Maximizing House Price in King County

Max Steele

Purpose

- Predict house prices for King County, WA

- Estimate price range

- Provide actionable insights
  - Maximize selling price
  - What to renovate
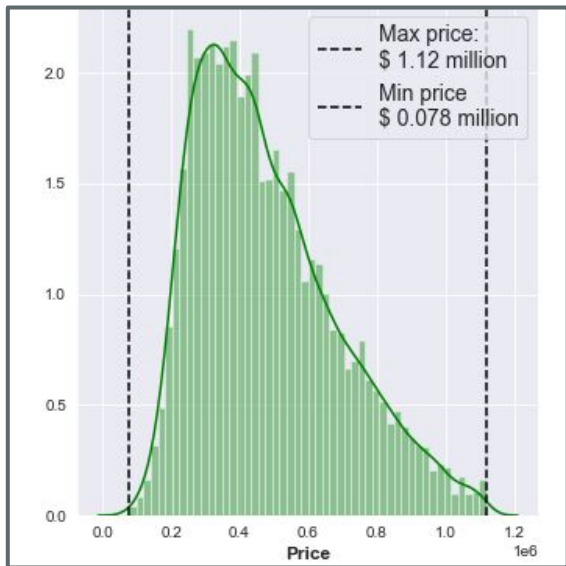
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Overview

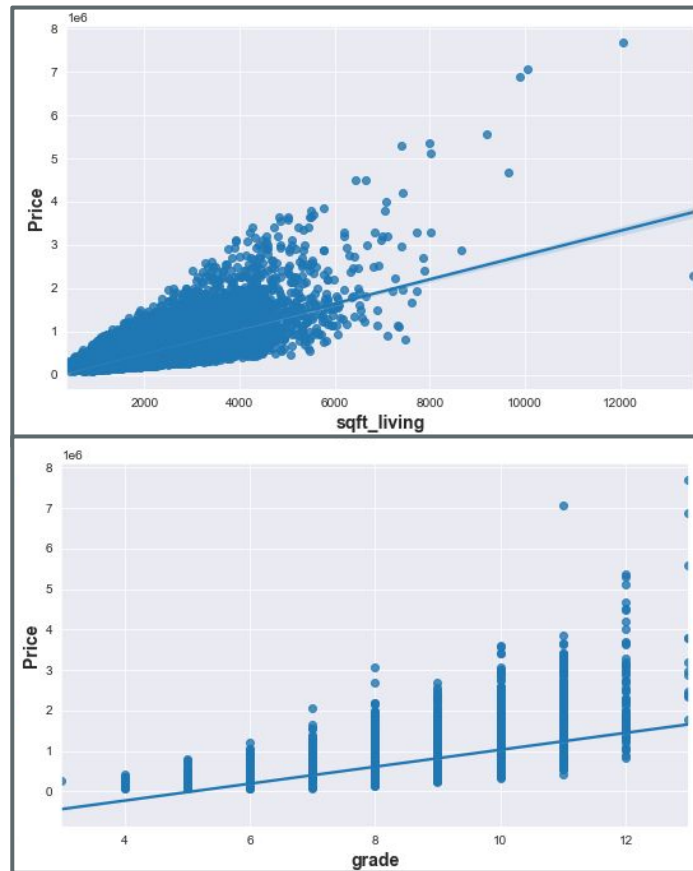Guiding Questions for Predictive Modeling

