Phase 2 Project

King County, WA

Housing Data Analysis

Data Analysis Course

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Outline

- Overview
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- Data & Methods
- Result
- Conclusion
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Overview

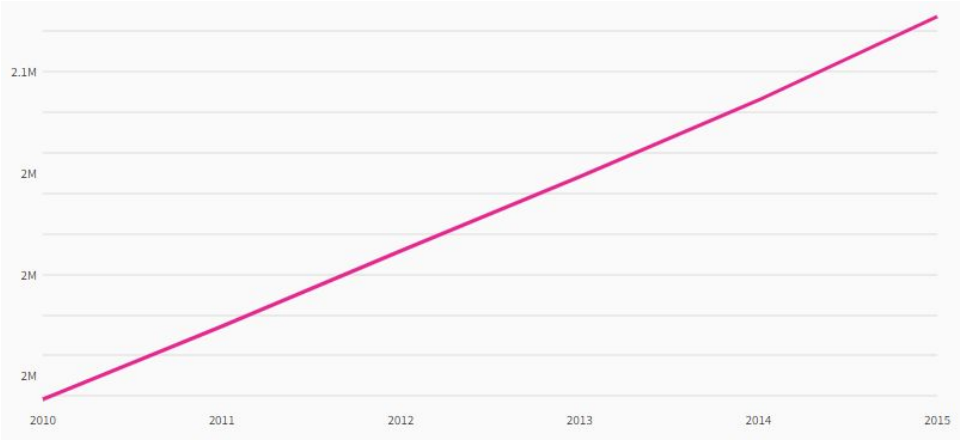
To provide business solutions that can be taken immediately through scientific data analysis, and offer suggestions that can maximise the business profits and the customer satisfaction

Business Problem

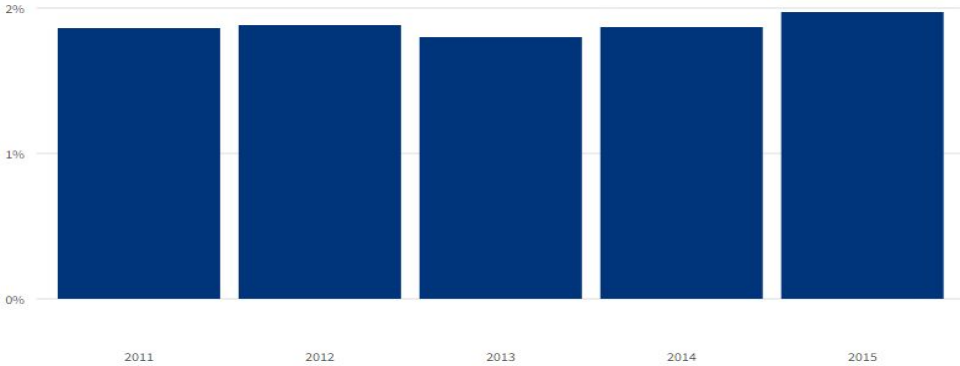
King County's population grew 9.7% from the 1.9 million people who lived there in 2010, against the population in the US grew 3.7% and the population in Washington grew 6.3% during that period. Between 2010 and 2015, the county grew by an average of 1.9% per year. As an inevitable consequence, Demanding for the real estate market & house flipping is getting higher.

Reference:
https://usafacts.org/data/topics/people-society/population-and-demographics/our-changing-population/state/washington/county/king-county/?endDate=2015-01-01&startDate=2010-01-01

Population in King County



Annual population change in King County



Business Problem

SKY Home Renovation and Extension is a King County-based home renovation company offering custom designs and quality builds. Given the high market demand for house renovation & flipping, they have decided to establish a new consulting team to provide their potential customers with maximising house values based on data analysis. They look forward to increasing business opportunities based on the most impactful features.

Data & Methods

Data Source: King county house sales dataset (data/kc_house_data.csv), 2014-2015

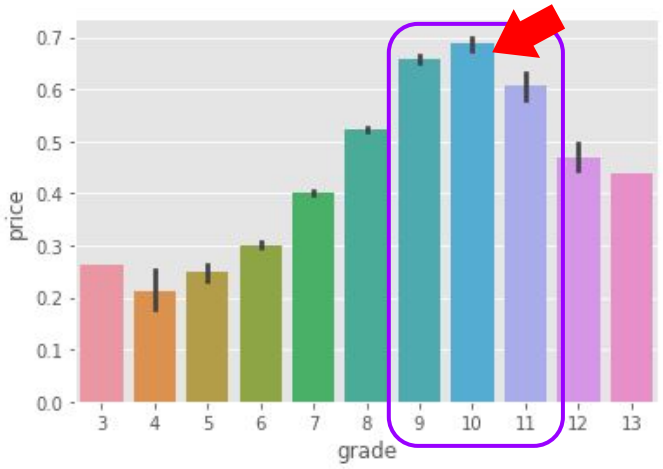
Main data (variables):

