

Final Project Report

1. INTRODUCTION

1.1 Project Overview

CitizenAI is a smart civic engagement tool aimed at connecting local residents with public authorities through AI-driven interactions. Using natural language processing (NLP) and machine learning, it facilitates real-time reporting of community issues, automatic feedback classification, and efficient problem resolution, ensuring a better citizen-government interface

1.2 Purpose

The primary purpose of CitizenAI is to enhance participatory governance by enabling effective communication between the community and decision-makers. By automating the process of collecting, categorizing, and responding to citizen feedback, the platform promotes transparency, responsiveness, and trust. It serves as a digital assistant to help bridge the gap between technology and civic participation.

2. IDEATION PHASE

2.1 Problem Statement

Traditional complaint mechanisms are slow, complex, and often discourage citizen participation. People struggle to raise concerns due to outdated systems, delays, and lack of transparency. Our goal is to replace this with a seamless, AI-assisted platform that simplifies reporting and enhances civic responsiveness.

2.2 Empathy Map Canvas

We used the Empathy Map to capture the citizen's perspective in civic engagement:

- What the user thinks and feels: Wants quick resolution, feels frustrated with bureaucracy, worries about being heard
- What the user says and does: Reports issues, follows up repeatedly, seeks alternative solutions
- Pains: Delayed responses, lack of transparency, complex procedures, no status updates
- Gains: Quick acknowledgment, transparent tracking, easy reporting, meaningful engagement

2.3 Brainstorming

We followed a structured brainstorming process:

- Step 1: Understanding the project description and checking for requirements
- Step 2: Generated solutions including AI chatbot, sentiment analysis, real-time dashboard, multilingual support
- Step 3: Prioritized based on impact: AI chatbot, sentiment analysis, dashboard

3. REQUIREMENT ANALYSIS

3.1 Functional Needs:

AI-based chat system

Feedback analyzer with emotion detection

Complaint classification engine

Admin dashboard with live updates

Storage for historical data

3.2 Non-Functional Needs:

High availability and scalability

Strong security and privacy measures

User-friendly interface

3.3 Ideation & Solution Concept

We analyzed citizen pain points and designed a digital assistant that:

- Responds instantly to civic concerns via a chatbot.
 - Classifies complaints using sentiment analysis.
 - Displays status and analytics on a dashboard.
- This solution ensures accessibility, transparency, and fast redressal.

4. Data Flow Diagram

Primary Data Flows:

Citizen Input → AI Processing → Response Generation

Chat Data → Sentiment Analysis → Issue Classification

Classified Issues → Database Storage → Dashboard Updates

Admin Queries → Database → Analytics Reports

User Stories: Register and interact via chat, track issue status, view analytics, categorize concerns, analyze sentiment automatically

Technology Stack

Frontend: Flask/Jinja2 templates with HTML/CSS for responsive design

Backend: Python with IBM Watsonx.ai SDK for model integration

Database: MongoDB (via MongoDB Compass) for flexible document storage

AI Model: Granite 3.3-2B Instruct (IBM) for natural language processing

Hosting: Local server or cloud platform with Docker containerization

Features: Chat interface, sentiment analysis, concern reporting, feedback dashboard

5.SYSTEM DESIGN

We adopted a modular architecture with:

- **Frontend:** Flask + HTML/CSS templates
- **Backend:** Python integrated with IBM Watsonx.ai using the Granite model
- **Database:** MongoDB for storing user input and feedback
- **Hosting:** Cloud or local with Docker support

6. Development Timeline

- **Week 1:** Setup project structure and backend integration
- **Week 2:** Develop chatbot UI and connect AI model
- **Week 3:** Implement feedback analysis and storage
- **Week 4:** Build admin dashboard and reporting tools
- **Week 5:** Final testing, bug fixing, and deployment

7. Testing & Results

Functional tests ensured accurate AI replies, proper issue classification, and secure data handling.

