

# Ames Housing Analysis & Prediction

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Selling Sunset





# Problem Statement

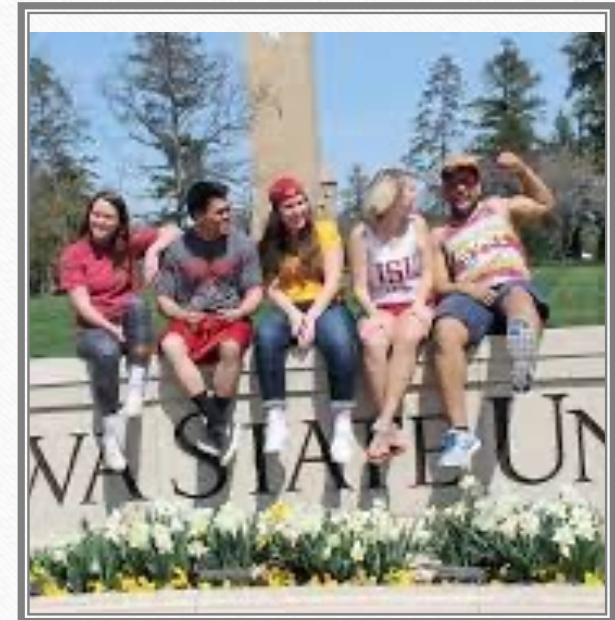
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- Create a model to predict house prices
- Using the model, identify features to increase house prices

# Background on Ames

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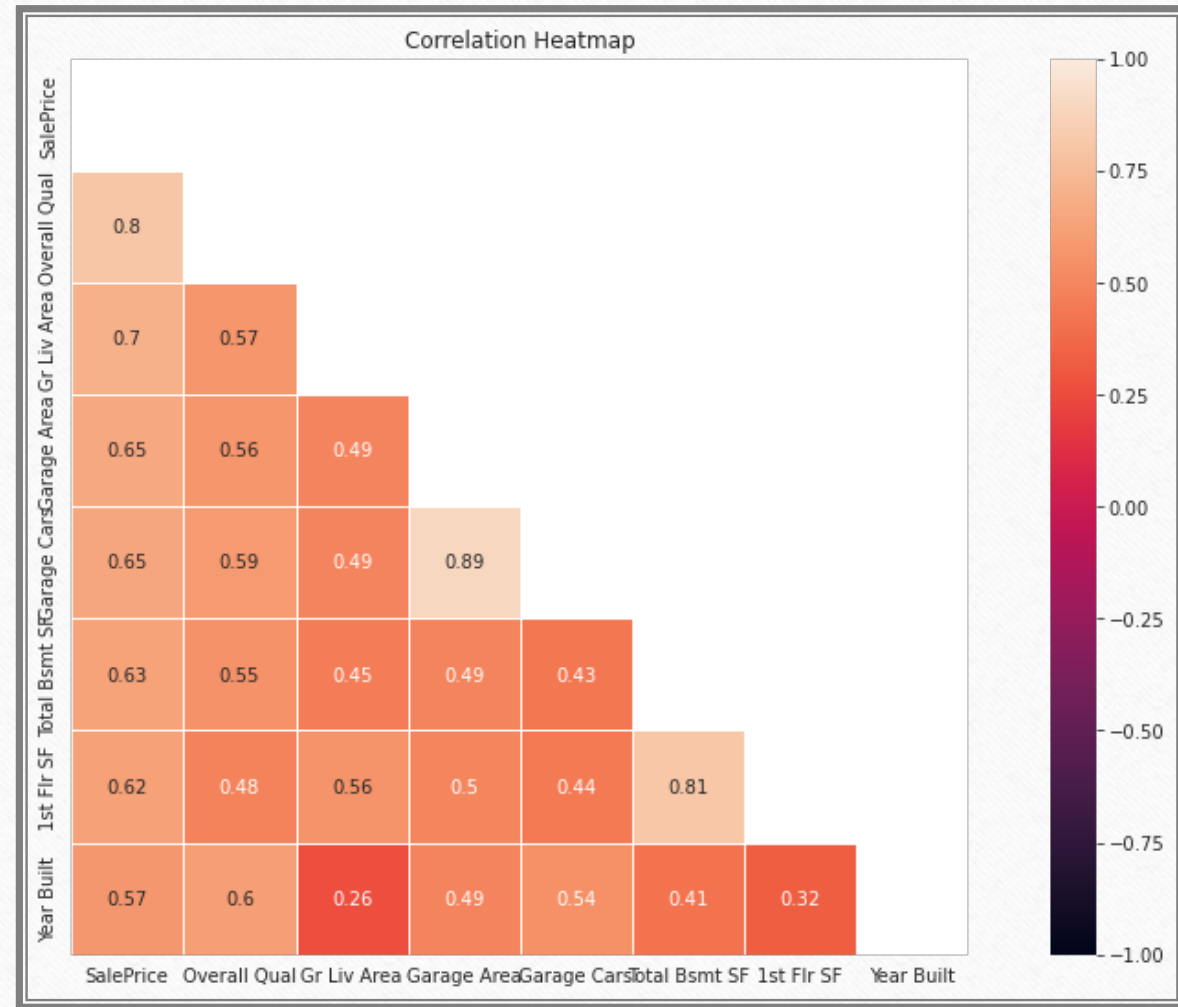
- Ames, Iowa is a Collegetown. Home to Iowa State University (ISU)
- Half the population of Ames are students of Iowa State University.
- Low owner-occupied housing rate





