Sustainable Smart City AssistantUsing IBM Granite LLM

Category: Generative AI with IBM

Prepared By

M.Nazima Banu

A.Kairunnisha

J.Humaira Barveen

N.Reshmina

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1. Introduction

Modern cities face challenges like resource management, citizen engagement, policy communication, and sustainability planning. The Sustainable Smart City Assistant is an AI-powered platform built with IBM Watsonx Granite LLM, cloud services, and ML pipelines. It assists city administrators, policymakers, and residents through intelligent summarization, predictive insights, anomaly detection, and real-time citizen feedback integration.

2. Objectives

Provide AI-powered policy summarization for quick decision-making.

Enable citizen feedback reporting to improve civic engagement.

Support data-driven planning with KPI forecasting and anomaly detection.

Enhance sustainability and governance using modern AI/ML.

Deliver a user-friendly dashboard for administrators and citizens.

3. Skills & Technologies Required

Machine Learning & Forecasting (scikit-learn, statsmodels, XGBoost)

IBM Cloud Services (Watsonx Granite LLM, Object Storage, IAM)

Backend Development: FastAPI, Python

Frontend Development: Streamlit, Leaflet (maps)

Data Storage: PostgreSQL (PostGIS for spatial data), IBM Cloud Object Storage

Data Pipelines & Orchestration: Celery/Redis, Apache Airflow/Prefect

Monitoring & Security: Prometheus, Grafana, OAuth2, IBM IAM

4. System Architecture

The system follows a modular architecture consisting of Frontend, Backend, Data Layer, and AI/ML Layer.• Frontend (Streamlit Dashboard): Upload policies, citizen feedback form, visualization of KPIs.• Backend (FastAPI): Provides endpoints for summarization, feedback, and forecasting.• Data Layer: PostgreSQL + PostGIS, IBM Object Storage, Vector Database.• AI/ML Layer: Granite LLM, forecasting models, anomaly detection models.

5. Use Case Scenarios

5.1 Policy Search & Summarization

A municipal planner uploads a policy document. The assistant summarizes it into a citizen-friendly version, reducing time to interpret long documents.

5.2 Citizen Feedback Reporting

Residents report issues (e.g., burst water pipe) via a form. The issue is automatically tagged and logged for administrators, improving incident tracking.

5.3 KPI Forecasting & Anomaly Detection

Administrators upload last year's water usage KPI data. The assistant forecasts next year's consumption and highlights anomalies to support planning.

6. Key Features

AI-powered Summarization (Granite LLM)

