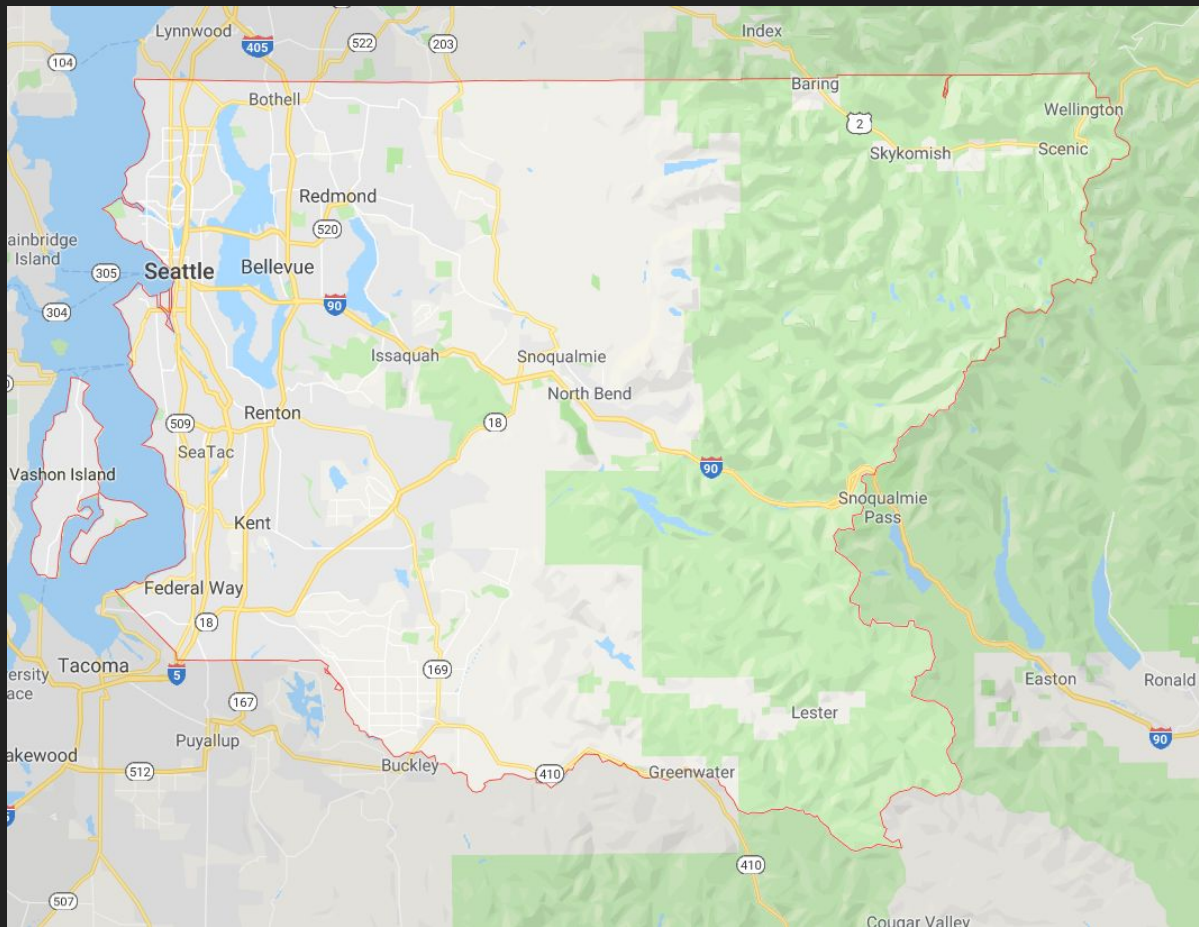# Modeling House Sale Prices in King County, WA

