

1. INTRODUCTION

1.1 Project Overview

Citizen AI is an advanced digital platform developed to foster effective communication between citizens and government bodies. In today's fast-paced digital age, where expectations for immediate and accurate responses are high, Citizen AI acts as a revolutionary system that leverages artificial intelligence and cloud technologies. The system is built using Flask as the backend framework and utilizes IBM Watson and IBM Granite models for powerful natural language processing (NLP) capabilities. It provides real-time, intelligent responses to citizen inquiries and allows government officials to monitor feedback and sentiment through a robust analytics dashboard. This platform not only facilitates better engagement but also supports data-driven policy-making and improves the overall public service experience.

1.2 Purpose

The primary objective of Citizen AI is to enhance civic engagement by transforming how governments respond to citizens. It aims to automate repetitive interactions, provide 24/7 assistance, and empower citizens to access vital information easily. The project supports transparency and accountability in governance, ensuring timely and relevant communication that builds trust and satisfaction among the public.

2. IDEATION PHASE

2.1 Problem Statement

| | |
|---------------|--|
| Date | 25 Jan 2025 |
| Team ID | LTVIP2025TMID31765 |
| Project Name | citizen ai – intelligent citizen engagement platform |
| Maximum Marks | 2 Marks |

Many citizens experience difficulty in accessing government services and getting their queries addressed efficiently. The manual processes currently in place lead to delays, miscommunication, and frustration. A significant gap exists between government service providers and the public due to a lack of interactive, intelligent, and scalable communication systems. The need for a platform that can address these challenges and simplify the interaction process is more critical than ever.

| | | |
|----------------------------|---|---|
| I am | Describe customer with 3-4 key characteristics - <i>who are they?</i> | Describe the customer and their attributes here |
| I'm trying to | List their outcome or "job" the care about - <i>what are they trying to achieve?</i> | List the thing they are trying to achieve here |
| but | Describe what problems or barriers stand in the way - <i>what bothers them most?</i> | Describe the problems or barriers that get in the way here |
| because | Enter the "root cause" of why the problem or barrier exists - <i>what needs to be solved?</i> | Describe the reason the problems or barriers exist |
| which makes me feel | Describe the emotions from the customer's point of view - <i>how does it impact them emotionally?</i> | Describe the emotions the result from experiencing the problems or barriers |

2.2 Empathy Map Canvas

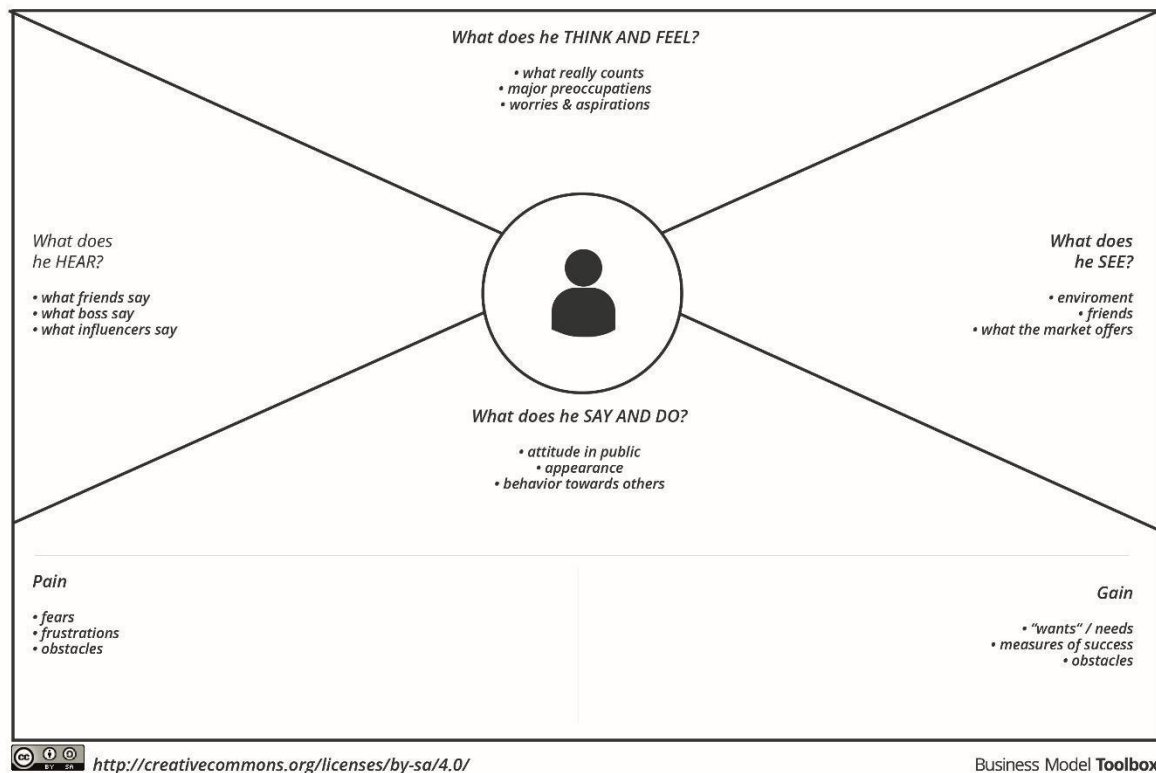
| | |
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An empathy map is a simple, easy-to-digest visual that captures knowledge about a user's behaviours and attitudes.

