Ames Assessors Prediction Model For Housing Prices

By: Robert Sarno

Objective

- Find housing features that have high correlations with regards to Housing Sale Price.
- To design a predictive model that will help Ames Assessor’s Office on deciding what there opening bid should be on their next property purchased.

Housing Sale Price of Ames, Iowa:

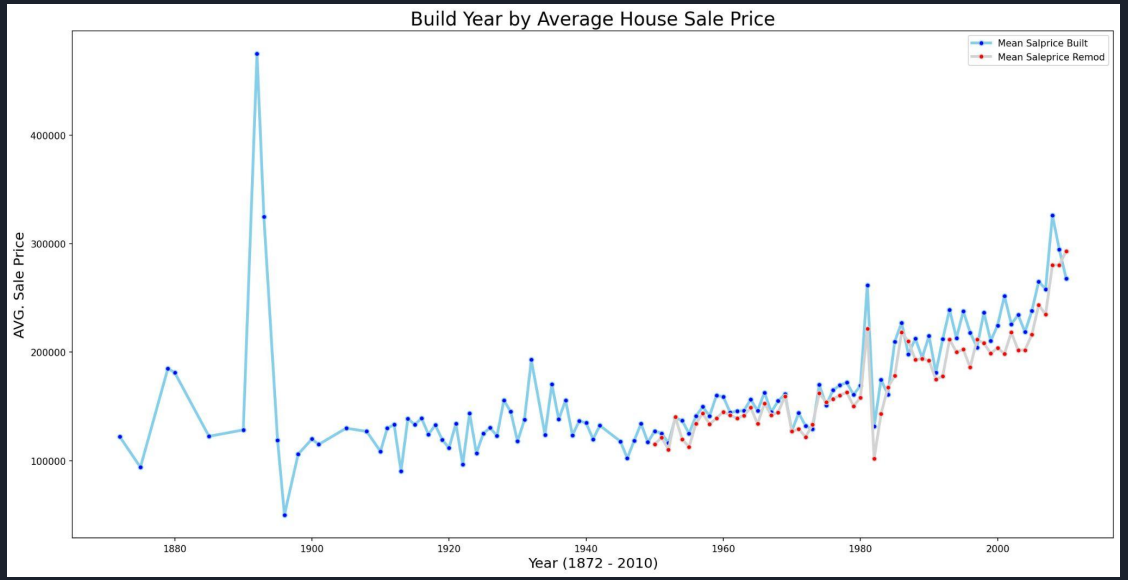
- The median listing home price in Ames, IA was $283.5K in March 2022, trending down -1.9% year-over-year.
- The median listing home price per square foot was $199. The median home sold price was $265K.
- What sells a Home?
  - Location
  - Home size and usable space
  - Age and condition
  - ect.

Analysis

- The features that I will be focusing on are ones with high correlation in regards to Sale Price.
  - Features related to Year Built:
    - Original Construction Year, Remodel Year, Garage Year Built
  - Features related to Quality of the home:
    - Basement Quality, Kitchen Quality, Total rooms above grade, Full bathrooms above grade
  - Features related to Area and Square Feet:
    - Garage area in Square Feet, Above grade living area Square Feet, 1st Floor Square Feet, Total Basement Square Feet
  - Features Related to other Aspects of the home:
    - Foundation, Masonry veneer area in square feet

