AMES, IOWA

Understanding the Housing Market

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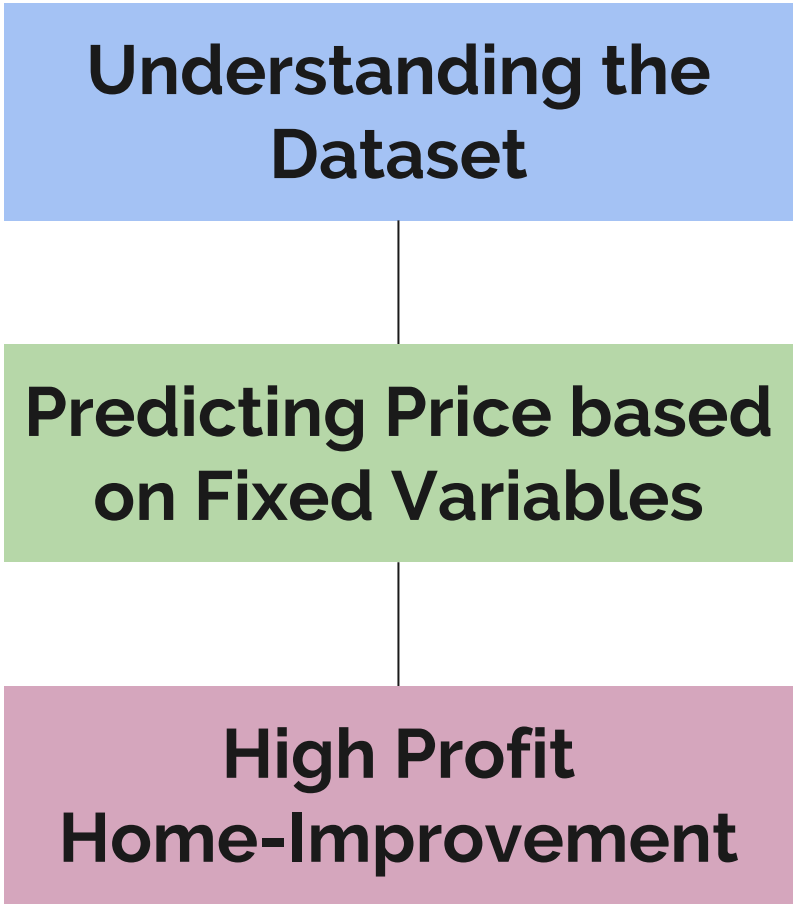
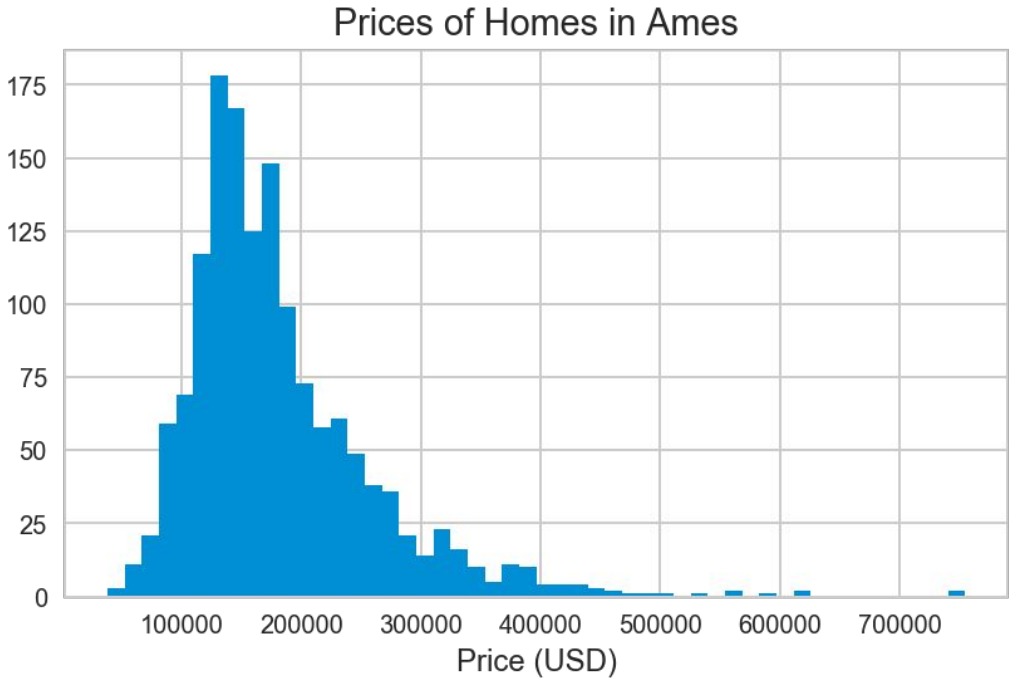
Presentation Goals



