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Aidrix: AI-Powered Civic Issue Reporting and Tracking Platform

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Abstract: ***Civic issues like potholes, garbage overflow, and broken streetlights often go unaddressed because of poor reporting systems and a lack of transparency. Aidrix is a platform for reporting and tracking civic issues, powered by AI and built using the MERN stack.***
It allows citizens to report problems through a web interface where they can upload images, provide text descriptions, and use automatic geolocation. Complaints are stored in MongoDB, and an AI module sorts the issues by type and severity. Authorities can track reports through an admin dashboard, look at trends, and manage the resolution process. Features like heatmap visualization, notifications, and feedback mechanisms increase transparency and accountability. Aidrix improves efficiency and trust in managing civic issues by blending artificial intelligence with modern web technologies.
Keywords: CivicTech, MERN Stack, MongoDB, Smart City, AI Classification, Node.js, React.js, E-Governance.

I. INTRODUCTION

Civic infrastructure problems, such as damaged roads, garbage overflow, water leakage, and broken street lights, are common challenges in quickly growing cities. Traditional systems for handling complaints, often based on phone calls or paper records, usually have slow response times, poor coordination among departments, and limited visibility for citizens.

As a result, some complaints may go unresolved for a long time, which reduces public trust and makes civic administration less effective.To tackle these issues, Aidrix is launched as a unified, AI-powered platform for reporting and tracking civic problems. The system allows citizens to report local issues easily through a user-friendly web interface, with automated geolocation and image-based evidence for support.

Intelligent categorization ensures that complaints are classified correctly and sent to the right authorities without manual work. By using artificial intelligence and automation, Aidrix helps municipal authorities prioritize urgent issues, find problem hotspots, and analyze trends in different areas. The platform also enhances workflow management by allowing real-time status updates, progress tracking, and feedback collection. Overall, Aidrix encourages greater transparency, boosts citizen participation, improves accountability, and helps create smarter and more responsive urban governance.

II. OBJECTIVES

The objectives are:

1) To build an AI-integrated platform for reporting civic issues using the MERN stack.
2) To use AI for automatic classification of issues.
3) To enable real-time tracking with geolocation and data visualization.
4) To improve transparency and citizen engagement with dashboards and feedback.

III. WORKING PRINCIPLE

Users report civic issues by submitting a brief description, an image, and a location tag through the platform. The collected data is stored in MongoDB. An AI model uses gemini API to analyzes the type and severity of the issues.

The backend, developed with Node.js and Express.js, communicates smoothly with the React.js frontend to update both user and administrator dashboards. Municipal authorities can review submitted reports, track resolution progress, and create visual analytics for better decision-making.

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IV. MODULES

The modules are:

A. Login and Signup Module

The platform has a Login and Signup module that securely handles user authentication. User passwords are encrypted before storage to ensure data security and stop unauthorized access. Based on their login credentials, users receive role-based access as citizens, administrators, or workers. This allows the system to work in an organized and controlled way.

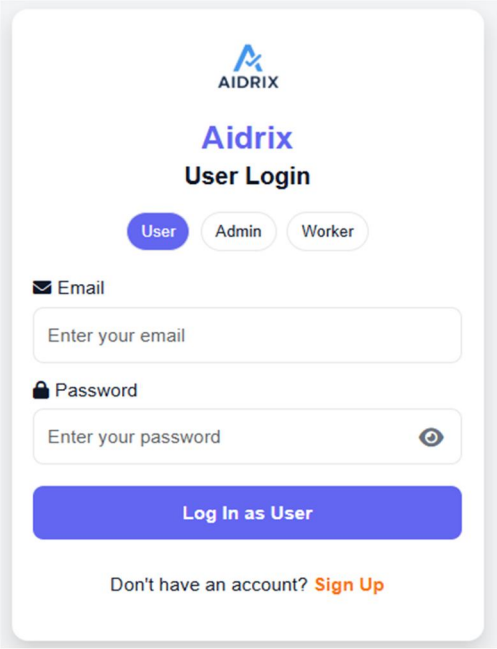


Fig. 1 The output of the login and signup page

B. AI & Analytics Module

This module examines reported civic issues using machine learning to automatically sort complaints by category, urgency, and location. By cutting down on manual review, it helps administrators respond more quickly and efficiently. The system also carries out analytical tasks like trend analysis, hotspot detection, and priority scoring. This helps identify frequently affected areas and repeated issues. These insights help authorities allocate resources effectively and plan preventive measures.

