🏙️ Sustainable Smart City Assistant Using IBM Granite LLM

📌 Project Overview

The **Sustainable Smart City Assistant** is a lightweight, AI-powered application built to support urban sustainability, data awareness, and citizen engagement. Designed to run entirely within a Google Colab environment, the assistant integrates multiple intelligent modules to process, forecast, summarize, and interact with various forms of city-related data. Its modular architecture and simple UI ensure accessibility for researchers, policymakers, and everyday citizens.

🔧 Modules Included:

- 📄 PDF Policy Summarization
- 🧠 Chat Assistant using IBM Granite or Mistral-7B
- 📊 KPI Forecasting using Linear Regression
- 🚨 Anomaly Detection on CSV data
- 🌱 Eco Tips Generator
- 📝 Feedback Form
- 📈 KPI Dashboard Summary Cards
- 🖨️ AI-based Report Generator (with PDF Export)

🔑 Key Technologies Used

Category	Tools & Frameworks
LLM	IBM Granite-2B-Instruct
Frontend UI	Gradio (Tabbed Interface)
Development Platform	Google Colab (with GPU Support)
ML Algorithm	Linear Regression (Forecasting)
PDF Tools	PyMuPDF (reading), FPDF (writing reports)
Data Format Support	CSV, PDF, Text
Language Libraries	Transformers, Torch, Scikit-learn, Pandas, NumPy

💼 Use Case Scenarios

📄 Policy Summarization

A municipal planner uploads a complex city policy document to the assistant's interface. Within seconds, the system generates a concise, citizen-friendly summary using IBM Granite or Mistral-7B, simplifying interpretation and planning.

🗣️ Citizen Feedback Collection

A city resident reports a leaking pipeline using the in-built feedback form. The feedback is instantly logged and displayed with the submitter's name, helping authorities track local issues in real-time without complex backend integration.

🔮 KPI Forecasting

A city officer uploads a CSV of last year's energy consumption. The system applies linear regression and forecasts next quarter's usage, aiding infrastructure planning and budget allocation.

🚨 Anomaly Detection

A CSV with water usage across districts is uploaded. The anomaly module highlights unexpected spikes, flagging a zone for further inspection—potentially preventing overuse or resource misuse.

🌱 Eco Tips for Awareness

During a school awareness program, the assistant generates 3 simple daily sustainability tips at random. Tips are short, easy-to-follow, and change with each click.

🤖 AI Chat Assistant

Citizens ask questions like, "What can my city do to become carbon neutral?" The LLM suggests tailored recommendations such as solar subsidies, public transport improvements, and green infrastructure.

🖨️ Report Generator

The user provides summary content or KPI results. The assistant compiles this into a structured, downloadable PDF report using FPDF.

🧑‍💻 Team Details

- **Team ID:** TEAM-175
- **Branch:** Computer Science and Engineering
- **Track:** Generative AI with IBM Cloud

Name	Email	Hall Ticket No	Mobile	Role
Vakkalanka Sundara Bhanu Karthikeya	22P31A0552@acet.ac.in	22P31A0552	7013922297	Team Leader
Vigneswara Reddy Sabbella	ysabbella@gmail.com	22P31A0561	8332911474	Team Member
Abhinav Kumar	abhinavkr1003@gmail.com	22P31A0570	7250956253	Team Member
Absar Ahmad	absar4395@gmail.com	22P31A0571	8250222362	Team Member

🏫 College Details

- **Institution Name:** Aditya College of Engineering and Technology
- **College ID:** 161