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Urban-Pulse Smart Local Issue Reporter

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ABSTRACT

Urban areas in India face numerous civic issues such as damaged roads, inefficient waste management, water leakages, non-functional streetlights, and traffic congestion. The absence of a centralized and efficient reporting system often leads to delays in addressing these problems, reducing transparency and accountability. This project presents Urban Pulse – Smart Local Issue Reporter, a web-based platform designed to bridge the communication gap between citizens and municipal authorities. The system enables users to report issues easily by providing essential details such as location, description, and photo evidence. It incorporates GPS-based tracking to ensure accurate reporting and includes a real-time complaint status feature categorized as Pending, In Progress, or Resolved. The platform is developed using modern web technologies including HTML, CSS, JavaScript, Node.js, Express.js, and Mongo DB, following a structured approach of requirement analysis, design, development, testing, and deployment. The proposed system improves the efficiency of complaint handling, enhances communication, and ensures greater transparency. It encourages active citizen participation and supports the development of smart cities by providing a reliable, user-friendly, and accountable digital solution for urban governance.

1. INTRODUCTION

In today's fast-growing urban environments, managing civic infrastructure and public services has become more challenging than ever. With rapid urbanization and increasing population, cities are facing a wide range of issues such as damaged roads, poor street lighting, inefficient waste management, water and sewage problems, environmental concerns in public spaces, and traffic congestion. These problems directly affect the daily lives of citizens and highlight the need for quick and effective action from municipal authorities to maintain a clean, safe, and well-organized city.

However, in many cities, the current systems used to report these issues are still manual, slow, and lack transparency. Because there is no proper and user-friendly reporting system, citizens often find it difficult to communicate their concerns to the right authorities. As a result, complaints are delayed, infrastructure maintenance suffers, and accountability is reduced, leading to dissatisfaction among the public.

To address these challenges, the proposed system, Urban Pulse – Smart Local Issue Reporter, introduces a digital solution that creates a direct connection between citizens and municipal authorities. This web-based platform allows users

to report civic issues easily by entering basic details such as name, phone number, email, and a brief description of the problem. Users can also upload photos and provide the exact location of the issue, which helps authorities understand and resolve the problem more efficiently.

The platform is designed to be simple and user-friendly, making it accessible even for people with limited technical knowledge. Once a complaint is submitted, users can track its progress in real time, whether it is marked as pending, in progress, or resolved. This feature improves transparency and builds trust between citizens and government bodies.

In addition, the system maintains a centralized database of all complaints, enabling authorities to organize and prioritize issues based on urgency and category. This helps in better planning, efficient use of resources, and improved decision-making. By replacing manual processes with a digital system, the platform reduces delays and ensures smoother and faster complaint handling. Overall, the Urban Pulse system plays an important role in improving urban governance by encouraging active citizen participation, increasing transparency, and ensuring quicker resolution of civic issues. It is a step forward in building smarter, cleaner, and more responsive cities through the effective use of technology.

2. RELATED WORK

The study titled "Smart Civic Issue Reporting System" by Walwadkar et al. (2022) presents an intelligent Android-based application designed to simplify the process of reporting civic infrastructure issues such as damaged roads, garbage overflow, and malfunctioning streetlights. The authors highlight the shortcomings of traditional grievance redressal systems, which are often time-consuming, inefficient, and lack transparency.

To overcome these limitations, the study proposes an automated mobile-based reporting platform that integrates GPS for accurate location tracking and camera functionality for capturing visual evidence. The system further incorporates advanced machine learning techniques, including hybrid CNN-RNN models, to analyze images and assess the severity of reported issues. In addition, an SVM-based NLP model is utilized to interpret and classify textual complaint descriptions, enabling prioritization of critical cases for faster resolution.

The proposed system follows a three-tier client-server architecture, clearly defining the roles of users, municipal officials, and administrators to ensure efficient communication and management of complaints.

Furthermore, the study reviews existing smart city solutions such as MarkaSpot and AppCivist, which enhance citizen participation through location-based and social interaction features. Prior research also explores the use of clustering algorithms for analyzing complaint patterns, as well as deep learning techniques like CNNs and RNNs for image classification and severity detection.

