Transforming Homes, Elevating Values

Group 6 Team

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Business Overview

Welcome to Reno Strategix, where the realms of real estate and home renovations converge.

This project addresses a pressing issue faced by CasaCrafters Realty Solutions: the need to provide data-driven guidance on home improvements for increased property value.

Our focus is not only on boosting value but also on enhancing overall appeal, guided by multiple linear regression modelling using King County house sales data.

Background of the study

Business Problem

Homeowners often grapple with the challenge of deciding on renovations that significantly enhance property values. CasaCrafters aims to fill this void by offering tailored advice grounded in a thorough analysis of the King County real estate market.

Objective 1

To develop a multiple linear regression model to identify and quantify the impact of features (e.g., square footage, bedrooms) on house sale prices in King County.

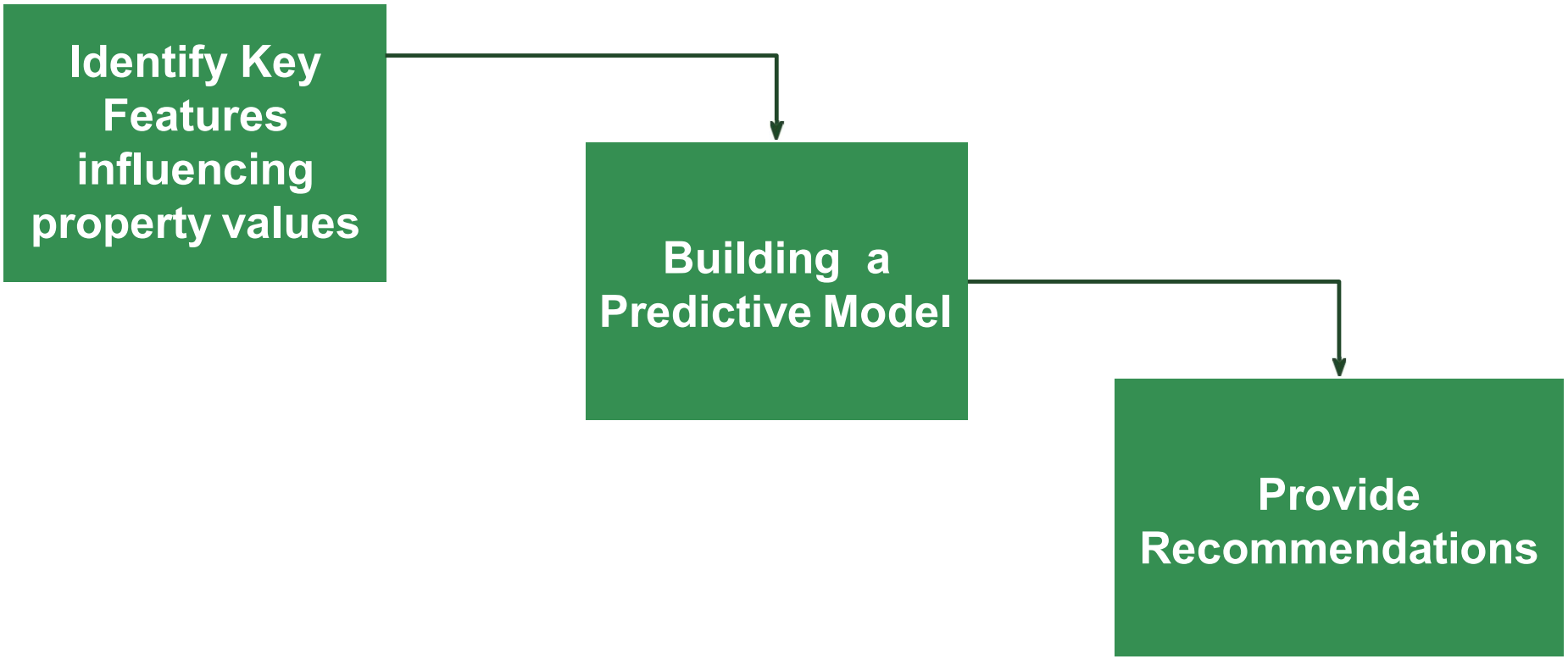
Objective 2

To Construct a robust regression model predicting house sale prices based on selected features for personalized property valuation.