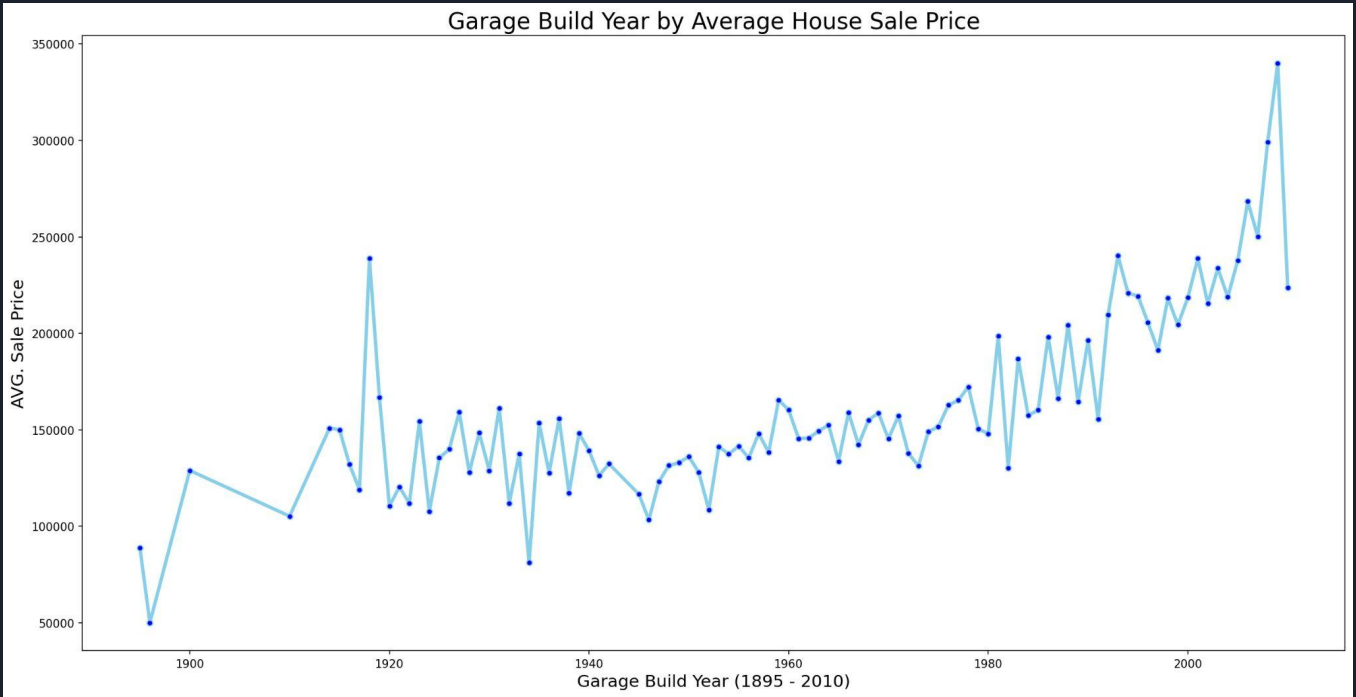
Data information: Year Built/Remod Features

- The oldest constructed house in the data set is 1872.
- The earliest constructed house in the data set is 2010.
- The oldest Remodeled house in the data set is 1950.
- The newest Remodeled house in the data set is 2010.
- As you can see the newer the house Build or Remodel the higher the average housing sale price will be.



