7. Results

The Smart City Assistant was tested across all functional modules, validating performance, accuracy, and usability. Below are screenshots and results captured from the working application:

7.1 Chat Assistant

- Built using IBM Watsonx's Granite LLM for natural language interaction.
- Understands queries related to smart city sustainability and governance.
- Responds with relevant eco-strategies, smart infrastructure tips, and urban planning suggestions.
- Maintains context-aware conversations with user-friendly interface.
- Acts as a virtual guide for citizens and municipal planners.

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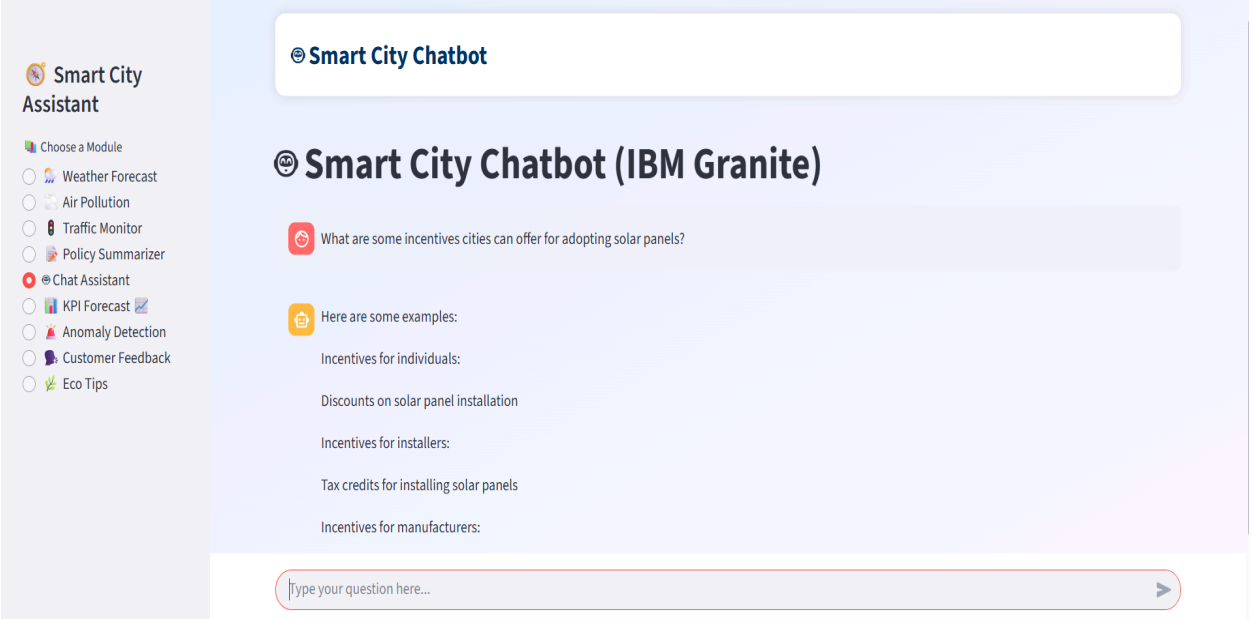
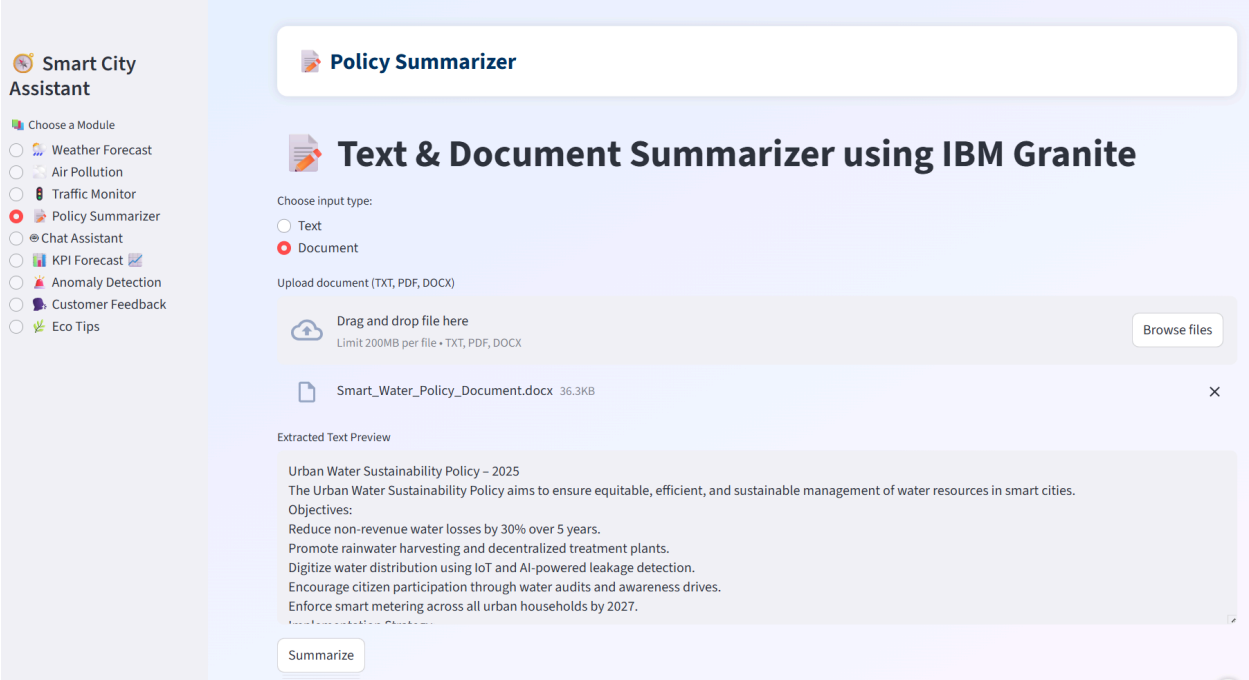