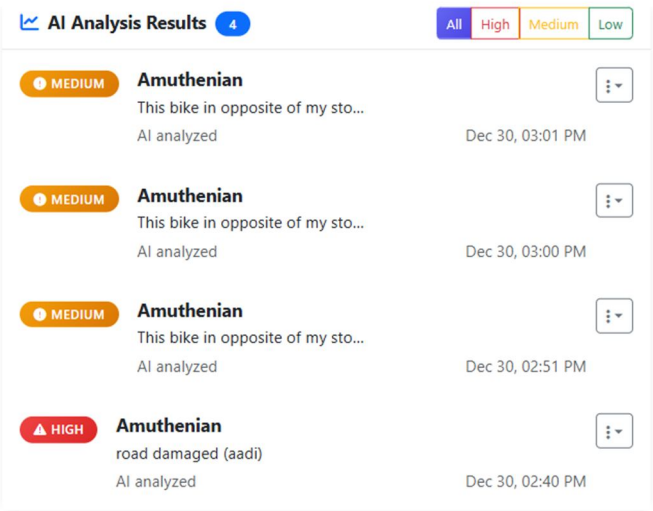


Fig.2 The output of the AI module

C. Mapping Module

The Mapping Module allows clear visualization of reported civic issues using geolocation data. When a user submits a complaint, the system captures the location manually through map selection. This makes sure that each issue is directly connected to its real-world location. The module shows complaints on an interactive map. This lets administrators identify affected areas, track issue density, and find problem hotspots. This visual representation helps with better planning, quicker assignment of workers, and efficient route management.

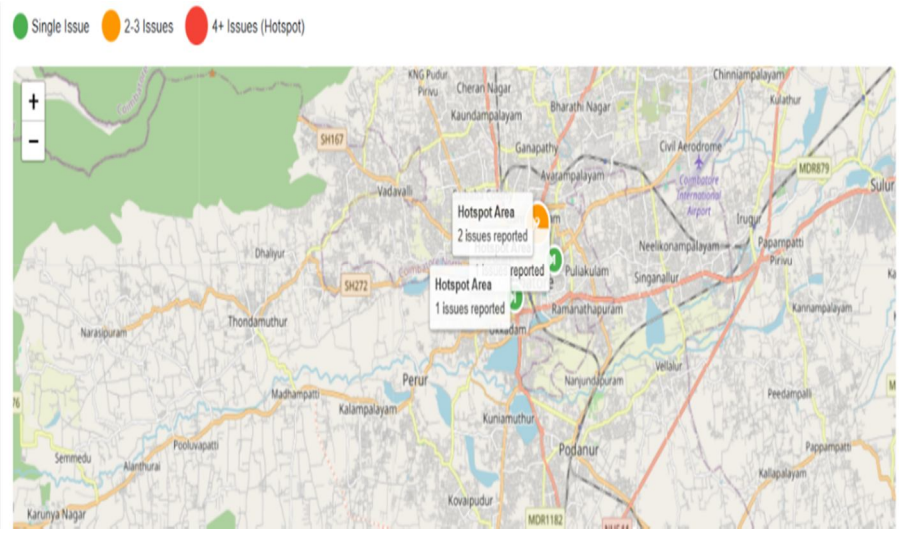


Fig.3 The output of the mapping module

D. Notification & Feedback Module

The Notification and Feedback Module helps users, workers, and system administrators communicate effectively during the complaint resolution process. Automated notifications are sent to users whenever there is a status update, like submitting a complaint, assigning it to a worker, or resolving the issue. These alerts keep users informed in real time and improve transparency. The module also lets users give feedback after a complaint is resolved. Users can rate the service and share comments about their experience. This feedback helps authorities assess performance and service quality. It supports ongoing improvement and builds trust between citizens and civic authorities.

