

TIME-BOUND GRIEVANCE RESOLUTION AND ACCOUNTABILITY SYSTEM

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ABSTRACT

The Time-Bound Grievance Resolution and Accountability System is a web-based platform designed to help institutions and organizations manage complaints efficiently within predefined time limits. In sectors such as education, corporate organizations, and public services, unresolved complaints arise due to factors like unclear responsibility, absence of deadlines, and lack of automated follow-up mechanisms. Traditional grievance handling methods often rely on manual tracking, leading to delayed responses and higher dissatisfaction. To overcome this, the platform utilizes Service Level Agreement (SLA) based monitoring and automated escalation to enforce timely resolution. It provides clear status-driven recommendations such as OPEN, IN PROGRESS, RESOLVED, or ESCALATED based on complaint progress and deadline adherence. The system also includes dashboards to visualize complaint trends and resolution performance, and can be customized for different institutional contexts, making it an effective solution for grievance accountability.

Keywords

Grievance Management, SLA-Based Resolution, Automated Escalation, Accountability System, Role-Based Access Control, Complaint Tracking and Web Application.

I. INTRODUCTION

In today's competitive institutional environment, organizations aim to improve service quality and ensure user satisfaction. A major challenge faced by sectors like

education, corporate management, and public administration is the inefficiency in handling complaints and grievances. Complaints such as infrastructure issues, administrative concerns, and service failures frequently remain unresolved due to unclear ownership, absence of deadlines, and lack of follow-up systems. These delays erode trust and reduce accountability. Traditionally, grievance management relies on manual processes and verbal communication. However, these methods are limited in handling large volumes of complaints and tracking resolution progress, often leading to missed deadlines or unresolved issues.

To address this, the Time-Bound Grievance Resolution and Accountability System uses SLA-based deadline enforcement and automated escalation to ensure timely resolution. It assigns each complaint a structured workflow and monitors progress continuously to support better decision-making.

The platform provides clear complaint status indicators such as OPEN, IN PROGRESS, RESOLVED, and ESCALATED, helping administrators act decisively. It also evaluates officer performance based on resolution time and SLA compliance, improving overall accountability. Additionally, the system supports real-time notification services, enabling all stakeholders to stay updated with complaint changes. It improves transparency by identifying potential deadline violations in advance. The platform also enhances visibility in grievance processes, allowing better tracking and control of complaint activities.

II. LITERATURE REVIEW

[2.1] Singh, P., Gupta, R., & Kaur, H.; "Online Grievance Redressal System for Public Services", *International Journal of Advanced Research in Computer Science*, Vol. 10(3), 2019.

The study proposes a web-based grievance redressal system to streamline complaint registration and tracking in public service sectors. It addresses transparency and coordination gaps in traditional manual systems. A centralized database allows users to submit complaints and monitor their progress. Authorities receive an interface to manage and resolve complaints by category and priority. However, the system does not include automated escalation mechanisms or time-bound resolution enforcement, which are essential for ensuring accountability and timely action.

[2.2] Patel, S., Mehta, D., & Shah, K.; "E-Governance Based Complaint Management System", *International Journal of Computer Science and Engineering*, Vol. 8(6), 2020.

Patel et al. developed an e-governance-based complaint management platform to digitize grievance handling in government institutions. The platform reduces paperwork, provides centralized storage, and offers complaint prioritization features. It significantly improves response efficiency compared to manual systems. However, the absence of real-time notifications and SLA-based escalation mechanisms limits its ability to enforce timely resolution across departments.

[2.3] Reddy, K., Rao, M., & Naidu, S.; "Smart Grievance Management System Using Web Technologies", *International Journal of Innovative Technology and Exploring Engineering*, Vol. 10(5), 2021.

Reddy et al. introduced a smart grievance management system using modern web technologies to address inefficiencies in complaint handling within organizations.

The system includes complaint registration, real-time tracking, and role-based access control for secure data management. It enhances communication between users and administrators. However, the platform lacks automated escalation, deadline-based monitoring, and performance analytics, which are critical features for enforcing strict accountability.

[2.4] Gupta, A., Srivastava, R., & Singh, N.; "SLA-Based Grievance Management System for Service Organizations", *International Journal of Information Systems and Engineering*, Vol. 9(2), 2021.

