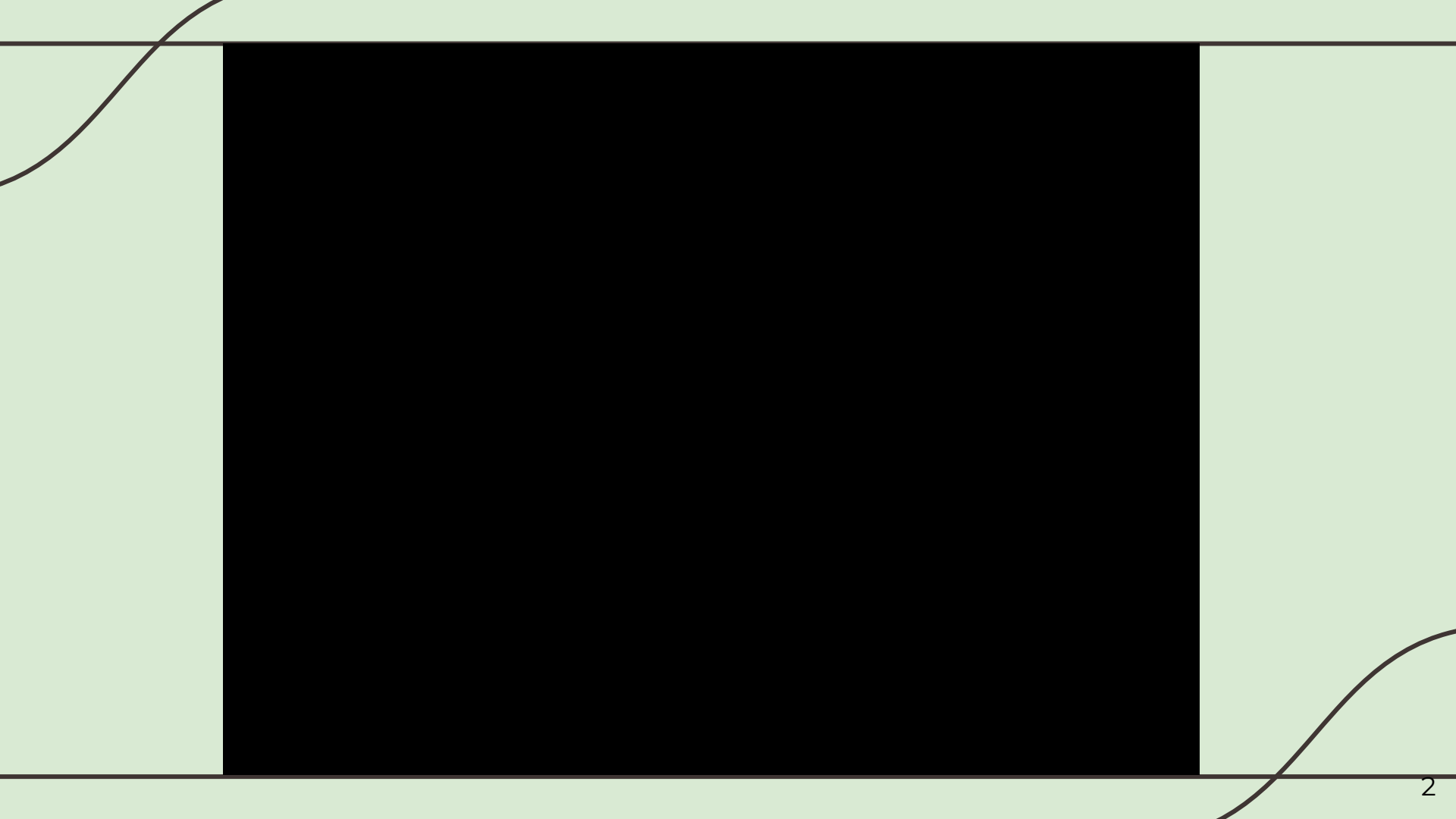


Project 2 - Ames Housing Data

DSIF3 Group 2





Welcome!

Property Flipping Masterclass

11 Dec 2011

Team Proprata



Shu



Cheng Yeow



Sean



Kris



Prop Flippin'

be

Flippin' EZ

Today's masterclass

01

Introduction

Problem Statement

02

Our Secret to Success

Data Cleaning, EDA, Visualizations

03

Our Winning Formula

Modeling and Evaluation

04

What We Have to Offer

Conclusion and Recommendations

AUSTIN FAMILY HOME APPRAISALS

AFTER "WHITEWASH"

\$1,482,500

BEFORE "WHITEWASH"

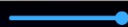
\$995,000



CBS MORNINGS

HOME PRICE DISCRIMINATION

BLACK COUPLE SAYS APPRAISER UNDERVALUED THEIR HOME DUE TO RACE



02:19 / 04:31



Live Software Demo

PropPrata

Your wish is our command

Home Qualities to flip or flop

Enter the desired or current qualities of your home

Building Age

0 0 100

Neighborhood Quality Index (Best=4, Good=3, Average=2, Below Average=1)

1 2 4

Local Positive Features (Best=2, Normal=1, Poor=0)

0 1 2

Remodeled Building (Yes=1, No=0)

0 0 1

01

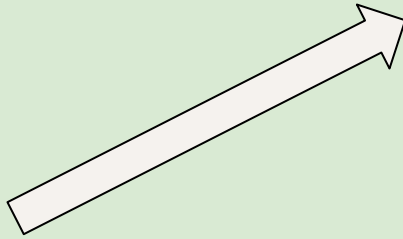
Problem Statement

Introduction

Introduction

Property flipping is an **investment strategy** of purchasing a property with a short holding period with the intent of selling it for a quick profit. ***All investments have risks.***

**BUY
LOW**



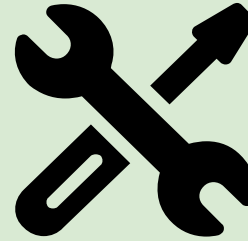
**SELL
HIGH**

Two types of property flipping



Hot Market Conditions

1. Rapidly appreciating market
2. Little to no renovation
3. Higher risk



Renovation Flip

1. Buys undervalued property
2. Improves with renovation
3. Lower risk

Problem Statement

To help novice property flippers manage risks, we will provide consultation upon application, based on **our home valuation** that predicts the sale prices of homes in Ames, Iowa. We have modeled **Linear Regression, Ridge, Lasso and Elastic Net models**. The **sale price prediction software** is also helpful for property buyers or sellers.