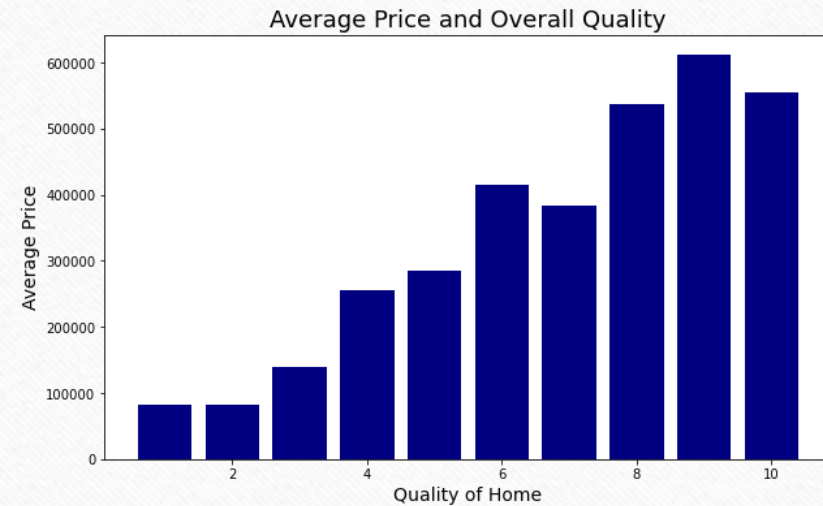
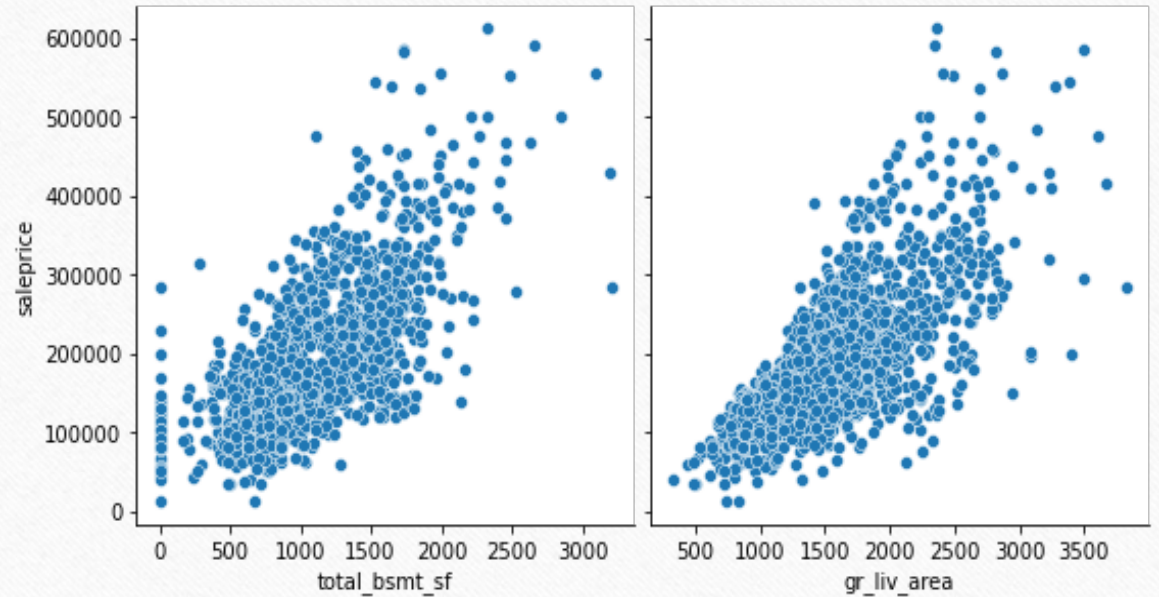
# Exploratory Data Analysis (EDA)

