AI-DRIVEN COMPLAINT MANAGEMENT SYSTEM

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Abstract— **Citizens Complaint is important information reflecting citizen's sound. Our main objective of the organization is to give valuable and productive feedback to the citizens. The design we proposed for an AI-driven logging portal will have the strength to minimize citizens' worry and additionally, it can inspire people to promote our country by logging complaints on our website. In this paper, we propose a new model that is an AI-driven logging portal where we try to improve communication between citizens and government, and we try to make transparent communication to make your country a better place to live. There are different services for different types of complaints in your web portal. These services are used by numerous citizens on basis of their grievances. We have created a framework that can recognize citizens' problems and provide timely feedback to citizens. This system can recognize grievances by identifying and commenting on each complaint that has been raised. The concern of citizens is treated according to the priority in this portal. That is a problem depending on the seriousness of the situation that will be prioritized.**

Keywords— **AI-driven logging portal, e-complaint, Issues Handling with Priority.**

I. INTRODUCTION

A portal is a web-based platform that collects citizens' complaints into a single user interface and presents users with the most relevant solution for their context. Simple web portals have developed into networks that promote digital customer service initiatives over time. In the early days of offline, content discovery was a problem that portals attempted to solve. In the face of a large number of citizens' issues, the complaint logging portal gives administrators and users the easiest way to resolve issues based on the severity of the problem. Portals could display selected content to provide a custom experience for users. Likewise, most consumer issues are evident where the government and the users have insufficient contact with a service provider. This poor communication may lead to poor organizational or government services. With a priority on grievances, firms can gain an efficient success factor by increasing service quality. Each organization must therefore establish its internal and external customer interaction with its people. Although adequate communication can minimize customer frustration, and complaints cannot be avoided.

In social organizations, there are grievances about the issues requiring an appropriate logging portal. People complain every day to public servants because they feel terrible. All complaints should be acknowledged and duly handled, regardless of any citizen's internal or external bills, such as face-to-face issues, phone accusations, complaints letters, and comments on the internet. Also, it should prioritize this complaint, i.e., insufficient grievance or serious allegation should be given priority, and appropriate action should be taken to prioritize the complaint handling. To overcome all these issues and to strengthen citizen-government ties. We have implemented an online portal that will help citizens save time by lodging complaints online. It will also help the complaint department solve problems according to the seriousness of a problem that will be helpful for both citizens and government. The idea of an AI-driven logging portal is implemented for the first time.

II. LITERATURE REVIEW

We have reviewed many research papers to gain knowledge and insight into how our project is being implemented.

Harne et al. [1] In this publication, we examined how to collect information on citizen data from the web pages that we included in this project. We also learned to analyze the data and perform an action on that data. We used this technology to make some data analysis changes and performed some sentimental analysis on citizens' data to prioritize the complaints. This paper also shows converted data to the people.so we have applied that in our project to perform analysis and update the data and display the status of the complaint to the citizens

Nadar et al. [2] We study how to perform actions on users' data, so we performed operations on citizens' data with this paper's help. We used algorithms to find the complaint score and found the score by using sentimental analysis. This paper also helped to give them priority. We prioritize complaints according to the score. The negative score will be the top priority, and the positive will be the least priority. This paper aided us in prioritizing grievances and data separation in our project.

Hegazy et al. [3] This paper discusses the recording complaints given by citizens. With the help of this paper, we stored the data of citizens in a database. We use PHP, MyAdmin, to store citizens' data and provide excellent feedback to the citizens on their complaints, whether the complaint is solved, unsolved, or in progress. Due to this, citizens and government can have a transparent conversation.

R. Razal et al. [4] This paper addresses complaint procedures to identify reasonable and acceptable grievances. Many web-based applications are being developed in the modern age of technology. There should also be an online complaint management system. A robust foundation design, particularly concerning the complaint process, is required to develop a web-based complaint management system. These design findings help us to create a successful web-based complaint logging portal.

Amy J.C. Trappey et al. [5] This paper explores the impact and the productive dealing with customer grievance. The new system covers the monitoring of grievances, compensation diagnostic, and complaint assessment. It represents the need for an organization's improvement. Also, this paper assesses the framework and its benefits automatically in response to various activities, which help decision supports complaints.

R. Razali et al. [6] We have government bodies (Municipal Corporations) in our country that oversee sustaining and operating towns. It is their collective responsibility to respond to citizen complaints. For this purpose, the municipal corporation has two options: first, cameras or other surveillance devices must be mounted, and second, people can report their problems to the municipal corporation. The aim of creating this website to simplify the process of lodging complaints to the respective Municipal Corporation and make it quick and cheaper.