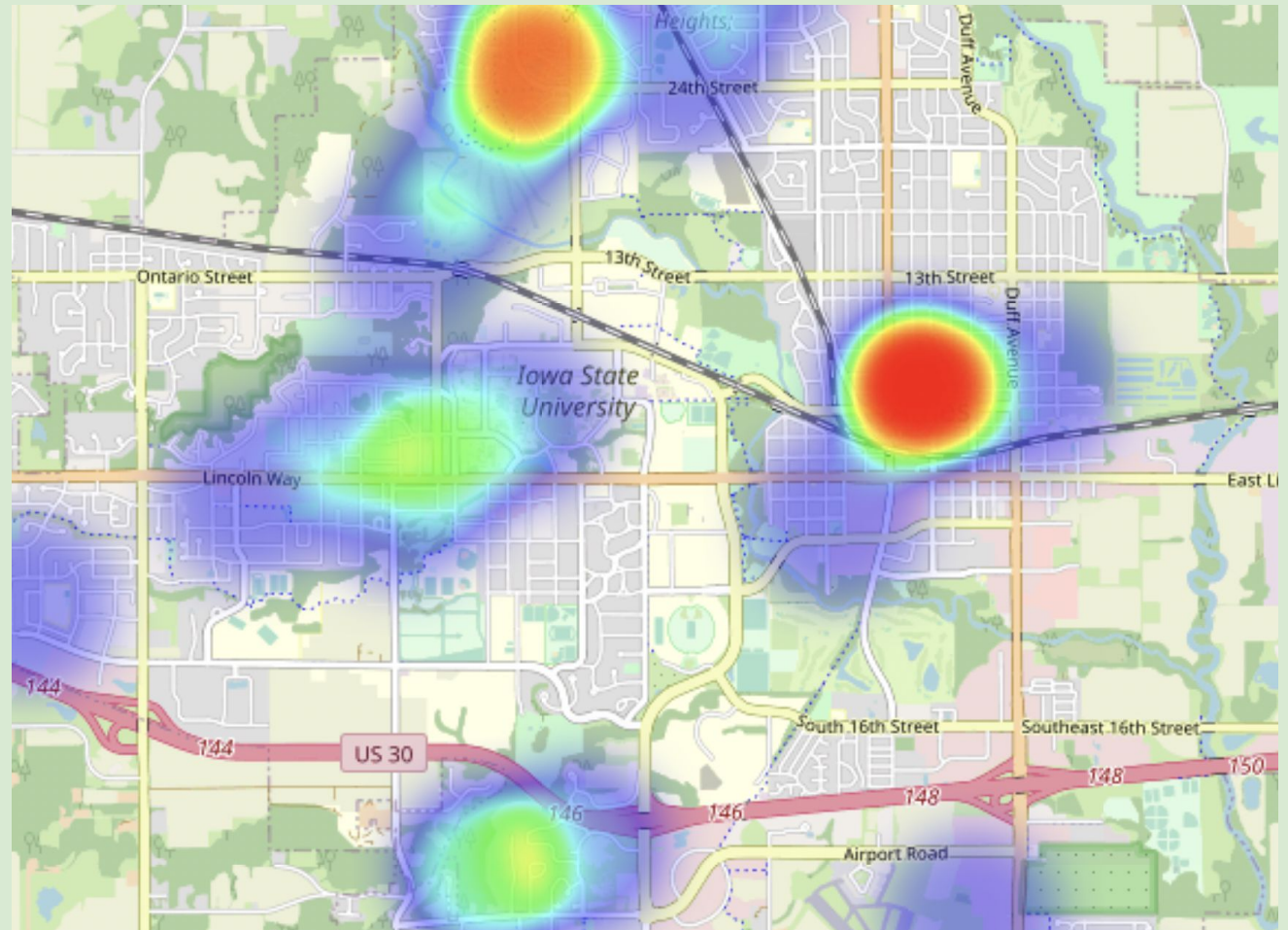
To **better manage risks** for new property flippers, we recommend the Reno Flip.

Thus, our recommendations will **focus on property features** that are more likely to **increase property value** when renovated, and which features to de-prioritise.

“Success in real estate starts when you
believe you are worthy of it.”

Michael Ferrara

Location,
Location,
Location.



Heatmap of sale prices of properties in Ames.

02

Data Cleaning, EDA, Visualizations

Our Secret to Success

Exploring the data

$$2,051 * 80 = 164,080$$

Properties

Sale of Ames
properties in
2006 - 2010

Features

Such as
Basement conditions,
kitchen quality.

