

AMES HOUSING DATA & NEXRES' NEXT STEPS



DSI-SG-33

Project 2: Group 1

Maryam, Priscilla, Rifqi, Shawn, Ting Wei

Background: Ames, Iowa



People

2,484 people
per square mile

*41% are
families*



Income

26.60%
poverty rate

*\$67,026
average*

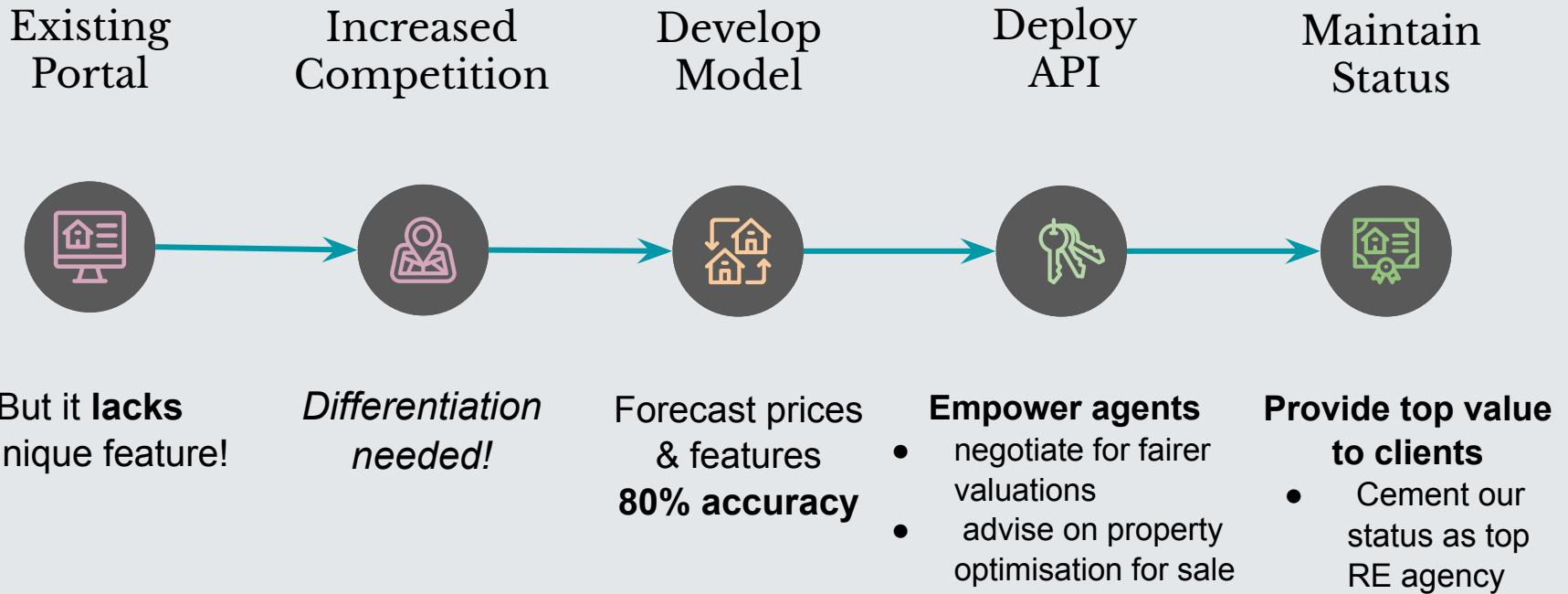


Climate

humid
continental

▲ 74.0°F (23.3°C)
▼ 20.4°F (-6.44°C)

