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AI ENABLED GRIEVANCE REDRESSAL ANALYTICS PLATFORM

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ABSTRACT*- This paper Presents an AI-Enabled Grievance Redressal Analytics System Platform that automates complaint registration, classification, prioritization, and management using Artificial Intelligence (AI) and Machine Learning (ML). The proposed system is designed to improve the efficiency of traditional grievance redressal by automatically predicting the Issue Type and Priority Level from complaint descriptions submitted by citizens. Complaint text is preprocessed using Natural Language Processing (NLP) techniques and TF-IDF (Term Frequency–Inverse Document Frequency) for feature extraction. A trained Scikit-learn model classifies complaints and assigns priority levels such as High, Medium, or Low. The application is developed using Python, Flask, SQLite, HTML, CSS, and JavaScript, providing a simple and user-friendly interface for complaint submission, tracking, and administration. A centralized dashboard enables administrators to monitor complaints, update their status, and analyze grievance records. By reducing manual effort, improving classification accuracy, and ensuring faster complaint resolution, the proposed system enhances transparency, operational efficiency, accountability, and citizen satisfaction in municipal grievance management.*

KEYWORDS*: Artificial Intelligence (AI), Machine Learning (ML), Grievance Redressal System, Complaint Classification, Priority Prediction, Flask, TF-IDF, SQLite.*

INTRODUCTION

Municipal authorities receive numerous public complaints every day regarding issues such as garbage collection, water leakage, drainage blockages, potholes, and streetlight failures. Traditional grievance management systems rely on manual complaint classification and prioritization,

which often results in delays, increased workload, and inefficient complaint handling. To overcome these challenges, an intelligent and automated grievance management system is required.

The proposed AI-Enabled Grievance Redressal Analytics Platform uses Artificial Intelligence (AI) and Machine Learning (ML) to automate complaint classification and priority prediction. The system allows users to register, log in, submit complaints, and track their complaint status through a user-friendly web interface. Based on the complaint description, the application automatically predicts the Issue Type and Priority Level. The platform is developed using Python, Flask, HTML, CSS, Bootstrap, JavaScript, Jinja2, SQLite, TF-IDF, and Scikit-learn with Logistic Regression. By automating complaint processing, the system reduces manual effort, improves classification accuracy, enhances transparency, and enables faster grievance resolution for efficient municipal service delivery.

RELATED WORK

Several researchers have developed intelligent grievance management systems to improve complaint registration, classification, tracking, and resolution. Earlier systems relied on manual complaint processing, resulting in delays, inconsistent prioritization, and increased administrative workload. With the advancement of Artificial Intelligence (AI), Machine Learning (ML), and Natural Language Processing (NLP), modern systems automate complaint classification and priority prediction, improving efficiency and accuracy. These systems analyze complaint descriptions, identify issue types, and assign appropriate priority levels. The proposed AI-Enabled Grievance Redressal Analytics Platform builds on these advancements by integrating TF-IDF, Logistic Regression, Python Flask, and SQLite to provide an automated, efficient, and user-friendly grievance management solution.

LITERATURE SURVEY

Recent studies have shown that Artificial Intelligence (AI) and Machine Learning (ML) can greatly improve grievance management by automating complaint classification and prioritization. Roumeliotis (2025) proposed a consumer complaint classification framework using Large Language Models (LLMs), demonstrating higher classification accuracy than traditional machine learning methods. Venkatesh C. (2024) introduced RE-GrievanceAssist, which combines TF-IDF feature extraction with machine learning algorithms to automate complaint categorization and reduce manual effort.

Vairetti (2024) developed an analytics-based complaint prioritization model using deep learning techniques to identify urgent complaints efficiently. These studies improve classification accuracy, reduce processing time, and support better decision-making. However, most focus on either classification or priority prediction. The proposed AI-Enabled Grievance Redressal Analytics Platform integrates both features using TF-IDF, Logistic Regression, Python Flask, and SQLite, while also providing complaint tracking, administrative management, and analytics in a single web application.

EXISTING METHOD

Recent studies have introduced intelligent grievance management systems using Artificial Intelligence (AI), Machine Learning (ML), and Natural Language Processing (NLP) to automate complaint handling. Venkatesh C. et al. (2024) developed RE-GrievanceAssist, which combines TF-IDF and machine learning algorithms for complaint categorization, improving processing efficiency. Vairetti et al. (2024) proposed an analytics-based complaint prioritization framework using deep learning techniques to identify urgent complaints. Roumeliotis et al. (2025) demonstrated that Large Language Models can accurately classify consumer complaints from textual descriptions. Although these approaches improve complaint classification and prioritization, they have certain limitations. Most systems focus on either complaint classification or priority prediction instead of integrating both features. Additionally, many lack real-time web-based implementation, complaint tracking, administrator dashboards, and analytics. These limitations emphasize the need for a comprehensive grievance management platform that combines automated prediction, complaint monitoring, administrative control, and user-friendly services within a single integrated application.