Sana Ullah Eduardo et al. [7] In this paper, we determine the optimal performance bounds for a fixed number of devices in different priority classes with different bit error ratio values. In comparison to low-priority devices, high-priority devices gain fast and secure access to the error-prone channel. Our analysis's performance bounds are used to understand the tradeoffs between different priority levels and network performance. So, we used this information to prioritize complaints of citizens in our project.

Yuling Chen et al. [8] In this paper, we determine Sentiment analysis of Internet reviews is a hot research topic in Web information mining. The standard text sentiment analysis approach relies on either an emotion dictionary or machine learning to determine sentiment. However, the generalization potential is limited due to its reliance on emotion dictionary construction and artificial layout and extraction functionality. The results of the experiments show that the proposed approach effectively increases text sentiment classification accuracy. So, we have used sentimental analysis in our project to give priority to the complaint.

III. Methodology

The website that we have designed is coded in Sublime Text, and we have used HTML5, CSS3 & PHP for creating a website. Without trouble and

some effort, our website can handle the complaint information. Since the work is performed manually before, it would take a lot of time and a great deal of time to hold the files. and to store all this data, we have used XAMPP & MySQL. These data can be managed with a bit of effort and with less time by computerizing the system. The chances of duplicating complaints are negligible because we have used PYTHON to perform operations on data. This data is in human language, so it is converted in machine language using natural language toolkit (NLTK)[1]library, and Sentiment Analysis(SA)[2]is used to prioritizing grievances by calculating score to each complaint, the score will be from -1 to 1 more negative score gets the highest priority and second priority will be given to complaints which are pending from many days, and this all is put in the table by using Pandas Data Frame(PDF)[3]. Also used (NUMPY)[4]for a one-dimensional array for citizens' storing data, the Citizen's Complaint Report can be quickly implemented by collecting data from all required details without any difficulty. The package is constructed using the GUI concept we used (Tkinter)[5]for GUI, and it is very user-friendly & easy to use. We will use matplotlib[6]for showing the solved no. of cases and the unsolved no. of cases in graphical form. The people should not go to the local office in the proposed framework to address their problems. So we have created a FAQ chatbot on your website by using (Dialogflow)[7] this will help citizens to solve basic queries like where can I track my grievances and so on. By introducing the issue in this proposed method, he can discuss his issues and can suggest a potential solution to the citizens' issues.

1) Sublime Text – Sublime text is used as a source code editor we have used in this project. It can be used for a variety of programming and markup languages, and users can add functions using plugins. It is also free software.

2) HTML5 – HTML5 is Hypertext Markup Language. It can be used for a variety of programming and markup languages, and users can add functions using plugins. It is also free software.

3) CSS3 – CSS3 is Cascading Style Sheets. It is used for more interactive graphics and animation. It is used to improve the appearance of the website.

4) PHP– PHP is a server-side scripting language that is used to produce dynamically produced pages quickly

5) Xampp– Xampp is used as a database to store data which user enters in the website in our project, and this software is free of cost

6) MySQL Database– MySQL Database is a Structured Query Language. It is used for adding, accessing, and managing content in a database. It is also freely available open-source software

7) Python– Python is a high-level programming language. We have used python in our project to perform operations on data entered by users.

8) NLTK Library– NLTK Library is a natural language toolkit in this project. It is used to understand machine-human language and reply with appropriate responses. Some of the packages we used in our project were tokenization, stemming, lemmatization, punctuation, character count, and word count. Sentiment analysis is a natural language processing technique for interpreting and categorizing emotions in subjective data.

9) Sentiment analysis– Sentiment analysis is a natural language processing technique used to interpret and classify emotions in subjective data. In this, we have used giving priority to the complaints as -1 to 1 so that the government can solve a more severe problem first.

10) Emotion detection– Emotion detection is a form of sentiment analysis that aims to identify emotions such as happiness, annoyance, rage, and sadness. We will use this to give priority to the complaints.

11) Pandas data frame– Pandas data frame is a two-dimensional data structure in which data is organized in columns and rows in a tabulated form.

The data, rows, and columns are the three main components of a Pandas Data Frame.

12) NumPy - NumPy is a Python library used for working with arrays. It also has functions for working in the domain of linear algebra, Fourier transform, and matrices.

13) Dialogflow - Dialogflow is a natural language understanding platform that makes it easy to design and integrate a conversational user interface into your mobile app, web application, device, bot, interactive voice response system.

