

An aerial photograph of a suburban neighborhood, likely in Austin, Texas. The image shows a dense collection of houses with dark brown tiled roofs and light-colored walls. There are many palm trees and other green plants scattered throughout the neighborhood. The houses are arranged in a grid-like pattern, with streets visible between them. The overall scene is bright and sunny, suggesting a clear day.

Austin Housing Price Regression

Oscar Ko

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The Data

- 15.2 thousand house records from Zillow home listings
- 47 features including:
 - Tax rates, garage spaces, cooling, heating
 - appliances, lot size, living area size
 - number of schools, bathrooms, bedrooms, and stories
- Dataset found on Kaggle
 - <https://www.kaggle.com/datasets/ericpierce/austinhousingprices>



The Goal

- Creating regression models
 - Selecting the best one for predicting housing prices in Austin, Texas



Conclusions: Best Model

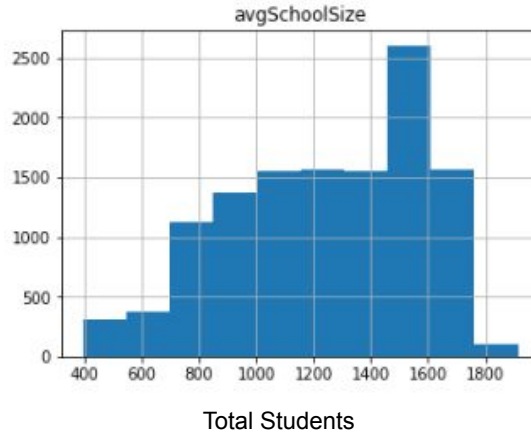
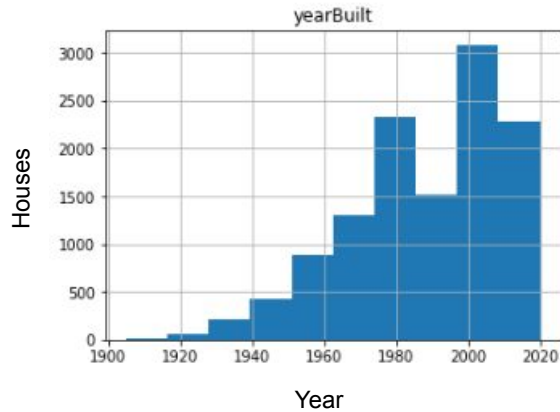
- Linear Regression
 - 31 Features that remained after Backwards Elimination
 - Train set R-squared = 0.46
 - Test set R-squared = 0.43



