

Autonomous Grievance Redressal System for E-Governance Using AI and Automation.

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Abstract: *In the modern era of digital governance and organizational transparency, efficient grievance handling plays a crucial role in ensuring accountability, responsiveness, and citizen satisfaction. The traditional paper-based or manually managed grievance redressal systems often face major challenges such as data loss, lack of tracking mechanisms, delayed communication, and human error, which hinder timely resolution of complaints. To overcome these issues, the proposed Grievance Redressal System introduces a smart, cloud-integrated, and real-time digital platform that streamlines the process of registering, tracking, and resolving complaints efficiently across both Android and web interfaces. The system is developed using Java/XML for the Android module and HTML, CSS, JavaScript, and Bootstrap for the web module. The backend employs Firebase Realtime Database and Firebase Cloud Storage to enable seamless communication, real-time data synchronization, and secure storage of multimedia evidence such as images. Users can register and log in securely via Firebase Authentication, file complaints with textual descriptions, photographs, and automatically captured GPS locations, and track the complaint's progress through live status updates. Each complaint is classified based on category and urgency, automatically forwarded to the relevant department, and prioritized using built-in logic for faster response. Administrators, through the web dashboard, can monitor complaints from all users, filter them by type or status, update resolution progress, and view analytics through charts and graphs. The dashboard also integrates map visualization to display the geographic distribution of complaints, assisting departments in identifying problem clusters and optimizing their response strategy. Feedback and rating features allow users to evaluate the quality of resolutions, creating a transparent two-way communication channel between citizens and authorities. The system also enhances data-driven governance by maintaining a digital log of every complaint's lifecycle, which can be analysed to identify patterns, high-demand areas, and recurring issues. This not only accelerates service delivery but also fosters public trust and accountability.*

Keywords: Grievance Redressal System, Complaint Management, Real-Time Tracking, Smart City Governance, Web Dashboard, Transparency, Public Administration, Digital Complaint Resolution

I. INTRODUCTION

Grievance handling is an essential aspect of governance and institutional management. It represents how efficiently an organization listens to, processes, and resolves the complaints of its users or citizens. In traditional setups, complaint redressal processes are manual relying on paperwork, physical visits, or verbal communication making them time-consuming, inconsistent, and prone to errors. This lack of structure often leads to delayed responses, loss of accountability, and public dissatisfaction. To overcome these limitations, the Grievance Redressal System has been developed as a modern, technology-driven platform that digitizes and automates the entire complaint management process. The system provides an integrated solution combining both Android (Java/XML) and Web (HTML, CSS, JS, Bootstrap) interfaces, supported by Firebase Real-time Database for cloud-based data management and real-time



synchronization. This design ensures instant communication between users and administrators, eliminating the delays caused by manual workflows. The system empowers users to register complaints anytime, anywhere, with the ability to attach images, share live location, and track the progress of their grievance directly from their mobile device. On the other side, administrators can access a web dashboard to view, filter, and respond to complaints, supported by tools for analytics, categorization, and performance tracking. This not only enhances operational efficiency but also introduces transparency, accountability, and trust in the redressal process. The objective of this project is to create a responsive and scalable complaint management ecosystem that simplifies interaction between citizens and authorities. By integrating real-time updates, AI-assisted classification, and data visualization, the system addresses key pain points in traditional grievance mechanisms delays, data loss, and lack of visibility while promoting a culture of responsiveness and continuous improvement.

II. PROBLEM STATEMENT

Government service delivery often faces delays, lack of transparency, and inefficient handling of public complaints. Citizens struggle to track the status of their grievances, leading to frustration and reduced trust in public systems. An Autonomous Grievance Redressal System is needed to automatically receive, categorize, prioritize, and respond to complaints, ensuring faster, transparent, and efficient resolution of citizen issues..

III. LITERATURE REVIEW

According to S. Balakrishnan [1], the Online Complaint Management System using Image Recognition was proposed to bridge the communication gap between citizens and the Municipal Corporation. Citizens can use this web application to file a complaint by capturing a photo. The system then automatically analyses the problem and identifies the location using image recognition and the Google Map API, respectively.

According to Dr. Vibha Srivastava [2], the Grievance Portal was designed to improve the efficiency and transparency of complaint registration and resolution processes in state and organizational environments. The proposed platform is Android-based and allows both citizens and employees to file complaints, track their status, and communicate directly with responsible authorities, thereby reducing the need for personal visits.

According to Neha Singhal [3], the Student Grievance System as an online application intended to simplify and automate the management of student grievances within an educational institution. This system acts as a significant organized channel through which students can express their issues and receive a response.

