AI APPRAISER

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Summary

- Stakeholder: Mortgage lender
- Business problem: Better appraisals to reduce risk for home loans.
- Data: King County (CA) House Sales dataset
- Method: Used machine learning to develop a model for predicting the value of a house.
- Result: accurate home value predictions; good tool for loan decisions.
- Recommendation: Use model with human appraisers.

Outline

- Business Problem
- Data
- Results
- Conclusions
- References

Business Problem

Maximize the number of appraisals where the true value of the house is between 80% and 105% of the prediction in order to minimize risk while remaining attractive to borrowers.
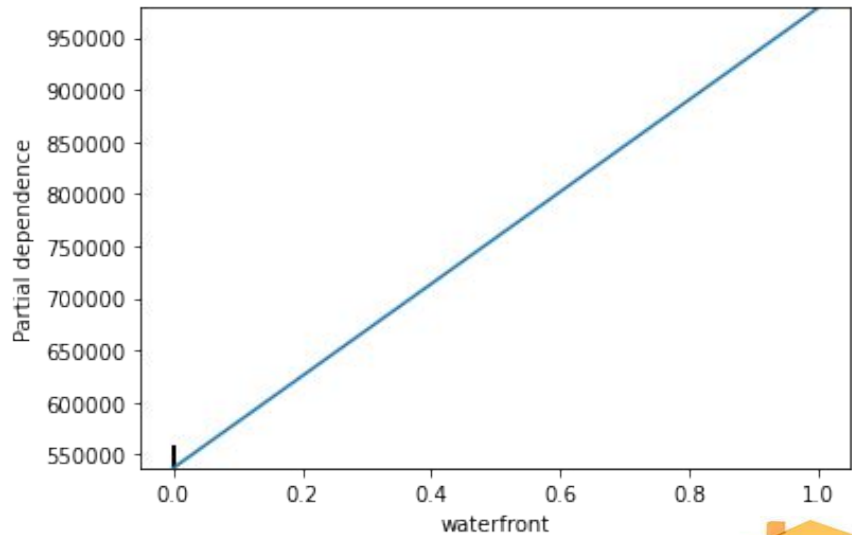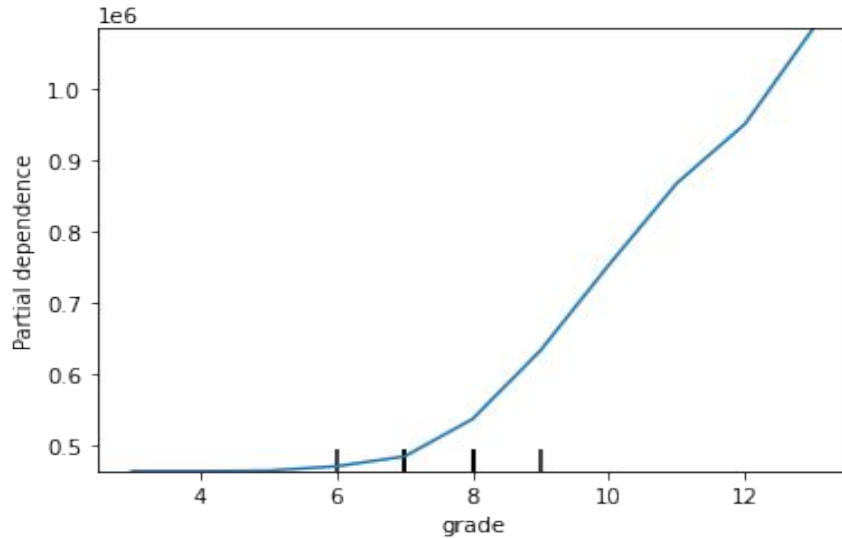
Data

King County (CA) House Sales dataset (2014-2015).

