Sustainable Smart City Assistant Using IBM granite LLM

1.Introduction

Project Title: Sustainable Smart City Assistant Using IBM granite LLM
Team Member: PUGAZHMANI B
Team Member: USMAN AHMED S
Team Member: MOHAMED ALFIN S
Team Member: SARAVANAN T
Team Member: SETHURAMAN S

2. Introduction Project Title: SmartSDLC – AI-Enchanted Software Development Lifecycle This project focuses on enhancing the traditional Software Development Lifecycle (SDLC) by integrating Artificial Intelligence (AI) to improve efficiency, accuracy, and automation across various phases of software engineering.

3. Project Overview Purpose: The purpose of SmartSDLC is to optimize software development by automating repetitive tasks, predicting issues early, and supporting decision-making with AI-powered insights. This reduces cost, increases speed, and ensures higher software quality.

Features: • AI-based Requirement Analysis

• Automated Code Generation & Review

• Bug Prediction & Anomaly Detection

• Test Case Automation & Optimization

• Project Progress Forecasting

• Documentation Summarization

4. Architecture Frontend (Streamlit/React): Provides an interactive dashboard for requirement inputs, progress tracking, and report visualization. Backend (FastAPI/Django): Hosts APIs for AI-driven modules such as bug prediction, code review, and test automation. AI/ML Modules:

• NLP for Requirement Analysis

• ML Models for Bug Prediction

• Automated Code Review using LLMs

• Test Case Generation & Optimization Database: Stores project data, requirements, test cases, and logs.

Integration: Supports CI/CD tools like Jenkins, GitHub, and Docker for seamless development.

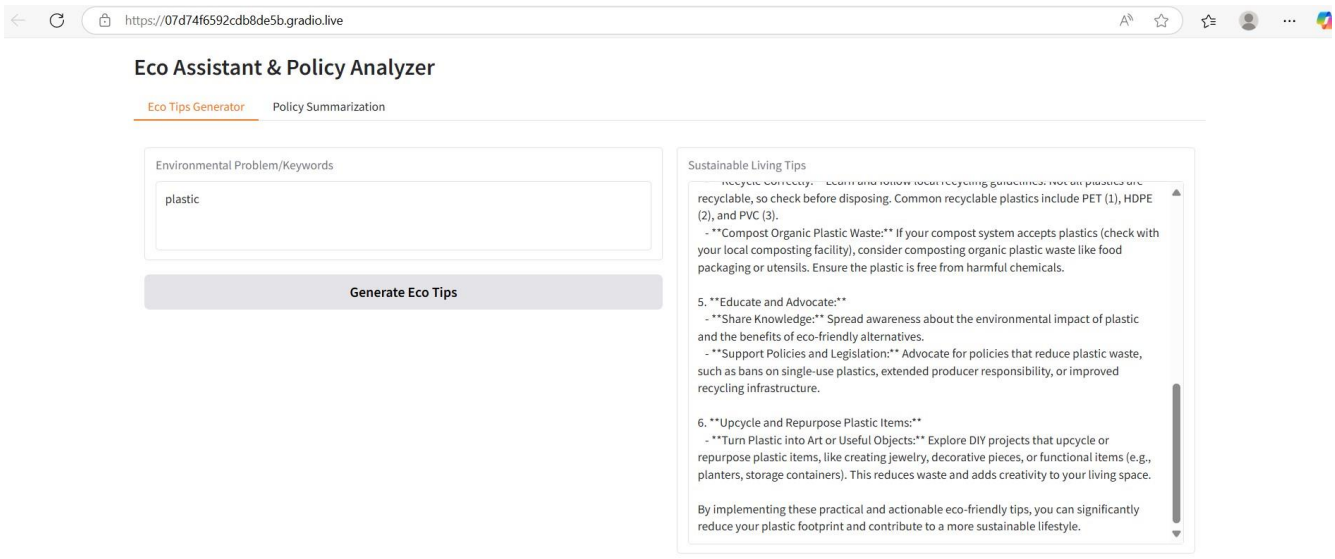
5. Setup Instructions Prerequisites: • Python 3.9+ • pip and virtual environment tools • API keys for AI/ML modules • Access to GitHub/Jenkins for CI/CD integration Installation Process: 1. Clone the repository 2. Install dependencies from requirements.txt 3. Configure environment variables (.env file) 4. Run backend server 5. Launch frontend dashboard 6. Upload project data and start interacting