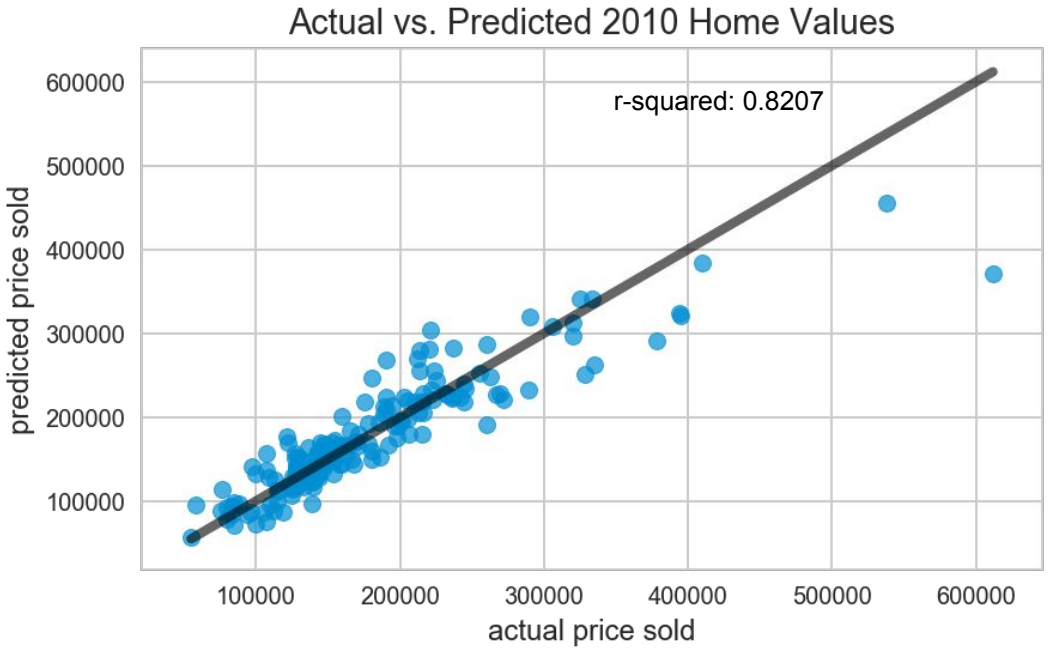
Understanding our Data

- 81 Features
  - Fixed Examples
    - Square feet of lot, garage, basement, living area, etc.
    - Shape of lot
    - Neighborhood
  - Unfixed
    - Quality and Condition of rooms, roof, and home.

