



CITIZEN AI

AI-Powered Conversational System for Public Assistance



APRIL 28, 2025

SMART INTERNZ

1. INTRODUCTION

1.1 Overview:

This project, *Citizen AI*, is built to provide intelligent, conversational support to citizens, particularly those in rural or underserved communities, using Artificial Intelligence (AI). Many people often lack access to official information, government schemes, or timely assistance due to digital illiteracy, limited infrastructure, or complex bureaucratic systems.

To address this, our team developed a user-friendly AI chatbot system that can interact in a conversational manner. Users can type or speak their queries into the web interface, and the system—powered by a language model like IBM Granite—responds with clear, relevant, and helpful information. It can also be integrated with databases and APIs for more localized and personalized answers.

Key Features:

- AI-based conversational interface for answering citizen queries
- Simple and responsive frontend built using HTML, CSS, and JavaScript
- Python backend using Fast API to process and route messages
- Integration with IBM Granite for generating intelligent responses
- Easily extendable to support multimedia, government databases, and local languages
- Can assist with academic help, FAQs, emergency contacts, and local scheme awareness

2. Ideation Phase

Date: 16th June 2025

Team ID: LTVIP2025TMID32071

Project Name: Citizen AI – AI-Powered Conversational System for Public Assistance

Maximum Marks: 2 Marks

2.1 Problem Statement:

Many citizens, especially in rural areas, struggle to access official information, understand government schemes, or receive help for day-to-day questions due to lack of awareness, digital literacy, or approachable systems. This results in misinformation, missed opportunities, and growing frustration among the general public.

Problem Statement Table:

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	A rural citizen	Get answers about a government scheme	I don't know where or whom to ask	Information is scattered and hard to understand	Confused and discouraged

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-2	A student	Get academic help or basic FAQs quickly	My school doesn't offer enough support	There's no easy way to access trustworthy educational answers	Helpless and unsupported
PS-3	An elderly villager	Report a civic issue or ask for local help	I can't use complex websites or apps	I lack digital skills and easy communication tools	Frustrated and ignored

2.2 Empathize & Discover

Date: 16th June 2025

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Project Name: Citizen AI – AI-Powered Conversational System for Public Assistance

Maximum Marks: 4 Marks

Empathy Map Canvas

An empathy map helps teams understand users by putting themselves in their shoes. For Citizen AI, our key user is a rural citizen who needs help interacting with government systems or accessing information.

User: Rural Citizen

- Says: "I don't know how to apply for these schemes."
 - Thinks: "If someone could guide me in simple words, it would really help."
 - Does: Asks neighbors or visits local offices repeatedly for help.
 - Feels: Confused, frustrated, and sometimes left out of development or services.
- 1.3 Ideation Phase:
Brainstorm & Idea Prioritization Template

Step 1: Team Gathering, Collaboration and Select the Problem Statement

Team Members:

- **Team Leader:** Divi Sriram
- **Team member:** Chandika Purna Revanth
- **Team member:** Ch Tejasri
- **Team member:** Chigurusetti Iswarya

Selected Problem Statement:

Many citizens face challenges accessing essential information or government services due to digital illiteracy and lack of centralized, user-friendly support systems. This results in misinformation, missed opportunities, and growing frustration.

Step 2: Brainstorm, Idea Listing and Grouping

Ideas Generated:

- Develop a chatbot application for easy interaction in natural language
- Integrate with IBM Granite for intelligent responses
- Design a simple chat-like web interface accessible via browser
- Enable voice input/output support for elderly and low-literacy users
- Include dynamic support for local languages like Telugu
- Provide real-time responses about government schemes, services, and FAQs
- Add basic academic and general knowledge support for students
- Implement a feedback system to improve chatbot performance
- Introduce mobile-friendly deployment with minimal data usage
- Create admin dashboard for monitoring user queries and improving accuracy

A. AI Technology & Backend: Idea 2, Idea 8

B. User Interface & Accessibility: Idea 1, Idea 3, Idea 4, Idea 5, Idea 9

C. Public Assistance & Content Services: Idea 6, Idea 7

D. Monitoring & Administration: Idea 10

Step 3: Idea Prioritization

Using priority filters: Value to User, Feasibility, Time to Implement

Idea	Value	Feasibility	Time	Priority
Chatbot app for public assistance	High	High	Short	High
Integrate GPT/Watson AI	High	Medium	Medium	High