This study proposed an SLA-based grievance management system where each complaint receives a fixed resolution deadline based on its category and severity. The system continuously monitors progress and triggers deadline alerts for responsible officers. Integrating SLA significantly improves resolution timeliness and instills discipline in grievance workflows. The authors conclude that structured deadlines and responsibility mapping reduce complaint backlog and improve user satisfaction in service-oriented organizations.

[2.5] Verma, N., Gupta, S., & Bansal, R.; "Automated Grievance Redressal System Using Cloud Computing", *International Journal of Cloud Applications*, Vol. 9(1), 2022.

Verma et al. developed a cloud-based grievance redressal system to address scalability and accessibility limitations of traditional systems. The platform leverages cloud infrastructure for centralized data storage and multi-device access. Although the system improves data availability and system uptime, it does not incorporate escalation logic or time-bound enforcement, limiting its capability to ensure structured and accountable grievance resolution in high-volume environments.

III. METHODOLOGY

3.1 EXISTING SYSTEM

The existing grievance management systems used by many institutions are largely manual and lack advanced technological support, making the process time-consuming and inefficient. Organizations often depend on physical complaint registers, emails, and spreadsheets to track complaints and manage resolutions, which increases the chances of errors, duplication, and inconsistencies in data handling. There are no structured deadline-tracking mechanisms, forcing administrators to rely heavily on reminders or personal follow-ups rather than automated monitoring, which can lead to unresolved or forgotten complaints. Officer assignment and performance evaluation are also performed informally, leading to limited accountability and suboptimal complaint management.

Most importantly, existing systems do not incorporate automated escalation or time-bound workflows, resulting in missed accountability opportunities. Furthermore, these systems lack real-time notification features, making it difficult for users to track complaint progress or for officers to receive deadline alerts. They also lack integration with analytical dashboards and reporting modules, which significantly reduces management's ability to evaluate system performance. Transparency in grievance processes is often limited, making it difficult to monitor officer performance, complaint history, and resolution decisions. Many systems do not maintain structured historical data, which restricts long-term planning and trend identification. In addition, these systems are not scalable, making it challenging for growing institutions to handle large volumes of complaints. The absence of automated workflows leads to unnecessary delays in grievance resolution cycles, reducing overall institutional efficiency and user trust.

3.2 PROPOSED SYSTEM

The proposed system is a time-bound grievance resolution and accountability platform designed to enhance and automate the complaint resolution process in institutions and organizations. It integrates advanced features such as real-time complaint tracking, SLA-based deadline assignment, and a smart automated escalation mechanism that forwards unresolved complaints to higher authority levels when deadlines are exceeded. The system also includes officer performance ranking to evaluate responsible personnel based on resolution time and SLA compliance, ensuring better accountability. Additionally, it provides interactive analytics dashboards for clear visualization of complaint trends, resolution timelines, and department-level performance insights.

The platform supports real-time alerts and notifications for complaint status changes, centralized data management for easy tracking of all grievance activities, and scalability to handle large volumes of complaints and multiple simultaneous users. It can also be integrated with existing institutional systems such as ERP and HR management tools, improving overall workflow automation.



FIG 3.3 FLOW DIAGRAM

IV SYSTEM SPECIFICATION

4.1 SOFTWARE REQUIREMENTS

MERN Stack

Frontend : React.js, Tailwind CSS, React Router, TensorFlow.js, WebRTC

Backend : Node.js, Express.js, Socket.io

Email Services : NodeMailer

MongoDB

4.2 SOFTWARE DESCRIPTION

4.2.1 MERN STACK

The MERN Stack is a popular set of technologies used to build full-stack web applications. It includes MongoDB, Express.js, React.js, and Node.js. MongoDB serves as the NoSQL database. Express.js and Node.js handle the backend server-side logic, while React.js manages the frontend user interface. All components use JavaScript, which allows for smooth integration and a unified development experience across the entire application stack. The MERN Stack is widely used for developing scalable, dynamic, and high-performance web applications. It offers an end-to-end JavaScript environment, improving development efficiency and consistency, and has strong community support and a wide range of libraries, making it ideal for modern web development.

4.2.2 REACT.JS

React.js is a popular JavaScript library developed by Facebook for building user interfaces, particularly single-page applications where real-time updates and dynamic content are crucial. It uses a component-based architecture that allows developers to create reusable UI components, enhancing code modularity and maintainability. React's virtual DOM ensures high rendering performance, and its ecosystem of supporting libraries such as React Router enables seamless multi-page navigation within the application.