PROPOSED METHOD

The proposed AI-Enabled Grievance Redressal Analytics Platform provides an intelligent solution for automating complaint registration, classification, prioritization, and management within a single web application. Citizens can register, log in, submit complaints, and monitor their grievance status using a unique Complaint ID. Complaint descriptions are preprocessed using TF-IDF for feature extraction, and a Logistic Regression model developed with Scikit-learn automatically predicts the Issue Type and Priority Level. The application is built

using Python Flask, HTML, CSS, Bootstrap, JavaScript, Jinja2, and SQLite, ensuring a lightweight, scalable, and user-friendly platform. A centralized administrator dashboard enables authorized users to view complaints, update their status, monitor grievance records, and analyze complaint statistics. By integrating automated prediction, complaint tracking, and administrative management, the proposed system reduces manual effort, improves classification accuracy, accelerates complaint resolution, increases transparency, and enhances the overall efficiency of municipal grievance management.

SYSTEM ARCHITECTURE

The architecture of the AI-Enabled Grievance Redressal Analytics Platform consists of a web interface, Flask backend, Machine Learning prediction module, SQLite database, and administrator dashboard. Users can register, log in, submit complaints, and track their grievance status using a unique Complaint ID. The Flask application validates the complaint details and sends the complaint description to the Machine Learning module, where TF-IDF and Logistic Regression predict the Issue Type and Priority Level. The complaint details and prediction results are stored in the SQLite database. Administrators can manage complaints, update their status, and monitor complaint records through a centralized dashboard, ensuring efficient and transparent grievance management.

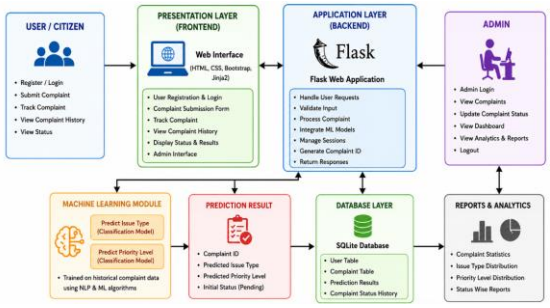


Fig 1: System Architecture

METHODOLOGY DESCRIPTION

The proposed AI-Enabled Grievance Redressal Analytics Platform follows a systematic methodology to automate complaint registration, classification, priority prediction, tracking, and management. Users first register and log in to the web application before submitting complaints with the required details and complaint description. The system validates the input and preprocesses the complaint text using TF-IDF (Term Frequency–Inverse Document Frequency) for feature extraction. A Logistic Regression model developed using Scikit-learn predicts the Issue Type and Priority Level automatically. The complaint details, prediction results, and complaint status are stored in an SQLite database,

and a unique Complaint ID is generated for tracking. Administrators use a centralized dashboard to view complaints, update their status, and analyze complaint records. This methodology reduces manual effort, improves prediction accuracy, ensures faster complaint processing, and enhances transparency and efficiency in grievance management.

RESULTS AND DISCUSSION

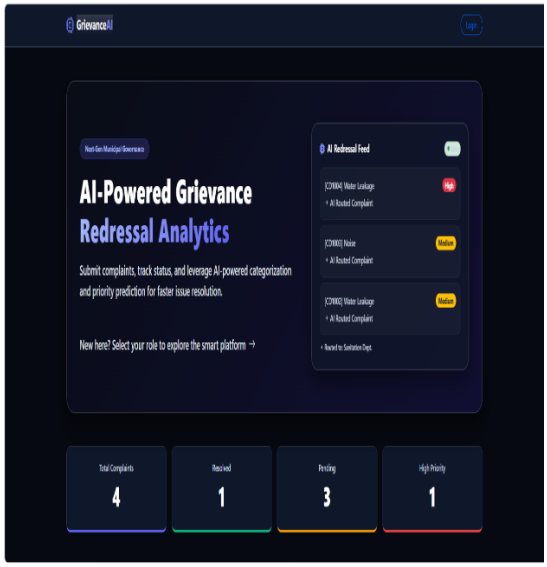


Fig 2: Home Page

The home page serves as the main entry point of the application. From here, users can navigate to registration, login, complaint submission, and complaint tracking pages. It provides a clean, simple, and intuitive interface for easy interaction with the grievance redressal system.