Rank	Variable	Correlation
1	Overall Quality	0.8
2	Exterior Quality	0.71
3	Ground Living Area	0.7
4	Kitchen Quality	0.69
5	Garage Area	0.65
6	Garage Cars	0.65
7	Total Basement SF	0.63
8	1st Flr SF	0.62
9	Basement Quality	0.61
10	Year Built	0.57



## Exploratory Data Analysis (EDA)

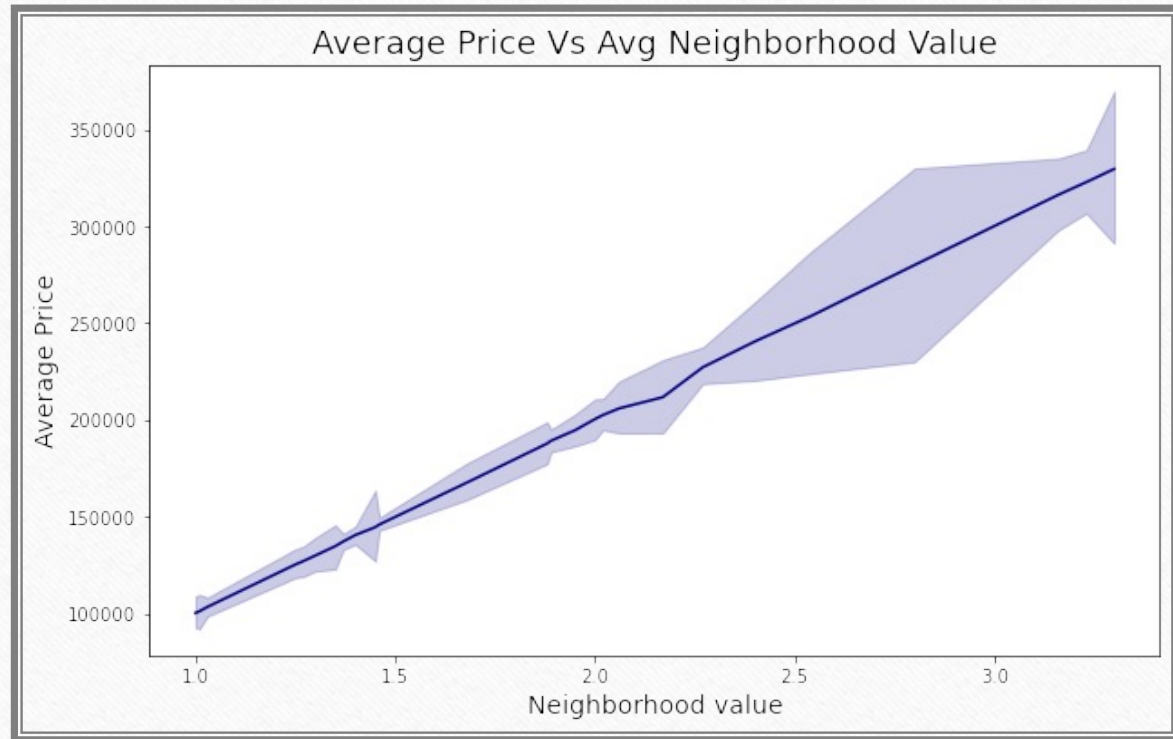
- Size and Quality are the most important features.
- Both have strong correlation to price





