



Fig.1 [1]

Airbnb Housing Price Guide for First-time Hosts in Ottawa

Presented by Team 5

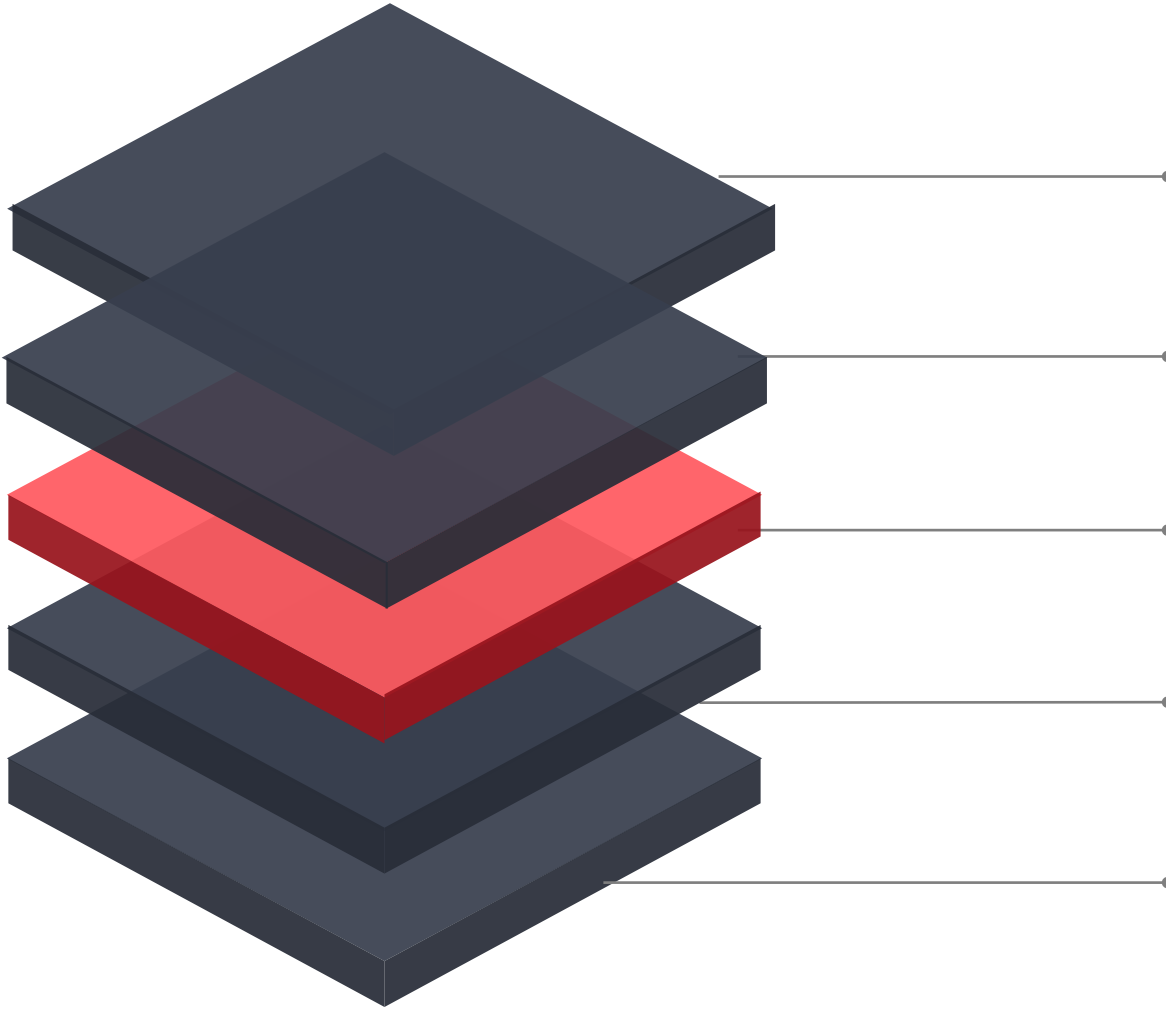
Jiaru Li

Ruiyang Li

Yixin Sun

Keying Chen

Agenda



| **Introduction & Problem Statement**

| **Data Sources**

| **Feature Engineering**

| **Model & Methods**

| **Conclusion & Takeaways**



- Houseowners make money



- Travelers have new experiences



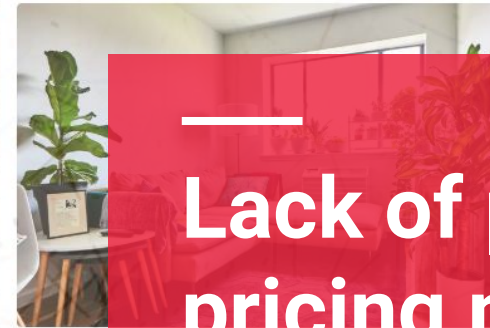
SUPERHOST Manhattan · New York ★ 4.95
Manhattan Lux Loft.Like.Love.Lots.Look !
\$218 CAD/night