1. Which factors have the strongest relationships with price?

2. How can I best predict price for the majority of houses in the county?

3. Which factors can be altered to maximize selling price?

Data & Methods

- Houses sold in King County
  - May 2014 - May 2015

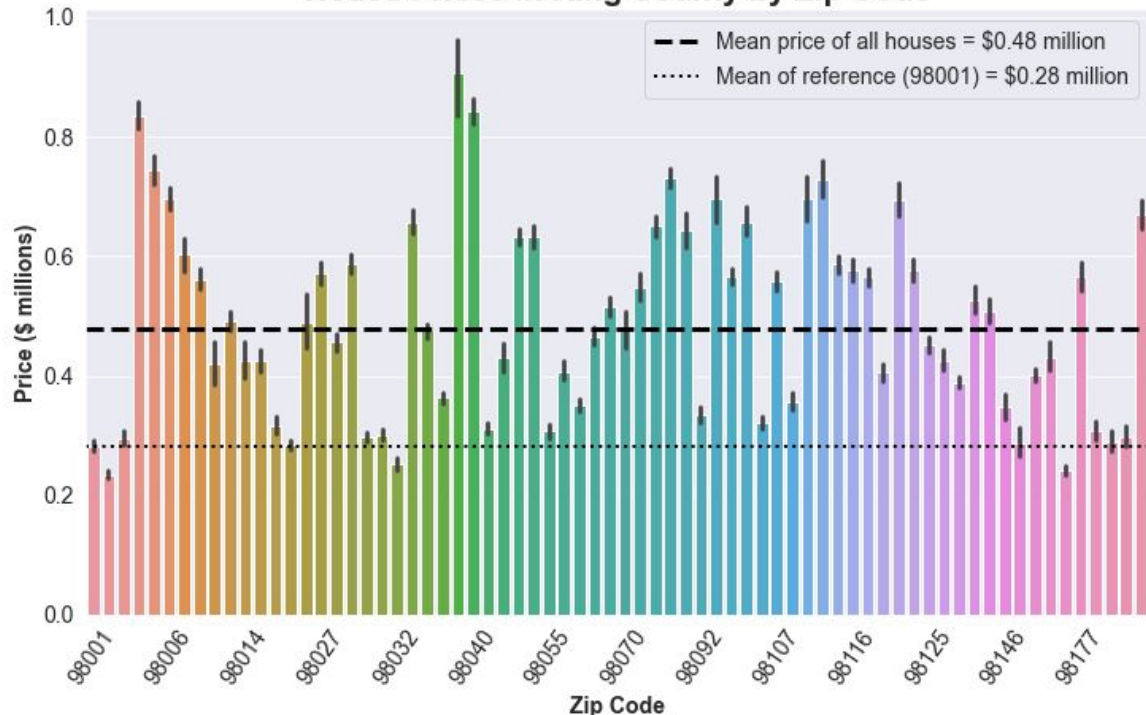- Removed outliers based on extreme price values

- Multiple linear regression
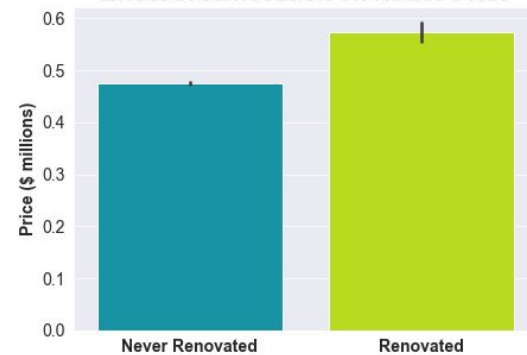 - Identify multiple factors that explain variation in price