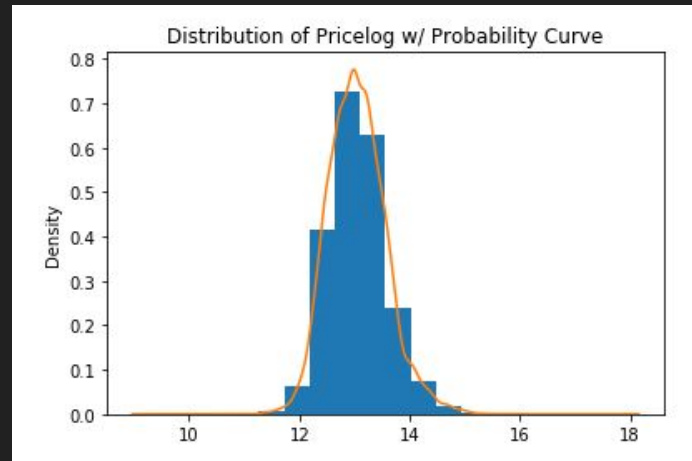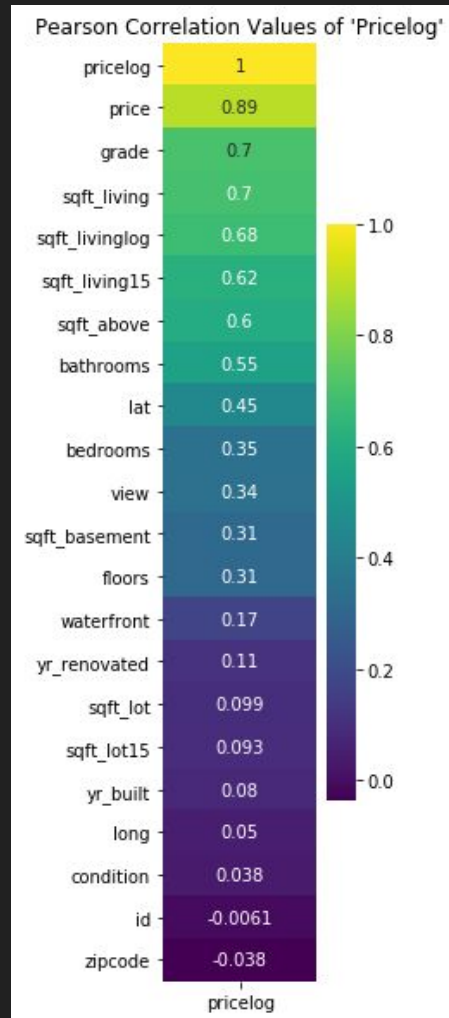A review of the data, methods, and findings

The Data

- Review of about 22K records of house sales in King County WA
- Vast majority of the data was intact and complete
- For analysis, scrapped data for which I'd need to estimate multiple points; and for those data missing just one point I replaced it with the category median

The Methods

- Normalized price w/ a log function
- Looked for variables that highly correlated with price
- Excluded variables that highly correlated with each other, regardless of their correlation with price

Pearson Correlation Values of 'Pricelog'

	pricelog
pricelog	1
price	0.89
grade	0.7
sqft_living	0.7
sqft_livinglog	0.68
sqft_living15	0.62
sqft_above	0.6
bathrooms	0.55
lat	0.45
bedrooms	0.35
view	0.34
sqft_basement	0.31
floors	0.31
waterfront	0.17
yr_renovated	0.11
sqft_lot	0.099
sqft_lot15	0.093
yr_built	0.08
long	0.05
condition	0.038
id	-0.0061
zipcode	-0.038

Distribution of Pricelog w/ Probability Curve

The Methods

- Ran remaining variables through linear models, selected those five with largest impacts
- Through trial and error added in another variable that seemed to explain more of the data
- Tested model on splits of the data itself - findings remained consistent, i.e. the model held
- Model error was consistent and normally distributed