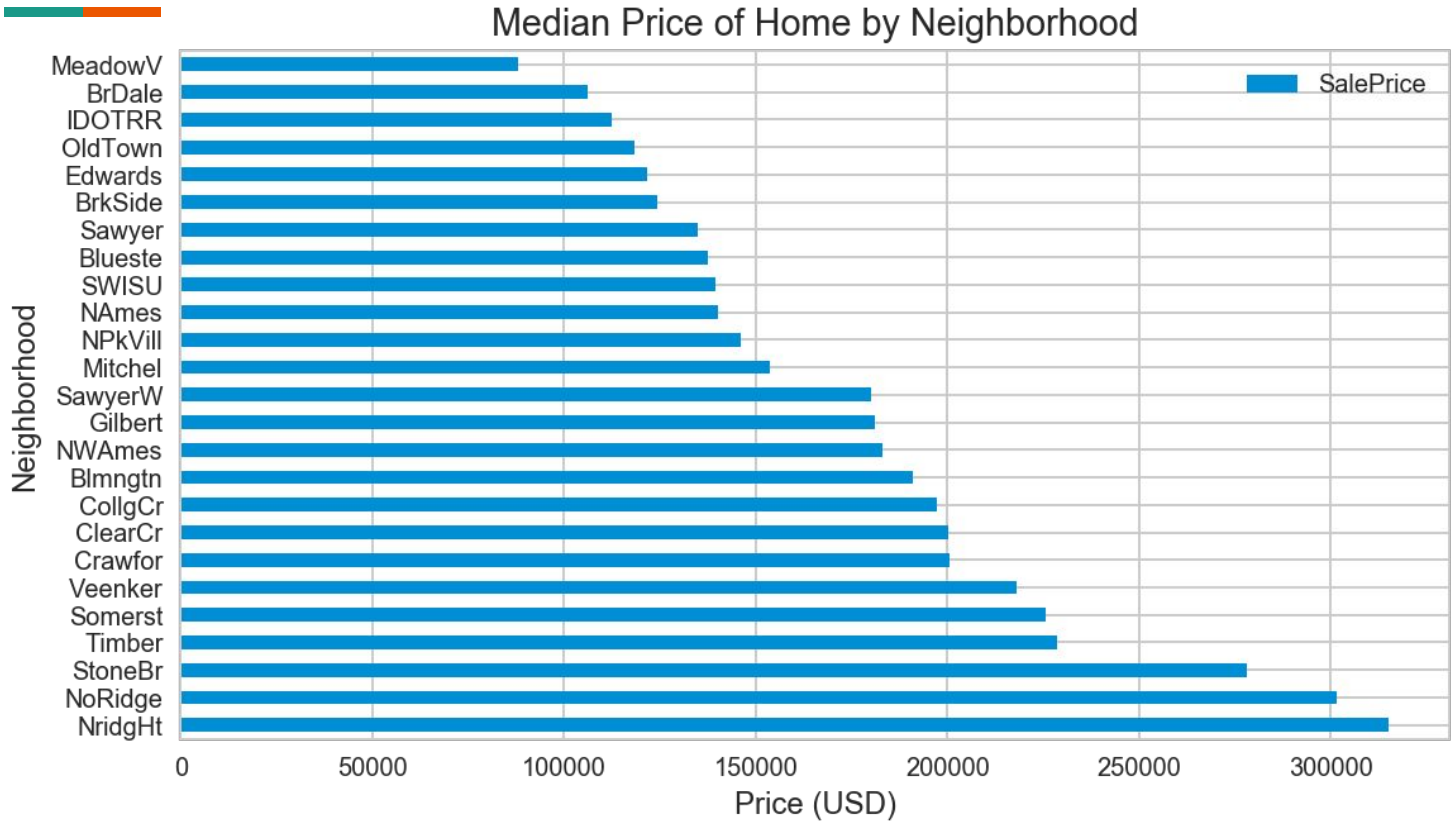


Predicting 2010 Sale Price with Fixed Features

- Linear Model
  - Initially, included 100 features due to Dummy Variables
- Lasso provided best regularization method
- Reduced feature count to 57
  - 7 of the 10 strongest features where the neighborhoods



Neighborhoods

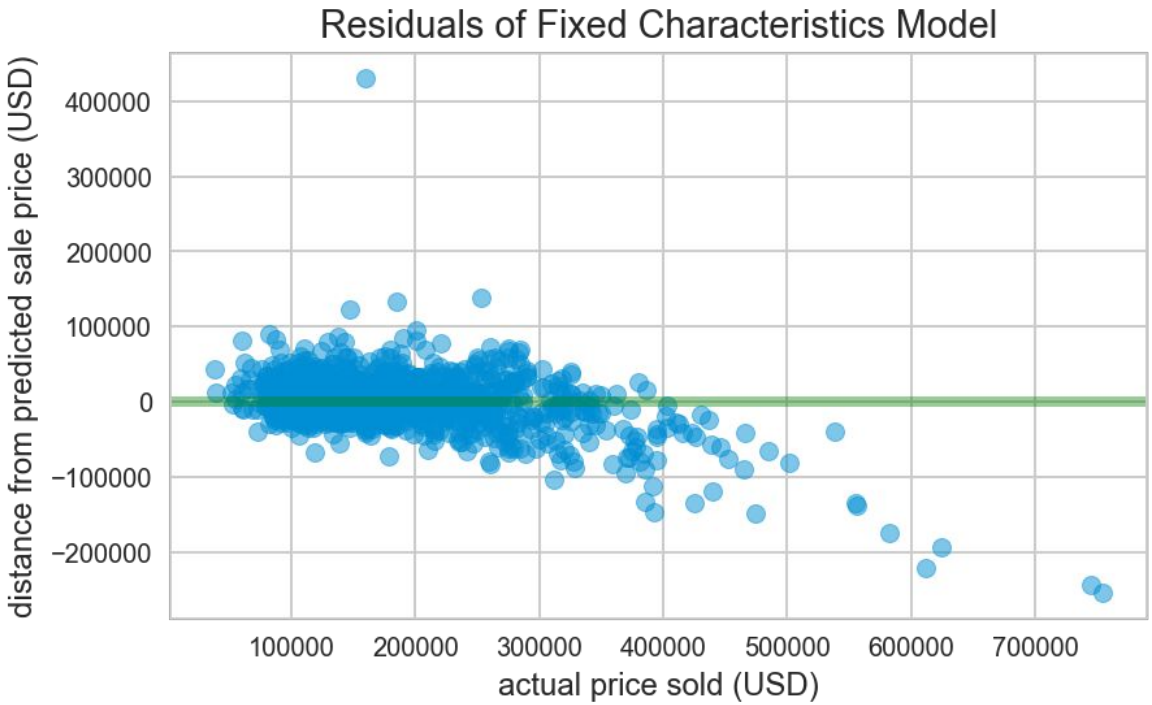


Profitable Home Improvement

How can we find why some homes sold for less or more than expected?