Objective 3

To utilize the regression model to generate personalized recommendations, suggesting renovations predicted to have the highest positive impact on property values.

Rationale for achieving the objectives



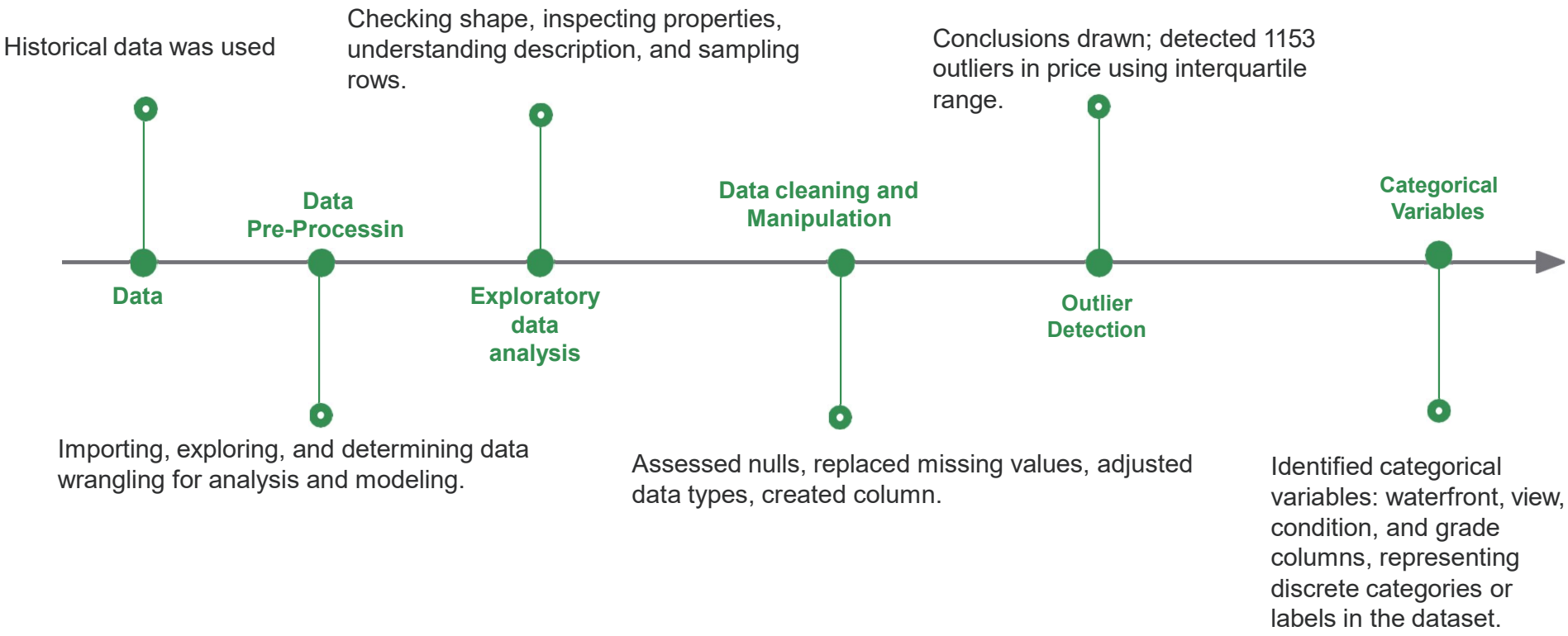
Data source, preparation and use