WORKFLOW

FIGURE 1. WORKFLOW DIAGRAM ARCHITECTURE
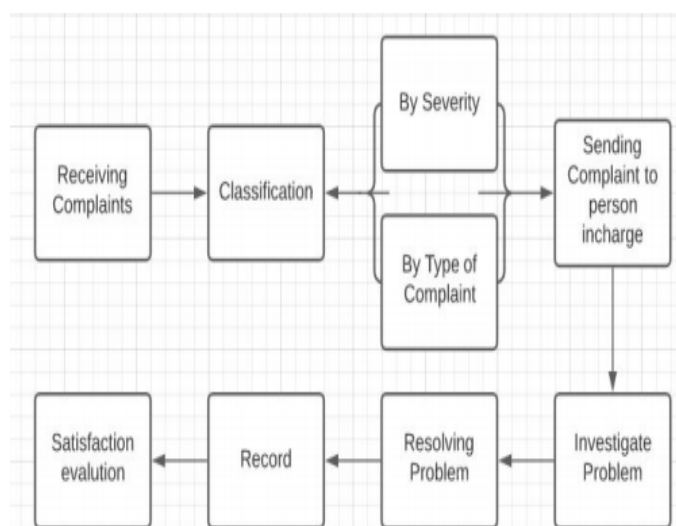
FIGURE 2. ARCHITECTURE

Website-We have created a website for citizens for logging complaints on government services and also created a FAQ chatbot for basic queries, After a complaint has lodged user will get a response that how much it will take approx time to solve the complaint, user can also check how many complaints are solved, unsolved overall in a graph format.

Categories for logging complaints are

1) Electricity: This department will process the complaints related to electricity, like live wires, damaged electric poles, and so forth.

2) Traffic: This department will process complaints related to traffic violations, like triple riding, moving in one way, no parking, riding a bike on the footpath, and so forth.

3) Police: This department will process the complaints related to criminal, activities such as robbery, murder, kidnapping, and so on.

4) Municipality: This department will process the complaints related to day-to-day life, such as garbage problems, water leakage, drainage, Etc.

To lodge complaints users must first fill in all necessary details so that we can check the complaint is legit or not; we will also show numbers of solved and unsolved cases so that everything will be transparent between citizens and the government.

Database- There, we have created different tables for different categories of complaints. In this database, all user's information and all complaints are stored. This data is fetched in python, and operations are performed on data and again send updated data to the database. Then the user can see the status of his/her complaints.

Natural Language Processing - Here Firstly, we will fetch data from the database. We will use pandas data frames to put data in rows and columns. To understand human language into machine language, we will use the NLTK library. After collecting all the data, we will perform a sentiment analysis. We will find all main

keywords from the description of a problem given by users, and we will find the score for it. the score will be from -1 to 1. If the score is negative, it will be solved first. If the score is positive, it will be solved later. Suppose there is a condition both scores are identical. In that case, it will give priority to the user who has complained first, and the second priority is given to a complaint which is pending for many days it will be solved. After prioritizing the complaints, it will create a new column of the score, and updated data will be sent to the database. Then it will be updating the status of the complaint to the user on the website

IV. IMPLEMENTATION

Admin Module

Here the admin first has to login with his/her id and password, and after that, he can see citizens' complaints.

In this section, the admin will give a response to citizen about a complaint that it is solved or in progress or how much time it will take to solve the complaint

Admin module has various sections like a pending complaint, closed complaint, the complaint in progress, admin can add categories and subcategories, for now, we have added only a few categories like water supply, electricity problem, and road problem.

In this admin module, we can see logs of citizens when they logged out and log in, etc.

FIGURE 3. ADMIN MODULE(CATEGORIES OF COMPLAINTS)

User Module References

This is the user's dashboard where the user first has to fill in his/her information. After that, he can complain about a problem with a photograph for proof.

In the user module users can see how many complaints have been registered and how many are in progress/unsolved/complaints solved, users can also see complaints filed by other citizens and their progress too.
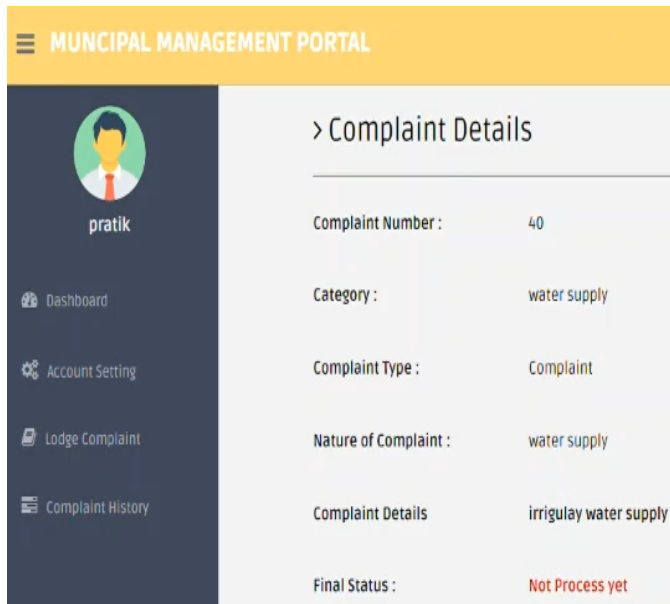
FIGURE 4. USER MODULE (REGISTER COMPLAINTS)

