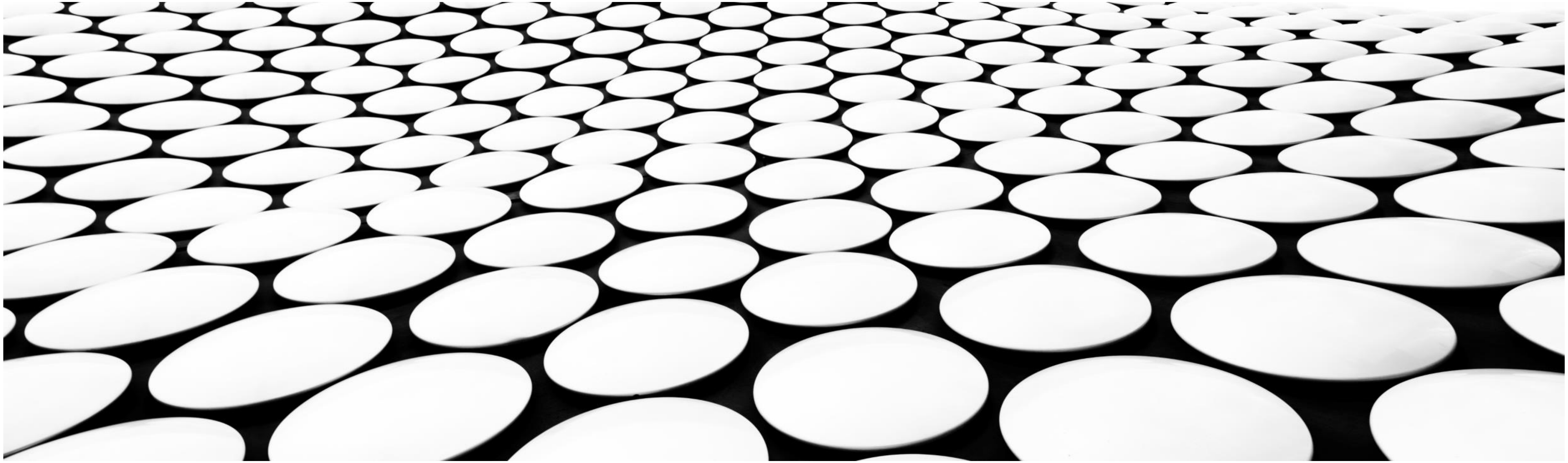
KING COUNTY HOUSING DATA ANALYSIS

FARNAZ GOLNAM



Project Summary

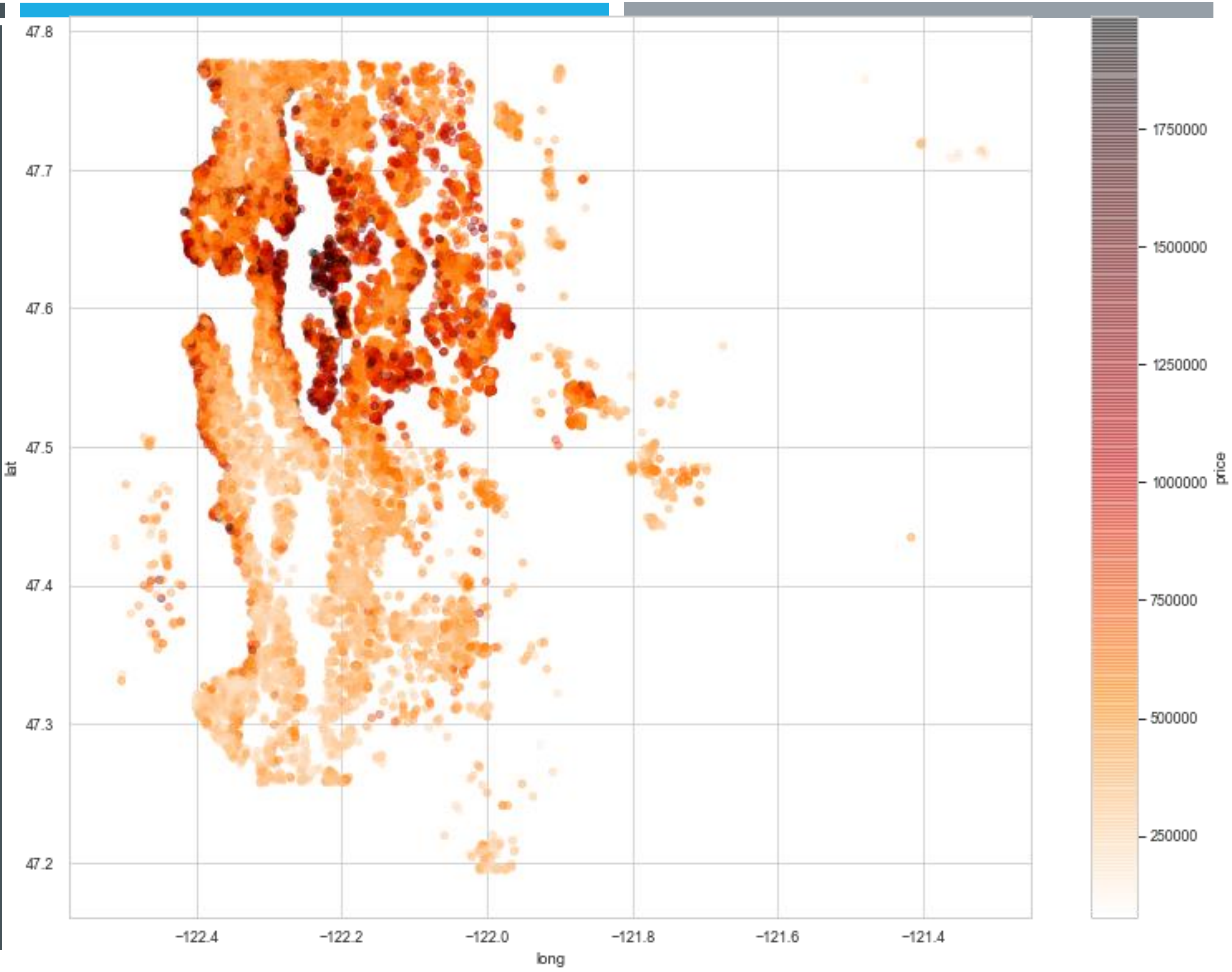
In this project, we are working with the King County House Sales dataset and model this dataset with a multivariate linear regression to predict the sale price of houses as accurately as possible.

Exploratory data analysis

Question1. How does the location affect the housing prices?
Question2. How does renovation affect the housing price?
Question3. How much difference is between the price of houses with the waterfront view and others?
Question4. what are the most effective factors on the housing price?

1. LOCATION

as we can see the latitude(northern-southern) direction has a linear and strong effect on the price but longitude coordinate(western eastern) direction, doesn't have much of effect on price.

