

Project Synopsis
on
**AI-based solution to enable ease of grievance lodging and tracking
for citizens across multiple departments**

Submitted as a part of course curriculum for

Bachelor of Technology
in
Computer Science



Submitted by

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ABSTRACT

A robust grievance redressal mechanism is essential for demonstrating the accountability, responsiveness, and user-friendliness of any administration. However, the current processes for lodging complaints in many Indian cities are often complex and inaccessible, particularly for a large migratory population unfamiliar with English, Hindi, or the local language. Citizens face challenges in identifying the correct department, navigating poorly maintained websites, and experiencing delays in receiving responses. To address these issues, this project proposes the development of an AI-based multilingual chatbot that simplifies the grievance lodging and tracking process.

The proposed system will allow citizens to dictate their grievances in their preferred language, enabling effortless lodging through a user-friendly interface. The chatbot will leverage Natural Language Processing (NLP) and Machine Learning (ML) models to understand and classify grievances, assigning them to the appropriate government department automatically. Citizens will receive a unique complaint number and real-time updates on the status of their grievances, facilitating a transparent one-on-one communication channel throughout the grievance lifecycle.

The primary objective of this solution is to streamline the grievance redressal process, making it more accessible, efficient, and responsive to citizens' needs. By reducing the time spent on identifying the correct department and tracking complaints, the system aims to enhance overall service delivery and improve citizen satisfaction with public administration. This project represents a significant step toward creating a more connected, citizen-centric governance model through the use of cutting-edge AI technologies.

INTRODUCTION

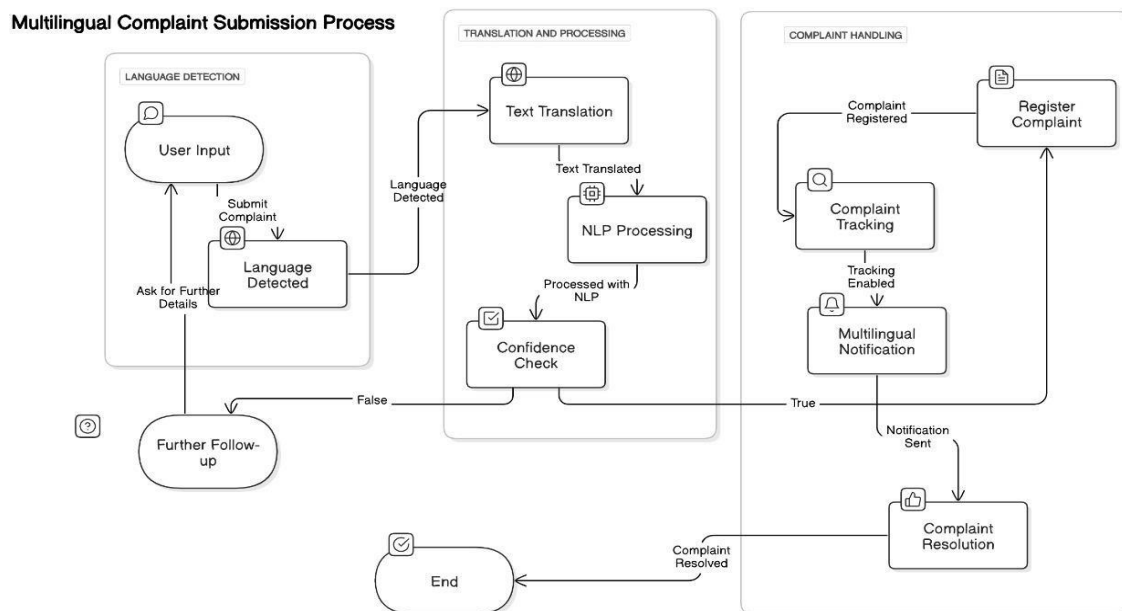
Grievance redressal is a critical function in public administration, ensuring that citizens' concerns are heard and addressed promptly. However, the traditional grievance redressal systems often suffer from inefficiencies such as manual processing, lack of transparency, delayed responses, and poor tracking mechanisms. This project aims to develop an AI-powered grievance lodging and tracking system that automates the handling of complaints, ensuring faster resolution and better accountability.

OBJECTIVE

The primary objective of this project is to develop a comprehensive AI-based grievance lodging and tracking system that addresses the inefficiencies in the current public grievance redressal mechanisms and significantly enhances the overall citizen experience. This system aims to provide a unified, automated, and transparent platform that simplifies the grievance lodging process for citizens, ensures prompt and efficient resolution of complaints, and equips government authorities with valuable insights to improve public service delivery.

1. Create a Multi-Channel Grievance Lodging System
2. Automate Complaint Classification and Routing
3. Provide Real-Time Tracking and Updates
4. Support Multilingual Communication
5. Gather User Feedback to Improve Service

METHODOLOGY



LITERATURE REVIEW

OBJECTIVE

The objective of this project is to develop an AI-based system that simplifies the process of lodging and tracking grievances across multiple government departments. The system will support multiple languages and provide real-time updates to users, making the grievance redressal more accessible and efficient.

