

AI-Driven Custom Home Design Assistant - Documentation

Introduction

The **AI-Driven Custom Home Design Assistant** is a web-based application designed to generate personalized home design plans using Google's Generative AI models. The tool allows users to input their preferences and receive AI-generated text descriptions and home design images based on their requirements.

Features

- **AI-Powered Home Design Generation:** Users can specify the number of rooms, architectural styles, and custom features.
- **Realistic Image Generation:** Utilizes Google's Gemini-Pro-Vision model for generating home design images.
- **Multi-Scenario Support:**
 - **Real Estate Development:** Helps buyers visualize property designs.
 - **Home Renovation Services:** Generates remodel suggestions for existing homes.
 - **Architectural Firms:** Provides preliminary design concepts.
- **Intuitive User Interface:** Built with Streamlit for a seamless experience.
- **Secure API Integration:** Uses Google's AI models via API for text and image generation.

Technologies Used

- **Python** (Core language for backend logic)
- **Streamlit** (Framework for UI development)
- **Google Generative AI (Gemini-Pro, Gemini-Pro-Vision)**
- **Pillow (PIL)** (For image processing)
- **Dotenv** (For managing environment variables securely)

Installation and Setup

Prerequisites

Ensure the following dependencies are installed:

- Python 3.8+
- pip (Python package manager)
- A valid Google API key for accessing AI models

Steps to Install and Run

1. **Clone the Repository:**
2. `git clone https://github.com/PallaganiSriRupa/AI-Driven-Custom-Home-Design-Assistant.git`
3. `cd AI-Driven-Custom-Home-Design-Assistant`

4. **Create a Virtual Environment:**
5. `python -m venv venv`
6. `source venv/bin/activate` # On Windows: `venv\Scripts\activate`
7. **Install Required Packages:**
8. `pip install -r requirements.txt`
9. **Configure API Key:**
 - Create a `.env` file in the project directory.
 - Add your API key:
 - `GOOGLE_API_KEY=your_google_api_key_here`
10. **Run the Application:**
11. `streamlit run app.py`
12. Open your browser and navigate to `http://localhost:8501/`.

Usage

1. **Select a Scenario:** Choose between real estate development, home renovation, or architectural firms.
2. **Input Home Preferences:** Specify room details, style, and custom features.
3. **Generate Design:** Click the button to receive AI-generated home plans and images.
4. **Review and Modify:** Regenerate designs as needed.

Deployment

Deploying on Streamlit Cloud

1. Push your project to GitHub.
2. Visit [Streamlit Cloud](#) and create a new app.
3. Select your repository and specify the branch.
4. Set the entry point (`app.py`).
5. Add your API key to the environment settings.
6. Click **Deploy** and wait for the app to launch.

Troubleshooting

- **Application Not Starting?** Check dependencies and ensure API keys are configured.
- **Images Not Loading?** Verify API limits and retry after some time.
- **Deployment Issues?** Ensure `.py` files have correct paths in your repository.

Future Enhancements

- **3D Home Design Renderings:** Enhancing output beyond static images.
- **User Accounts & Saved Designs:** Allowing users to store and modify plans.
- **Expanded Architectural Styles:** Supporting a broader range of design options.

Conclusion

The **AI-Driven Custom Home Design Assistant** simplifies home planning by leveraging AI for instant design generation. This tool aids homebuyers, renovators, and architects by providing tailored design recommendations and AI-generated visuals.