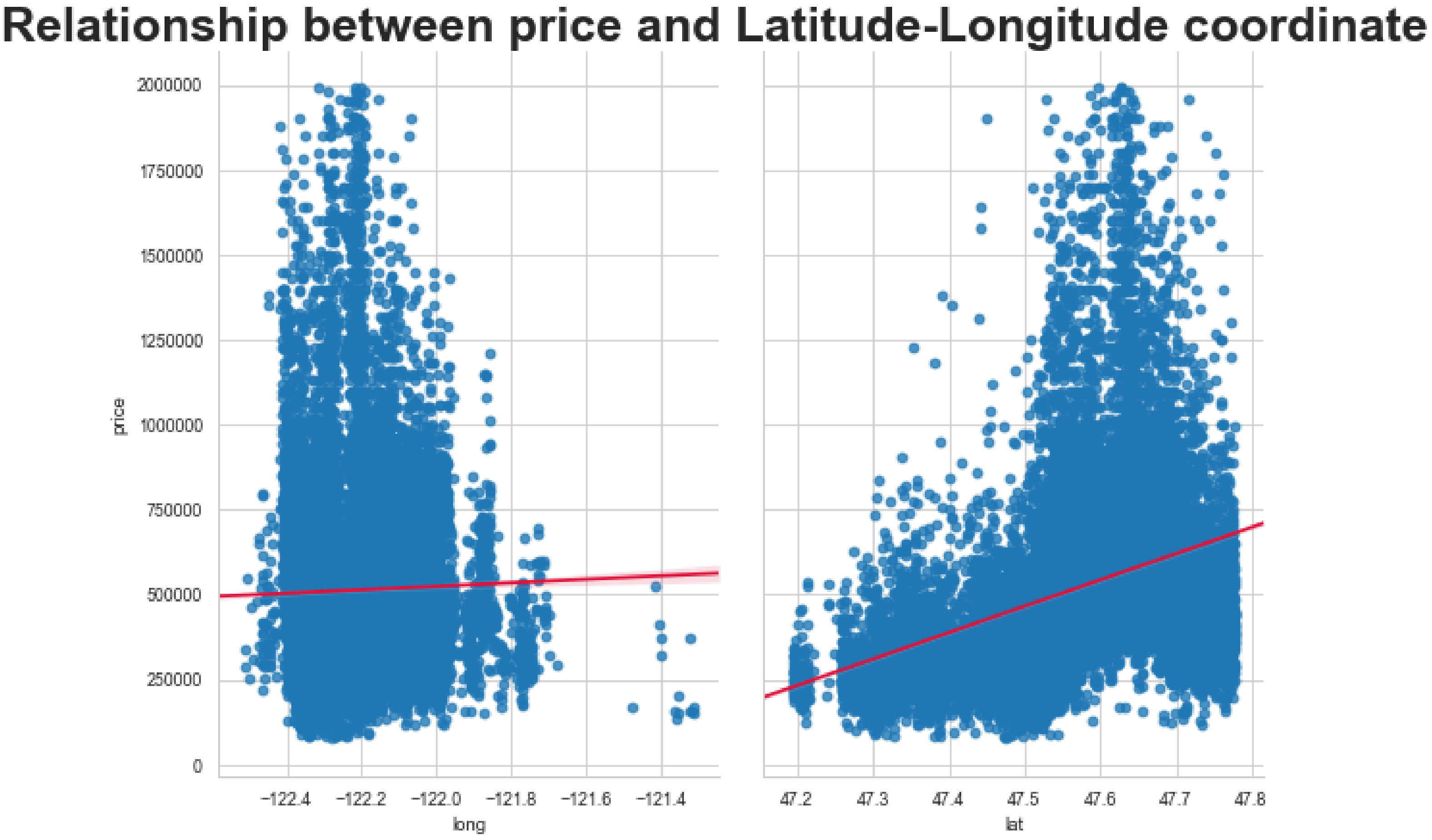


LONGITUDE VS LATITUDE

The pair plot shows the relationship between latitude and longitude coordinate with price and strongly indicates that Longitude has less effect on price than latitude.

