



ELITE PROPERTIES PROJECT

DATA DRIVEN INSIGHTS AND PREDICTIVE
MODELLING

OVERVIEW

Elite Properties Group is a distinguished real estate agency specializing in assisting homeowners with buying and selling residential properties.

The purpose of this project is to build regression models to understand the main features that affect Sale Price of homes.





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THANK YOU

BUSINESS UNDERSTANDING

Elite Properties Group has the need to develop a reliable and accurate model that predicts the sale prices of residential properties based on their key attributes.

By leveraging historical data, including features such as the number of bedrooms, bathrooms, square footage of living space, lot size, number of floors, property condition and year built, the agency aims to provide clients with precise pricing recommendations and maximize their returns on investment.

The primary objective of this project is to build a robust predictive model that accurately estimates the sale prices of residential properties listed by Elite Properties Group.



DATA UNDERSTANDING

To gain a comprehensive understanding of the dataset provided by Elite Properties Group, I examined the features and identify the key ones to use when creating models to predict the sale prices. The dataset `kc_house_data.csv` contains attributes such as:

- Saleprice
- Number of Bedrooms
- Number of Bathrooms
- Year Built
- Date the house was sold
- Whether the house is on a waterfront
- Square footage of living space in the home
- Number of floors (levels) in house
- Quality of view from house



DATA UNDERSTANDING

The provided features in the dataset have significant relevance in predicting the sale prices of residential properties. The number of bedrooms and bathrooms provides insights into the property's size and functionality, which are crucial factors influencing its value.

The square footage of the living space provides an indication of the overall spaciousness and potential use of the property, impacting its desirability and pricing. The number of floors reflects the property's layout and can affect its appeal to potential buyers.



MODEL A



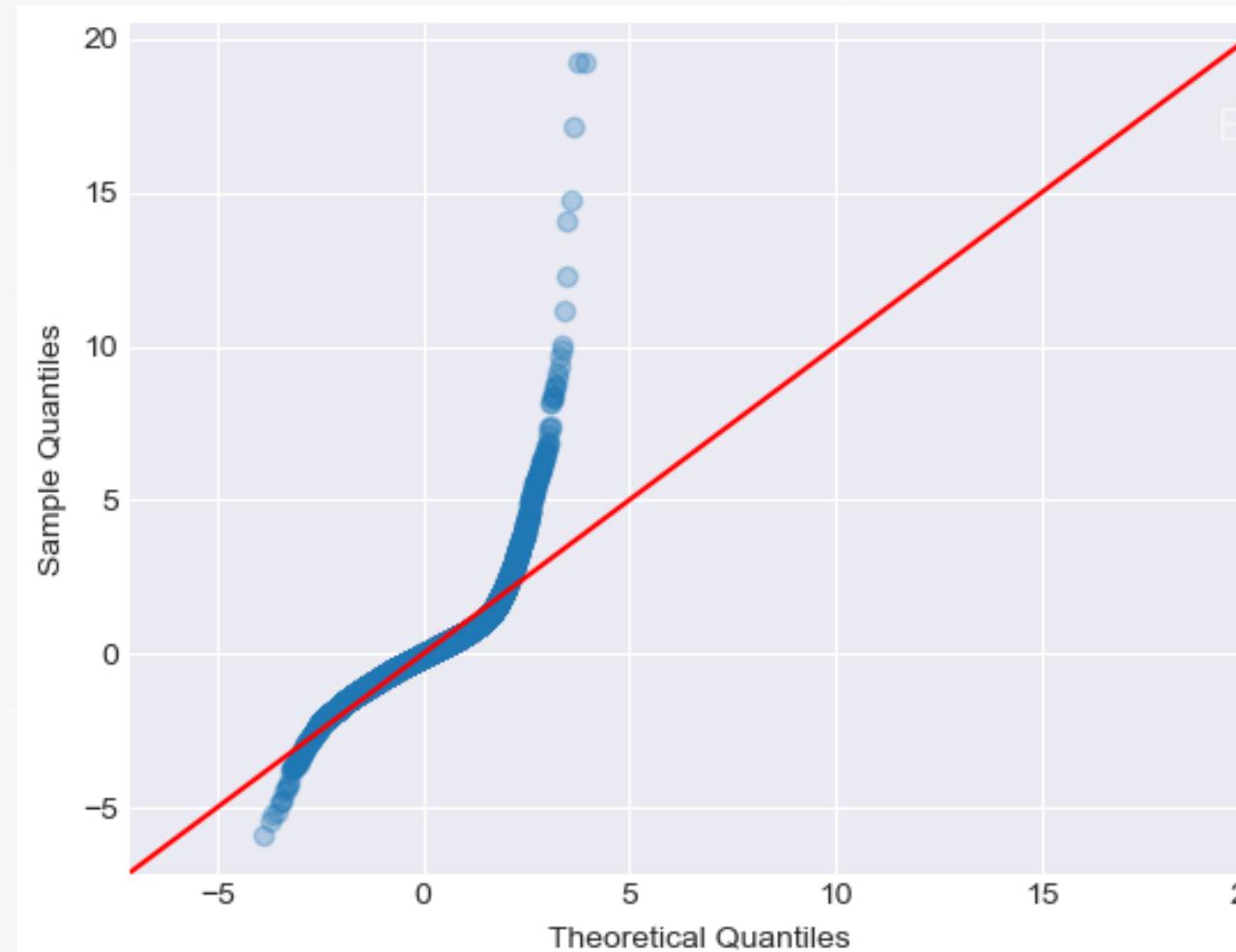
- Number of Features was 1. (sqft_living)
- Adjusted R-squared of 0.493(49.3% of variations were explained by this model)
- Root Mean Squared error(RMSE) of 261689.59 meaning that on average the actual price will be USD 261,689 more or less than our predicted price.
- The coefficient of sqft_living is 280, which means that for every additional square-foot of living area, the price increases by USD 280.
- Built a scatter plot with the predicted y values and found that for smaller living areas our model looks decent but as the sqft_living value increases our model's performance declines. This shows that sqft_living is not a good enough predictor for larger houses.