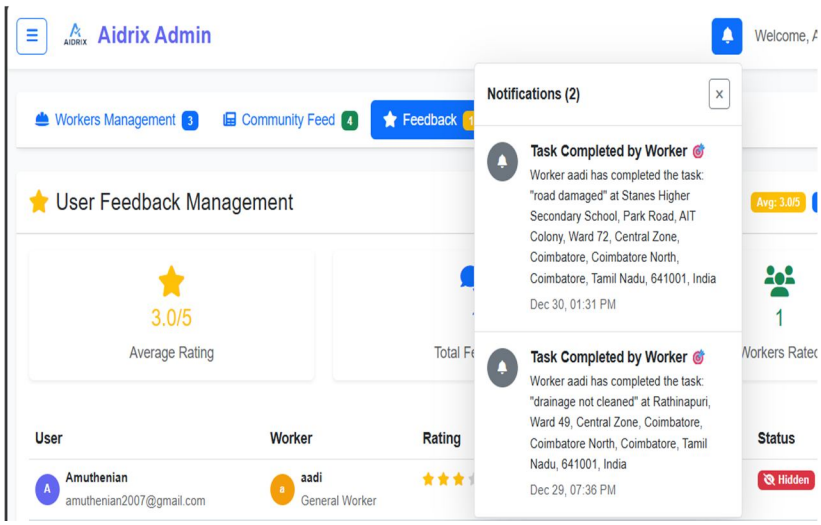


Fig.4 The output of the notification and feedback module

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V. CLASS DIAGRAM

This class represents citizens who can register and log in securely using their user ID, email, and password. It ensures that users are properly identified and have authenticated access within the system. Users report civic problems through the Complaint class. This class keeps important details like complaint ID, title, description, category, priority, status, location, timestamp, and uploaded images. Each complaint connects to its reporter, allowing for transparency and effective tracking. The AI Analytics class processes complaints intelligently. It automatically classifies complaints, spots issue hotspots, prioritizes urgent cases, and groups similar complaints. The Location class handles accuracy by storing validated address information, along with latitude and longitude for precise mapping.

