Predicting home prices with linear, lasso, ridge and random forest regression

Client summary

A first capstone project for
Springboard's data science bootcamp

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Problem

What's the home going go sell for?

And why?

Data

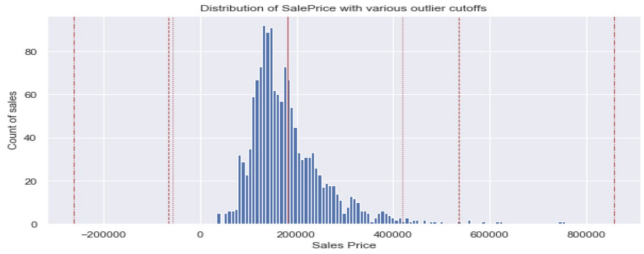
kaggle

“Ames Housing Data”

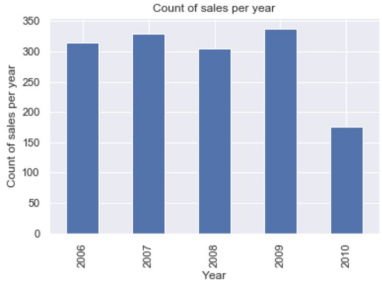
- Sales price of 700 homes
- About 80 features describing each home
- From one US city
- 30 miles north of Des Moines

Sales price

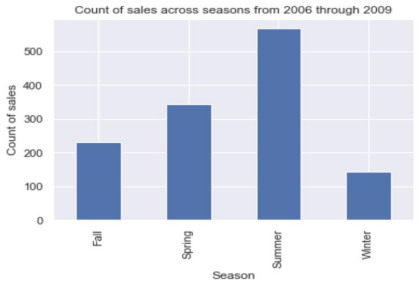
- $160,000 median
- Outliers

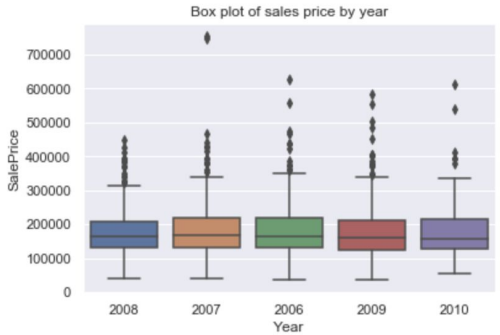


- 300 sales/year
- 25 sales/month



- Seasonal
- Prices flat





Home features

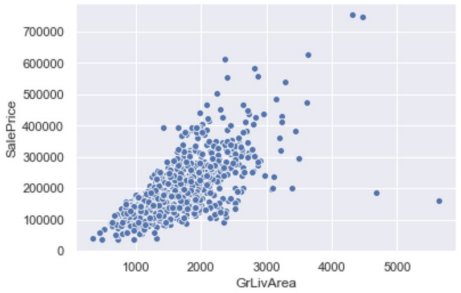
Of 54 non-categorical

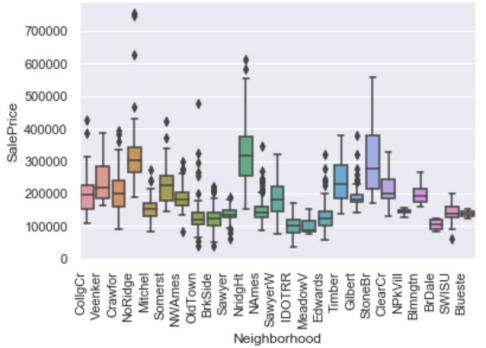
- 24 with Pearson's r > 30%
- 10 with cross correlation < 50%

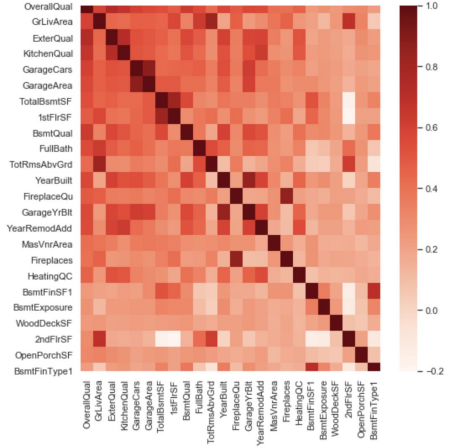
Of 25 categorical

- 2 with Pearson's r > 30%

Selected 12







Models

Build, tune and compare

Linear - baseline				
~~Linear - baseline~~	v.	Linear - normalized		
Linear - normalized	v.	~~Lasso~~		
Linear - normalized	v.	~~Ridge~~		
		Random forest - baseline - all		
		~~Random forest - baseline - all~~	v.	Random forest - tuned - all
		Random forest - tuned - all		~~Random forest - tuned - high~~
		Random forest - tuned - all		~~Random forest - tuned - high+med~~
		~~Random forest - tuned - all~~		Random forest - tuned - high+med+low
Linear - normalized	v.			~~Random forest - tuned - high+med+low~~

Best performance

Linear - normalized

- RMSE: .15
- MAE: .11
- R2: .86

Recommendations

Launch

- Minimum viable product around
- Predicted price
- Prediction interval
- For a specific property in Ames, Iowa and
- For all properties in Ames, Iowa.

Improve

- Data
  - Location
  - Time
  - Features
- Model
  - Regression
  - Other models