Boost your House Price!

King County, WA, USA, Home Improvements:
A Multiple Linear Regression Project

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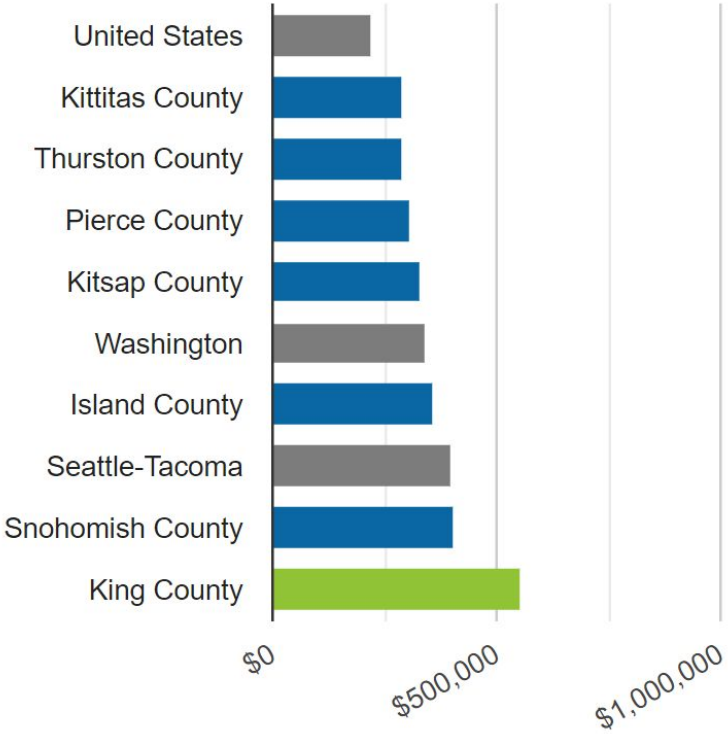
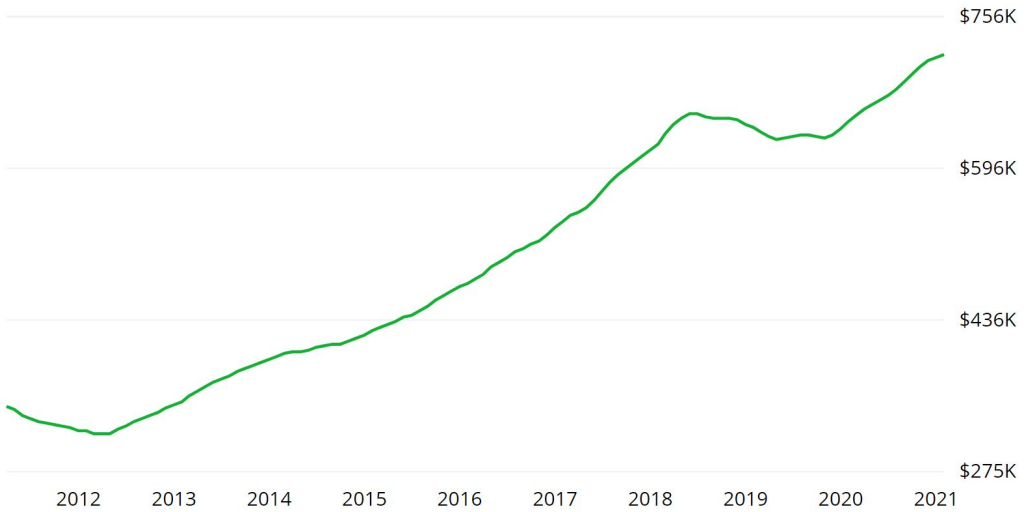
Business Problem

Determine what changes homeowners can implement that will have a positive impact on the value of their homes - in what is already a very expensive County - will a porch really help?