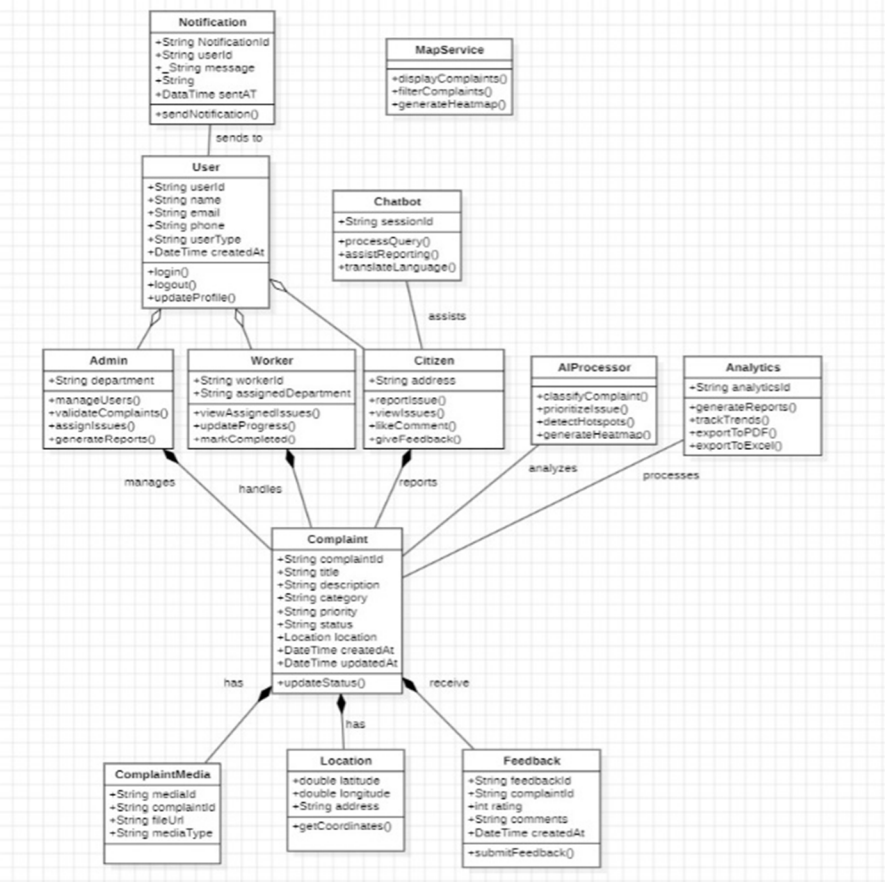


Fig.5 Class Diagram

VI. USECASE DIAGRAM

In the Aidrix application, citizens can securely register or sign in using Firebase to access services for reporting civic issues. Once they log in, users are taken to a homepage that features an interactive map showing current civic issues in their area. Through this interface, citizens can view, report, and track complaints like potholes or water leaks by adding descriptions, uploading images, and sharing GPS-based location details. The platform also lets users talk with a multilingual chatbot that supports Tamil and English, making it easy for them to submit complaints and ask questions. Social engagement features like likes, comments, and feedback promote community