- Largest Factors
  - Grade & Waterfront
  - Location
  - Square Footage
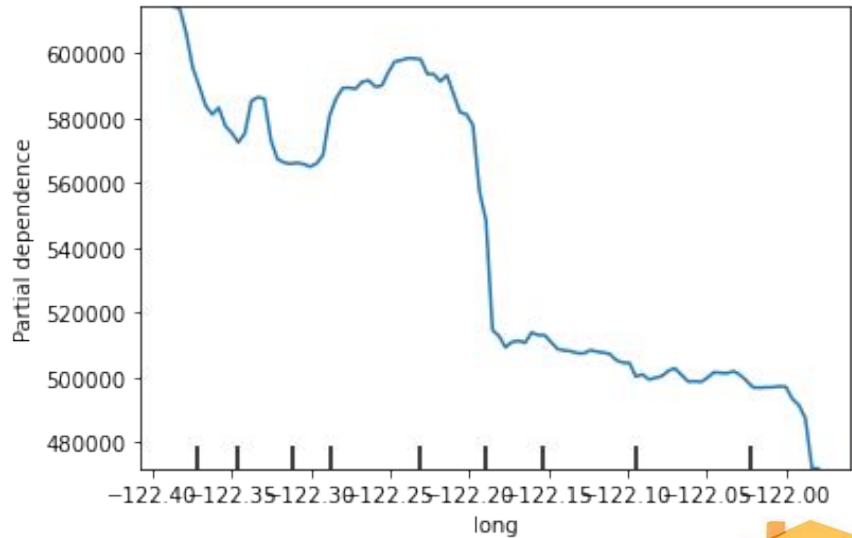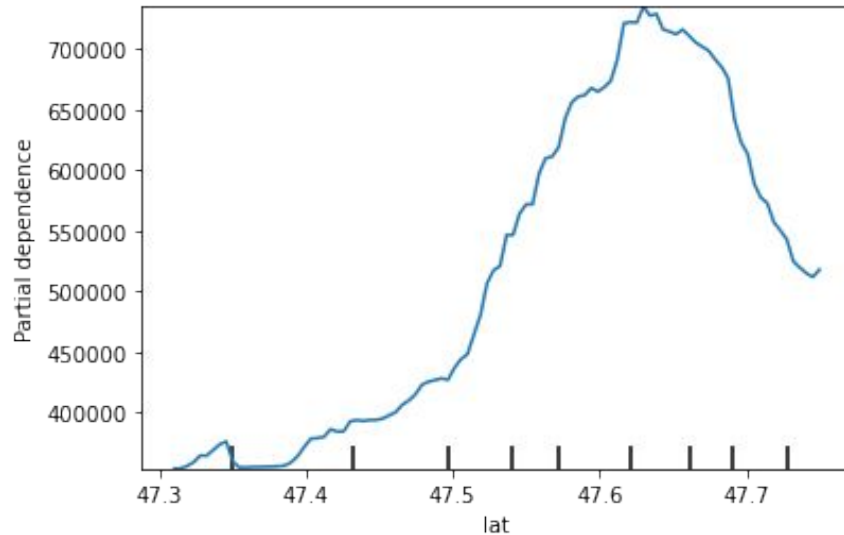- Interesting Factors
  - Year Renovated & Built