Problem Statement



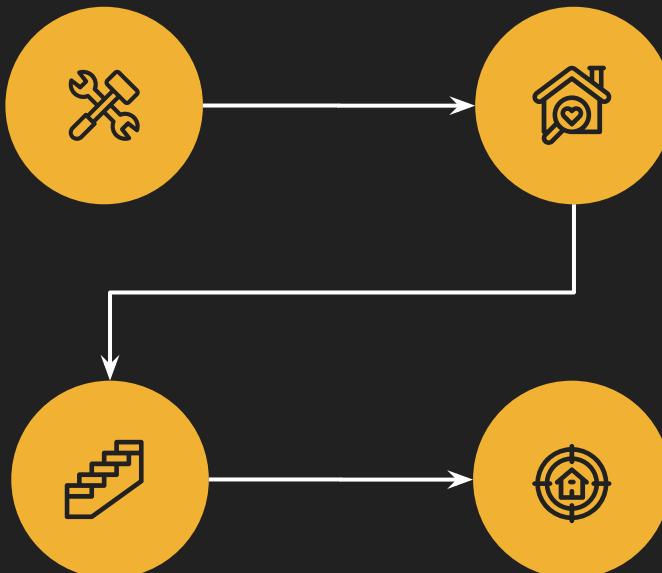


METHODOLOGY

Building a Predictive Model

Data Cleaning

Dealing with "missing" values



Modelling

Create models and evaluate performance

Analysis

A closer look at features that relate to higher selling prices

Insights

Interpretation and recommendations

DATA CLEANING





Process



Imputation of null values

Median, Mode, "None", "0"



Dropping of features

Identifiers



Feature Engineering

Creation of new features
using existing features

Dataset

Obtained from the Ames Assessor's Office.

Record of sales for residential properties sold in Ames, Iowa from 2006 to 2010.

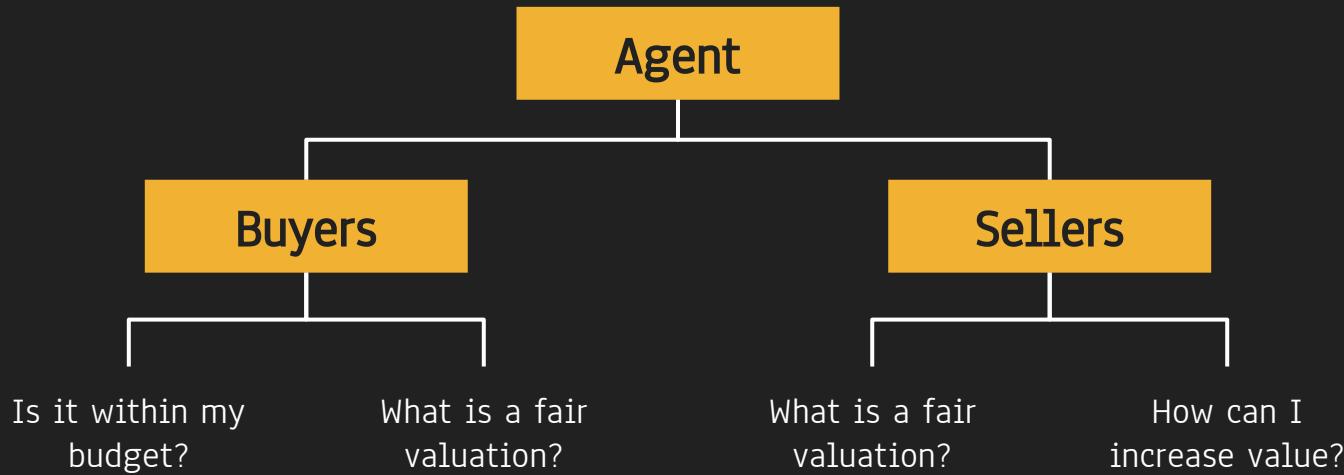
After cleaning and feature engineering:

Valid House Observations	Original Features	New Features	Target
2049	77	2	Sale Price

