

DSI-4 Project 02

AMES HOUSING PRICE PREDICTIONS

Buy, sell, or HODL?

by Zhen Ming, Wei Hao, Kevin

AGENDA

- 1) Background & Motivations
- 2) Problem Statement & Objectives
- 3) Model Highlights
- 4) Conclusions & Recommendations

BACKGROUND + MOTIVATIONS

What's going on?

BACKGROUND + MOTIVATIONS

What Bubble?...

- In the early to mid 2000s, cheap credit and lax lending standards led to a booming Real Estate market.
- This reduced barriers to entry, and fuelled housing sales volumes and prices.
- This presents a great opportunity to purchase undervalued properties, and sell them off for a healthy profit.

BACKGROUND + MOTIVATIONS

OUR TEAM.

Believe we can solve most problems with Data Science....



... And make money while we're at it.

PROBLEM + SOLUTION

What are we going to do?

PROBLEM STATEMENT + OBJECTIVES

What is the problem?...

- Over reliance on sentiment
- Over reliance on realtors to provide valuations
- Over or underestimation of fair value.



PROBLEM + SOLUTION

SOLUTION

Provide a quicker, more reliable estimate on housing prices
using Machine Learning ...



... And help home owners make informed decisions on their purchase.

MODEL FEATURES

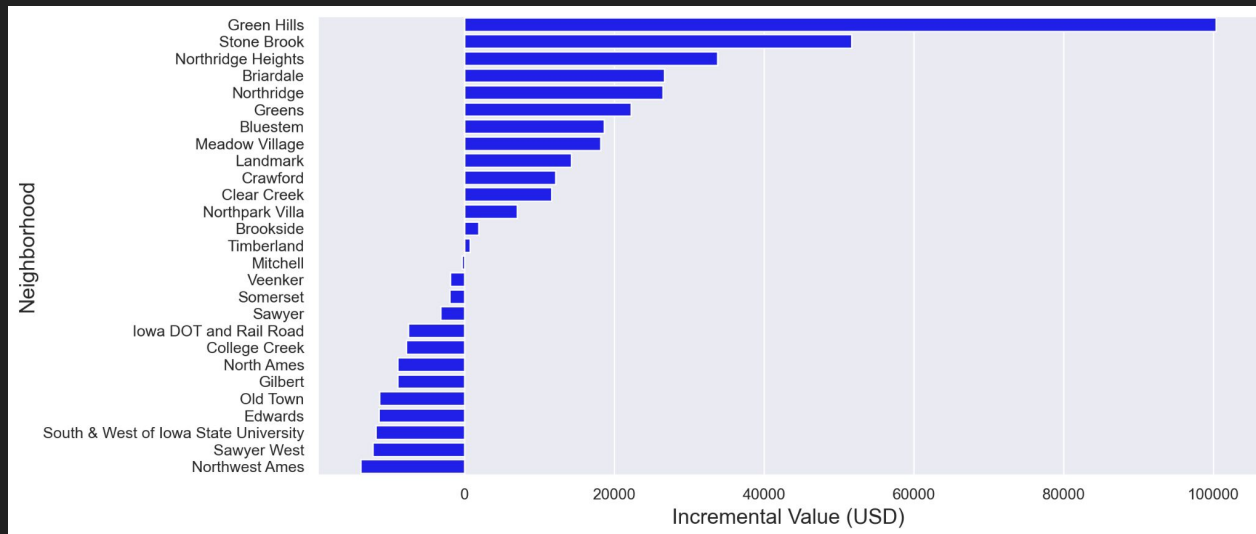
What helps?...

... and what doesn't?

MODEL FEATURES

Things to look out for...

