Increasing Home Values in Ames, IA

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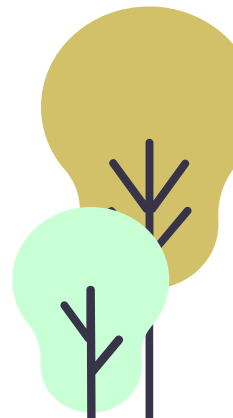# TABLE OF CONTENTS

01
PURPOSE

02
BACKGROUND

03
DATA

04
METHODOLOGY

05
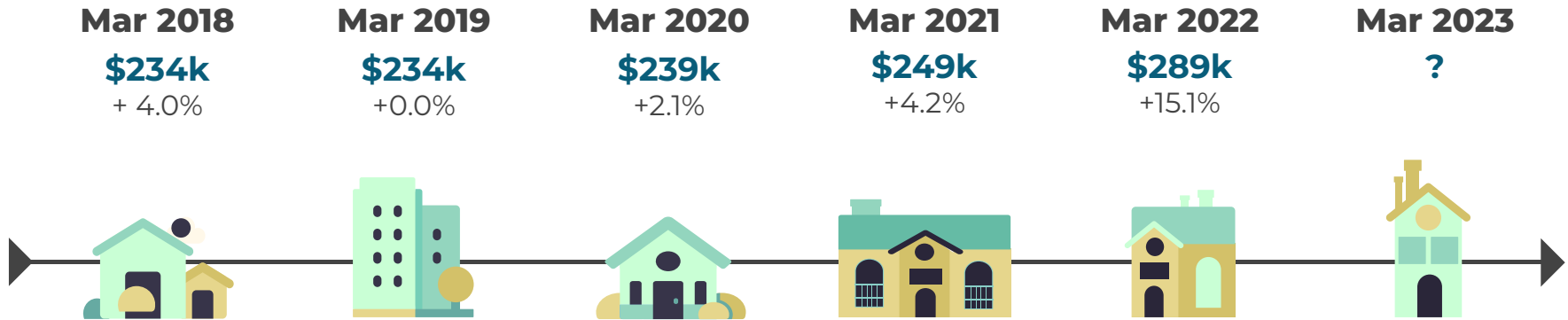INSIGHTS

06
CONCLUSION

01 Purpose

Problem Statement

This analysis aims to identify specific housing features that have a high impact on a home's value using a machine learning regression model.

With this information, the city will know what to consider when building new housing and residents will know what to consider when building, updating or selling their home.

02 Background

5-Year Zillow Home Value Index

Mar 2018
$234k
+ 4.0%

Mar 2019
$234k
+0.0%

Mar 2020
$239k
+2.1%

Mar 2021
$249k
+4.2%

Mar 2022
$289k
+15.1%

Mar 2023
?

03 Data

Dataset

- Obtained from the Ames Assessor's Office
- 2051 observations spanning from 2006-2011
- 81 features (41 numerical and 40 categorical) including but not limited to:

  - Building/House Type & Style
  - Lot & Land
  - Foundation
  - Neighborhood
  - Roof & Exterior
  - Rooms & Square Footage
  - Basement
  - Garage
  - Deck, Porch & Fence
  - Pool

# 04 Modeling

Model Exploration

- **4 models explored:**
  - Linear Regression
  - Ridge Regression
  - Lasso Regression
  - Elastic Net Regression

- **Evaluation metrics:**
  - R2 score
  - RMSE

Model Results

	Simple Linear	Ridge #1	Ridge #2	Lasso #1	Lasso #2	Elastic Net
Alpha	–	10.23531	9.77010	83.02176	79.24829	79.24829
Features	301	301	301	128	128	128
Train R2	0.94398	0.91268	0.91305	0.92680	0.92786	0.92786
Val R2	-2.04941	0.91480	0.91478	0.92580	0.92616	0.92616
Train RMSE	18,879	23,571	23,416	21,582	21,425	21,425
Val RMSE	3.5 Q	22,499	22,509	20,996	20,945	20,945