- price: Prediction target
- bedrooms: Number of Bedrooms/House
- bathrooms: Number of bathrooms/bedrooms
- sqft_livingsquare: footage of the home
- sqft_lotsquare: footage of the lot
- floors: Tota floors (levels) in house
- waterfront: House which has a view to a waterfront
- condition: How good the condition is (Overall)
- grade: Overall grade given to the housing unit, based on King County grading system
- sqft_basement: Square footage of the basement

Source: data/column_names.md

Result

The most effective feature is **house grade scores** in relation to the house values
To maximise the house values in the market, need to aim getting Grade score 10



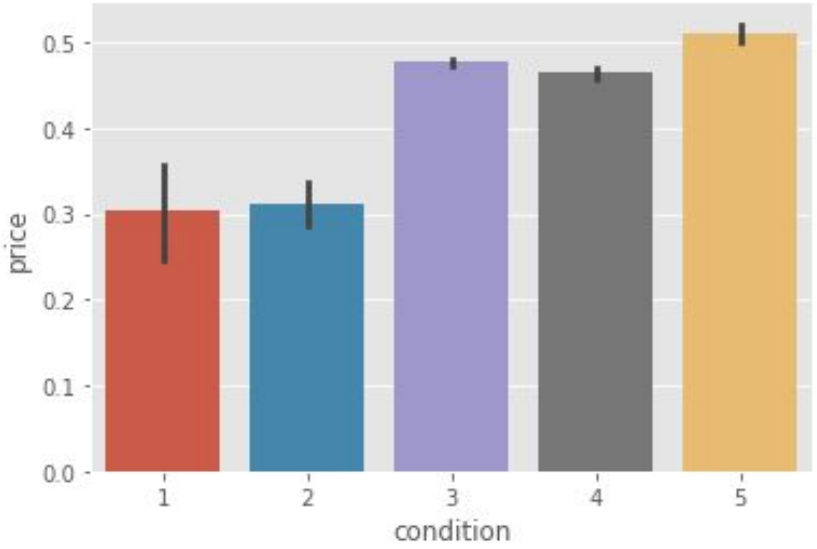
King County Residential Building Grades

- Grades 1 - 5 Falls short of minimum building standards, small and simple designs
- Grade 6 Minimum building codes. Low quality materials, simple designs
- Grade 7 Average grade of construction and design
- Grade 8 Better materials in both the exterior and interior finishes from Grade 7
- Grade 9 Architectural design, with extra exterior and interior design and quality
- Grade 10 Homes with high quality features and larger square footage
- Grade 11 Custom design and higher quality finish work, with more luxurious options
- Grade 12 Custom design and excellent builders with the highest quality
- Grade 13 Generally custom designed and built. Approaching the Mansion level

Result

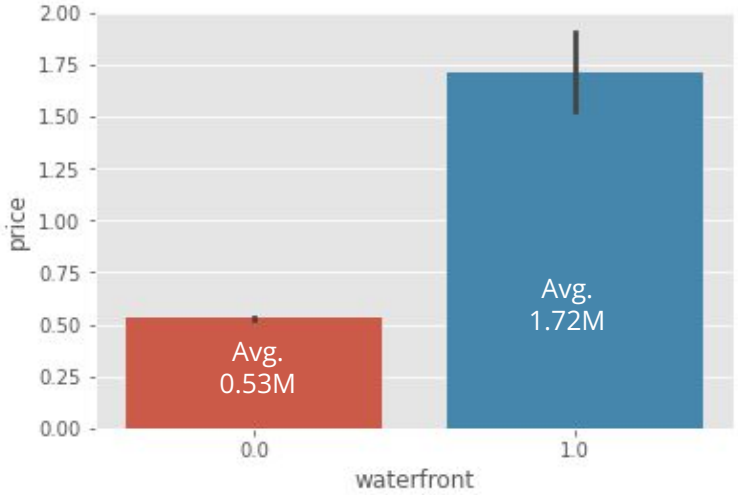
The 2nd most effective feature is the size of living area
(Coef: 0.40, t: 45.96)