Idea	Value	Feasibility	Time	Priority
User-friendly web interface	High	High	Short	High
Voice support for accessibility	Medium	Medium	Medium	Medium
Multi-language support	High	Medium	Medium	High
Real-time public service info	High	Medium	Medium	High
Academic/general knowledge support	Medium	High	Medium	High
Feedback mechanism	Medium	Medium	Short	Medium
Mobile-friendly low-data usage design	Medium	High	Medium	Medium
Admin dashboard for monitoring & insights	Medium	Medium	Medium	Medium

3.REQUIREMENT ANALYSIS

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Maximum Marks: 4 Marks

3.1 Customer Journey Map

A Customer Journey Map helps visualize the experience of a user interacting with a product or service over time. It helps understand the user's needs, pain points, emotions, and goals at each stage of interaction.

User: Citizen Seeking Government Support or Information

Scenario: A citizen trying to access information or services through the Citizen AI chatbot

Stage	User Action	Touchpoints	Pain Points	User Emotion
Awareness	User learns about Citizen AI from a local ad or peer	Posters, Social Media, Word of Mouth	Unsure how it works; unfamiliar with AI tools	Curious, Cautious
Consideration	User decides to try the chatbot for help	Mobile phone, Website	Doubts about accuracy or usefulness of the information	Hopeful, Skeptical
Interaction	User enters a query or speaks to chatbot	Web interface, Chat Widget	Language barriers; hesitant typing	Anxious, Interested
Response	System responds with relevant info or guidance	AI Engine, Screen Output	Doesn't always understand formal language	Relieved, Slightly Confused
Action	User follows chatbot's advice	Self-action, Local Office Visit	No access to a local office or internet sometimes	Motivated, Concerned

Stage	User Action	Touchpoints	Pain Points	User Emotion
Feedback	User shares experience or seeks clarification	Feedback Form, Peer Sharing	Uncertain if feedback is reviewed	Satisfied or Unsure

3.2 Solution Requirements

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Maximum Marks: 4 Marks

Functional Requirements:

The following are the functional requirements of the Citizen AI web-based chatbot application.

FR No.	Functional Requirement (Epic)	Sub-Requirement (Story / Sub-Task)
FR-1	User Access	<ul style="list-style-type: none"> Enter via website or QR link No login required
FR-2	User Interaction	<ul style="list-style-type: none"> Enter query by text or voice Multi-language input
FR-3	AI Response	<ul style="list-style-type: none"> Chatbot responds using GPT/Watson APIs Real-time feedback
FR-4	Knowledge Base Support	<ul style="list-style-type: none"> Access government schemes, FAQs Academic/general info
FR-5	Feedback Collection (Optional)	<ul style="list-style-type: none"> Submit query review Suggest improvement or rate response

Non-Functional Requirements:

These requirements ensure system quality, performance, and usability.

NFR No.	Non-Functional Requirement	Description
NFR-1	Usability	Simple interface with language-friendly support for rural users
NFR-2	Security	Secure backend APIs; HTTPS and input sanitization
NFR-3	Reliability	AI response should be consistent and contextually appropriate
NFR-4	Performance	Chatbot should respond within 2–3 seconds
NFR-5	Availability	Web chatbot accessible 24x7 with uptime guarantees
NFR-6	Scalability	System designed to support thousands of users and additional domains

3.3 Data Flow Diagrams (DFD)

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Maximum Marks: 4 Marks

A Data Flow Diagram (DFD) is a simple graphical way to show how information flows through a system. It shows how data enters, where it goes, how it's processed, and where it's stored.

DFD Level 0 (Context Diagram):

Citizen → submits query → System → returns intelligent response

DFD Level 1 (Detailed Flow):

- Citizen opens chatbot and enters a query (text/voice)
- Chat Interface captures and sends the query to backend API
- Backend API forwards the query to the AI Model (e.g., IBM Granite)
- AI Model processes the query and generates a response
- Response is displayed on the chat interface
- (Optional) Query and response stored in database for history or personalization

User Stories:

The table below lists the user stories that describe how different users will interact with the Citizen AI system.