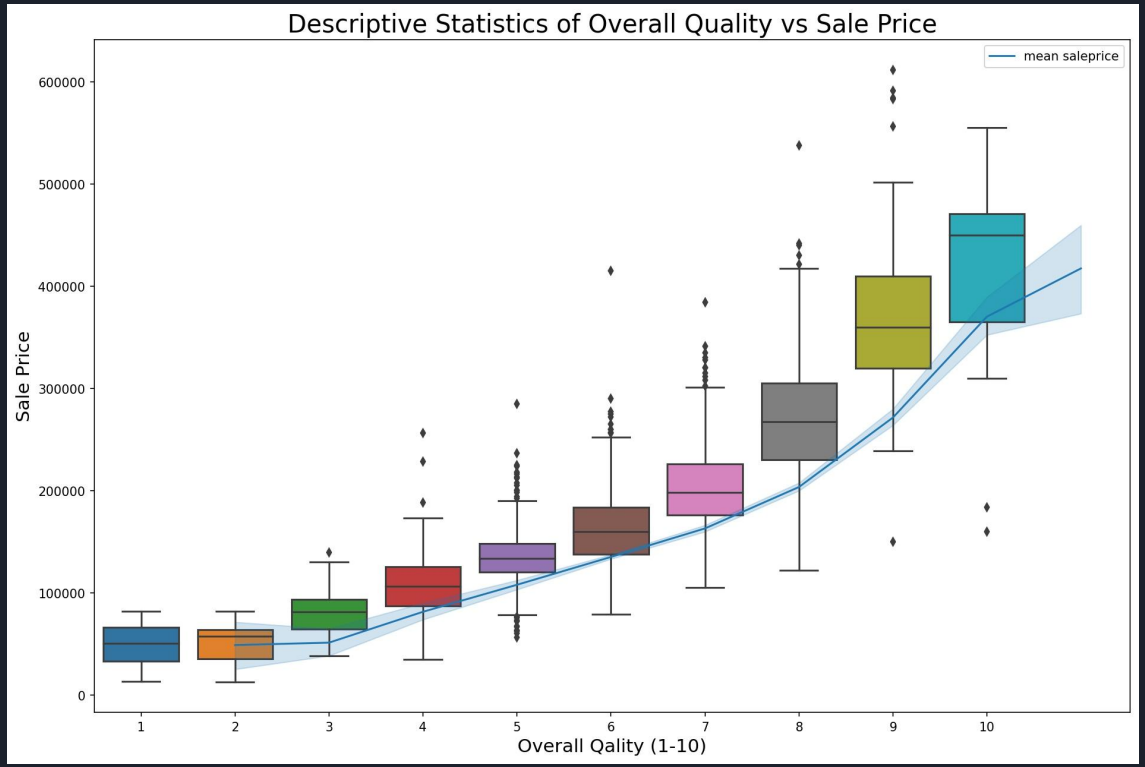
Data Information: Garage Year Built

- Out of 2051 observations only 1903 had a garage built.



Data Information: Overall Quality Feature

- The Overall Quality of a home is essential to the Sale Price.
- As Overall Quality is better the more the Sale Price will be.