It is a useful tool to helps teams better understand their users.

Creating an effective solution requires understanding the true problem and the person who is experiencing it. The exercise of creating the map helps participants consider things from the user's perspective along with his or her goals and challenges.

Empathy Map



2.3 Brainstorming

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions.

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

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



Brainstorm & idea prioritization

Use this template in your own brainstorming sessions so your team can unleash their imagination and start shaping concepts even if you're not sitting in the same room.

🕒 10 minutes to prepare
🕒 1 hour to collaborate
👤 2-8 people recommended



Before you collaborate

A little bit of preparation goes a long way with this session. Here's what you need to do to get going.

🕒 10 minutes



A Team gathering

Define who should participate in the session and send an invite. Share relevant information or pre-work ahead.



B Set the goal

Think about the problem you'll be focusing on solving in the brainstorming session.



C Learn how to use the facilitation tools

Use the Facilitation Superpowers to run a happy and productive session.

[Open article](#) →



1 Define your problem statement

What problem are you trying to solve? Frame your problem as a How Might We statement. This will be the focus of your brainstorm.

🕒 5 minutes

PROBLEM

How might we [your problem statement]?



Key rules of brainstorming

To run an smooth and productive session



Stay in topic.



Encourage wild ideas.



Defer judgment.



Listen to others.



Go for volume.



If possible, be visual.

Step-2: Brainstorm, Idea Listing and Grouping



Brainstorm

Write down any ideas that come to mind that address your problem statement.

🕒 10 minutes



TIP
You can select a sticky note and hit the pencil (switch to select) icon to start drawing!

Amar

Handwritten notes on a 3x3 grid.

Yuktesh

Handwritten notes on a 3x3 grid.

Person 3

Handwritten notes on a 3x3 grid.

Person 4

Handwritten notes on a 3x3 grid.

Person 5

Handwritten notes on a 3x3 grid.

Person 6

Handwritten notes on a 3x3 grid.

Person 7

Handwritten notes on a 3x3 grid.

Person 8

Handwritten notes on a 3x3 grid.



Group ideas

Take turns sharing your ideas while clustering similar or related notes as you go. In the last 10 minutes, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you can break it up into smaller sub-groups.

🕒 20 minutes

Person 4



TIP
Add customizable tags to sticky notes to make it easier to find, browse, organize, and categorize important ideas as themes within your mind.

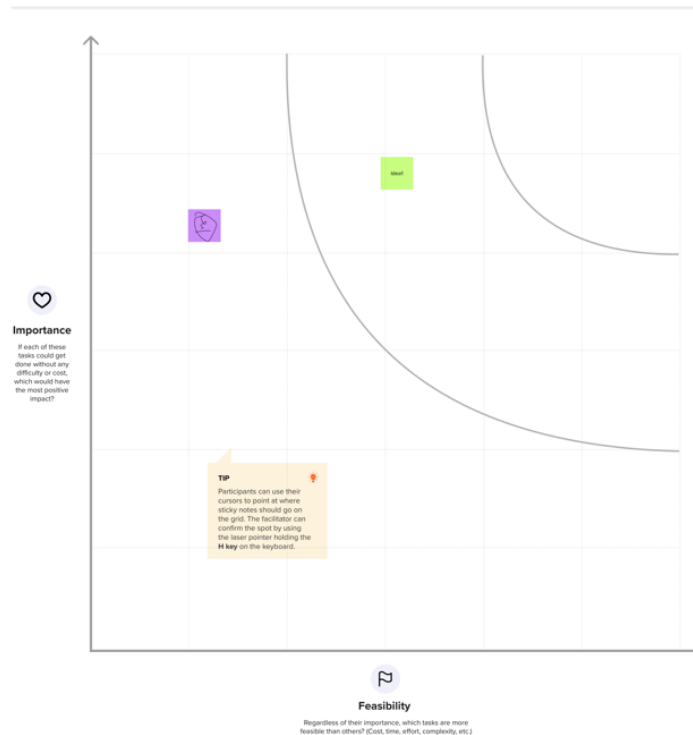
Step-3: Idea Prioritization

4

Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes



3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

1. A citizen accesses the Citizen AI platform via a web browser.
2. The user interacts with the chatbot by typing a query or concern.
3. The chatbot processes the input using IBM Granite NLP models.
4. A contextual and personalized response is returned to the user.
5. Feedback from the user is analyzed for sentiment and logged.
6. Officials monitor the feedback via a dynamic dashboard.

Each step in the journey is designed to be intuitive, time-efficient, and responsive to the unique needs of individual users. The backend system ensures smooth query routing, language comprehension, and storage of useful feedback for continuous improvement.

3.2 Solution Requirement

- Responsive Web UI

- Secure backend using Flask
- NLP APIs from IBM Watson and IBM Granite
- Real-time sentiment analysis engine
- Cloud object storage for logging interact
- Dashboard for visualizing trends and metrics
- Feedback collection module
- Admin access controls These requirements were gathered based on user stories, surveys, and expert interviews during the early analysis stage.

3.3 Data Flow Diagram

User Input → Flask Application → NLP Processing (Watson/Granite) → Response Generation → Sentiment Analysis → Dashboard Update

This linear yet modular flow allows the system to be expanded in the future for multilingual queries, voice input processing, and advanced intent classification.

