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GRIEVANCE REDRESSAL SYSTEM FOR MUNICIPALITIES

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Abstract:
In the era of digital governance and smart city development, efficient grievance management and transparent public service delivery are essential components of effective municipal administration. "Grievance Redressal System for Municipalities" utilizes web-based and mobile technologies to streamline the process of registering, tracking, and resolving citizen complaints. The system is built using a cloud-based backend, centralized database, and role-based access control to ensure secure and organized grievance handling.

The system allows citizens to submit complaints related to municipal services such as sanitation, water supply, street lighting, and road maintenance, along with supporting details like location and images. It automatically assigns complaints to the appropriate departments and enables real-time status tracking. Administrators and municipal staff can monitor, update, and manage grievances through a dedicated dashboard. By reducing manual intervention, improving accountability, and ensuring transparency, the system enhances service efficiency and strengthens trust between citizens and municipal authorities.

Keywords: Grievance Redressal System, Municipal Governance, Complaint Management, Web Application, Machine Learning, Real-Time Tracking, Smart City, E-Governance.

I. INTRODUCTION:

Grievance redressal is very important for making sure that citizens receive proper and timely services from their local municipal authorities. Municipalities are responsible for providing essential services like sanitation, water supply, road maintenance, street lighting, drainage, and waste management. Whenever issues arise in these areas, people should have a reliable and simple way to report their problems and expect a timely solution. The way these complaints are handled greatly affects public satisfaction, trust in the government, and the overall quality of life in a community. Unfortunately, many existing grievance systems are still slow, poorly organized, and not efficient enough to meet citizens' expectations[6][7].

In many municipalities, complaints are still handled using traditional manual methods such as visiting offices, making phone calls, or submitting written applications. These complaints are usually recorded in physical registers or simple spreadsheets, which makes proper tracking and monitoring difficult. Because of this, complaints may get delayed, misplaced, or sometimes even ignored. Citizens often do not know the current status of their complaints and have to follow up repeatedly with officials. This lack of transparency and accountability creates frustration among people and reduces trust in municipal

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services[4][5][10].

With the increasing use of smartphones and digital technologies, there is a clear need for a modern and centralized grievance management system. A web and mobile-based platform can make it easier for citizens to submit complaints, track their progress in real time, and receive timely updates. At the same time, it can help municipal authorities manage complaints more efficiently by organizing workflows, monitoring department performance, and ensuring faster resolution. The proposed Grievance Redressal System is designed to provide a transparent, efficient, and user-friendly solution that improves public service delivery and strengthens the relationship between citizens and municipal authorities[8][9].

II. EXISTING SYSTEM:

In many municipalities, grievance redressal systems still depend on traditional and partially digital methods that lack proper coordination and automation. These systems are often fragmented and do not provide complete transparency or accountability. Because there is no centralized monitoring mechanism, tracking complaints and ensuring timely resolution becomes difficult. The existing grievance handling methods can generally be classified into the following types:

A. MANUAL COMPLAINT SYSTEM

The most common method is the manual complaint system. Citizens report issues by visiting municipal offices, making phone calls, or submitting written applications. These complaints are recorded in physical registers or files and then manually forwarded to the concerned departments. Since everything depends on manual work, the process is slow and prone to errors. Complaints can be misplaced, delayed, or not properly documented. There is no proper tracking system, making it hard for citizens to know the status of their complaints.

B. EMAIL-BASED SYSTEM

Some municipalities allow citizens to send complaints through official email addresses. Staff members read these emails and forward them to the appropriate departments. Although this method uses digital communication, it still lacks structured tracking and automation. There are no proper monitoring tools to ensure complaints are resolved within a fixed time frame.

C. BASIC WEB PORTAL SYSTEM

Certain municipalities provide simple online forms for complaint submission. While this improves accessibility, most portals do not offer features like automated routing, real-time tracking, or performance monitoring. As a result, delays and misclassification of complaints can still occur.

D. DEPARTMENT-CENTRIC DECENTRALIZED SYSTEM

In some cases, each department handles complaints separately using its own records or systems. This lack of centralization causes miscommunication, duplication of work, and difficulty in generating overall reports. It reduces transparency and makes efficient grievance management challenging.

DRAWBACKS OF THE EXISTING SYSTEM

The existing grievance redressal systems used in many municipalities have several limitations that affect the efficiency of complaint management. One major drawback is the lack of transparency, as citizens are unable to track the real-time status of their complaints after submission. Most grievance handling processes still rely on manual methods such as phone calls, written applications, or in-person visits, which makes the system slow and inefficient.