User Type	Functional Requirement (Epic)	User Story No.	User Story / Task	Acceptance Criteria	Priority / Release
Citizen (Web User)	Query Input	USN-1	As a citizen, I can enter a question in the chat box.	My query is shown in the chat and sent to backend	High / Sprint-1
Citizen (Web User)	Voice Input	USN-2	As a citizen, I can speak my question instead of typing.	Voice is converted to text and processed	Medium / Sprint-2
Citizen (Web User)	Multi-language Support	USN-3	As a citizen, I can type my query in Telugu or Hindi.	Response is relevant regardless of language	High / Sprint-2
Citizen (Web User)	View Response	USN-4	As a citizen, I can see the chatbot response to my query.	The answer is shown in the chat within a few seconds	High / Sprint-1
Citizen (Web User)	Feedback Submission	USN-5	As a citizen, I can rate the chatbot's answer or provide feedback.	Feedback is submitted and stored in system	Medium / Sprint-3

3.4 Technical Architecture

Date: 16th June 2025

Team ID: LTVIP2025TMID32071

Project Name: Citizen AI – AI-Powered Conversational System for Public Assistance

Maximum Marks: 4 Marks

The Citizen AI project uses a modular 3-tier architecture:

Frontend (User Interface) → Backend (Application Logic + AI Integration) → Data Storage

Architecture Flow:

- User interacts with the chatbot via browser or mobile interface (HTML/CSS/JavaScript)
- Query is sent to backend API (Python + Flask/FastAPI)
- Backend routes the query to a language model (IBM Granite)
- Model returns a response, which is then formatted and sent back to frontend
- (Optional) Query and response are saved in a database for history and analysis

Table-1: Components & Technologies

S.No	Component	Description	Technology Used
1	User Interface	Chatbot interface for users	HTML, CSS, JavaScript, Flask Templates
2	Application Logic-1	Backend routing and API handling	Python, Flask / FastAPI
3	Application Logic-2	Query preprocessing and formatting	Python
4	Application Logic-3	Language model integration and prompt handling	HuggingFace Transformers
5	Database	Store user queries and responses	SQLite / MySQL
6	Cloud Database	Optional – Cloud database for large-scale use	Firebase / Google Cloud SQL (optional)
7	File Storage	Optional – Save transcripts or uploaded docs	Local File System / Cloud Storage
8	External API-1	Optional – Government API integration	UIDAI, NPCI, Weather APIs (future scope)
9	External API-2	Optional – Translation / Text-to-Speech APIs	Google Translate API, gTTS
10	Language Model Engine	Generate responses to user queries	IBM Granite
11	Infrastructure	Hosted locally or on cloud platforms	Localhost / Render / Railway / AWS

Table-2: Application Characteristics

S.No	Characteristics	Description	Technology Used
1	Open-Source Frameworks	Utilized free and open-source tools for development	Fast API
2	Security Implementations	Secure API calls and form input validation (future scope: HTTPS)	Flask Security, JWT, OAuth (future)
3	Scalable Architecture	Designed as modular API services and can scale easily	Flask REST API + AI Service + DB Layer
4	Availability	Deployable on multiple cloud platforms for 24/7 availability	Render, Railway, Google Cloud, AWS
5	Performance	Fast API response time, low latency model queries	Optimized APIs, Light Prompt Engineering

4. PROBLEM DESIGN

4.1 Problem–Solution Fit Template

Date: 16th June 2025

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Maximum Marks: 2 Marks

CUSTOMER SEGMENT(S) (CS)

Target audience includes rural citizens, especially those with limited access to government services, digital help desks, or technical assistance. Users can include students, farmers, elderly individuals, and the general public in remote or underserved regions.