Overall, these contributions highlight the increasing importance of artificial intelligence, geolocation, and crowdsourcing technologies in improving civic engagement. The proposed Smart Civic Issue Reporting System builds upon these advancements to deliver a more efficient, adaptive, and transparent platform, thereby supporting the vision of smart cities and citizen-centric urban governance.

Table 1: Literature Survey

Author(s)	Title	Merits	Demerits
B. Rohith Kumar1, K. Hrushikesh, K. Niveeth Reddy, A. Sriram (2023)	A paper pothole Detection	Efficiently detects potholes in real-time using the YOLOv4 deep learning algorithm with high accuracy (~85%) and fast processing speed.	The system struggles with long-distance pothole detection and occasional misclassification, limiting its reliability in all driving conditions.
Gurudeep G, Prachi Pingle, Nitin G C (2023)	Repairring of potholes and highway maintenance	Provides a comprehensive review of modern, sustainable, and cost-effective methods for pothole repair and highway maintenance	Lacks experimental implementation or quantitative performance data to validate the effectiveness of the discussed repair methods..
Anjaly Antony, Minla K.S (2021)	Civic complaint report-ng using image processing	Uses AI to quickly detect and prioritize civic issues, improving efficiency and transparency.	Depends on internet and GPS, which may cause issues in low connectivity areas.
Krishna Sonawane, Prachi Pingle, Trupti Zagade, Siddhant Lunawat (2021)	City cleanliness detect-ion using geo-tagged street images	Enables real-time automated street cleanliness detection.	Depends on strong internet and quality image data.

2. PROPOSED METHODOLOGY

The proposed system, Urban Pulse – Smart Local Issue Reporter, follows a structured and systematic approach to design and develop a web-based platform that enables efficient communication between citizens and municipal authorities. The primary goal is to simplify civic issue reporting while ensuring faster response and effective resolution through a technology-driven framework.

A. Requirement Analysis

The development process begins with identifying the requirements of both citizens and municipal authorities. Citizens need a simple and intuitive interface to report issues without technical complexity, whereas authorities require a reliable system to monitor and manage complaints efficiently. The system is designed to collect essential information such as user details, issue description, location, and photo evidence to ensure authenticity and traceability. This phase defines both functional and non-functional requirements of the platform.

B. System Design

The system architecture is divided into frontend, backend, database, and administrative components. The frontend is developed using HTML, CSS, and JavaScript to provide a responsive and user-friendly interface. The backend is implemented using Node.js and Express.js to manage application logic and server-side operations. Mongo DB is used as the database to store complaint records and user information securely. Additionally, an admin dashboard is designed to allow authorities to view, categorize, and update complaint statuses.

C. System Implementation

In this phase, all modules are developed and integrated. Users can register or log in and submit complaints by providing relevant details, including images and location. The submitted data is stored in the database and immediately reflected in the admin panel for further action.

D. Data Processing and Management

The administrator reviews and verifies each complaint, updates its status, and ensures timely action. The system provides real-time status updates, allowing users to track whether their complaint is pending, in progress, or resolved, thereby improving transparency and communication.

E. Testing and Validation

The system undergoes rigorous testing to ensure functionality, usability, and performance. Key components such as authentication, issue reporting, database integration, and admin operations are tested to verify accuracy, responsiveness, and error handling.

F. Deployment and Maintenance

After successful testing, the application is deployed on a web server for real-time usage. Continuous maintenance and updates are performed to fix issues, enhance features, and improve overall system performance based on user feedback.

4. RESULTS AND DISCUSSION

The Urban Pulse – Smart Local Issue Reporter system demonstrates a significant improvement in the way citizens interact with municipal authorities through its user-friendly, web-based platform. The system was evaluated using various real-world scenarios, including reports of overflowing garbage bins, potholes, and non-functional streetlights. During testing, the application performed reliably, enabling users to submit complaints effortlessly by providing essential details such as name, contact information, location, images, and a brief description of the issue.