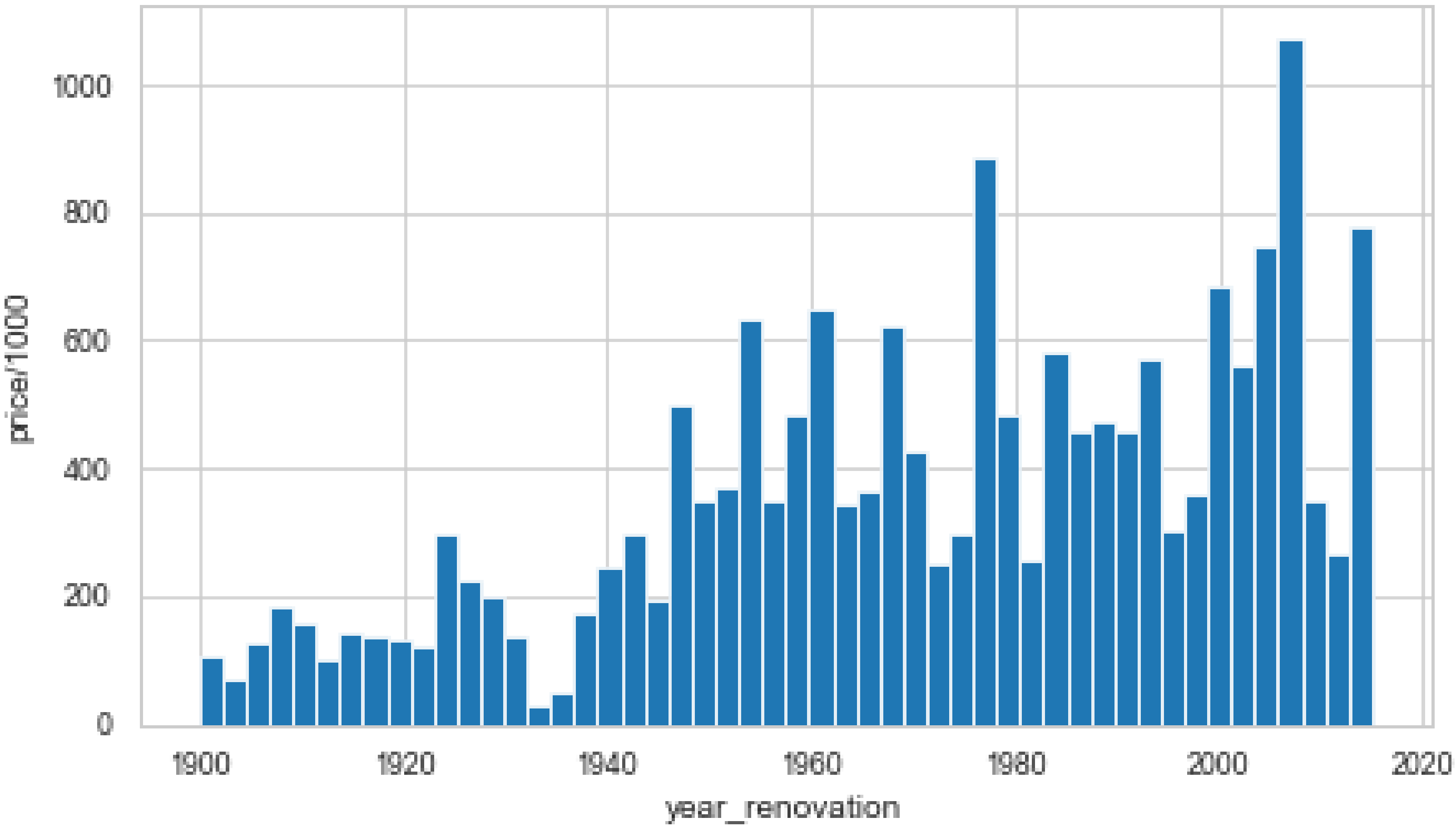
The **red line** represents the relationship between the independent variable and the dependent variable(price).

The **greater** the magnitude of the **slope**, the