Median House Price in Washington by County vs USA (2019) [1]

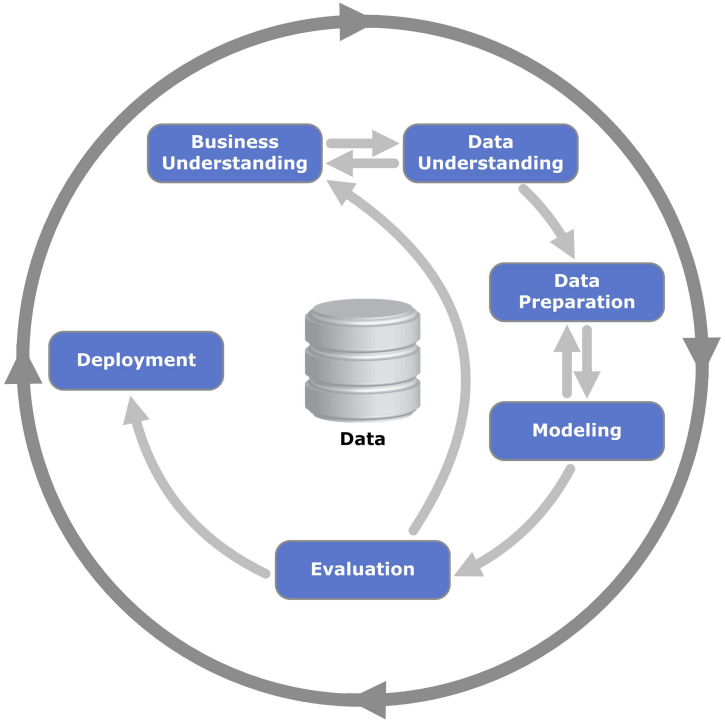


King County Median House Price since 2011 [2]



Methods

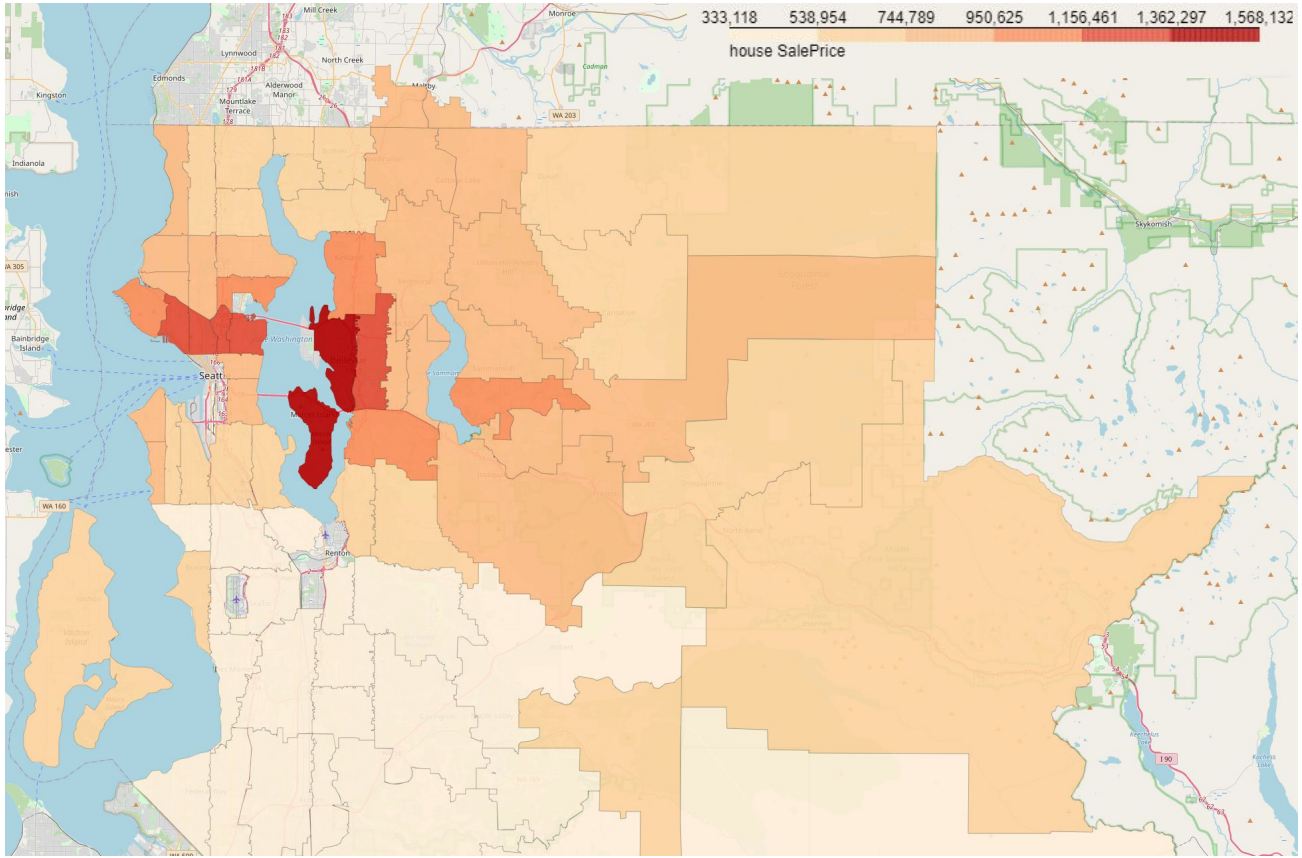
- For this project, the Cross-industry standard process for data mining (CRISP-DM) has been adopted.
- Modeling will be limited to Multiple Linear Regression.
- Coefficients from models will be used to interpret the value of potential home improvement projects i.e. adding a bathroom.



