Ames Housing Sale Price Predictions

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# Problem Statement and Objective:

- When houses go on sale, buyers want to get as sense of what kind of houses can fit within their budget.
- Each buyer has their own preferences and aspects they wish to forgo when considering their budget.
- Our Objective is to **create a model, identifying the key features and predict housing sale prices, to make better recommendations.**

EDA

- We picked our features using visual representations against Sale Price
- We also used a correlation matrix to filter out aspects that had little influence on the prices
- Dropped outliers, ground floor area above 4000 sqft
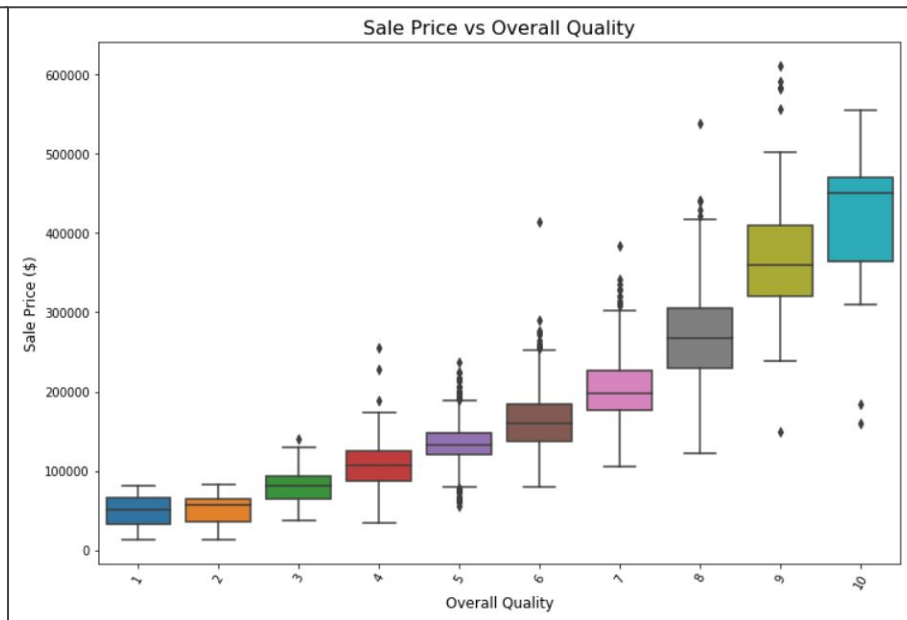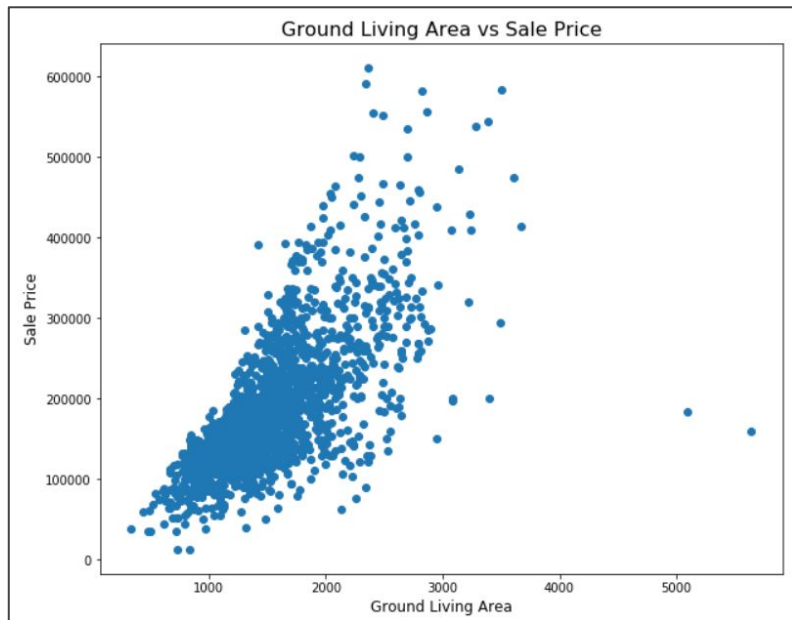
Feature Selection techniques

- Correlation Matrix
- Recursive Feature Elimination with Cross-Validation
- Sequential Forward Selection (SFS from mlxtend package)