3.4 Technology Stack

- Frontend: HTML, CSS, Bootstrap, JavaScript
- Backend: Python with Flask framework
- AI/NLP: IBM Watson and IBM Granite APIs
- Database: Optional (Firebase or JSON-based logging)
- Cloud: IBM Cloud for storage and deployment
- Visualization: Chart.js or D3.js for dashboard

The chosen stack balances simplicity, scalability, and modernity, ensuring quick deployment and ease of maintenance.

4. PROJECT DESIGN

4.1 Problem-Solution Fit

The solution precisely addresses the communication challenges between citizens and government. It offers an AI-powered system that can handle multiple queries simultaneously and ensures consistent, transparent service delivery without manual intervention. It also provides key metrics to government departments to enable proactive service improvement.

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| | | | | |
|-------------------------|--|--|--|-----------------------------------|
| Define CS, fit into CC | 1. CUSTOMER SEGMENT(S) CS Who is your customer? i.e. working parents of 0-5 y.o. kids | 6. CUSTOMER CONSTRAINTS CC What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices. | 5. AVAILABLE SOLUTIONS AS Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking | Explore AS, differentiate |
| | 2. JOBS-TO-BE-DONE / PROBLEMS J&P Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides. | 9. PROBLEM ROOT CAUSE RC What is the real reason that this problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations. | 7. BEHAVIOUR BE What does your customer do to address the problem and get the job done? i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace) | |
| Identify strong TR & EM | 3. TRIGGERS TR What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news. | 10. YOUR SOLUTION SL If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality. If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour. | 8. CHANNELS of BEHAVIOUR CH 8.1 ONLINE What kind of actions do customers take online? Extract online channels from #7 | Extract online & offline CH of BE |
| | 4. EMOTIONS: BEFORE / AFTER EM How do customers feel when they face a problem or a job and afterwards? i.e. lost, insecure → confident, in control - use it in your communication strategy & design. | | 8.2 OFFLINE What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development. | |

4.2 Proposed Solution

Citizen AI offers a web-based AI assistant integrated with IBM's NLP models. It understands citizen queries, responds in a human-like manner, analyzes public sentiment, and logs issues for further review. It also features a dashboard that visually represents the collected data and sentiment trends, enabling efficient monitoring by government departments.

| | |
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| S.No. | Parameter | Description |
|-------|---|---|
| 1. | Problem Statement (Problem to be solved) | Many citizens face delays and confusion while accessing government services due to lack of real-time, scalable support systems. |
| 2. | Idea / Solution Description | A web-based AI platform that uses IBM Watson to answer citizen queries instantly, analyze sentiment, and provide insights to officials through a dynamic dashboard. |
| 3. | Novelty / Uniqueness | Combines real-time AI chatbot, sentiment analysis, and analytics dashboard into a single civic engagement tool. Offers contextual, personalized responses using IBM Granite models. |
| 4. | Social Impact / Customer Satisfaction | improves citizen satisfaction by offering fast, 24/7 query support. Increases transparency and builds trust in digital governance. |
| 5. | Business Model (Revenue Model) | Freemium model for basic services; premium subscriptions for local governments. Revenue can be generated from Analytics dashboards, support services, or customization features. |

4.3 Solution Architecture

- User Layer: Web-based interface for interaction
- Logic Layer: Flask app handling requests and routing
- AI Layer: IBM Watson and Granite processing queries
- Sentiment Engine: Analyzes citizen feedback
- Dashboard Layer: Visualizes user sentiment and query trends

This architecture promotes modularity, simplifies debugging, and facilitates quick updates or third-party integration.

| | |
|---------------|--|
| Date | 15 Feb 2025 |
| Team ID | LTVIP2025TMID31765 |
| Project Name | citizen ai – intelligent citizen engagement platform |
| Maximum Marks | 4 Marks |

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

A systematic project plan was designed to break down the development into manageable phases. Each phase was allotted specific tasks and timelines to ensure organized progression.

| | |
|---------------|--|
| Date | 15 Feb 2025 |
| Team ID | LTVIP2025TMID31765 |
| Project Name | citizen ai – intelligent citizen engagement platform |
| 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 |
|----------|-------------------------------|-------------------|---|--------------|----------|--------------|
| Sprint-1 | Registration | USN-1 | As a user, I can register for the application by entering my email, password, and confirming my password. | 2 | High | |
| Sprint-1 | | USN-2 | As a user, I will receive confirmation email once I have registered | 1 | High | |

| Sprint | Functional Requirement (Epic) | User Story Number | User Story / Task | Story Points | Priority | Team Members |
|----------|-------------------------------|-------------------|--|--------------|----------|--------------|
| | | | for the application | | | |
| Sprint-2 | | USN-3 | As a user, I can register for the application through Facebook | 2 | Low | |
| Sprint-1 | | USN-4 | As a user, I can register for the application through Gmail | 2 | Medium | |
| Sprint-1 | Login | USN-5 | As a user, I can log into the application by entering email & password | 1 | High | |
| | Dashboard | | | | | |