MODEL B



- Used 9 Features.
- Adjusted R-squared of 0.648(64.8% of variations were explained by this model)
- Root Mean Squared error(RMSE) of 217893.79.
- Created a QQ-plot of residuals. There appeared to be some issues with the residuals not being normally distributed.



MODEL C



- I tested for multicollinearity and remove features which are multicolinear with each other.
- Used 8 Features.
- Adjusted R-squared of 0.588(58.8% of variations were explained by this model)
- Root Mean Squared error(RMSE) of 235693.65.



MODEL D



- Performed one hot encoding on columns that appeared to be categorical and noted differences if any.
- Used 28 Features.
- Adjusted R-squared of 0.604(60.4% of variations were explained by this model)
- Root Mean Squared error(RMSE) of 231070.21.



FINAL MODEL



- Included data from the grade column and performed one hot encoding
- Used 38 Features
- Adjusted R-squared of 0.681(68.1% of variations were explained by this model)
- Root Mean Squared error(RMSE) of 207312.12.



REGRESSION RESULTS

Houses that are **grade_13** and **grade_12** as well as houses with **7** and **8** bathrooms tend to have the highest impact on Saleprice since they have the highest coefficients.

However, sqft_living and sqft_lot also have a high impact on SalePrice. They have low coefficients here since they are not in boolean unlike grade or bathrooms. An increase by 1 square foot of living area results to an increase by **149.59** on Sale Price.

An increase by 1 square foot of lot size leads to a decrease bt 0.27 on Sale Price. Houses that have a waterfront view are estimated to be worth from **USD700,000** indicating that the Saleprice is also very dependent on waterfront access.

Houses of **grade_13** are worth around **USD 2,000,000** while houses with 7-8 bedrooms are worth around **USD1,400,000** and **USD1,900,000**.

CONCLUSION AND RECOMMENDATION

GRADE

The higher the grade assigned to a house, the higher the estimated value and potential selling price. The grade of a house is an important factor influencing its market value and attractiveness to potential buyers.

Buyers are willing to pay more for houses with higher-grade ratings, indicating perceived quality and desirability. Homeowners looking to increase the value of their properties may consider improving the overall grade by enhancing various features and amenities.

