Project Title

Sustainable Smart City Assistant Using IBM Granite

👥 Team Members

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1. Introduction

The project aims to empower cities and residents to thrive in eco-conscious, connected urban environments using AI, real-time data, and generative intelligence.

2. Project Overview

🎯 Purpose

To optimize energy, water, waste management, and citizen engagement by providing actionable insights, personalized recommendations, policy summarizations, and strategic decision support using AI.

3. Key Features

Conversational Interface – Natural language Q&A for citizens and officials.

Policy Summarization – Converts complex policies into simple summaries.

Resource Forecasting – Predicts future energy, water, and waste usage.

Eco-Tip Generator – Personalized sustainability actions.

Citizen Feedback Loop – Collects & analyzes public input.

KPI Forecasting – Tracks performance indicators for decision support.

Anomaly Detection – Flags unusual patterns in data.

Multimodal Input Support – Supports text, PDFs, CSVs.

Streamlit or Gradio UI – User-friendly dashboard interface.

4. Architecture

Frontend: Streamlit-based interactive dashboard.

Backend: FastAPI framework handling APIs for chat, document processing, reporting, and vector embedding.

LLM Integration: IBM Watsonx Granite for natural language tasks.

Vector Search: Pinecone for semantic document search.

ML Modules: Scikit-learn for forecasting & anomaly detection.

5. Setup Instructions

Install Python 3.9+, dependencies, configure .env with API keys, run backend and frontend, interact via web UI.

6. API Documentation

/chat/ask – Query assistant.

/upload-doc – Upload & embed documents.

/search-docs – Search semantically similar policies.

/get-eco-tips – Get sustainability tips.

/submit-feedback – Store citizen feedback.

7. Authentication (Future Enhancements)

JWT, OAuth2, Role-based Access.

8. User Interface

Minimalist design, intuitive navigation, KPI visualizations, tabbed layouts, real-time forms, PDF report downloads.

9. Testing

Unit, API, manual testing, edge case handling.

10. Future Enhancements

User sessions, history tracking, advanced security.

11. Screeshots