## **Sustainable smartcity**

## 1. Project Overview:

The Sustainable Smart City Assistant is an AI-powered solution designed to enhance city sustainability, governance, and citizen engagement.

It leverages IBM Granite models from Hugging Face with a Gradio interface and runs seamlessly on Google Colab (T4 GPU).

**Key Features:**

1)City Health Dashboard – quick insights on sustainability metrics

2)Citizen Feedback Tool – collect and analyze public input

3)Document Summarization – summarize governance/policy documents

4)Eco Tips Generator – provide daily sustainability recommendations

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**2. Pre-requisites:**

Before running the project, ensure familiarity with the following:

* Gradio Framework → Gradio Docs
* IBM Granite Models (Hugging Face) → Hugging Face Granite
* Python Programming → Python Docs
* Git & Version Control → Git Docs
* Google Colab T4 GPU → Colab Guide

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**3. Project Workflow:**

The workflow consists of the following activities:

Activity 1: Exploring Naan Mudhalvan Smart Interz Portal

* Understand the portal and identify sustainability challenges.

Activity 2: Choosing an IBM Granite Model from Hugging Face

* Select a Granite model suitable for NLP tasks (e.g., summarization, classification)

Activity 3: Running the Application in Google Colab

* Install dependencies (Gradio, Hugging Face, etc.)
* Load Granite model
* Build Gradio UI for interaction
* Test functionalities

Activity 4: Upload Project to GitHub

* Initialize a Git repository
* Push Colab notebook, scripts, and documentation
* Maintain version control

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**4. System Architecture:**

Components:

* Frontend: Gradio interface
* Backend: IBM Granite NLP model (via Hugging Face)
* Platform: Google Colab (T4 GPU)
* Version Control: GitHub
* (Include a block diagram if possible)

**5. Installation & Setup**

Run in Google Colab:

# Install dependencies

!pip install gradio transformers accelerate

# Clone the project (if hosted on GitHub)

!git clone https://github.com/your-username/smart-city-assistant.git

%cd smart-city-assistant

# Run the app

!python app.p

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**6. Usage:**

1. Open the Colab notebook.

2. Run the setup cells.

3. Launch Gradio UI.

4. Access:

* Dashboard for city insights
* Upload documents for summarization
* Submit citizen feedbac
* Get eco tips

**7. Results & Screenshots**:

* Gradio interface
* Dashboard outpu
* Summarization result
* Eco tips suggestions

**8. Challenges & Learnings:**

* Managing model performance on Colab T4
* Optimizing Granite models for real-time use
* Integrating Gradio for an interactive UI
* Using GitHub for collaboration and version contro

**9. Future Enhancements:**

* Expand to support multiple languages
* Add real-time city data APIs (air quality, traffic, energy usage)
* Integrate chatbot for 24/7 citizen support

**10. References**

* IBM Granite Models on Hugging Face
* Gradio Documentation
* Python Documentation
* Git Documentation
* Google Colab Guide