Property Price Prediction Using Machine Learning

This presentation explores property price prediction through machine learning techniques, focusing on Linear Regression and Random Forest models. This work aims to provide data scientists and machine learning engineers with insights into practical modeling approaches for real estate valuation.

We will examine the methodology, datasets, model performances, and interpretations to understand how these algorithms can predict property prices accurately, combining statistical fundamentals with advanced non-linear models.

Members

Naman Jain

SV Prabhas

Anurag Pratap Singh

Shankar Singh

Property

Introduction to the Problem and Dataset

Challenge Overview

Predicting property prices is critical for buyers, sellers, and investors to make informed decisions.

Data Description

Dataset includes property features like size, location, number of bedrooms, age, and amenities, alongside historical prices.

Data Preprocessing

Handling missing values, encoding categorical features, and scaling numerical attributes to prepare the data for modeling.

Real Estate

		Price	Property Featurg Fowtura	Square Feature	Location	Price
ro sequared fetach	algition	29.00	$2,000	$81,000	$2,000	$2,0(
uarer of bedrooom	alaition	1,0.00	$8,000	$81,000	$8,000	12,0(
mber of recotemding	algition	58.00	$2,000	$51,000	$2,000	$2,0(
ratural	algition	69.00	$8,000	$65,000	$8,000	$7,0(
merrd ofler stadlow	alaition	13200	$8,000	$51,000	$0,000	15,0(
aress Baty Sedelscal	alaition	$0.00	$6,000	$51,000	$3,000	17,0(
are's derrpily danty	atution	19,04	$6,000	$72000	$8,000	$2,0(

		$14.0
17.17	$6.90	$19.5
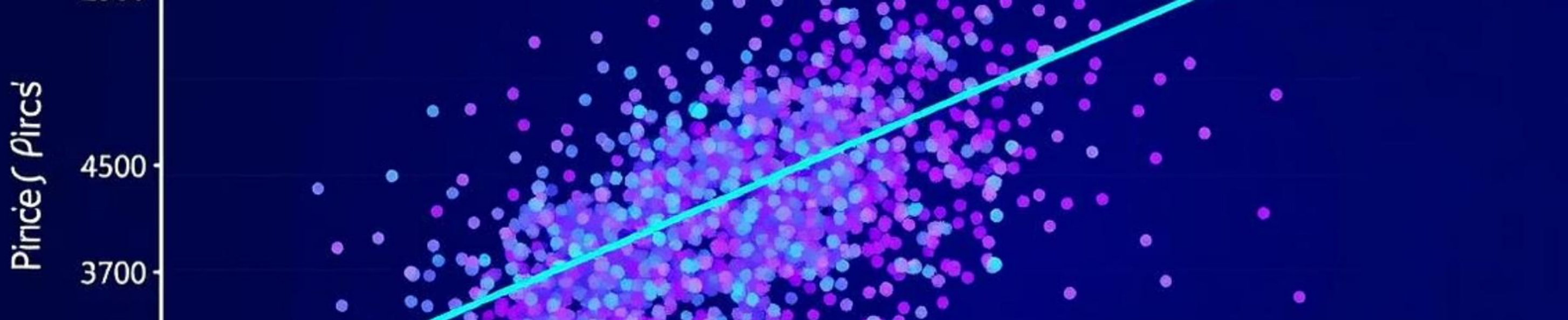
Linear Regression Model: Approach and Insights

Fundamental Concept

Linear Regression models the linear relationship between features and property price using a weighted sum.

Interpretability

Provides coefficients that quantify feature impacts, offering interpretable insights into price drivers.

Limitations

Assumes linearity and may underperform when relationships are complex or non-linear.

Property Price Prediction

Model Evaluation Metrics

Mean Absolute Error (MAE)

Measures average absolute difference between predicted and actual prices.

Root Mean Squared Error (RMSE)

Highlights larger errors by squaring differences before averaging and rooting.

R-Squared

Indicates proportion of variance explained by the model, higher is better.

Property Price Prediction

Comparing Linear Regression

Linear Regression

- Simple and fast to train

- Good interpretability

- Limited to linear relationships

Key Challenges and Practical Considerations

Data Quality

Inconsistent or incomplete data can bias models, necessitating careful cleaning and validation.

Feature Engineering

Creating meaningful features such as location scores or neighborhood crime rates improves predictions.

Model Interpretability

Balancing complexity and transparency is vital for trust and actionable insights in real estate markets.

Property Price Prediction

Summary and Future Directions

1	2	3
Model Deployment	**Enhanced Data**	**Advanced Techniques**
Integrating predictive models into real-time platforms for dynamic price estimation.	Incorporating additional data such as economic indicators and satellite imagery.	Exploring deep learning and hybrid models to capture more subtle data patterns.