Data points

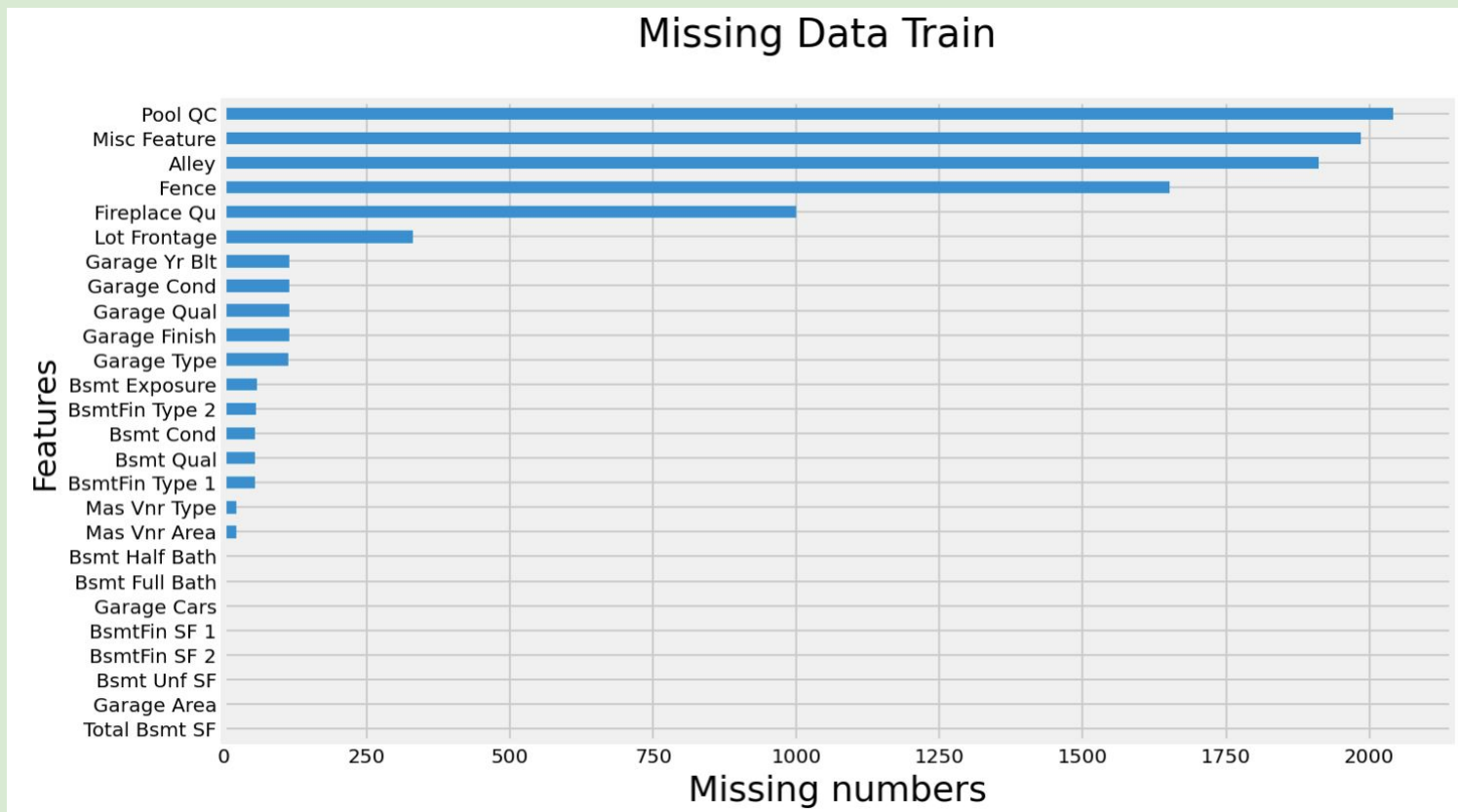
Bits of information

26

Features with
missing data

9,822

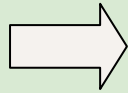
Total
missing data



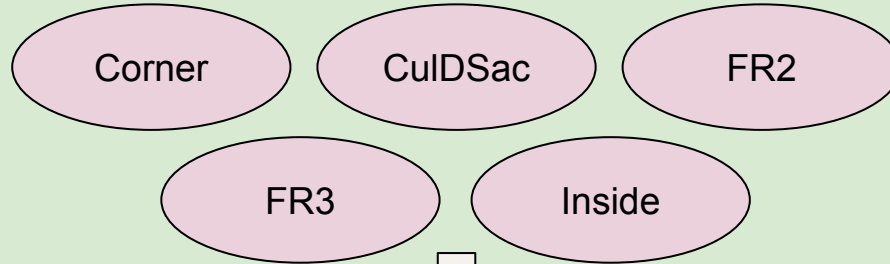
Dealing with missing data - Example

Lot Frontage

Filled missing
values with median



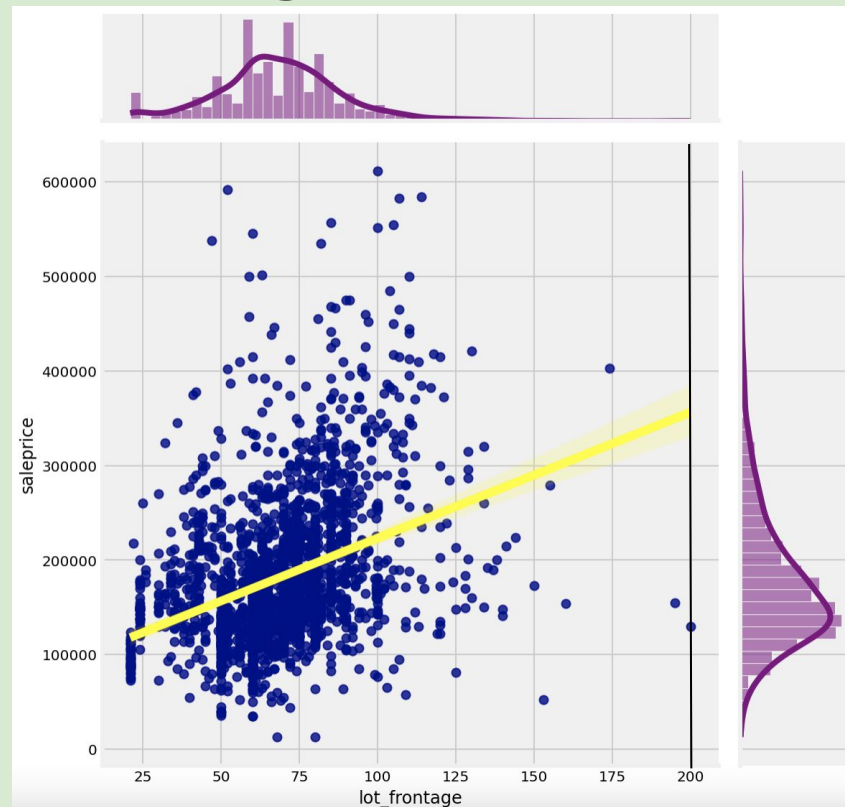
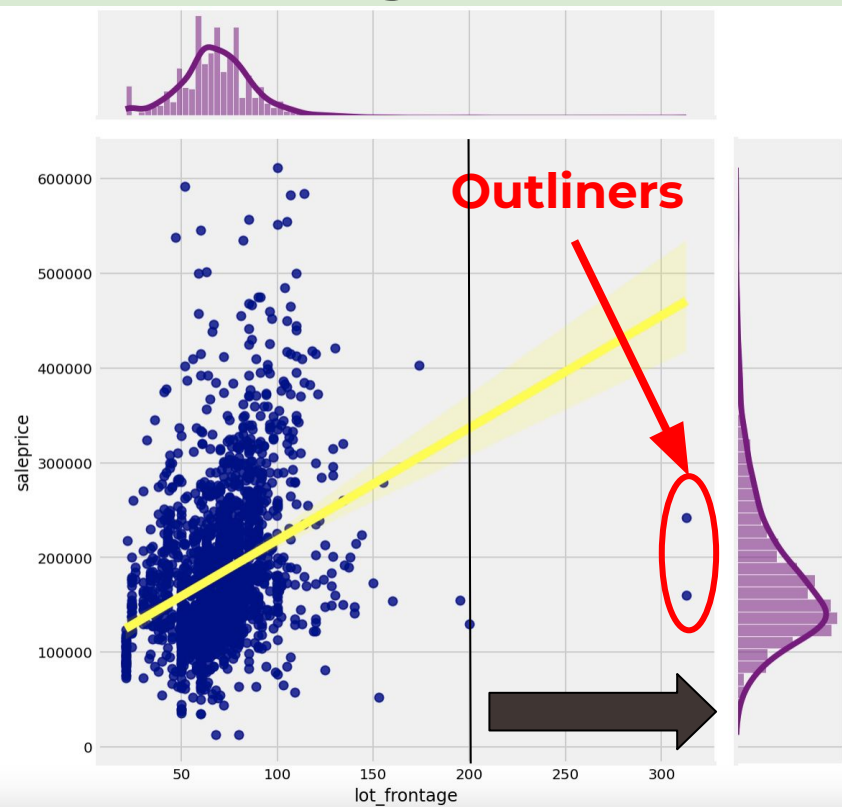
Neighborhood - Lot Config