Model Implications

House Prices in King County by Zip Code

- Mean price of all houses = $0.48 million
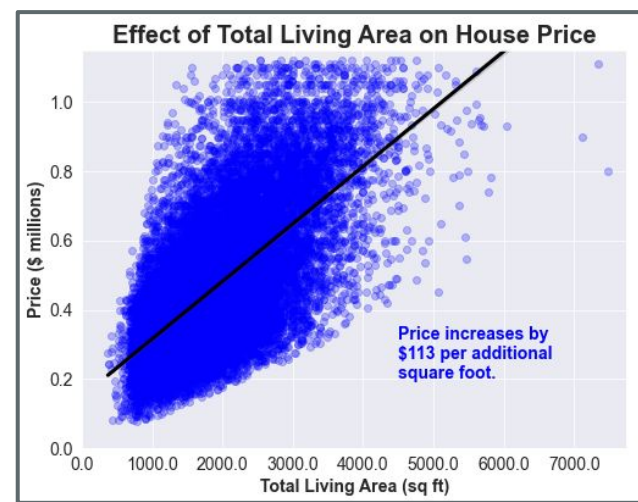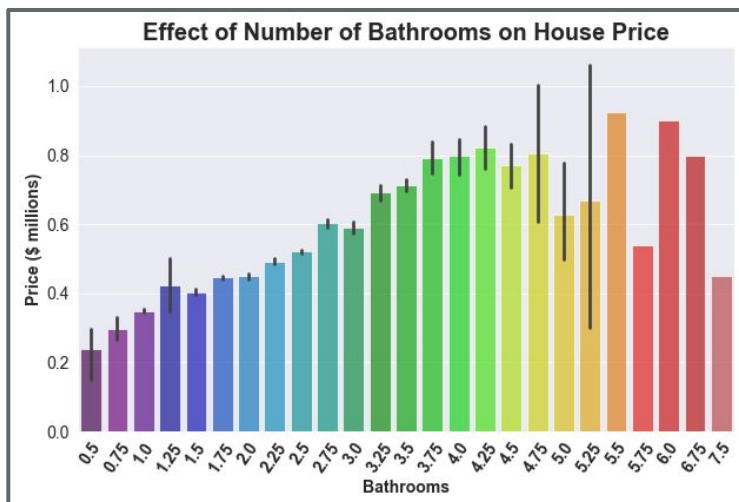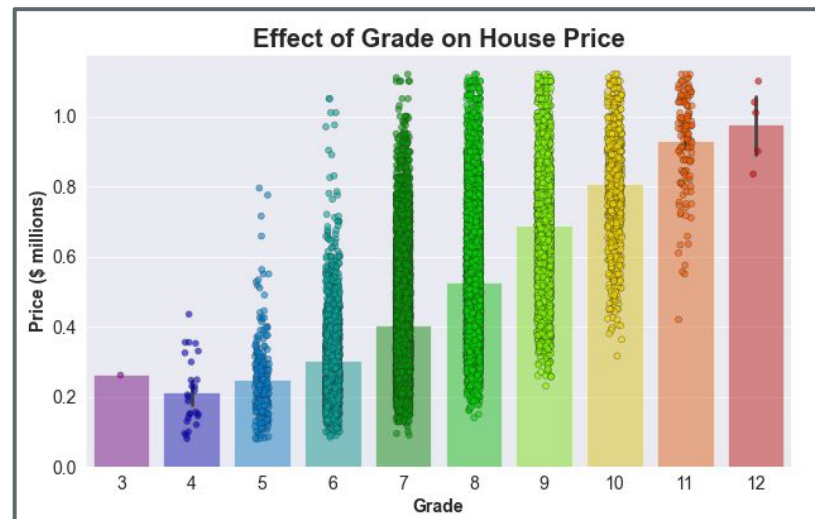- Mean of reference (98001) = $0.28 million

- Location matters
  - Zip code
  - Latitude

- Renovations can help maximize price

Effect of Renovation on House Price

Recommendations

- **Do:**
  - Improve grade
  - Add interior square footage
  - Add bathrooms

- **Do Not:**
  - Add bedrooms
  - Add floors

Effect of Grade on House Price

Effect of Number of Bathrooms on House Price

Effect of Total Living Area on House Price

Price increases by $113 per additional square foot.

Summary

- Predictions apply to price range $78,000 to $1.12 million

- Location strongly influences price

- Focus on specific renovations to maximize price:
    - Improve grade
    - Add interior square footage
    - Add bathrooms
    - Do not add bedrooms or floors

Future Work

- Update model by adding more recent data
  - Potential to include more expensive houses

- Build model to predict return on investment for specific renovations

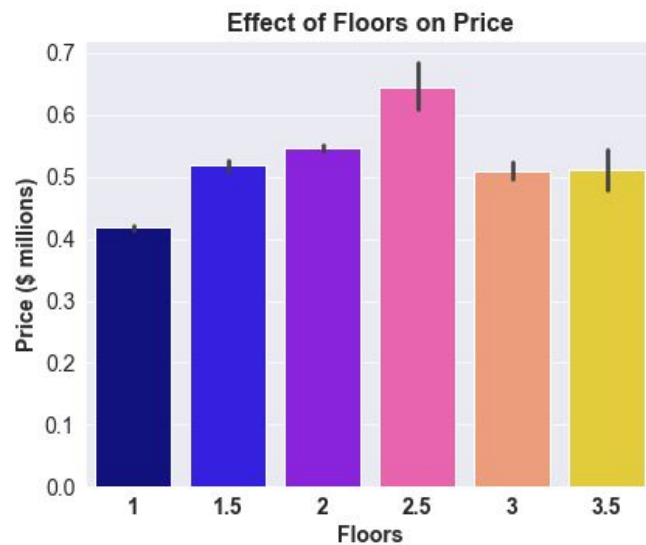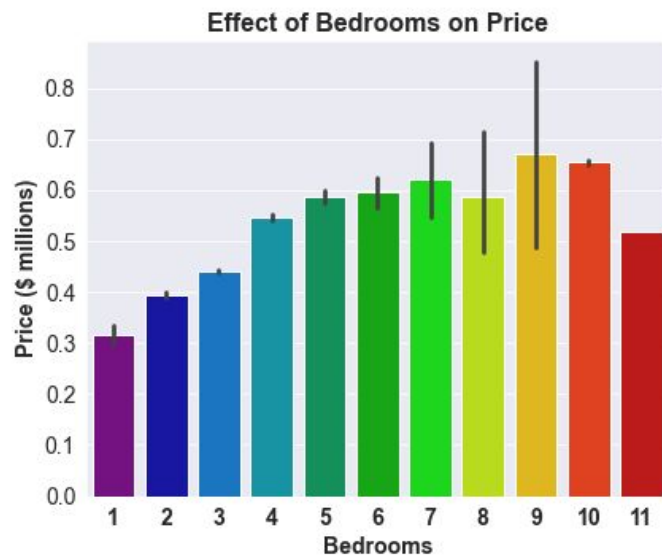- Interactive website based on current model