05 Insights

Distribution of Sale Prices (2006-2011)
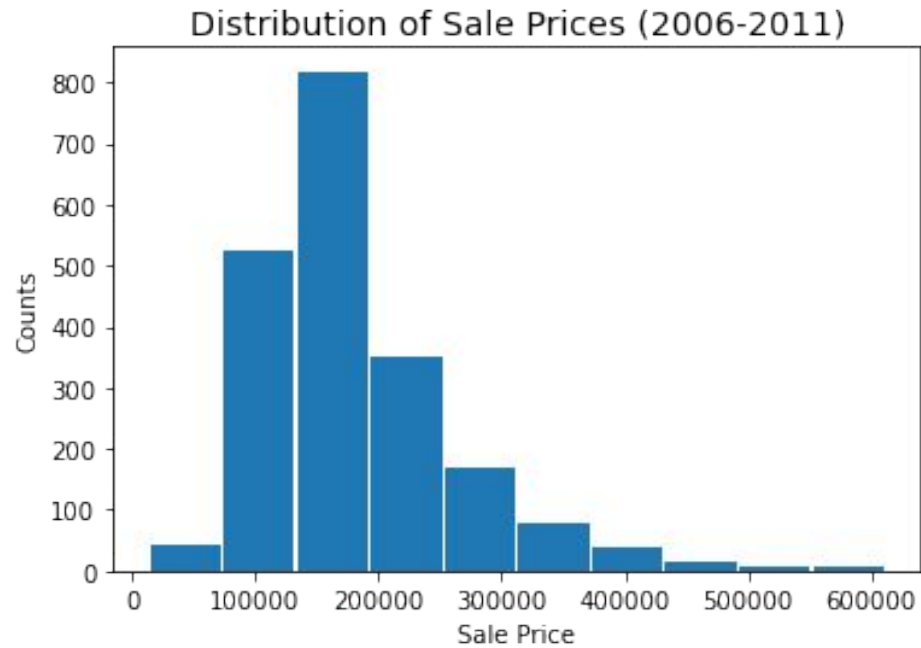
Neighborhood Impact on Sale Price (2006-2011)
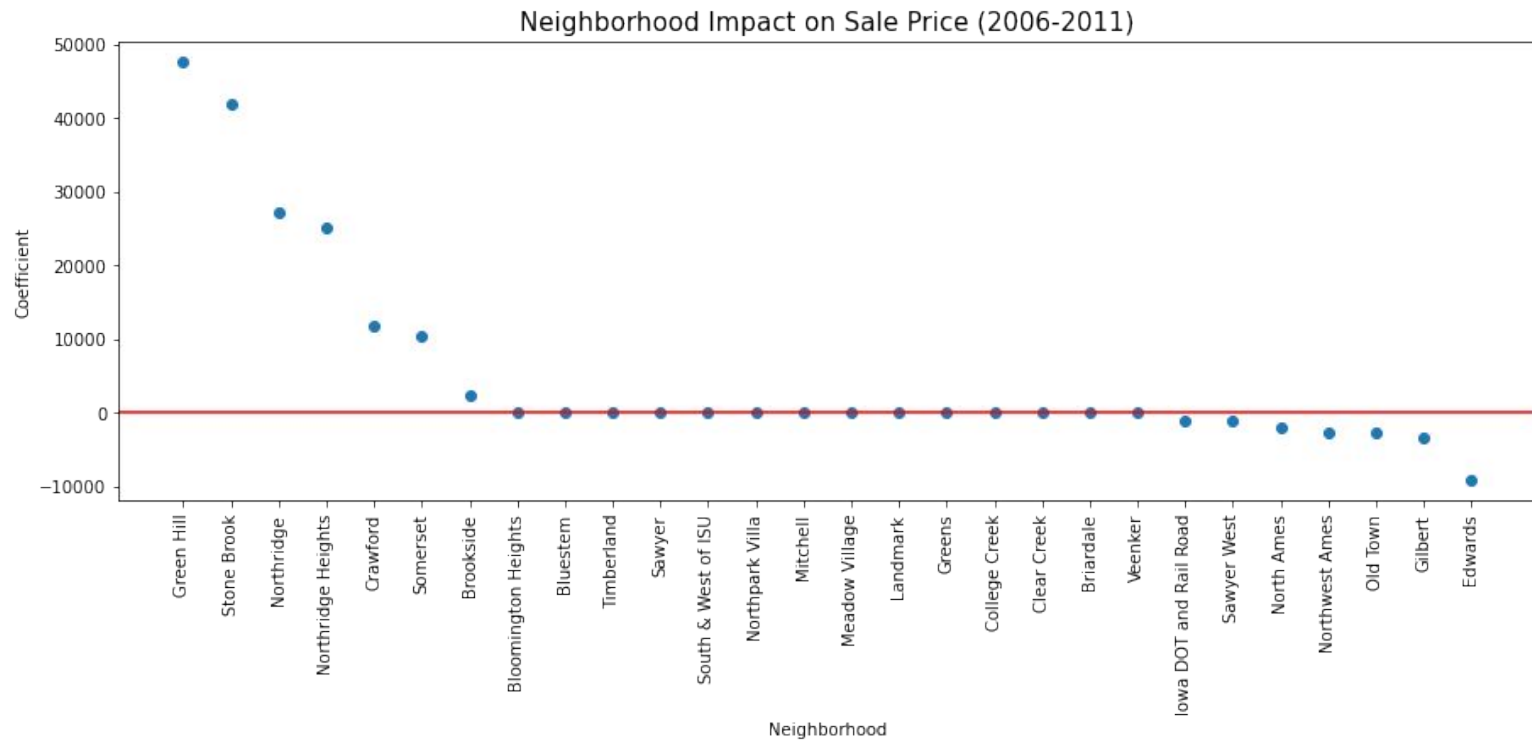
Neighborhood Insights