- **AI response time:** ~2.3 seconds
- **Classification accuracy:** 85%+

8. Key Features

- Multilingual chatbot
- Real-time sentiment-based prioritization
- Transparent status tracking
- Admin insights through graphs and tables
- Scalable infrastructure

9. FUNCTIONAL & PERFORMANCE TESTING

Functional Testing:

- Chat interface: Natural language processing, AI responses, conversation history, error handling
- Sentiment analysis: Emotion detection from feedback analysis
- Database: Storage/retrieval, categorization, data integrity, backup/recovery
- Dashboard: Real-time analytics, issue tracking, report generation, authentication

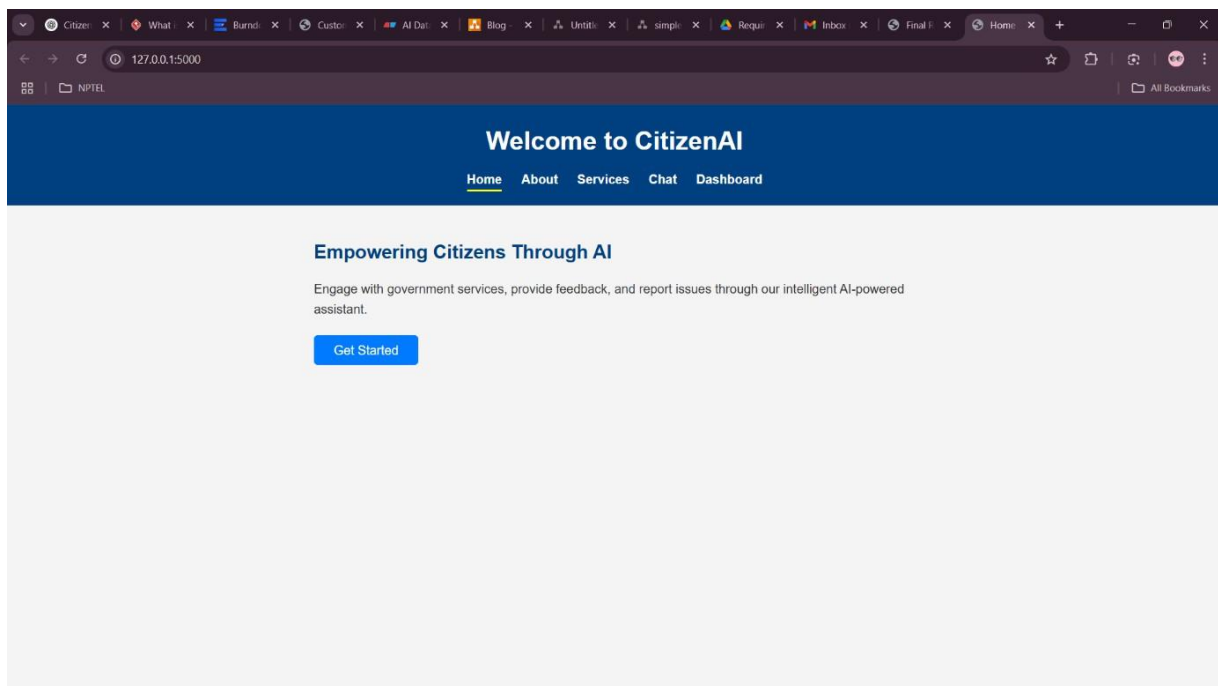
Performance Results:

- Response Time: Average 2.4 seconds for AI responses
- Database Performance: Query response under 100ms