## Exploratory Data Analysis (EDA)

- Neighborhood also have a strong correlation to price
- Assigned avg housing prices to each neighborhoods



# Models Used

- 33 features

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- Quality
    - Overall
    - Exterior
    - Kitchen
    - Basement
    - Heating
  - Size
    - Ground Living Area
    - Total Basement SF
    - Garage Area
  - Rooms
    - Total Rooms
    - Total Bathrooms
  - Location
    - Neighborhood
    - Zone Classification
  - Property characteristics
    - Lot Shape
    - Lot Config
    - Building Type
    - Foundation
    - Function
  - Sale Type



# Models Used

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- Lasso and Ridge regularization was utilized.
- Slight curvature
- Polynomial feature was used to further tune the model



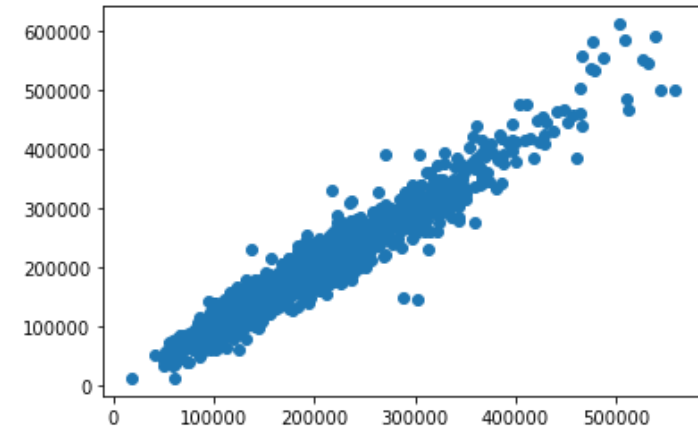
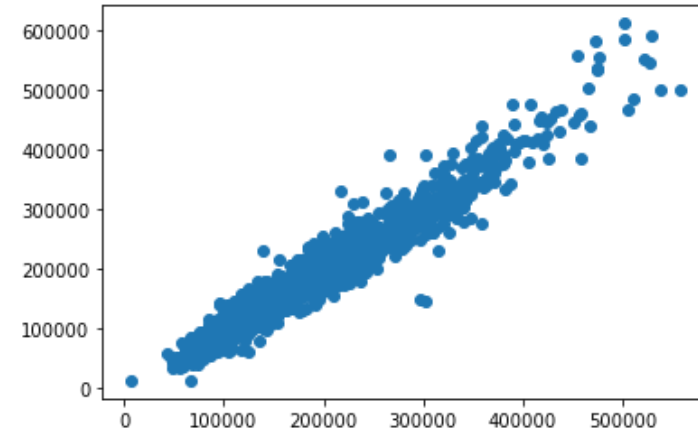
# Final Model Used

