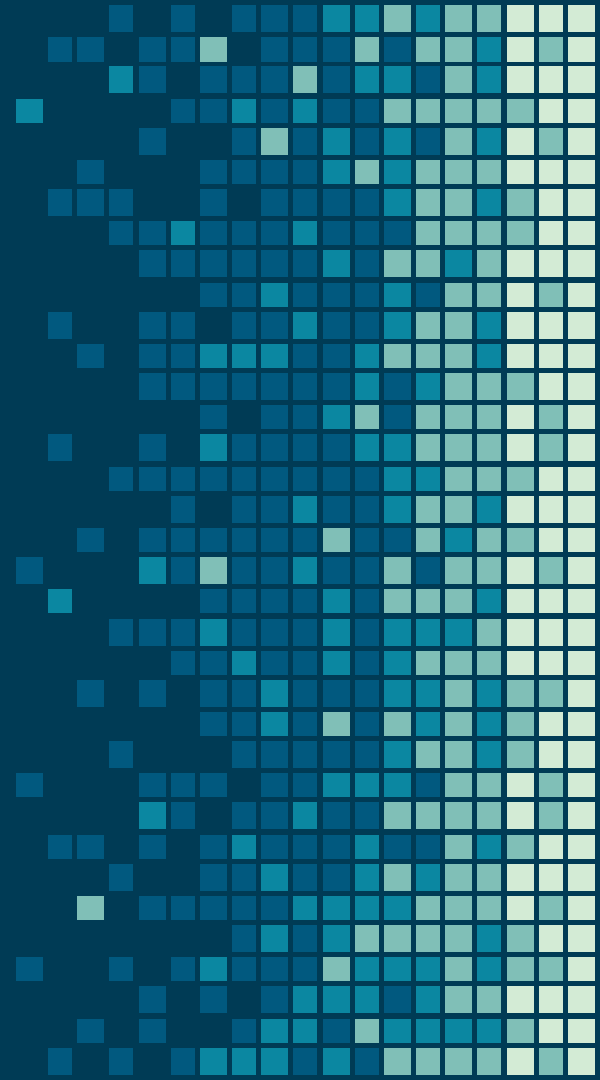# House Improvement Spending Prediction

By Old Iron Squad

Data Creation

Abbreviation	Description	Abbreviation	Description
Interest	interest rate	Oil	oil price
HPI	monthly house price	CPIHOSNS	consumer price index for all urban consumers
Unemployment	unemployment	Mortgage	30-year fixed mortgage rate
Pop	Population (million)	Oak	oak price
RTFS	Retail Trade and Food Services	MSACSR	monthly supply of houses
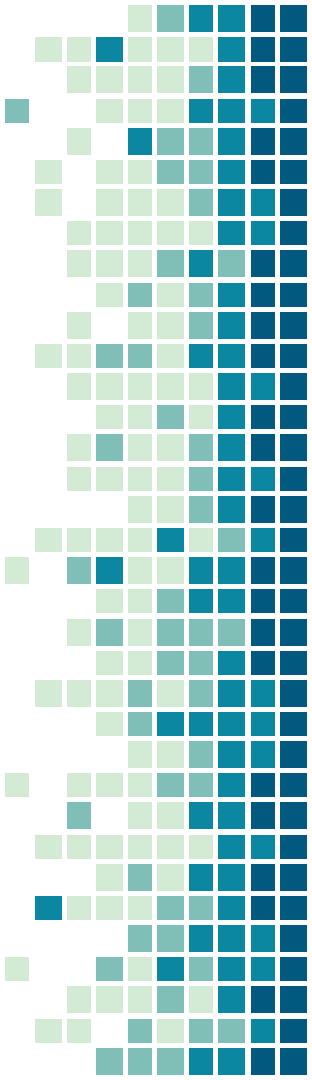
Continued

| Abbreviation	Description	Abbreviation	Description
Sales(target)	Sales in $MM	PSR	Personal saving rate
AR	Annual Rate for New Single-family Houses Sold	Steel	Price of steel bar
REALLN	Real Estate Loans of all Commercial Banks	Mortgage	30-year fixed mortgage rate
sp_500	S&P 500 index	median_income	Household median income
CCI	Consumer Confidence Index	NSFHUC	Price Indexes of New Single-Family Houses Under Construction
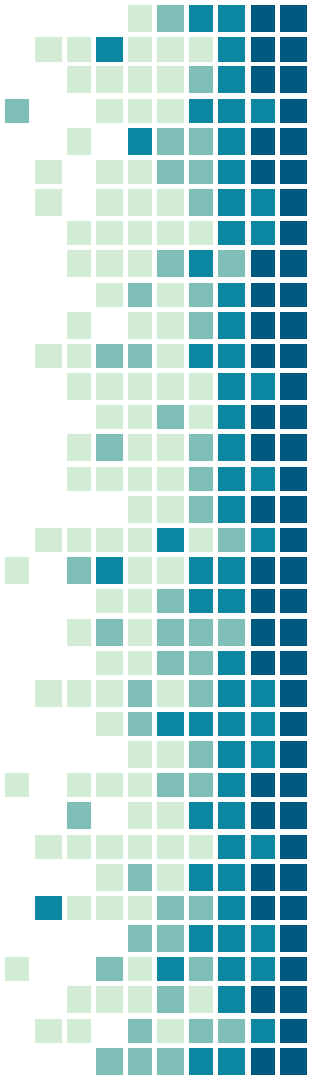
Continued

