

SMART CIVIC ISSUE REPORTING SYSTEM

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Abstract:

In many urban regions, addressing civic issues such as garbage accumulation, water leakage, and potholes remains inefficient due to manual reporting procedures and delayed responses. The *Smart Civic Issue Reporting System (SCIRS)* presents an AI-integrated, web-based platform designed to streamline this process and promote transparency between citizens and municipal authorities. The system allows citizens to register, log in/log out, and report issue of any civic problems by capturing the image, adding a description, and the location is captured automatically. The issue reports are then assigned to respective municipal officer based on constituency, where the municipal officer can be review, accept, and updated the status of the civic issue. The system executes a deep learning model based on MobileNetV2 to identify images as garbage or non-garbage using a 0.65(65%) limit, helps to prevent manual verification of civic issue reported. From approving local officials right through to watching users across regions, admin holds every string. Oversight stretches everywhere without exception. At times, it might limit entry for a town without warning. A unique visual using charts appears alongside charts. When people share what they think, it gives a second look at whether things are done right. This extra check makes outcomes more accurate because real experiences shape the results. Trust grows when actions match what users actually face citizen trust. This approach ties into broader aims for city management that rely on technology. It uses artificial intelligence to help cities run better. Automation takes over repetitive tasks so systems respond faster. Instead of waiting for human input, decisions happen as conditions change. Efficiency grows when processes adapt in real time. Cities become more responsive because data guides actions. Tools like these, shape how places grow without slowing down daily life.

Keywords — Smart City, Civic Issue Reporting, Deep Learning, MobileNetV2, AI Automation, Urban Governance.

I. INTRODUCTION

Managing civic facilities is a big problem for developing cities. Piles of trash pile up where streets go uncleaned. Roads crack and break apart under constant wear. Sewage seeps through broken pipes beneath sidewalks is referred from

[1][2]. Problems stack when basic systems fail streetlights not working properly.

Still, many complaint systems run on paper. Getting help means visiting city buildings. Some folks must make phone calls instead. Offices stay busy with face-to-face requests. Voice lines fill up fast each morning. Few places offer online options yet. Workers write details by hand is

referred from [1][3]. Responses take days to arrive. Digital updates feel rare here. Waiting feels normal for most users, A call could help sort out what's wrong.

Spending longer than automatic tools, these approaches miss tight deadlines. Updates slip through cracks, arriving late or not at all, Later on, problems take longer to fix because of this gap, making residents doubt their leaders' ability to respond is referred from [4]. Still, confidence slips when responses drag without clear reasons behind the wait. Faster tech means new answers to old troubles. When cities get smarter, fixes arrive before things break. Machines watch. Systems adapt is referred from [5]. Life shifts without noise. Quiet changes shape how people move, live, think. What once took days now happens while you wait. Not magic - just math, working behind walls is referred from [6].

Looking ahead, smoother teamwork demands quicker tools that run on smarter systems. A shift toward speedier automation becomes clear when connections must stay strong across distances. Moving forward, efficiency grows where technology removes delays in daily tasks. Progress shows up most when processes feel seamless, almost invisible. Without hiccups, collaboration flows easier through well-built digital express frameworks is referred from [7]. A person who serves the community alongside local government roles.

The system keeps things on track through a smart tool that links users together. Communication flows happen inside this digital space where responses are quick. One way it works is by using learning algorithms to guide interactions is referred from [8][9]. Instead of old methods, messages move with help from pattern recognition. What shows up is shaped by how people engage over time. Responses form based on past exchanges within the interface.

Every person on the street shares the same role, whether standing behind a badge or walking without one. Picture arrives from someone out there, showing exactly where things went wrong. The system pinpoints that spot without guesswork is referred from [10]. A clear view emerges when

details line up just right. What matters shows up sharp, no blurring edges short named description.

A single layer begins it all - three parts form the base. One role shape how people join in. Another guides local decisions through a town helper. Power shifts at the top, where control adjusts under one who manages all is referred from [3][10]. Citizens basic functionality is to report any civic issue and also can get to know the status of the reported issue, The officer are assigned the reviewed issues and have a authority to either accept or reject the case with a proper naming of the reason, and where as admin powers all over the system to control each and every access to prevent any inconsistency or malfunction of the system, which also includes officer approvals and issue tracking.

The model is built with a MobileNetV2 deep learning model to analyze attached images for the report and cross- check the issue with a 0.65(65%) is referred from [11][12]. Once fixed, the person leaves a note about how things went. If what they say sounds off, someone checks again is referred from [13].

