KINGS COUNTY HOME SALE PRICE ANALYSIS

GOALS

- Use Linear Regression Modeling on provided data to make a recommendation of home improvement projects for King County homeowners.

DATA

Datasets provided by **Kings County Department of Assessments:**

- Parcel Record
- Real Property Sale Record
- Residential Building Record
- Look Up Record

METHODS

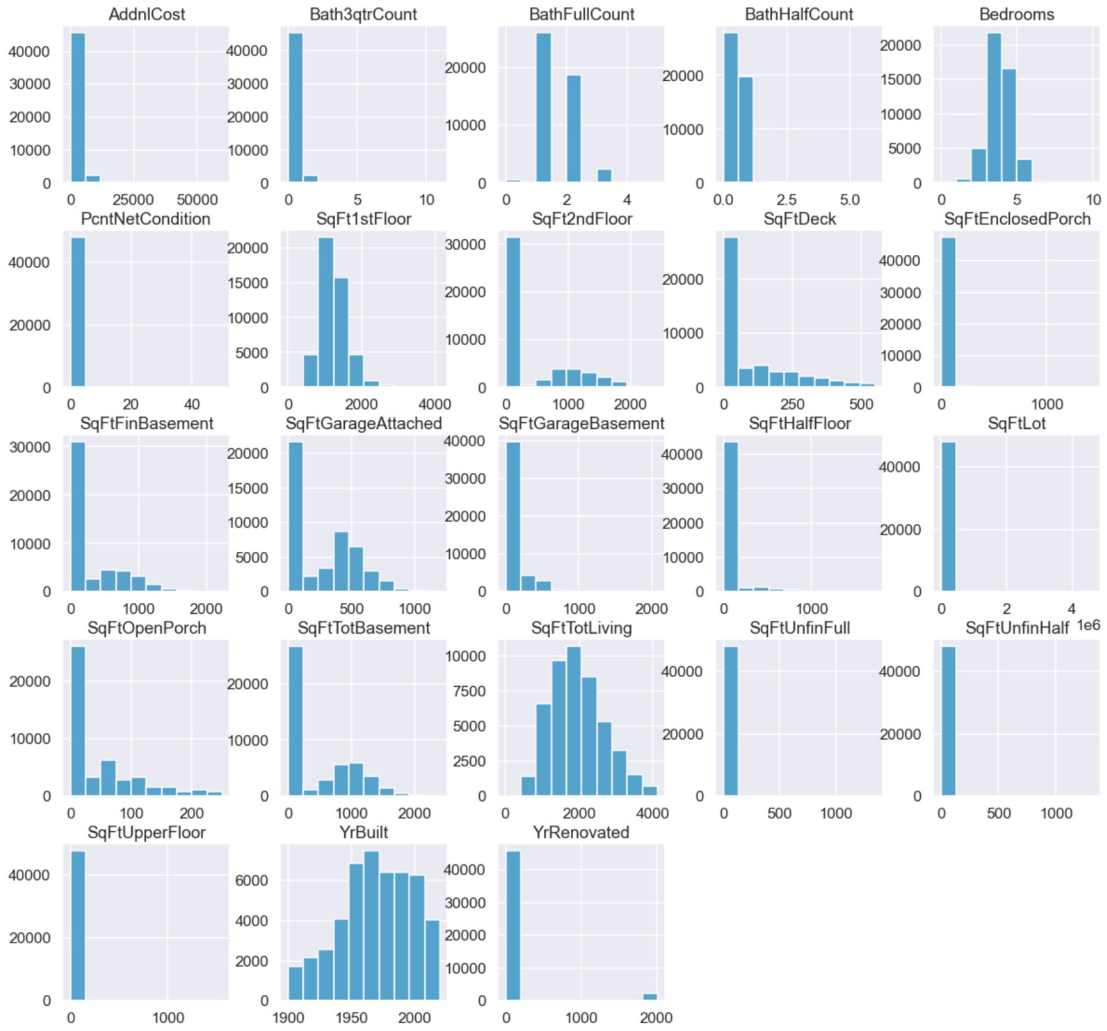
Libraries used for the Project analysis and visualization:

Pandas, Statsmodels, Scikit Learn, Seaborn and NumPy

PROCESS

- Most of the features are **not normally distributed**
- SqFt1stFloor, Bedroom, SqFtTotLiving, YearBuilt close to **normal distribution**

* Normal Distribution resembles bell shape curve.



MODELING

- Baseline Model – Linear Regression with Square Feet Total Living Feature and Sale Price target.
- Final Model – Linear Regression with following features:
  - Square Feet Total Living (sqrt)
  - Square Feet Enclosed Porch
  - Square Feet Open Porch
  - Hot Water Heating System
  - Radiant Heating System
  - Electric Baseboard Heating System
  - Gravity Heating System
  - Other (Heat System)
- Assumptions of linear regression were checked for all models.

MODELING

- Square Feet of living space increases house price by $17 500
- Electric Baseboard heating system – low price
- Enclosed porch – higher price

OLS Regression Results

Dep. Variable:	SalePrice	**R-squared:**	0.300
Model:	OLS	**Adj. R-squared:**	0.300
Method:	Least Squares	**F-statistic:**	688.8
Date:	Thu, 02 Dec 2021	**Prob (F-statistic):**	0.00
Time:	11:49:53	**Log-Likelihood:**	-1.7652e+05
No. Observations:	12837	**AIC:**	3.531e+05
Df Residuals:	12828	**BIC:**	3.531e+05
Df Model:	8		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	-1.136e+05	1.16e+04	-9.759	0.000	-1.36e+05	-9.08e+04
SqFtTotLiving	1.751e+04	265.231	66.022	0.000	1.7e+04	1.8e+04
x0_Hot_Water	1.235e+05	1.66e+04	7.416	0.000	9.08e+04	1.56e+05
x0_Radiant	1.649e+05	2.39e+04	6.902	0.000	1.18e+05	2.12e+05
x0_Elec_BB	-4.026e+04	8172.621	-4.926	0.000	-5.63e+04	-2.42e+04
x0_Gravity	1.856e+05	4.15e+04	4.469	0.000	1.04e+05	2.67e+05
SqFtOpenPorch	110.0329	33.099	3.324	0.001	45.153	174.913
SqFtEnclosedPorch	160.2459	64.392	2.489	0.013	34.028	286.464
x0_Other	1.019e+05	7.18e+04	1.419	0.156	-3.88e+04	2.43e+05

Omnibus:	420.522	**Durbin-Watson:**	2.039
Prob(Omnibus):	0.000	**Jarque-Bera (JB):**	462.530
Skew:	0.464	**Prob(JB):**	3.66e-101
Kurtosis:	2.947	**Cond. No.**	3.00e+03

RESULTS

- **Enclose porch -** the price of the house increases by $160 per square feet if the porch is enclosed.
- **Upgrade to Forced Air** system the Elec BB Heat Systems due to price increase.
- **Increase the square feet of Living Space -** every foot upgrade increases house price by $17 500.

NEXT STEPS

- Further investigation of houses with fully open porches and fully enclosed porches. Find average price for both features.
- Increase the Living Space by converting Basement Garage to living area and investigate effect on the sale price.
- Further analysis of heat system to calculate average sale price for each heat system.

THANK YOU!

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GitHub