

Project Design – Building an AI-Driven Smart City Assistant

Problem–Solution Fit

The project was designed to directly tackle the challenges identified in the ideation and requirement analysis phases. Every module was purposefully crafted to align with a user need, ensuring that functionality was never bloated or irrelevant.

User Pain Point	Proposed Solution
Long, unreadable policy PDFs	AI-powered PDF summarizer using Mistral/IBM Granite LLM
Confusion around city performance data	Forecasting and anomaly detection modules using CSV inputs
Low engagement in sustainable behavior	Interactive eco tips generator with randomized prompts
Lack of centralized, user-friendly interface	Gradio-based dashboard with tabs for modular access
Tedious documentation or feedback mechanisms	Instant PDF report generator and session-based feedback form

Proposed Solution

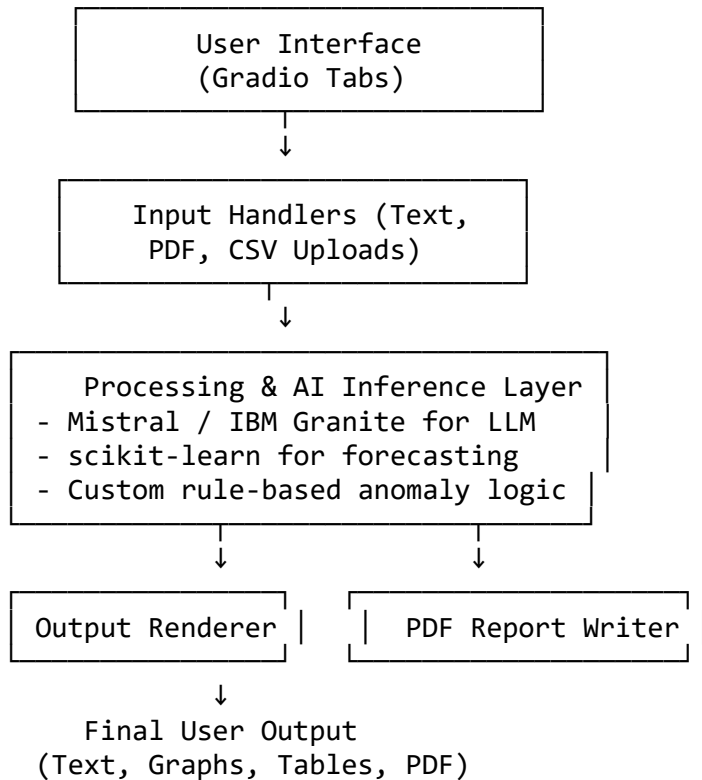
The final system is a modular, AI-powered platform that runs entirely in a Colab environment using a GPU-backed inference model. Key aspects include:

- **Conversational Interface:** Uses LLMs like Mistral-7B or IBM Granite to answer user queries about sustainability.
- **Summarization Engine:** Converts large PDF documents into bite-sized summaries using transformer models.
- **KPI Modules:** Includes CSV-based forecasting via linear regression and anomaly detection based on dynamic thresholds.
- **Engagement Features:** A daily eco tip generator with randomly selected prompts keeps users educated and involved.
- **Gradio UI:** A lightweight, interactive UI built with tabs for each functionality.
- **Offline PDF Export:** Text-based insights and AI-generated summaries can be exported as professional-looking PDFs.

This modular approach ensured scalability and made the project easy to test, deploy, and use.


Solution Architecture

A high-level architecture diagram of the project:



Design Highlights:

- Entirely session-based – no backend/database needed
- Runs smoothly in Colab with GPU support
- Built-in PDF reader (PyMuPDF) and writer (FPDF)
- Supports multimodal inputs (text, CSV, and PDF)
- Easy to update or expand via modular Python functions

 *The project design stage ensured that all systems were technically sound, user-focused, and extensible—forming the core foundation for a powerful AI-powered smart city platform.*