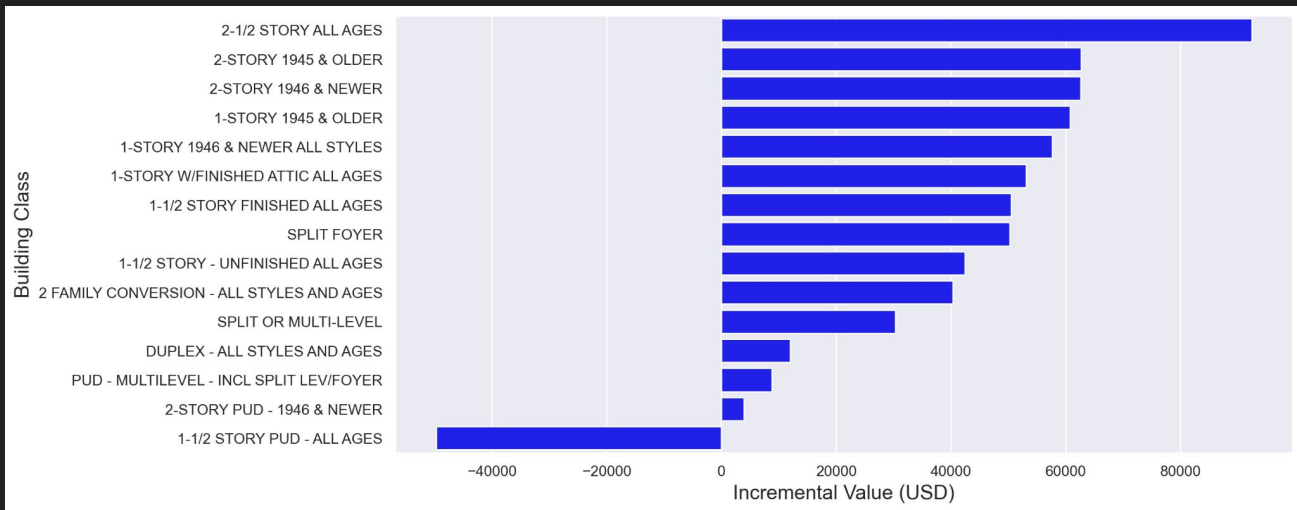
- Location, Location, Location...
- Type of House
- Size Does Matter
- Kitchen & Exterior Quality
- Age of House



MODEL FEATURES

Things to look out for...

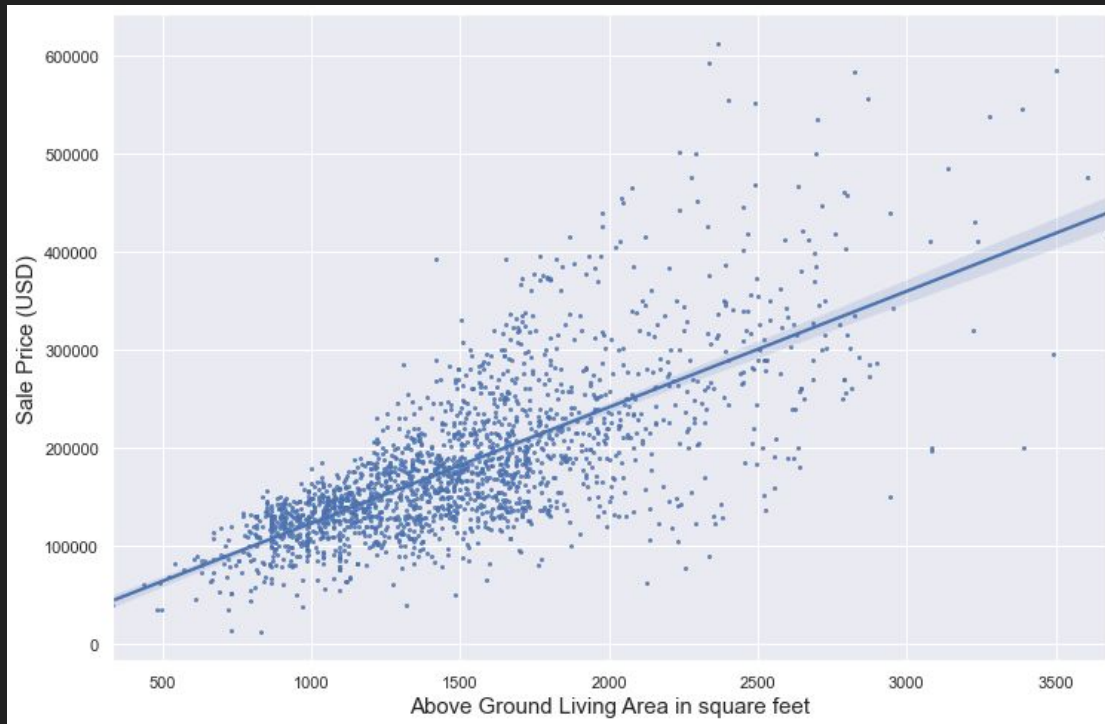
- Location, Location, Location...
- Type of House
- Size Does Matter
- Kitchen & Exterior Quality
- Age of House



MODEL FEATURES

Things to look out for...