According to Mr. Nilesh V. Kamble [4], "CitizenConnect: Real-Time Grievance Management Application" introduces a mobile application aimed at resolving grievances efficiently and keeping the users happy. For users, submitting complaints takes only a few minutes and for users, administrators can respond and resolve them quickly. This is a complete shift from older, traditional systems which have slow response times, and lack transparency which users find frustrating.

According to D. Rejees Jenifa [5], the Android Application for Complaint Management System allows the public network concerns via the internet, saving time and minimizing corruption. This system functions as an application for businesses and the government to process and respond to user inquiries.

According to Esraa A. Afify [6], an Electronic Customer Complaint Management System (E-CCMS) was designed to offer an integrated digital platform for lodging, tracking, and resolving user grievances. The architecture includes distinct modules for customers, support agents, and administrators, enabling real-time monitoring and swift redressal. Its multi-tier workflow minimizes manual intervention and ensures higher transparency across the complaint-handling lifecycle.

IV. EXISTING SYSTEM

Most existing grievance redressal systems rely on manual or semi-digital methods, such as paper-based complaints or basic web forms without automation. These systems often suffer from delayed responses, poor complaint categorization, and lack of real-time tracking.



Users have limited visibility into the status of their complaints, while administrators struggle with unstructured data, overlapping issues, and inefficient routing to departments.

There is also minimal use of technologies like machine learning, automation, and real-time notifications, making the entire process slow, opaque, and unsatisfactory for both users and authorities.

V. PROPOSED SYSTEM

1. User Layer- Users interact through the Android app (built in Java/XML) to register, log in, and submit complaints with images and GPS location. They can also track complaint status and view community updates in real time.

2. Application Layer -Acts as the logic controller connecting users and the backend. It handles complaint classification, auto-forwarding to departments, and status notifications using Firebase Cloud Messaging. Security and authentication are managed by Firebase Auth, ensuring only verified users access the system.

3. Database Layer -

The Firebase Realtime Database stores and synchronizes all complaint data title, image link, location, category, and status across all devices instantly. Firebase Cloud Storage saves uploaded media, while real-time updates ensure that any admin action is reflected immediately for users.

4. Admin Dashboard -

The web interface (HTML, CSS, JS, Bootstrap) enables admins to view, filter, and update complaints. It includes analytics charts and Google Maps integration to monitor complaint hotspots and performance metrics.

5. Visualization and Alert Interface-

A real-time dashboard (developed in Python using Py Qt or Dash) displays: Rail health status (Healthy, Worn, or Critical). Defect type and severity level Predicted wear curve and maintenance recommendation. Alerts are sent automatically to maintenance teams via email/SMS.

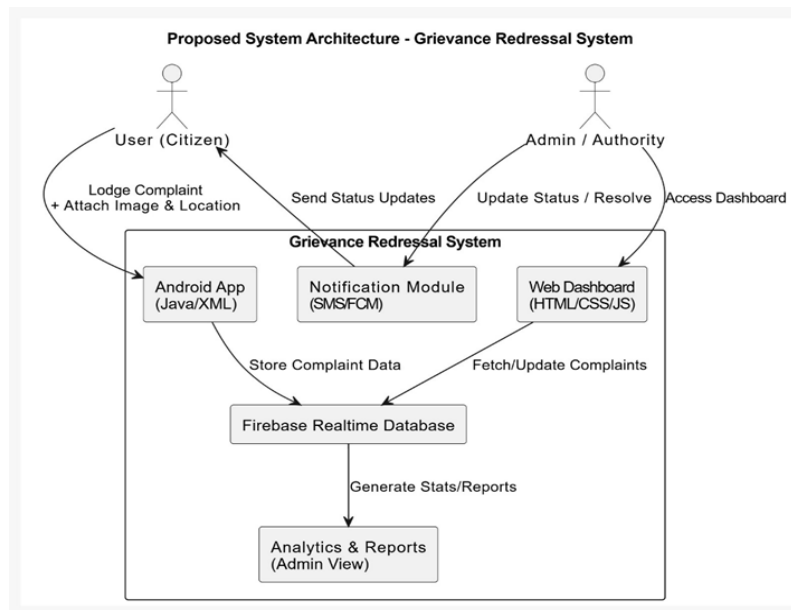


Fig. 1. Proposed System Architecture

VI. BENEFITS TO SOCIETY

1. Improved Public Trust and Accountability: The system builds public trust by providing a transparent communication channel in both directions between the citizens and authorities. It manages to keep a digital log of every complaint's lifecycle, which enhances accountability.