All submitted complaints were instantly reflected in the admin dashboard, allowing municipal officials to review, verify, and update the status of each issue as Pending, In Progress, or Resolved. The use of Mongo DB ensured secure and efficient data storage, while integration with Google Maps API enabled accurate location tracking of reported issues. This combination improved transparency, enhanced accountability, and streamlined the complaint handling process compared to traditional manual systems.

The results indicate a noticeable reduction in response time and improved real-time monitoring of civic issues. Municipal authorities found the dashboard intuitive and effective for managing complaints, while citizens benefited from instant feedback and the ability to track their submissions. Overall, the system highlights the potential of digital civic engagement platforms in improving urban governance, increasing operational efficiency, and strengthening trust between citizens and government bodies. Future enhancements, such as mobile application support, AI-based issue classification, and automated notification systems, can further improve scalability and adaptability for smart city applications.

5. IMPLEMENTATION

A. Login Interface of the Urban Pulse – Smart Local Issue Reporter system

The login interface of the Urban Pulse – Smart Local Issue Reporter system functions as the primary access point for users to interact with the

platform. It is designed with a simple, clean, and intuitive layout, featuring a centrally positioned login panel over a city-themed background that reflects the smart city concept. The interface provides a secure authentication mechanism for registered users, ensuring that only authorized individuals can access the system. Its user-friendly design enables easy navigation and a smooth login experience, even for users with limited technical expertise. This module plays a vital role in maintaining system security while allowing users to efficiently access features such as reporting civic issues and tracking the status of their complaints.

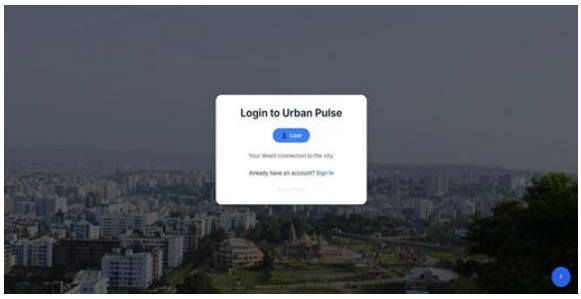

Fig No: 1 Login Page

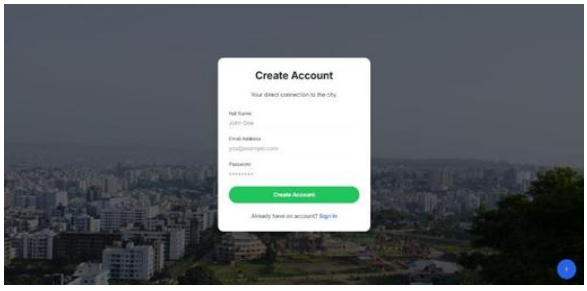

Fig No: 2 New User Registration Interface

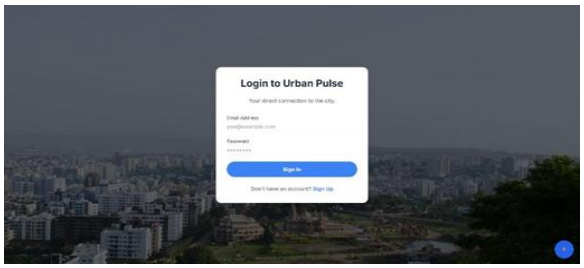

Fig No: 3 User Authentication Interface

B. Homepage (dashboard) of the Urban Pulse – Smart Local Issue Reporter system

The displayed output represents the homepage (dashboard) of the Urban Pulse – Smart Local Issue Reporter system after successful user authentication. It features a clean and modern interface with a city-themed background, reflecting the concept of smart urban management. The main heading, "Urban Pulse," along with its tagline, clearly conveys the platform's purpose of connecting citizens with municipal services. The dashboard provides key functionalities such as "Report an Issue" and "Learn More," enabling users to quickly submit complaints or explore system features. Additionally, the navigation bar includes access to the user profile, supporting a personalized and user-friendly experience.