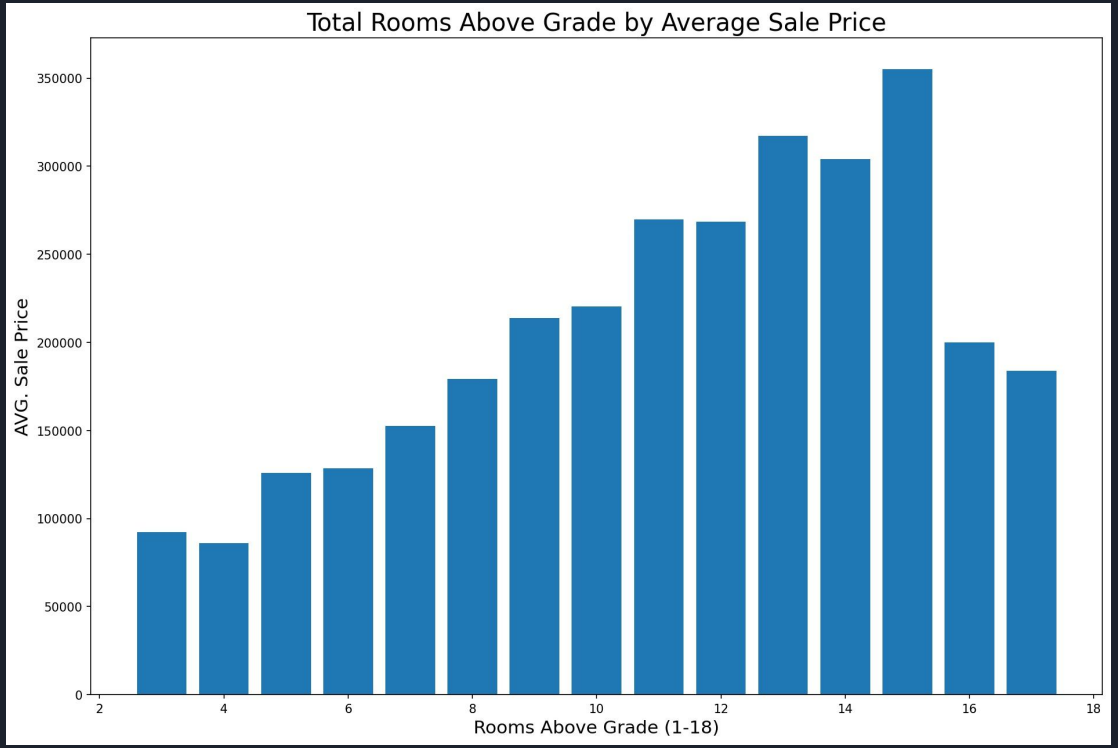


Data Information: Basmt Qual/Kitchen Qual

- As you can see observations that have excellent Basement and Kitchen qualities have the highest average Sale Price.
- Same goes for observations that have good Basement and Kitchen qualities have the second highest average Sale Price.
- Conversely for both graphs you can see observations like TA that have a lower average Sale Price.

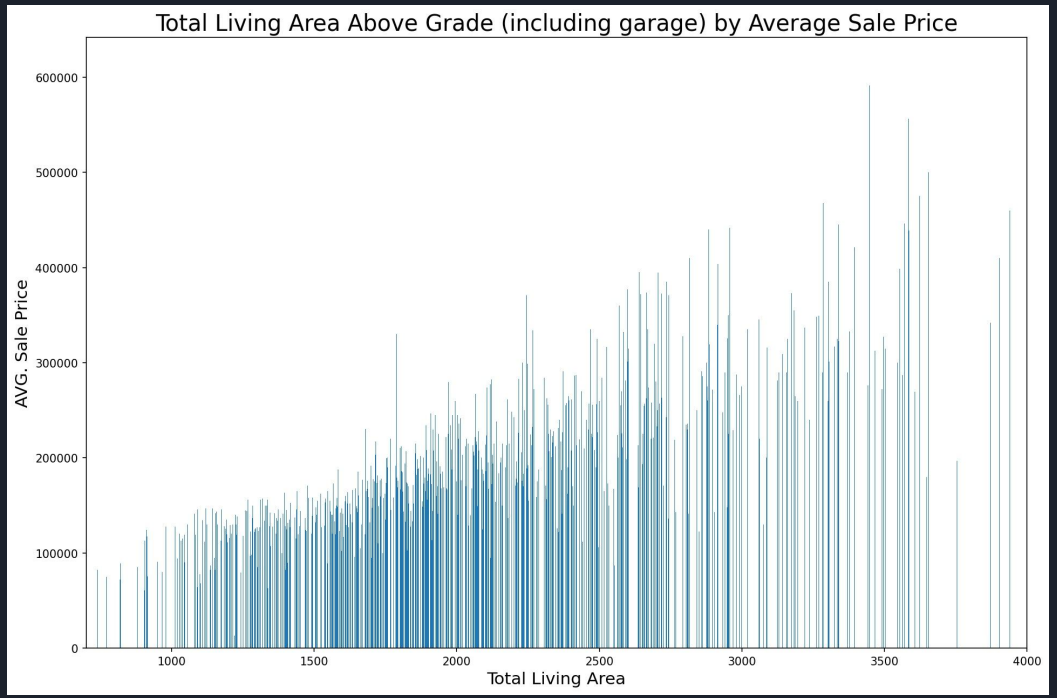
Data Information: Total rooms above grade

- The more rooms an observations has that are above grade means the higher the Sale Price will be.