Another limitation is the absence of a centralized monitoring mechanism, making it difficult for municipal authorities to supervise complaint progress across multiple departments. Due to manual documentation and fragmented workflows, complaints may be misplaced, delayed, or assigned to the wrong department, which further increases resolution time.

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In addition, citizens often need to repeatedly follow up with officials to receive updates about their grievances, leading to dissatisfaction and reduced trust in public services. These drawbacks highlight the need for a digital, transparent, and well-structured grievance management system that can improve accountability, efficiency, and communication between citizens and municipal authorities.

III. PROPOSED SYSTEM:

A. OVERVIEW OF THE PROPOSED SYSTEM:

The proposed Grievance Redressal System (GRS) for Municipalities is designed to provide a modern, centralized, and user-friendly digital platform for handling citizen complaints. Unlike traditional systems that depend on manual records and disconnected processes, this system fully digitizes the entire complaint process—from registration to resolution and feedback.

Citizens can submit complaints easily through a mobile app or web platform. They can upload photos of the issue, automatically capture the exact location using geotagging, and select the appropriate complaint category. The system includes a Machine Learning-based routing feature that automatically identifies the correct department and assigns the complaint without manual intervention. Real-time status tracking, SLA-based monitoring, and automatic notifications help ensure faster resolution, improved transparency, and better accountability.

B. OVERALL SYSTEM ARCHITECTURE:

The proposed system follows a cloud-based architecture with three main components working together smoothly.

i. Citizen Interface

The citizen interface is accessible through mobile phones and web browsers. It allows users to:

- Register complaints with images and location details
- Track complaint progress in real time
- View their complaint history
- Provide feedback after resolution

All data is securely sent to the backend system using secure communication protocols.

ii. Cloud-Based Backend System

The backend acts as the main processing unit of the system. It includes:

Complaint Management Module

- Generates unique complaint IDs
- Stores complaint details in the database
- Manages assignment and status updates

ML-Based Smart Routing Module

- Automatically classifies complaints
- Assigns them to the appropriate department
- Reduces delays caused by manual routing

Analytics and Reporting Module

- Tracks complaint trends
- Monitors department performance
- Ensures SLA compliance

All information is securely stored in a centralized database such as MySQL.

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iii. Municipal User Interface

Municipal staff and administrators access the system through a web-based dashboard. They can:

- View assigned complaints
- Update complaint status
- Upload proof of resolution
- Monitor performance reports
- Track SLA deadlines

C. SMART COMPLAINT ROUTING MODULE:

The smart routing feature uses a machine learning model to automatically assign complaints to the correct department based on category and historical data. This reduces human error and speeds up the resolution process.

D. REAL-TIME TRACKING AND ACCOUNTABILITY:

The system provides real-time tracking of complaint status, showing stages like Submitted, Assigned, In Progress, Resolved, and Closed. SLA deadlines are monitored automatically, and alerts are sent if delays occur. This ensures transparency and responsibility at every step.

E. BENEFITS OF THE PROPOSED SYSTEM:

The proposed system improves transparency by providing real-time tracking and digital records. It increases efficiency through automated routing and centralized monitoring. It enhances accountability by enforcing SLA deadlines and performance tracking. The use of geotagging and photo uploads improves verification accuracy. Additionally, the system is scalable and can be integrated into larger smart city initiatives in the future.