Project Tracker, Velocity & Burndown Chart: (4 Marks)

| Sprint | Total Story Points | Duration | Sprint Start Date | Sprint End Date (Planned) | Story Points Completed (as on Planned End Date) | Sprint Release Date (Actual) |
|----------|--------------------|----------|-------------------|---------------------------|---|------------------------------|
| Sprint-1 | 20 | 6 Days | 24 Oct 2022 | 29 Oct 2022 | 20 | 29 Oct 2022 |
| Sprint-2 | 20 | 6 Days | 31 Oct 2022 | 05 Nov 2022 | | |

| Sprint | Total Story Points | Duration | Sprint Start Date | Sprint End Date (Planned) | Story Points Completed (as on Planned End Date) | Sprint Release Date (Actual) |
|---------------|---------------------------|-----------------|--------------------------|----------------------------------|--|-------------------------------------|
| Sprint-3 | 20 | 6 Days | 07 Nov 2022 | 12 Nov 2022 | | |
| Sprint-4 | 20 | 6 Days | 14 Nov 2022 | 19 Nov 2022 | | |

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

| | |
|---------------|--|
| Date | 21 Feb 2025 |
| Team ID | LTVIP2025TMID31765 |
| Project Name | citizen ai – intelligent citizen engagement platform |
| Maximum Marks | |

Test Scenarios & Results

| Test Case ID | Scenario (What to test) | Test Steps (How to test) | Expected Result | Actual Result | Pass/Fail |
|---------------------|---|--|--|----------------------|------------------|
| FT-01 | Text Input Validation (e.g., topic, job title) | Enter valid and invalid text in input fields | Valid inputs accepted, errors for invalid inputs | | |
| FT-02 | Number Input Validation (e.g., word count, size, rooms) | Enter numbers within and outside the valid range | Accepts valid values, shows error for out-of-range | | |
| FT-03 | Content Generation (e.g., blog, resume, design idea) | Provide complete inputs and click "Generate" | Correct content is generated based on input | | |

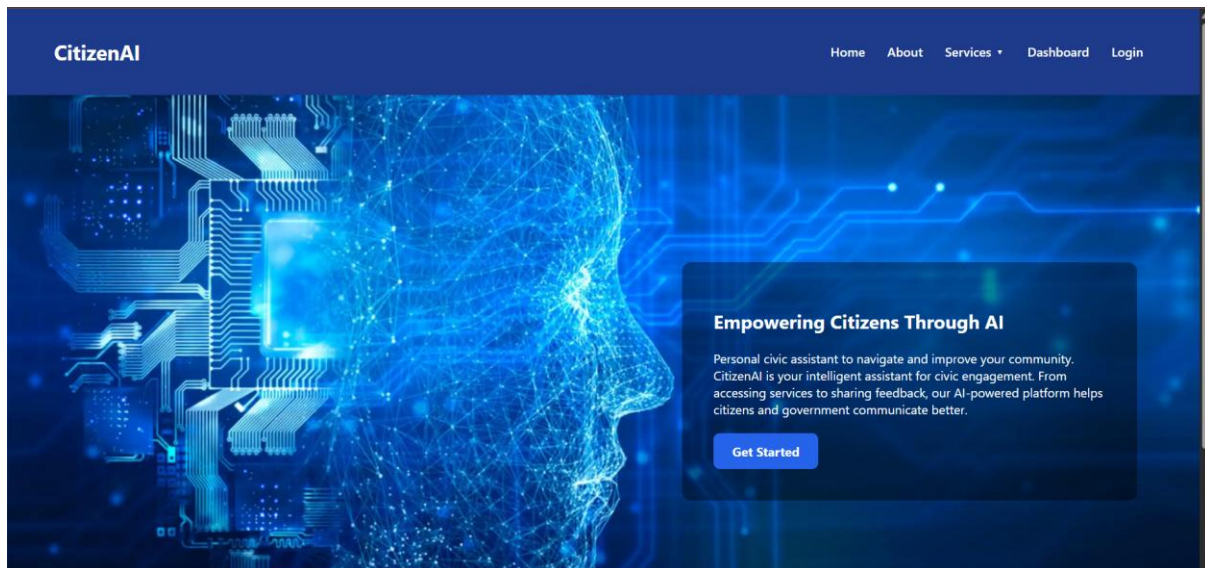
| | | | | | |
|--------------|---|---|--|--|--|
| FT-04 | API Connection Check | Check if API key is correct and model responds | API responds successfully | | |
| PT-01 | Response Time Test | Use a timer to check content generation time | Should be under 3 seconds | | |
| PT-02 | API Speed Test | Send multiple API calls at the same time | API should not slow down | | |
| PT-03 | File Upload Load Test (e.g., PDFs) | Upload multiple PDFs and check processing | Should work smoothly without crashing | | |