Sentiment detection and priority allocation

Here we will first fetch data of citizens from the database and we will perform sentiment analysis on the description of complaint given by the user and we will create a score for that complaint score is calculated by three-factor negative, neutral, positive and by using lambda function we will calculate the score in compound value between -1 to 1, and later we will sort the complaints according to score. More negative the score, the more priority to that complaint.

FIGURE 5. SENTIMENT DETECTION (PRIORITY ALLOCATION)

Prediction of Time takes to resolve a complaint
This is the backend part here we basically predict how much time it will take to solve the complaint of the customer. Prediction is done on basis of seriousness and priority given to the problem.
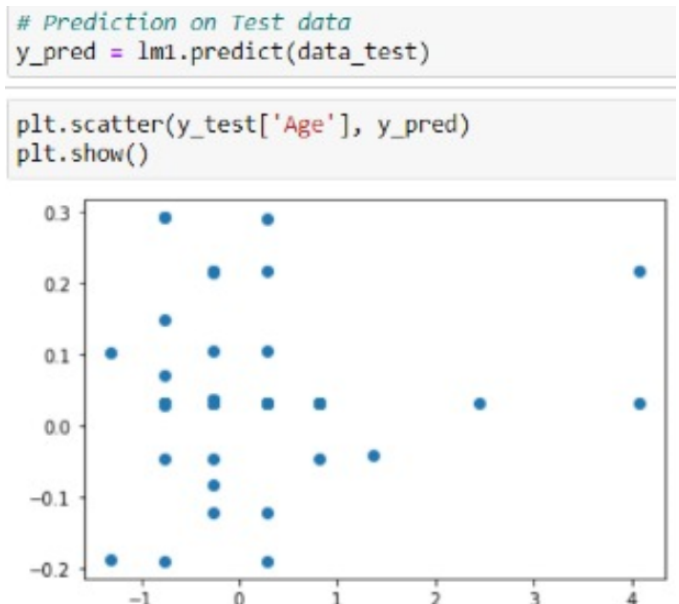

FIGURE 6. PREDICTION OF TIME TO SOLVE A COMPLAINT

FAQ Chatbot

Here we solve basic queries of citizens like how to lodge complaints, where can I track my grievances, and so on.
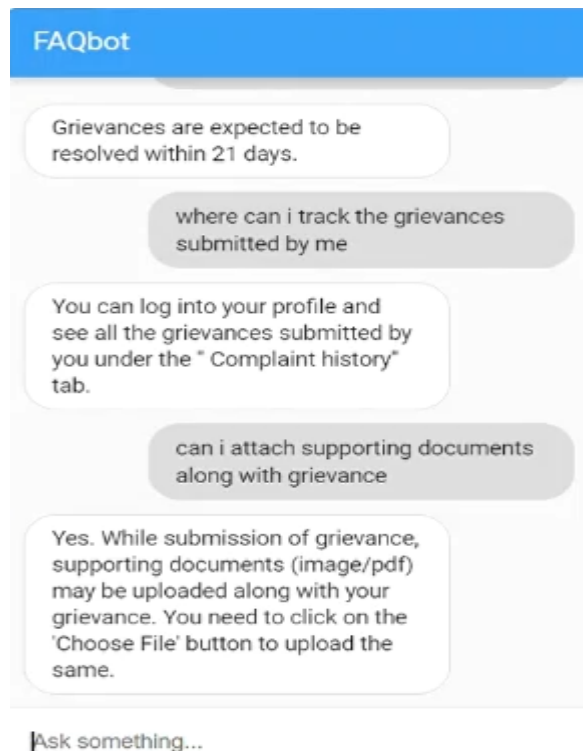

FIGURE 7. FAQ CHATBOT

V. CONCLUSION

This project will improve communication between government and citizens; in this project, we have shown how the system will work according to the complaint's priority. This project provides an overview of the AI-Driven complaint logging portal as a web service design and execution. The outcomes of implementation are that people will communicate directly with the government, and issues will be addressed depending on the problems' seriousness. Claims and feedback are essential sources of knowledge for developing the nation and the facilities used by organizations. As we know, offline complaints are not so effective. The preferred alternative is an AI-driven complaint logging portal that can directly communicate between citizens and the government and allows the government to solve problems according to priority. Further, we will work on the front end to make it more interactive, and we will add more categories to this project.

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