This setup handles AI's role in checking user-reported problems without needing hands-on work with ability to check results, the built platform keeps performance steady while growing. It runs without failure under increasing load. This setup supports extra tools, such as a response loop that checks problems again; at the same time, it keeps entry limited. While some parts stay hidden, others open only under certain conditions

For improved tracking, submit it directly to the administrator is referred from [14]. Speed shows up when AI joins the workflow, pushing tasks ahead without dragging. That power lets the app handle big jobs smoothly, growing beyond old limits. Progress builds not by chance but through smart connections inside the tool

A single report stands, built on careful detail and exactness. Its structure holds firm through measured steps. Every part fits because attention stayed sharp. Clarity comes not from force but steady control. Accuracy shapes each line without reaching for perfection is referred from [1][15].

II. RELATED WORK

Years went by, then suddenly software and online gateways started showing up everywhere. Different tools began appearing across screens, one after another. Some worked well, others faded fast. Each brought its own way of doing things is referred from [16]. Time passed, more kept arriving. None looked quite the same. A few stayed longer than expected. Most just slipped away quietly

A fresh start each morning means tackling public concerns head on. Fixing what bothers people clears paths forward slowly but surely is referred from [2]. When shared troubles get attention, daily life shifts a little at a time. Small steps add up where communities take charge together. Progress shows when ordinary moments feel easier than before.

FixMyStreet and Swachh Bharat portal alongside local web apps, Citizens found it easier to look into community concerns when town offices stepped in is referred from [3][4]. Problems got shared online because local hubs offered a web entry. A city-run site made reporting simpler after neighborhoods joined the effort. When areas lent support, people used digital paths to speak up. Town centers gave access so residents could flag issues straight away government.

Yet those systems barely changed how problems got fixed because key parts were missing, such as handling growth comes naturally when systems adapt. Response times shrink because processes streamline themselves. A deep look at problems happens only once, cutting repeat efforts. Old tools stay in place instead of swapping them out.

Even though tools exist, most rely heavily on people doing tasks by hand work completed on matters raised by residents is referred from [2][3]. Working like this uses up much time along with plenty of effort, sometimes causing several issues down the line one issue stands out - repeated incidents pile up, making tracking messy. Workers get stretched thin, which lifts expenses fast. Extra staff hours add pressure on budgets without warning.

One day, doing things by hand in city management will lead to big mismatches. Mistakes might grow when people rely only on old methods. Trust tends to fade if results keep varying. Without precision, doubt creeps into how services work. Accuracy slips when systems stay untouched by updates around every corner, folks might face issues when AI ignores duties in such uses - big problems can grow from small oversights is referred from [5][16]. Mistakes pile up if smart systems just look away.

Folks once deep into research dabbled in merging tools like IoT sensors with GIS mapping systems - database frameworks often tagged along. One thing led to another, pieces started fitting, tech stacked up without much fanfare. Connections grew where signals met locations, information found structure. Not every attempt stuck, yet patterns emerged over time. Systems began speaking to one another, slowly making sense even though it tracks activity, human effort often steps in to verify things is referred from [3]. Power relies heavily on hands-on checks despite oversight tools running in the background. There remains a significant gap in automating the validation and categorization of civic issues using artificial intelligence.

The proposed SCIRS addresses these challenges by introducing AI-driven automation through a light weight CNN architecture (MobileNetV2) is referred from [17]. This model automatically analyzes and classifies issue images, minimizing redundancy and manual workload is referred from [11][13]. The inclusion of real-time feedback and automated re-evaluation ensures greater accuracy and efficiency compared to traditional approaches is referred from [18]. As a result, the system reduces operational effort, lowers maintenance costs, and promotes a more responsive and transparent mechanism for smart city management.

III. DATASET

The dataset used for the SCIRS is organized into multiple categories representing civic issues such as garbage, water leakage, potholes, sewage leakage, and streetlight faults. Every primary dataset category is further divided into two

sections: Clean, indicating areas without issues, and affected, representing regions where the civic problem exists.

These subfolders are further divided into train and validation sets to support supervised learning. All images were standardized to 224×224 pixels and normalized to enhance uniformity. The dataset structure enables the model to effectively distinguish between normal and problematic conditions, ensuring accurate classification and reliable issue verification. We represented 12 sample images from dataset in Fig. 1.



Fig. 1. Images from dataset

IV. SYSTEM ARCHITECTURE AND DESIGN

The SCIRS follows a three-tier architecture consisting of a Frontend Layer, Backend Layer, and Database Layer, designed to ensure scalability, security, and efficient communication between citizens, municipal officers, and administrators.

