



The Secret Price of Home Garages

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Problem Statement

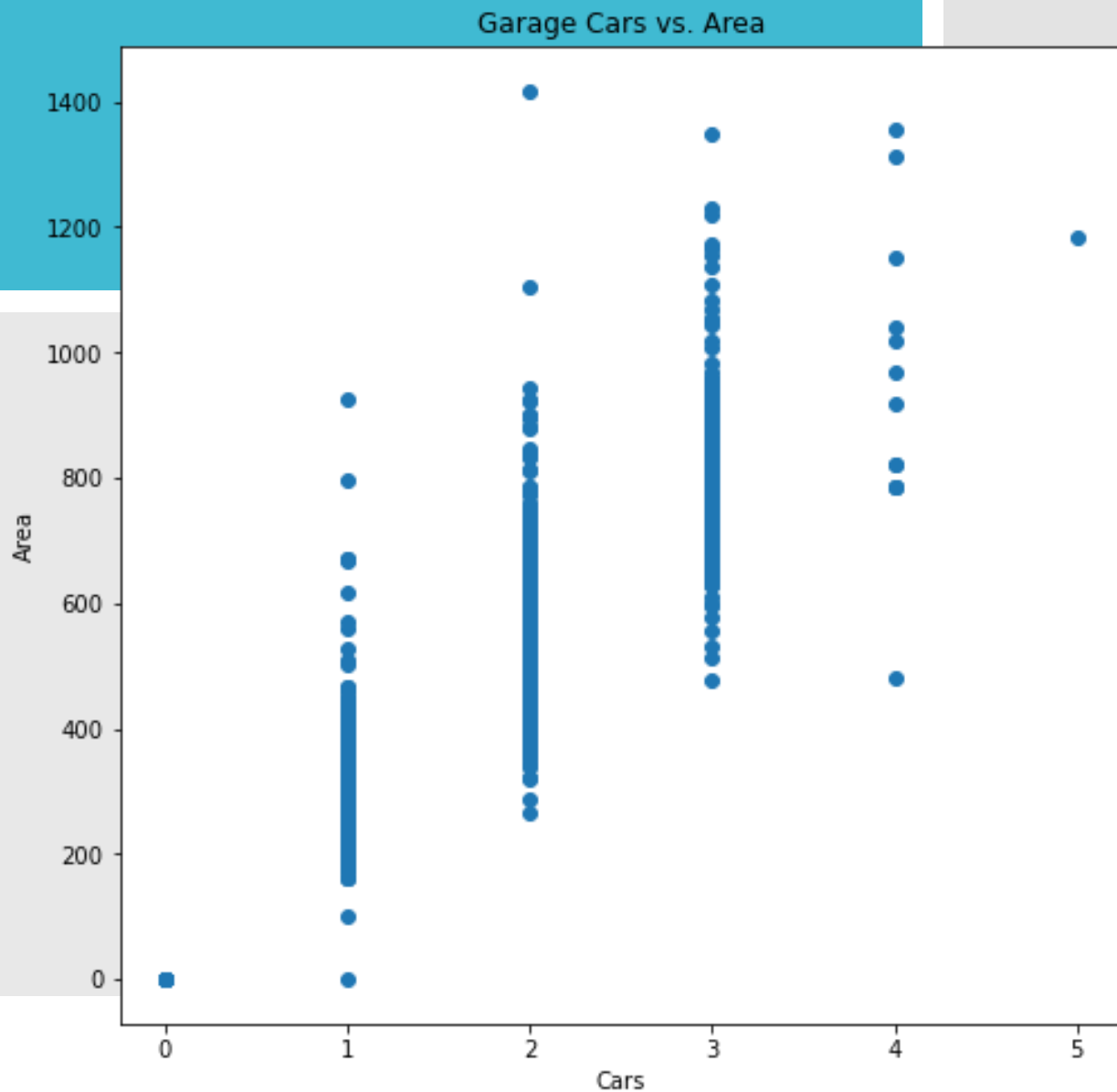
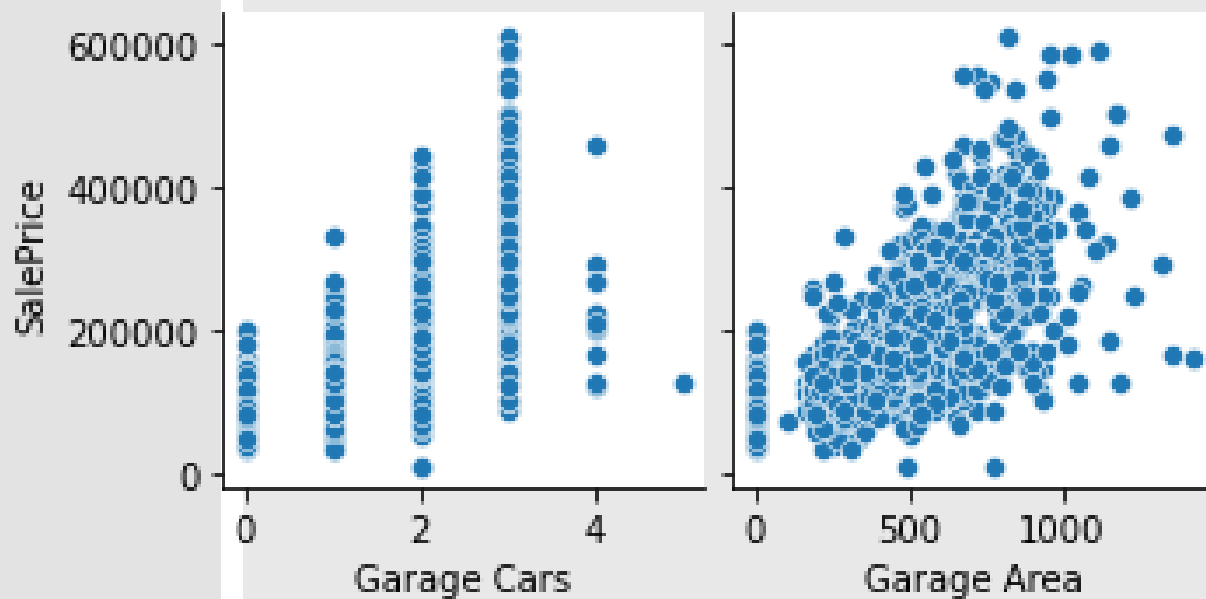
If you own a car and you're looking for a house, you probably want a garage to come with the house. But does the garage alone mean the house is too expensive?

