Predicting housing prices in Ames , Iowa

Vaishnavi Brungi

Problem Statement

At our real estate investment firm, apart from providing investors with new and refurbished investment properties, we also do consultation service to sellers who want to sell their homes by estimating sale price, finding buyers, taking care of the documentation process until seller handovers key to the buyer.

We have been given list of clients who are willing to sell their homes in Ames city in Iowa.

This analysis seeks to predict sale price of homes in Ames.

This analysis also aims to list down top factors that affect sale price in Ames which can be used as a checklist in the future if any client from these locations approaches us seeking consultation service to sell their property.

Understanding the data

81 Features

Nominal(24)

Sale Type
Garage Type
Building Type
Street
MS Zoning
Heating
Central Air
Misc Feature
Etc.

Continuous(21)

Lot Frontage
Lot Area
1st Floor Sq Ft
Sale Price
Garage Area
Total Basement Sq Ft
2nd Floor Sq Ft
Pool Area
Etc.

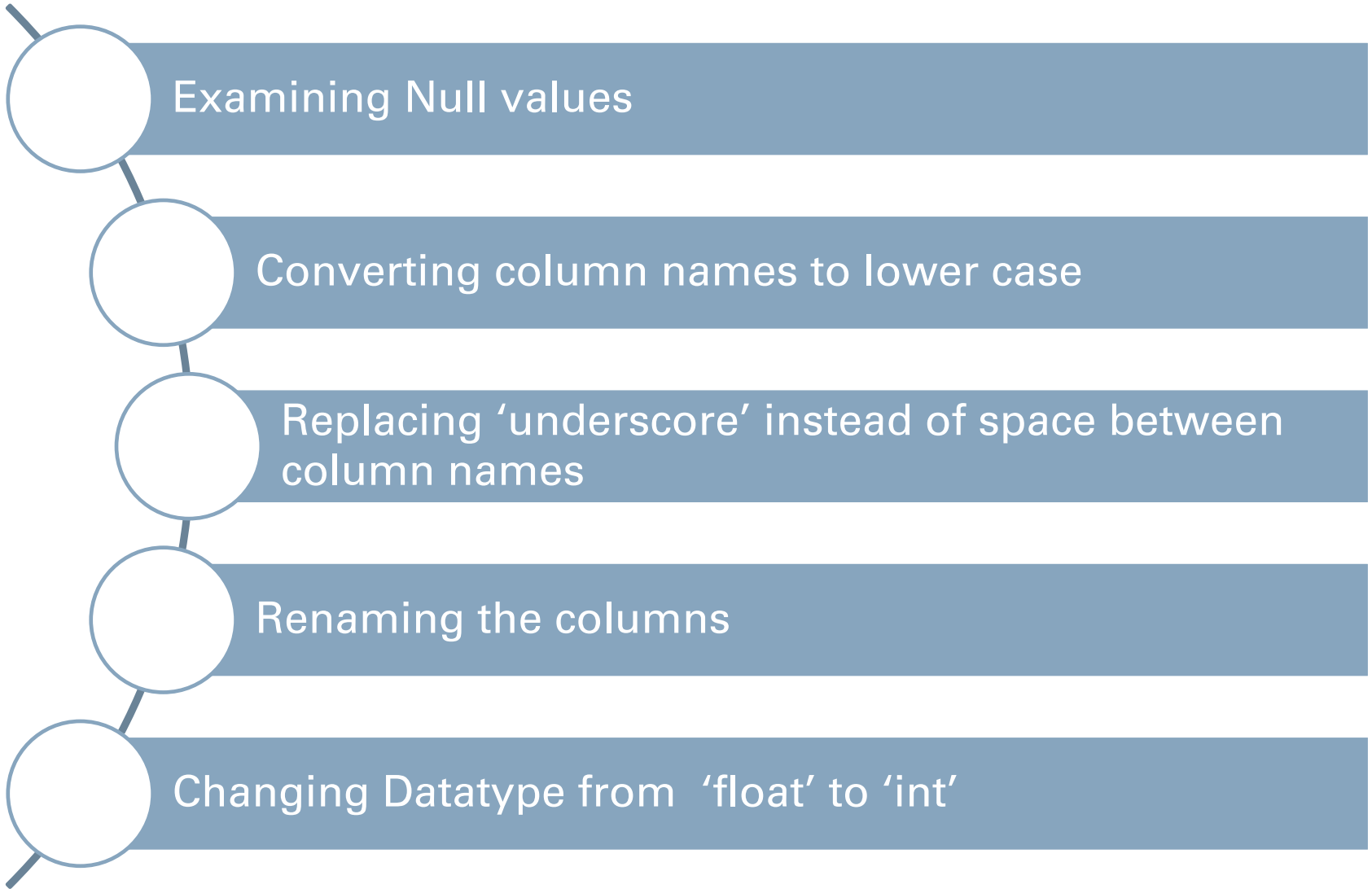
Discrete(15)

