HOME SWEET HOME 🏠

❖ **Problem Statement**

Navigating the real estate market is challenging due to the complexity, dynamic nature, abundance of scattered information and the lack of interactive tools to evaluate property trends. Buyers and sellers need a unified platform to explore, analyze, and predict property values while understanding market trends in real-time.

❖ **Objective**

The main objective of this project to create an interactive and user-friendly web application that empowers users to make data-driven decisions in the real estate market. This platform provides price prediction model, area-specific analysis, and property recommendation system, ensuring transparency and efficiency for buyers, sellers, and market analysts.

❖ **Introduction**

In today's dynamic real estate market, making informed decisions is crucial. The web application **Home Sweet Home** provides an all-in-one solution for understanding property trends, estimating property values, and exploring the market with interactive data visualizations. This tool is perfect for anyone involved in real estate, from first-time homebuyers to seasoned investors.

❖ **Technologies Used**

➢ **Data Collection & Processing:** Python, NumPy, Pandas, Selenium.
➢ **Data Visualization:** Matplotlib, Seaborn, Plotly.
➢ **Machine Learning:** Scikit-learn, XG Boost.
➢ **Frontend & Backend:** Python, Streamlit.
➢ **Deployment:** Streamlit Cloud.

❖ **Methodology**

1. **Data Gathering:** The project started by collecting real estate data, which was carefully gathered through self-scraping from the 99acres website.

2. **Data Cleaning and Merging:** To prepare the dataset for analysis, cleaned the data, addressing missing values and ensuring consistency. Then merged the data to create a unified dataset, combining information on houses, flats, and apartments.

3. **Feature Engineering:** During feature engineering, I introduced several new features to make the dataset more informative. These included additional room indicators, specifications for different areas, details about the age of property, furnishing details, and a luxury score to provide a more comprehensive view of the properties.

4. **Exploratory Data Analysis (EDA):** To understand the data better, conducted both univariate and multivariate analyses to uncover patterns and relationships within the dataset. Also used Pandas Profiling to get a detailed overview of the data distribution and structure.

5. **Outlier Detection, Missing Value Imputation:** Outliers were identified and removed to ensure the robustness of subsequent analyses. Missing values, especially in crucial columns like area and bedroom, were addressed using appropriate imputation techniques.

6. **Feature Selection:** Identified and removed outliers to ensure the robustness of our analysis. Missing values, especially in important columns like area and bedroom, were addressed using suitable imputation techniques.

7. **Model Selection and Productionalization:** In the model selection and productionalization phase, I compared various regression models to identify the most effective one for predicting property prices. Then built a detailed price prediction pipeline, incorporating encoding methods to ensure robustness and accuracy. The chosen model was deployed using Streamlit, creating an intuitive and user-friendly web interface for end-users.

8. **Building the Analytical Module:** To make the data more informative, I developed an analytics module that visually represents key insights about the real estate data. I used geographical maps to show location-specific trends, word clouds to highlight common amenities, and various charts like scatter plots, pie charts, and box plots to provide a comprehensive understanding of the market.

9. **Building the Recommendation System:** In building the Recommender System, I created three distinct models, each focusing on different aspects of the real estate dataset: top facilities, price details, and location advantages. This way, users receive personalized recommendations tailored to their preferences and priorities. To enhance accessibility, I crafted a user-friendly recommendation interface using Streamlit.

10. **Deploying the Application:** The entire application, encompassing prediction, analytics, and recommendation functionalities, I deployed on Streamlit Cloud.

⬥ **Project Link: https://22ranjan15-house-flat-price-prediction-1-home-snz2tr.streamlit.app/**