Output: Smart City Assistant

7.2 Policy Document Summarizer

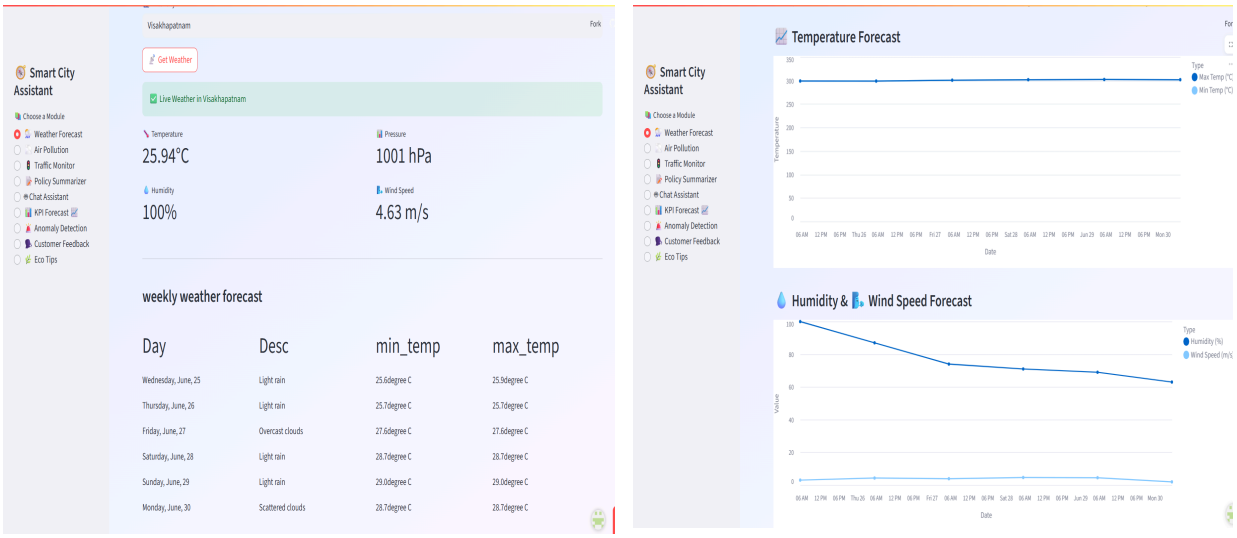
- Accepts policy documents (PDF or TXT) as input from users.
- Uses IBM Granite LLM to summarize complex policy language into citizen-friendly text.
- Helps municipal officers extract key information quickly.
- Encourages greater transparency and accessibility of city regulations.
- Saves time for planners in drafting, reviewing, and communicating policies.