steeper the **line** and the **greater** the rate of change.



2.RENOVATION

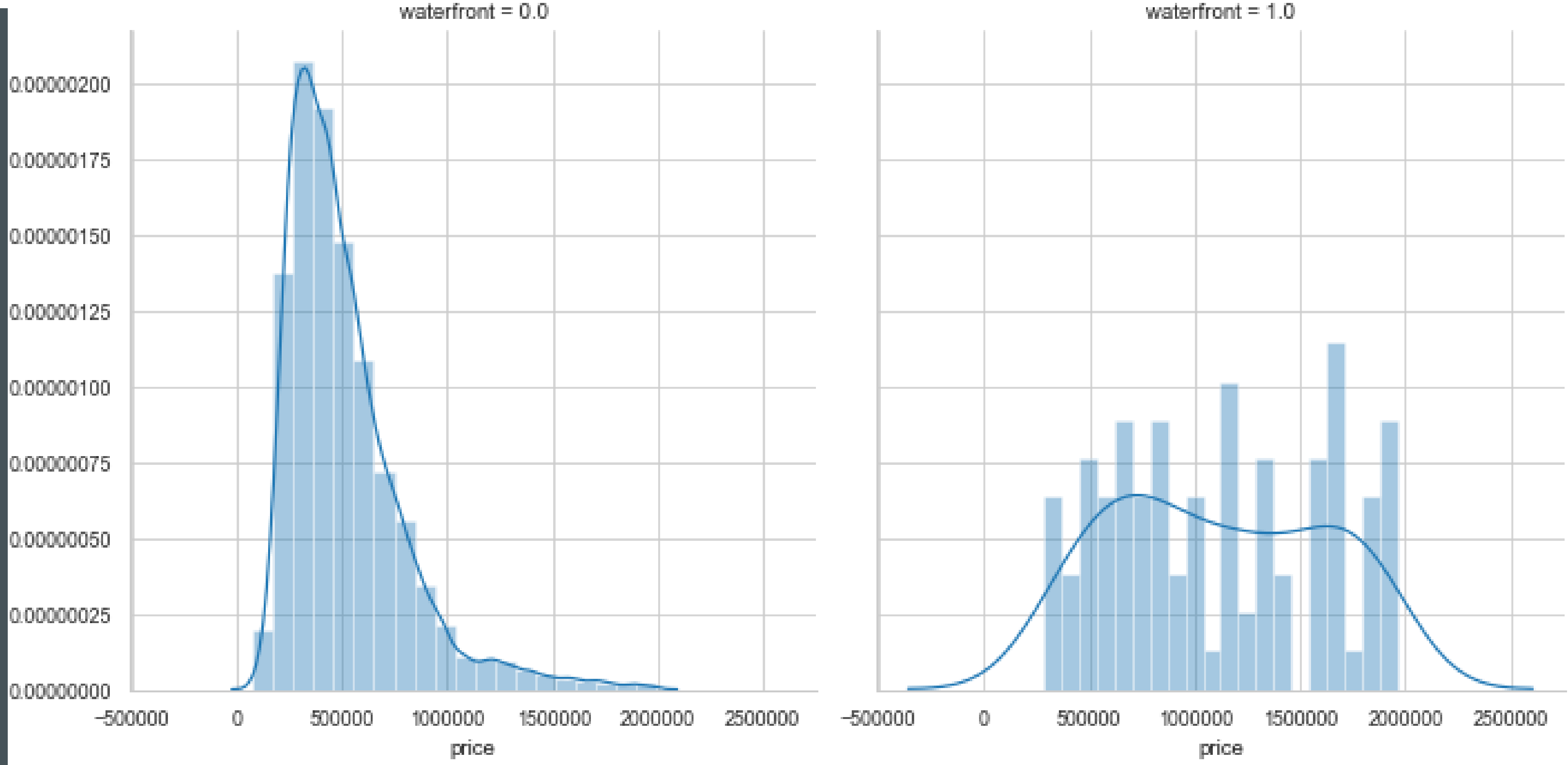
As shown, the more recent the renovation happened the more the prices spread upwards