7. RESULTS

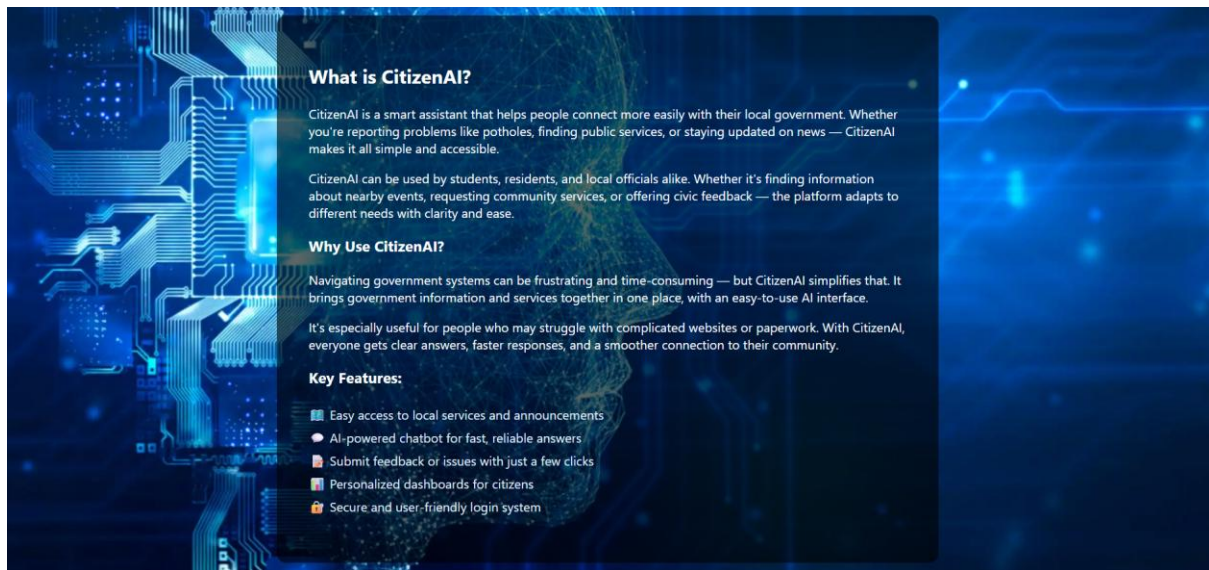
7.1 Output Screenshots

Screenshots were captured at various development stages to illustrate functionality:

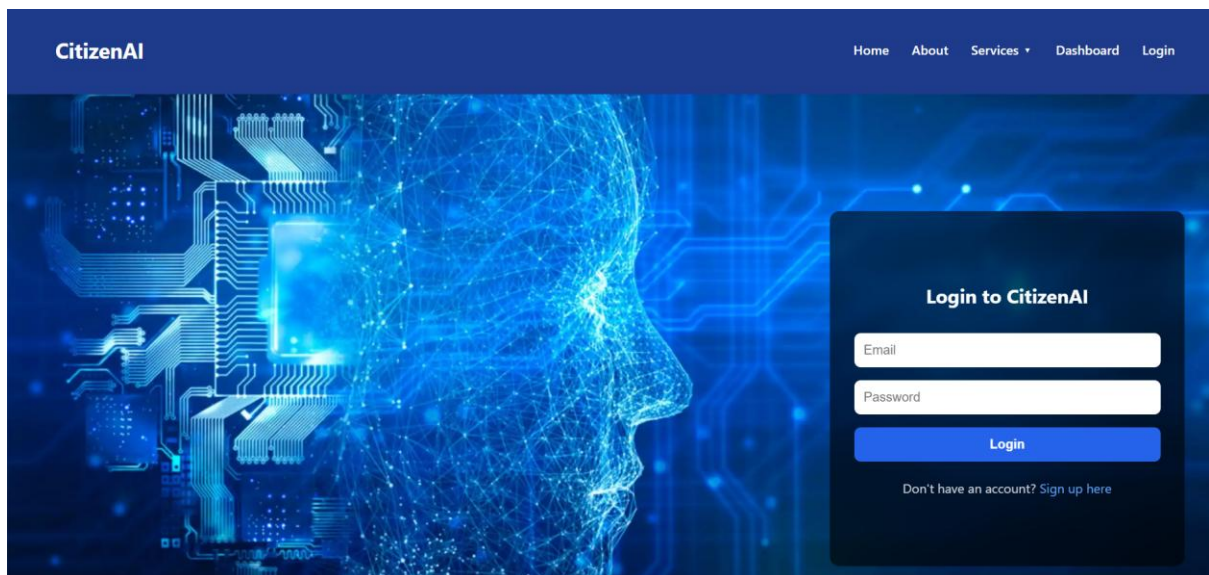
Home page :



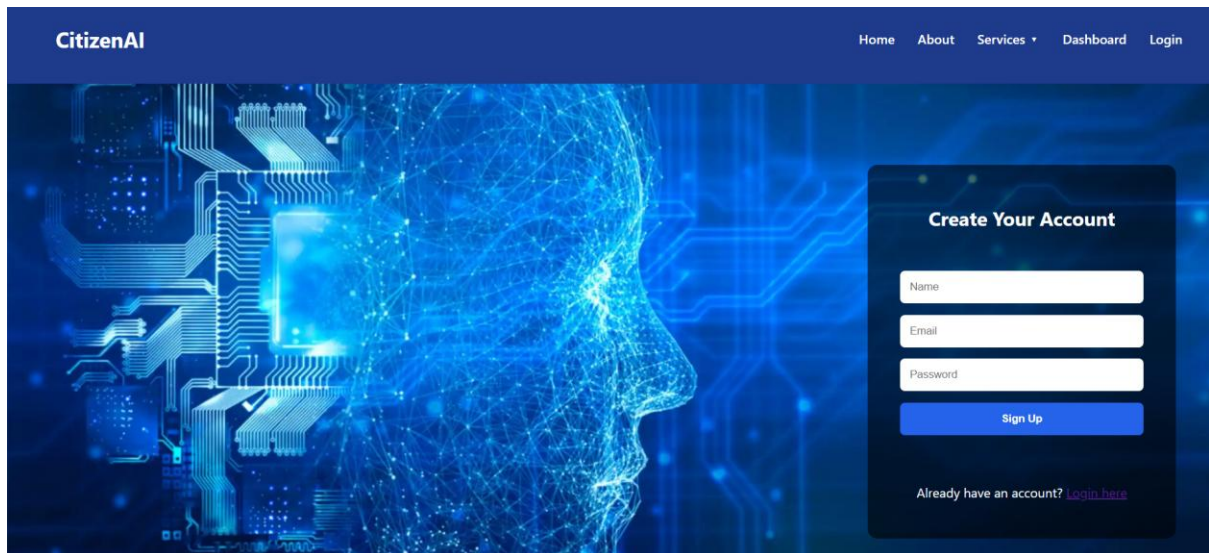
About page :