Data Source:
Kings county housing data

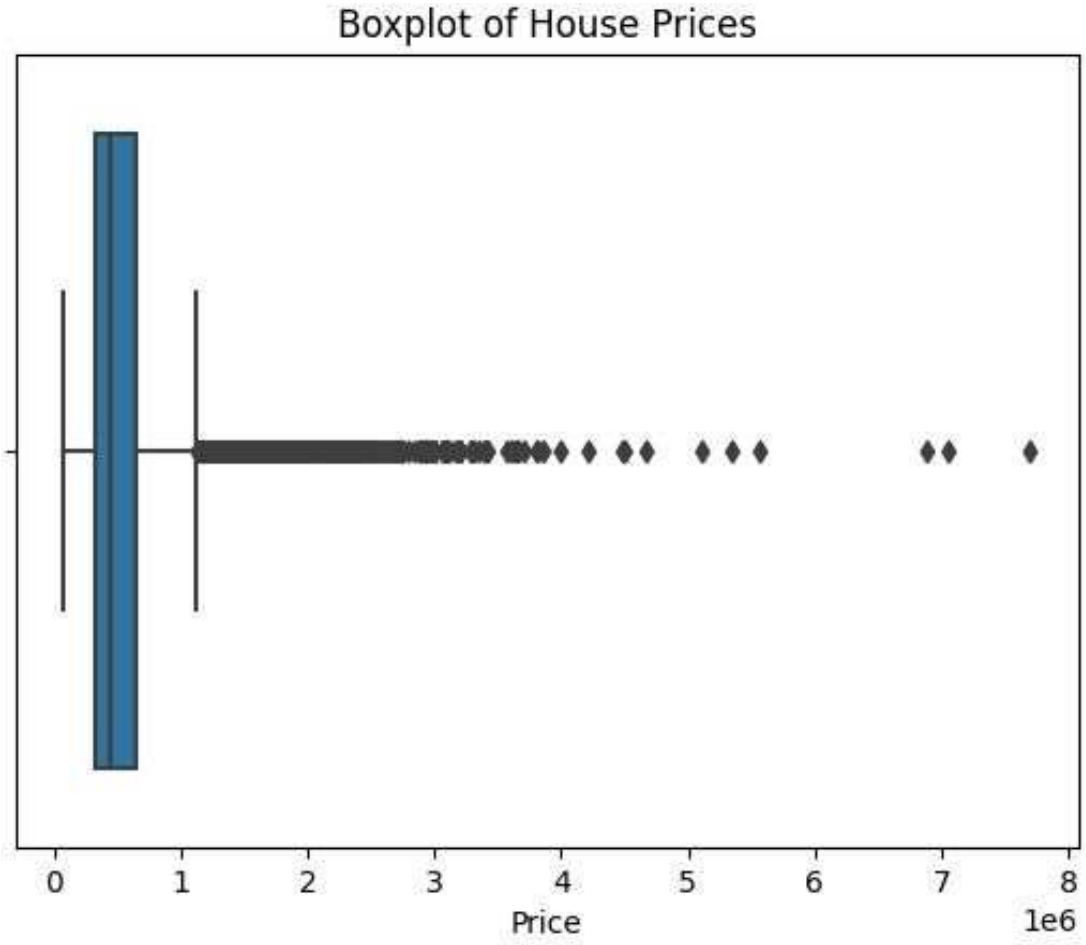
Data Preparation:
Import data, explore, understand dataset, identify wrangling techniques for analysis.

Exploratory Data Analysis
Examine structure, scrutinize properties, comprehend description, sample initial five rows.