Transformation

Neighborhood	Blmngtn	Blueste	BrDale	BrkSide			
Lot Config	Inside	Inside	Inside	Corner	FR2	FR3	Inside
Lot Frontage	43.0	24.0	21.0	51.0	60.0	79.5	51.0
Lot Area	3189.0	1866.0	1680.0	6180.0	6911.0	6047.5	6240.0

Dealing with outliers - Lot frontage



Feature Engineering - Neighborhood

Type of variable

Ordinal



Transformation

Mapping of text to numeric
'Ex': 5, 'Gd': 4, 'TA': 3, 'Fa': 2, 'Po': 1



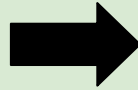
Features

Neighborhood, Kitchen quality

Feature Engineering - Example -KIV

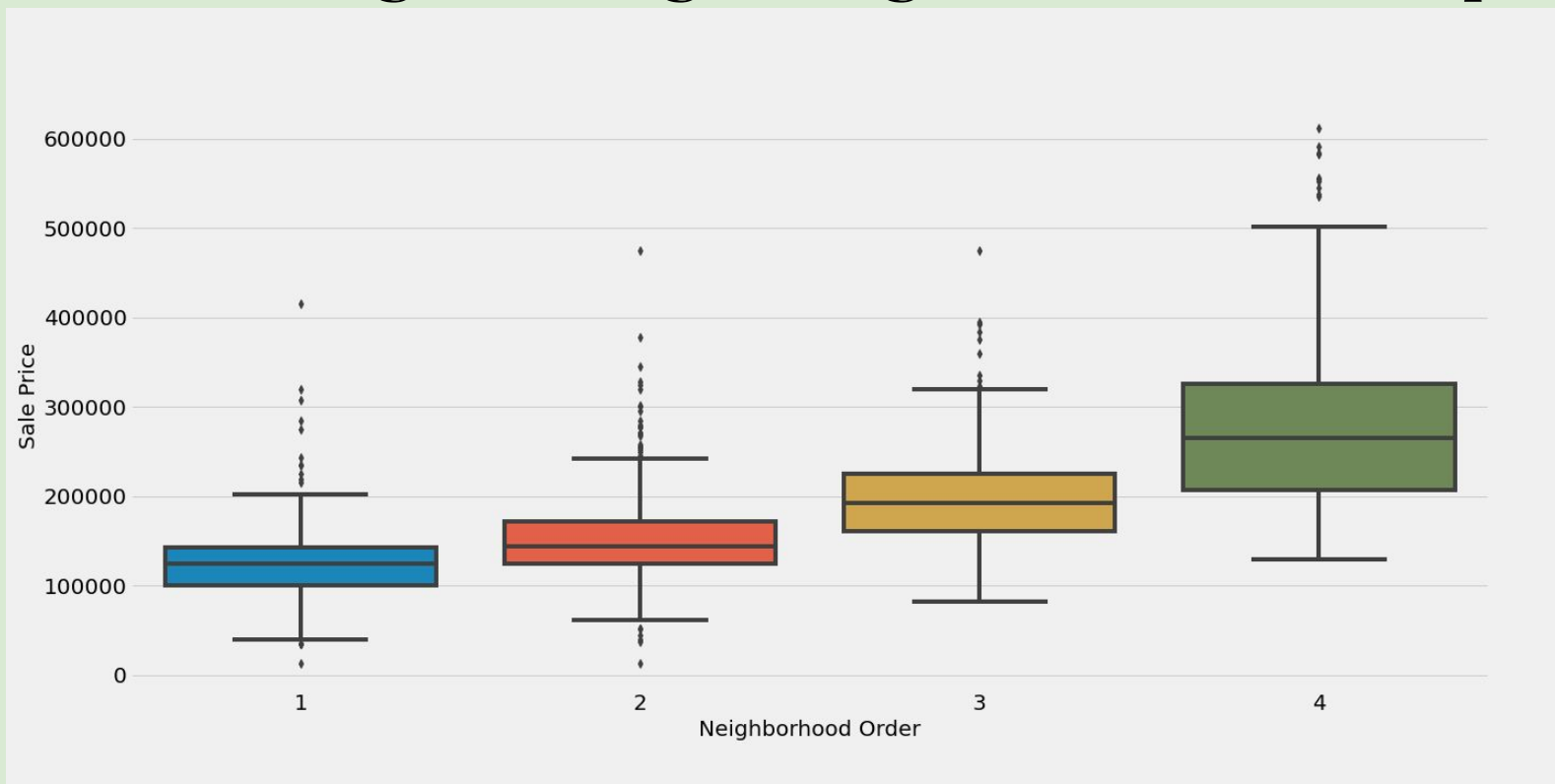
Neighborhood Feature

Classify using the mean value of overall quality & condition, external quality & condition and functional features