participation. Push notifications keep users updated on complaint progress and resolution status. On the administrative side, government officials use a dedicated dashboard to verify complaints, assign field workers, update progress, merge duplicate reports, and track issue status. The system can also generate analytical reports in PDF or Excel formats to help with decision-making. Meanwhile, the AI engine automatically sorts complaints, identifies hotspots, and prioritizes cases to ensure resources are used effectively. Developers can improve the platform further by refining AI models and integrating new features based on feedback from citizens and municipal officials.

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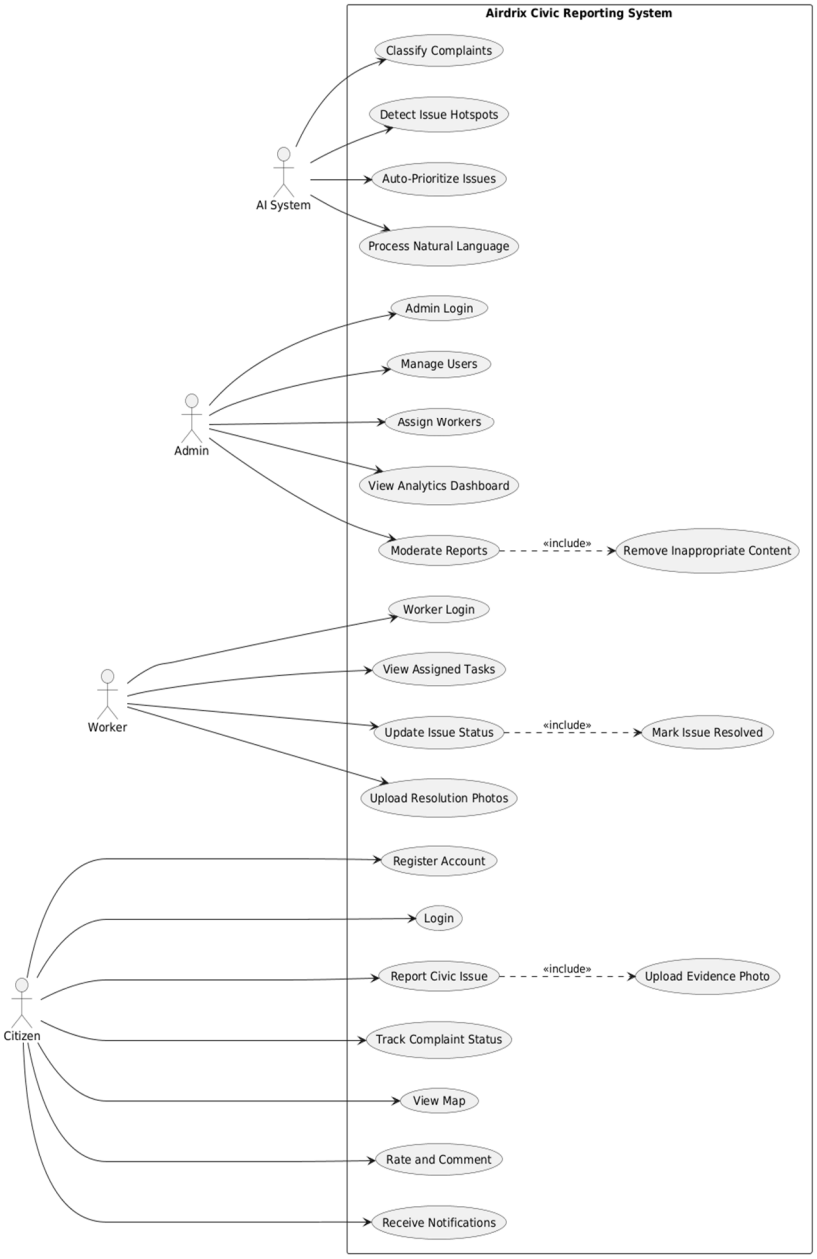