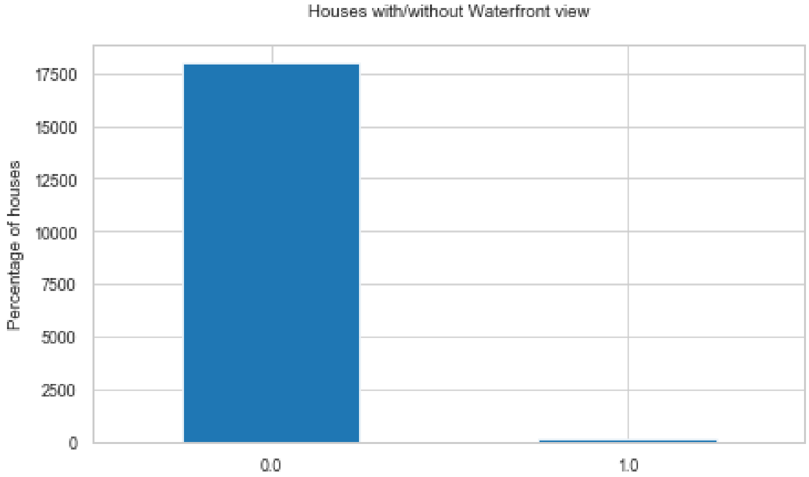


3.WATERFRONT

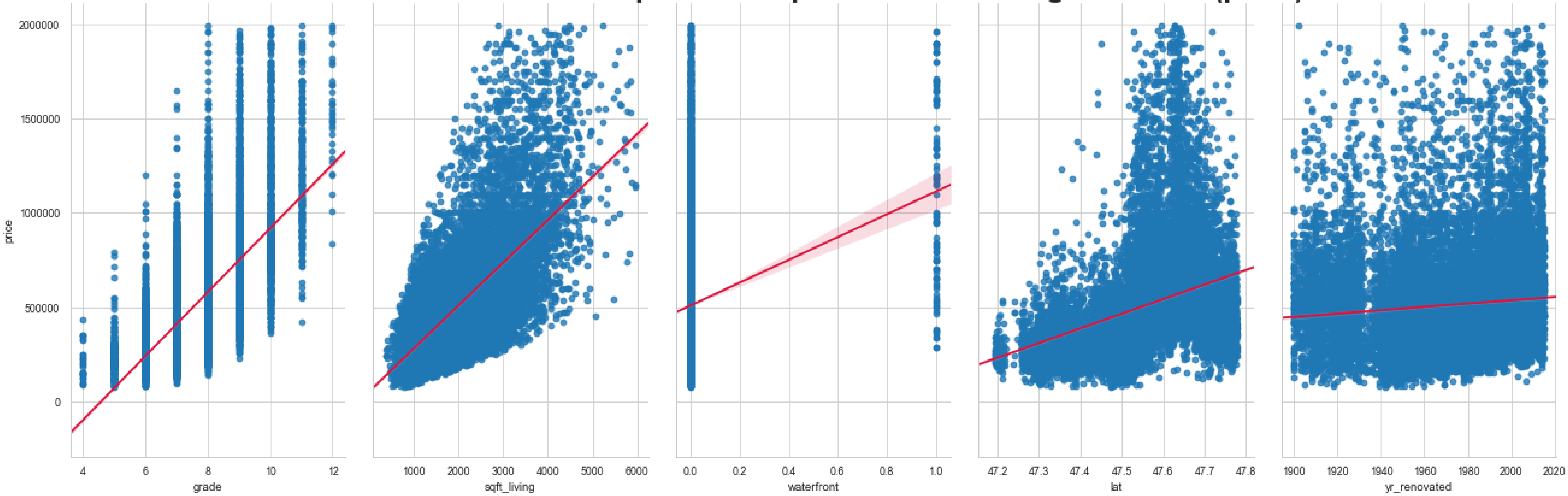
As shown in the KDE plots, the distribution of price is completely different in waterfront and non-waterfront view. the mean of the price is