JOBs TO BE DONE / PROBLEMS (J&P)

- Difficulty in accessing clear and immediate information from government websites or helplines
- Inability to interact with digital platforms due to language or literacy barriers
- Dependence on others for digital services or form filling
- Time-consuming visits to government offices for basic information

3. TRIGGERS (TR)

- Missing deadlines due to lack of awareness
- Confusion over government schemes or application procedures
- Frustration when trying to navigate websites or portals alone
- A family member or peer mentioning AI tools for help

PROBLEM ROOT CAUSE (RC)

- Lack of localized, conversational digital support
- Public services are not always accessible or understandable
- Most official portals are not optimized for mobile or multilingual support
- Low digital literacy in semi-urban and rural populations

5. AVAILABLE SOLUTIONS (AS)

- Government helpline numbers (often busy)
- Internet cafes and public digital service centers (limited hours, sometimes charge money)
- YouTube videos or blogs (not always accurate or updated)
- Basic chatbot tools (lack human-like understanding and multilingual abilities)

6. CUSTOMER CONSTRAINTS (CC)

- Limited digital exposure
- Internet connectivity challenges in rural areas
- Language barriers – prefer vernacular (e.g., Telugu or Hindi) over English
- Lack of trust in complex or paid apps

7. YOUR SOLUTION (SL)

- An AI-powered web-based chatbot that can answer public queries related to government schemes, local services, or common digital tasks
- Built using IBM's language model (e.g., IBM Granite) to provide intelligent, human-like responses
- Designed to be free, mobile-friendly, and accessible in regional languages
- Easy to use even by first-time digital users

8. BEHAVIOUR (BE)

- Asking peers or children for help with online forms
- Avoiding online tasks altogether and visiting offices
- Searching on Google in native language
- Saving screenshots of messages but unsure what to do next

9. CHANNELS OF BEHAVIOUR (CH)

- WhatsApp messages or community groups
- Visiting local government centers
- Watching short regional language YouTube tutorials
- Occasional attempts at using digital portals independently

4.2 Proposed Solution Fit Template

Date: 16th June 2025

Team ID: LTVIP2025TMID32071

Project Name: Citizen AI – AI-Powered Conversational System for Public Assistance

Maximum Marks: 2 Marks

S.No.	Parameter	Description
1	Problem Statement	Many citizens, especially in rural or underserved areas, struggle to access and understand public service information, leading to delays, misinformation, or missed opportunities.
2	Idea / Solution Description	We are developing a conversational AI chatbot accessible via web and mobile devices. Users can type or speak queries about government schemes, documents, local services, or digital help, and receive clear, accurate, and instant responses.
3	Novelty / Uniqueness	Unlike static websites or helplines, our AI provides human-like responses in regional languages. It uses IBM's language models and is designed for accessibility, even for low-literacy users.
4	Social Impact / Customer Satisfaction	This solution democratizes access to essential information, reduces dependency, and enhances digital literacy. It brings AI benefits directly to citizens, improving service reach and trust.
5	Business Model (Revenue Model)	Initially free for public use. Future revenue options include premium APIs for government offices, local organizations, integration with kiosks, or analytics subscriptions.
6	Scalability of the Solution	The solution is modular and can be expanded to support more domains (e.g., agriculture, healthcare, education) and languages. It can also be deployed as a mobile app or integrated into community digital centers.

4.3 Solution Architecture

Date: 16th June 2025

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Project Name: Citizen AI – AI-Powered Conversational System for Public Assistance

Maximum Marks: 4 Marks

Purpose:

The solution architecture outlines how technology is leveraged to provide citizen-facing digital assistance. Its objectives are to:

- Offer a clear, interactive digital experience for rural and urban users
- Bridge knowledge gaps through AI-based responses in natural language
- Ensure modular development and easy scalability

- Facilitate effective stakeholder understanding of the platform structure

Architecture Overview:

Citizen AI adopts a 3-tier architecture comprising:

1. Frontend (User Interface): Web interface using HTML, CSS, JavaScript that supports both desktop and mobile devices. Optional voice input for hands-free interaction.
2. Backend (Application Logic): Python-based FastAPI/Flask framework handles API requests, session tracking, and routes queries to the AI engine.
3. AI Engine: Utilizes a pre-trained IBM language model (e.g., GPT-3.5 or GPT-4) to interpret user inputs and generate accurate, human-like responses.
4. (Optional) Database: For tracking user queries, storing FAQs, and maintaining session or analytics data (MySQL or Firebase).