| Abbreviation	Description	Abbreviation	Description
PLA	plastic material and resins manufacturing price	CCMS	CONVENTIONAL CONFORMING
NASDAQ	NASDAQ index	Steel	Price of steel bar
GDP	GDP by Billions (Quaterly)	CSUSHPINSA	S&P/Case-Shiller U.S. National Home Price Index
Sales(target)	Sales in $MM		

Scatter Plot (Variables v.s Date)
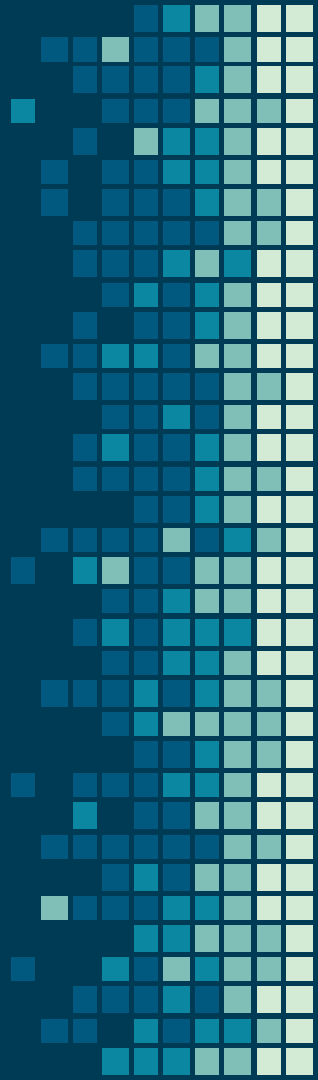
Looking at this graph, we can see that