Output : Document Summarizer

7.3 Weather Forecast

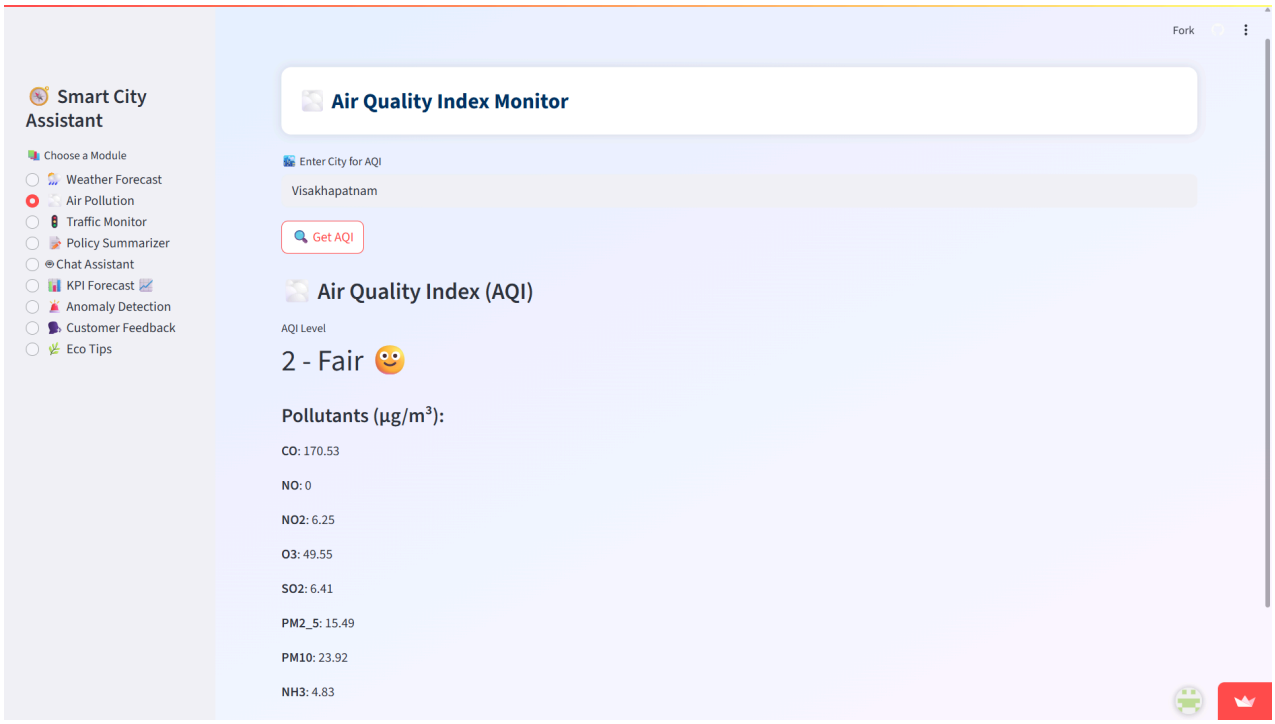
- Fetches 7-day weather forecast for any city entered by the user.
- Displays real-time metrics such as:
    - 🌡️ Temperature in °C
    - 💧 Humidity percentage
    - 🌬️ Wind speed in m/s
    - 📊 Pressure in hPa
- Visualizes forecast trends using interactive charts.
- Enables city officials to plan maintenance, events, or advisories.



Output : Weather Forecast

7.4 Air Pollution

- Retrieves and visualizes AQI (Air Quality Index) for selected cities.
- Provides pollutant breakdown:
    - PM2.5, PM10, CO, NO_2, SO_2, O_3
- Displays health advisories for sensitive groups.
- Helps authorities trigger alerts or restrictions when pollution is high.