higher for the waterfront properties.

only small percentage (less than 1%) of housing options have waterfront view.





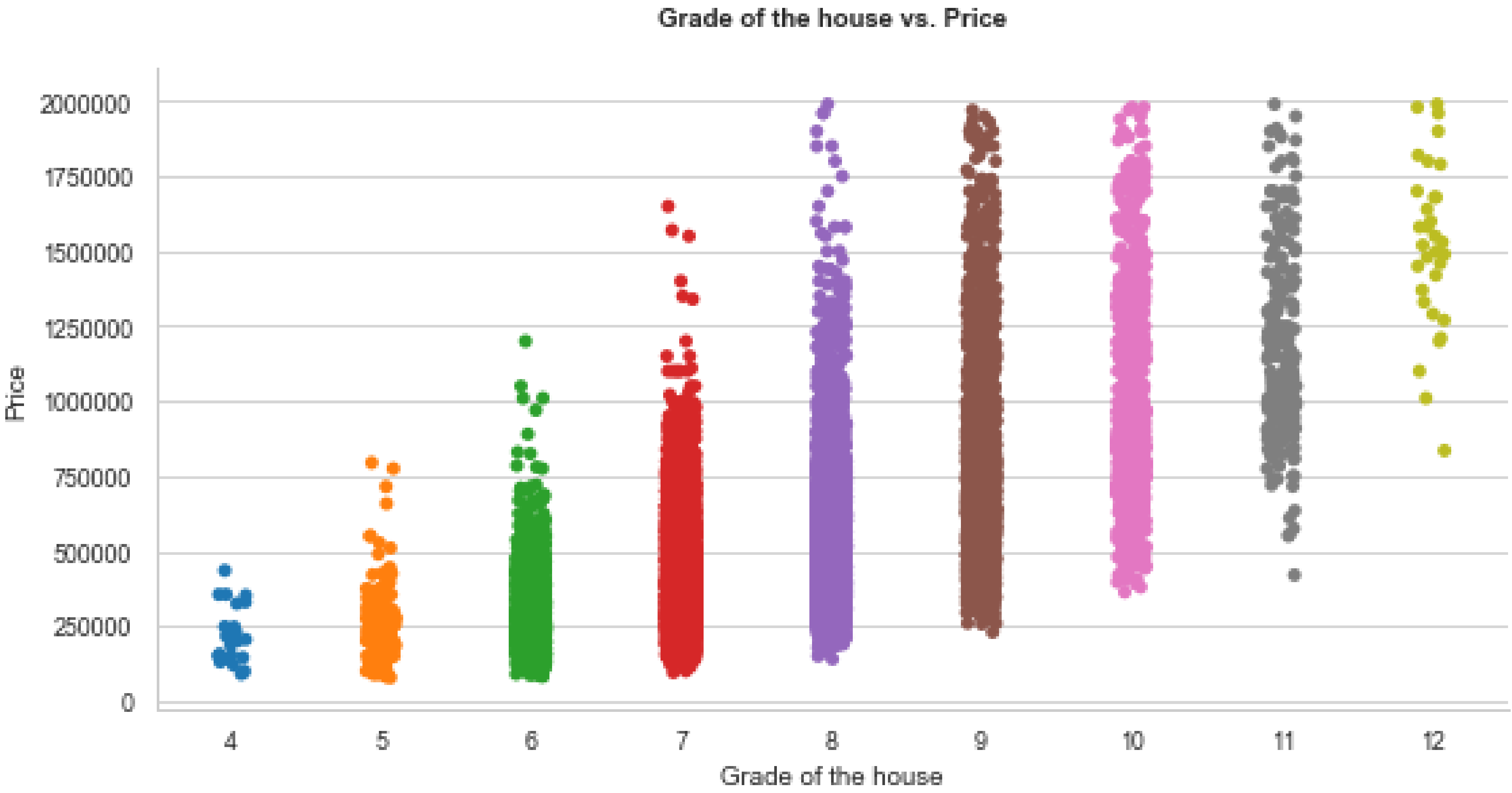
Pair Plots of Relationship between predictors and target variable(price)