6. API Documentation Available APIs: • POST /analyze-requirements – Extracts requirements from uploaded documents • POST /generate-code – Generates code snippets from specifications • POST /predict-bugs Predicts bugs from codebase • POST /generatetests – Creates test cases automatically • GET /project-forecast – Provides progress insights and predictions

7. Testing Testing Phases: • Unit Testing – For individual AI models and utility scripts • Integration Testing For combined modules (code review + bug prediction) • API Testing – Using Postman & Swagger • Manual Testing – User interface and overall workflow • Edge Cases – Handling incomplete requirements, ambiguous inputs

8. Future Enhancements • AI-based Project Management Assistant • Enhanced Natural Language Requirement Gathering • Predictive Maintenance for Large Codebases • Automated Deployment with AI-optimized CI/CD pipeline.

9.Screenshots


https://07d74f6592cdb8de5b.gradio.live
Eco Assistant & Policy Analyzer
Eco Tips Generator
Policy Summarization
Environmental Problem/Keywords
plastic
Generate Eco Tips
Sustainable Living Tips
recyclable, so check before disposing. Common recyclable plastics include PET (1), HDPE (2), and PVC (3).
- **Compost Organic Plastic Waste:** If your compost system accepts plastics (check with your local composting facility), consider composting organic plastic waste like food packaging or utensils. Ensure the plastic is free from harmful chemicals.
5. **Educate and Advocate:**
- **Share Knowledge:** Spread awareness about the environmental impact of plastic and the benefits of eco-friendly alternatives.
- **Support Policies and Legislation:** Advocate for policies that reduce plastic waste, such as bans on single-use plastics, extended producer responsibility, or improved recycling infrastructure.
6. **Upcycle and Repurpose Plastic Items:**
- **Turn Plastic into Art or Useful Objects:** Explore DIY projects that upcycle or repurpose plastic items, like creating jewelry, decorative pieces, or functional items (e.g., planters, storage containers). This reduces waste and adds creativity to your living space.
By implementing these practical and actionable eco-friendly tips, you can significantly reduce your plastic footprint and contribute to a more sustainable lifestyle.


Smart City Ai.ipynb
File Edit View Insert Runtime Tools Help
Share
Gemini
Commands
+ Code
+ Text
Run all
Reconnect
special_tokens_map.json: 100% 701/701 [00:00<00:00, 14.4kB/s]
config.json: 100% 786/786 [00:00<00:00, 16.2kB/s]
`torch_dtype` is deprecated! Use `dtype` instead!
model.safetensors.index.json: 29.8k/? [00:00<00:00, 2.96MB/s]
Fetching 2 files: 100% 2/2 [01:14<00:00, 74.86s/it]
model-00001-of-00002.safetensors: 100% 5.00G/5.00G [01:14<00:00, 121MB/s]
model-00002-of-00002.safetensors: 100% 67.1M/67.1M [00:01<00:00, 74.5MB/s]
Loading checkpoint shards: 100% 2/2 [00:21<00:00, 8.79s/it]
generation_config.json: 100% 137/137 [00:00<00:00, 9.28kB/s]
Colab notebook detected. To show errors in colab notebook, set debug=True in launch()
* Running on public URL: https://07d74f6592cdb8de5b.gradio.live
This share link expires in 1 week. For free permanent hosting and GPU upgrades, run `gradio deploy` from the terminal in the working directory to deploy to Hugging Face Spa
Eco Assistant & Policy Analyzer
Eco Tips Generator
Policy Summarization
Environmental Problem/Keywords
Sustainable Living Tips