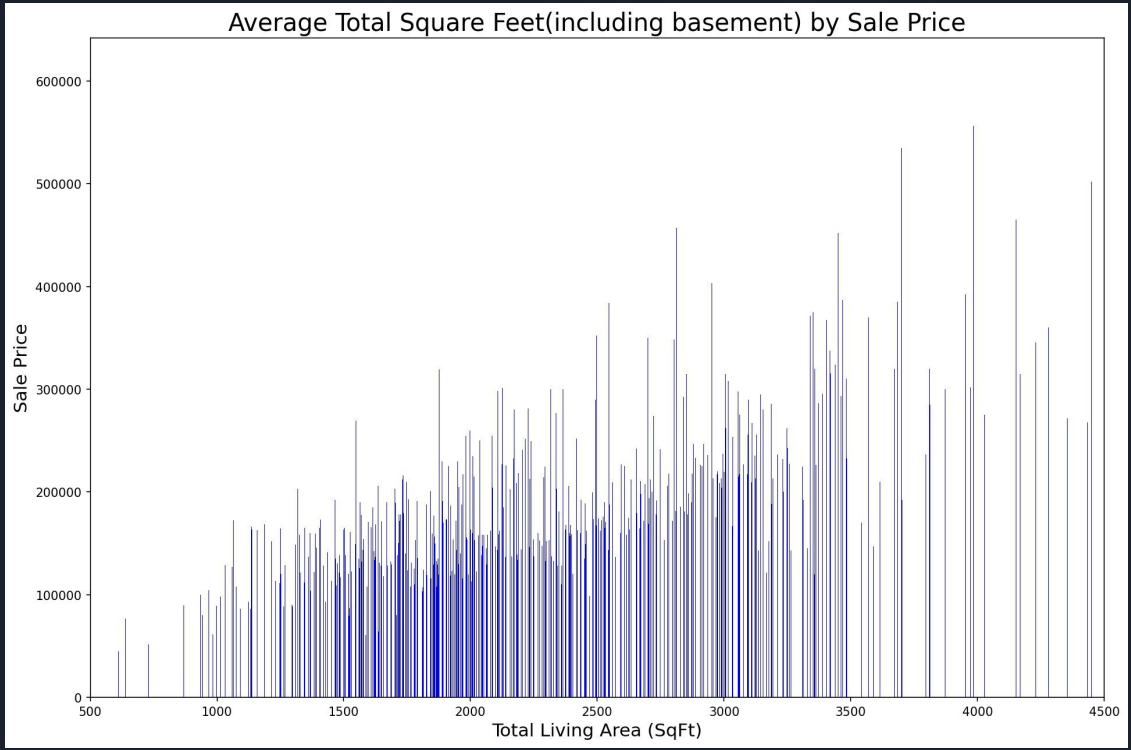
Data Information: Total Living Area

- The larger the Total Living Area is above Grade the More the Average Sale Price will be as seen with all my other visuals.



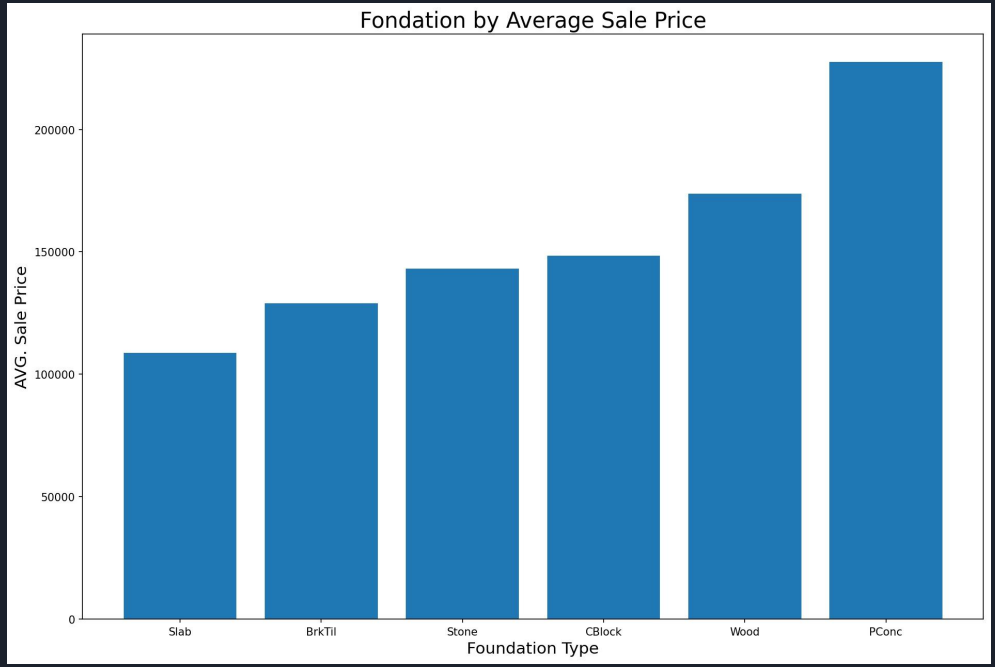
Data Information: Total Square Feet (1st Floor, Total Basement)