Output : Air Quality Monitor

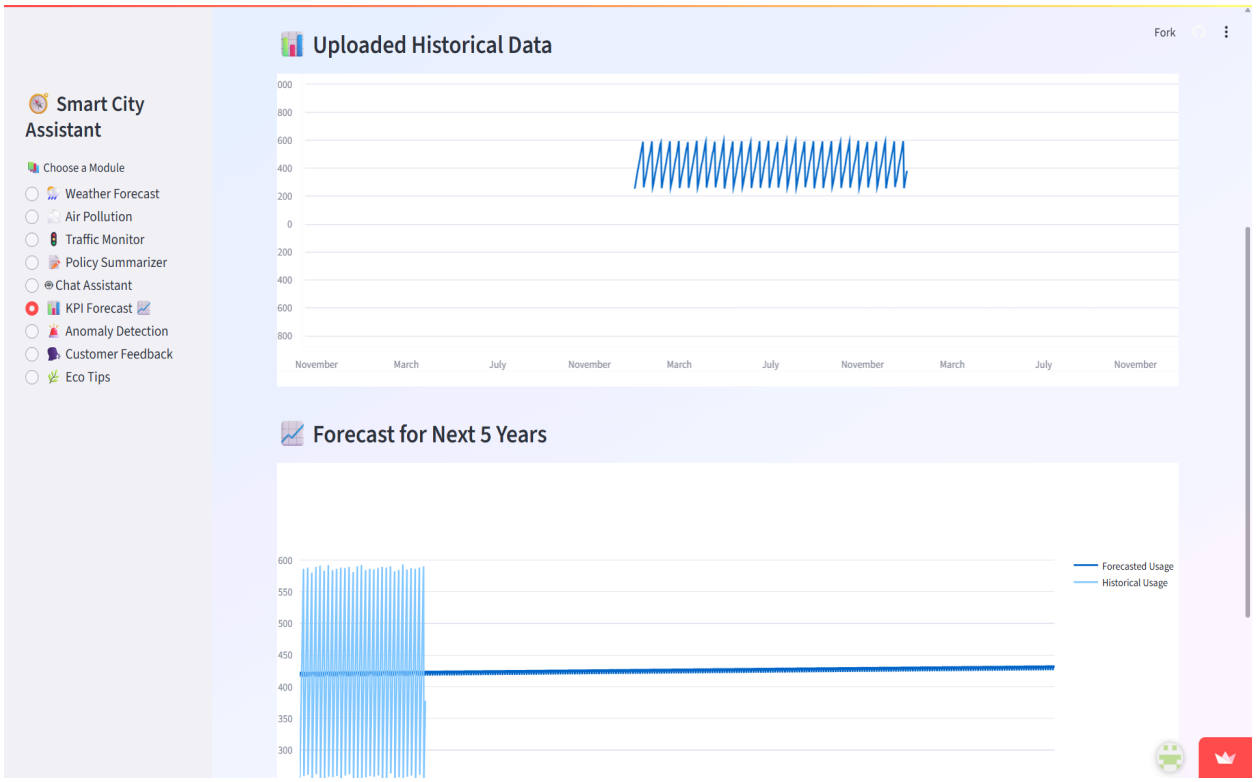
7.5 Traffic Monitor

- Uses GPS coordinates to fetch live traffic congestion levels.
- Integrates TomTom API to show:
    - Road density status
    - Speed patterns in key urban sectors
- Assists in dynamic rerouting or emergency response planning.
- Useful for citizens, transport departments, and city planners.

Output : Real-Time Traffic Monitoring

7.6 KPI Forecasting

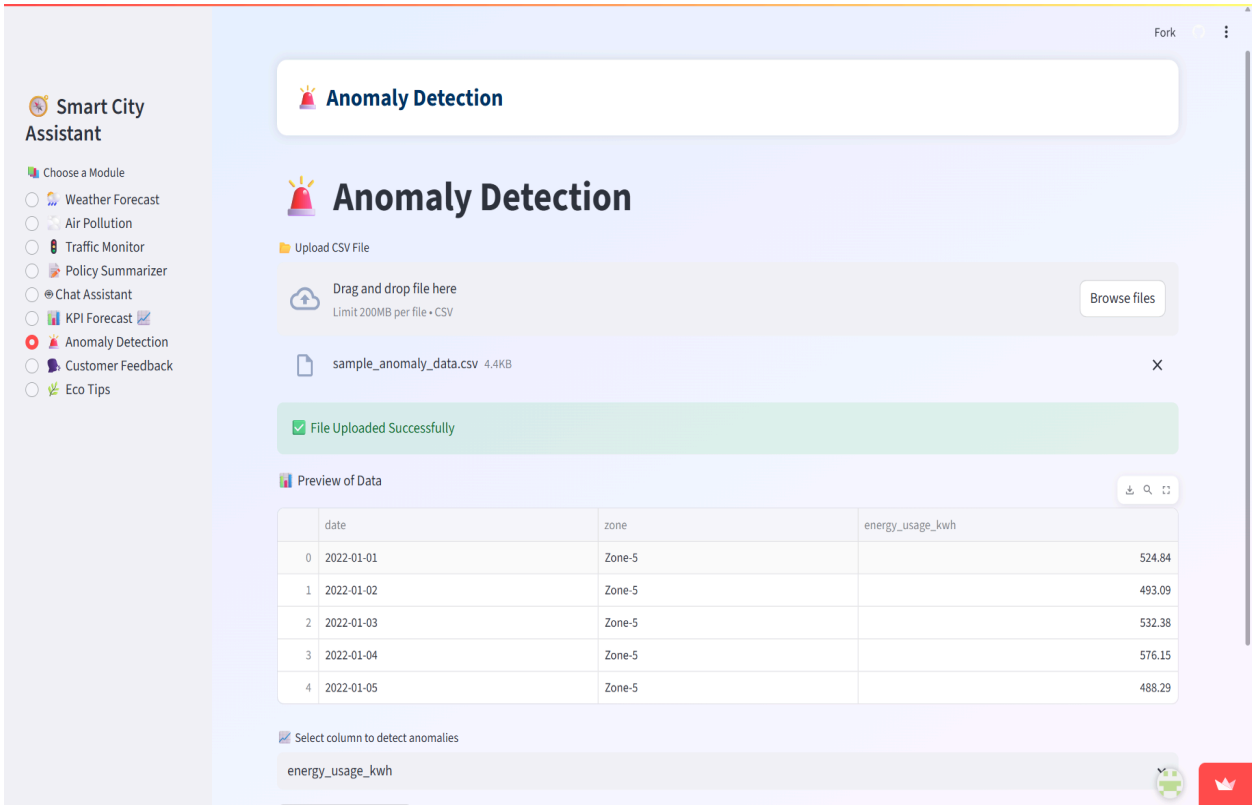
- Allows city officials to upload historical KPI datasets (CSV format).
- Uses Prophet (ML model) to forecast metrics like energy or water consumption.
- Generates interactive trend visualizations using Plotly.
- Aids in data-driven budget allocation, infrastructure scaling, and sustainability planning.
- Option to download forecast results for report sharing or archiving.