Year Built
Full Bath
Half Bath
Fireplaces
Year Sold
Month Sold
Garage Cars
Year Remod/Add
Etc.

Ordinal(23)

Lot Shape
Garage Condition
Overall Quality
Basement Quality
Kitchen Quality
Fireplace Quality
Utilities
Lot Shape
Etc..

Data Cleaning



Feature Engineering

Total Basement Sq ft

1.Bsmt Fin SF 1

2.Bsmt Fin SF 2

3.Bsmt Unf SF

Above ground living area sq ft

1.Low Qual Fin SF

2.1st Flr SF

3.2nd Flr SF

bathrooms

1.Bsmt Full Bath

2.Bsmt Half Bath

3.Full Bath

4.Half Bath

has pool

Pool Qc :

Ex,Gd,TA,Fa=1

NA=0

has fence

Fence :

GdPrv, MnPrv, GdWo, MnWw=1

NA=0

has central air

N =0

Y=1

paved street

gravel = 0

paved = 1

has garage

Fin , RFn , Unf =1

NA=0

Is remodeled

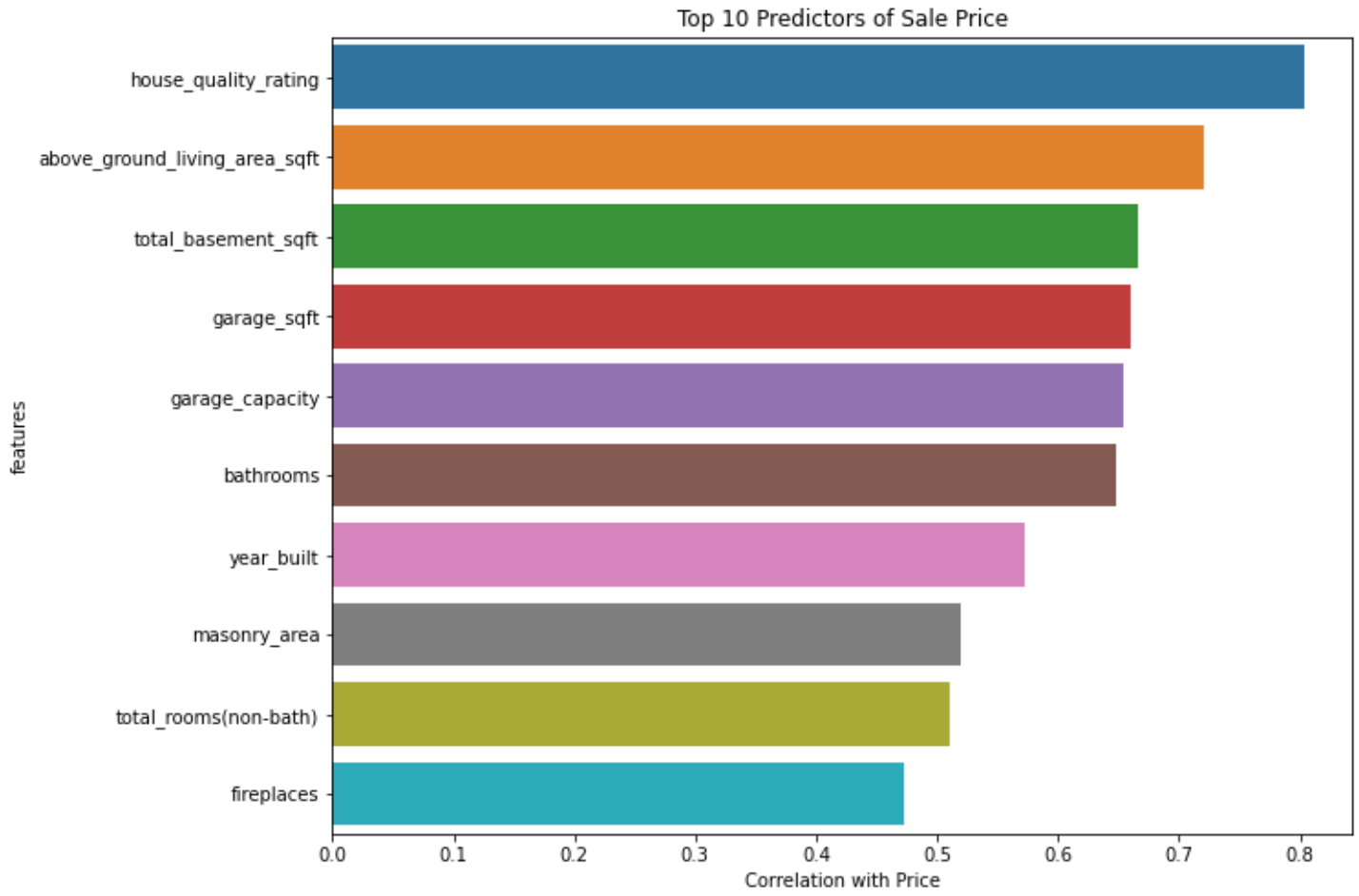
Year remod/add-year built

Correlations with Sale Price :

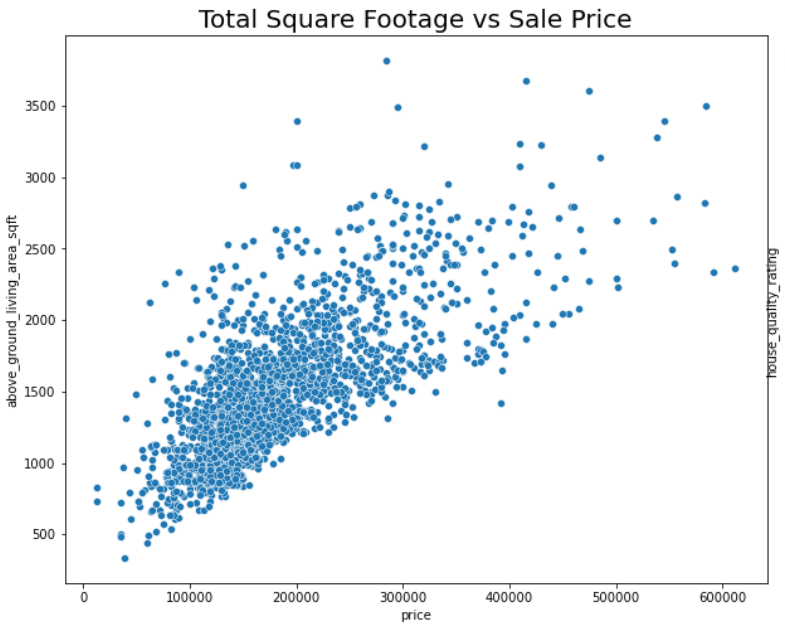
- House Quality Rating
- Above Ground Living Area Sq Ft
- Total Basement Sq Ft
- Garage Sq Ft
- Garage Capacity
- Bathrooms
- Year Built
- Masonry Area
- Total Rooms(Non-bath)
- Fireplaces