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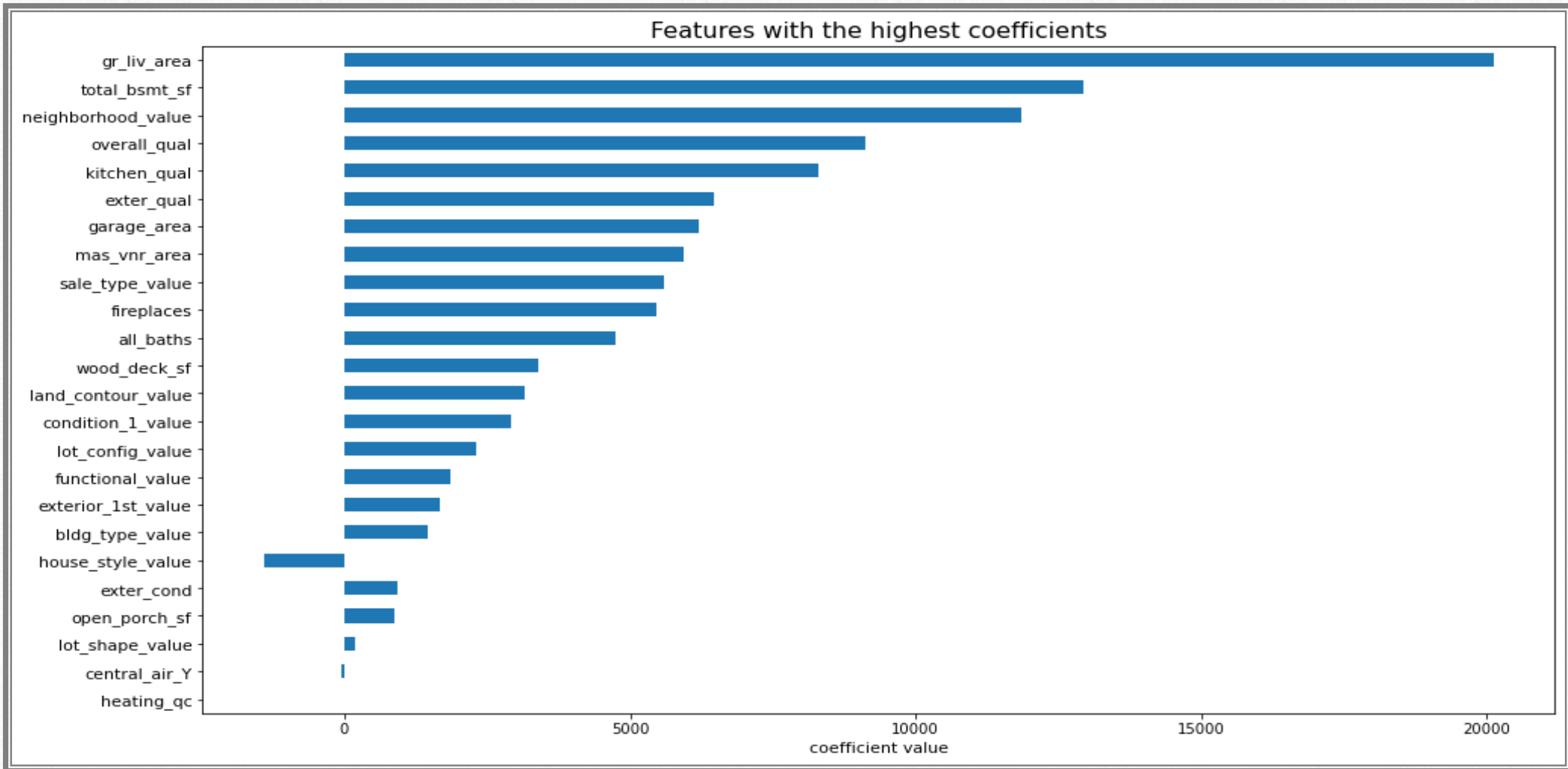
Final Model

Lasso  $\alpha = 71.62$

Ridge  $\alpha = 72.33$



# Top Coefficients





# Tradeoffs

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- Using polynomial features
- Having too many features
  - Run the risk of overfitting
- Group categorical variables by avg price

# Future areas of investigation

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- Sales data was provided between 2006 - 2010.
- Inflation data can be incorporated to future models.
- Apply model to other similar cities.