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Sequential forward feature selection search
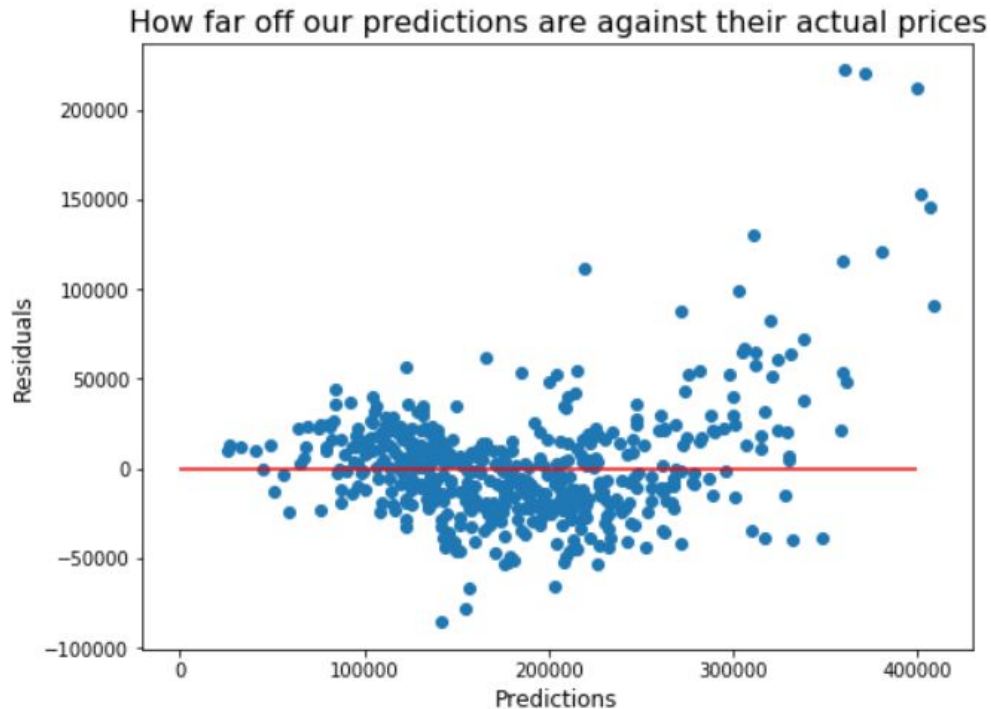

Heatmap of continuous variables
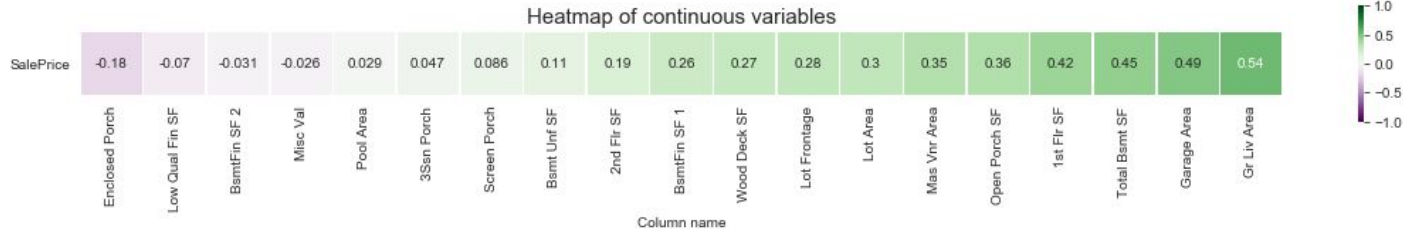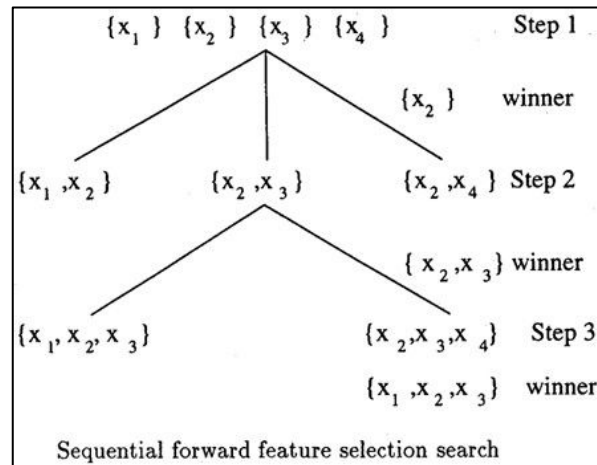
Model Evaluation

- Lasso Model selected

Model Type	R^2	RMSE
Simple Linear	0.878372	26690.26
Lasso	0.879434	26571.65
Ridge	0.878543	26673.27

How does the model fare?

