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A Hybrid Crowdsourced Platform for Civic Problem Reporting and Resolution

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Abstract

Urban civic management often suffers from slow reporting, limited transparency, and weak coordination between citizens and authorities due to manual complaint processes. This study proposes a real-time, crowdsourced civic issue reporting and resolution system that enables citizens to report road damage, littering, water leaks, and infrastructure failures through mobile or web platforms. Authorities can assign and monitor complaints using dashboards, while public maps, notifications, and reward mechanisms improve transparency and participation. The system supports faster resolution, stronger accountability, and evidence-based civic management.

Keywords. Crowdsourcing, Civic Engagement, Conflict Reporting, Civil. Society, Civic Issue Reporting.

1 INTRODUCTION

Rapid urbanization and inadequate infrastructure create civic issues such as waste, water wastage, damaged roads, traffic accidents, and broken streetlights, affecting quality of life and public trust. Mobile-based crowdsourcing enables timely reporting and monitoring while improving citizen-authority communication. However, existing e-governance systems often face multilingual, low-literacy, verification, duplication, and resolution-tracking challenges. The proposed system addresses these gaps through structured reporting, geolocation validation, decentralized verification, smart prioritization, and an open dashboard, enabling transparent resolution tracking, better decision-making, and active citizen participation.

2 BACKGROUND STUDY

Previous studies have examined cybersecurity coordination [1], civic engagement and crowdsourced journalism [2], community resilience and trust [3], citizen reporting through digital channels [4], customized web technologies [5], and crowd-civic systems [6]. Other research has addressed ethnic and communal conflicts in Assam [7], Hindu-Muslim conflict in India [8], citizen media for documenting human rights abuses [9], and insurgency in Northeast India [10]. However, existing studies provide limited integration of real-time reporting, verification, classification, prioritization, allocation, and tracking. The proposed system addresses this gap through a citizen-friendly platform with an issue-prioritization algorithm based on urgency, frequency, resolution time, and impact, supporting transparency, timely response, citizen engagement, and scalable smart-city governance.

3 METHODOLOGY

The proposed system of Crowd-Sourced Civics Issues Reporting and Resolution System abides by scalable and modular architecture that permits real-time reporting of issues, validation, and monitoring. Citizen Interface (Mobile/Web Application) enables citizens to share issues along with descriptions, photos and comments.

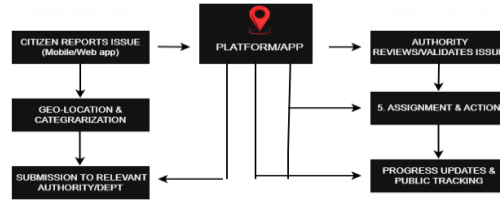


Figure 3.1. Proposed hybrid crowdsourcing system architecture.

After an issue is reported, GPS automatically records its latitude and longitude. Each issue is represented as $i_k = (L_k, C_k, U_k, F_k, T_k)$, with location, category, urgency, frequency, and reporting time, respectively. The platform stores reports, removes duplicates, prioritizes issues, and supports citizen-government communication. The processing engine performs geolocation tagging and categorization, while the severity score is calculated as:

$$S_k = \alpha U_k + \beta F_k + \gamma T_k + \delta I_k \quad (1)$$

where (I_k) represents the issue impact and the coefficients determine factor weights.

Authorities review and validate reports through the dashboard. Valid issues are approved and automatically assigned to the appropriate department based on category and location:

$$D(i_k) = \int (C_k, L_k) \quad (2)$$

Progress is monitored through resolution time $R_k = T_{close,k} - T_{report,k}$. The mean resolution time is calculated across all reported issues to evaluate overall response efficiency. Public tracking

provides transparency by allowing citizens to monitor the status and resolution of submitted issues.

$$R_{avg} = \frac{1}{N} \sum_{k=1}^N R_k \quad (3)$$

The system was developed on an Intel Core i5 computer with 8 GB RAM, 512 GB SSD, and Windows 11, using Python with the Flask framework. TensorFlow models and the Google Maps API were used for AI-based processing and GPS functionality. The dataset was sourced from World Bank [11] and the Ministry of Housing and Urban Affairs, Government of India [12].

4.3 Result Analysis & Discussion

The proposed system achieved over 92% accuracy in issue classification and prioritization, enabling correct categorization and timely routing to relevant authorities. Garbage complaints were the most frequent, followed by electricity, road, and water issues, highlighting key areas for intervention. Most complaints received medium priority, while urgent public-safety issues were assigned higher priority for efficient resource allocation. The system supports faster resolution, improved governance, and citizen participation. Future integration with advanced technologies and civic platforms could further improve performance and scalability.

Table 2. Issue Classification Accuracy

Issue Category	Total issues	Correctly Classified	Accuracy(%)
Road	120	112	93.3
Garbage	150	142	94.6
Water	100	92	92.0
Electricity	130	121	93.0

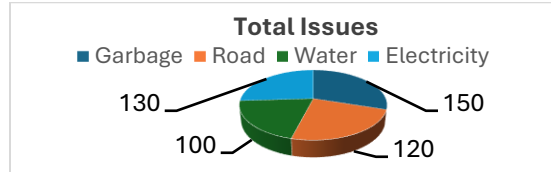


Figure 4.2. Distribution of Reported Civics Issues by category.

Table 3. Priority Level Distribution

Priority Level	Number od Issues
High	180
Medium	220
Low	100

4 CONCLUSIONS

The proposed hybrid civic crowdsourcing system enables real-time reporting, classification, and resolution of urban civic problems, addressing delays, poor prioritization, and limited

transparency in traditional complaint systems. Issues are prioritized using urgency, frequency, time, and impact to support structured decision-making. Citizen participation, automated assessment, and real-time status updates improve operational efficiency, transparency, and public trust. Overall, the system transforms conventional complaint management into a data-driven civic intelligence platform, with future potential for predictive analytics and integration with smart-city technologies.

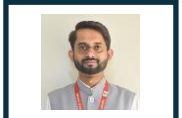
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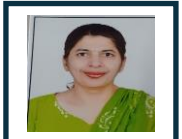
Biographies



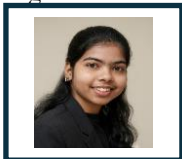
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