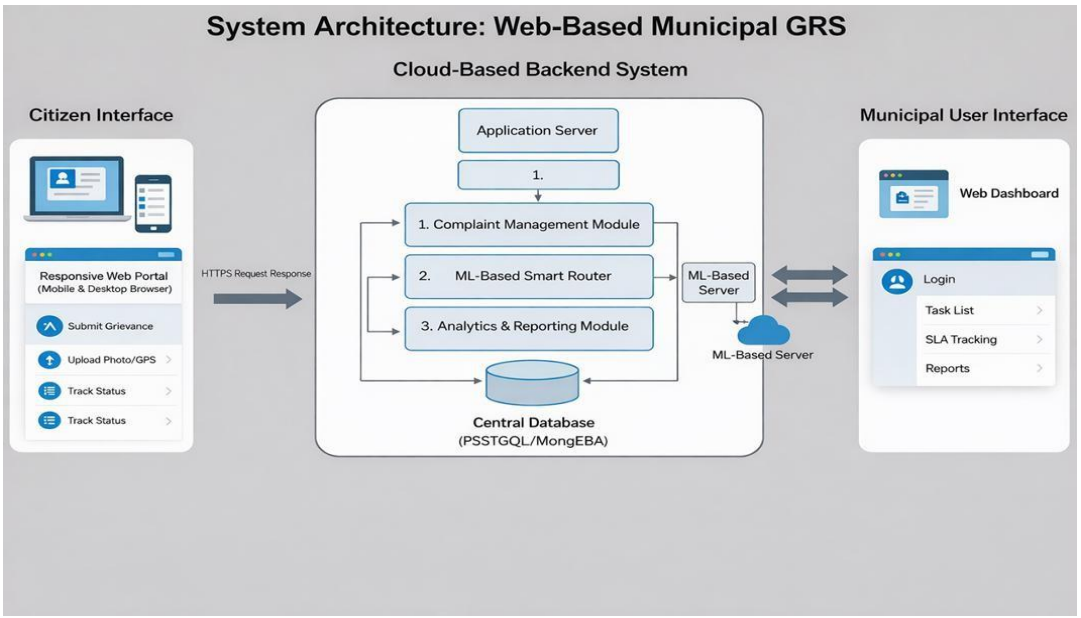

Fig: System Architecture

IV. ALGORITHM:

Step 1: System Initialization

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1. Start the application.
2. Import required Django, PyMySQL, and system libraries.
3. Establish connection with MySQL database named “grievance”.
4. Initialize global variables:
   * uname – to store logged-in username.
   * logged_department – to store logged-in department.
5. Load necessary HTML templates for user interface.

Step 2: User Registration Process

1. User enters registration details:
   * Username
   * Password
   * Contact Number
   * Email ID
   * Address
2. System checks whether the username already exists in the signup table.
3. If username does not exist:
   * Insert the user details into the database.
4. Display registration success message.
5. Else display "Username already exists".

Step 3: User Login Process

1. User enters username and password.
2. System verifies credentials from the signup table.
3. If credentials match:
   * Store username in uname.
   * Redirect to User Dashboard.
4. Else:
   * Display login error message.

Step 4: Grievance Submission Process

1. User enters grievance details:
   * Title
   * Description
   * Category
   * Latitude & Longitude
   * Address
   * Upload Photo
2. System generates a unique Complaint ID:
   * Retrieve maximum complaint_id from grievance table.
   * Increment by 1.
3. Store uploaded image in static/photo directory.
4. Automatically assign department using:
   * getKNNML(category) function.
5. Insert grievance record into grievance table with:
   * Status = "Pending"
   * Complaint Date = Current Date
   * Resolved Date = "-"
6. Display Complaint ID and Assigned Department.

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Step 5: View Grievance Status (User)

1. Retrieve all complaints where username = uname.
2. Display:
* Complaint ID
* Title
* Category
* Assigned Department
* Status (Pending/Closed)
* Complaint Date
* Resolved Date
* Uploaded Photo

Step 6: Department Login Process

1. Department enters login credentials.
2. System verifies credentials from department table.
3. If valid:
* Store department username.
* Redirect to Department Dashboard.
4. Else: Display error message.

Step 7: Department Grievance Handling

1. Fetch grievances where:
* Assigned department = logged department
* Status = "Pending"
2. Display all assigned complaints.
3. Department reviews complaint details.

Step 8: Update Grievance Status

1. Department selects "Close Complaint".
2. System updates:
* Status = "Closed"
* Solved Date = Current Date
3. Display status update confirmation.

Step 9: Feedback Collection

1. User selects Complaint ID.
2. User enters:
* Comments
* Rating
3. Insert feedback into feedback table.
4. Display feedback submission confirmation.

Step 10: Admin Module Operations

1. Admin logs in using credentials.
2. Admin can:
* View all grievances.
* View all departments.
* Add new department.
* View user feedback.

Step 11: System Termination

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1. The system continues running to:
* Accept new grievances.
* Track complaint status.
* Update resolutions.
* Maintain transparency and accountability.

V. IMPLEMENTATION:

A. User Management Module

The User Management Module handles all user-related operations, including registration, login, and access control. Citizen administrators, and departmental staff can securely log in using their designated credentials. This module ensures role- based access, meaning each user will only see the features relevant to their role. It also allows users to update their profiles, manage account details, and ensures secure authentication through encrypted login processes. Overall, it forms the foundation of secure access to the entire system.

B. Complaint Registration Module

This module enables citizens to lodge grievances easily through a user-friendly form. Users can select the grievance category, provide a detailed description, and specify the location of the issue. They may also upload photos or supporting documents for better clarity. Once the complaint is submitted, the system generates a unique complaint ID and sends an acknowledgment to the user. This module ensures that the complaint lodging process is fast, transparent, and accessible to all users.