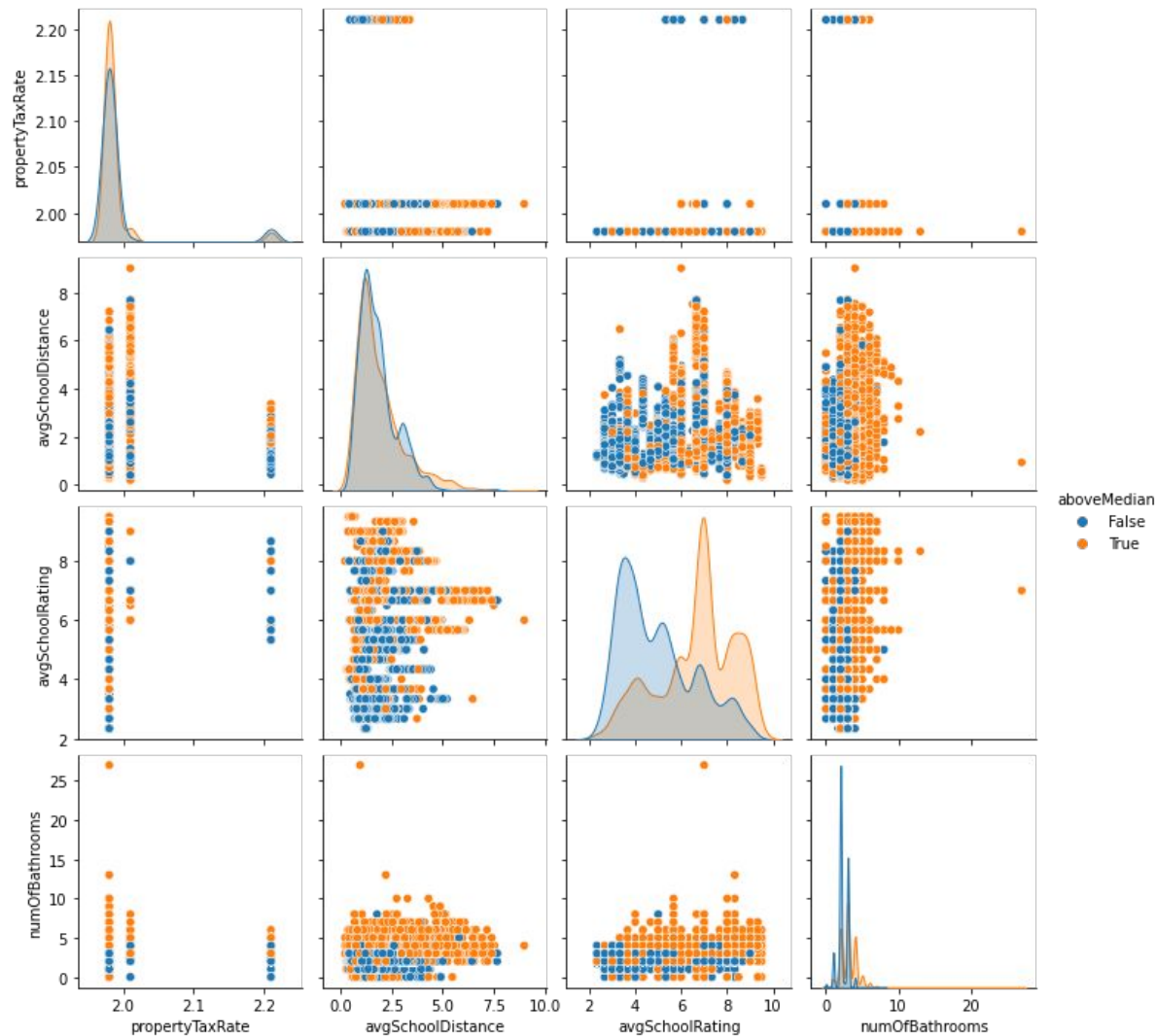
Conclusions: Other Models

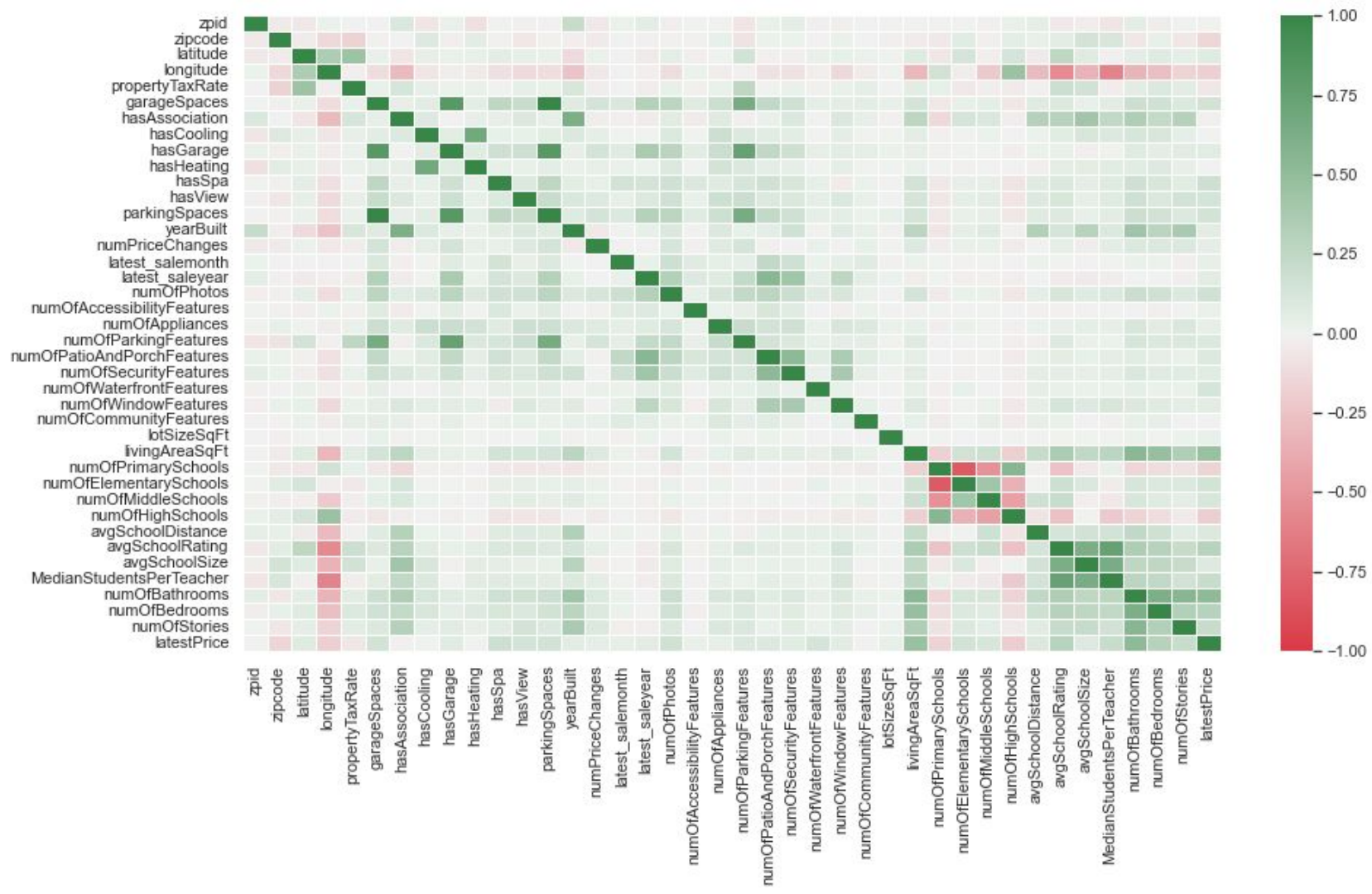
- What improved prediction
 - **Backwards elimination**
 - Reduced the number of features, and the R-squared remained the same.
- What didn't improve prediction
 - **Dimensionality Reduction (PCA)**
 - The dimensionality reduction worked, but the model's predictive power decreased:
 - (Without PCA) Train set R-squared = 0.46
 - (With PCA) Train set R-squared = 0.39
 - **Ridge** optimized with GridSearchCV
 - Train set R-squared = 0.41
 - **Lasso** optimized with GridSearchCV
 - Train set R-squared = 0.24

Other Findings: YearBuilt, SchoolSize, Bedrooms



Other Findings: SchoolRatings & Bathrooms





Other Findings: Two Best Predictors

- Lasso
 - Just two features helped explain about 24% of the variability in the test set's housing prices
 - Living Area Square Feet
 - Number of Bathrooms



Other Findings: Two Best Predictors

- The best Linear Regression model (31 Features)
 - livingAreaSqFt coefficient = \$106,300
 - numOfBathrooms coefficient = \$224,300
 - For every 1 unit increase for each feature, the house's price will increase by the coefficient.
 - The features are standardized, a shift of 1 standard deviation to the right of the distribution.