Output : KPI Forecasting

7.7 Anomaly Detection

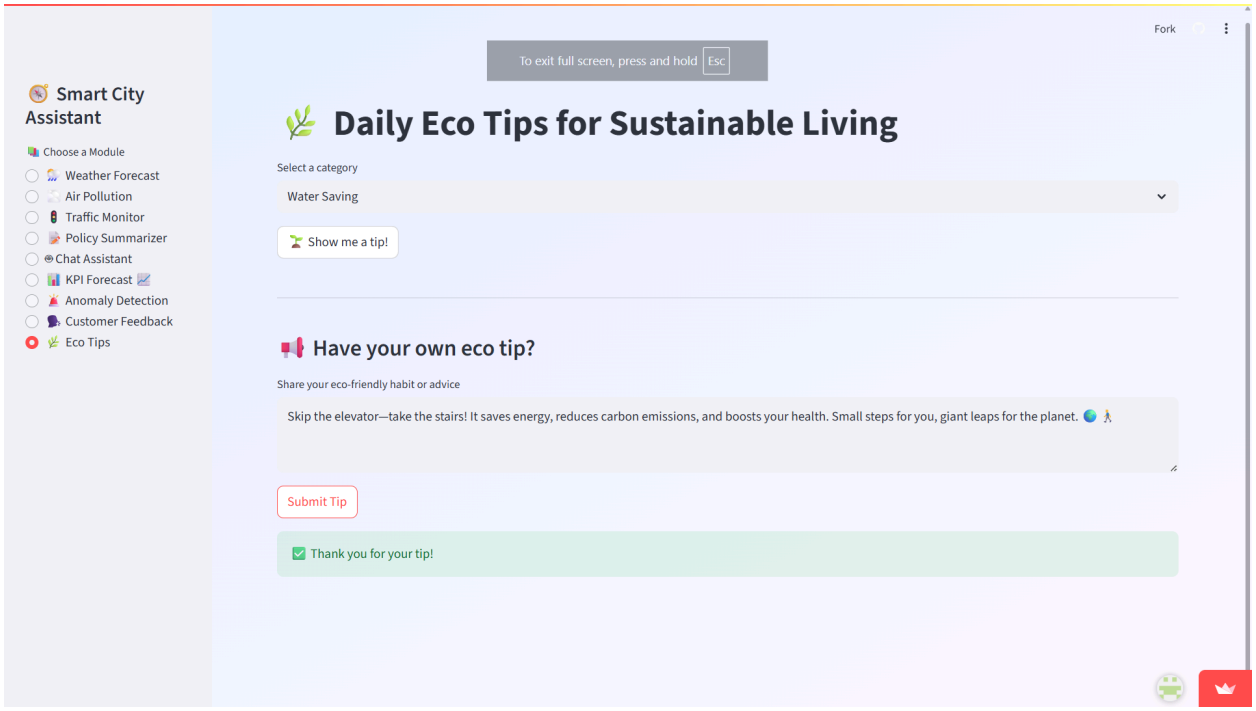
- Accepts monthly energy consumption KPI data from different city zones.
- Automatically flags unusual spikes or drops in resource usage.
- Helps detect unauthorized construction or faulty infrastructure.
- Visual indicators allow quick spotting of anomalies on charts.
- Enhances city resource auditing and policy enforcement.



