

# Increasing Property Value Through Strategic Renovations Project

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The Analysis of King County House Sale.

# Introduction

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In the realm of real estate, the decision to renovate a home can be pivotal, influencing its market appeal, sale price, and ultimately, its overall value. For homeowners looking to optimize their property's potential before listing it for sale, understanding which renovations provide the greatest return on investment is essential.

This project focuses on developing a predictive model that evaluates the potential impact of various renovation projects on property values. By incorporating -

bedroomsNumber,bathroomsNumber,sqft\_livingsquare,waterfront,condition,grade as features for renovations.



# Business Problem Statement

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- The real estate agency needs a solution to provide reliable advice to homeowners regarding home renovations that can effectively increase the estimated market value of their properties. Homeowners seek clarity on which renovations yield the highest return on investment and by what amount, enabling them to make informed decisions about improving their homes before listing them for sale.

# Objectives

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- ✓ Data Exploration and Cleaning
- ✓ Perform exploratory data analysis (EDA) to identify trends, correlations, and patterns in the data
- ✓ Develop regression models to predict house prices based on the selected features
- ✓ Provide Insights and Recommendations

# Data source

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- kc\_house\_data.csv

This is the data was used for analysis.



# Data preparation and cleaning

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- After importing the data (**the kc\_house\_data.csv**) we were able to have the features in the table and also get the information of rows and columns such as the type of values in the columns data.
- The description of the dataset was able to give us information about the average, mean, standard deviation and the percentiles of the features on the table.
- We identified the columns with the null values and also dropped the features with highest missing values.