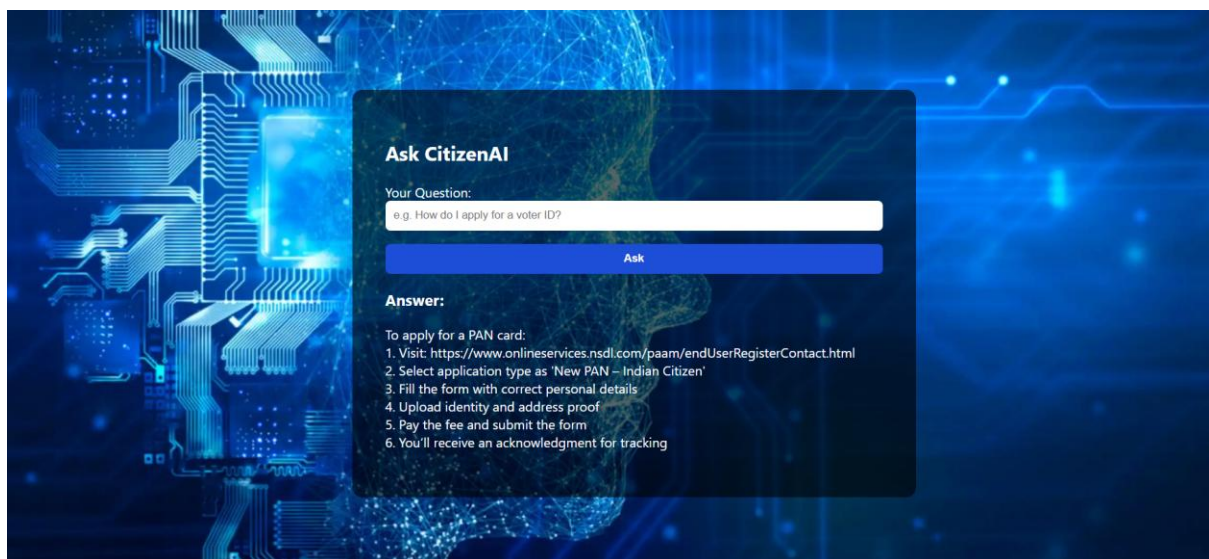
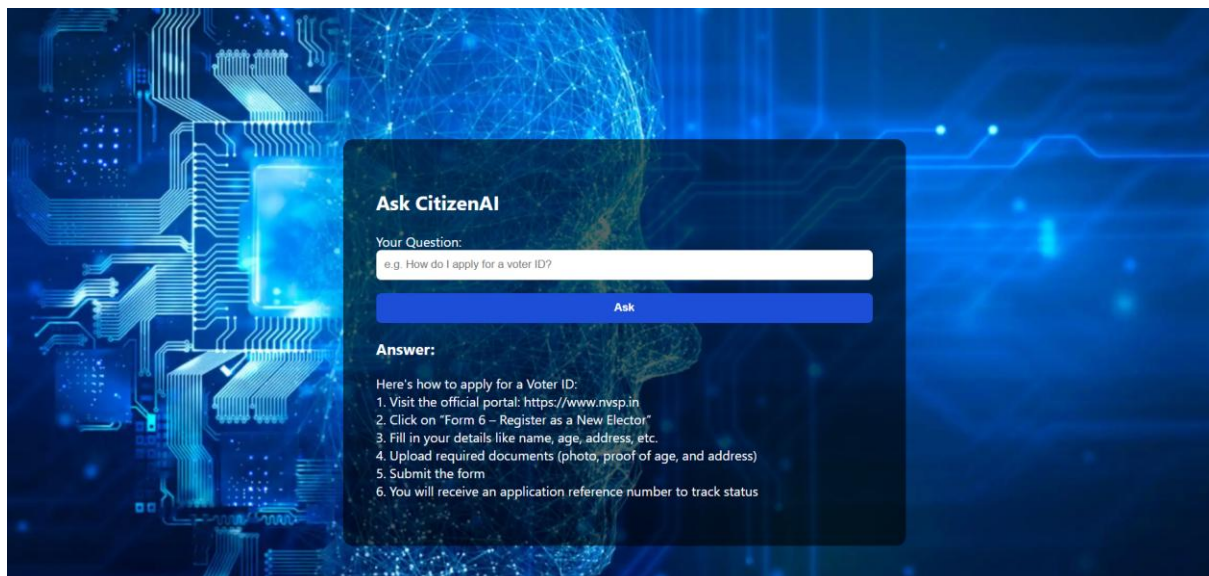
Login page :