CRISP-DM Process Model [3]

King County - A World within a World

Average House Price by Zip Code (2019 sales only)



Not only is King County an expensive County in its own right, some areas are on another level altogether.

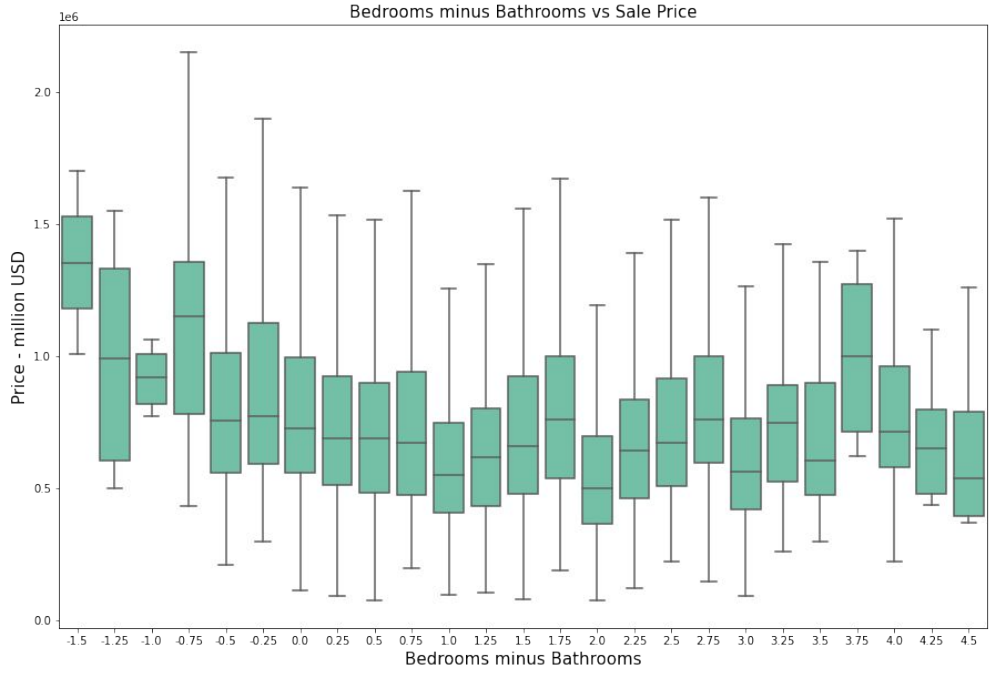
Mercer Island, Bellevue and Medina are home to some of the most expensive properties in the USA.