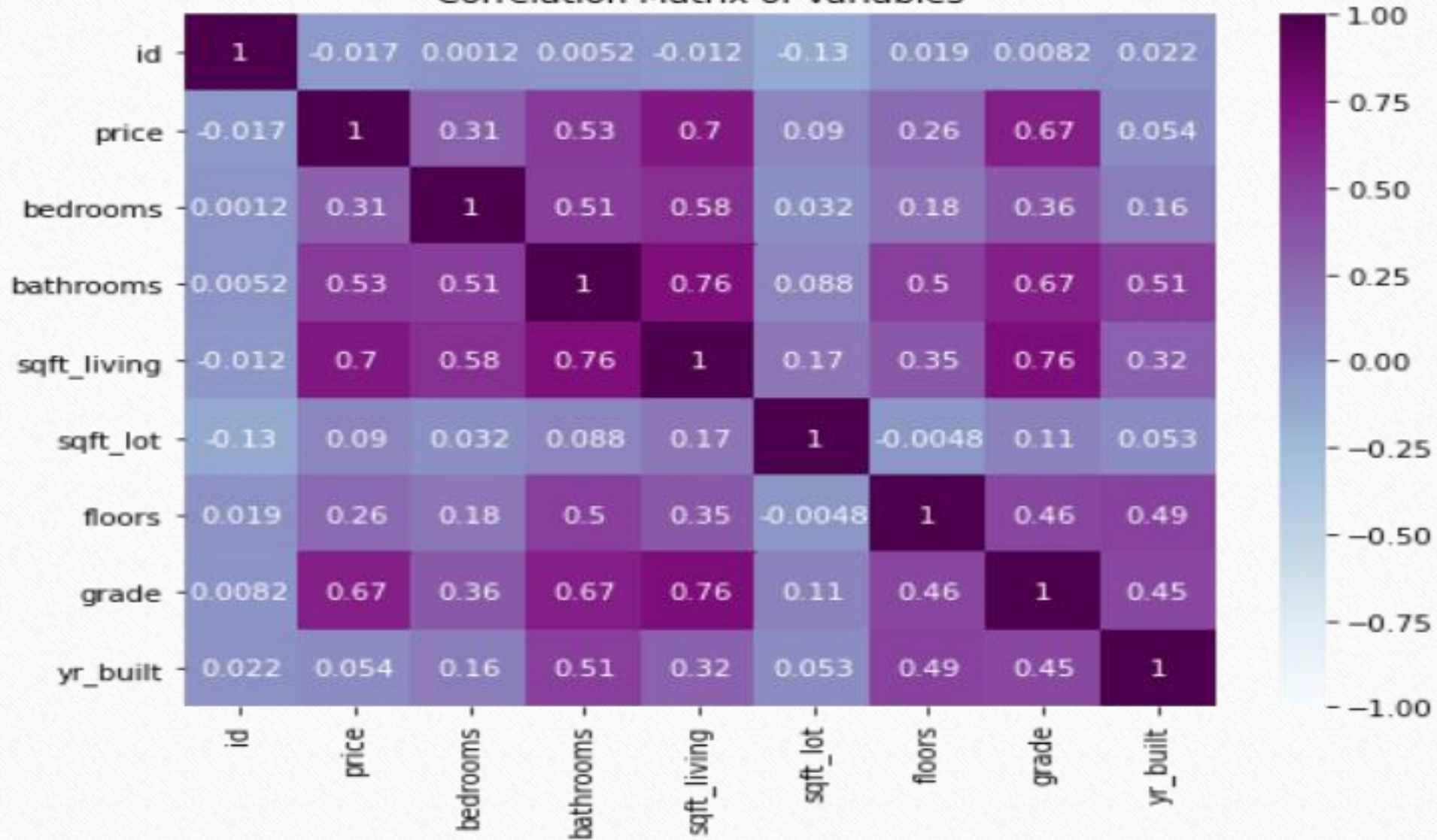
# Explanatory data analysis

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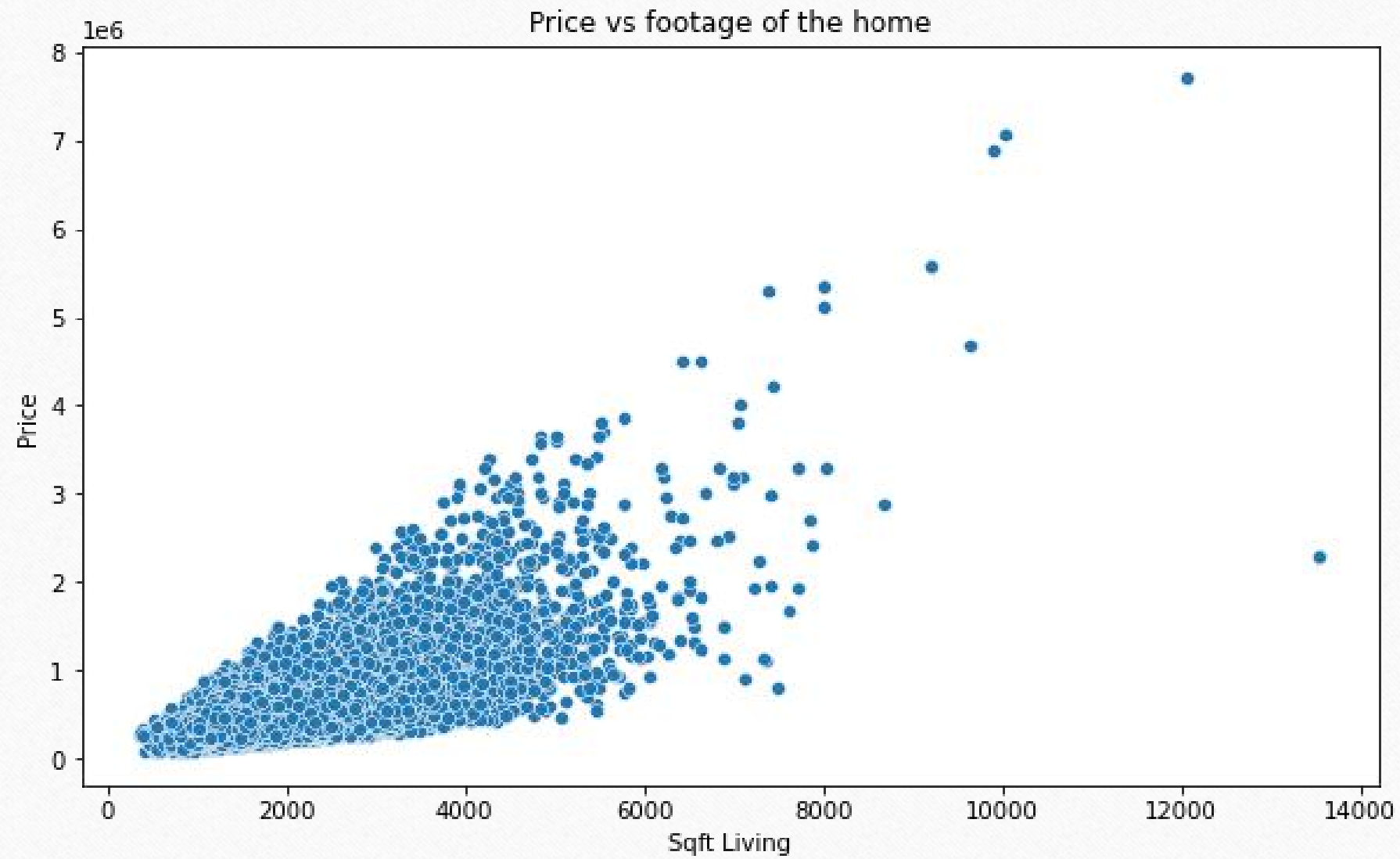
- We analysed using:
  - Pair plot
  - Correlation heatmap
  - Scatterplot
  - Boxplot