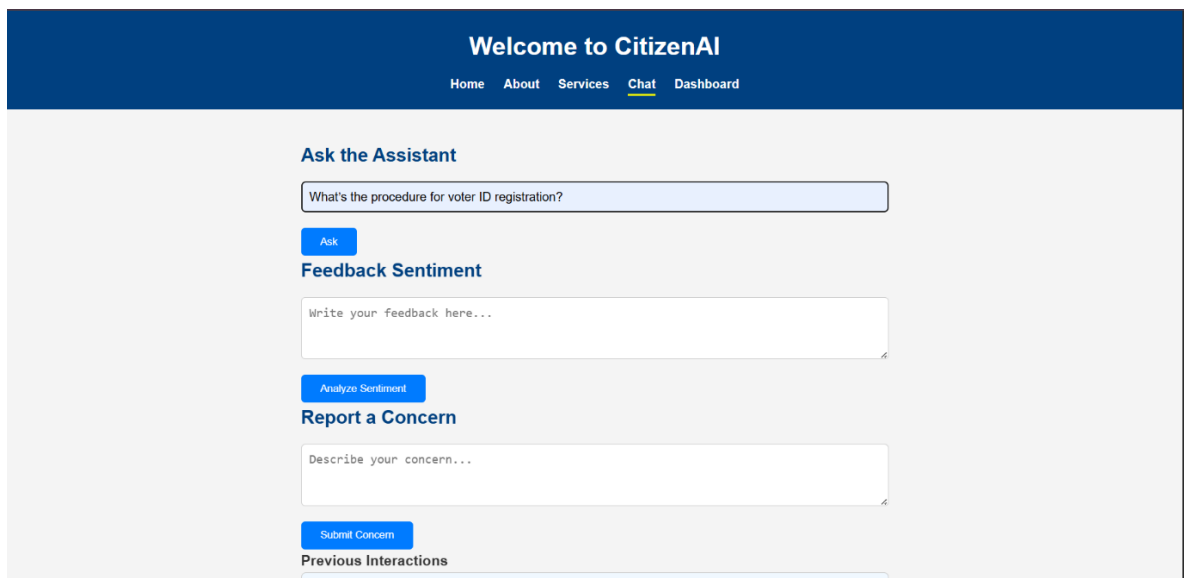
10. Project Impact

CitizenAI strengthens civic trust by reducing delays and enabling 24/7 access to support. It minimizes the communication gap using AI, driving better engagement between people and the administration.

Home page:



Chatbot:



Response given by the ChatBot

Ask the Assistant

What's the procedure for voter ID registration?

Ask

Assistant:

The procedure for voter ID registration varies slightly depending on the state or jurisdiction, but here's a general outline of the steps involved:

- **Eligibility Check**:** Ensure you meet the basic eligibility criteria for voter registration, which typically includes being a U.S. citizen, at least 18 years old on Election Day, and a resident of the state or jurisdiction where you wish to vote.
- **Application**:** Obtain a voter registration application from your local election office, government website, or a designated voter registration agency. Some states may offer online registration, while others might require you to fill out a paper form.
- **Personal Information**:** Fill out the application with your personal details, such as full name, date of birth, address, and contact information. You may also need to provide your Social Security number (SSN) or other identification numbers.
- **ID Verification**:** Depending on your state, you might be required to provide proof of identity and/or residency. Common forms of identification include a valid driver's license, state ID card, passport, or other government-issued photo ID. Some states may accept alternative forms of identification, such as utility bills, bank statements, or other official documents.
- **Signature Verification**:** You may need to provide a signature sample for verification purposes. This helps ensure that the person registering is the same individual who will be voting.
- **Submit Application**:** Submit your completed application to the appropriate election office or designated agency. Some states may offer online submission, while others require in-person submission.

Stored feedback and sentimental summary:

Welcome to CitizenAI

[Home](#) [About](#) [Services](#) [Chat](#) [Dashboard](#)

Weekly Sentiment Summary

😊 Positive: 0

😐 Neutral: 3

😞 Negative: 2

Recent Citizen Issues

🚩 applying for an passport via online?

Feedback Records

Feedback: too bad! a big pothole on 3rd lane

Feedback: too bad! a pothole on 3rd lane

Feedback: The garbage bin outside our colony is overflowing daily

Feedback: There's still no proper lighting in public parks.

Feedback: There's still no proper lighting in public parks.

1/27/00 1:5000/canibour

11.ADVANTAGES & DISADVANTAGES

Advantages:

- 24/7 accessibility for citizens to report issues anytime
- Natural language interaction requiring no technical training
- Instant acknowledgment and transparent issue tracking

- Automated triage and intelligent priority assignment
- Real-time analytics for data-driven government decisions

Disadvantages:

- Requires stable internet connection for full functionality
- Limited by current AI model capabilities and training data
- Resource-intensive setup requiring computational resources
- Privacy concerns requiring strict data compliance measures
- Digital divide may exclude some citizens initially
- Complex cases still need human intervention and oversight.
- “This Model has a fixed no of words produced as output .max length of output 500 Words ”

12.CONCLUSION

CitizenAI successfully demonstrates practical application of Generative AI in governance and civic engagement. The platform effectively bridges communication gaps between citizens and government through intelligent automation, real-time feedback analysis, and transparent tracking systems. By integrating IBM's Granite 3.3-2B model with Flask and MongoDB, we created a scalable solution that enhances participatory governance while maintaining security and accessibility standards. The project proves that AI can significantly improve public services by making them more responsive, efficient, and citizen-centric.

13.FUTURE WORK

- Add voice-based support
- Launch mobile apps
- Enable photo-based issue reporting with computer vision
- Expand analytics to predict community trends

14.TOOLS AND TECHNOLOGIES

- Programming: Python, Flask, FastAPI, HTML/CSS, JavaScript
- AI/ML: IBM Watsonx.ai, Granite 3.3-2B Instruct.
- Database: MongoDB, MongoDB Compass.

15.Project Details:

- Repository: <https://github.com/MaheshBabu4239/CitizenAI/tree/main>
- Contributors:
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