BACKGROUND

Grievance redressal is a critical component of any administration, demonstrating its accountability, responsiveness, and user-friendliness. However, the current process for lodging complaints in many Indian cities is often cumbersome and inaccessible, particularly for the large migratory population unfamiliar with English, Hindi, or the local regional language. This project aims to address these challenges by leveraging AI and NLP technologies to create a user-friendly and efficient grievance redressal system.

RELATED WORK

Research and existing solutions in automating grievance redressal using AI and NLP, such as the work by Kumar et al. (2020), have demonstrated the potential of these technologies in streamlining the complaint lodging and tracking process. However, there is a gap in addressing multilingual support and integrating the system across various government departments seamlessly. Our proposed solution aims to fill this gap by incorporating advanced NLP models, such as GPT-based large language models (LLMs), and leveraging translation and speech-to-text APIs.

PROPOSED SYSTEM

1. User Initiates Complaint

Input Method: Text or Voice

2. Input Processing

Voice Input: Transcribed using Google Speech-to-Text API

3. Translation to English

Google Translation API: Converts input to English for uniform processing

4. NLP Processing

Text Analysis: Using GPT-based large language models (LLMs) for understanding and extracting relevant information

5. Complaint Categorization: by NLP model

6. Multilingual Support

7. Google Translation API: Converts feedback and status updates back to the user's preferred language

COMPLAIN ROUTING

1. Assign to the relevant department based on classification results
2. Additional Details Request (if needed): Backend may ask for further details if necessary

DATA STORAGE

MongoDB

FEEDBACK TO USER

Provide Complaint Number and Real-time Status Updates

DATA COLLECTION

To train the models and ensure the system's accuracy, we will gather data through the following methods:

- 1. Surveys and Feedback Forms:** Collect data directly from citizens via online surveys and feedback forms.
- 2. Collaboration with Government Departments:** Work with various government departments to obtain historical complaint data and understand the common categories and issues.
- 3. Individual Contributions:** Encourage citizens and student volunteers to contribute data by lodging sample complaints in a controlled environment.

COLLABORATION WITH GOVERNMENT PROGRAMS

Access to relevant data. This collaboration will involve:

API Integration: Developing RESTful APIs for submitting complaints to government departments and retrieving status updates.

Data Sharing Agreements: Establishing agreements with government departments to share complaint data and insights for continuous improvement. We will collaborate with government programs and initiatives to ensure seamless integration and.

DIFFERENTIATION FROM EXISTING SOLUTIONS

•**Multilingual Support:** Comprehensive support for multiple languages using Google Translation API.

•**Advanced NLP Capabilities:** Utilizing GPT-based large language models for accurate text analysis and understanding.

•**Real-time Updates:** Providing users with real-time status updates and feedback.

•**User-friendly Interface:** Building an intuitive interface using React/Next.js for ease of use.

•**Comprehensive Integration:** Seamless integration with existing grievance redressal systems of various government departments.

TECHNOLOGY STACK

React/Next.js: For building the user interface and ensuring a responsive design.

Node.js: For server-side logic and handling API requests.

Express.js: For setting up the server and defining API routes.

RESTful APIs: For communication between frontend, backend, and third-party services.

MongoDB: For storing user information, complaints, and status updates.

Python: For building and integrating NLP and machine learning models.

GPT-based LLMs: For text analysis and understanding.

Google Speech-to-Text API: For transcribing voice input into text (voice recognition).

Google Translation API: For translating text to English for processing and back to the user's preferred language for feedback.

Example Chatbot Interaction:

User: "I want to report a pothole in my area."

Chatbot: "Sure, please provide the location of the pothole."

User: "It is on MG Road near the bus stop."

Chatbot: "Thank you. I have lodged your complaint about the pothole on MG Road near the bus stop. Your complaint number is 123456. You will receive updates on the status of your complaint."

Research Paper

1. AI-Based Modeling: Techniques, Applications and Research Issues

Towards Automation, Intelligent and Smart Systems received: 20 July 2021 / Accepted: 21 January 2022 / Published online: 10 February 2022

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This paper provides a comprehensive overview of AI-based modeling, highlighting its role in developing intelligent systems across various real-world applications like business, healthcare, and smart cities. It discusses different types of AI and their potential in Industry 4.0, while addressing the challenges of dynamic real-world data. The paper serves as a reference guide for academics, industry professionals, and decision-makers.

