

AI-Driven Custom Home Design Assistant - Documentation

Introduction

The **AI-Driven Custom Home Design Assistant** is a web application that leverages Google's Generative AI models to create personalized home design plans based on user preferences. This tool enables users to generate textual design plans and AI-generated home design images based on their requirements.

Features

- **Personalized Home Design Generation:** Users can input preferences such as number of bedrooms, bathrooms, architectural style, and custom features.
- **AI-Powered Image Generation:** The application uses Google's generative AI to create home design images.
- **Multiple Scenarios:**
 - **Real Estate Development:** Generates designs optimized for potential buyers.
 - **Home Renovation Services:** Creates remodel plans for existing homes.
 - **Architectural Firm:** Produces preliminary design concepts for architects.
- **User-Friendly Interface:** Built using Streamlit for easy accessibility.

- **Secure API Integration:** Uses Google's AI models via API for text and image generation.

Technologies Used

- **Python** (Main programming language)
- **Streamlit** (Web framework for UI)
- **Google Generative AI (Gemini-Pro, Gemini-Pro-Vision)**
- **PIL (Pillow)** (For image handling)
- **Dotenv** (For managing API keys securely)

Installation and Setup

Prerequisites

Ensure you have the following installed:

- Python 3.8+
- pip (Python package manager)
- A Google API key (for AI model access)

Steps to Install and Run

1. **Clone the Repository:**
2. `git clone https://github.com/jaswanthk993/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 Dependencies:

8. `pip install -r requirements.txt`

9. Set Up the API Key:

- Create a `.env` file in the project root.
- Add the following line:
- `GOOGLE_API_KEY=your_google_api_key_here`

10. Run the Application:

11. `streamlit run app.py`

12. Open the web browser and go to
`http://localhost:8501/`

Usage

1. Select a scenario (Real Estate, Renovation, or Architectural).
2. Enter home preferences (bedrooms, bathrooms, style, features).
3. Click "Generate Design" to get a text-based plan and AI-generated image.
4. View, modify, or regenerate designs as needed.

Deployment

Deploying on Streamlit Cloud

1. Push your code to a public GitHub repository.
2. Go to [Streamlit Cloud](https://streamlit.io/cloud).
3. Click on **New App**, select the repository and branch.

4. Set the main file (e.g., app.py).
5. Add the API key in the deployment settings.
6. Click **Deploy** and wait for the app to go live.

Troubleshooting

- **App not starting?** Ensure all dependencies are installed and API keys are correctly set.
- **Image not generating?** Verify API limits and retry after some time.
- **Deployment errors?** Ensure .py file extensions and correct GitHub repository setup.

Future Enhancements

- **3D Model Generation:** Expanding image output to include 3D renders.
- **User Account System:** Allowing users to save and modify designs.
- **More Architectural Styles:** Incorporating a wider range of design aesthetics.

Conclusion

The **AI-Driven Custom Home Design Assistant** simplifies home design for real estate, renovation, and architecture firms by leveraging AI. Users can quickly visualize and refine their dream homes with AI-powered insights and images.