Top 5 neighborhoods that increase home value:

	Neighborhood	By...
1	Green Hills	$48k
2	Stone Brook	$42k
3	Northridge	$27k
4	Northridge Heights	$25k
5	Crawford	$12k

Neighborhood Insights

Bottom 5 neighborhoods that <u>decrease</u> home value:

	Neighborhood	By...
1	Edwards	$9k
2	Gilbert	$3k
3	Old Town	$3k
4	Northwest Ames	$3k
5	North Ames	$2k

Top 25 Home Features Impact on Sale Price (2006-2011)
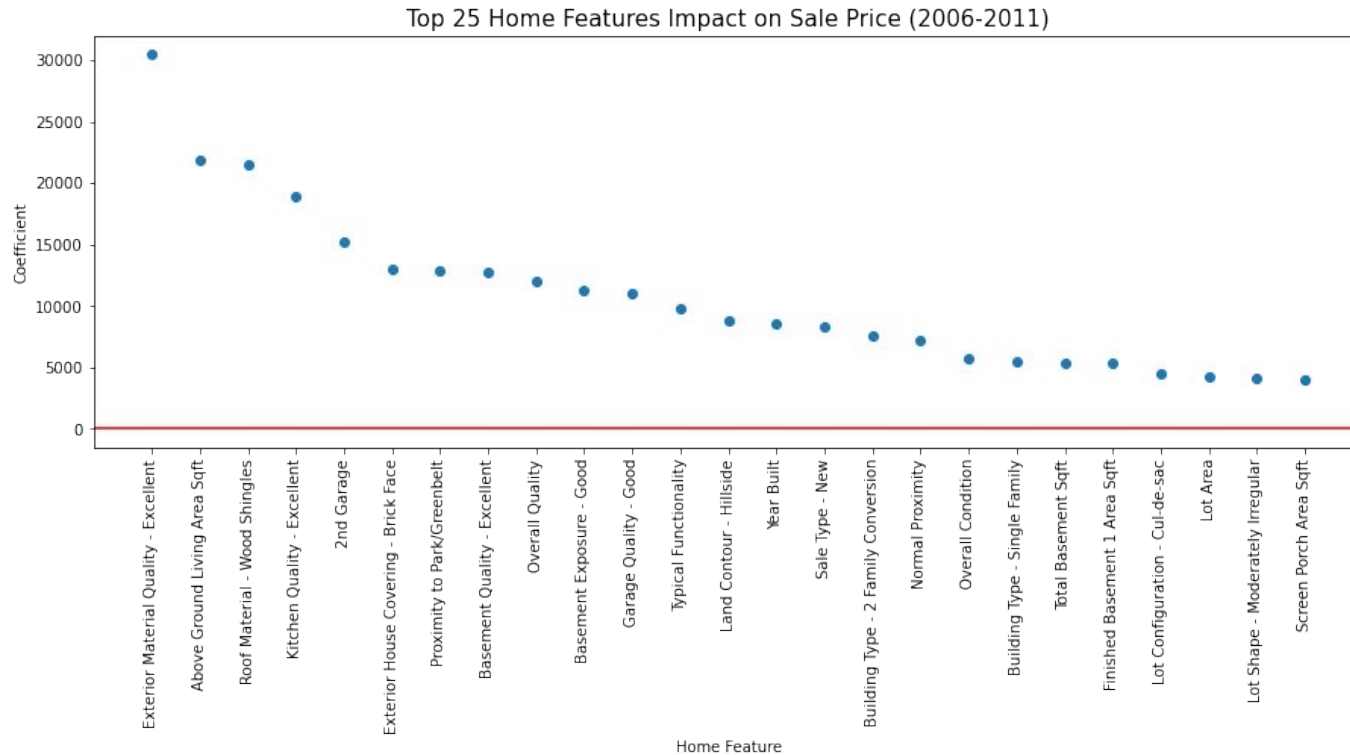
Bottom 25 Home Features Impact on Sale Price (2006-2011)
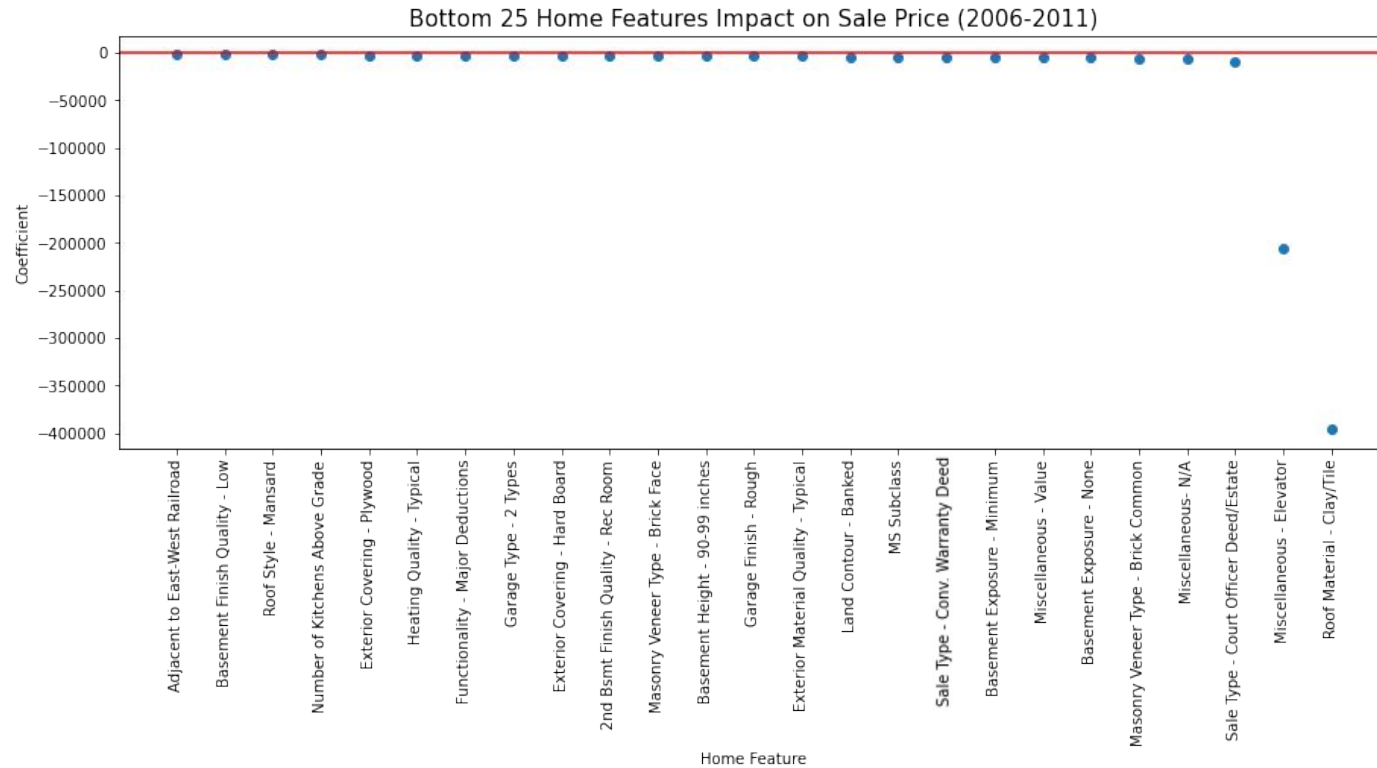
Home Feature Insights