- As Total Square Feet increases so will the sale price of the home.



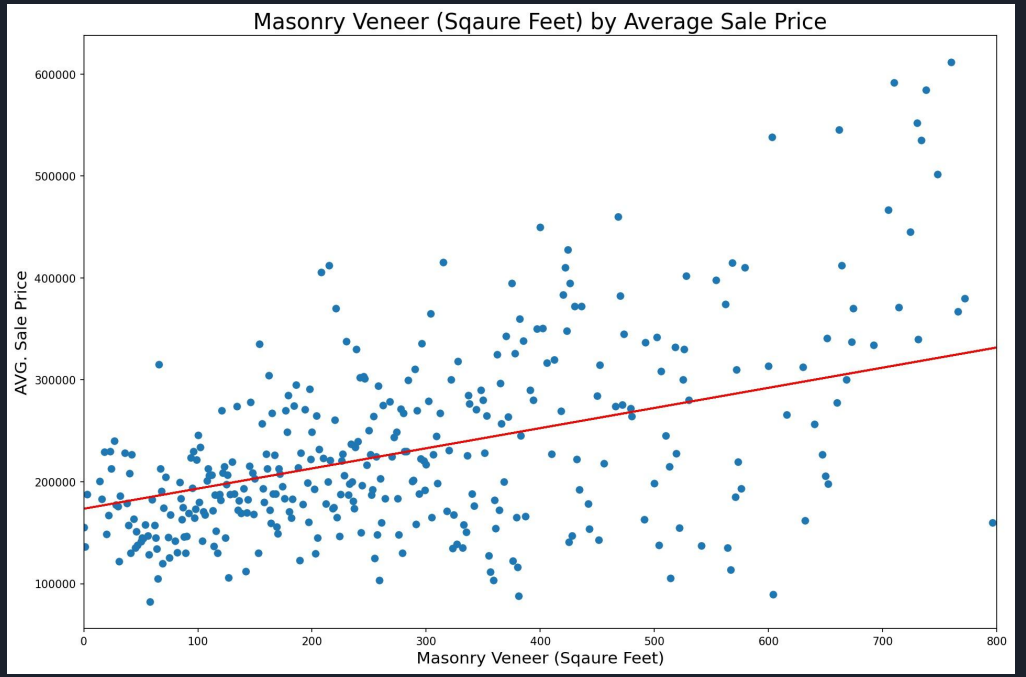
Data Information: Foundation

- As you can see in this graphic Pcon is the most important Foundation in terms of having a higher Sale Price.



Data Information: Masonry Veneer Area Square Feet

- Regression Line:
  - 197.78(x) + 173502.1
- As Masonry Veneer increases so does the Average Sale Price



Regression Model:

- The feature engineering I used was Polynomial Features, Standard Scalar, and One Hot Encoder.
- After feature Engineering I used a Pipeline to continuously test Regression modeling with Lasso, Ridge, Elastic Net until I found the best score.

Final Thoughts:

- For Mean Squared Error on my validation set:
  - 32848.07
- For the percent of variance present in the data that my model explained:
  - 0.85
- RECOMMENDATIONS:
  - Get more data.
  - Make sure miss inputs are minimized.