- Location, Location, Location...
- Type of House
- Size Does Matter
 - \$51.6 per incremental SF
- Kitchen & Exterior Quality
- Age of House



MODEL FEATURES

Things to look out for...

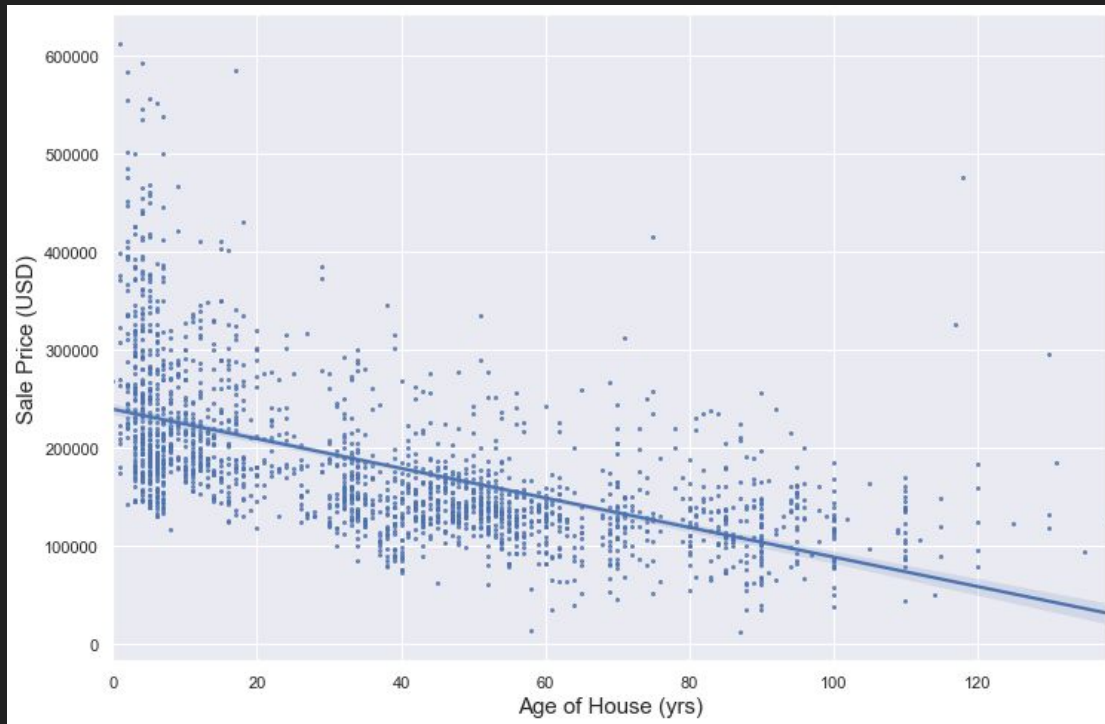
- Location, Location, Location...
- Type of House
- Size Does Matter
- Kitchen & Exterior Quality
- Age of House

<u>Kitchen Quality</u>	<u>Exterior Quality</u>
Incremental Valuation (USD)	Incremental Valuation (USD)
\$11,089 per rating increase	\$11,581 per rating increase

MODEL FEATURES

Things to look out for...

- Location, Location, Location...
- Type of House
- Size Does Matter
- Kitchen & Exterior Quality
- Age of House
 - -\$5,489 per extra year older



MODEL FEATURES

Things to look out for...

●Location, Location, Location...

- Green Hills
- Stone Brook
- Northridge Heights

●Type of House.

- 2-1/2 Story; All Ages
- 1-1/2 Story; Unfinished - All Ages
- 2-Story; 1946 & Newer

●Size Does Matter...