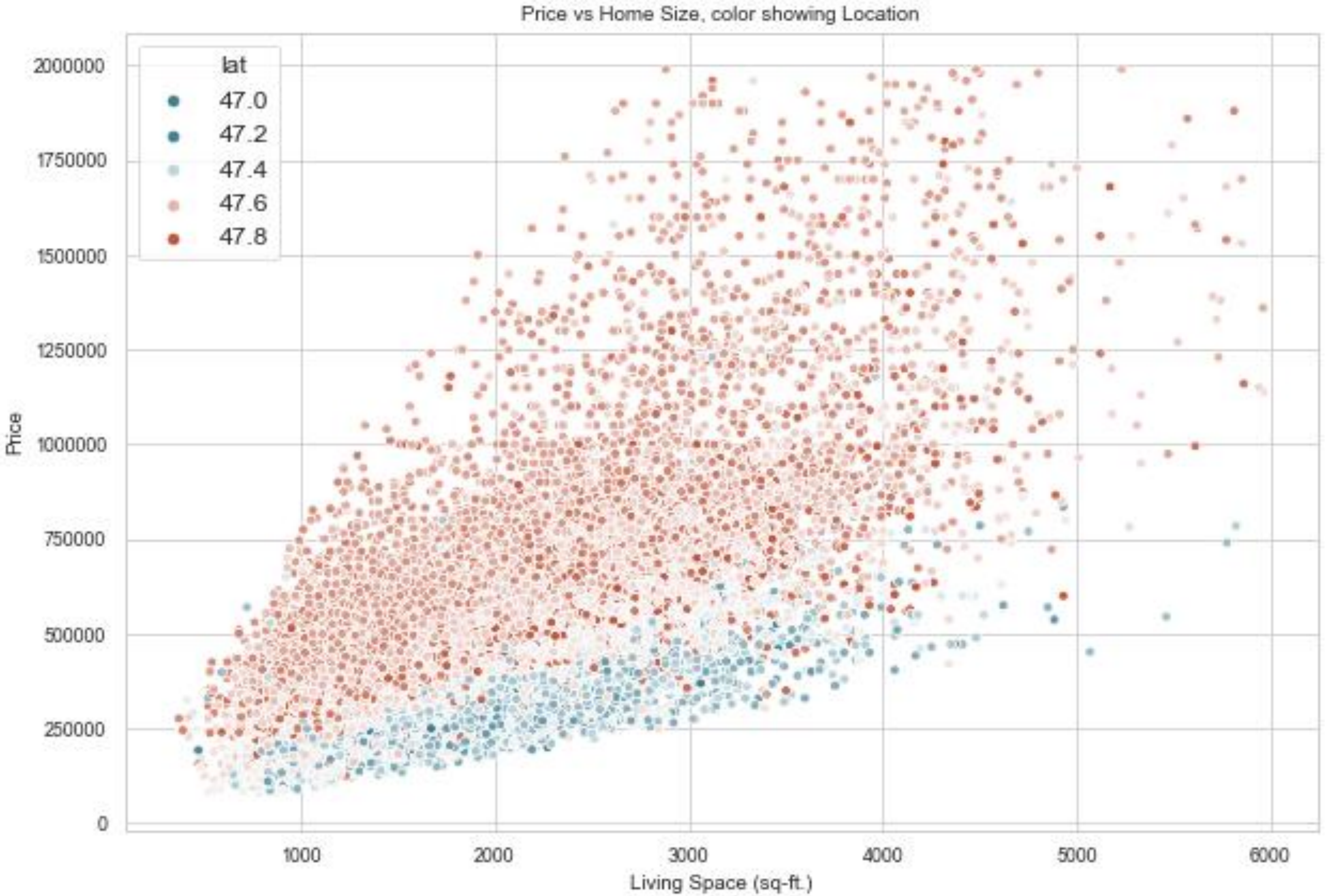


MOST IMPORTANT FACTORS AFFECT THE HOUSING PRICE BY ORDER OF IMPORTANCE:

THE **RED LINE** REPRESENTS THE RELATIONSHIP BETWEEN THE INDEPENDENT FACTOR AND THE DEPENDENT VARIABLE(PRICE). THE **GREATER** THE MAGNITUDE OF THE **SLOPE**, THE STEEPER THE **LINE** AND THE **GREATER** THE RATE OF CHANGE**.**

1. GRADE: overall grade given to the housing unit, based on King County grading system has the most effect on the price
2. SQFT_LIVING: square footage of the home is the second most effective factor
3. LOCATION: the latitude coordinate of the house is the third most effective factor
4. WATERFRONT: having a waterfront view is the forth important factor.
5. RENOVATION: Year when house was renovated is our last factor in the model.t the housing price


Grade of the house vs. Price
Price
2000000
1750000
1500000
1250000
1000000
750000
500000
250000
0
4
5
6
7
8
9
10
11
12
Grade of the house


Price vs Home Size, color showing Location
lat
47.0
47.2
47.4
47.6
47.8
Price
2000000
1750000
1500000
1250000
1000000
750000
500000
250000
0
1000
2000
3000
4000
5000
6000
Living Space (sq-ft.)

RECOMMENDATIONS

1. THE GRADE OF THE HOUSE AND SQFT OF LIVING SPACE HAVE DIRECT AND STRONG AFFECT ON THE PRICE OF THE PROPERTY.
2. THE PRICE IS HIGHER FOR THE WATERFRONT PROPERTIES.
3. THE LATITUDE(NORTHERN-SOUTHERN) DIRECTION HAS A LINEAR AND STRONG EFFECT ON THE PRICE BUT LONGITUDE COORDINATE(WESTERN-EASTERN) DIRECTION, DOESN'T HAVE MUCH OF EFFECT ON PRICE.