Output : Anomaly Detection

7.8 Eco Tips Generator

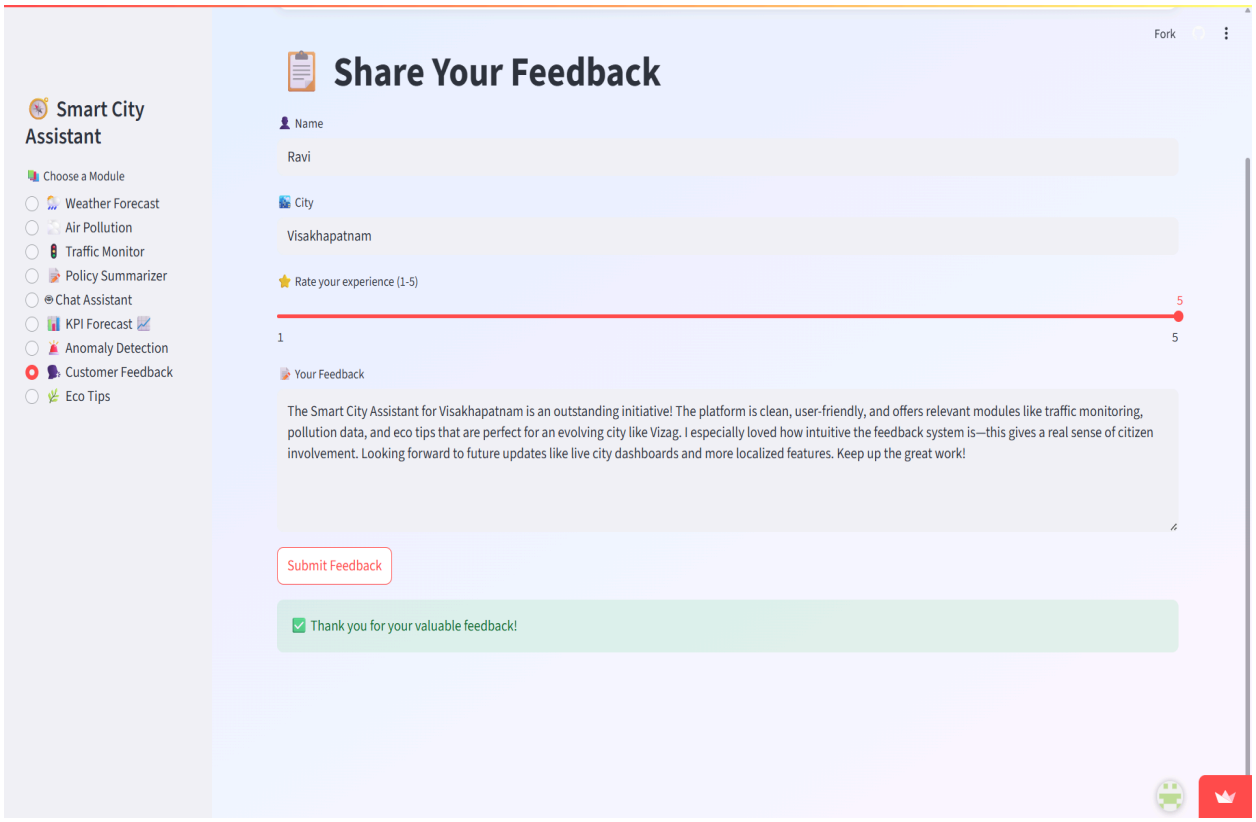
- Accepts environment-related keywords like “plastic,” “solar,” or “transport.”
- Generates concise, actionable tips for sustainable living.
- Ideal for use in educational campaigns, schools, and community drives.
- Powered by Granite LLM for smart, human-like suggestions.
- Promotes daily green habits among citizens.



Output : Echo Tips

7.9 Customer Feedback

- Citizens can submit issues via a structured feedback form (e.g., "water pipe burst").
- Categorizes inputs into predefined tags (e.g., Water, Waste, Roads).
- Stores entries for review and action by administrators.
- Encourages participatory governance and faster grievance redressal.
- Reduces burden on physical complaint centers or helplines.



Output : Customer Feedback