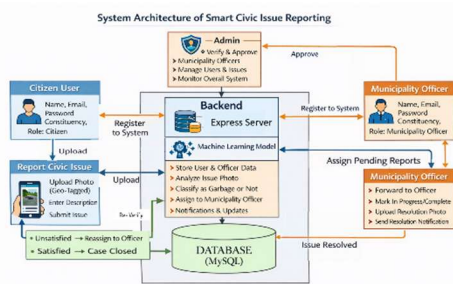


Fig. 2. System Architecture of SCIRS

A. Overall Architecture

The Frontend Layer serves as the main framework from where the citizens communicate with the system. It provides an intuitive and well-structured design focused on ease of access and

clarity. It offers a clean and user-friendly interface where citizens can register, log in, and report issues by uploading images, descriptions, and location details. The interface automatically captures GPS coordinates and provides real-time feedback on issue status.

Municipality officers can view and manage issues reported within their assigned areas, while the admin, who has complete system control, can monitor all activities, approve officer registrations, and manage user data and system configurations. The design focuses on simplicity and responsiveness, ensuring accessibility across devices for both technical and non-technical users.

The Backend Layer functions as the logical core of the system, developed using Node.js and Express. It manages authentication, authorization, issue routing, and integration with the AI classification model. When a citizen submits an issue, the backend validates the data, processes the image through the CNN-based model, and forwards the report to the relevant municipality officer. The communication of user server and admin server is managed using backend, and municipal interface to maintain transparency and traceability.

At the heart of the architecture lies the AI Verification Module, powered by the MobileNetV2 convolutional neural network. This module analyzes uploaded images and determines whether they represent a major civic issue (e.g., garbage accumulation) based on a 65% confidence threshold. It reduces human verification time and ensures that only valid issues reach the concerned authorities.

The Database Layer securely stores all data, including user information, civic issue details, officer profiles, and feedback. Implemented using MySQL, it maintains structured relationships among tables such as Users, Issues, Officers, Feedback, and Admin Logs. The database ensures data consistency, efficient query handling, and scalability for future expansion.

Together, these layers create a robust and transparent ecosystem for real-time civic issue reporting, verification, and resolution.

B. Data Flow

1) User Registration and Login: Citizens, officers, and the admin register with unique credentials. The admin verifies officer accounts to prevent unauthorized access. Each session is secured through OTP-based authentication and encrypted credentials.

2) Issue Reporting and Submission: A citizen reports an issue by uploading an image, entering a short description, and allowing GPS-based location capture. The system stores this data and forwards it to the AI verification module.

3) AI-Based Image Verification: The MobileNetV2 model analyzes the uploaded image to detect issue type and severity. If the confidence level exceeds 65%, the issue is verified as significant and forwarded to the municipality officer of that area. Otherwise, it is categorized as minor or invalid.

4) Municipality Officer Review: The respective officer receives verified complaints in their dashboard. They can update the issue status as Pending, In Progress, or Completed and upload proof images after resolution.

5) Admin Monitoring and Control: The admin has complete oversight of the system, including approval of officers, issue tracking, feedback management, and analytics of civic data. Admins can also reopen or close issues in case of discrepancies or duplicate reports.

6) Citizen Feedback and Re-evaluation: Once an issue is marked Completed, the citizen reviews the outcome and provides feedback as Satisfied or Unsatisfied. If marked Unsatisfied, the uploaded resolution image is rechecked by the AI model. If the garbage detection confidence is above 65%, the issue is reopened for further action.

7) Data Storage and Analytics: All interactions—reports, images, and feedback—are securely stored in the MySQL database. Admins can generate analytical reports to assess issue frequency, response times, and municipal performance, ensuring continuous improvement in civic management.

V. IMPLEMENTATION

A. Frontend Layer

The frontend serves as the main user interface and provides dedicated dashboards for three roles — Citizen, Municipality Officer, and Admin.

- Citizens can register, log in, and report civic problems by uploading an image, description, and location. The interface automatically captures geolocation and forwards the issue to the corresponding municipality.

- Municipality Officers can view issues assigned to their area, update issue status (Pending, In Progress, Completed), and upload proof-of-resolution images.

- The admin have full access over the complete system operations and configurations, including approval of officer registrations, monitoring of all complaints, and managing user accounts and datasets.

The frontend is designed with responsive web technologies to ensure smooth navigation, accessibility, and ease of use across multiple devices.

B. Backend Layer

The backend of the system is implemented using **Node.js** with the **Express** framework and serves as the logical core of the application. It manages user authentication, authorization, image handling, and communication with the integrated AI module.