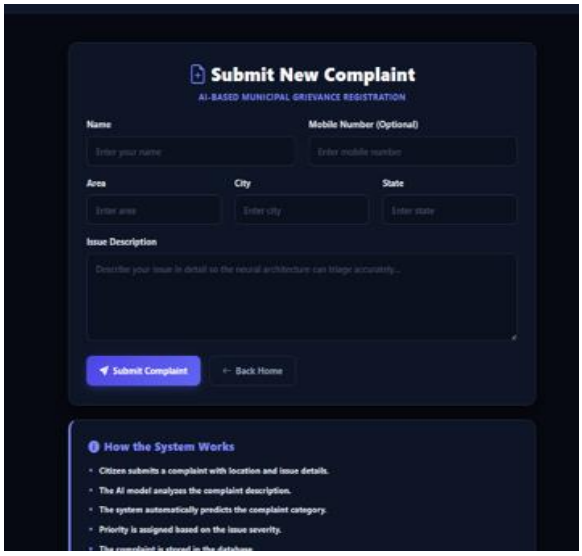


Fig 3: Complaint Submission Page

The complaint submission page allows users to enter complaint details such as Name, Mobile Number, Area, City, State, and Complaint Description. After submission, the complaint is processed by the Machine Learning model. The system automatically predicts the Issue Type and Priority Level. All complaint details are then stored in the SQLite database.

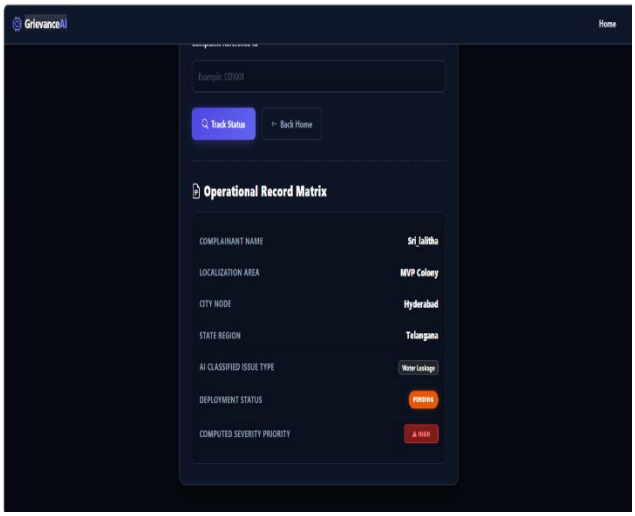


Fig 3: AI Prediction Result Page

This screen displays the output generated after successful complaint submission. The application automatically predicts the Issue Type and Priority Level using the trained Machine Learning model. It also generates a unique Complaint ID and displays the initial complaint status. This demonstrates the successful integration of Artificial Intelligence into the grievance management process.

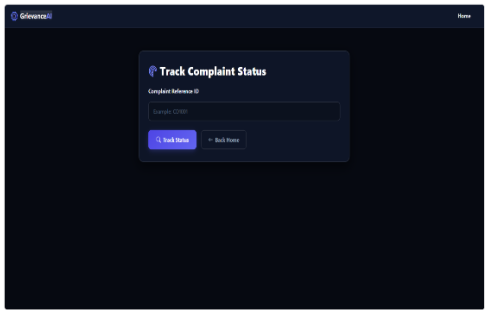


Fig 4: Complaint Tracking Page

The complaint tracking page allows users to check the current status of their complaints using the Complaint ID. The system retrieves the latest information from the database and displays it instantly. Users can monitor whether the complaint is pending, in progress, or resolved. This feature improves transparency between citizens and municipal authorities.



Fig 5: Admin Dashboard

The admin dashboard provides a centralized interface for managing all registered complaints. Administrators can view complaint details, monitor predicted Issue Types and Priority Levels, and update complaint statuses. The dashboard improves complaint management efficiency by organizing all complaint records in one place. It enables faster decision-making and better grievance resolution.

CONCLUSION

The proposed AI-Enabled Grievance Redressal Analytics Platform provides an efficient solution for managing municipal complaints using Artificial Intelligence and Machine Learning. The system allows users to register, submit complaints, track their status, and automatically predicts the Issue Type and Priority Level. Developed using Python, Flask, SQLite, and Scikit-learn, it reduces manual work, improves complaint classification, and speeds up grievance resolution. The administrator dashboard helps manage complaints and update their status easily. Overall, the platform improves transparency, efficiency, and user satisfaction. In the future, the system can be enhanced with a mobile application, multilingual support, advanced AI models, and real-time notifications.

FUTURE SCOPE

The proposed AI-Enabled Grievance Redressal Analytics Platform can be improved in several ways. A mobile application can allow users to submit and track complaints from anywhere. Advanced AI models such as BERT can improve the accuracy of issue type and priority prediction. Multilingual support can help users submit complaints in different regional languages, making the system easier for everyone to use. Location-based complaint mapping using GPS can help authorities identify areas with more problems and respond quickly. Predictive analytics can study past complaint data to predict future civic issues, helping municipal authorities plan better and improve public services more efficiently.

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