Distribution of Model Residuals
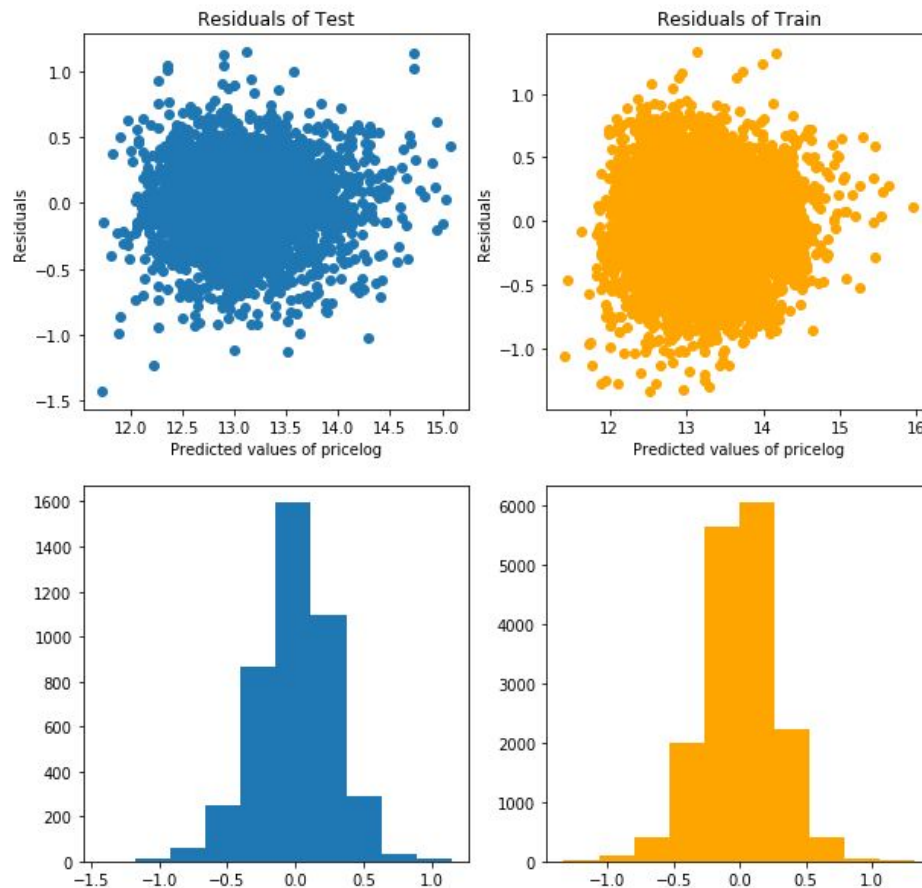
The Findings

- One of the strongest predictors of price is how the county "Grades" the house
- County grades from 1-13, with class 13 houses being described as "Mansions" with high amounts of detail, high craftsmanship, etc
- It's a standardized, wholistic category
- For an average house, the difference between being graded a 7 and an 8 is worth ~$50K

BUILDING GRADE

Represents the construction quality of improvements. Grades run from grade 1 to 13. Generally defined as:

1-3 Falls short of minimum building standards. Normally cabin or inferior structure.

4 Generally older, low quality construction. Does not meet code.

5 Low construction costs and workmanship. Small, simple design.

6 Lowest grade currently meeting building code. Low quality materials and simple designs.

7 Average grade of construction and design. Commonly seen in plats and older sub-divisions.

8 Just above average in construction and design. Usually better materials in both the exterior and interior finish work.

9 Better architectural design with extra interior and exterior design and quality.

10 Homes of this quality generally have high quality features. Finish work is better and more design quality is seen in the floor plans. Generally have a larger square footage.

11 Custom design and higher quality finish work with added amenities of solid woods, bathroom fixtures and more luxurious options.

12 Custom design and excellent builders. All materials are of the highest quality and all conveniences are present.

13 Generally custom designed and built. Mansion level. Large amount of highest quality cabinet work, wood trim, marble, entry ways etc.

The Findings

- Price increases as latitude increases - makes sense, as values farther N are closer to Seattle
- The same house at in south King County is worth an additional $150K in Seattle
- The closer you are to Seattle, the more impactful all changes are

The Findings

- Waterfront views are a big deal
- A waterfront view can potentially double the value of the same house
  - A grade 7 house with 2 bathrooms goes from $300K to $600K just by adding a waterfront view
  - That same house, an hour south of Seattle, sells for $360K
  - Without a waterfront view, it would sell for about $189K

The Findings

- Adding a bathroom can be worth about $20K
  - Only $15K as you get much farther south
- Likely due to the fact that n bathrooms also correlates to total sqft of living space - i.e. larger houses have more bathrooms

The Findings

- Model shows a minor penalty for newer houses
- Likely due to the fact that older houses are closer to the city center - implies that higher prices favor centrality and renovation
- This house is built in 1955, recent renovation, record says it sold for $617K - model predicts $593K - very centrally located.

338 N 155th St

Conclusions

- County's wholistic grading system is a big price predictor. Grades quality of overall build and considers square footage.
- Latitude is a big driver - the same house in the far south can cost $150K more in the Seattle area.
- Waterfront views can double a property's value.
- Adding bathrooms can add between $15-20K, probably because bathrooms vary with total square footage available
- Minor penalty for newer builds - likely because newer builds may be more suburban; older, renovated houses are closer to city center and renovations can increase county's Grade