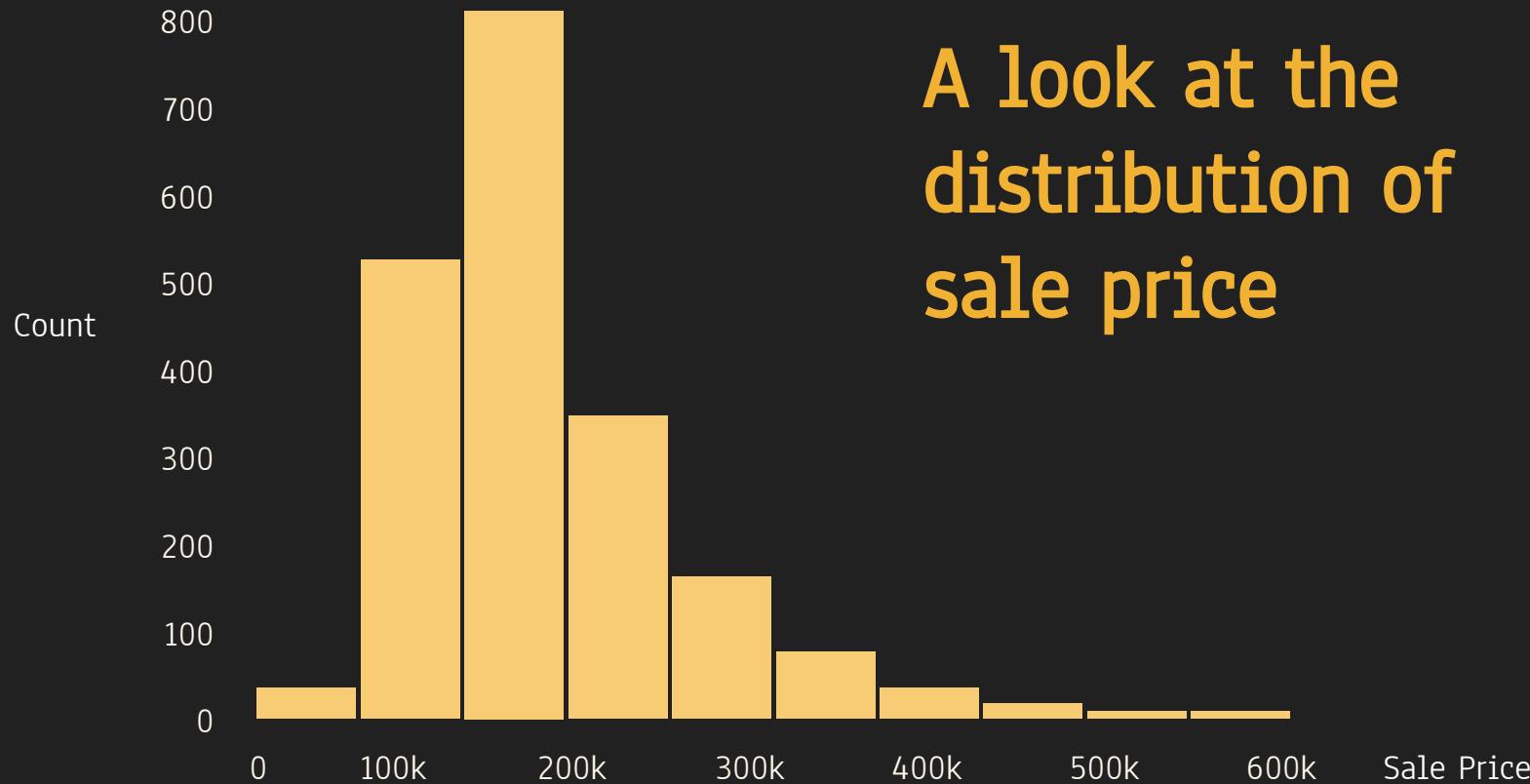
EXPLORATORY DATA ANALYSIS

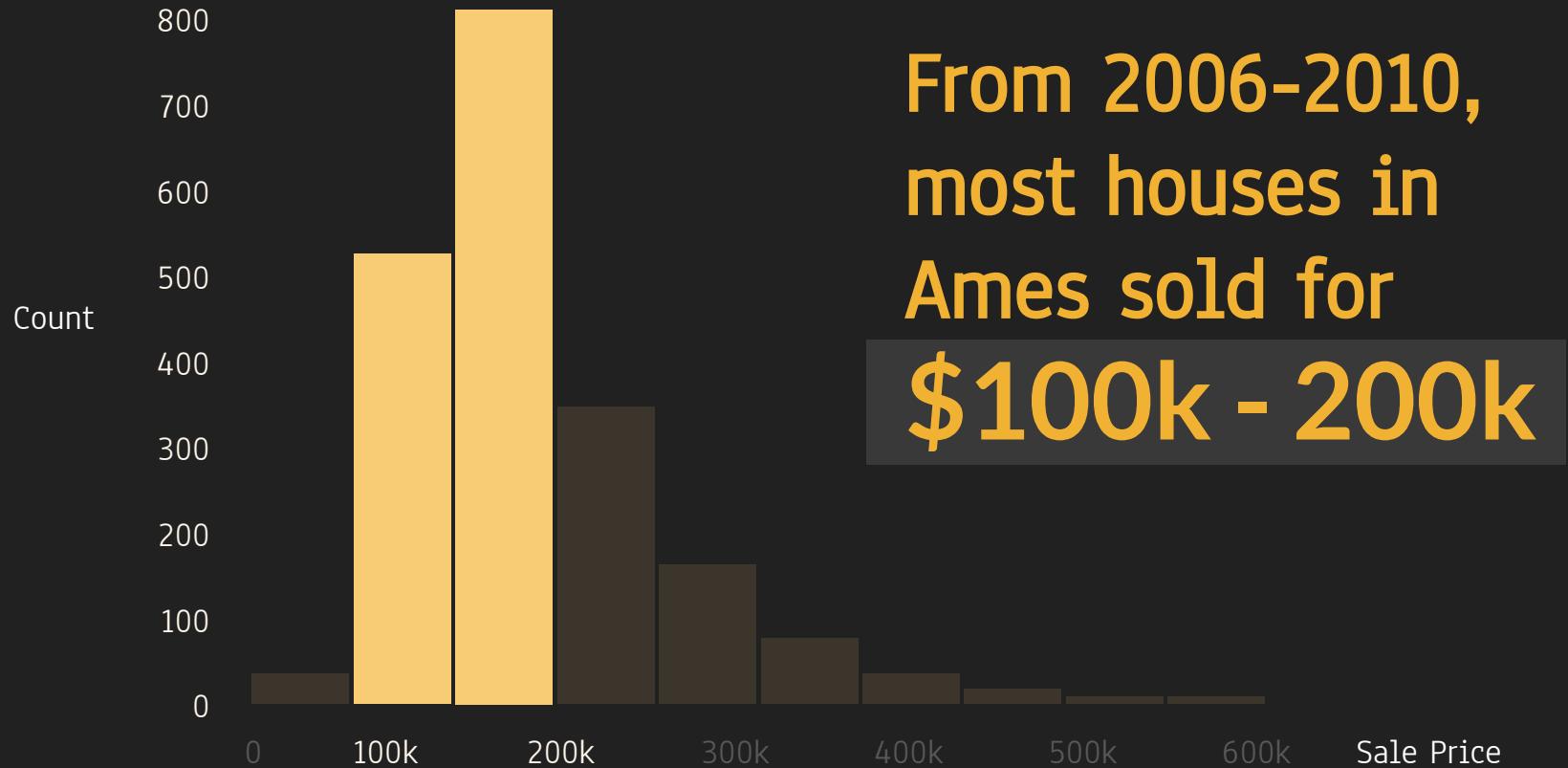


Guiding Principle



A look at the
distribution of
sale price





From 2006-2010,
most houses in
Ames sold for
\$100k - 200k

Higher Selling Price - 3 Key Features



Neighborhood

Houses in certain locations command the higher average prices