C. Complaint Assignment Module

The Complaint Assignment Module is used by municipal administrators to manage incoming grievances. It provides an overview of all newly submitted complaints, allowing administrators to filter and sort them based on priority, location, or type. The admin can assign complaints to the appropriate municipal departments or officials for resolution. In case a complaint is misrouted, it can be reassigned or redirected easily. This module ensures that complaints reach the correct department quickly and efficiently.

D. Department Handling Module

This module is designed for departmental staff responsible for addressing the grievances assigned to them. It provides staff with a dashboard containing the complaints they must handle. They can update the complaint status as work progresses, such as “In Progress,” “Resolved,” or “Closed.” Staff can also upload work updates, images of the resolved issue, and remarks explaining the actions taken. This module enhances accountability by ensuring every assigned task is tracked until completion.

E. Complaint Tracking Module

This module allows citizens to track the real-time status of their grievances. By entering the complaint ID or checking their complaint history, users can view the progress of each complaint from submission to closure. The module displays a complete timeline showing when the complaint was submitted, assigned, processed, and resolved. Citizens can also view remarks, photos, and the final action taken by the department. This promotes transparency and builds trust between citizens and the municipality.

VI. DISCUSSION:

A. SYSTEM PERFORMANCE AND REAL-WORLD RELEVANCE:

The proposed Grievance Redressal System (GRS) performed effectively in handling the complete process of municipal complaints. Compared to traditional systems that depend on manual records and scattered communication, this system simplifies and digitizes the entire workflow—from complaint submission to final resolution and feedback. During testing, the system was able to successfully manage complaint

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registration, automatic department assignment, status updates, and feedback collection without errors or delays.

The Machine Learning-based routing feature improved the accuracy of complaint classification and reduced delays that usually occur due to manual assignment. Real-time tracking allowed citizens to monitor their complaint status at every stage, which increased transparency. SLA monitoring ensured that departments were alerted about pending complaints, helping maintain accountability. Overall, the system proves to be practical and highly relevant for real-world municipal governance, where timely service and public trust are very important.

B. PRACTICAL BENEFITS:

The main advantages of the proposed system are transparency, efficiency, and automation. Unlike traditional grievance systems that require repeated visits and follow-ups, this platform provides instant acknowledgment with a unique complaint ID and real-time tracking. Citizens can monitor progress without physically visiting municipal offices.

The smart routing feature reduces resolution time by directly assigning complaints to the correct department. Geotagging and photo uploads improve accuracy and prevent misuse. Role-based access ensures secure management for citizens and officials.

Additionally, the centralized database helps administrators analyze complaint patterns, track department performance, and make informed decisions. The system is scalable and can support future smart city initiatives, making it a reliable and sustainable solution for modern municipal governance.

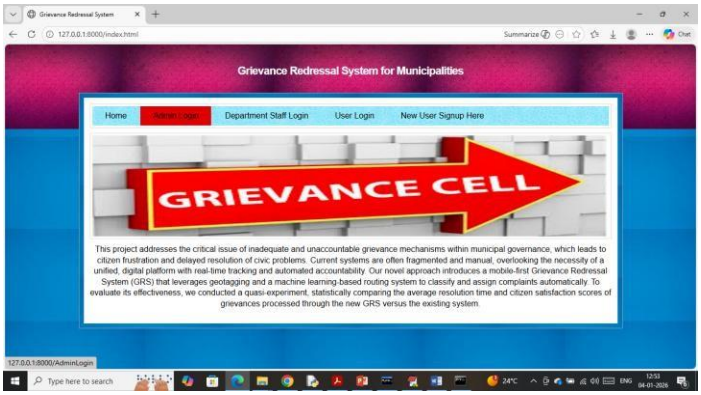
C. LIMITATIONS AND OBSERVATIONS:

Even though the proposed Grievance Redressal System improves transparency and overall efficiency, it still has a few limitations.

The system mainly depends on the complaint category selected by the user and the description provided. If a citizen selects the wrong category or gives incomplete details, the complaint may be assigned to the wrong department, which can cause delays in resolution. The Machine Learning-based routing feature also depends on the availability of sufficient historical data. In the early stages of implementation, limited training data may affect the accuracy of automatic classification.

The system also requires stable internet connectivity for real-time tracking and notification updates. In areas with poor network coverage, users may face difficulties accessing the platform. Moreover, while SLA monitoring increases accountability, timely status updates still depend on municipal staff. If officials delay updating complaint progress, transparency may be reduced. These limitations highlight the need for further improvements and future enhancements.