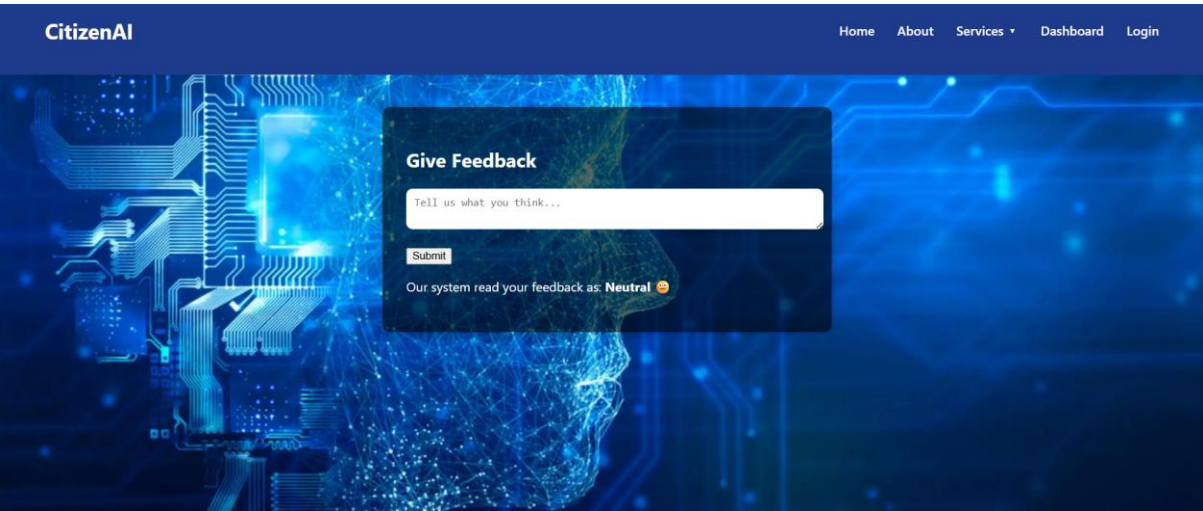
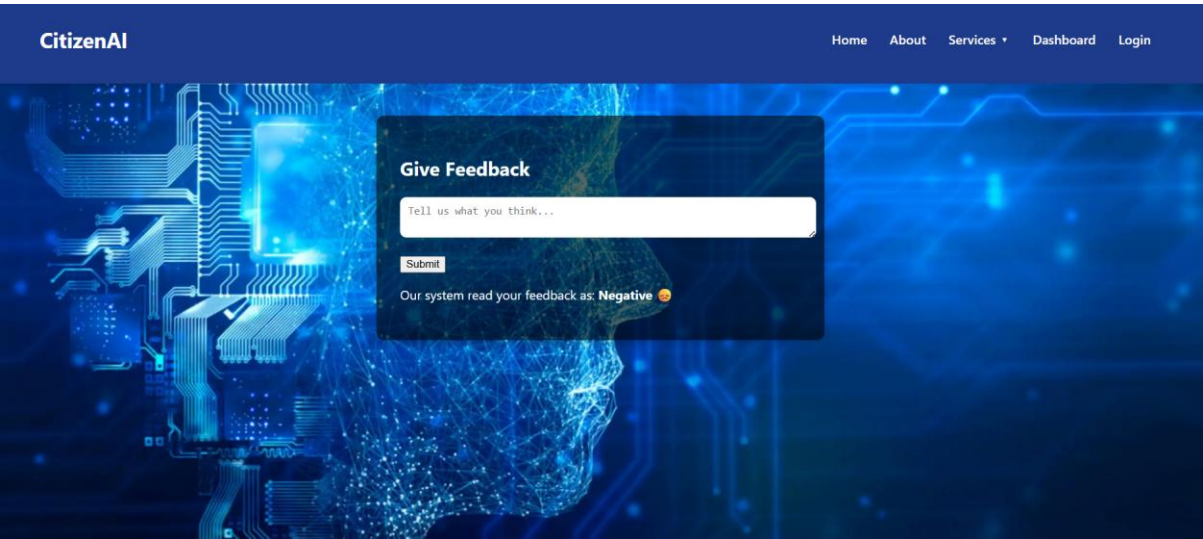
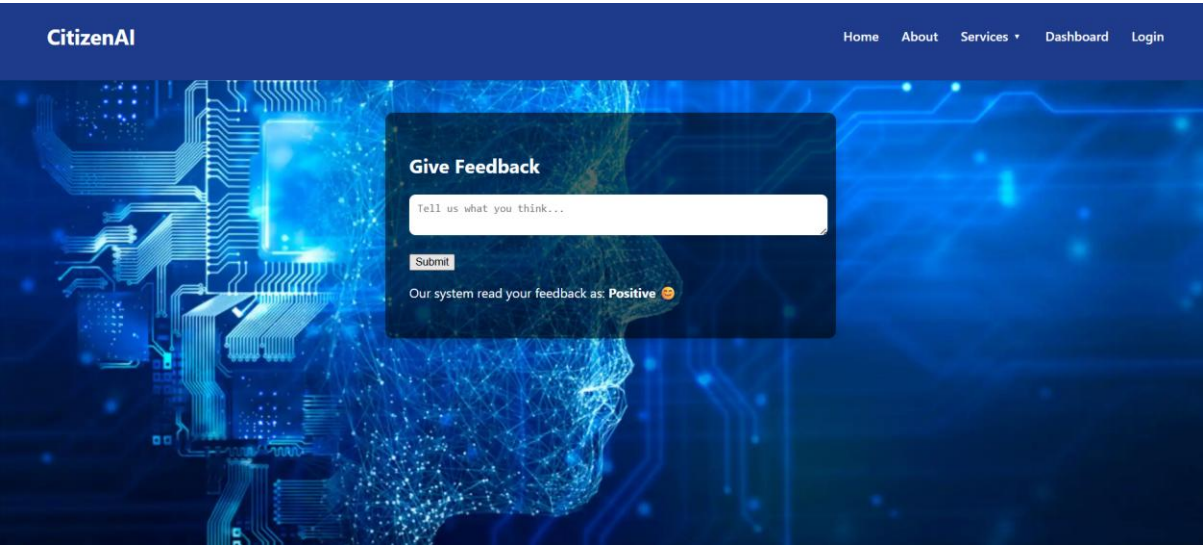
Signup page :



