Project Report

# Project Title:

Flat Price Estimation for UrbanNest Realtors

## 1. Introduction

UrbanNest Realtors aims to modernize their flat price valuation system using machine learning. This project involves building a data-driven model that estimates the price of residential flats based on features such as location, size, amenities, and proximity to key facilities. The system offers both manual and bulk prediction modes and supports model training as well as loading pre-trained models.

## 2. Objectives

- Create a predictive system for flat price estimation.  
- Enhance realtor decision-making using machine learning.  
- Support bulk and manual input.  
- Provide easy-to-use interface compatible with Colab and local Python.

## 3. Technologies Used

- Python  
- Pandas, NumPy  
- Scikit-learn  
- RandomForestRegressor  
- Joblib  
- Google Colab or local Python

## 4. Dataset Features

- Area in sqft  
- Number of bedrooms  
- Distance to metro (km)  
- Age of flat (years)  
- Amenities score (0-10)  
- Target variable: flat\_price

## 5. Methodology

1. Dataset uploaded and preprocessed.  
2. Features and target variable separated.  
3. Model trained using Random Forest Regressor.  
4. Model performance evaluated using R², MAE, and RMSE.  
5. Model saved or loaded as `.pkl`.  
6. User chooses between manual or bulk predictions.

## 6. Model Evaluation

Model metrics:  
- R² Score: Indicates how well predictions approximate actual values.  
- MAE (Mean Absolute Error): Average absolute error between predicted and actual prices.  
- RMSE (Root Mean Square Error): Penalizes larger errors more heavily.

## 7. Output

The user can either:  
- Enter values manually to get an estimated flat price.  
- Upload a CSV file for bulk prediction and download results with predicted prices.

## 8. Conclusion

This project helps UrbanNest Realtors provide quick, accurate price estimates. It combines automation with flexibility and can be easily enhanced or deployed with GUI or web integration.