Overall Quality

Houses with better overall material and finish sell for higher



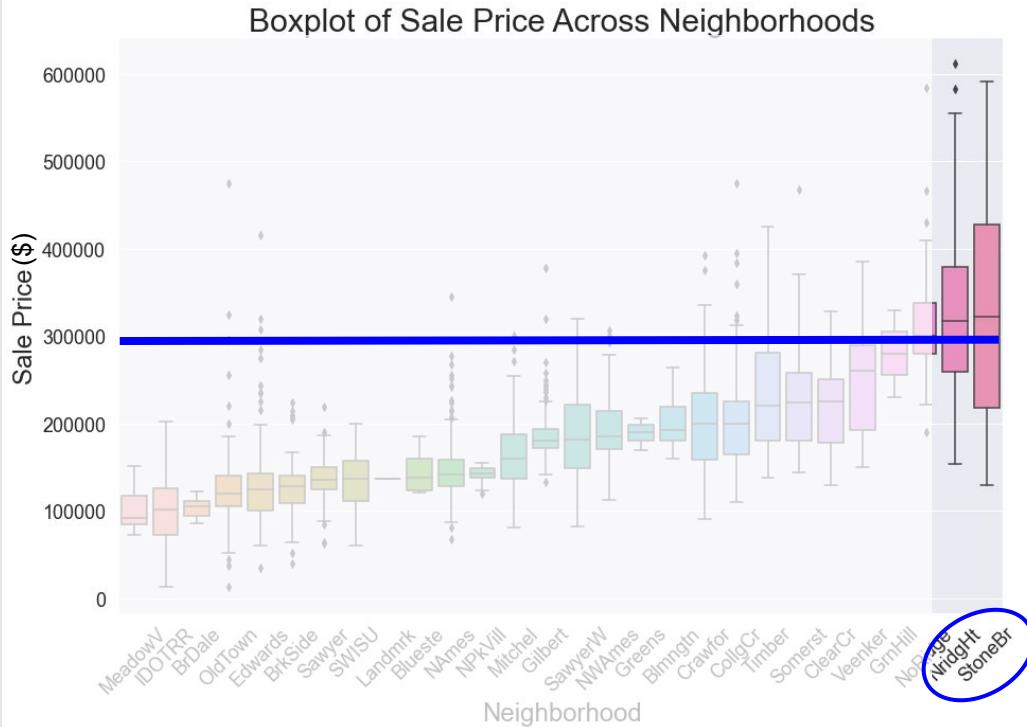
Total Built Area

The amount of “useful” area above ground is a familiar valuation metric

Neighborhood

Stone Brook and Northridge Heights homes have a higher median sale-price of above \$300K