- Gross Living Area (SF)

●Kitchen & Exterior Quality...

- Kitchen Quality: \$11,089 per rating increase
- Exterior Quality: \$11,581 per rating increase

●Foundation...

- Slab: \$46,328, if used.

<u>Neighborhood</u>		<u>Building Class</u>		<u>Gross Living Area</u>
Name	Incremental Valuation (USD)	Type	Incremental Valuation (USD)	Incremental Valuation (USD)
Green Hills	\$123,548	2-½ Story All Ages	\$51,110	\$51.6 per incremental SF
Stone Brook	\$54,936	1-½ Story Unfinished - All Ages	\$45,892	
Northridge Heights	\$37,766	2-Story 1946 & Newer	\$42,180	

MODEL FEATURES

...and some **red** flags.

- Location, Location, Location.
 - Old Town
 - Sawyer West
 - Iowa DOT and Rail Road (IDOTRR)
- Exterior Covering
 - Common Brick
 - Stone
 - Imitation Stucco
- Age of House.

<u>Neighborhood</u>		<u>Exterior Covering</u>		<u>Age of House</u>
Name	Incremental Valuation (USD)	Material	Incremental Valuation (USD)	Incremental Valuation (USD)
Old Town	- \$14,695	Common Brick	- \$36,782	-\$5,489 per extra year older
Sawyer West	- \$12,238	Stone	- \$21,707	
IDOTRR	- \$11,340	Imitation Stucco	- \$20,968	

