**Property Bot Technical Documentation**

* **Core Features Implemented:**

**### 1. Multilingual Support**

- Complete UI translation system for English, Spanish, and French

- Dynamic language detection for user queries

- Translation capabilities using MarianMT models

- Consistent language handling across all UI elements

**### 2. Property Recommendation System**

- Role-based interface (Buyer, Seller, Tenant, Landlord)

- Preference-based property matching for Buyer

- Advanced similarity scoring system including:

- Price similarity with Indian currency handling

- Area matching with fuzzy logic

- Categorical matching for furnishing, transaction type, and status

- Weighted scoring algorithm for property recommendations

- Detailed match quality explanations

**### 3. Question-Answering System**

- FAQ handling using FAISS vector store

- Context-aware responses using LangChain

- Multilingual query support

**### 4. Technical Infrastructure**

- Model caching using Streamlit's cache system

- Efficient vector store creation for properties and FAQs

- Dependency verification system

- Error handling and graceful degradation

**### 5. User Interface**

- Tab-based navigation (Recommendations and FAQ)

- Expandable property details

- Interactive preference selection

- Dynamic metric displays

- Progress indicators and loading states

* **Implementation Details:**

**1. \*\*Models and Embeddings\*\***

- HuggingFace embeddings (all-MiniLM-L6-v2)

- TinyLlama model for text generation

- MarianMT models for translation

**2. \*\*Data Processing\*\***

- CSV loader for property data

- Text loader for FAQ data

- RecursiveCharacterTextSplitter for document chunking

- FAISS vector stores for efficient similarity search

**3. \*\*Recommendation Engine\*\***

- Multi-criteria scoring system

- Price parsing for Indian currency formats

- Fuzzy matching for area comparisons

- Weighted scoring with randomization for tie-breaking

* **Remaining work and process:**

**1. Recommendation System for Sellers, Landlords, and Tenants**

* **Objective:** Develop a personalized recommendation system for Sellers, Landlords, and Tenants, like the system already implemented for Buyers.

**2. Upgrade to High-Performance Models**

* **Objective:** Improve FAQ responses by upgrading to a more powerful language model, like LLAMA. I have tried model with 7B parameter, but it is taking too much time to generate the response.

**3. Optimize the prompt:**

* **Objective:** Optimize the prompt for retrieval process so that It can generate the response based on the criteria.

**3. Provide Real-Time Property Links**

* **Objective:** Allow users to directly access property details via external links. Embed links in chatbot responses that direct users to the respective property websites for detailed information.

**4. Enable Multimedia Support for Image Input**

* **Objective:** Allow users to upload images to the chatbot for enhanced interaction.

**References:**

Dataset: <https://www.kaggle.com/datasets/abhijitdahatonde/real-estate-kolkata/data>

Model: <https://huggingface.co/TinyLlama/TinyLlama-1.1B-Chat-v1.0>