- 📍 Proximity to Iowa state university and Gilbert school district ¹
- 📍 Full range of amenities ²



¹About Ames, City of Ames

²Northridge Heights, Hunziker Development.

Overall Quality (1-10 Scale)

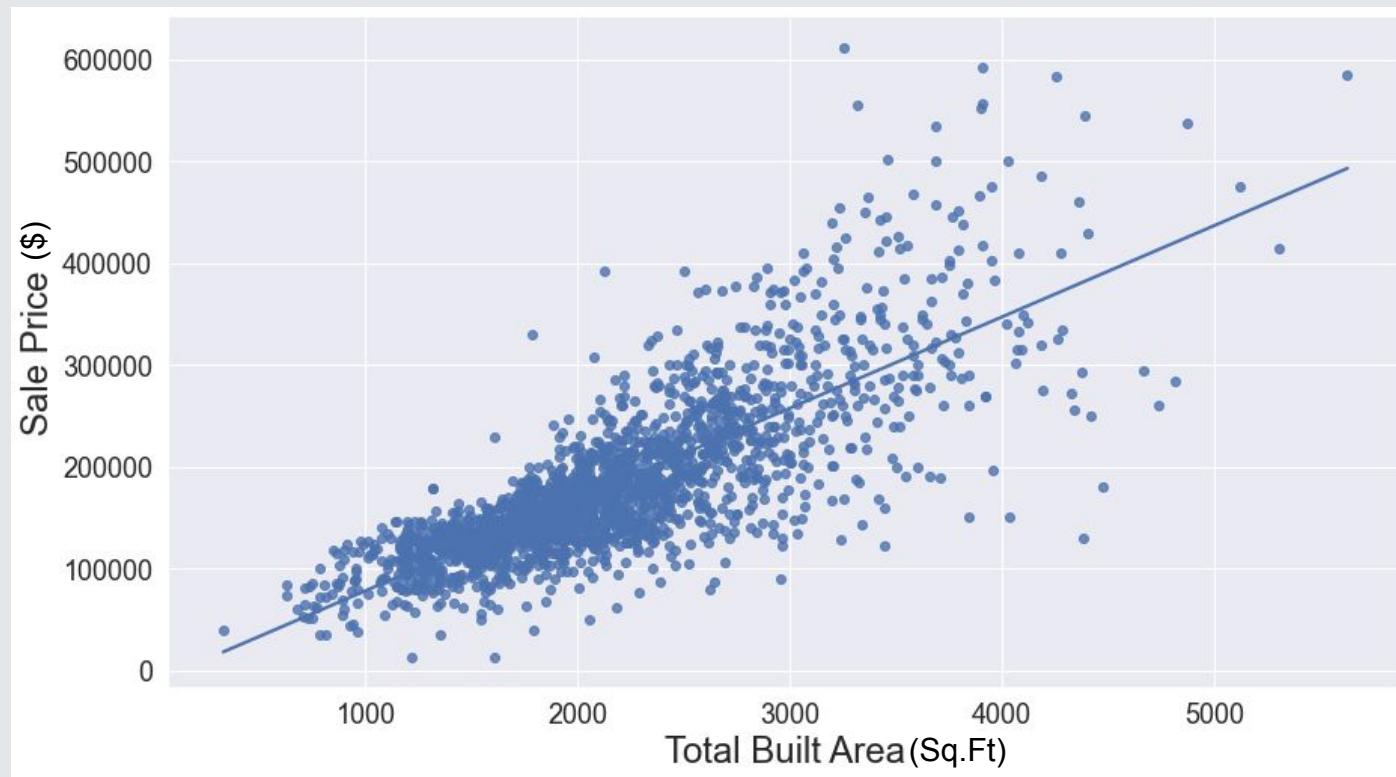
Houses with **better overall** materials and finish **sell for higher**