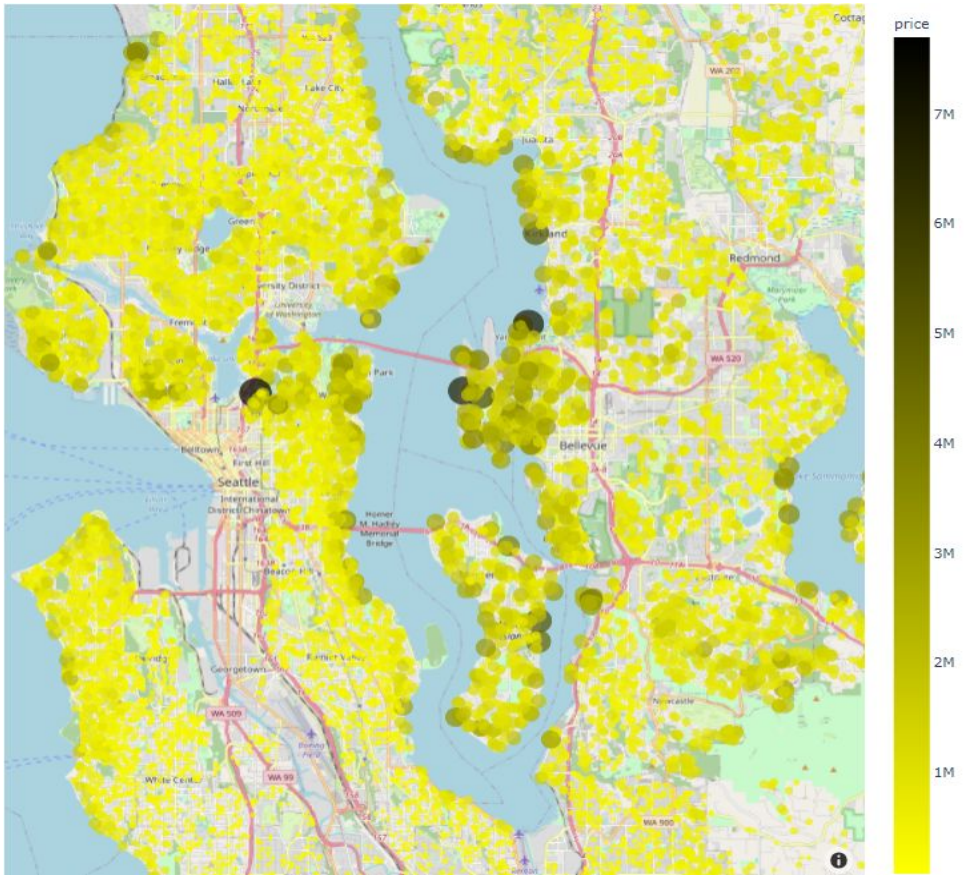
The 3rd most effective feature is the House condition Score which should be aimed more than 3



Result

Based on the general analysis, Waterfront properties are much more higher values, which is highly correlated to the house values





Conclusion

Suggestion

- Focusing on interior and exterior renovation solutions as a main business model to maximise the house grades
- Identifying spare spaces in houses that can be turned into a part of a living area, impacts house values significantly and directly

Next step

- Analysing the latest data based on the residential grade/condition scoring system for better targeting
- Investigating further for return of Investment in the house flipping market
- Analysing geographical data for key neighbourhoods

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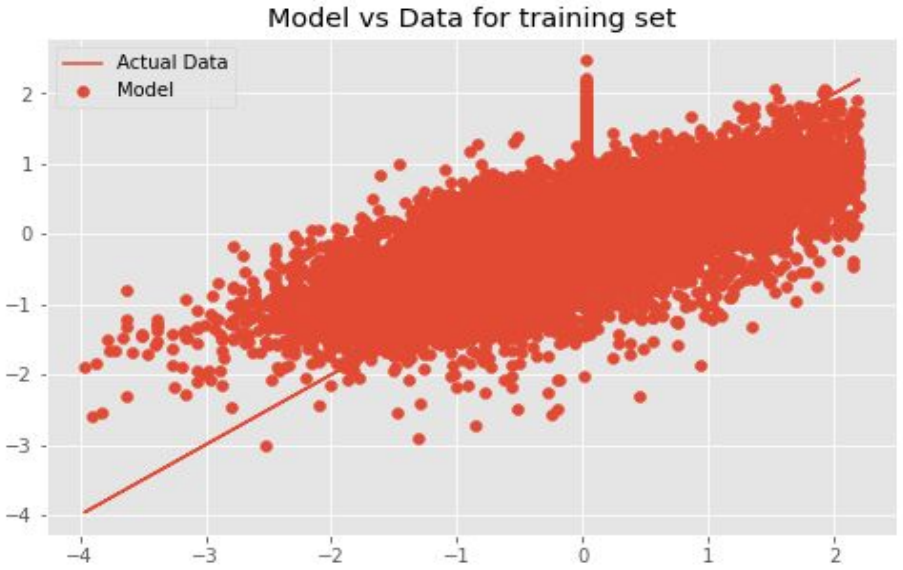
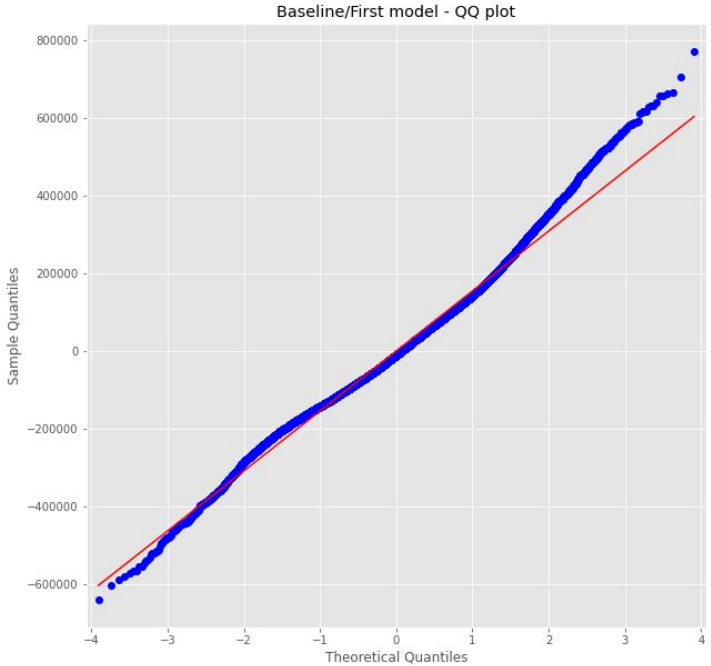
Appendix.