The Residuals!

We look at the characteristics of the homes that can be renovated to explain this difference.



Worthwhile Home Renovations

Method

1. Dummy all renovatable Features
2. Lasso Regularization to eliminate worthless features
3. See features with highest beta for inclusion in final model
4. Ensure that the feature is well distributed in the data

Result

Kitchen Quality is a huge driver of Sale Price. (3 of top 6 Betas).

Kitchen Renovations and Sale Price

Method

1. Dummy only Kitchen Quality
    a. Drop Fair Kitchen for comparison
2. Add these dummies to the 'Fixed' model
3. DO NOT STANDARDIZE DATA
4. See Betas of Kitchen Quality Dummies

Result

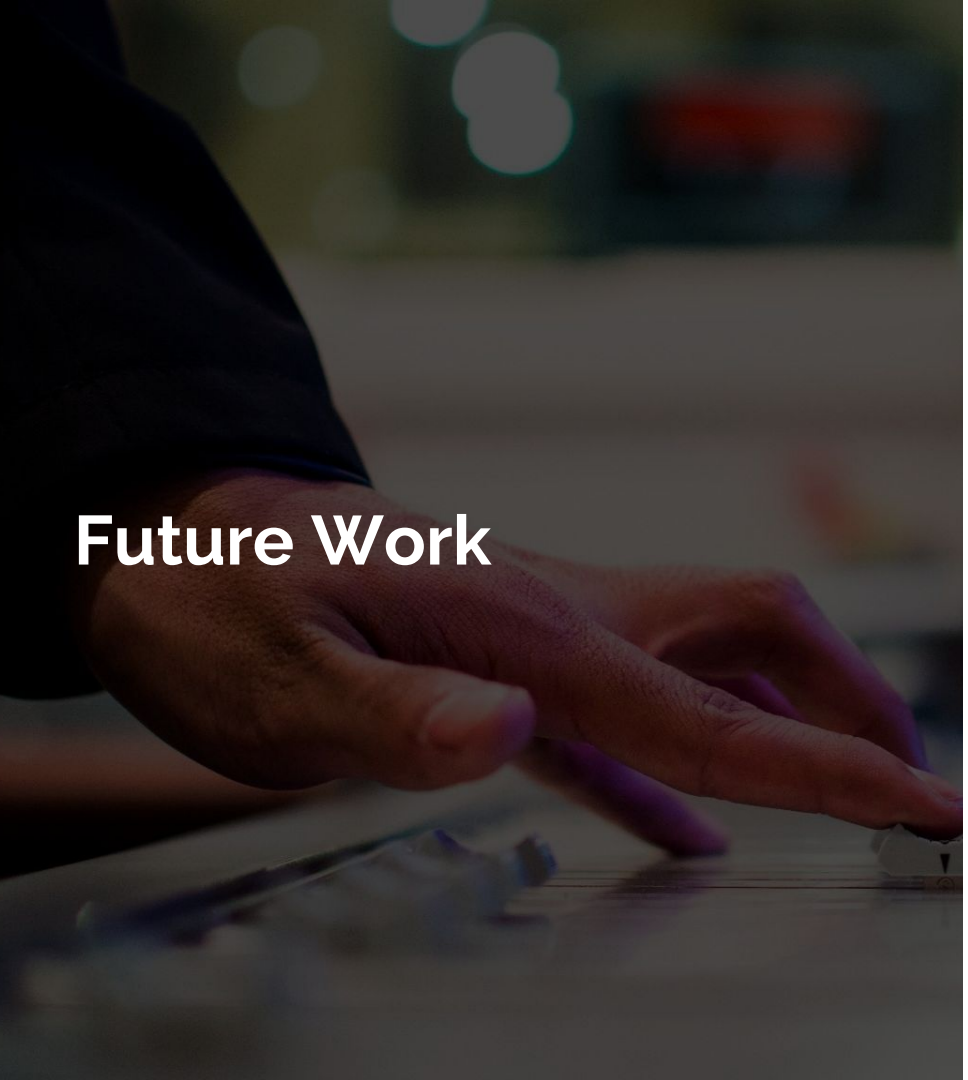
- R-Squared value increased from .820 to .855
- The Kitchen Quality explains 19.4% of the variation remaining from the original model

Kitchen Quality Level	Beta
Excellent	$65,884.53
Good	$17,898.30
Typical / Average	$1,878.90
Fair	$0.00

Interpretation:

Upgrading a Poor Kitchen to an Excellent Kitchen will increase Sale Price by $65,884. **

** All else being equal



Future Work

1 - Tune the models to better predict high-priced homes (greater than $350,000).

2 - Determine the cost of going from Fair to Typical to Good to Excellent Kitchen Quality.

3 - Use these features to predict Abnormal House Sales