 An **increment in quality by 1 point** from 7-8 sees a marginal median sale price **increment of 35%**

 On average, the price of a house **rated as a 10** commands more than **2x** that of a 7



Positive Correlation between Total Built Area and Sale Price

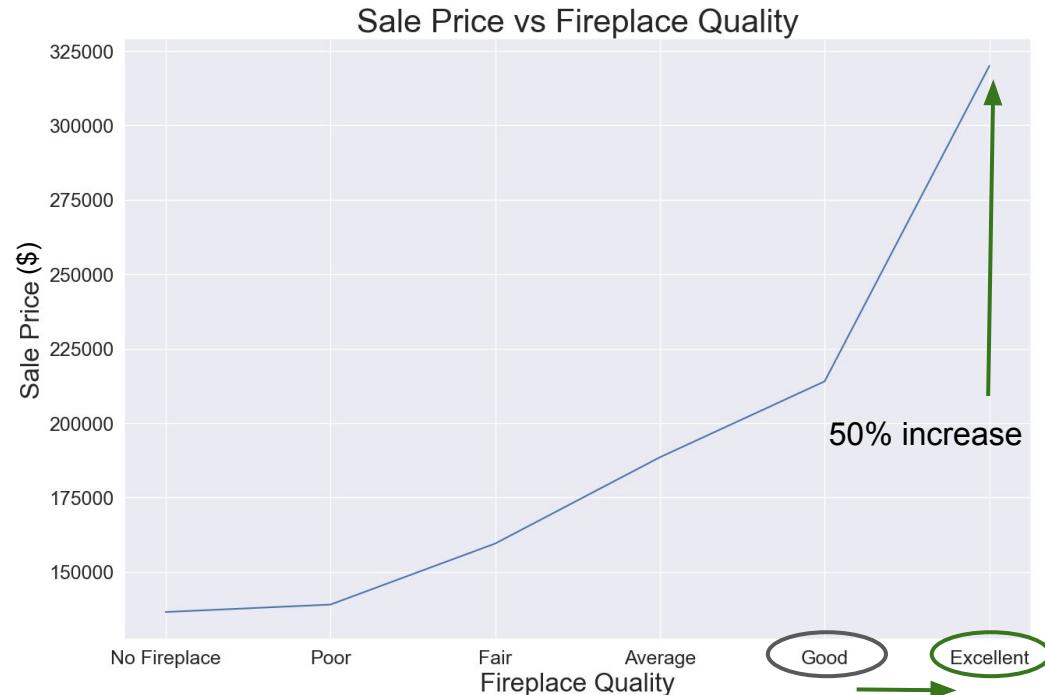


Fireplace Quality

Sub-zero (°C) temperatures
during winter

 **Better quality fireplaces → Higher prices**

 **Excellent fireplace → 50% higher median sale price!**

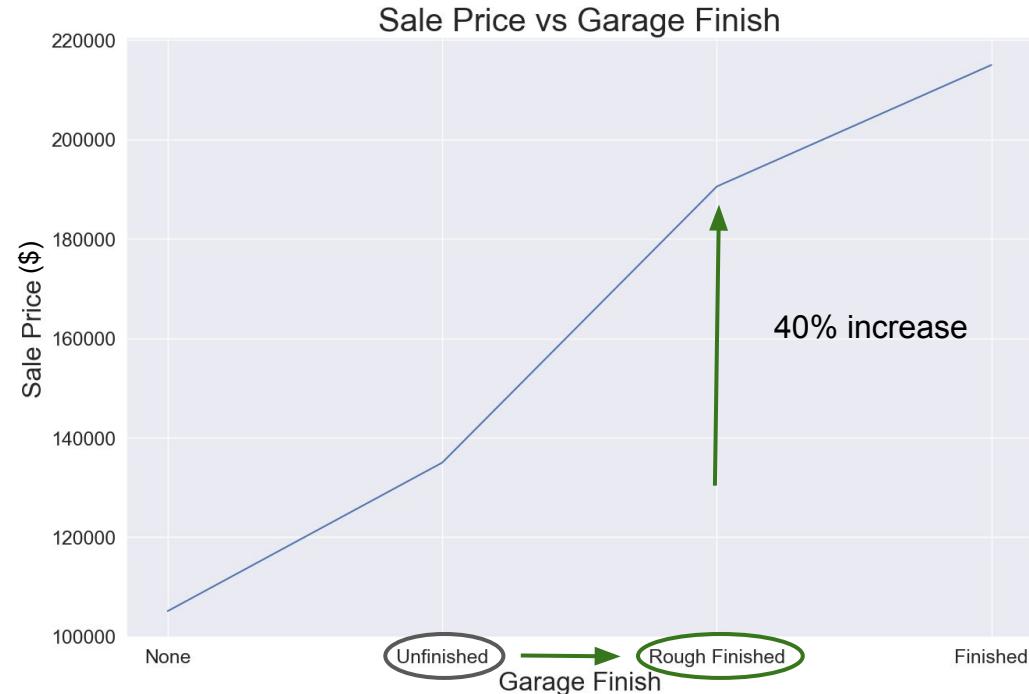


Garage Finish

Average car ownership is relatively high at 2 per household