Fig No: 4 Dashboard for Urban Pulse Smart Application

C. Issue Reporting Categories Page of the Urban Pulse system

The presented output illustrates the issue reporting categories page of the Urban Pulse – Smart Local Issue Reporter system, where users can select the type of civic issue they intend to report. The interface is organized into clearly defined categories such as Roads and Infrastructure, Street Lighting, Waste Management, Water and Sewage, Parks and Environment, and Traffic and Parking, enabling users to easily identify the relevant problem area. Each category is accompanied by a brief description to assist users in making appropriate selections. A "Start Reporting Issues" option is provided to guide users to the complaint submission process. This structured design enhances usability and ensures a simple, organized, and efficient approach to reporting urban issues.

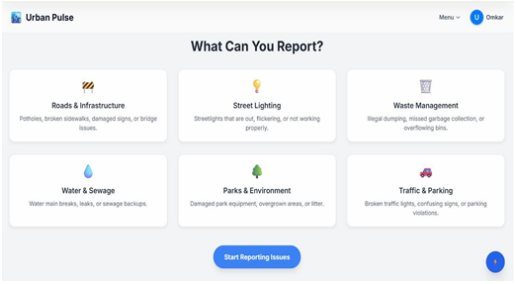

Fig No: 5 Issue Reporting Category Page

D. Issue Reporting Form in the Urban Pulse system

The displayed output represents the issue reporting form for the Roads and Infrastructure category in the Urban Pulse – Smart Local Issue Reporter system. This form allows users to provide detailed information about civic issues through fields such as full name, phone number, email address, location, photo evidence, and a brief description of the problem. The inclusion of image upload and precise location input supports accurate identification and verification of the issue. Users can submit their complaint using the "Submit Report" option, while the "Back" option ensures easy navigation. This well-structured form facilitates organized data collection, enabling

quicker processing and more efficient resolution by municipal authorities.

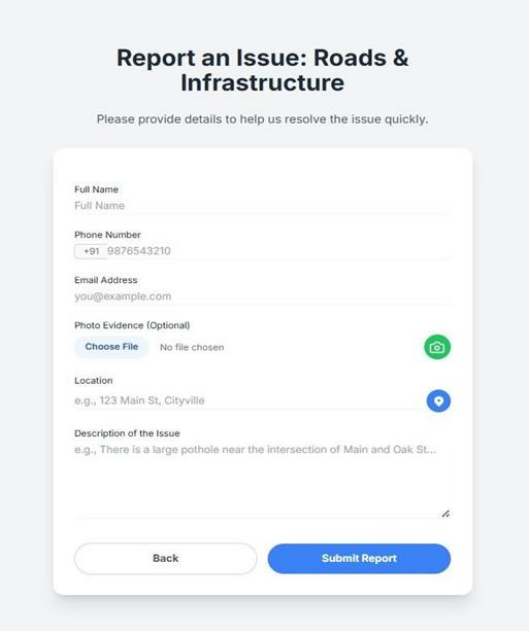

Fig No: 6 Issue Reporting Form in Urban Pulse System

E. Working Process and System Statistics of the Urban Pulse Platform

The displayed output represents the working process and system statistics of the Urban Pulse – Smart Local Issue Reporter platform, outlining how reported issues are managed throughout their lifecycle. It highlights four key stages—Report, Review, Resolve, and Verify—which collectively describe the progression of a complaint from initial submission to final confirmation. In addition, the interface presents important performance metrics, including the total number of issues reported, issues resolved, and the average response time. This section provides users with a clear understanding of the system's workflow while promoting transparency, efficiency, and accountability in handling civic issues.