Bill Gates' house is in Medina and valued at over $100m USD...

In general, prices tend to fall as you move away from the Seattle/Bellevue/Mercer Island triangle.

Results

The model R-squared was 83.5 meaning it is able to explain 83.5% of the variance in Sale Price. The following conclusions were drawn from this model. A notable one was improving the ratio of bedrooms to bathrooms. Reducing the difference by 1 will increase the value of the property by ~30,000 USD. For example going from 4 bed 2 bathroom to 4 bedroom 3 bathroom.

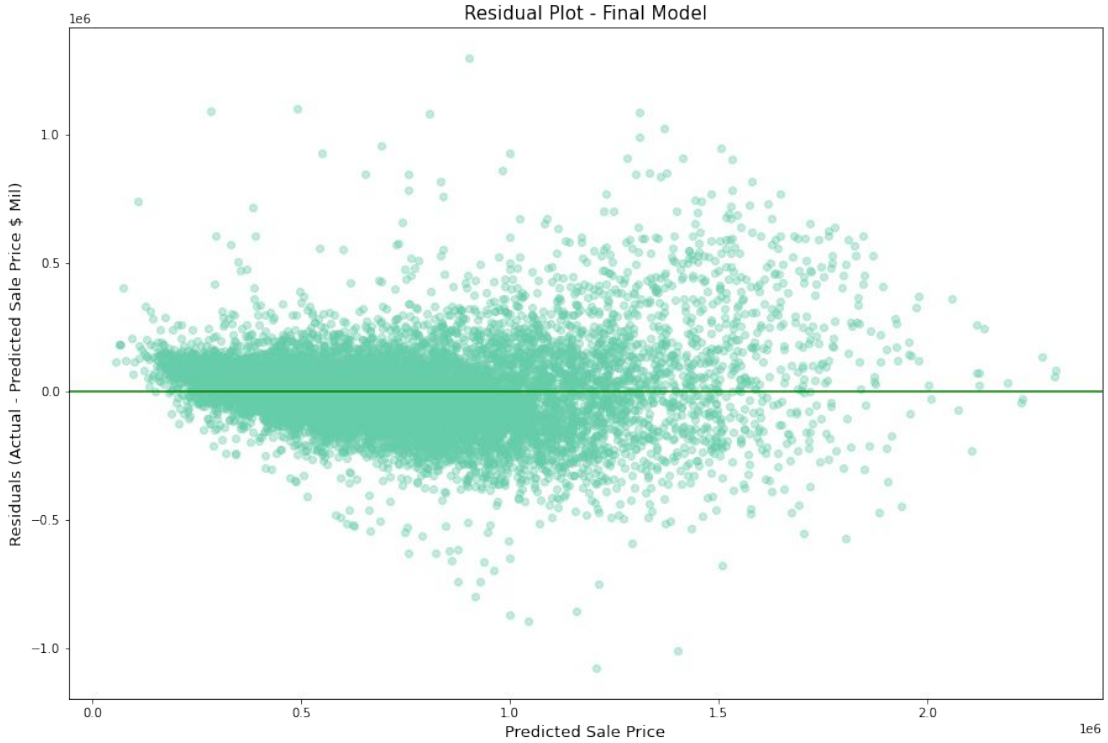


Results - What will add Value?

