

# Citizen AI - Project Documentation

**Project Title:** Citizen AI

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**Team Size:** 5

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## 1. Introduction

The Citizen AI project is an innovative AI-driven platform designed to streamline and improve the interaction between citizens and government services. By combining Artificial Intelligence (AI), data analytics, and user-friendly interfaces, this system aims to enhance civic engagement, provide timely information, and improve the efficiency of public services. It is designed to help citizens report issues, access information, and provide feedback to government bodies, making civic participation more efficient, transparent, and responsive.

## 2. Project Objectives

The primary objectives of the project are:

- To provide a personalized, real-time AI assistant for citizens to navigate government services.
- To improve civic participation and engagement through a user-friendly and intuitive platform.
- To empower citizens by providing actionable information and a direct channel for feedback.
- To act as a data-driven tool for government officials to understand citizen needs and priorities.

## 3. Problem Statement

Citizens often face challenges when interacting with government services, such as navigating

complex bureaucratic processes, finding accurate information, and reporting local issues. This can lead to frustration, decreased civic engagement, and a disconnect between the public and government. There is a need for a modern, accessible, and efficient platform that uses technology to bridge this gap, providing a single point of access for all civic needs and enabling a more collaborative approach to governance.

#### 4. Scope of the Project

The project focuses on citizen-centric government interaction using AI. It covers two primary functionalities: a conversational AI chatbot for citizen queries and a data analytics dashboard for government officials. It does not currently manage large-scale IoT networks or enforce compliance but serves as a support and insight tool to improve communication and public service delivery.

#### 5. Literature Review / Background

Many existing government service portals provide static information but lack a truly interactive, citizen-centered approach. Previous studies show that platforms enabling direct communication and feedback lead to higher citizen satisfaction. AI-powered chatbots and natural language processing (NLP) have been successfully used in customer service and are now being adopted by public institutions. This project builds upon these concepts by combining conversational AI with data analytics to create a comprehensive and interactive platform for civic engagement.

#### 6. Features of the System

Key features include:

- **Conversational Interface:** For natural interactions via a chatbot.
- **Service Locator:** An AI-powered tool to help citizens find the right government service or contact person.
- **Issue Reporter:** Allows citizens to easily report local issues with text and image support.
- **Feedback & Polls Generator:** Enables government officials to create and analyze citizen feedback and opinions on public policies.
- **Sentiment Analysis:** Analyzes citizen feedback to gauge public sentiment on specific issues.
- **Multi-format Support:** For handling inputs like text, images, and links.

#### 7. System Requirements

To run the project successfully, the following requirements are necessary:

- **Programming Languages:** Python 3.9 or later.
- **Libraries:** Transformers, Gradio, Flask.
- **Platform:** Google Colab or a local Python environment with GPU support.
- **Hardware:** Stable internet connection for model downloads.

- **Optional:** T4 GPU runtime in Colab for faster execution.

## 8. Technology Stack

The project is built using the following technologies:

- **Programming Language:** Python
- **Frameworks:** Flask for the backend web server and Gradio for the user interface.
- **Natural Language Processing (NLP):** IBM Granite model for conversational understanding and response generation.
- **Database:** SQLite for storing user and report data.
- **Front-end:** Gradio-based web app for user interaction.

## 9. Project Architecture

The architecture consists of:

- **Frontend:** Gradio UI for the chatbot and user interface.
- **AI Backend:** A Flask server that handles API requests.
- **Core AI Model:** IBM Granite for processing user queries, extracting information, and generating responses.
- **Data Flow:** User inputs are sent to the Flask backend, processed by the AI model, and the response is sent back to the Gradio frontend.

## 10. Data Flow Diagram

Data flows through the system as follows:

1. User inputs a query or a report via the Gradio interface.
2. Input is sent to the Flask backend.
3. The backend uses the IBM Granite model to process the request and generates an intelligent response.
4. The output is displayed on the Gradio interface in real-time.

## 11. Module Description

The system is divided into modules:

- **Chatbot Interface:** Provides a user-friendly conversational interface.
- **Natural Language Understanding (NLU):** Extracts key information from user queries.
- **Response Generation:** Uses the LLM to produce intelligent and accurate responses.
- **Data Analytics Dashboard:** Provides a visual representation of reports and feedback for officials.

## 12. Implementation Steps

Implementation is done in Google Colab:

1. **Open** a new Colab notebook.
2. **Change runtime** to T4 GPU.
3. **Install** all necessary libraries (Flask, Gradio, IBM Granite).
4. **Write and run** the complete project code.
5. **Launch** Gradio and access the app via a shareable link.

### 13. User Interface

The user interface is built with Gradio. It provides a main chatbot window where users can type their queries or upload reports. It accepts text, and outputs are displayed in a conversational format.

### 14. Code Description

Key functions:

- `process_query()`: Generates intelligent text using the IBM Granite model.
- `extract_report_data()`: Extracts text and images from user-submitted reports.
- `generate_response()`: Produces accurate and helpful responses to user queries.

### 15. Testing and Validation

Testing was done in multiple stages:

- **Unit testing:** For text extraction and response generation.
- **Functional testing:** Validating that the chatbot handles common queries and report submissions.
- **Edge case testing:** For handling empty or invalid inputs.

### 16. Output Screenshots

The Gradio app provides clear outputs. Responses are displayed in a scrollable text box. Screenshots can be added to demonstrate the outputs visually.

### 17. Results and Discussions

The project successfully delivered an AI-based assistant capable of generating accurate responses and handling citizen-submitted reports. The system proved efficient in streamlining communication and providing actionable insights for government officials.

### 18. Advantages of the Project

- **Increased Citizen Engagement:** Encourages active participation in local governance.
- **Time Savings:** Simplifies complex bureaucratic processes.
- **Improved Public Services:** Provides a direct channel for feedback and issue reporting.
- **Easy-to-use Interface:** Accessible to all citizens, regardless of technical skill.

## 19. Limitations of the Project

- **Language Dependency:** Limited to the English language in the current version.
- **Accuracy:** Accuracy depends on the LLM model quality.
- **Offline Functionality:** No offline functionality.
- **Scalability:** Requires robust infrastructure for large-scale deployment.

## 20. Future Enhancements

Planned improvements:

- **Multilingual support:** For wider accessibility.
- **Mobile app version:** For on-the-go access.
- **Integration with IoT data:** From smart city sensors to provide real-time updates.
- **Enhanced security:** With user authentication.

## Conclusion

The Citizen AI project demonstrates how AI can transform the relationship between citizens and government. By providing a user-friendly and efficient platform, this project can be a critical tool for transparent and responsive governance. It empowers citizens to be active participants in their communities and helps government officials make data-driven decisions.