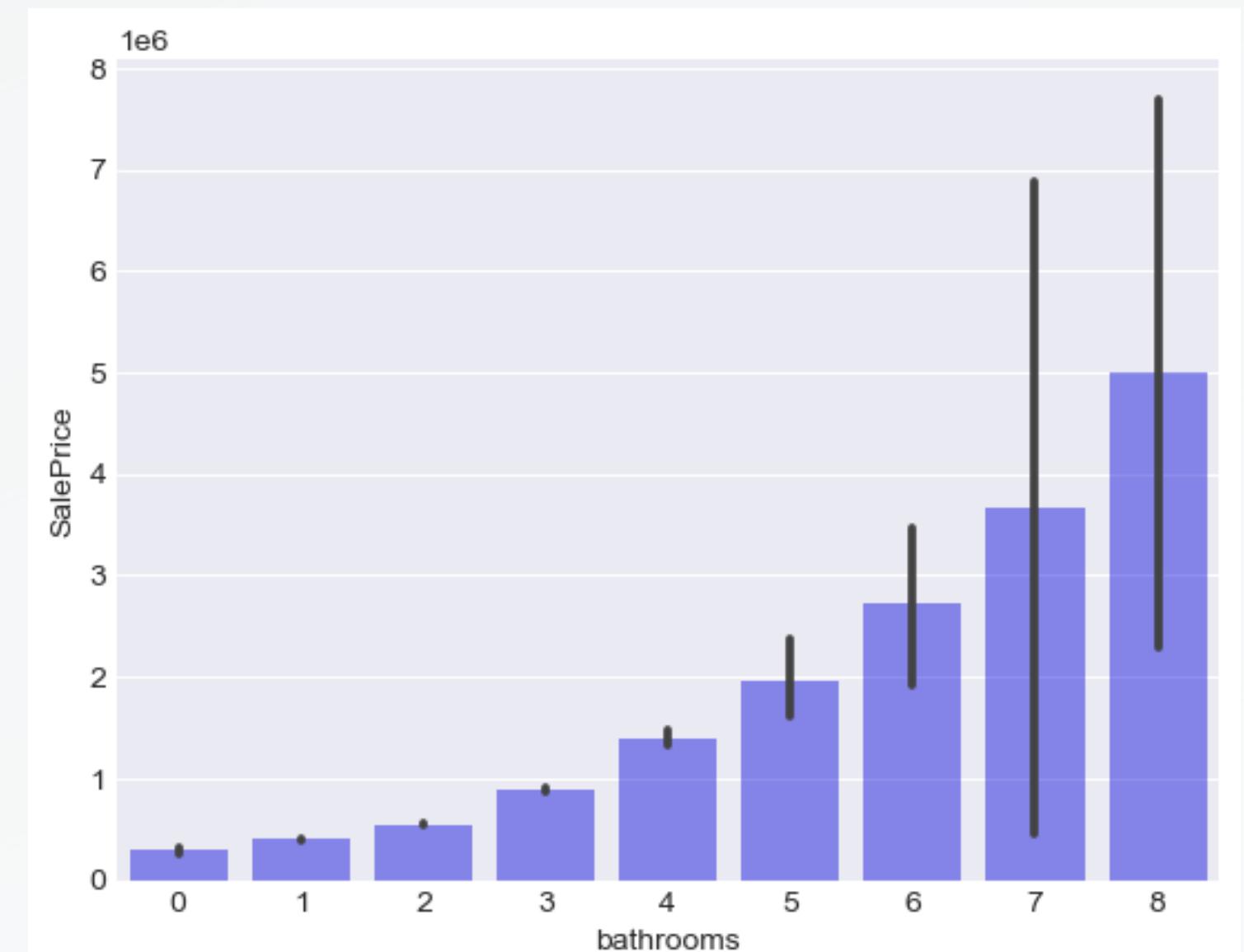
CONCLUSION AND RECOMMENDATION

Bathrooms

The greater the number of bathrooms in a house, the higher its estimated value and potential selling price.

Having more bathrooms is seen as a desirable feature by buyers, as it provides convenience and accommodates larger households.

Homeowners looking to increase the value of their properties may consider adding or upgrading bathrooms to attract potential buyers and command a higher sale price.