Top 5 home features that <ins>increase</ins> home value:

	Feature	By...
1	Exterior Material Quality - Excellent	$30k
2	Above Ground Living Area Sqft	$22k
3	Roof Material - Wood Shingle	$22k
4	Kitchen Quality - Excellent	$19k
5	2nd Garage	$15k

Home Feature Insights

Bottom 5 home features that <u>decrease</u> home value:

	Feature	By...
1	Roof Material - Clay or Tile	$396k
2	Elevator	$207k
3	Court Officer Deed/Estate Sale Type	$10k
4	Masonry Veneer Type - Brick Common	$6k
5	Basement Exposure - None	$5k

06 Conclusion

Recommendations

- Investing in housing in the Green Hills, Stone Brook, Northridge, Northridge Heights and Crawford neighborhoods

- Considering:

  - Excellent Exterior Material Quality (and avoid Common Brick)

  - Above Ground Living Area Square Footage

  - Wood Shingle Roofing (and avoid Clay/Tile)

  - Excellent Kitchen Quality

  - 2nd Garage

  - Avoiding unnecessary luxury features

Next Steps

1. Gaining more insight as to what is considered Excellent, Good, etc. for some of the categorical features.

2. A follow-up analysis on an updated housing dataset to see if the findings of this analysis continue to hold true.

Questions?

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