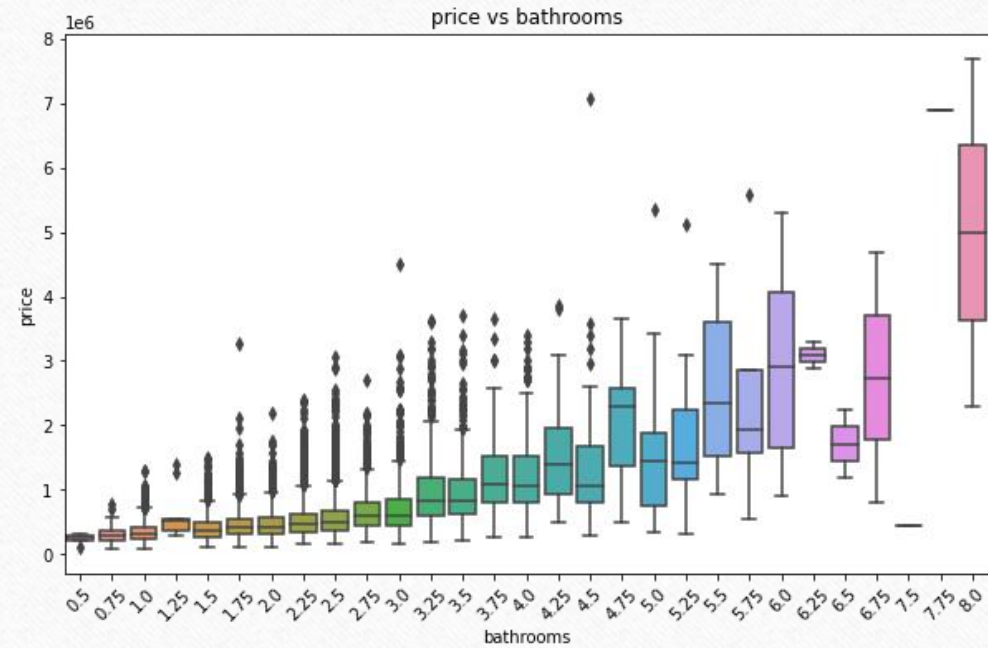
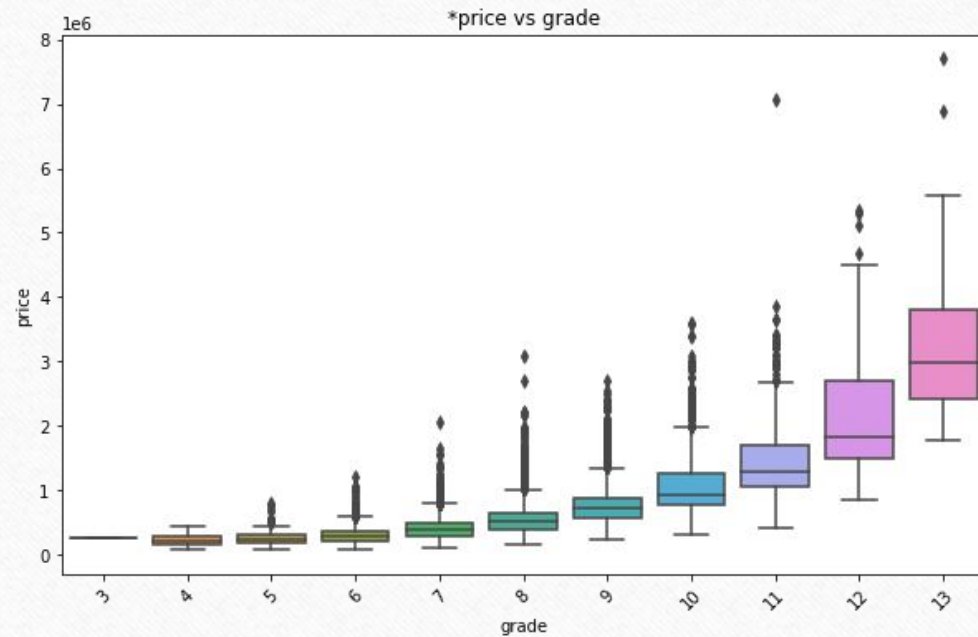
### Correlation Matrix of Variables