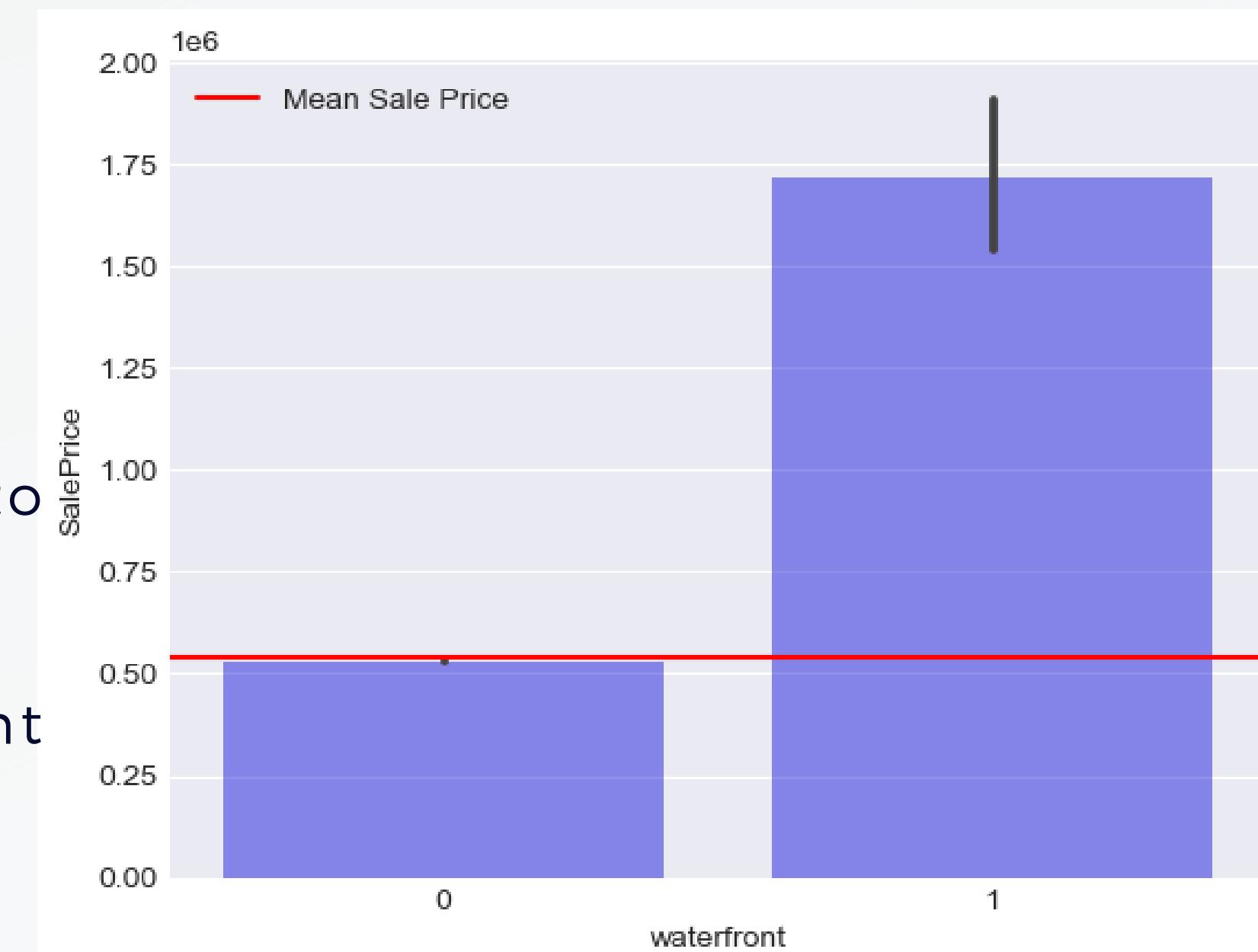
CONCLUSION AND RECOMMENDATION

Waterfront

Properties with a waterfront view are considered more desirable and offer a unique feature that attracts buyers.

The scenic beauty and recreational opportunities associated with waterfront properties contribute to their increased market value.

Homeowners who own properties with a waterfront view can expect a higher potential selling price. Investing in a property with a waterfront view can potentially yield a higher return on investment compared to similar properties without such a feature.