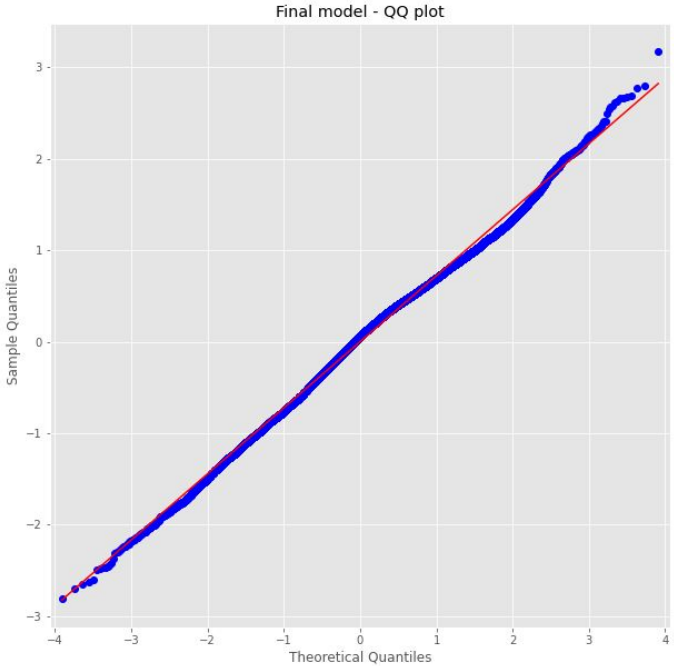
homoscedasticity assumption comparison
Baseline model vs Final Model



Appendix.

Quantile-Quantile normality comparison
Baseline model vs Final Model





Appendix.

Residential Building Grades

- Grades 1 - 3 Falls short of minimum building standards. Normally cabin or inferior structure.
- Grade 4 Generally older low quality construction. Does not meet code.
- Grade 5 Lower construction costs and workmanship. Small, simple design.
- Grade 6 Lowest grade currently meeting building codes. Low quality materials, simple designs.
- Grade 7 Average grade of construction and design. Commonly seen in plats and older subdivisions.
- Grade 8 Just above average in construction and design. Usually better materials in both the exterior and interior finishes.
- Grade 9 Better architectural design, with extra exterior and interior design and quality.
- Grade 10 Homes of this quality generally have high quality features. Finish work is better, and more design quality is seen in the floor plans and larger square footage.
- Grade 11 Custom design and higher quality finish work, with added amenities of solid woods, bathroom fixtures and more luxurious options.
- Grade 12 Custom design and excellent builders. All materials are of the highest quality and all conveniences are present.
- Grade 13 Generally custom designed and built. Approaching the Mansion level. Large amount of highest quality cabinet work, wood trim and marble; large entries

Reference:
https://kingcounty.gov/depts/assessor/Reports/area-reports/2016/~/media/depts/Assessor/documents/AreaReports/2016/Residential/034.ashx

Appendix.

Condition: Relative to Age and Grade

- 1= Poor Many repairs needed. Showing serious deterioration.
- 2= Fair Some repairs needed immediately. Much deferred maintenance.
- 3= Average Depending upon age of improvement; normal amount of upkeep for the age of the home.
- 4= Good Condition above the norm for the age of the home. Indicates extra attention and care has been taken to maintain.
- 5= Very Good Excellent maintenance and updating on home. Not a total renovation.

Reference:
https://kingcounty.gov/depts/assessor/Reports/area-reports/2016/~/media/depts/Assessor/documents/AreaReports/2016/Residential/034.ashx