© MAY 2026 | IRE Journals | Volume 9 Issue 11 | ISSN: 2456-8880
DOI: https://doi.org/10.64388/IREV9I11-1717254

Unified Complaint Routing System for Government Departments

PRANAV RAJ T G[1], MOHIT VINAAKAR V[2], PARTHIBAN R[3], PEER MOHAMED M[4]
[1, 2, 3, 4]*Department of Computer Science, PSNA College Of Engineering and Technology*

Abstract- The Unified Complaint Routing System (UCRS) is a full-stack web-based solution designed to improve grievance redressal using Artificial Intelligence and Machine Learning. It allows users to submit complaints through both text and voice inputs, where voice is converted into text using speech recognition. Natural Language Processing techniques are applied to understand user intent and context. The system uses a deep learning-based model to automatically predict the appropriate government department and route complaints using location-based mapping. With an integrated frontend, backend, and AI module, the system enhances accuracy, reduces response time, and provides a scalable and user-friendly solution for e-governance.

I. INTRODUCTION

In modern governance systems, efficient grievance redressal is essential for transparency and citizen satisfaction. However, existing complaint systems require users to manually select departments, which often leads to confusion, misclassification, and delays. Most systems rely on basic text input and lack intelligent processing, voice support, and location-based routing.

To overcome these limitations, the proposed Unified Complaint Routing System uses an AI-driven approach to automatically classify and route complaints. By integrating Natural Language Processing, speech-to-text conversion, and location-aware routing, the system improves accuracy, reduces response time, and provides a more accessible and user-friendly solution for e-governance.

1) Abstract
2) Introduction
3) Research Elaborations
4) Results or Finding
5) Conclusions

II. SYSTEM OVERVIEW

The Unified Complaint Routing System is designed as an intelligent platform that automates grievance submission and routing. The system allows users to submit complaints through text or voice input. Voice inputs are converted into text using speech recognition, and the processed data is analyzed using Natural Language Processing techniques.

A machine learning-based classification model is used to identify the appropriate government department based on the complaint content. Additionally, location data such as GPS or pincode is used to route the complaint to the correct regional authority. This ensures accurate and efficient grievance handling.

The system includes the following key components:

1) Multi-modal input (text and voice)
2) Speech-to-text conversion using ASR
3) NLP-based complaint analysis
4) AI-based department classification
5) Location-based routing system

III. METHODOLOGY

The proposed system follows a structured methodology for processing and routing complaints. Initially, user input is collected through the frontend interface in either text or voice format. Voice data is converted into text using a speech recognition module. The processed text is then passed through an NLP pipeline for cleaning and feature extraction. A trained machine learning model analyzes the input and predicts the most relevant department. Based on the user's location, the complaint is routed to the appropriate local authority.

This approach ensures accurate classification, reduces manual effort, and improves the overall efficiency of the grievance redressal system.

IV. SYSTEM ARCHITECTURE

The Unified Complaint Routing System follows a modular full-stack architecture consisting of frontend, backend, AI module, and database layers. The frontend provides an interface for users to submit complaints through text or voice input.

The backend, developed using Spring Boot, handles API requests, authentication, and communication with the AI module. The AI module processes complaint text using NLP techniques and predicts the appropriate department using a trained machine learning model. The database stores user data, complaints, and routing information.

A location-based routing engine ensures that complaints are directed to the appropriate regional authority, enabling efficient and decentralized grievance management.

V. ADVANTAGES OF THE SYSTEM

The proposed system offers several advantages over existing grievance redressal systems. It eliminates the need for manual department selection by automatically classifying complaints using AI. The integration of voice input makes the system accessible to users with limited literacy or technical knowledge. The use of Natural Language Processing improves the accuracy of complaint understanding, while location-based routing ensures faster and more precise complaint handling. The system enhances efficiency, reduces delays, and provides a user-friendly and scalable solution for digital governance.

VI. CONCLUSION

The Unified Complaint Routing System provides an intelligent and automated approach to grievance redressal using Artificial Intelligence and Full Stack technologies. By integrating Natural Language Processing, speech-to-text conversion, and location-based routing, the system eliminates the need for manual department selection and reduces errors in complaint handling.

The system improves efficiency, accuracy, and accessibility, making it suitable for real-world e-governance applications. It ensures faster complaint resolution and better user experience. Future enhancements may include multilingual support, image/video-based complaint analysis, and integration with mobile applications to further extend usability.

ACKNOWLEDGMENT

The authors would like to thank the faculty and institution for their guidance and support in completing this project. We also express our gratitude to all those who contributed directly or indirectly to the successful development of this system.

REFERENCES

[1] T. Mikolov et al., “Efficient Estimation of Word Representations in Vector Space,” arXiv, 2013.
[2] J. Devlin et al., “BERT: Pre-training of Deep Bidirectional Transformers for Language Understanding,” NAACL, 2019.
[3] A. Vaswani et al., “Attention is All You Need,” NeurIPS, 2017.
[4] OpenAI, “Whisper: Speech Recognition Model,” 2022.
[5] S. Bird, E. Klein, and E. Loper, “Natural Language Processing with Python,” O’Reilly, 2009.
[6] Spring Boot Documentation, https://spring.io/projects/spring-boot
[7] Google Speech-to-Text API Documentation, https://cloud.google.com/speech-to-text