Thank you!

Questions?

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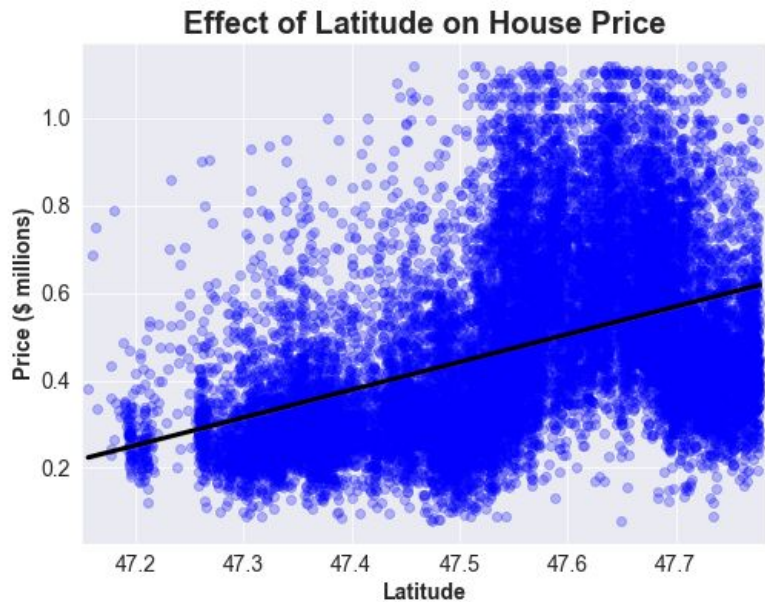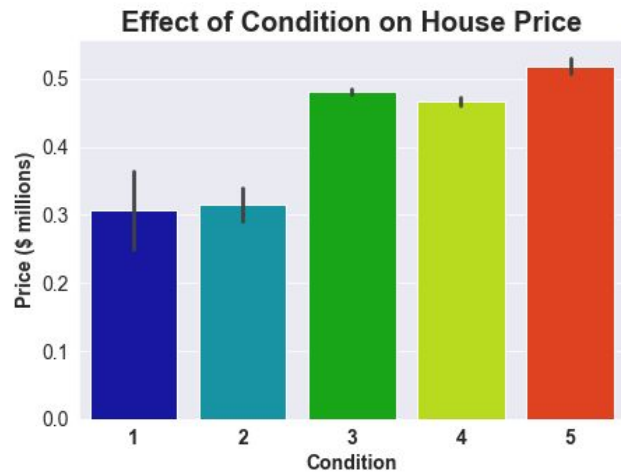
https://github.com/zero731

Appendix I

- **Significant predictors of price in final model:**
    - **Zip code (some +, some -)**
    - **Latitude (+)**
    - **Waterfront (+)**
    - **Age (+)**
    - **Renovated (+)**
    - **Sqft_living (+)**
    - **Sqft_living15 (+)**
    - **Est_sqft_basement (-)**
    - **Bedrooms (-)**
    - **Floors (-)**
    - **Bathrooms (+)**
    - **Grade (+)**
    - **Condition (+)**