Biggest jump in median sale price of **40%** between an **unfinished** and **roughly finished** garage.



Machine Learning Models



Regression Model?

Altitude



Temperature



Relationship between Sale Price and Features



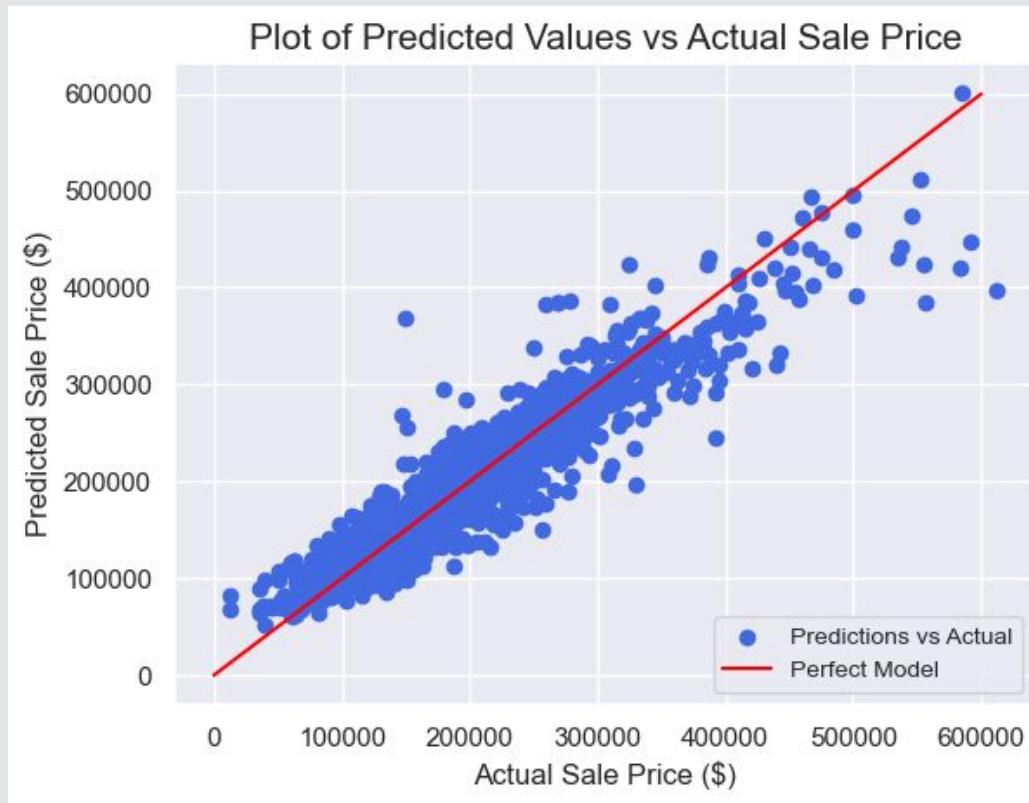
10 Features

1. Overall Quality
2. Total Built Area
3. No. of Bathrooms
4. House Style
5. Type of Foundation
6. Exterior Covering
7. Type of Masonry Veneer
8. Fireplace Quality
9. Type of Garage
10. Garage Finish

Regression Model Performance

	R ²	RMSLE	% Error	Selection
Linear	83.96%	0.2353	17.71%	
Ridge	84.30%	0.2326	17.49%	
Lasso	84.44%	0.2316	17.42%	✓