The process flow



Price outliers

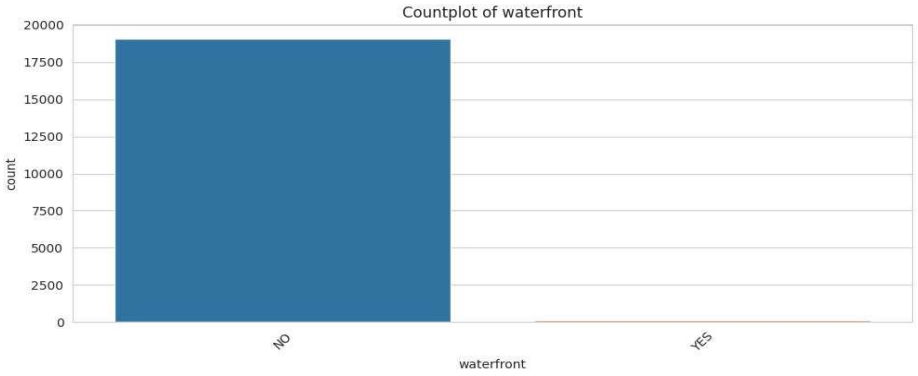


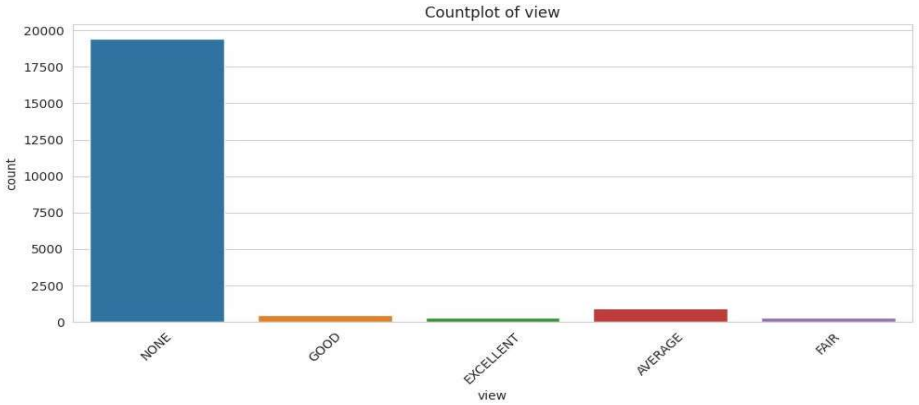
Identified 1153 outliers.

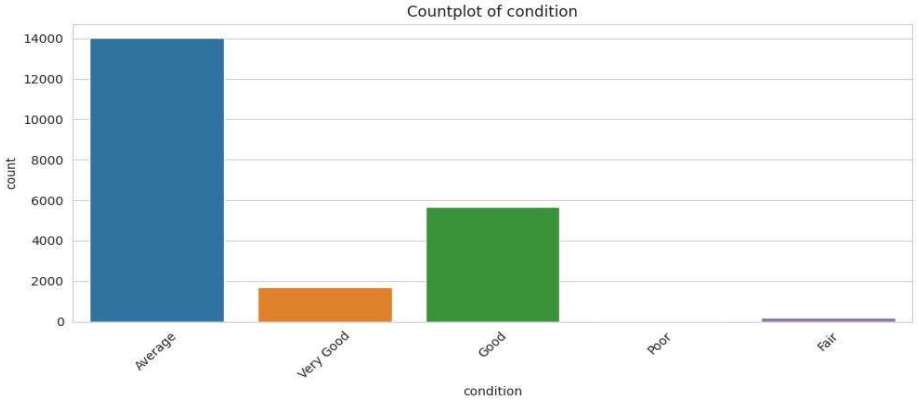
Lower bound: -162,500.0,
Upper bound: 1,129,500.0.