How far off our predictions are against their actual prices

- Residuals represent the difference between our predictions and actual prices
- The closer they are to zero, the more accurate our predictions are
- Majority of our predictions seem to be around ± 30000

Business Questions

1) **Most valued features: Ground Living Area size and Overall Quality of the house**

2) **What house improvements: Exterior features like Mason Veneer Area, Roof style, open porch, wooden deck**

3) **What are the good neighborhoods: Stone Brook, Northridge, Bloomington, Bluestem**

4) **Can it be used on other cities:**
   a) **can be used for cities that are similar to Ames**
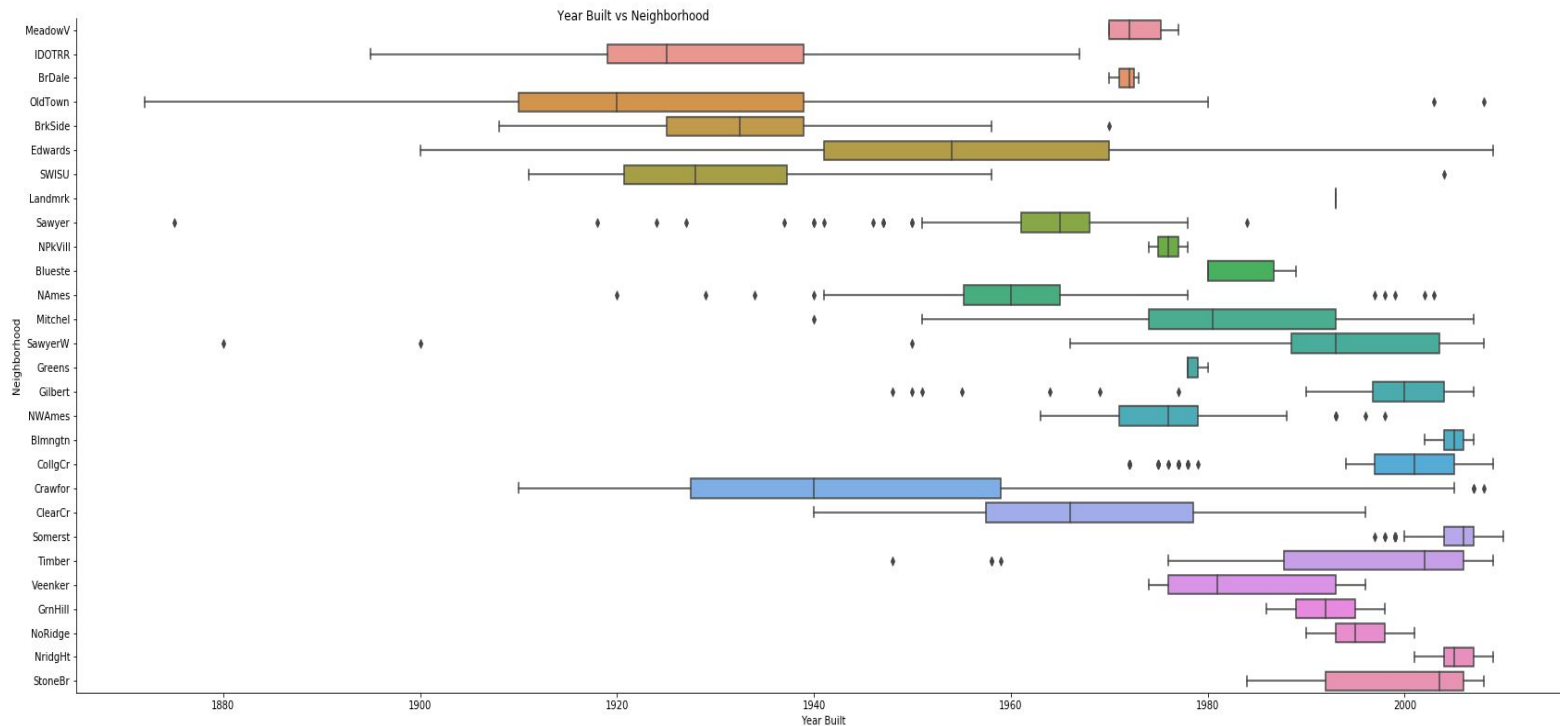   b) **only used as a guide for cities that are different to Ames**