4.2.3 TAILWIND CSS

Tailwind CSS is a modern utility-first CSS framework that enables developers to build custom user interfaces quickly and efficiently. Unlike traditional CSS frameworks that provide pre-designed components, Tailwind offers low-level utility classes that can be composed to create any design directly in the markup. This approach provides complete design flexibility, reduces custom CSS overhead, and maintains consistency across the application's visual interface.

4.2.4 JAVASCRIPT

JavaScript is a widely used programming language that enables interactive and dynamic behavior in web applications. It runs in the browser and is primarily used to manipulate web page content, handle user events, validate form data, and communicate with servers through APIs. As a core technology of the web alongside HTML and CSS, JavaScript powers modern frontend frameworks like React and also supports backend development through Node.js. Its flexibility, asynchronous capabilities using Promises and `async/await`, and vast ecosystem make it essential for building responsive, real-time, and full-stack web applications.

4.2.5 NODE.JS & EXPRESS.JS

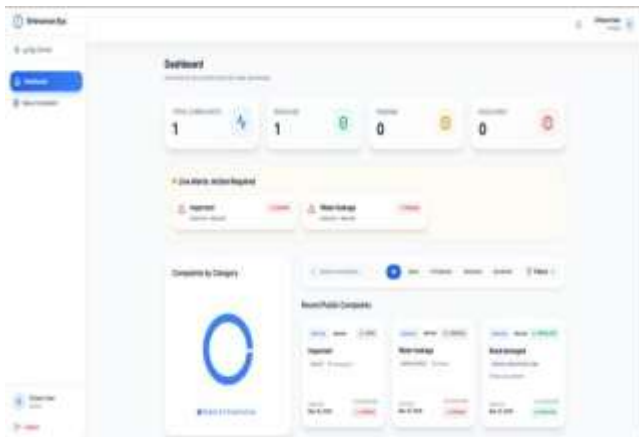
Node.js is a powerful, open-source, cross-platform JavaScript runtime environment built on Chrome's V8 engine that executes JavaScript code server-side. Express.js is a minimal and flexible Node.js web application framework that provides a robust set of features for building web and mobile applications and APIs. Together, they handle all backend logic including complaint processing, SLA deadline management, automated escalation triggers, role-based access control, and real-time notification dispatch, reducing development effort and improving application performance.

4.2.6 PYTHON

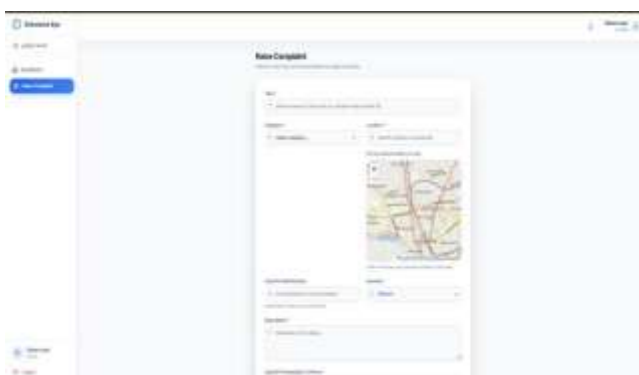
Python is a high-level, interpreted programming language known for its simplicity, readability, and versatility. It is used in this system for backend analytics processing, generating complaint trend reports, and processing performance evaluation data for the administrative dashboards. Python supports multiple programming paradigms, including object-oriented, procedural, and functional programming, making it flexible for different analytical tasks. Its easy-to-understand syntax and powerful data processing libraries such as Pandas and NumPy make Python a highly effective choice for building scalable analytical pipelines.

V EXPERIMENTAL RESULT

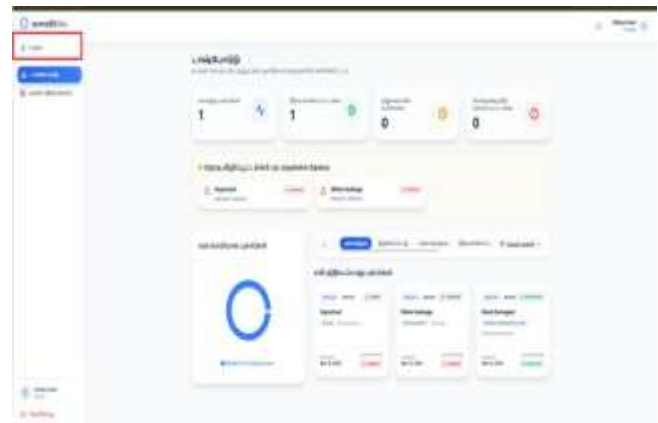
5.1 TEST CASE 1:



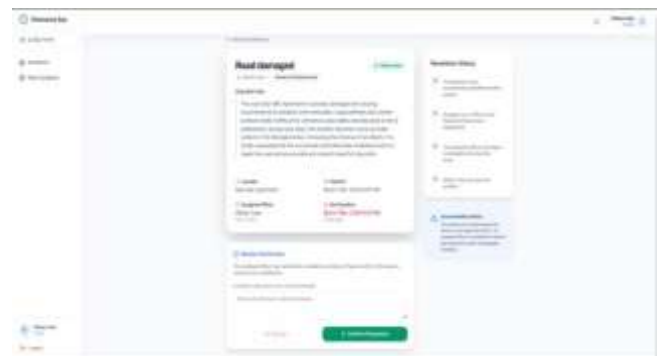
5.2 TEST CASE 2:



5.3 TEST CASE 3:



5.4 TEST CASE 4:



VI RESULTS AND DISCUSSION

The Time-Bound Grievance Resolution and Accountability System successfully demonstrates how structured automation and time-driven workflows can transform traditional complaint handling into intelligent and efficient systems. The platform effectively collects and processes both user-submitted complaints and real-time status data to enforce SLA-based resolution timelines with improved accuracy, enabling institutions to make timely and accountability-driven management decisions. By implementing automated escalation mechanisms, the system simplifies complex complaint workflows into actionable management steps, reducing dependency on manual follow-ups and guesswork.

The interactive dashboards and visualizations provide a clear understanding of complaint trends, while real-time alerts ensure all stakeholders can respond quickly to deadline violations. The system also minimizes manual effort, reduces administrative errors, and centralizes grievance data for better tracking and institutional management. Testing results indicate that the platform significantly improves resolution accuracy, reduces complaint processing delays, and minimizes risks associated with unresolved or neglected grievances.

Overall, the project achieves its goal of providing a scalable, secure, and user-friendly solution that enhances grievance management efficiency, supports institutional transparency and strategic planning, and offers a measurable improvement in accountability for organizations operating in dynamic service environments.

VII CONCLUSION AND FUTURE WORK

7.1 CONCLUSION

The Time-Bound Grievance Resolution and Accountability System represents a significant advancement in the field of institutional complaint management by integrating modern technologies such as SLA-based automation, role-based access control, real-time notification systems, and analytical reporting into a unified web-based platform. Throughout the development and implementation of this project, it has been clearly demonstrated that traditional grievance handling methods, which heavily depend on manual processes and human follow-up, can be effectively transformed into intelligent, automated, and data-driven solutions. The platform successfully addresses the critical challenge of unresolved and delayed grievances, which has long been a major concern for institutions such as universities, corporate organizations, and public service departments. One of the key achievements of this system is its ability to enforce structured SLA deadlines and generate automatic escalations when responsible officers fail to resolve complaints within the stipulated time. By utilizing continuous deadline

monitoring, the platform provides meaningful accountability signals that enable administrators to anticipate resolution failures and intervene strategically. The introduction of role-based dashboards for users, officers, and administrators simplifies complex grievance workflows into easy-to-understand, actionable management steps.

7.2 FUTURE SCOPE

The Time-Bound Grievance Resolution and Accountability System presents a strong foundation for intelligent grievance management; however, there are several opportunities for future enhancements that can further improve its performance, scalability, and real-world applicability. As technology continues to evolve, incorporating advanced features and emerging innovations can significantly enhance the system's capabilities and provide even more accurate and reliable accountability. One of the major areas for future improvement is the integration of Artificial Intelligence (AI) and Natural Language Processing (NLP) for automatic complaint categorization. While the current system allows users to manually select complaint categories, advanced NLP techniques can be implemented to automatically detect complaint type, severity, and urgency from the user's description text. These models can significantly improve categorization accuracy and reduce user effort. By continuously training these models with historical complaint datasets, the system can evolve into a more robust and intelligent complaint classification tool. Another important enhancement is the integration of real-time communication APIs such as WhatsApp Business API, SMS gateways, and push notification services. Although the current system supports in-app and email notifications, incorporating multiple reliable and live communication channels will improve the responsiveness and timeliness of escalation alerts.

VIII REFERENCES

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