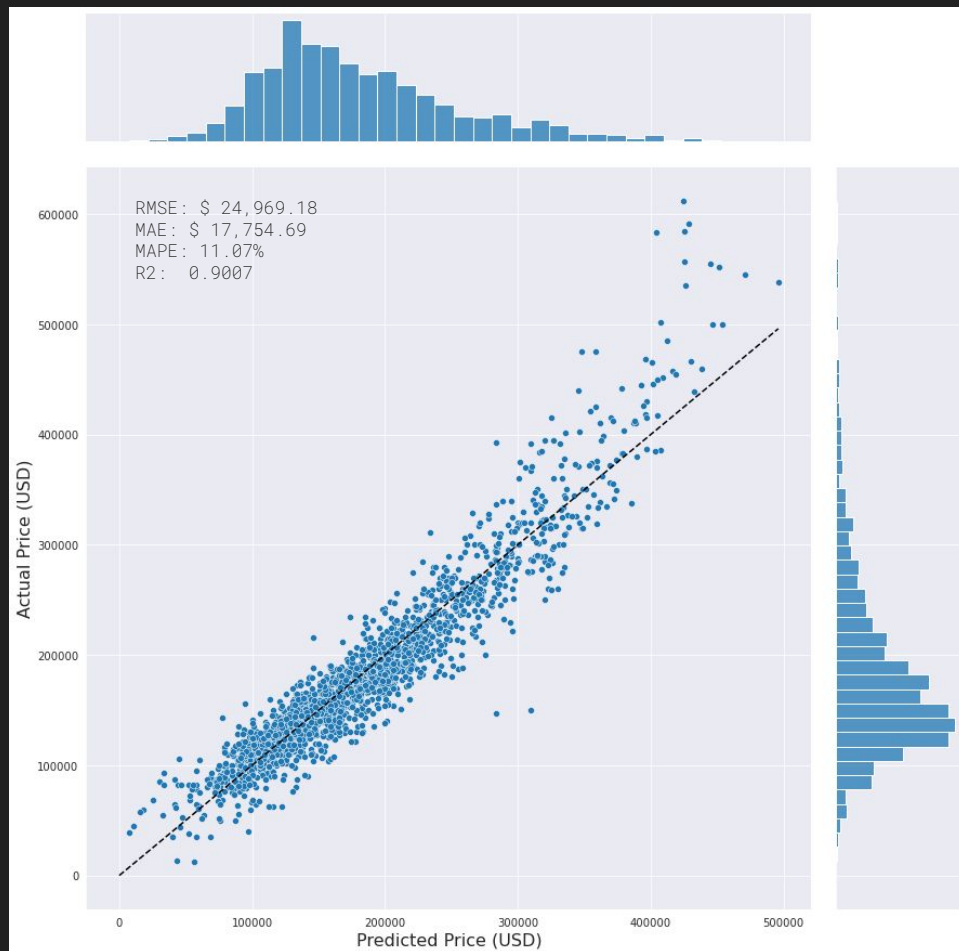
MODEL USAGE

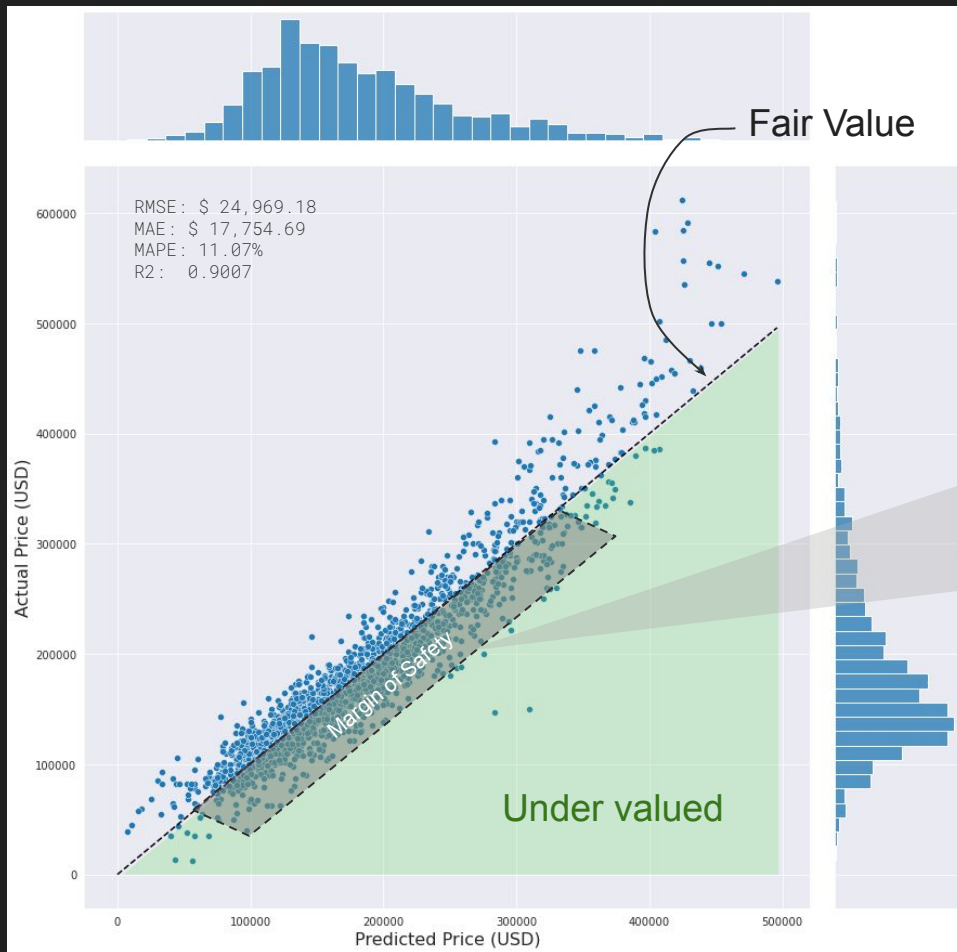
Great. So how do we use it?

MODEL USAGE

Identifying undervalued offers...

- Dotted line represents the “Fair Value” lines
 - Prices most would be willing to pay, given housing attributes
- Offers below the “Fair Value” line are considered under-valued
- Margin of safety (MAPE & MAE)
 - Offer should be **no more than 10-15% below** the “fair value” line
 - \$18,000 - \$24,000





Sell Here

Buy Here

Profit Margin

Recommendation:
Identify properties below the fair value line.
After which, quote a selling price near the fair value line.