4. THE MORE RECENT THE RENOVATION HAPPENED THE MORE THE PRICES SPREAD UPWARDS.

PRICE ESTIMATION EQUATION

IN THIS PROJECT A MODEL HAS BEEN CREATED TO EXPLORE THE MOST IMPORTANT FACTORS IN HOUSING MARKET AND PREDICT THE PRICES:

COEFFICIENTS GIVE US THE STATISTICAL RELATIONSHIP BETWEEN VARIABLES

$$\text{Estimated\_price}= -0.067 + 0.5\ \text{Grade} + 0.39\ \text{Sqft\_living} + 0.25\ \text{Lat} + 0.2\ \text{Waterfront} - 0.1\ \text{Yr\_renovated}$$

CONCLUSION

The dataset deals with the real world data, there are always changes, updates, additions and errors in data and their collections, so there will always be some degree of error in any model, for instance, data and likely to have a multiplicity of additional factors that are effecting housing prices which are missing from the data collected.

It is the matter of getting to the best possible approximate with the available data.

FURTHER WORK

If there were more data (neighborhood crime rates, proximity/quality of schools, accessibility/quality of public transportation, etc), we could likely improve our model considerably.

Also, Perhaps a more complicated non-linear regression (polynomials) might make a better model, so we will continue to update and gather more data and explore different versions of models to keep improve our results.

THANK YOU

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