Real-time Citizen Feedback System

Data-driven KPI Forecasting

Anomaly Detection for City Metrics

Interactive City Health Dashboard

Conversational Assistant for Residents & Planners

7. Benefits

Faster policy decision-making

Increased citizen engagement

Improved resource planning

Early detection of anomalies

Transparent governance & sustainability monitoring

8. Future Enhancements

Multi-language support for policy summaries

Integration with IoT devices for real-time data feeds

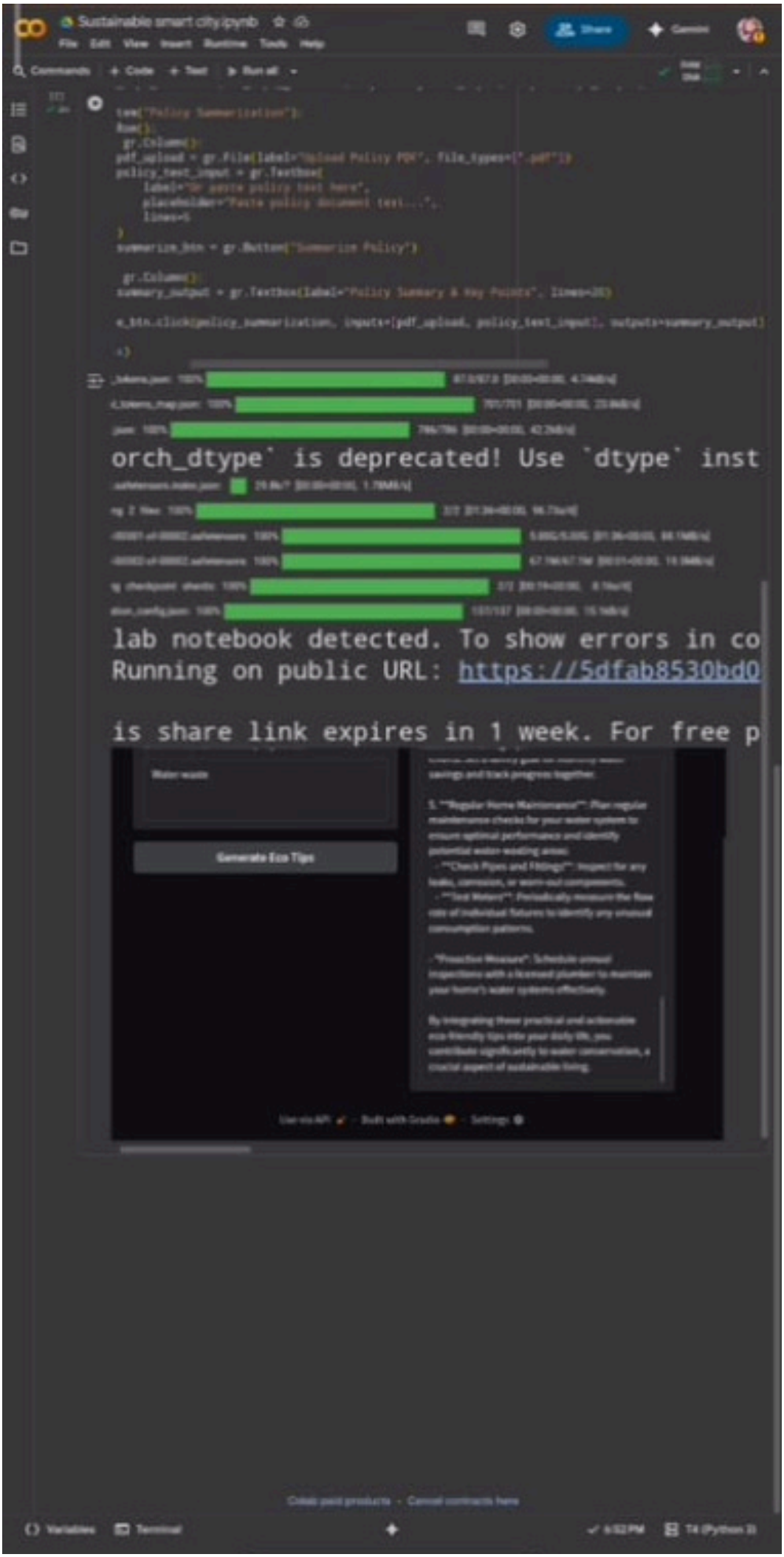
Predictive maintenance for infrastructure

Voice-enabled citizen assistant

9. Conclusion

The Sustainable Smart City Assistant leverages IBM Watsonx Granite LLM, AI-driven forecasting, and modern cloud infrastructure to transform how cities manage resources, communicate with citizens, and plan for the future. It enables greener, smarter, and more responsive cities.

Output:


Sustainable smart city.ipynb
File Edit View Insert Runtime Tools Help
Commands + Code + Text Run all
Share
Commit
tab("Policy Summarization"):
Row():
gr.Column():
pdf_upload = gr.File(label="Upload Policy PDF", file_types=[".pdf"])
policy_text_input = gr.Textbox(
label="Or paste policy text here",
placeholder="Paste policy document text...",
lines=5
)
summarize_btn = gr.Button("Summarize Policy")
gr.Column():
summary_output = gr.Textbox(label="Policy Summary & Key Points", lines=20)
e_btn.click(policy_summarization, inputs=[pdf_upload, policy_text_input], outputs=summary_output)
)
orch_dtype` is deprecated! Use `dtype` inst
lab notebook detected. To show errors in co
Running on public URL: https://5dfab8530bd0
is share link expires in 1 week. For free p
Water waste
Generate Eco Tips
savings and track progress together.
5. **Regular Home Maintenance**: Plan regular maintenance checks for your water system to ensure optimal performance and identify potential water-wasting areas.
- **Check Pipes and Fittings**: Inspect for any leaks, corrosion, or worn-out components.
- **Test Meters**: Periodically measure the flow rate of individual fixtures to identify any unusual consumption patterns.
- **Proactive Measure**: Schedule annual inspections with a licensed plumber to maintain your home's water systems effectively.
By integrating these practical and actionable eco-friendly tips into your daily life, you contribute significantly to water conservation, a crucial aspect of sustainable living.
Use via API · Built with Gradio · Settings
Variables
Terminal
T4 (Python 3)