Neighborhood vs Sale Price

Neighborhood vs Sale Price

Number of Sales by Neighborhood

Mean Sale Price per Area
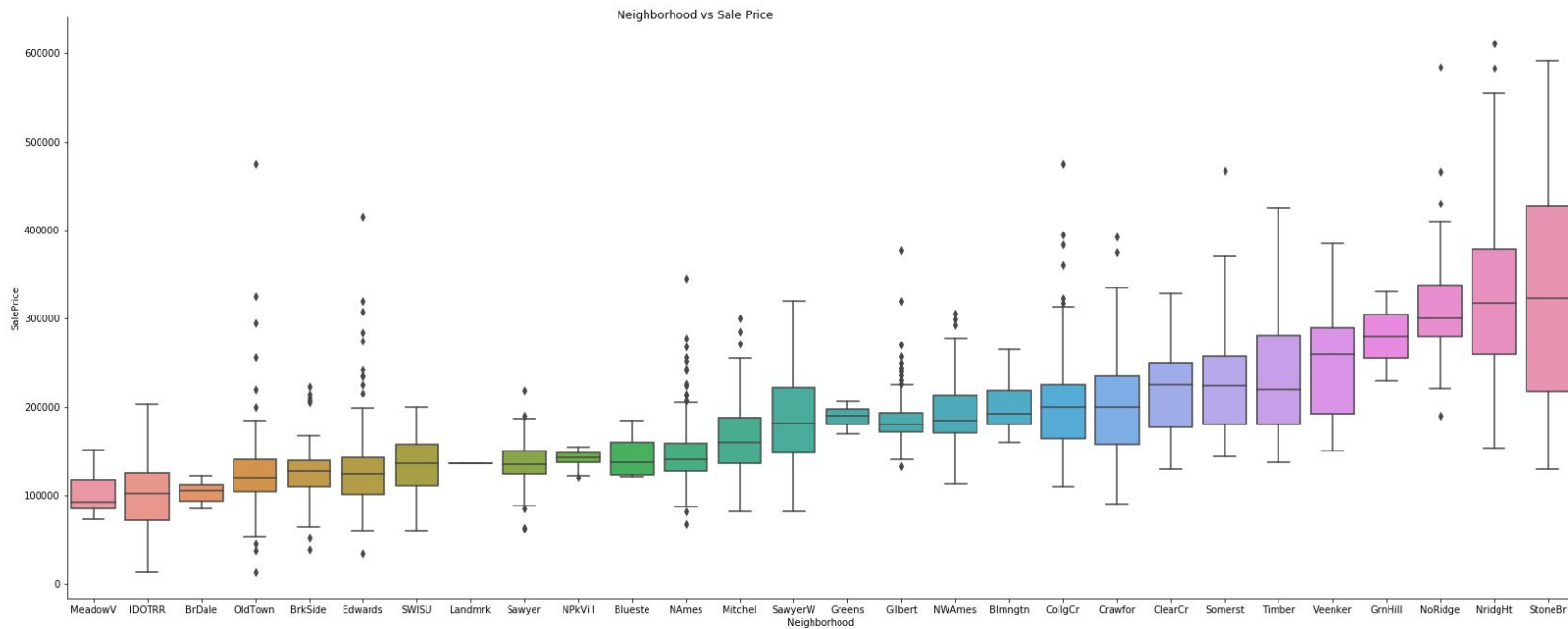
Year Built vs Neighborhood
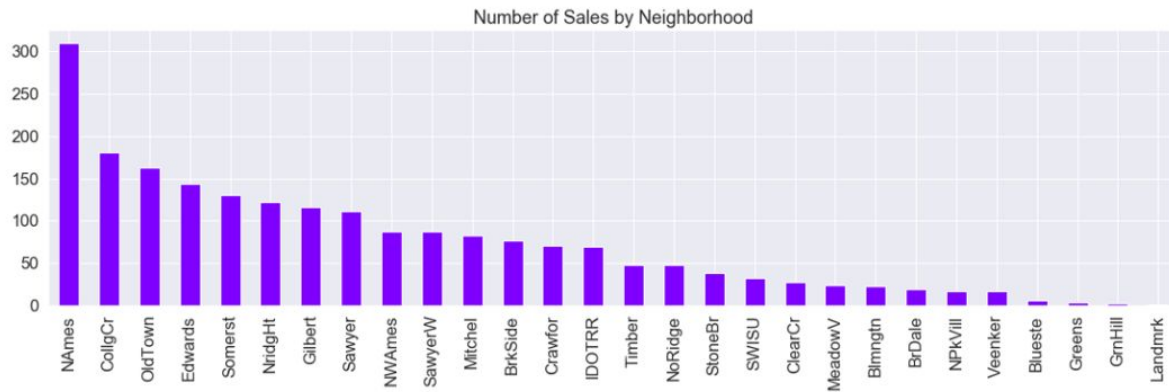
Year Built vs Neighborhood

Research

1) Ames, Iowa is a small university town.

2) Population less than 100,000 pax

3) Iowa State university is top employer

4) Average Annual Temperature is 10 degrees celsius

5) Research shows price increase in housing near universities

Conclusion

- Our model consists of a myriad of features we found to be significant and below are the top 5 most significant ones.
- Other features would have negligible impact on the Sale Price, so you can maximise those as much as you want!

Features	Coefficient
Gr Liv Area	18878.124116
Overall Qual	18672.804359
Exter Qual	9894.967844
Total Bsmt SF	9524.907871
Garage Area	8512.469205

Recommendation

Analysis shows: distance from the university impacts sale price of houses.

We recommend that for our model to be more accurate for other cities, information needed:

1) Distance from facilities such as universities
2) Weather
3) Economic activity
4) Demographics