When a citizen submits an issue, the backend validates the provided data, identifies the respective municipality, and automatically forwards the complaint to the appropriate officer. The built-in **MobileNetV2 convolutional neural network (CNN)** analyzes the uploaded images and classifies them as *garbage* or *non-garbage* using a confidence threshold of **65 %**. This automated process minimizes manual verification effort and ensures that only valid issues reach the concerned department.

C. Database Layer

All application data are securely maintained in a **MySQL relational database** that supports

structured storage and scalability. The principal entities include:

- **Users:** Contains login credentials, assigned role, municipality, and contact details.
- **Issues:** Stores image paths, textual descriptions, status, and timestamps.
- **Officers:** Maintains officer information and the geographic areas they manage.
- **Feedback:** Records citizens' satisfaction ratings and comments.
- **Admin Logs:** Tracks approvals, issue updates, and overall system activity.

This schema ensures data integrity, efficient retrieval, and controlled access, enabling reliable long-term operation of the platform.

D. Security and Admin Management

Security is enforced through **Role-Based Access Control (RBAC)**, which assigns specific privileges to citizens, officers, and the administrator. All passwords are encrypted, and **OTP-based verification** is employed during registration and password recovery. The **Administrator** retains full authority over the system and performs critical tasks such as:

- Approving or rejecting municipality-officer registrations.
- Monitoring and managing all submitted issues across regions.
- Reviewing analytical dashboards, feedback reports, and performance charts.
- Deleting duplicate or invalid entries when necessary.

This centralized control mechanism enhances accountability, transparency, and overall governance efficiency within the smart-city framework

VI. RESULTS AND DISCUSSION

The SCIRS achieved an overall accuracy of 83% and a precision of 97% during model testing, demonstrating strong performance in classifying civic issues such as garbage accumulation. The integrated AI assistant effectively filters duplicate

and non-critical reports, minimizing manual intervention and improving response efficiency. This automation significantly reduces human effort, processing time, and operational cost. The system also provides fast processing, high scalability, and efficient resource utilization due to its modular design and optimized backend communication. The combination of AI verification and real-time issue routing ensures reliable results, making the platform an effective and sustainable solution for smart city governance.

A. User Interface and Experience



Fig. 3. Home Page of SCIRS

The SCIRS interface features an intuitive and well-organized dashboard that enables citizens to register, sign in, and submit civic complaints with ease. The home screen offers direct options for filing new reports, checking past submissions, and monitoring real-time issue progress. Designed with a focus on accessibility and simplicity, the layout remains user-friendly even for beginners. A responsive navigation panel ensures a smooth and responsive experience for user through different device.

B. Issue Reporting Module

The issue reporting form allows users to upload images, add brief descriptions, and automatically capture GPS-based location data. Once submitted, The submitted report is automatically routed to the designated municipal officer corresponding to the citizen's registered location. Uploaded images are simultaneously processed through the AI verification model to classify the issue as garbage or non-garbage with a confidence threshold of 65%. This feature minimizes false or duplicate reports and ensures that

only valid complaints reach municipal authorities.

C. Officer Dashboard

The officer dashboard provides an organized overview of all issues within a specific region. Each report is displayed with its description, image, status, and timestamps. Officers can update the issue status as Pending, In Progress, or Completed, and upload proof-of-resolution photos after completion. This structured layout improves accountability and helps ensure timely action on citizen complaints.

D. AI-Based Image Verification

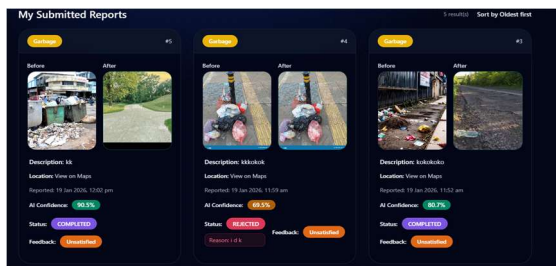


Fig. 4. Image Classification Results

The AI module, trained using the MobileNetV2 CNN model, classifies civic issue images effectively. During testing, the model achieved high accuracy in distinguishing between garbage and non-garbage scenarios. As shown in the accuracy and loss plots, the model converged smoothly over 10 epochs, achieving strong validation accuracy with minimal overfitting. This automation reduces manual review effort and enhances the system's reliability.

E. Feedback and Resolution Monitoring



Fig. 5. Citizen Feedback Panel

After an issue is marked Completed, citizens can rate the resolution as Satisfied or Unsatisfied. If marked Unsatisfied, the officer's proof image is automatically re-evaluated by the CNN model. If the confidence level exceeds 65%, the issue is reopened for further action. This closed-loop feedback mechanism promotes transparency, verifies the problem is resolved effectively and citizens remain involved

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