Neighborhood Order	Avg Sale Price	No. of Properties
1	124,518	399
2	150,775	791
3	198,180	455
4	278,513	406

Feature Engineering - Neighborhood Example



Cleaned Data

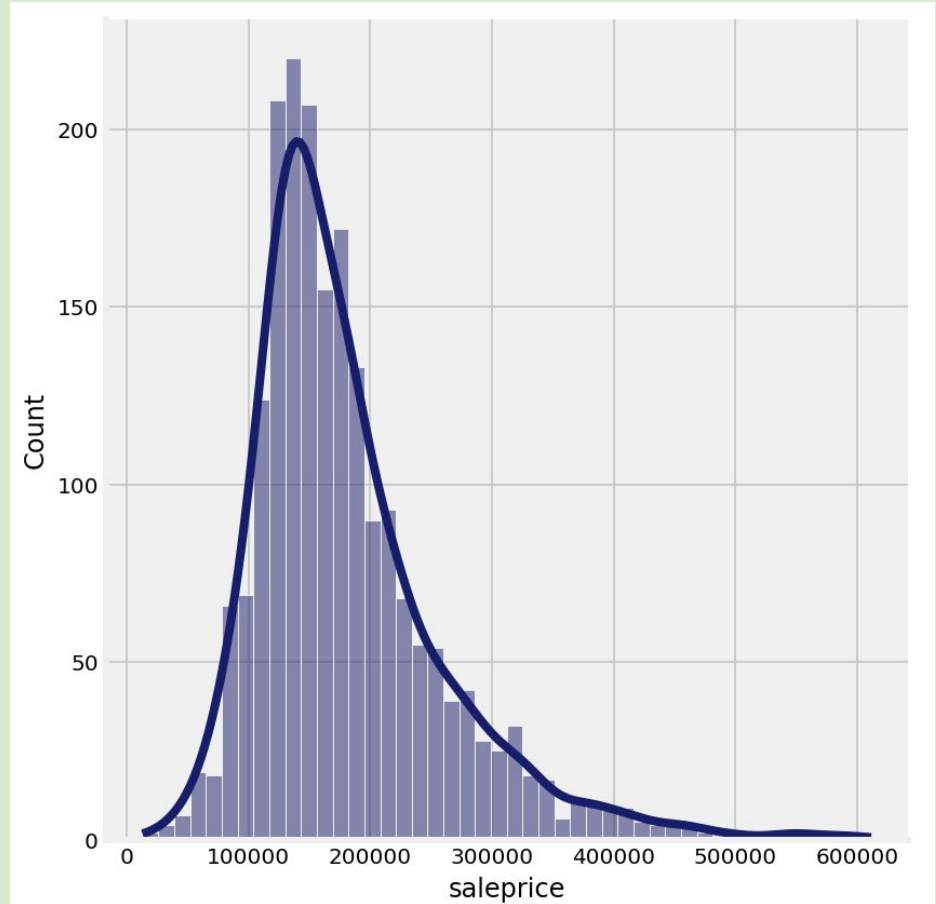
80

Original features



33

Useful features/
group of features



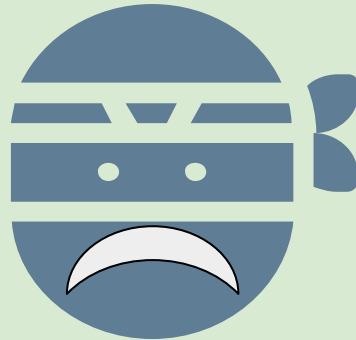
03

Modeling and Evaluation

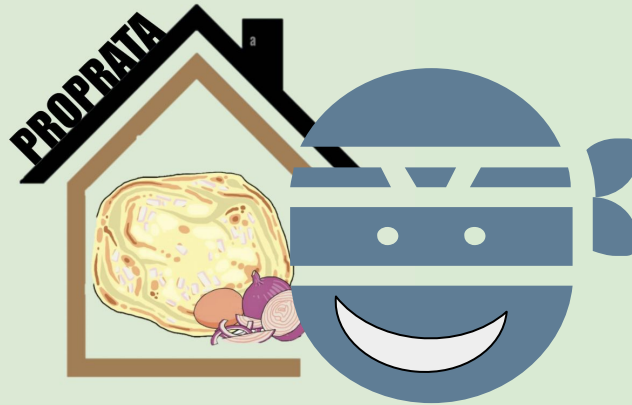
Our winning formula

Firstly.. A look at profits without ProPrata's help!

Losses in potential profits of up to \$70000 *and more.*



With ProPrata's help, profits have gone up as much as \$48000!





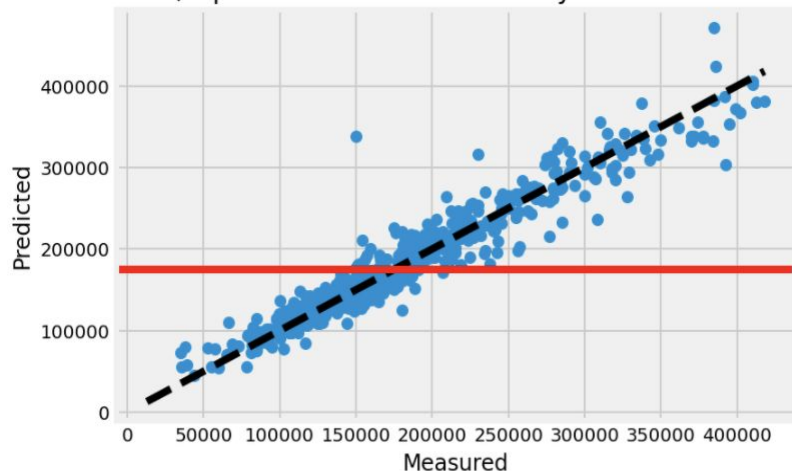
But how did we do it?

Let's take a look at our Proprata's formula VS
other companies' formula!