VII. RESULTS:



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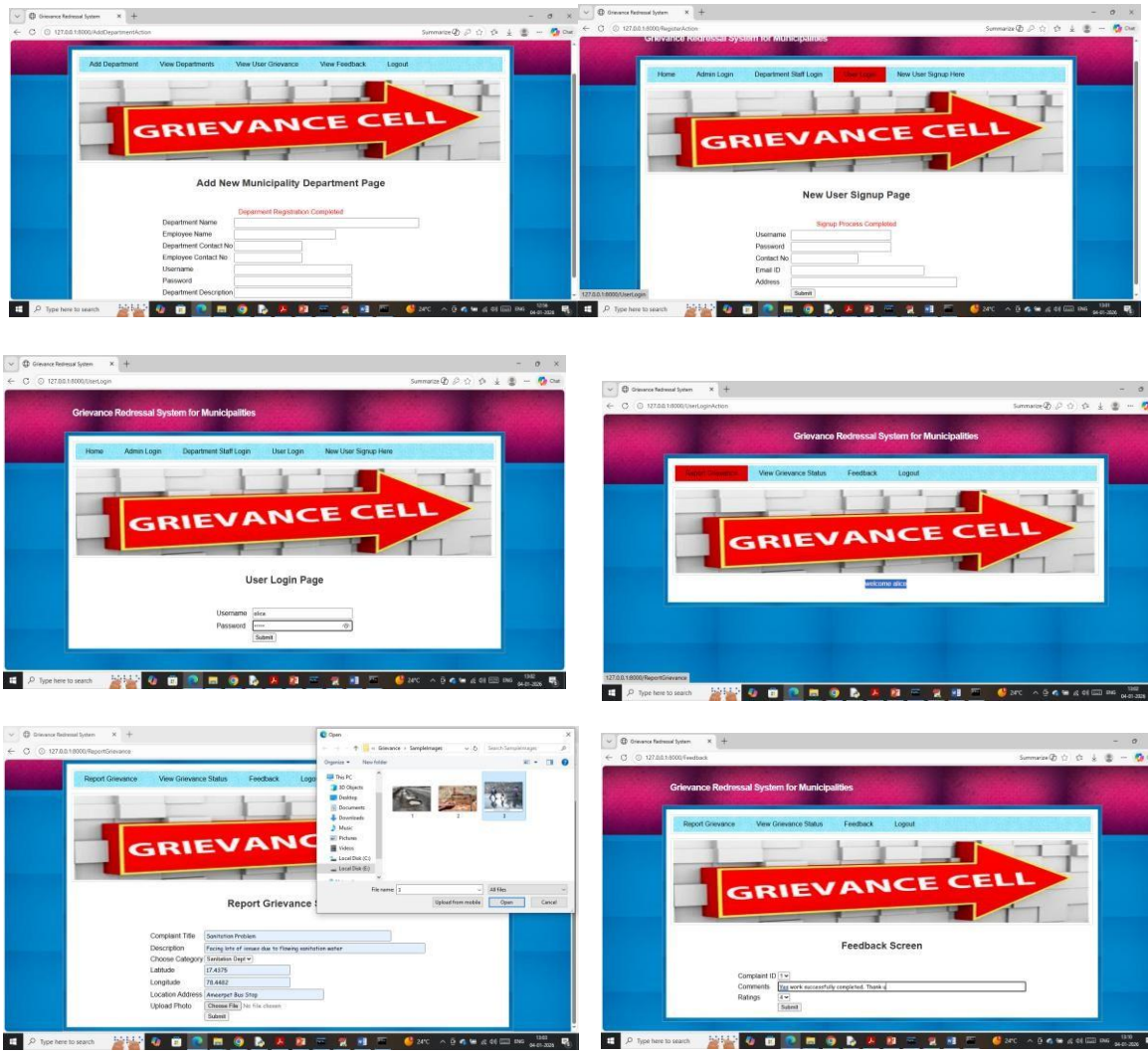

VIII. CONCLUSION:

The Grievance Redressal System for Municipalities developed in this project provides a structured and efficient digital platform for managing citizen complaints. The system successfully enables users to register grievances, upload relevant details, and track complaint status in real time. It ensures proper complaint handling through role-based access control, allowing administrators to manage departments, municipal staff to update assigned complaints, and citizens to monitor progress transparently.

The implementation of a centralized database ensures secure storage and retrieval of complaint records, while the complete workflow—from complaint submission to resolution and feedback—operates smoothly without data inconsistencies. All modules, including user management, complaint registration, assignment, tracking, and feedback, were tested and functioned as expected.

By replacing manual and fragmented processes with a web-based solution, the project improves transparency, accountability, and efficiency in municipal grievance management. Overall, the system strengthens communication between citizens and authorities and contributes to better public service delivery.

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