Appendix II

Appendix III

Effect of Condition on House Price

Effect of Latitude on House Price
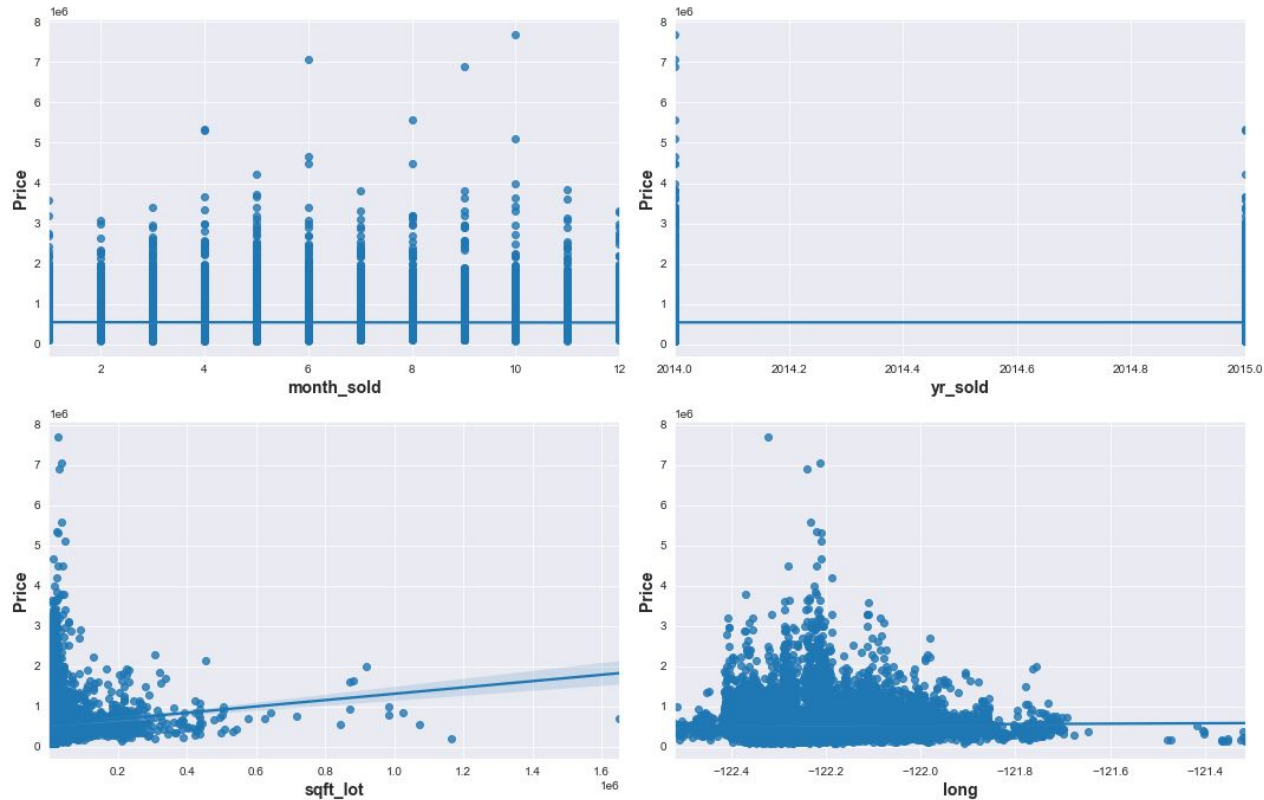
Appendix IV

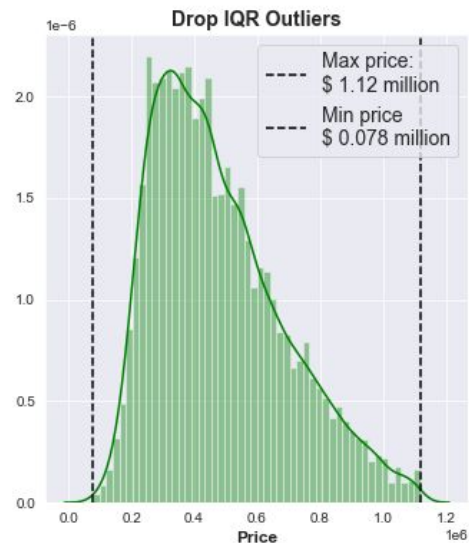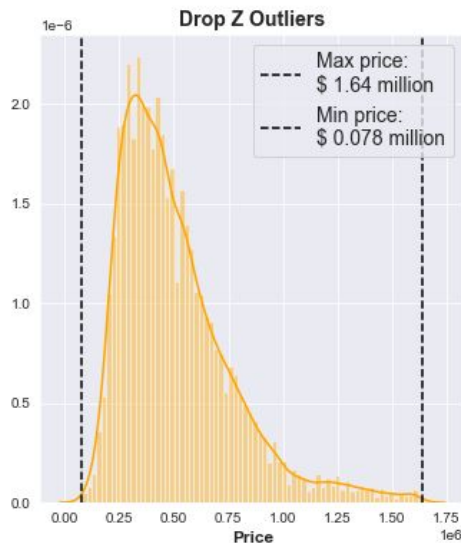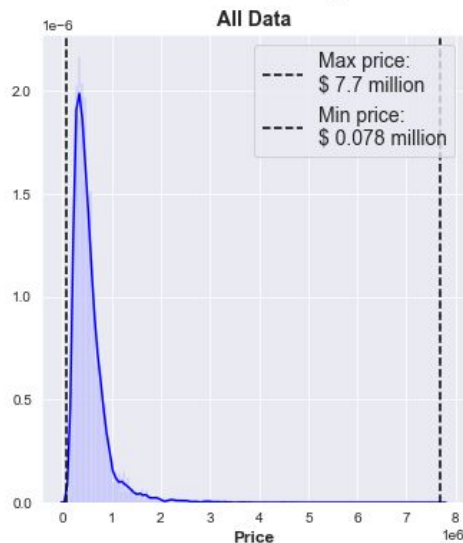Effect of Interior Living Area on House Price