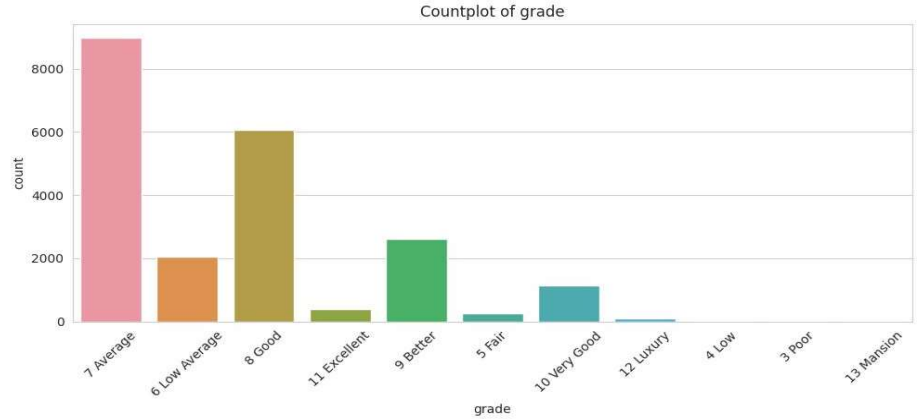
Grouped variables

Categorical variables





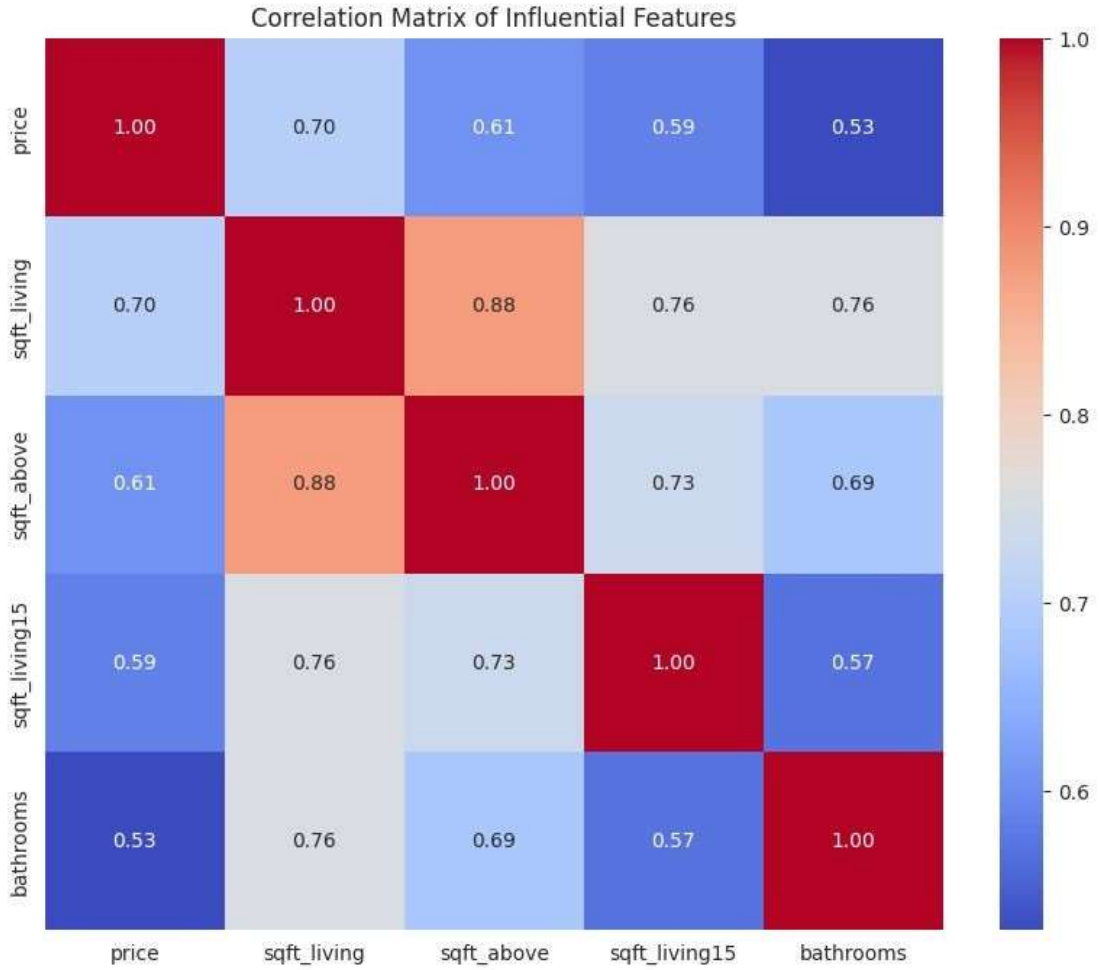




There were 1153 outliers, with the lower bound set at -162,500.0 and the upper bound at 1,129,500.0