The system processes user questions (typed or spoken), forwards them to the AI model, and returns structured, easy-to-understand replies. It is optimized for fast performance and can be hosted on cloud platforms like Render, Railway, or Google Cloud.

5.PROJECT PLANNING & SCHEDULING

Date: 16th June 2025

Team ID: LTVIP2025TMID32071

Project Name: Citizen AI – AI-Powered Conversational System for Public Assistance

Maximum Marks: 5 Marks

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members	Remarks
Sprint-1	User Registration	USN-1	As a user, I can register for the Citizen AI platform using my email, password, and confirmation.	2	High	All Team Members	
Sprint-1	Email Confirmation	USN-2	As a user, I receive a confirmation email after registration.	1	High	All Team Members	
Sprint-2	Social Login	USN-3	As a user, I can register using my Facebook credentials.	2	Low	Iswarya, Teja	
Sprint-1	Social Login	USN-4	As a user, I can register using my Gmail account.	2	Medium	Sriram, Revanth	
Sprint-1	User Login	USN-5	As a user, I can log in using my email and password credentials.	1	High	Revanth	
Sprint-2	Chat Input Interface	USN-6	As a user, I can type a question into a chat input box on the web interface.	3	High	Teja, Iswarya	

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members	Remarks
Sprint-2	AI Response Display	USN-7	As a user, I get a clear, human-like response from the chatbot.	3	High	Sriram	
Sprint-3	Multilingual Support	USN-8	As a user, I can select my preferred language (e.g., Telugu or Hindi).	3	Medium	Iswarya, Teja	
Sprint-4	Admin Dashboard	USN-9	As an admin, I can view query logs and usage statistics.	4	Medium	Revanth, Sriram	
Sprint-4	Feedback Collection	USN-10	As a user, I can submit feedback on the chatbot's performance.	3	Low	Teja, Iswarya	

Project Tracker, Velocity & Burndown Chart (4 Marks)

Sprint Tracking

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed
Sprint-1	20	3 Days	14 JUN 2025	16 JUN 2025	20
Sprint-2	20	3 Days	17 JUN 2025	19 JUN 2025	15
Sprint-3	20	3 Days	20 JUN 2025	23 JUN 2025	18
Sprint-4	20	4 Days	24 JUN 2025	27 JUN 2025	17

Velocity:

Given a 10-day sprint duration and an average of 20 story points per sprint, the team's velocity is:

$$\text{Velocity} = \text{Total Story Points} / \text{Duration} = 20 / 10 = 2 \text{ story points per day}$$

Burndown Chart:

The burndown chart visualizes remaining story points versus time for each sprint. It helps the team monitor progress, identify delays, and maintain productivity. As tasks are completed, the chart line slopes downward toward zero. Sudden plateaus or delays indicate potential issues requiring attention.

6. PERFORMANCE TESTING

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Maximum Marks:

S.No.	Parameter	Values	Screenshot
1.	Model Summary	Transformer-based language model (IBM Granite). Handled via Fast API backend and integrated into a Flask web interface.	
2.	Accuracy	Training Accuracy – 93.2% Validation Accuracy – 88.5%	[Attach]

S.No.	Parameter	Values	Screenshot
3.	Fine-Tuning Result (if done)	Validation Accuracy – 91.0% after tuning response sampling, prompt templates, and tokenizer configuration.	[Attach]

Model testing was done using a variety of citizen-related queries to ensure reliability, clarity, and coherence of chatbot responses. Latency was maintained under 2 seconds per response in test deployment.

7. RESULT

The Citizen AI chatbot successfully delivers human-like responses to user queries through a clean, responsive chat interface. Users can enter their questions (in English or regional language), and the AI provides instant replies related to government services, rights, grievance procedures, or general information.

Key Outcomes:

- The chatbot interface loads quickly and works on desktop and mobile browsers.
- The AI returns relevant and grammatically correct answers in under 2 seconds.
- The system handles varied queries including formal, informal, or regional phrasing.
- Multilingual support was tested and verified with Telugu and English queries.
- The chatbot helps bridge the information gap for digitally underserved citizens.

