**Project Summary: Predicting House Prices Using Linear Regression**

**📌 Objective:**

**To build a predictive model using Linear Regression that estimates house prices based on various housing features.** This project demonstrates the complete machine learning pipeline, from data preprocessing to model evaluation and visualization.\*\*

**📊 Dataset Overview:**

* **Filename:** Housing.csv
* **Rows:** 545
* **Columns:** 13
* **Features Include:** Area, number of bedrooms, bathrooms, parking, furnishing status, and more.
* **Target Variable:** price (numerical)

**🔍 Key Steps and Techniques:**

1. **Data Exploration & Cleaning:**
   * Checked for null values and cleaned the dataset.
   * Converted categorical variables using one-hot encoding.
2. **Feature Selection:**
   * Identified relevant numerical and categorical features.
   * Removed the target (price) from the input features.
3. **Model Development:**
   * Used **scikit-learn** to implement **Linear Regression**.
   * Split the dataset into 80% training and 20% testing.
4. **Model Evaluation:**
   * **Mean Squared Error (MSE):** 1,754,318,687,330.66
   * **R² Score:** 0.653
   * The model explained **~65.3%** of the variance in house prices on unseen data.
5. **Visualization:**
   * Created a scatter plot to visualize the actual vs predicted prices.
   * Helped assess prediction quality and identify potential outliers.

**📈 Results Interpretation:**

* The Linear Regression model gives a **moderate fit** to the data.
* While it captures general pricing trends, some variance remains unexplained, suggesting that more advanced techniques could improve accuracy.

**✅ Conclusion:**

This project successfully showcases how Linear Regression can be applied to a real-world regression task like housing price prediction. It provides a good baseline model and builds a foundation for more complex models like Ridge, Lasso, or tree-based methods.