# Boxplot





# CHART ANALYSIS

- From the scatterplot and the box plot analysis, it clearly shows that features such as Grade, Bathrooms, sqft living and bedrooms highly correlates
- This means that the analysed features has a positive impact on the pricing of the housing
- A good example is the 'Bedrooms' feature, we can see that the best number of bedrooms to have in a house either 4 or 5. The higher the number of bedrooms does not equate to a higher price of the house
- This is however, different with the 'Grade' of the house. The higher the grade, indicates a higher pricing of the house.

# Modeling and Evaluation

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- Features assigning , the predictors  
“sqft\_living”; , “grade”; , “bathrooms”; , “bedrooms”
- Predicted assigning “Price”
- Data train test split
- Regression modeling (sklearn.linear\_model)
- Standard scaling



# Models

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- The group analysed using three types of model regression
  - Model ONE with one feature (price ~ sqft\_living)  
Based on r2 score model\_ONE scores 53.47%
  - Model 2 without bedroom feature  
Based on r2 score model\_TWO scores 53.12%
  - model THREE modelled with stats~model (price ~ sqft\_living + bathrooms + bedrooms + grade)  
Based on r2 score model\_TWO scores 54.4%

# Conclusion

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- In conclusion, leveraging regression modeling provides a robust solution for the real estate agency to offer reliable advice to homeowners on home renovations. By analyzing data on past sales and renovations, this approach can effectively identify which upgrades yield the highest return on investment. Armed with this knowledge, homeowners can make informed decisions to enhance their properties' market value before listing, ensuring their investments translate into tangible returns when it's time to sell.



# Insights and Recommendations

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## **Sqft\_living**

The best feature to consider during renovations to increase the pricing of the houses is the "sqft\_living". For every additional square foot in living space, the predicted house price increases by approximately \$226.93.

## **Grade**

For instance, upgrading a house from a grade of 7 to a grade of 8 could increase its price by nearly \$96,740, holding other factors constant. This can be particularly important in markets where buyers are willing to pay a premium for higher quality and better design.

# Cont...

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## **Bathrooms**

For a real estate investor agency, properties with fewer bathrooms relative to their price will present opportunities for improvement or renovation. Adding bathrooms could potentially increase the property's value.

## **Bedrooms**

A recommended number lies between 3 - 5 and after that there is a low increase in property value/prices. Most houses should be renovated and with consideration of the given range.