- RTFS
- HPI
- CSUSHPINSA
- CCMS

have similar trends as Sales over time. So these might be the most important variables we want to fit in our model.
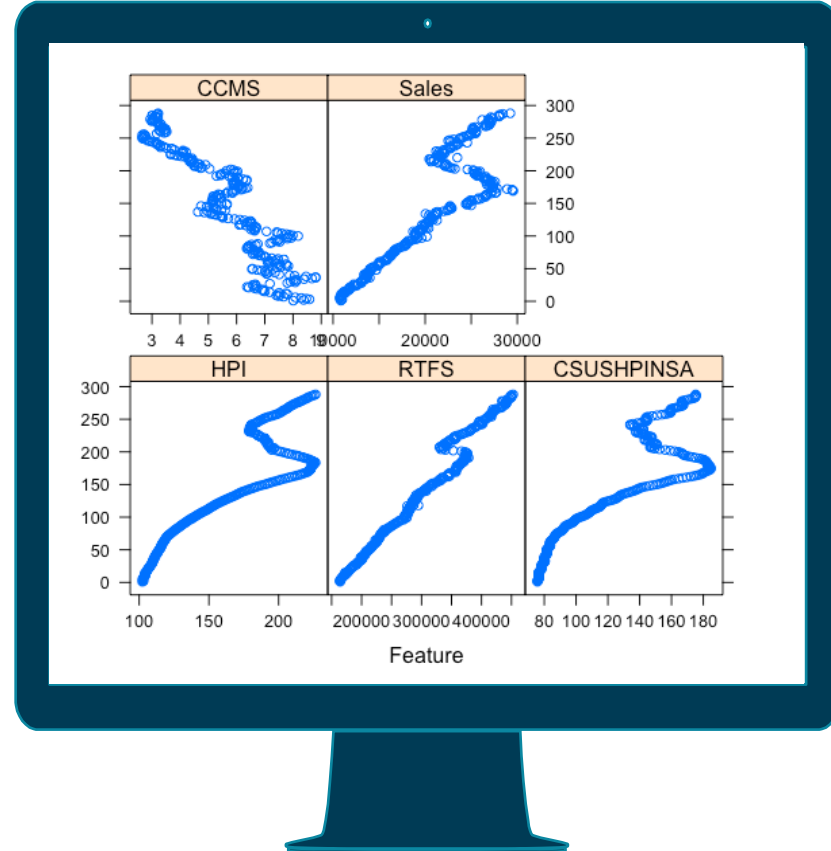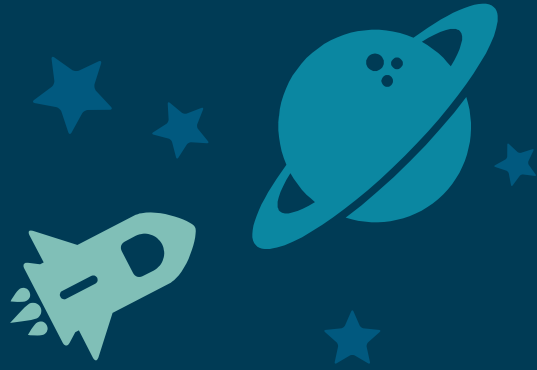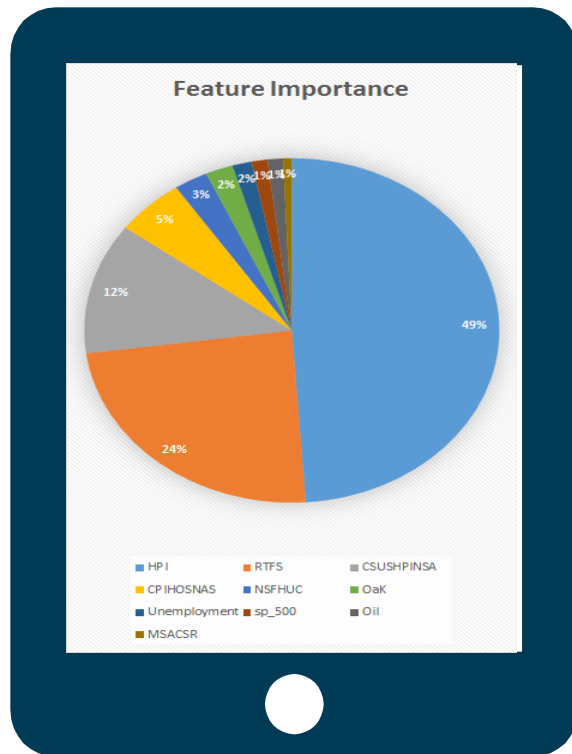
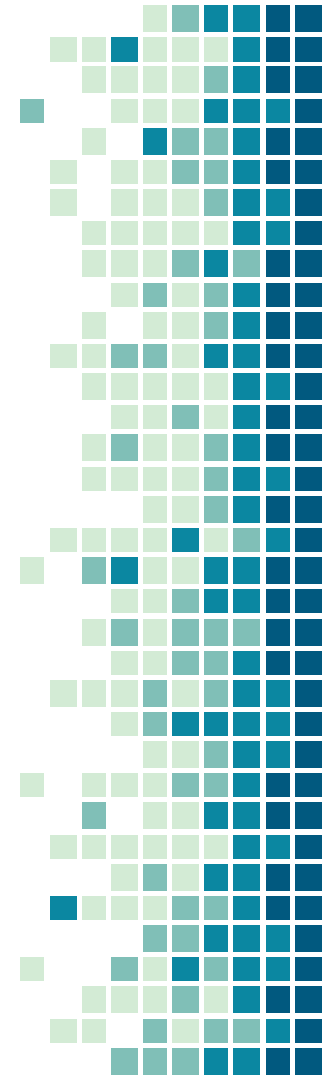# Findings

Features Importance & Results

After fitting all the variables in boosting model, we can get the variable importance, and this further confirms that we should use RTFS,HPI,CSUSHPINSA, and CCMS as our predictors.

Fitting those variables in Lasso model, the best RMSE we obtained in test set is **425.9**.

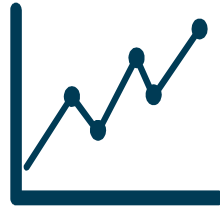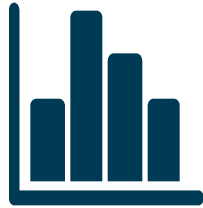Feature Importance

▪ HPI	▪ RTFS	▪ CSUSHPINSA
▪ CPIHOSNAS	▪ NSFHUC	▪ OaK
▪ Unemployment	▪ sp_500	▪ Oil
▪ MSACSR		

Insights

In the final model, we only use "Retail Trade and Food Services", "monthly house price ", "S&P/Case-Shiller U.S. National Home Price Index", "Conventional Conforming" to predict home improvement spending. It means that the home improvement spending is correlated with the real estate market. Specifically, people tends to spend more money on home improvement when the market is promising and vice versa.

Reference

All data sources are from https://fred.stlouisfed.org/

THANKS!