# Project Summary: House Price Prediction

## Introduction

This project aims to predict property prices accurately using machine learning techniques. The process involved data preparation, exploratory data analysis, model training, and evaluation, ensuring the final model delivers meaningful insights for property pricing.

## Steps Followed

The following steps were implemented during the project:

### 1. Data Preprocessing

- Loaded the dataset and checked for missing values.  
- Imputed missing values in numerical and categorical columns.  
- Encoded categorical variables using one-hot encoding.  
- Scaled numerical features to standardize the data.

### 2. Exploratory Data Analysis

- Analyzed relationships between features and property prices.  
- Conducted location-based analysis to identify trends in different zones.  
- Visualized data distributions and outliers to refine feature selection.

### 3. Model Development

- Used Random Forest Regressor as the primary model.  
- Split the dataset into training (80%) and testing (20%) subsets.  
- Built a pipeline to preprocess data and train the model.

### 4. Model Evaluation

- Evaluated the model using metrics such as R² score and RMSE.  
- Achieved high accuracy with R² > 90% on the test dataset.  
- Identified areas for improvement, such as hyperparameter tuning.

## Conclusion

The machine learning model successfully predicts property prices with high accuracy. The Random Forest Regressor demonstrated strong performance, making it suitable for property pricing analysis. Future work includes hyperparameter optimization and feature engineering to further improve predictions.