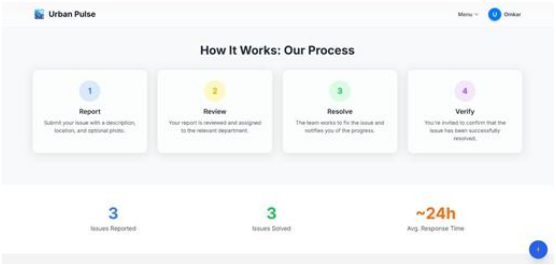

Fig No: 7 Working Process and System Statistics of the Urban Pulse Platform

F. Contact and Support Section of the Urban Pulse System

The displayed output represents the contact and support section of the Urban Pulse – Smart Local Issue Reporter system, designed to facilitate communication between users and municipal authorities. It includes a "Send Us a Message" form where users can enter their name, email address, and query for assistance. In addition, the interface provides essential contact details such as support email, phone number, office address, and working hours. This section enhances accessibility and ensures that users can easily seek help, thereby improving overall user support and communication within the system.

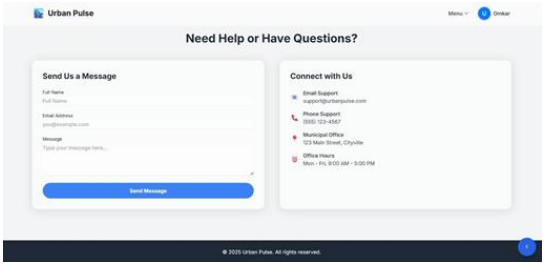

Fig No: 8 Contact and Support Section of The Urban Pulse System

G. Admin Login interface of the Urban Pulse system

The displayed output represents the Admin Login interface of the Urban Pulse – Smart Local Issue Reporter system, designed for municipal authorities to securely access the complaint management dashboard. The interface includes fields for admin username and password, ensuring restricted and authenticated access. Upon successful login, administrators can monitor, manage, and update the status of reported issues efficiently. This module plays a critical role in maintaining system security, administrative control, and effective handling of user complaints.

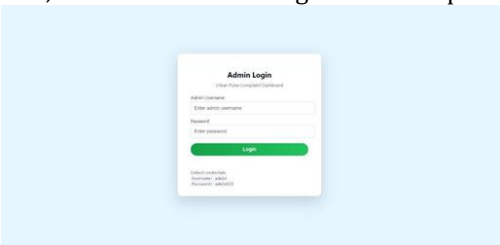

Fig No: 9 Admin Login Page

H. Admin Dashboard of the Urban Pulse system

The displayed output represents the Admin Dashboard of the Urban Pulse – Smart Local Issue Reporter system, where municipal authorities can efficiently monitor and manage all reported complaints. The interface presents a structured list of issues, including details such as complaint ID, reporter information, issue category, location, and current status. It also provides functionalities to filter complaints based on their status, update progress (e.g., marking issues as resolved), and remove records when necessary. Additional options such as "Refresh" and "Logout" enhance usability and control. This dashboard supports effective tracking, streamlined management, and timely resolution of civic issues,

thereby promoting transparency and efficient administration.

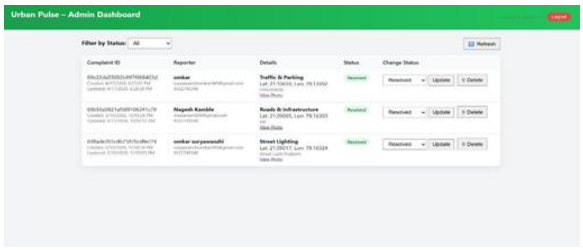

Fig No: 10 Admin Dashboard Page

CONCLUSION

The Urban Pulse – Smart Local Issue Reporter system effectively addresses the limitations of traditional civic issue reporting by providing a digital, user-centric solution. It enables citizens to report common urban problems—such as road damage, waste management concerns, water and sewage faults, and malfunctioning streetlights—in a simple and efficient manner. By incorporating features such as real-time reporting, image and location-based evidence, and complaint status tracking (Pending, In Progress, Resolved), the system enhances transparency, accountability, and communication between citizens and municipal authorities. The use of modern web technologies ensures a responsive and user-friendly interface, while a centralized database supports secure and efficient data management. Overall, the proposed system facilitates faster issue resolution, improves urban service management, and contributes to the development of smart, responsive, and citizen-centric cities.

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