Proprata's Model

Mean in red, Optimized LassoCV With Polynomial Features in black



Prediction buffer

\$20,253.00

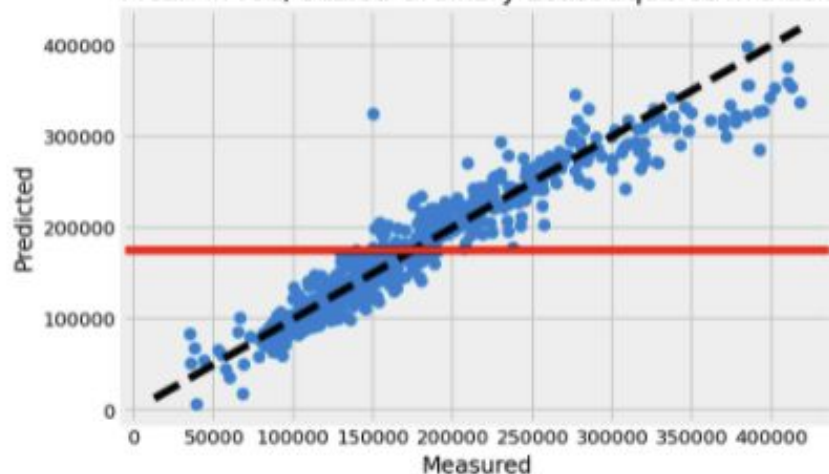
Predictive power

past clients 92%

prospective clients 93%

Coy A's Model

Mean in red, Scaled Ordinary Least Squares in black



Prediction buffer

\$22,692.69

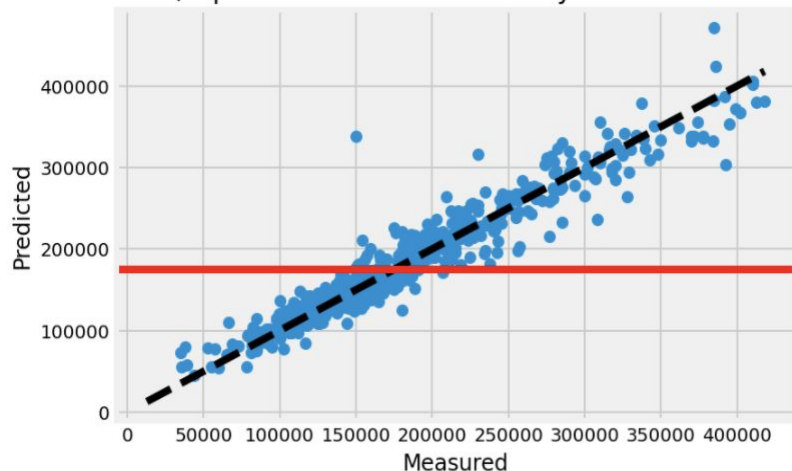
Predictive power

past clients 89%

prospective clients 90%

Proprata's Model

Mean in red, Optimized LassoCV With Polynomial Features in black



Prediction buffer

\$20,253.00

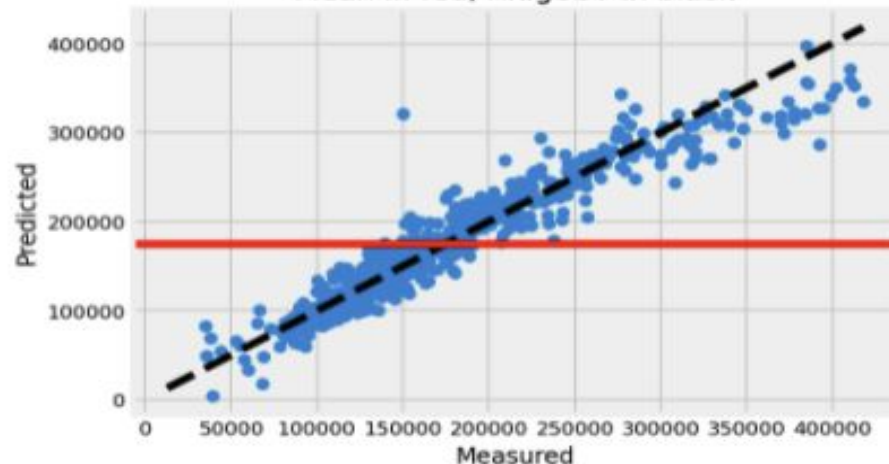
Predictive power

past clients 92%

prospective clients 93%

Coy B's Model

Mean in red, RidgeCV in black



Prediction buffer

\$22,673.49

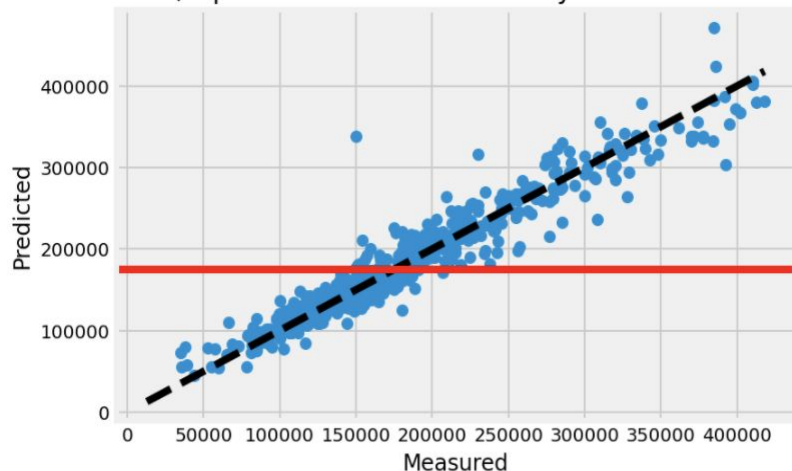
Predictive power

past clients 89%

prospective clients 90%

Proprata's Model

Mean in red, Optimized LassoCV With Polynomial Features in black



Prediction buffer

\$20,253.00

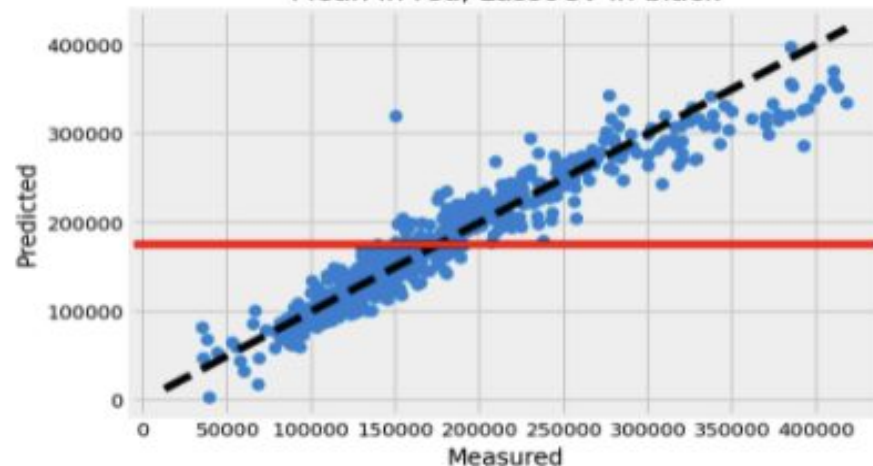
Predictive power

past clients 92%

prospective clients 93%

Coy C's Model

Mean in red, LassoCV in black



Prediction buffer

\$22,685.97

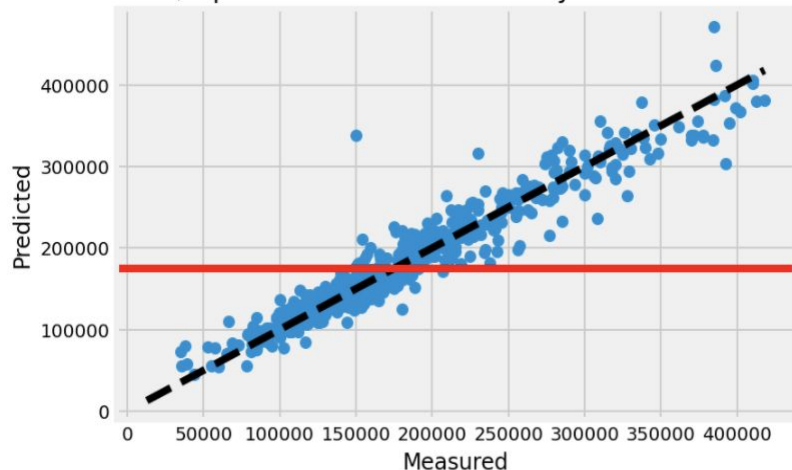
Predictive power

past clients 89%

prospective clients 90%