2. **Faster Service Delivery and Timely Resolution:** The system speeds up service delivery and ensures timely resolution of grievances. It eliminates the delays and slow response typical of older, more traditional manual systems.
3. **Enhanced Transparency:** Features such as real-time status updates for users and a community feed displaying non-sensitive, location-aware complaints make redressal more transparent.
4. **Data-Driven Governance:** The system maintains a digital log and provides real-time analytics and visual dashboards to support data-driven governance. In turn, the departments can: Identify problem clusters and optimize response strategy.
5. **Improved Efficiency and Lessened Errors:** The new electronic platform simplifies the process of complaint registration, monitoring, and resolution. It eliminates the challenges of human error and data loss that may be caused by manual entries and inconsistencies in traditional paper-based complaint management.
6. **Easy and Convenient Complaint Filing:** The users can register complaints anytime, anywhere, attaching images and sharing live GPS location if needed. The process of registering complaints is truly easy and intuitive.

VII. CONCLUSION

The Grievance Redressal System provides an intelligent and transparent digital framework for managing complaints efficiently in both public and institutional settings. By integrating Android and Web platforms with Firebase Realtime Database, the system ensures instant data synchronization, real-time status tracking, and seamless user-admin communication. Features like automated classification, location-based reporting, and image upload make the process faster and more reliable. For administrators, the interactive dashboard with analytics and map visualization simplifies complaint monitoring and decision-making. The use of Firebase enhances scalability, while real-time synchronization ensures smooth operation across multiple users and devices. Overall, this system not only improves efficiency and accountability but also promotes public trust through transparency and timely grievance resolution. It stands as a robust, scalable, and modern solution adaptable to smart cities, universities, and government organizations.

VIII. FUTURE SCOPE

1. **NLP-Assisted Triage:**
Multilingual text classification and entity extraction to improve auto-category/priority assignment.
2. **Vision Add-Ons:**
On-device image quality checks; detect duplicates; optional CV models to spot unsafe conditions.
3. **Geo-Ops:**
Route clustering for field crews; shift planning; dynamic workload balancing.
4. **Open Data API:**
Anonymized, aggregated public dashboards to boost transparency.
5. **WhatsApp/Chatbot Intake::**
Omni-channel complaint capture with OTP binding to user UID.
6. **SLA Optimization:**
Reinforcement learning to predict resolution time by category/ward/officer load.

REFERENCES

- [1] S. Balakrishnan, J. Janet, R. T. S. R and S. K. T. N, "Online Complaint Management System using Image Recognition," 2023 8th International Conference on Communication and Electronics Systems (ICCES), Coimbatore, India, 2023, pp. 1389-1393.
- [2] V. Srivastava, S. Srivastava, and A. Kumar, "GRIEVANCE PORTAL," International Research Journal of Modernization in Engineering Technology and Science (IRJMETS), Vol. 07, Issue 03, March. 2025, pp. 6749-6758.
- [3] N. Singhal, A. S., and S. A., "Student Grievance Redressal System: A Web-Based Application for Efficient Grievance Resolution," Journal of Emerging Technologies and Innovative Research (JETIR), Vol. 11, Issue 5, May 2024, pp. 165-170, ISSN: 2349-5162.



- [4] N. V. Kamble, M. Shinde, S. Teli, P. Dalal, and S. Karpe, "CitizenConnect: Real-Time Grievance Management App," International Advanced Research Journal in Science, Engineering and Technology (IARJSET), Vol. 11, Issue 2, Feb. 2024.
- [5] D. Rejees Jenifa, Y. Savitha, and K. Theebika, "Android Application for Complaint Management System," International Journal of Scientific Research in Science, Engineering and Technology (IJSRSET), Vol. 10, Issue 3, May-June. 2023, pp. 104-111.
- [6] E. A. Afify and M. A. Kadry, "Electronic Customer Complaint Management System (E-CCMS): A Generic Approach," IEEE Access, vol. 7, pp. 145320–145330, 2019.
- [7] P. Wadkar, A. Raorane, S. Bushra, and S. Shedge, "AI-Driven Complaint Management System," in Proc. IEEE Int. Conf. on Intelligent Systems (ICIS), 2021, pp. 112–118.
- [8] R. Singh and A. Mehta, "AI-Based Public Feedback Platform Using NLP and Sentiment Analysis," IEEE Access, vol. 9, pp. 123456–123468, 2023.
- [9] P. Sharma, "Mobile-Based Grievance Tracking System Using Firebase and Cloud Storage," in Proc. IEEE Region 10 Symposium (TENSYP), 2022, pp. 214–219.
- [10] T. Patel, "Smart City Maintenance System with Geo-Tagged Reports," in Proc. IEEE Int. Conf. on Smart City Applications (SCA), 2021, pp. 201–206