Feature Selection

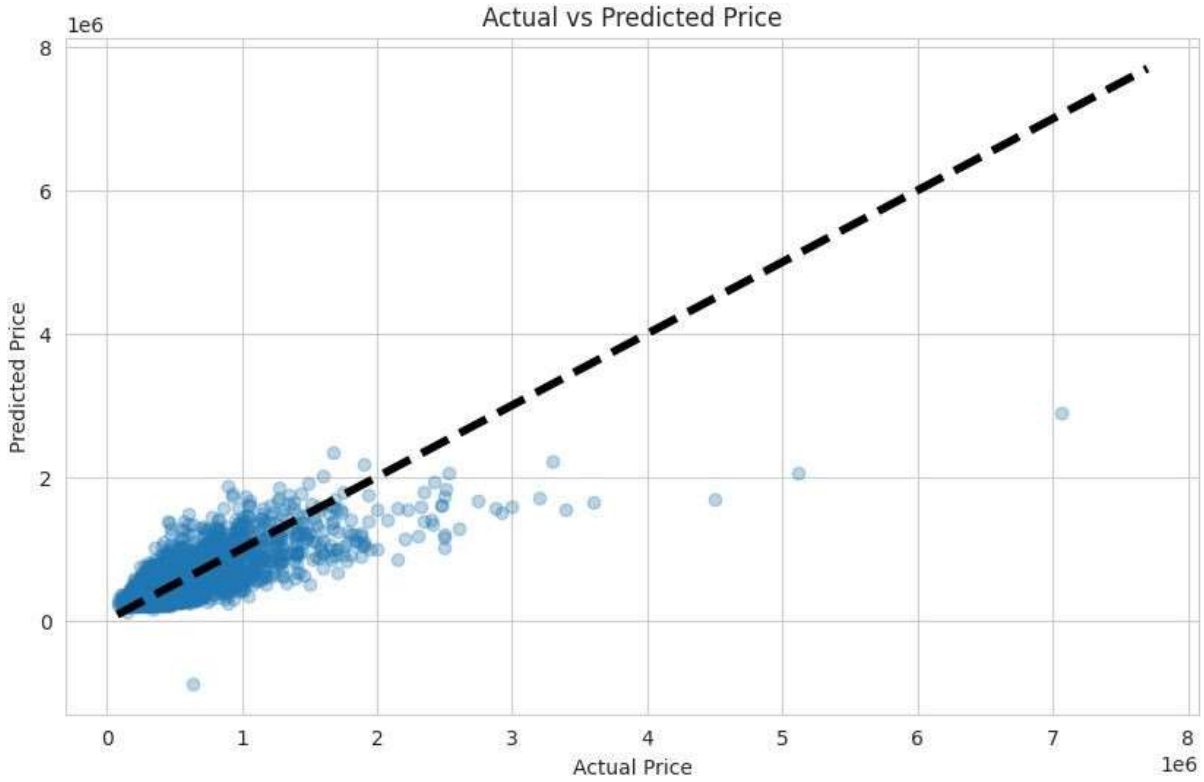
Identifying the most influential features through analysis and correlation



Using Pearson correlation in pandas, we obtained the correlation matrix for all the numerical columns in the dataset.

