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AI-Driven Citizen Grievance Redressal System

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Abstract*— The system proposed is an AI-based system for resolving citizen complaints. This system is designed to make the process of filing complaints with government agencies simpler and more effectiveThis powerful system harnesses the capabilities of Natural Language Processing, Sentiment Analysis, Machine Learning, AI-driven Chatbots, and Voice-to-Text technologies to deliver exceptional results. This system enables citizens to file their complaints with government agencies in a simple and effective manner. A citizen can file a complaint with the government agencies in three ways: by writing a statement, by speaking, and by interacting with a chatbot. After filing a complaint, the system analyzes the complaint written by the citizen. This system utilizes Natural Language Processing techniques for analyzing the complaint. This system categorizes the complaints based on the types of complaints and also based on the priority levels. This system utilizes Machine Learning technologies for automatically routing the complaints to the concerned government agencies. This system also enables local residents to file complaints in their local language.

A user-friendly chatbot interface is provided that helps users navigate the complaint filing process. This interface provides users with information on how to file grievances and track the status of their case and follow-up activities. By using historical grievance data, the system improves its classification and decision-making mechanisms. This ultimately improves the routing mechanisms. Thus, the platform helps automate the complaint management process.

Index Terms*— AI Chatbot, Citizen Grievance System, Machine Learning, Multilingual Support, Natural Language Processing (NLP), Sentiment Analysis, Voice-to-Text Processing.

I. INTRODUCTION

The AI-Driven Citizen Grievance Redressal System offers a new means for citizens to lodge complaints against government officials through the use of technology. The conventional method of lodging complaints takes a very long time and involves many processes, which may require a citizen to make many visits and involves a lot of paperwork. This makes it very difficult for a person to lodge a complaint about their problems. This project offers a solution by providing an easy means of automating all the processes of handling complaints.

The system utilizes advanced technology in artificial intelligence, Natural Language Processing (NLP), Sentiment Analysis, Machine Learning (ML), AI-based Chatbots, and Voice to Text Processing are essential and transformative technologies that drive innovation and efficiency across various industries. The various components of the system work together to process user-submitted information to help identify the reasons for every complaint while facilitating users. Users can submit their complaints in two ways: by typing out their issues or by using voice commands. This feature is particularly beneficial for elderly individuals, people living in remote areas, those who struggle with reading, and those who may not be familiar with technology.

Once the complaint is submitted, the system will automatically analyze the details provided. The system will be able to extract the important details of the complaint and evaluate the urgency of the complaint. The system will also categorize the complaint according to the appropriate category. The system will utilize machine learning to identify emotions in complaints. Furthermore, it will employ sentiment analysis to determine if a complaint needs immediate attention. The system will use past grievance data to evaluate the accuracy of the complaint. The system will also direct the complaint to the appropriate government agency.

The AI-Driven Citizen Grievance Redressal System has automated procedures for sorting, prioritizing, and forwarding complaints to different departments. This minimizes manual intervention, decreases the likelihood of errors, and enables quicker response times. Moreover, it provides citizens a facility to track a complaint through a public complaint tracking system that operates with complete transparency and efficiency. The project enhances public service delivery by facilitating direct interactions between citizens and government agencies. It also creates a reliable system for timely redressal of genuine grievances.

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II. RELATED WORK

Research studies have examined how artificial intelligence technologies enhance the effectiveness of complaint processing systems in government services. These systems incorporate technology to reduce waiting times and increase the accuracy of complaints while handling customer complaints quickly. The basic paper proposed a system of AI technology for the resolution of grievances, which increases the efficiency of the system of handling complaints in government organizations. It is stated that conventional systems of grievance handling are associated with a number of problems, such as response times, classification of complaints, and the assessment of complaints.

The proposed solution utilizes computer vision, machine learning, and NLP techniques to overcome these problems. Users can register their complaints using written statements and images. Users can provide evidence of problems occurring in the area, such as damaged roads and environmental degradation. NLP techniques help in finding keywords and categorizing complaints based on categories such as water supply, power, infrastructure, etc. Machine learning techniques help in ranking complaints based on priorities. Sentiment analysis helps in understanding the urgency of complaints. Computer vision techniques help in understanding the severity of the problem based on the images provided by the user. This method helps in sorting complaints in an automated manner, helping the government services become more efficient. The paper helps in improving grievance management using automated systems for complaint categorization, prioritization, and analysis of complaints. However, the proposed solution does not offer complete support in terms of interactive and accessible features required by different user groups. The proposed AI-Driven Citizen Grievance Redressal System improves existing research in the following areas: user accessibility features, interactive features, and smart complaint management techniques. Users can register complaints using various methods. The new system enables them to raise complaints through text messages, voice calls, and interactions with chatbots. The complaint content is analyzed by using a combination of NLP, sentiment analysis, machine learning algorithms, voice-to-text conversion, and chatbots to gauge urgency and categorize complaints.

The proposed system indicates the accessibility of the system in multiple languages and user-friendliness. This helps people of different educational and linguistic backgrounds to file their complaints easily. It also helps the user in filing complaints and automatically forwards the complaints to the respective departments and tracks the complaints. This increases transparency and avoids the need for government employees to get involved in these processes. It not only helps in automatic classification of complaints and prioritization of grievances but also helps in incorporating voice communication and chatbots with accessibility features, making an effective grievance redressal system.

III. RESULTS AND DISCUSSION

The AI-Driven Citizen Grievance Redressal System has various modules that are created for different needs during the process of handling grievances. The system enables citizens to submit their grievances through its efficient platform, and it is also possible to handle grievances efficiently by the authorities. The system makes use of Natural Processing Language, Machine Learning and Sentiment Analysis, and Voice to Text technologies for efficient management of grievances.

