Project 2: Ames Housing

Problem Statement

A real estate company is looking to sell their properties in the Ames, Iowa area and make a return on their investment. Hence, they are keen to know the valuation of their properties. They are also keen to know which housing features can contribute the most to the valuation, so that they can upgrade properties with a low ROI (Return on Investment) and appreciate its value.

Objective

This project aims to assist the college board on their strategy to increase student

participation and increase their number of students being accepted to college.

Methodology

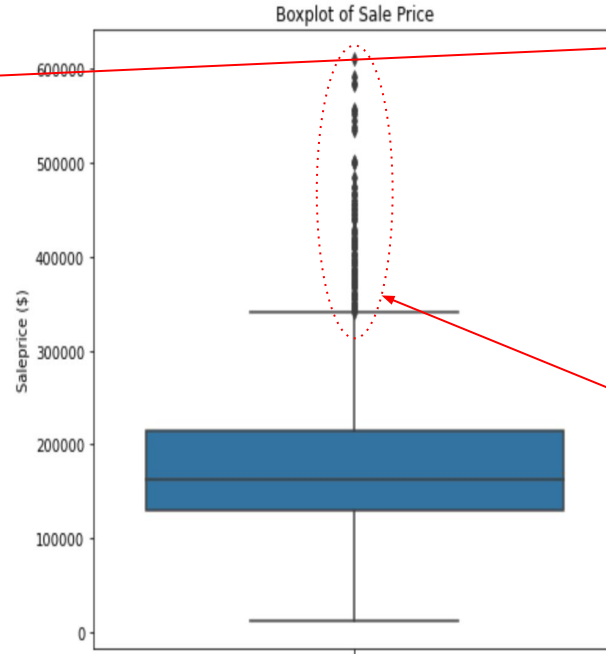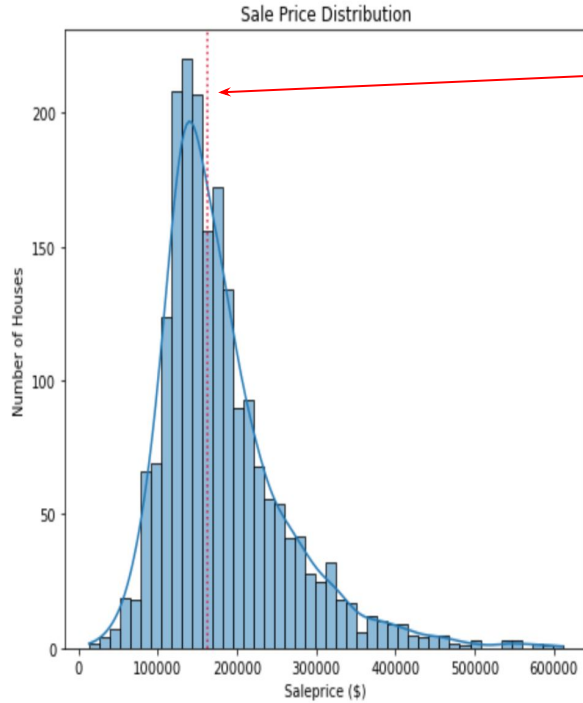|	
EDA & Clean Data	- Preparation for analysis - Find trends and patterns within dataset
Preprocessing & Feature Selection	- Prepare data for further analysis - Reduce the number of input variables
Model Benchmark & Tuning	- Evaluate & compare models - Increase model accuracy by tuning hyperparameter
Recommendations	Recommend insights on predictions to client