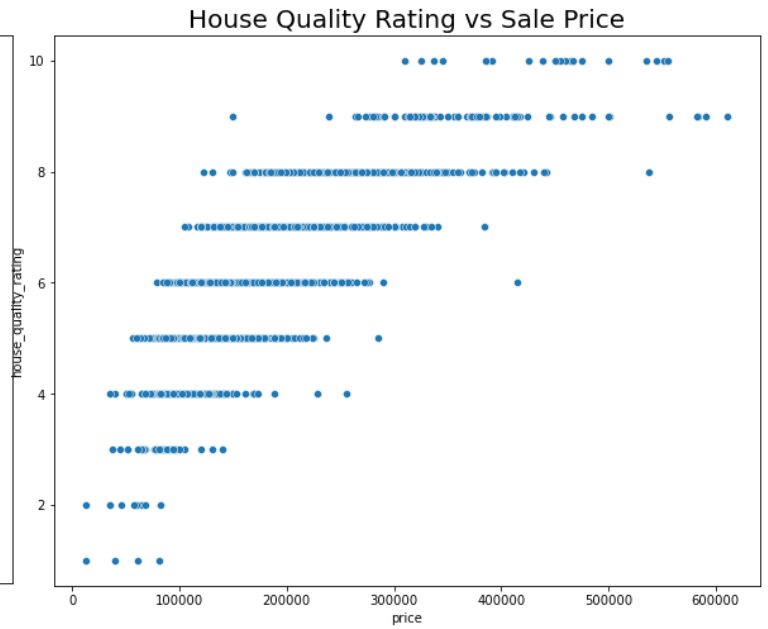
Outliers were removed for :

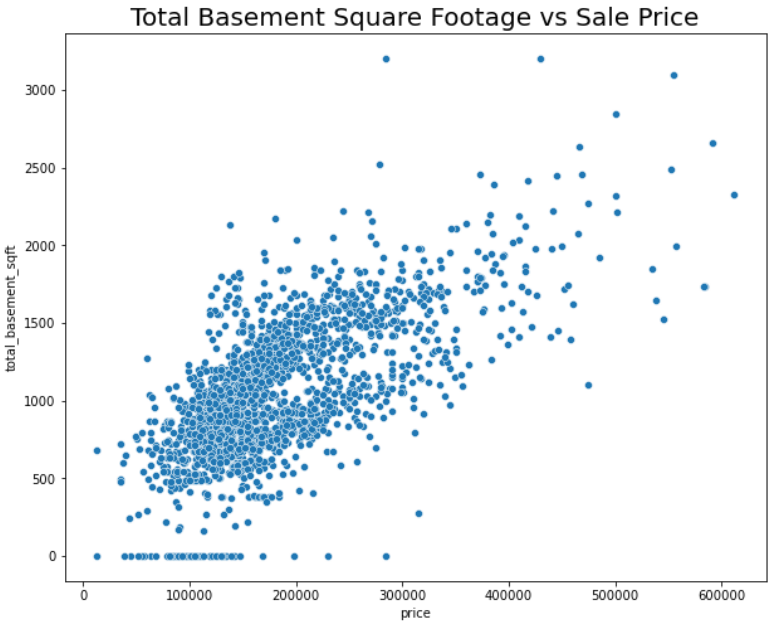
- Total basement sq ft
- Bathrooms
- Masonry area
- Garage capacity