To the right is the representation of the correlation in the correlation matrix;

Train a multiple linear regression model using the selected features

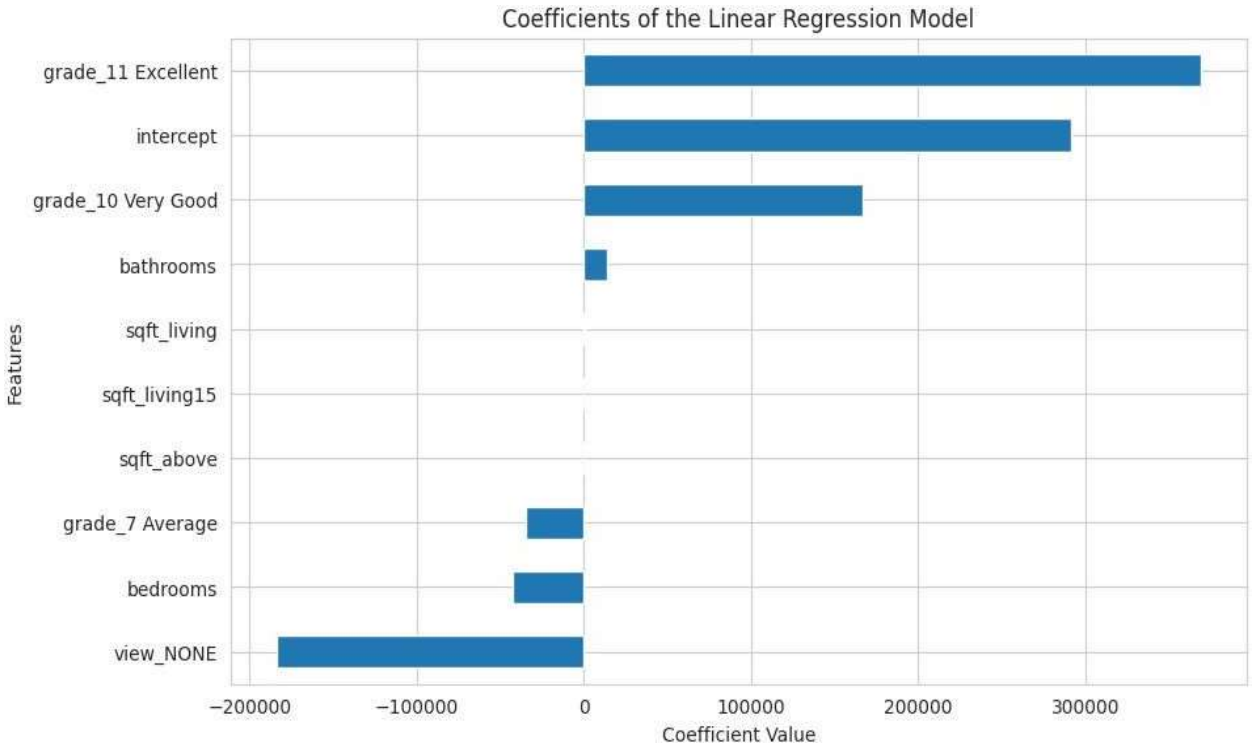


Split data into training and testing sets, trained model, and assessed performance.

- The Mean Squared Error (MSE) at 58.3 billion signifies the average squared difference between predicted and actual prices.
- R-squared at 0.55 implies the proportion of house price variance explained by selected features, higher values indicating a better fit; refer to the scatter plot for visual representation.

