilities for the classification, monitoring, and resolution of

complaints in an efficient manner. Through incorporating mobile accessibility and real-time monitoring, the platform presents higher responsiveness and effectiveness in service delivery. The research points out how web-mobile integration can make complaint management processes more transparent and user-oriented.

Chao Huang et al [10] suggested a crowdsourcing-driven ur- ban anomaly prediction system based on citizen-provided data to predict problems in smart cities prior to their worsening. In contrast to conventional complaint management systems that concentrate on reporting based on reaction, this method highlights prediction through patterns in crowdsourced data analysis. The research shows that integrating citizens' data with data analytics may enhance municipal planning and the allocation of resources. But the performance of such predictive systems is dependent to a large extent on continuous citizen involvement and high-quality data collection.

Wijethilake et al [11] presented a crowdsourced waste reporting and monitoring system aimed at fostering urban sustainability. The system allows citizens to report waste buildup via a mobile platform that helps municipal author- ities detect and resolve sanitation problems effectively. The research points out the manner in which the use of commu- nity engagement can enhance waste management, minimize environmental risks, and increase urban cleanliness. However, the effectiveness of the system relies on the active participation of citizens and the incorporation of reported information into municipal processes for taking timely action.

Sakhare et al.
citesakhare2023ircr designed the Intercity Road Complaint Reporter (IRCR), a mobile-based system to ease the report- ing process of road problems like potholes, infrastructure damage, and traffic hazards. The system allows citizens to lodge complaints with geotagged information and multime- dia attachments and enables quicker redressal by municipal authorities. The research substantiates the role of ICT-based platforms to increase road maintenance effectiveness and citi- zen participation. The performance of the system is limited by internet access, user response, and the responsiveness of local government to complaints.

Esparza et al. [13] introduced a crowdsourced flood report- ing system for the purpose of enriching inundation monitoring of urban road networks. They combined citizen-provided flood reports with spatial analysis to deliver real-time situational awareness that assists authorities and commuters in locating road closures and areas of high risk. The research brings out the usefulness of the integration of community engage- ment and data-driven modeling towards disaster resilience. Although successful at enhancing the response time and decision-making, the framework is hampered by issues of data reliability, skewed reporting distribution, and compatibility with official monitoring frameworks.

Peserico et al [14] have presented performance benchmark- ing of YOLOv5 and YOLOv8 object detection models on low-end embedded hardware for real-time scenarios. Accuracy, inference time, and computational cost were measured in their work, shedding light on the compromises involved in detection performance and hardware constraints. The results showed that although YOLOv8 performed better in terms of accuracy, YOLOv5 provided greater real-time suitability for low-power platforms. This research is especially applicable to smart city technologies where complaint reporting and anomaly detection applications are generally based on embedded vision technologies for field implementation.

Kim et al. [15] presented a detailed review of pothole- detection algorithms from the automation perspective, cover- ing progress in computer vision, sensor-based methods, and deep learning models. The research compared the strengths and weaknesses of image-based detection, accelerometer- based analysis, and hybrid models, highlighting their use in smart city infrastructure monitoring. The review found that although deep learning approaches demonstrate high accuracy and flexibility, there are still issues with regard to cost of de- ployment, real-time processing, and robustness across various road conditions and weather scenarios. This paper is of great value to researchers developing complaint reporting and urban infrastructure management systems.

III. CONCLUSION

The combination of citizen engagement, artificial intelligence, and effective governance system is capable of changing the manner in which public matters are reported and addressed. With a friendly web platform, citizens are enabled to partici- pate effectively in city development through reporting issues like potholes, trash disposal, faulty streetlights, and leakages of water. The implementation of dual-input reporting—text descriptions coupled with image evidence—guarantees clarity and reduces miscommunication, while the implementation of deep learning algorithms such as YOLOv8 and YOLOv9 auto- mates complaint categorization with precision and efficiency. This alleviates manual work, increases scalability, and speeds up the entire workflow. In addition, the automated routing of categorized complaints to concerned municipal departments facilitates resolution, enhances accountability, and allows for data-driven decision-making. Essentially, the project closes the gap between people and the authorities to develop a more open, efficient, and cooperative environment that helps build the vision of smart and sustainable cities.

IV. REFERENCES

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