Fig.6 Usecase Diagram

VII. ACTIVITY DIAGRAM

The activity diagram of the Aidrix platform starts with users launching the mobile application and logging in or signing up through Firebase to ensure secure access. After successful authentication, citizens are taken to the home screen, where an interactive map displays nearby reported civic issues.Users can submit new complaints by uploading photos, adding GPS-based location details, and interacting with a multilingual chatbot that supports Tamil and English. Once a complaint is submitted, the AI system automatically classifies the issue, assigns priority, and groups similar complaints to identify hotspots.Administrators then review the complaints, validate them, and assign tasks to field workers. Workers update the complaint status by recording progress and uploading completion evidence. Throughout the process, citizens receive real-time notifications, track the status of their complaints, and share feedback after resolution. This structured workflow ensures transparent, efficient, and intelligent management of civic issues from reporting to final resolution.

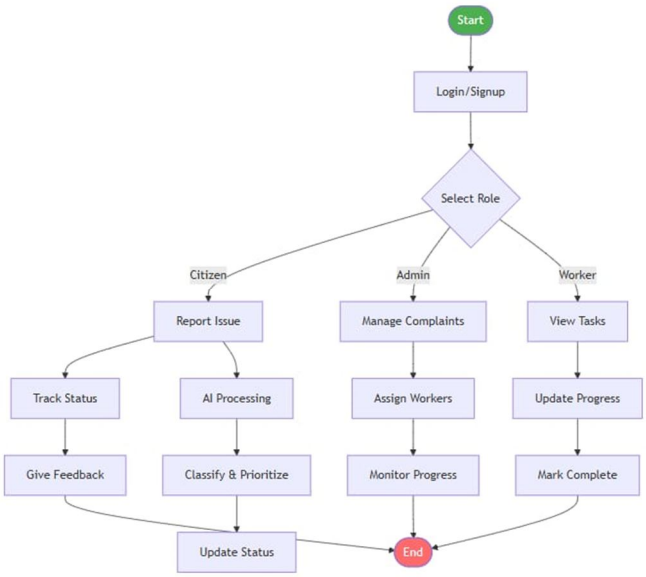


Fig.7 Activity Diagram

VIII. IMPLEMENTATION

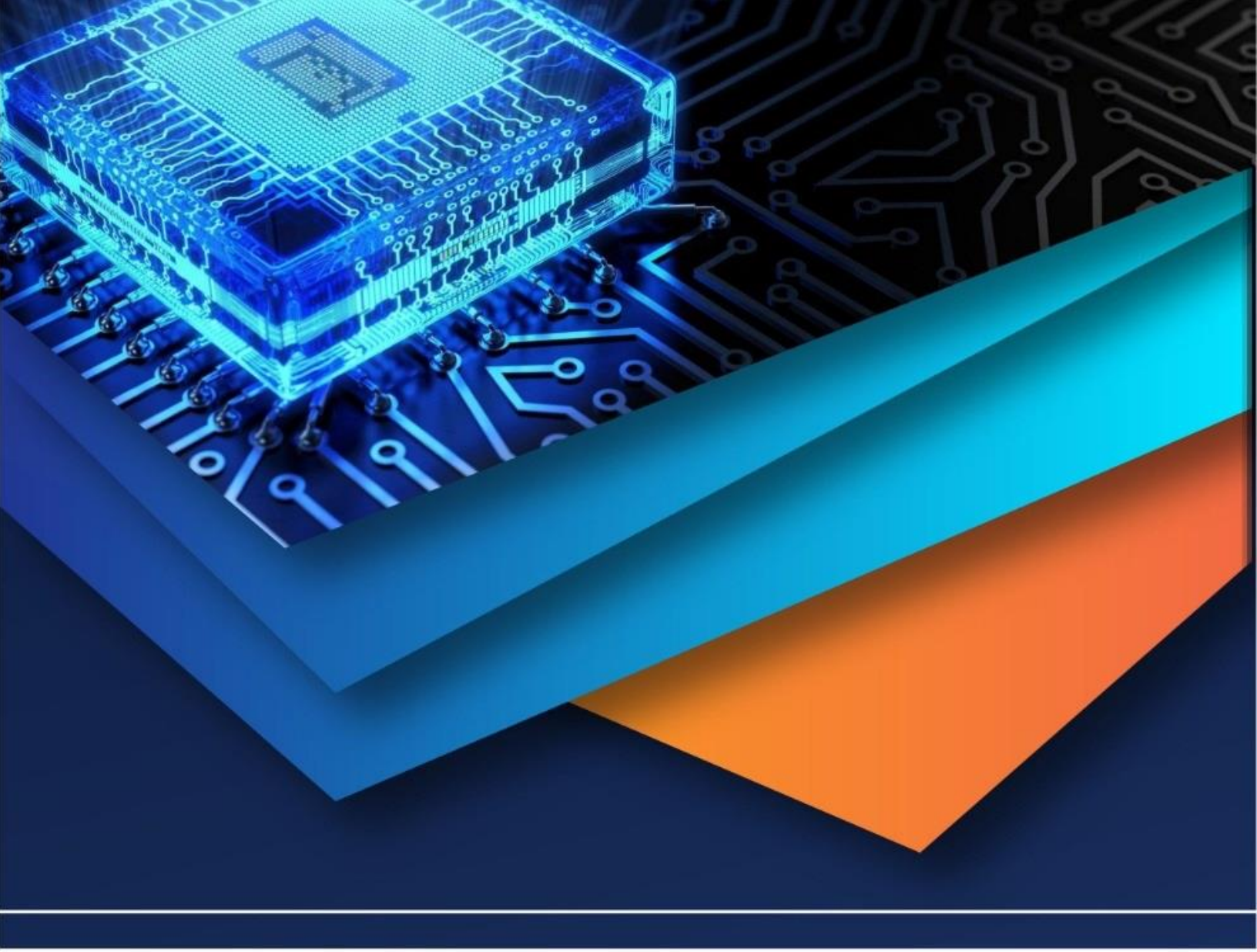
The Aidrix platform is implemented using the MERN stack for both frontend and backend development. The frontend is built with modern web technologies to provide a responsive and user-friendly interface, while the backend handles application login, API services, and secure data processing. For data storage, MongoDB is used as a NoSQL document-oriented database, enabling flexible schema design, efficient handling of large civic data, and scalable performance for real-time issue reporting and analytics.

IX. CONCLUSION

Aidrix successfully demonstrates the application of artificial intelligence and the MERN stack to streamline civic issue reporting and enhance urban governance. The platform improves transparency, minimizes response delays, and encourages active citizen participation. Future enhancements will focus on multilingual chatbot integration, predictive analytics for proactive issue management, and seamless integration with municipal APIs to support large-scale deployment.

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