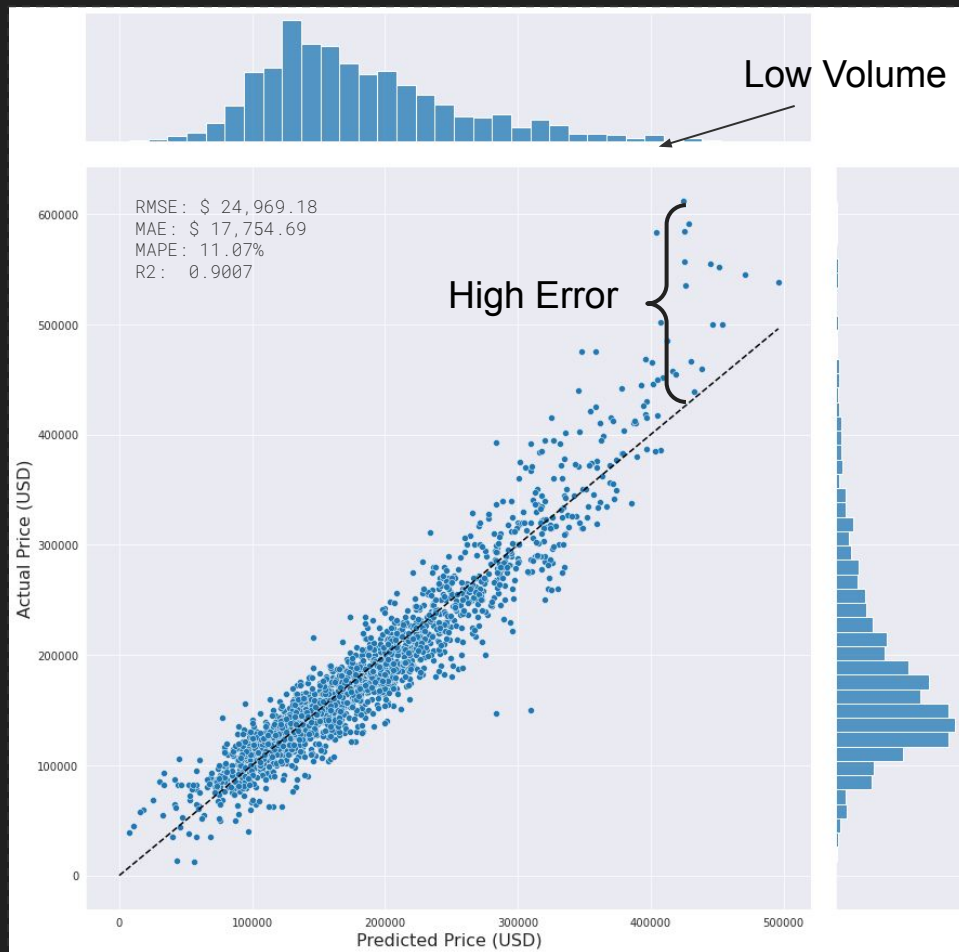
MODEL BREAKDOWN

Edge Cases...

- Due to the lack of data, the model begins to **break down at higher prices**.
 - Occurs at ~ \$380,000 and above.
- Model begins to severely **underpredict the actual sales prices**.
- However, due to the low volume, we can assume that these situations are rare and **would not be typically encountered**.

Recommendation:

Avoid using this model for valuations above \$380,000.



APPLYING INSIGHTS

Kitchen Remodelling & Exterior Quality ...

- Kitchen & Exterior Quality...
 - Kitchen Quality: \$11,089 per rating increase
 - Exterior Quality: \$11,581 per rating increase
- Cost Estimates:
 - Min Kitchen Remodel cost: \$5,000 (Forbes)
 - Min Exterior Paint cost: \$2,547 (Fixr.com)

Recommendation:

Identify properties with undervalued kitchens, in a prime location.

Conduct a cost-effective remodelling project for the house.

Engage high school kids to help paint the exterior of the house.



CONCLUSION + RECOMMENDATIONS

CONCLUSIONS + RECOMMENDATIONS

- Identify undervalued properties within 10-15% of the fair value line
- When valuing a house, pay close attention to...
 - Location, House type
 - Material of Construction
 - Kitchen Quality, Exterior Quality
 - House size.
- Engage a interior designer as an advisor to provide estimates and feasibility recommendations on kitchen remodelling during house tours.
- Focus on opportunities below \$380,000.

DSI-4 Project 1

End

DSI-4 Project 1

Analysis Notes