CONCLUSION AND RECOMMENDATION

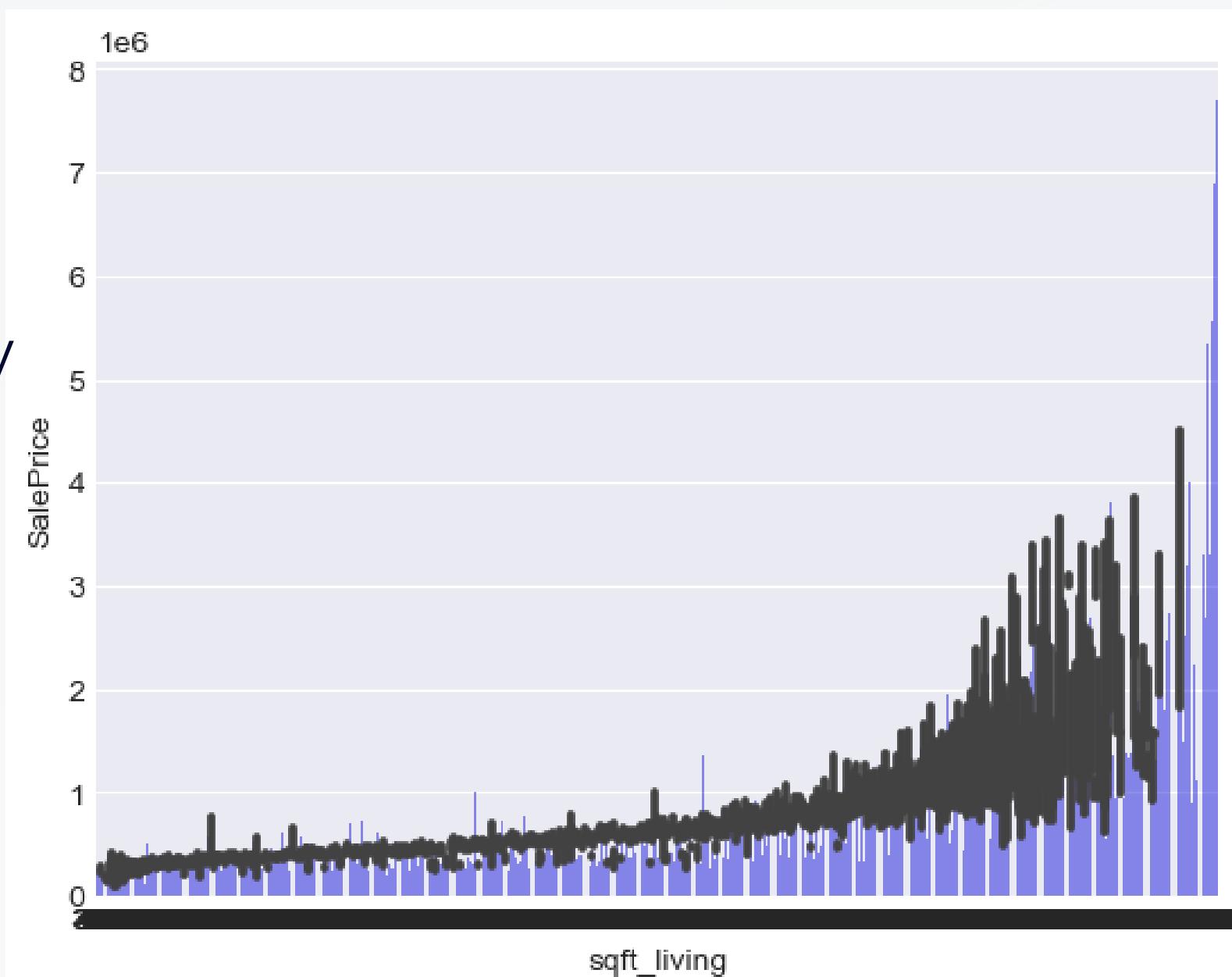
Square Foot of living area

The size of the living area is a significant factor in determining the market value and desirability of a property.

Buyers often prioritize spacious living areas, as they provide more room for living, entertaining, and accommodating their needs.

Larger living areas offer greater flexibility in furniture arrangement and potential for customization.

Homeowners who own houses with a larger square footage of living area can expect a higher potential selling price.





**THANK YOU
QUESTIONS??**