Top Three Correlated Features

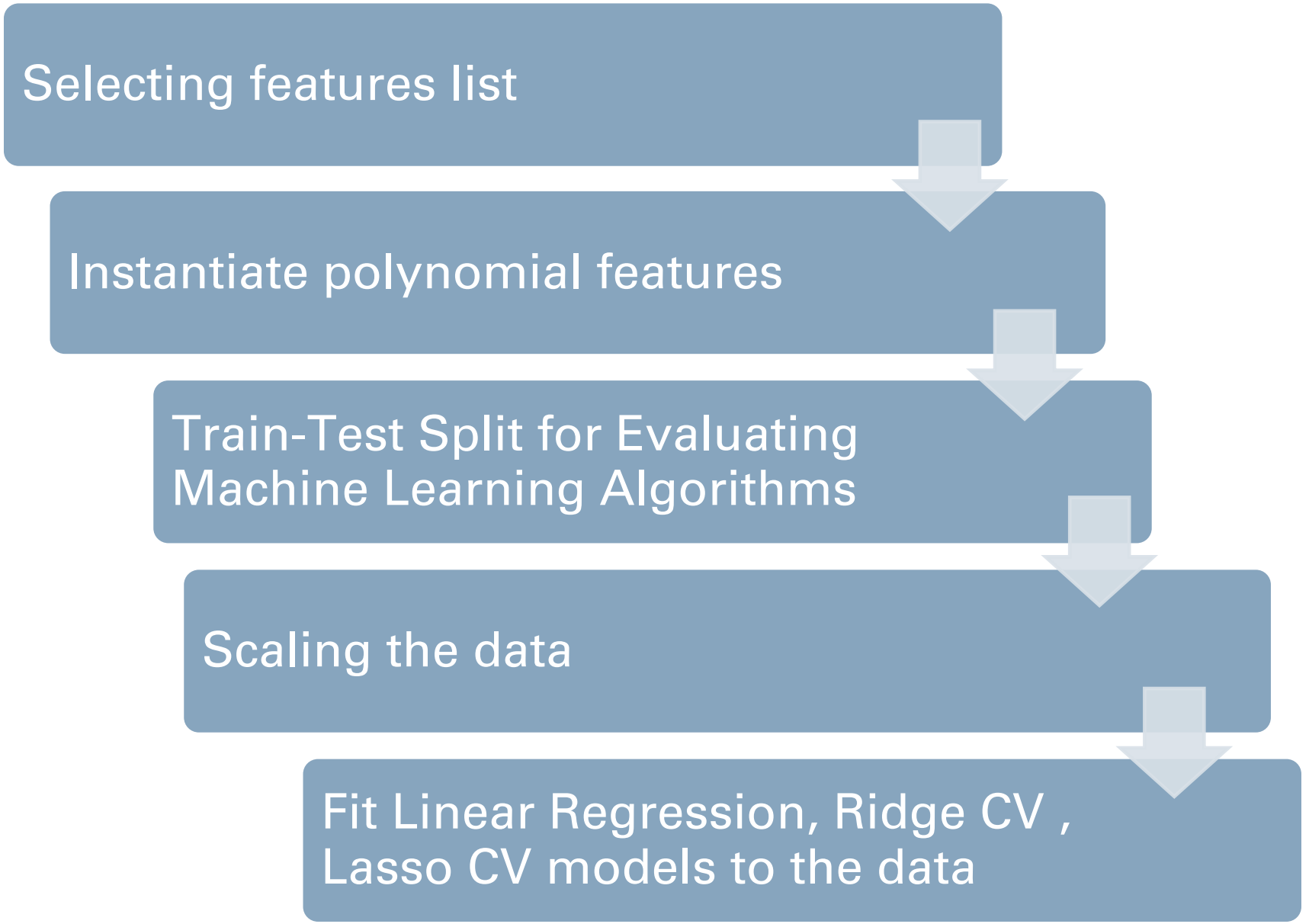






All three features demonstrate a linear relationship with the target variable.