Modeling Evaluation

Assessing the performance of the model and interpreting the coefficients

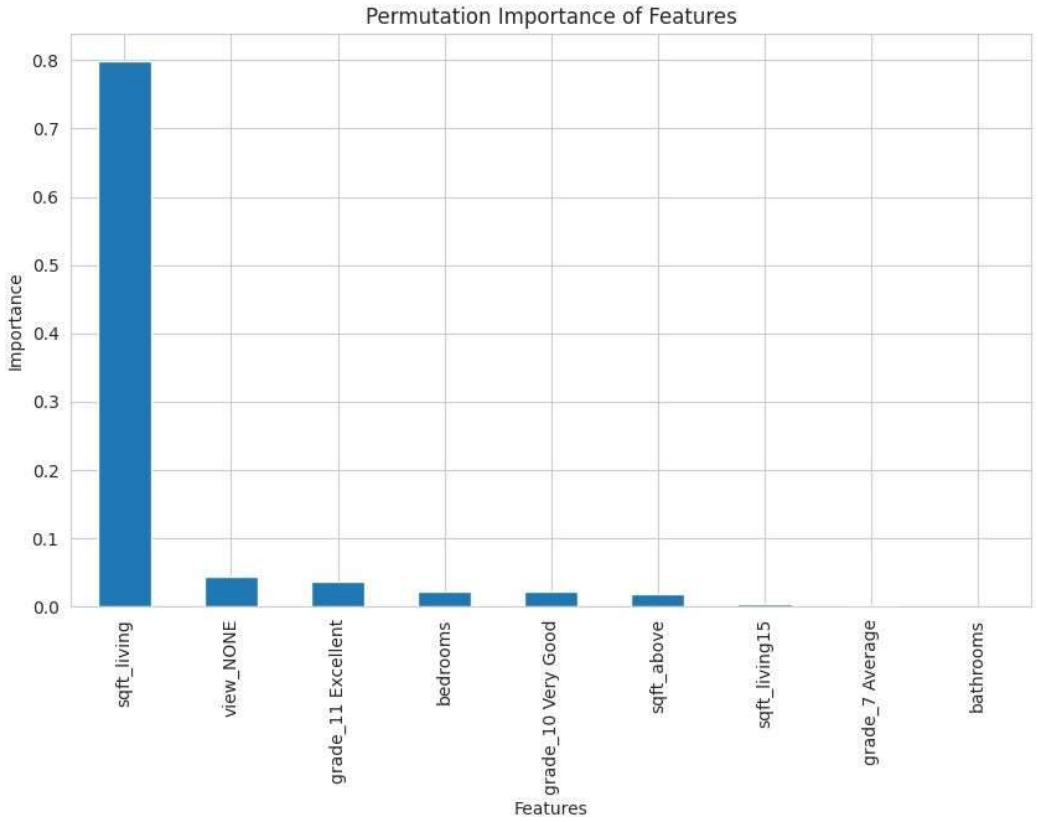


Coefficients in Linear Regression

- Positive coefficients: Positive correlation with target variable.
- Negative coefficients: Negative correlation.
- Intercept: Estimated target variable value when all features are zero.

Recommendation System

Developing a system to recommend specific renovations based on their predicted impact on house prices



Sqft_living holds the highest importance score, signifying that alterations in living area square footage have the most significant potential impact on house prices.

Bathrooms exhibit an extremely low importance score, indicating a minimal impact on house prices

Conclusions

1. House size in square ft holds the highest importance score, meaning that the the more square feet a house has the higher its price is.

2. A Very Good grade increases the house price compared to the baseline grade

3. Bathrooms have a significantly low importance score, suggesting a minimal influence on house prices.

Recommendations

Based on the model insights, here is clear and actionable advice for homeowners considering renovations to increase their house's value:

Recommendation	Explanation
Maximize Living Space	Expanding the living space is a key strategy for maximizing the house's value. Consider options like room additions, finishing basements, or creating open floor plans
Strategic Bathroom Additions	Strategically adding bathrooms can be a valuable investment. Evaluate the existing layout and identify spaces where an additional bathroom could enhance convenience and appeal.
Grade Upgrades	Upgrading the house grade, especially to 'Excellent,' can significantly increase the property's market value. Explore ways to enhance the quality of materials and finishes in your home.

Recommendations

Recommendation	Explanation
Budget Assessment	Assess the return on investment for each proposed renovation in line with your budget; prioritize projects aligned with financial capacity and long-term goals.
Understand Local Market Trends	Factors such as market conditions, neighborhood trends, and buyer preferences can influence the impact of renovations on property value.
Emphasize Quality	Prioritize quality over quantity in renovations; strategic improvements enhancing functionality and aesthetics yield favorable returns.
Adopt a Holistic Approach	Comprehensive renovations, accounting for features like square footage and bathrooms, alongside overall appeal, significantly boost a property's market value.

Questions?