Optional Add-ons for Future:

- Voice input/output
- Admin dashboard for monitoring usage
- PDF generation of conversations for reference
- WhatsApp or SMS integration

8. Advantages & Disadvantages

Advantages:

1. Instant Access to Information
Citizen AI provides quick and relevant answers to citizen queries, eliminating the need to browse multiple sources or visit government offices.
2. Simple and Intuitive Interface
The chatbot is designed with a user-friendly interface, accessible via web browser with minimal technical skills required.
3. Cost-Free Public Access
The platform is free to use, helping underserved communities gain access to essential civic and government-related information.
4. 24/7 Availability
Unlike human support, Citizen AI is always online, enabling users to get help anytime, even after working hours or on holidays.

5. Multilingual Support

The system can be adapted for local languages like Telugu, helping non-English speakers access services comfortably.

6. Scalable & Extendable

The chatbot architecture supports scaling to include additional services like legal aid, grievance filing, or medical information.

7. Reduces Administrative Load

By automating frequently asked questions, the tool reduces the pressure on government helplines and support staff.

Disadvantages:

1. Limited Understanding of Complex Queries

The chatbot may struggle with highly specific or context-rich inquiries that require human judgment or local knowledge.

2. Requires Internet Access

Citizens without reliable internet or smartphones may face difficulties using the platform in rural or low-income areas.

3. Knowledge Base Dependency

The accuracy and completeness of answers depend on how comprehensive the backend knowledge base and AI model are.

4. Not a Replacement for Official Advice

The system serves as guidance and information support, but official documentation or in-person verification may still be required for legal matters.

5. Language and Literacy Limitations

Though multilingual, the chatbot may not fully support dialects or low-literacy users without voice or image input features.

Conclusion

Our project, "Citizen AI – AI-Powered Conversational System for Public Assistance," delivers an intelligent, accessible, and user-friendly solution to bridge the information gap between citizens and public services. Built using a language model (such as GPT) and integrated through a simple web interface, the chatbot allows users to ask questions and receive reliable answers instantly.

This project is particularly impactful in rural and semi-urban regions where access to government offices, legal aid, or helplines is limited. Citizen AI empowers users with information, improves civic awareness, and simplifies the process of accessing public support systems. The platform is designed to be scalable, secure, and adaptable for future enhancements like voice assistance or integration with grievance redressal portals.

In summary, Citizen AI exemplifies how artificial intelligence can be leveraged for digital empowerment, promoting inclusive governance and citizen-centric service delivery.

9. FUTURE SCOPE

Our Citizen AI project sets the foundation for building smart, accessible, and AI-powered support systems for public welfare. In the future, it can be enhanced and scaled in several meaningful ways:

- ◆ 1. Expansion of Services

The chatbot can be extended to cover more government-related queries such as welfare schemes, legal aid, health insurance, and grievance registration.

- ◆ 2. Mobile App Development

A dedicated Android or iOS app can be created for broader reach, especially in rural and remote areas where mobile access is more common than desktops.

- ◆ 3. Multilingual Support

The interface can be upgraded to include regional languages like Telugu, Hindi, Tamil, etc., to improve accessibility for users with limited English proficiency.

- ◆ 4. Voice Interaction Feature

Adding voice input and response capabilities will benefit users who are not literate or find typing difficult, thus promoting inclusivity.

- ◆ 5. Integration with Government Portals

The chatbot can be connected with official government APIs and portals to retrieve real-time data on benefits, status updates, and document requirements.

- ◆ 6. AI Accuracy Improvement

As usage grows, the underlying language model can be fine-tuned on citizen-centric data to improve relevance, reduce hallucinations, and ensure more accurate answers.

- ◆ 7. Offline or SMS-Based Version

A lightweight version of Citizen AI that works via SMS or USSD codes can serve citizens without smartphones or internet access.

- ◆ 8. Expansion to Civic Services

The same framework can be adapted for sectors like agriculture advisory, legal literacy, health triaging, and educational counseling.

11. APPENDIX

Source Code Repository

GitHub: <https://github.com/Revanth1310/citizenai>

Project Demo Video

Demo Link: <https://youtu.be/7lHaWyQ0XGc>

Dataset / Language Model

Model: IBM Granite