This project aims to not only determine how different garage attributes affect the price of a house, but also how those three factors compare to non-garage statistics in doing so. The answer will come out through fitting a linear model on both garage-focused and other attributes to predict price.

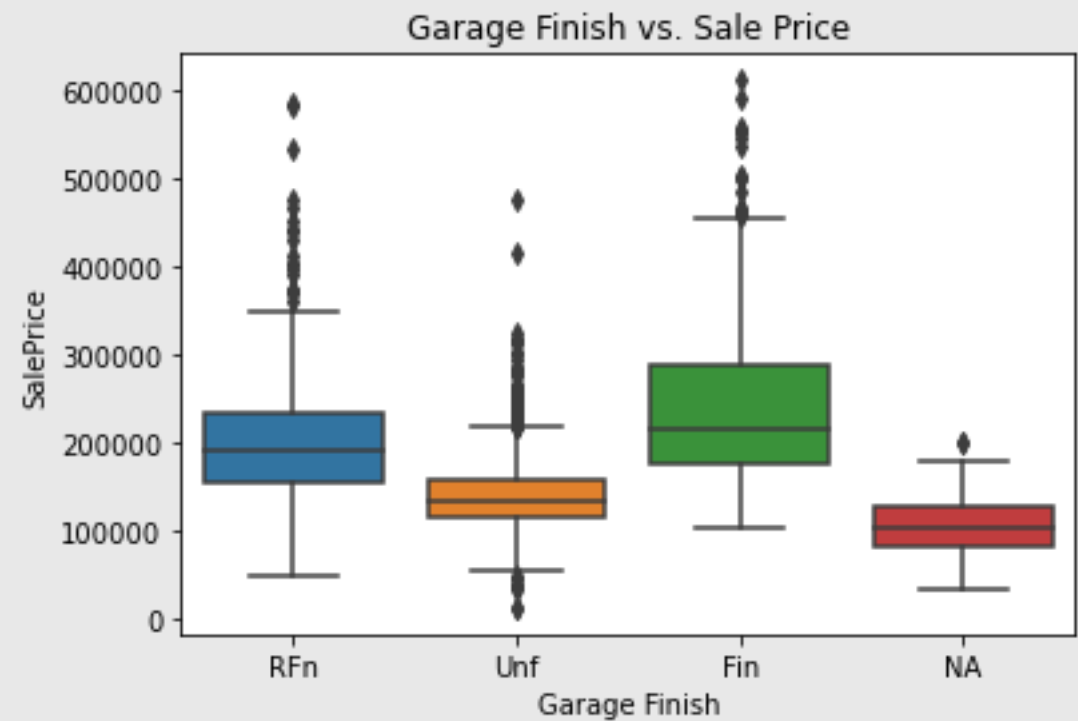
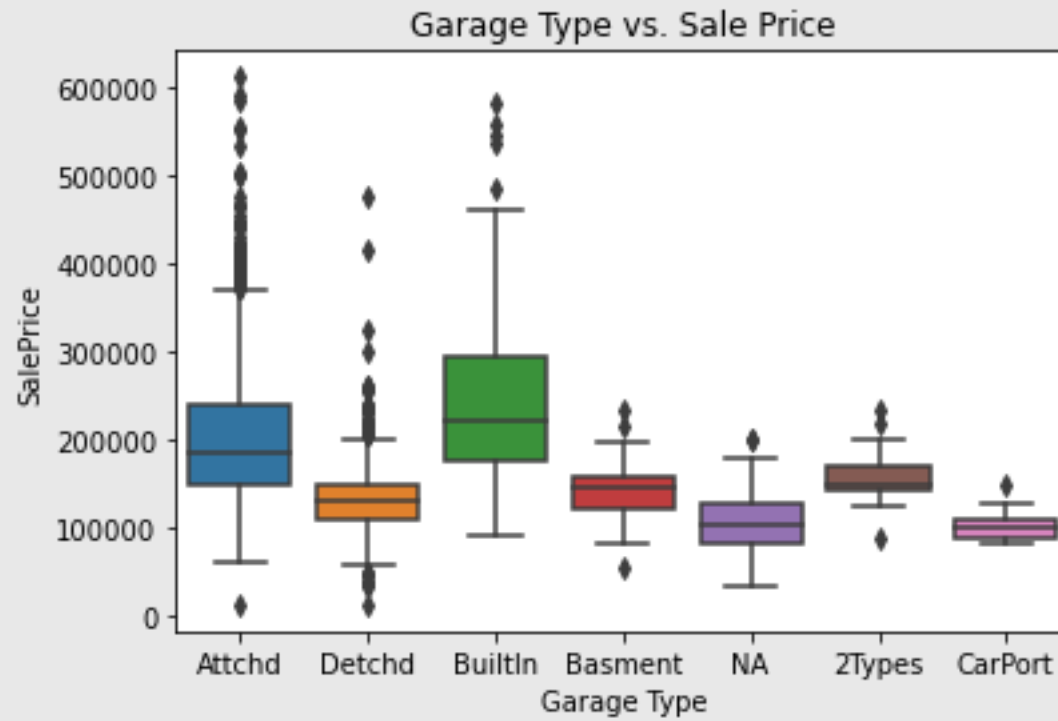
Garage attributes that could predict house price

- Type
- ~~Year built~~ Not enough data to make a conclusion!
- Interior finish completion
- Number of cars that could fit
- Area
- Quality
- Condition