A. User Authentication Module

The User Authentication Module provides security for access to the grievance redressal platform. The module allows the users to register on the platform by providing access through their credentials. A user is required to provide their name, email id, and password during the registration process. Once a user registers on the platform, they are allowed access to the platform for the submission of grievances. The platform provides the facility of authentication for data security. It allows access to the users only.

B. Grievance Submission Module

The Grievance Submission Module enables citizens to easily report their issues through an easily accessible interface that enables citizens to report their problems. Users can easily report complaints by either typing their complaints' descriptions or even reporting complaints through their voices. The Grievance Submission Module uses Speech-to-Text technology, where users can report complaints through their voices, and the technology converts these voices into text descriptions. This feature allows citizens to easily navigate the system, as some may find it challenging to type their complaints' descriptions. The Grievance Submission Module stores all information related to complaints in the database after users have submitted their complaints.

C. Natural Language Processing Module

The module of Natural Language Processing is of utmost importance in the analysis of the grievance provided by the user. The module analyzes the complaint provided by the user in the form of text through various operations such as tokenization, keyword extraction, and entity recognition. These operations help in the identification of the main issue described in the complaint provided by the user and the category of the grievance.

D. Sentiment Analysis Module

The Sentiment Analysis Module is responsible for analyzing the sentiment of the grievance that is entered into the system. The system analyzes the text of the grievance entered into it and determines if it indicates a need for urgency or customer dissatisfaction and great magnitude of problems. Complaints that have a lot of negative emotion and urgency are at the highest level. The authorities can handle great problems urgently due to the prioritization of complaints.

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E. Machine Learning Classification Module

The Machine Learning Classification Module classifies the complaints based on various service areas, which include complaints about water supply problems, electricity problems, road maintenance and sanitation problems, and all other public service complaints. The classification of the complaints ensures that they are channeled to the right government department that will be able to address the problem.

F. Chatbot Interaction Module

The Chatbot Interaction Module is a module that provides interaction with the user during the grievance submission process. The chatbot interacts with the user through a series of questions and helps the user in the process of submitting the grievance. The feature provides a better experience with the required information for the user in processing the complaints.

G. Administrative Management Module

The Administrative Management Module helps the authorities manage grievances. In the Administrative Management Module, the authorities are able to view all the grievances filed by the public through the administrative dashboard. In the dashboard, the authorities are able to assign tasks to the relevant authorities and keep a record of the status of the resolution. Every complaint is linked to a grievance identification number, which helps in tracking the progress of a complaint filed by a person. The system developed demonstrates how Artificial Intelligence can be employed effectively for grievance management systems in the country. The automated system helps in avoiding manual work in the grievance resolution process.

IV. HELPFUL HINTS

H. Figures

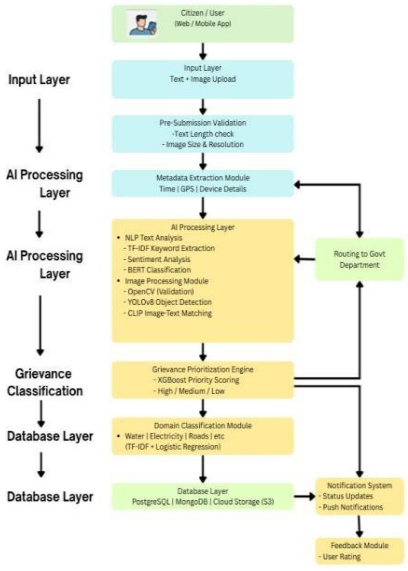

Fig1. Existing architecture

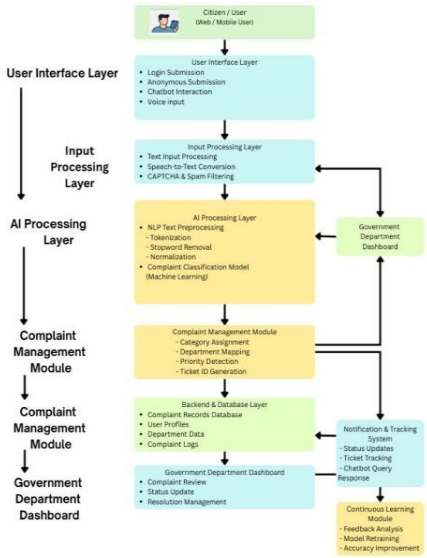

Fig2. System architecture

V. CONCLUSION

The AI Driven Citizen Grievance Redressal System helps in modernizing existing traditional systems by incorporating intelligent technology to improve public service delivery by making it efficient and accessible and transparent. The existing traditional systems involve manual processing of grievances, causing two problems: it causes delays and misclassification of grievances. It is difficult to manage citizen grievances due to their sheer volume. The existing system needs an advanced solution that incorporates automated systems to make it intelligent compared to existing systems. The proposed system utilizes advanced technologies such as Natural Language Processing, Sentiment Analysis, Machine Learning, AI Chatbots, and Voice-to-Text to address these issues.

These technologies help the system to process citizen complaints through the determination of the type and level of urgency of the complaint and directing the complaint to the right government department. The system becomes user-friendly as it allows users to select whether they want to be assisted by voice support or a chatbot, hence helping the elderly and less tech-savvy users to use the system. The system has the ability to automate three processes, including classifying and prioritizing citizen complaints and directing the complaint to the right department. This increases transparency through the utilization of the real-time status tracking feature of the system as the system has the capability to build trust between the citizen and government officials. The proposed AI-based system has the ability to provide an expandable system that can efficiently manage the entire framework of grievance resolution. Future enhancements to the system will be provided through the development of deep learning models and the application of predictive analytics and smart city platform.

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