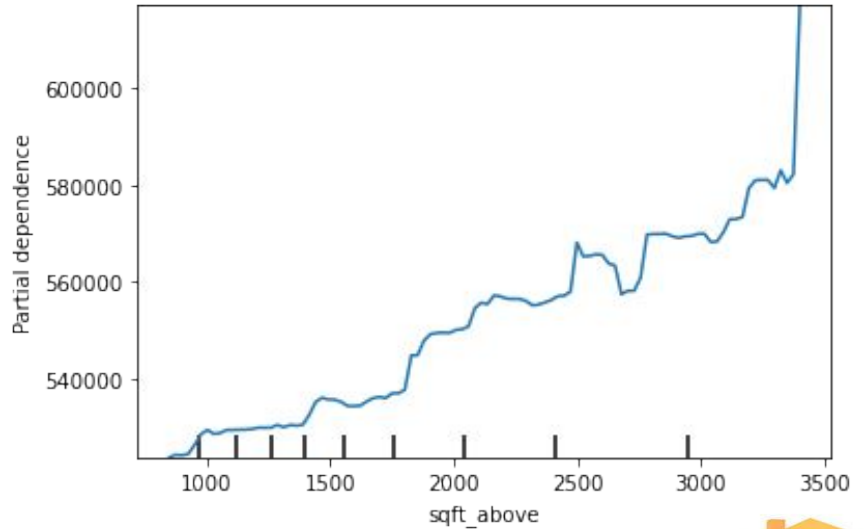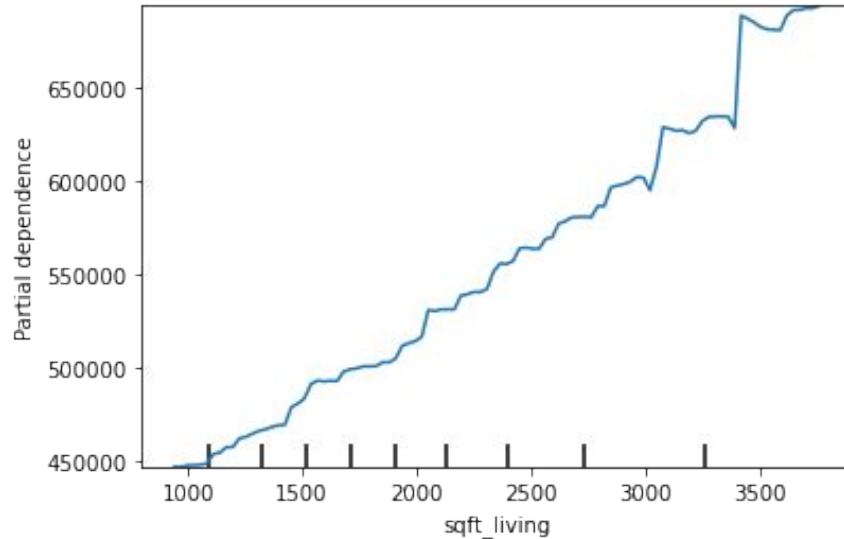# Largest Factors:

Grade & Waterfront

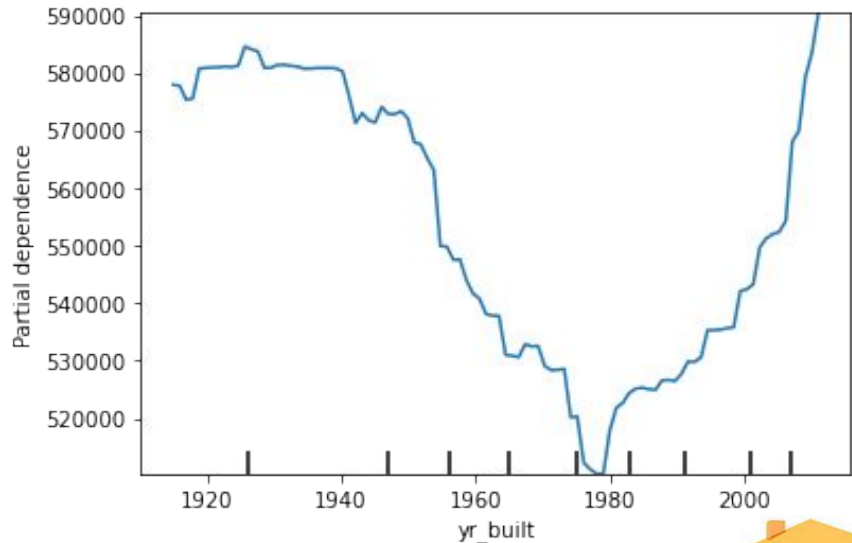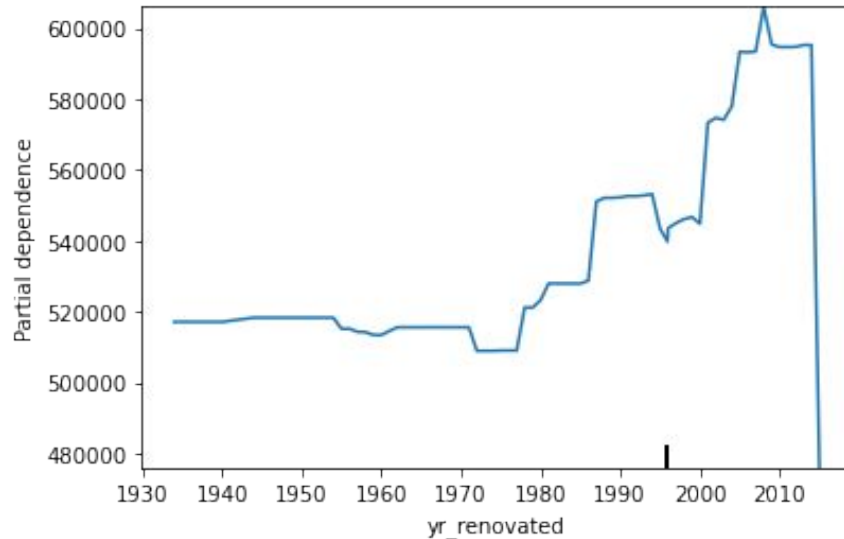## **Location (Latitude & Longitude)**
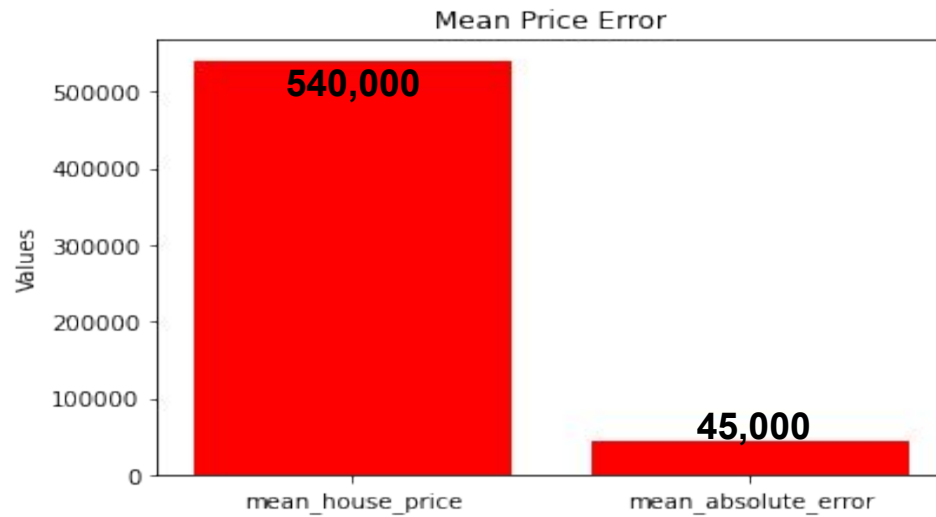
Largest Factors:

Square Footage
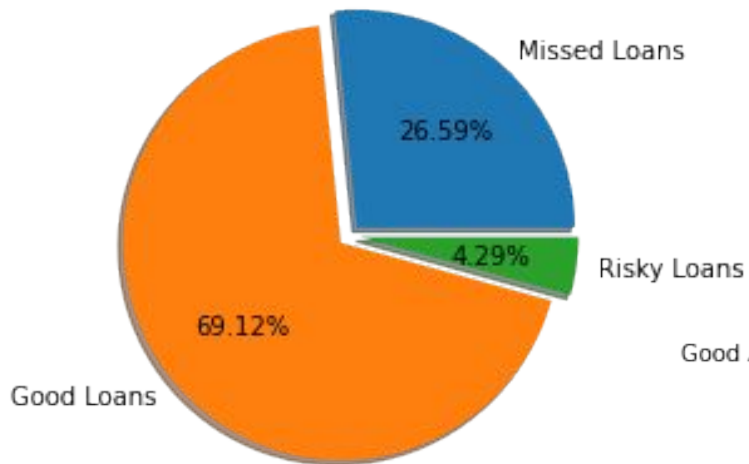
Suprising Fact:

Year Renovated & Built

Results

Results

Loan Values

- Missed Loans — 26.59%
- Risky Loans — 4.29%
- Good Loans — 69.12%

Number of Appraisal

- Low Appraisal — 27.98%
- High Appraisal — 5.22%
- Good Appraisal — 66.80%
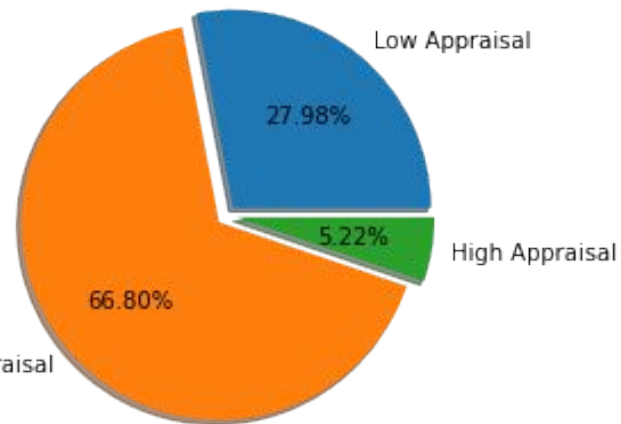
Assumptions:

12% Default Rate, 2% APR

Interest 99.74%   0.26% Losses
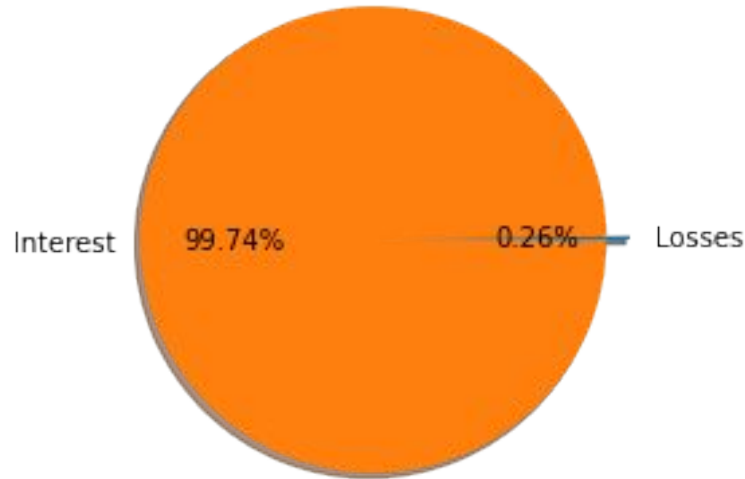
- 12% default rate (historically high)
- 2% APR for all loans (historically low)
- All defaults go into immediate foreclosure and sell for their sale price.
- All non-defaulting loans end up paid in full

Conclusions

- The model is very good at predicting house values in 2014-2015.
- Using model for appraisals should be profitable!
- Market crashes have not been analyzed (house value dropping after purchase)

Future

- Train on more data including different years
- Use more realistic assumptions of default rate and APR to evaluate whether this model is more profitable than client's existing process.
- Generate confidence intervals instead of single estimates

References

Board of Governors of the Federal Reserve System (US). (2021, January 30). *Delinquency Rate on Single-Family Residential Mortgages, Booked in Domestic Offices, All Commercial Banks.* Retrieved from https://fred.stlouisfed.org/series/DRSFRMACBS

Berger, R. (2020, October 23). *Mortgage Rates Fall To 50-Year Low.* Retrieved from https://www.forbes.com/sites/robertberger/2020/10/23/mortgage-rates-fall-to-50-year-low/?sh=5d7da1b33323

Thank You!

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