- Square Footage Total Living increase by 1: Sale Price increase by 119 USD
- Adding bathroom could add 30,000 USD
- Carrying out renovation adds 58,220 USD
- Adding porch could add 17,560USD
- Improving condition of house from Average to Good increases price by 33,950 USD
- Fix the issues: A home sold with a problem such as water issue will sell for 18,960 USD less than one without

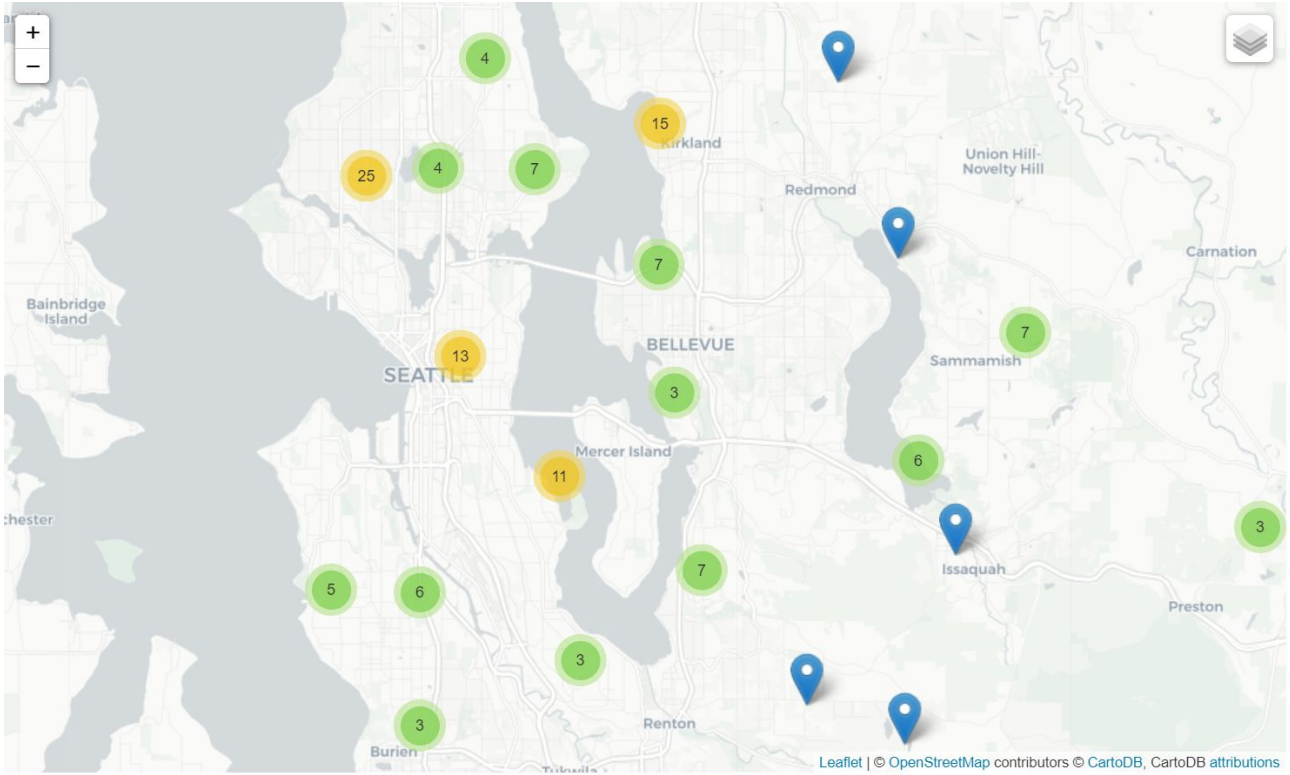
Conclusion - Model Performance

Whilst the model explained 83.5% of the variance in sale price, it performed worse in more expensive properties.



Conclusion - Further Work

By mapping top 200 locations where difference between model and actual was the largest, it can be seen that the model underestimates price very close to water.



Future Improvements

- Incorporate distance to nearest shoreline/waterbody.
- Investigate value of including proximity to transport links
- Other features could be proximity to good schools or commute time

Ultimately it will never be possible to get a model that can compete with more sophisticated techniques but the purpose of this wasn't to predict house prices but to draw conclusions as to what features are important in adding value to a property.

References

1. www.towncharts.com/Washington/Housing/King-County-WA-Housing-data
2. https://www.zillow.com/
3. CRISP-DM – a Standard Methodology to Ensure a Good Outcome

Thank You!

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