House Sale Prices in Ames (2006-2010)
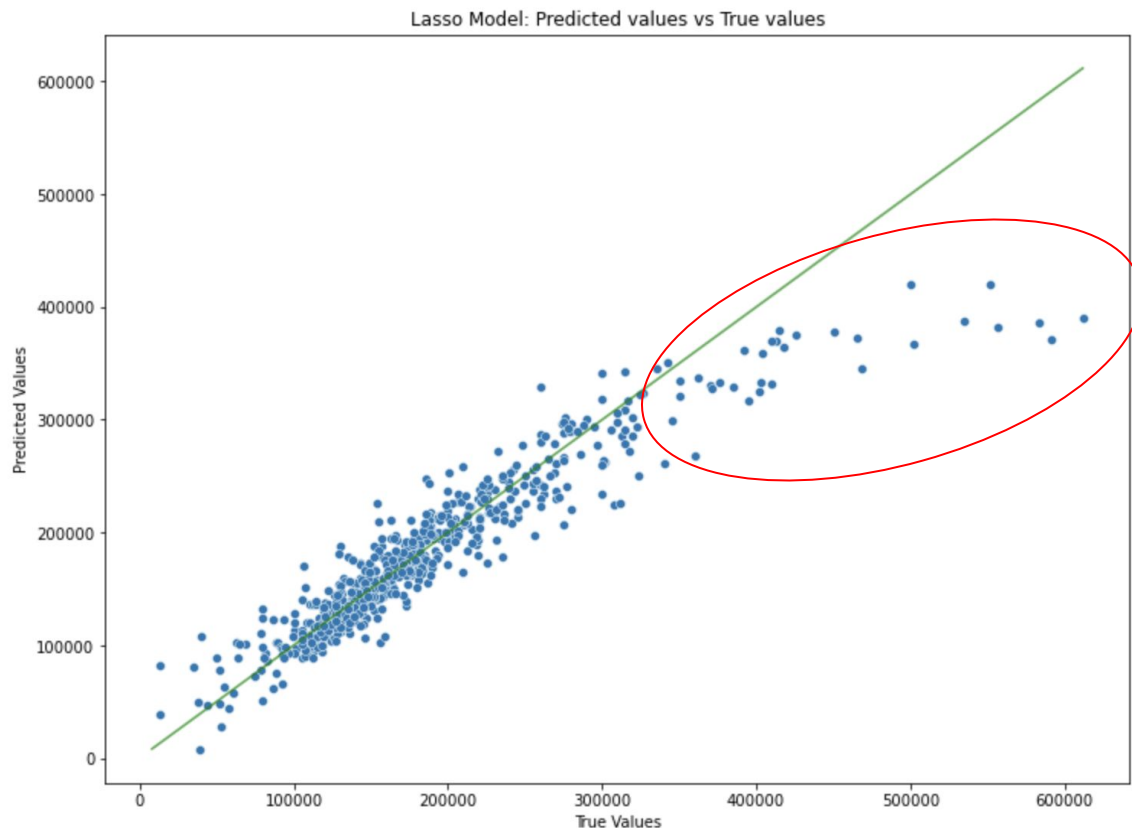

Sale Price Distribution

Boxplot of Sale Price

- Median Price = $162,500

- Right-Skewed

- 61 Outliers

Estimate of Model Performance

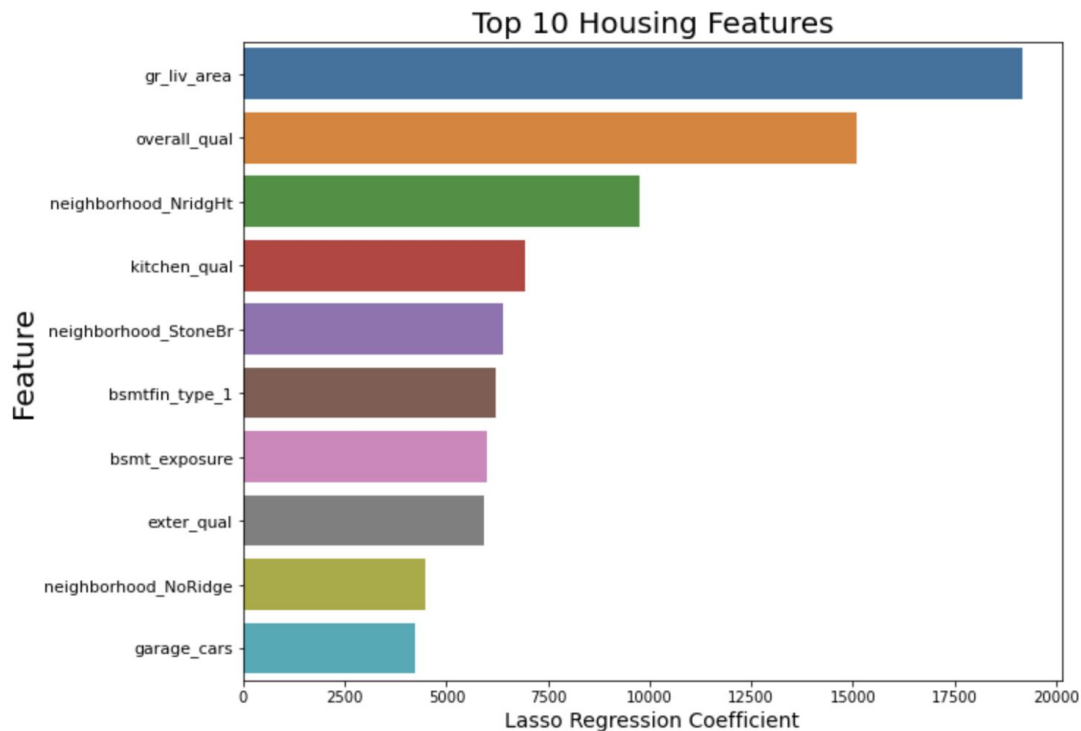| Model	Hyperparams	Num Features	CV RMSE	Train RMSE	Holdout RMSE
Linear Regression (1 Feature)	-	1	56568	56210	58465
Linear Regression (All Features)	-	199	37304	24079	30629
Ridge	Alpha=327	199	31256	26526	30604
Lasso	Alpha=893	66	31810	27160	30842
ElasticNet	Alpha=0.64 ratio=0.5	77	30729	27766	28643

Production Model

Lasso Model: Predicted values vs True values

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- ACT participation rates in some states are close to 100%, while SAT participation rates is some states are close to 0%

What are the Top 10 features contributing to Sale Price?

Top 10 Housing Features

feature	coef
gr_liv_area	20639.196034
overall_qual	14693.848184
neighborhood_NridgHt	9684.745155
kitchen_qual	7700.046379
garage_cars	6881.356825
bsmtfin_type_1	6567.432183
bsmt_exposure	6565.684327
neighborhood_NoRidge	5448.917720
neighborhood_StoneBr	4985.980773
exter_qual	4746.722989

Recommendation

- Focus on making home improvements in the kitchen and exterior, get an assessor to grade the quality
- If Planning to increase the ground living area, build a bigger garage as this would bring the most value
- Include a fireplace and ensure that the heating around the house is of good quality
- Consider changing the roof style to be hip