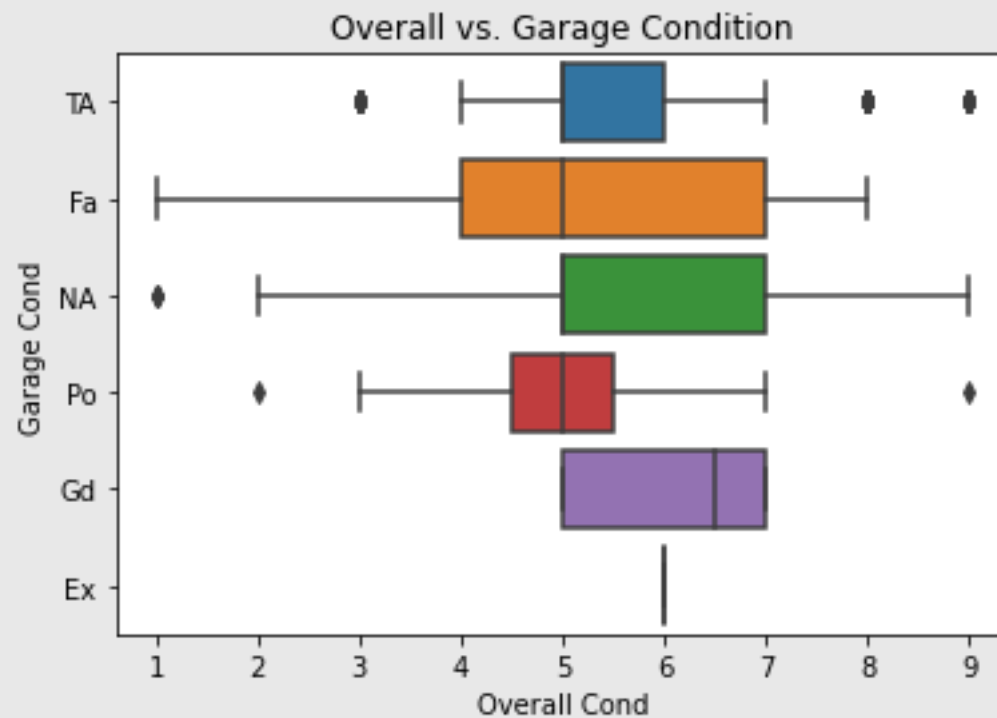
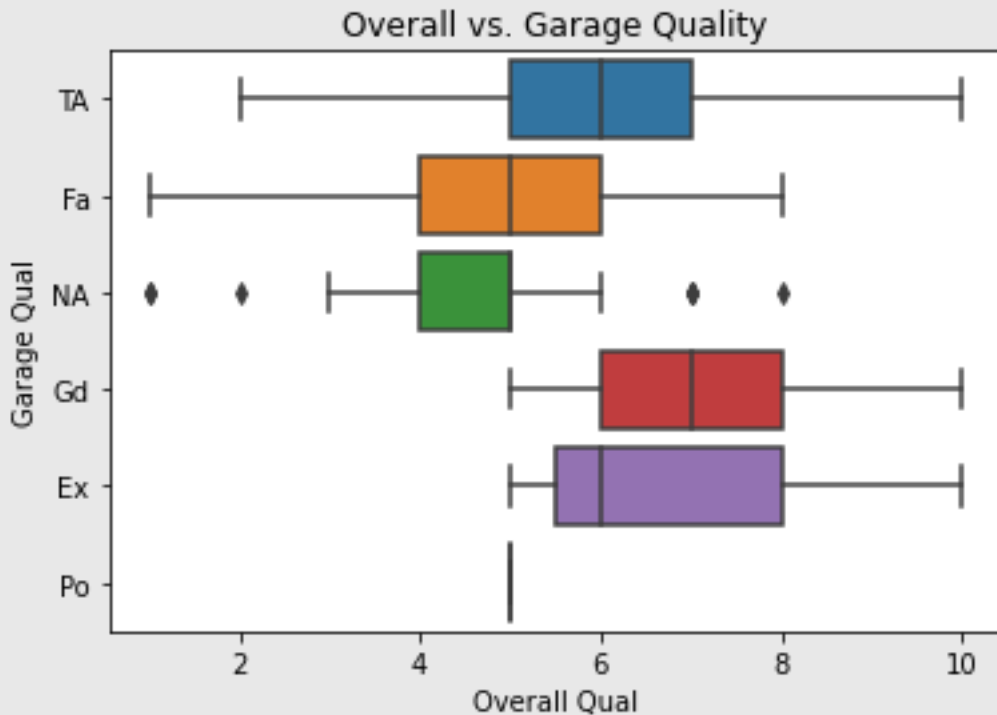
Correlation graphs 1



Correlation graphs 2



Correlation graphs 3



Regression Modeling

- I eventually chose 12 price predictors, 3 of which were garage-related: number of cars, garage finish, and whether the garage was directly connected to the house. This last was encoded from garage type.
- I fitted my data with sklearn's default linear regression model. Ridge and LASSO had the same R^2 and slightly higher RMSE.
- The R^2 scores on the training and test data (split from Kaggle's training data) were 0.796 and 0.838 respectively, indicating low bias and low variance.
- The RMSE's on the aforementioned training and test data were 35865 and 31509 respectively, around half the baseline RMSE of 79239.

Model Coefficients

| Predictor | Effect on Price |
|---|-----------------|
| Garage Cars | 8630 |
| Attached Garage | 1070 |
| Garage Finish | 2492 |
| Overall Quality | 24817 |
| Overall Condition | 6310 |
| Year Built | 11060 |
| Total Basement Area | 10637 |
| Residential Status of House | -915 |
| Expensive Neighborhood | 13204 |
| Proximity to Positive Off-Site Features | 4068 |
| Above Ground Living Area | 23440 |
| Wood Roof | 1239 |

Conclusion

- The three garage categories which you should focus on while trying to figure out the price of the house you want are **the number of cars, the state of the interior finish, and whether the garage is connected to the house or not**, in that order.
- Easily the most impactful of the three is the number of cars, likely because higher area in general greatly increases price.
- Future research would need to include garage-specific statistics that could greatly affect price and are more than likely **not** correlated with the rest of the home. These include the date the garage was built and (for garages not built into the home) what the roofing material of the garage is.