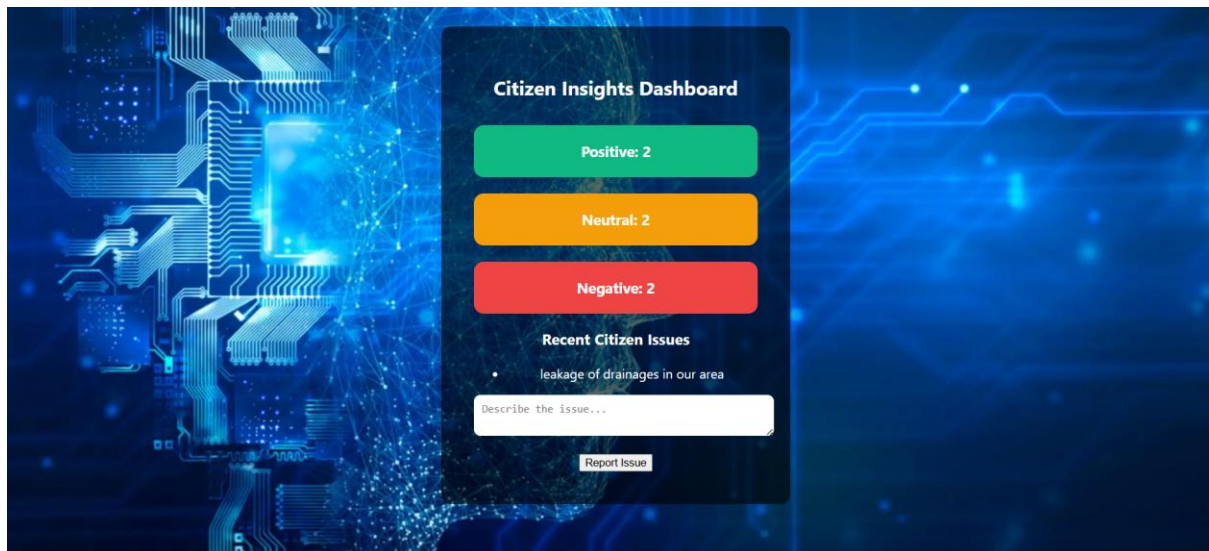
Chat interface with citizen queries and AI responses page :



Sentiment analysis results labeled as Positive, Neutral, or Negative :



Dashboard charts showing user sentiment over time and interaction volume :



These visuals validate the system's usability, response speed, and efficiency in information delivery.

8. ADVANTAGES & DISADVANTAGES

Advantages:

- Enhances public satisfaction by offering instant and intelligent responses.
- Reduces manual workload on government staff.
- Helps government agencies gain insight into citizen concerns and priorities.
- Improves accessibility and inclusivity through a web-based platform.
- Scalable and adaptable for future integration of features like voice, mobile support, and multilingual communication.

Disadvantages:

- Initial development may require technical expertise and training.
- Heavily dependent on cloud infrastructure and third-party APIs.
- May not be accessible to individuals without internet access.
- Requires regular updates and maintenance to stay effective and relevant

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- Initial development may require technical expertise and training.
- Heavily dependent on cloud infrastructure and third-party APIs.
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9. CONCLUSION

Citizen AI represents a transformative step in e-governance and public service delivery. By leveraging AI, cloud computing, and user-centered design, the platform bridges the gap between citizens and government bodies. It enables quick, meaningful communication and helps build public trust. The successful implementation of Citizen AI can inspire further digital innovation in the public sector, offering long-term benefits to society.

10. FUTURE SCOPE

The future scope of Citizen AI includes numerous enhancements to broaden its usability and impact:

- Integration of voice-based interactions for visually impaired users or hands-free use.
- Expansion into regional languages to make the platform accessible to diverse linguistic populations.
- Development of a mobile app version for on-the-go access.
- Enhanced analytics features such as predictive modeling to forecast common issues.
- Integration with external databases and e-Governance services for deeper utility.
- Use of advanced machine learning for automatic topic detection and personalized communication.

11. APPENDIX

- Source Code: [hosted on GitHub]
- Dataset Link: N/A – live user input used
- GitHub/Project Demo : <https://github.com/sagarika-v/Citizen-AI-intelligent-citizenengagement-platform>