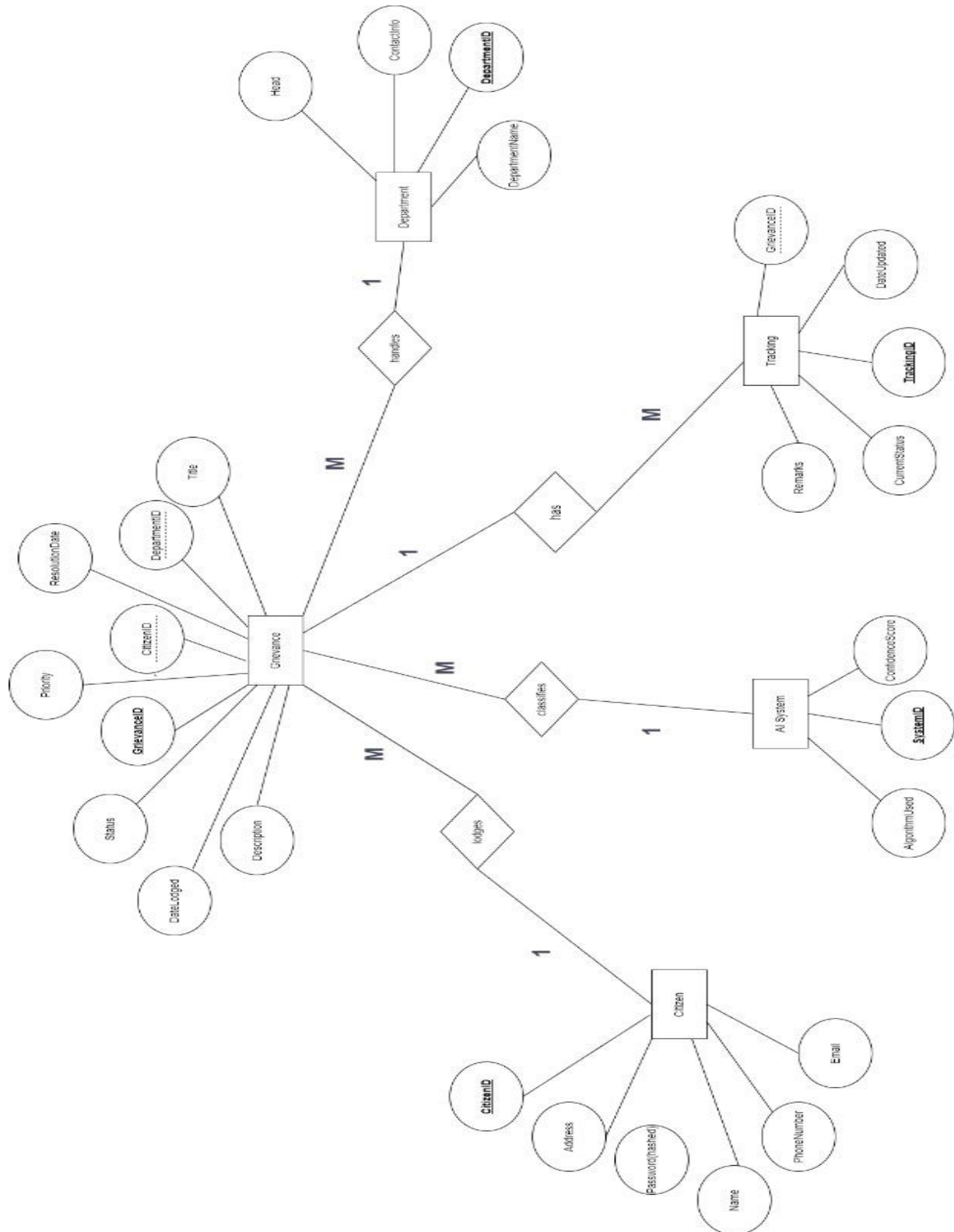
2. An intelligent Chatbot using deep learning with Bidirectional RNN and attention model

The paper reviews the evolution of conversational agents, highlighting advancements in chatbot systems across sectors like retail, banking, and education. It discusses the shift from traditional rule-based approaches to more sophisticated models employing Natural Language Processing (NLP), Deep Learning techniques, and architectures like Sequence-to-Sequence and Bidirectional Recurrent Neural Networks (BRNN) with Attention mechanisms. The study emphasizes the importance of performance metrics in chatbot design, focusing on conversation structure, user engagement, and personalization. It concludes that the integration of BRNN and Attention models enhances chatbots' ability to understand and respond to complex, real-world conversations.

3. Automatic Grievance Portal by Automating Central Grievance Redressal System

The paper discusses the implementation of an Artificial Intelligence (AI)-driven Centralized Grievance Redressal System (CGRS) aimed at optimizing the complaint resolution process. It highlights the integration of machine learning and natural language processing techniques to enhance efficiency, transparency, and user experience in managing grievances. The study reviews traditional grievance systems and showcases successful AI applications, demonstrating improvements in response times and customer satisfaction. Overall, the research advocates for a user-friendly, automated solution to this.

ER DIAGRAM



OUTCOMES

1. Voice recognition, chatbot interface, and multi-language support.
2. Automated complaint categorization and prioritization for faster resolutions.
3. Real-time updates and tracking improve trust in the system.
4. Analytics for identifying trends and recurring issues.
5. Handles large complaint volumes with ease.
6. Promotes inclusivity, accountability, and citizen satisfaction.

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