Appendix V
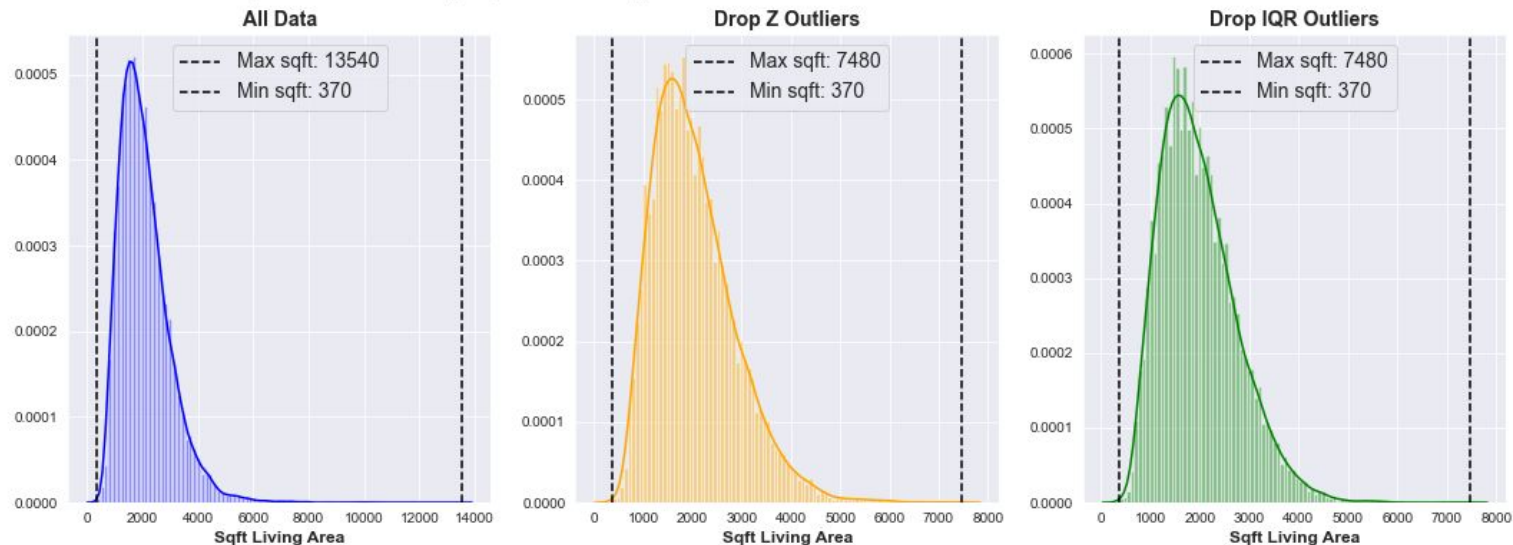

Variables Unrelated with Price

Appendix VI

Comparison of Price Distributions for Different Methods of Outlier Removal

Appendix VII

Comparison of Living Square Footage Distributions for Different Methods of Outlier Removal

Appendix VIII

Q-Q Plot of Model Residuals

Homoscedasticity of Model Residuals