Proprata's Model

Mean in red, Optimized LassoCV With Polynomial Features in black



Prediction buffer

\$20,253.00

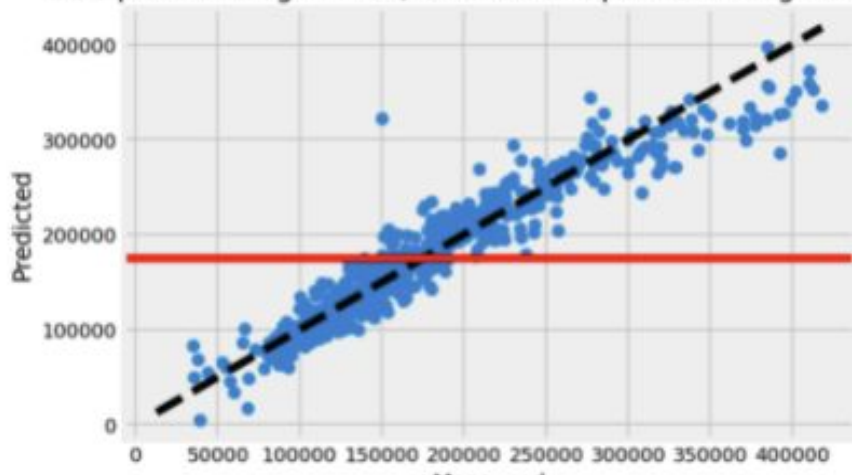
Predictive power

past clients 92%

prospective clients 93%

Coy D's Model

Sale price average in red, Gridsearch Optimized Ridge in black



Prediction buffer

\$22,676.54

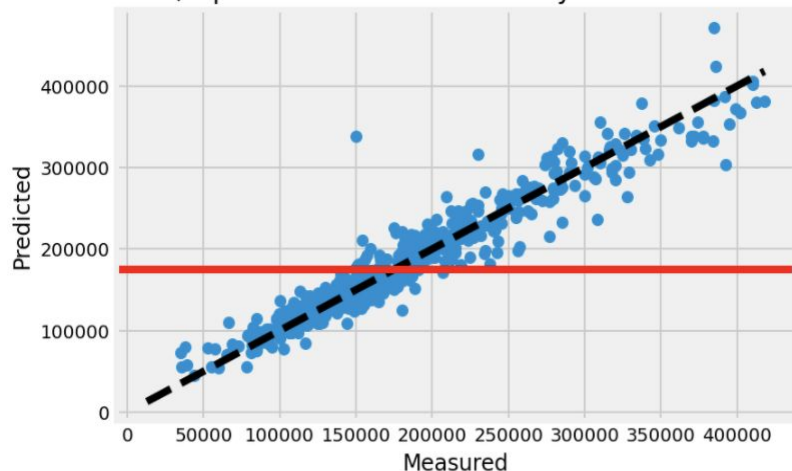
Predictive power

past clients 89%

prospective clients 90%

Proprata's Model

Mean in red, Optimized LassoCV With Polynomial Features in black



Prediction buffer

\$20,253.00

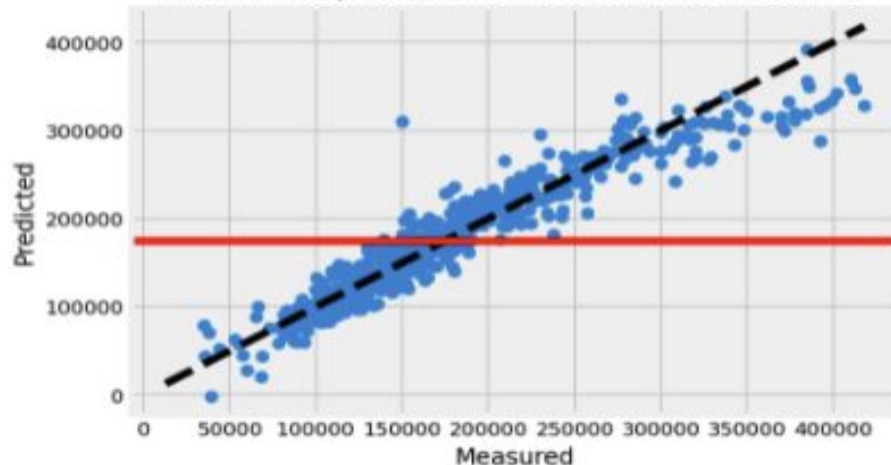
Predictive power

past clients 92%

prospective clients 93%

Coy E's Model

Mean in red, ElasticNet Model dashed black line



Prediction buffer

\$22,752.07

Predictive power

past clients 89%

prospective clients 90%



Proprata's
Optimized
LassoCV_{with}
Polynomial
Features
Model

\$20,253.00

Prediction buffer

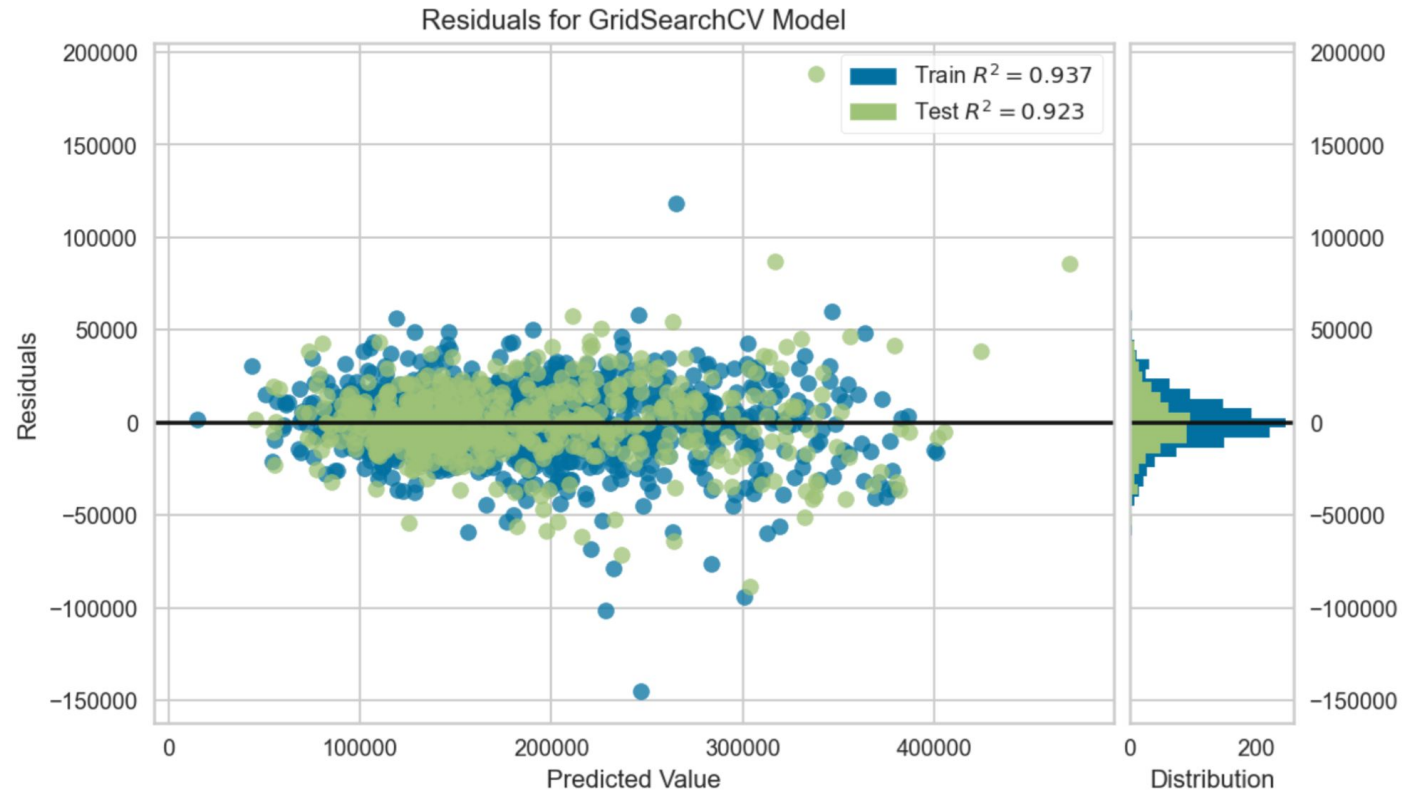
92%

Predictive power : ***past*** clients

93%

Predictive power : ***prospective*** clients

The Predictive Power of Proprata's Model





19591.74

Kaggle Submission Score

04

Conclusion and Recommendations

What we have to offer

Top 20 Features

Rank	Features	Rank	Features