Data Modeling

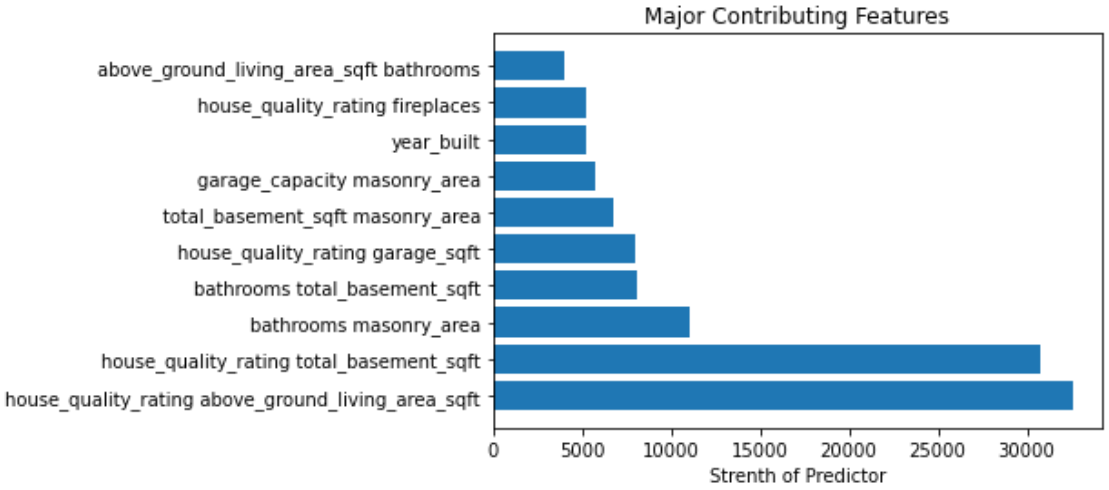


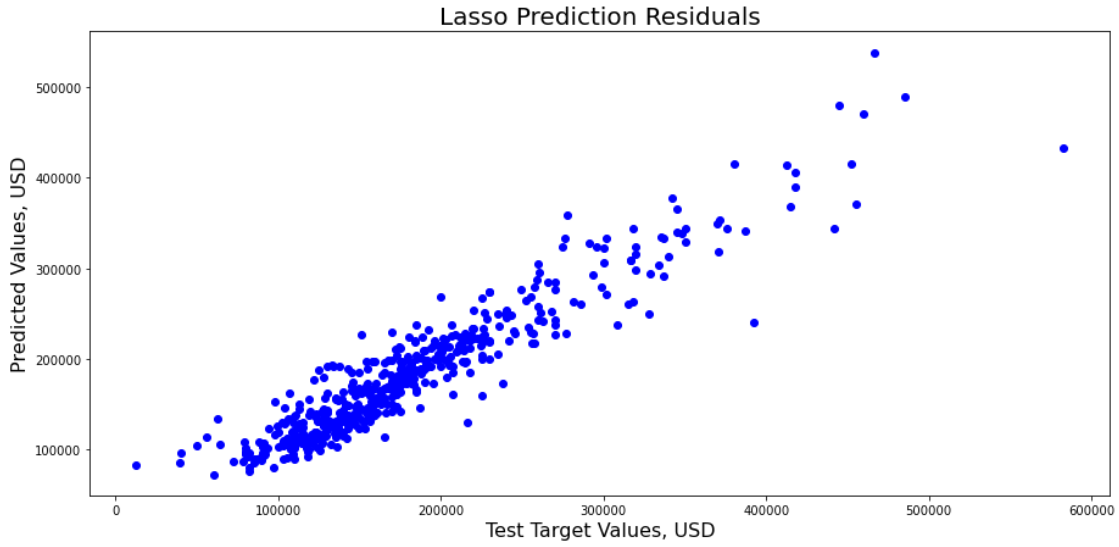
Evaluating the Models

Model	Train Score	Test Score	RMSE
Linear Regression	0.90	0.88	26661
RidgeCV Regression	0.89	0.88	26156
LassoCV Regression	0.89	0.88	26109

Based on RMSE , our fit model is LassoCV.

LassoCV Model Results





Conclusion

Prediction of sale price

RMSE yields an error of ~±$26109

Factors that affect sale price :

- Overall house quality
- Living Area Square footage
- Basement Square Feet
- Garage Square Feet
- Garage Car Capacity
- Number of Fireplaces
- Year Built (The more recent is the house built, the higher is the sale price)
- Total number of bathrooms
- Area of Exterior Masonry

Thank you