High Accuracy of Model in Predicting Sale Price



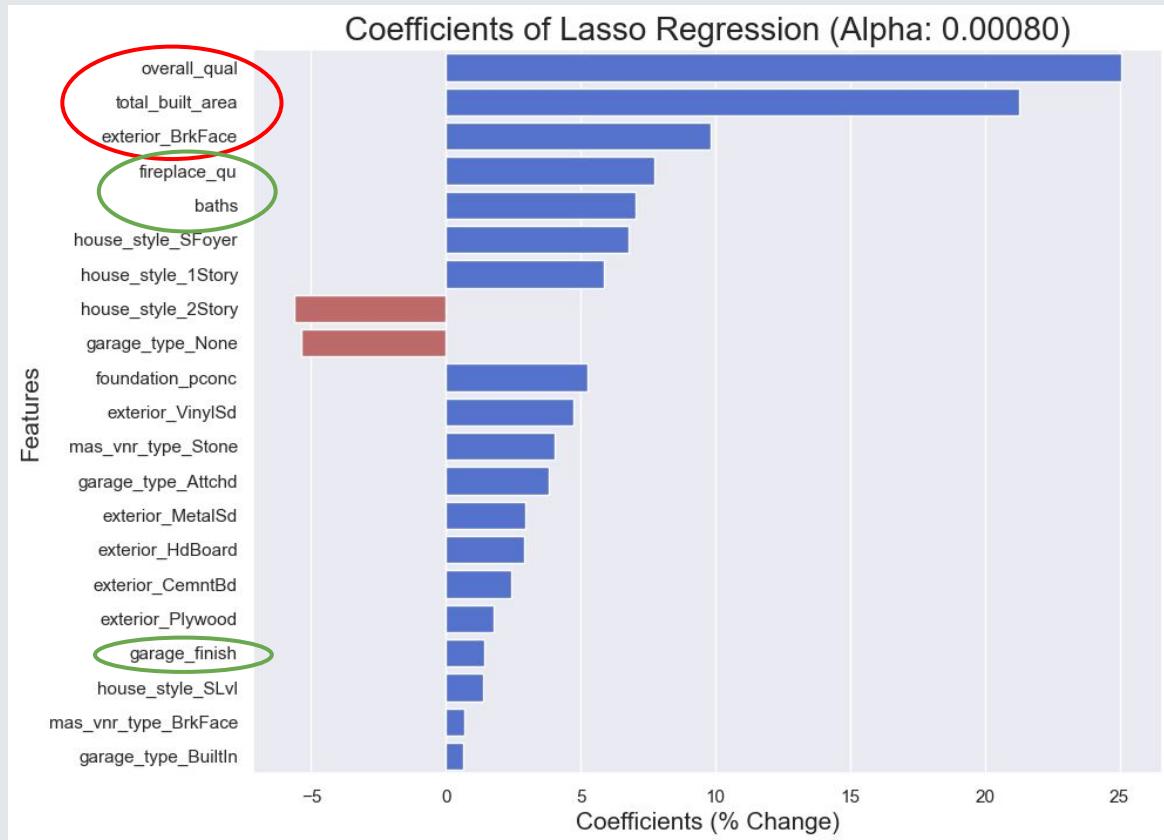
Does it actually work?

Stone Brooke	NW Ames	Edwards
Predicted Price \$334,523	Predicted Price \$169,320	Predicted Price \$82,544
<ul style="list-style-type: none">• Overall Condition - 8• Foundation - P Concrete<ul style="list-style-type: none">• Fireplace - Good	<ul style="list-style-type: none">• Overall Condition - 6• Foundation - C Block<ul style="list-style-type: none">• Fireplace - Typical	<ul style="list-style-type: none">• Overall Condition - 4• Foundation - Brick & Tile<ul style="list-style-type: none">• No Fireplace
Actual Price \$349,265	Actual Price \$181,000	Actual Price \$86,000
4% lower	6% lower	4% lower



RECOMMENDATIONS

% Change in Sale Price per Feature



The top 3 **positive** features

Improve the value of a home

Negotiate for better prices

FUTURE WORK



Limitations

Outdated Dataset

Significant changes to neighborhoods since



Socio-Economic Factors

Recession periods from
2007 - 2009



Lack of Certain Features

Amenities, nearby
schools

Future Uses



Build an in-house app (for Agents only)

Advise clients on house features



Conclusions

We managed to:

- Build an effective model
- Understand which and to what extent various features affect sale price
- Advise agents to negotiate better transactions

Thank you!



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