1	Rooms above size	11	External features
2	Single storey	12	Garage area
3	Basement ceiling	13	Ground living area
4	Outside space	14	Lot size
5	Neighbourhood quality	15	Kitchen quality
6	Local features	16	Basement size
7	Fireplace quality	17	Duplex building
8	Paved driveway	18	Remodeled
9	Lot frontage	19	Heating quality
10	Floor size	20	Basement quality

Features to buy into:



Rooms above
Size

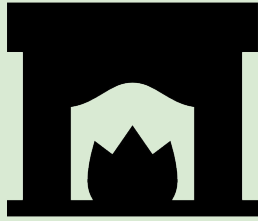


Single Storey



Neighborhood
Quality

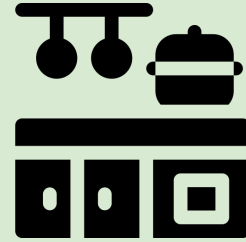
Features to reno:



Fireplace Quality

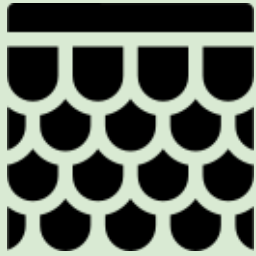


Paved Driveway



Kitchen Quality

Insignificant features:



Roof Quality



Age



Bath Rooms

Customised recommendations

Case Study



Seller X

Budget
constraints



Consultation

Went through our
winning formula
and took our advice.



Renovation

Upgraded his
fireplace for

\$280



Result

Predicted increase
in saleprice

\$2838

TODAY only.

“Real Estate cannot be lost or stolen.
Nor can it be carried away.
Purchased with common sense,
paid for in full,
and managed with reasonable care,
it is about the safest investment in the
world.”

—**Franklin D' Roosevelt**

Thank you

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