SUPERHOST Hell's Kitchen · New York ★ 4.90
The Artist's Experience
\$133 CAD/night



Brooklyn ★ 4.72
Brownstone Studio
\$114 CAD/night



SUPERHOST Alphabet City · New York ★ 4.76
Sunny, Modern room in East Village!
\$47 CAD/night



SUPERHOST Manhattan · New York ★ 4.83
Apartment 6
\$133 CAD/night



SUPERHOST Bushwick · Brooklyn ★ 4.82
Private! entire studio, own entrance, private bath
\$80 CAD/night



Williamsburg · Brooklyn ★ 4.65
Bedford Loft, Williamsburg Prime
\$229 CAD/night



Manhattan · New York ★ 4.33
Private Bedroom in Manhattan
\$60 CAD/night

Lack of predictive pricing models...

Unformed spot checks [3] are used by first-time hosts currently.

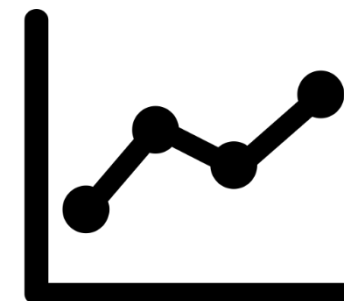
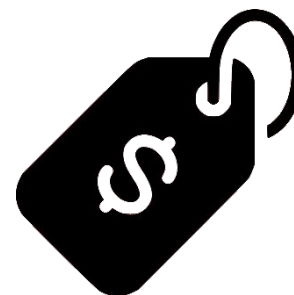
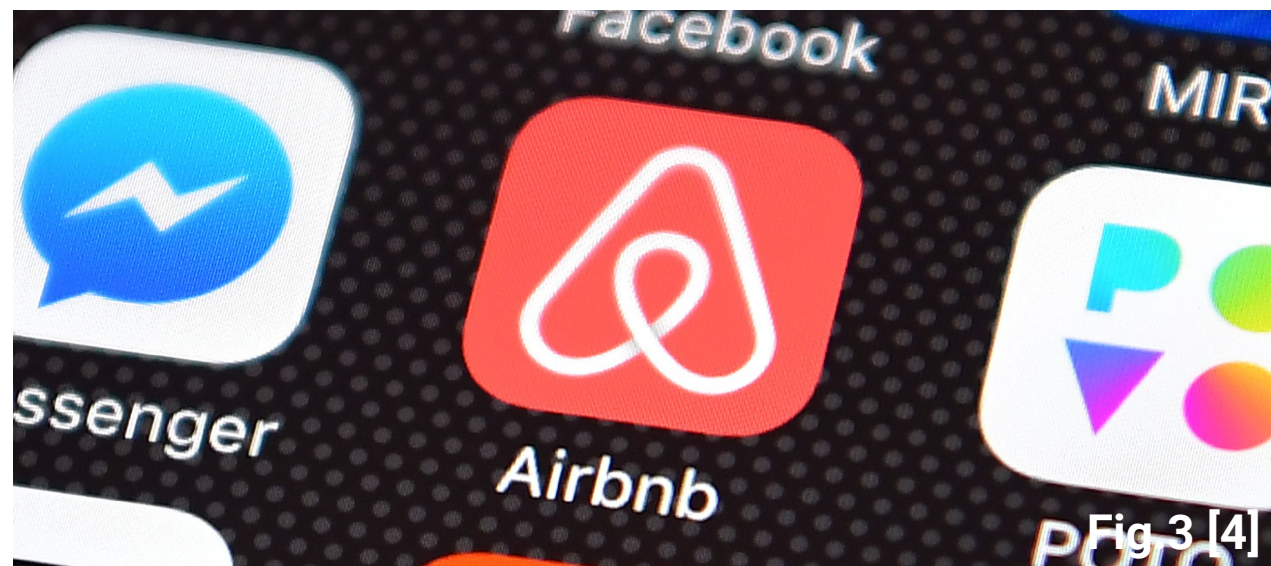
Fig.2 [2]

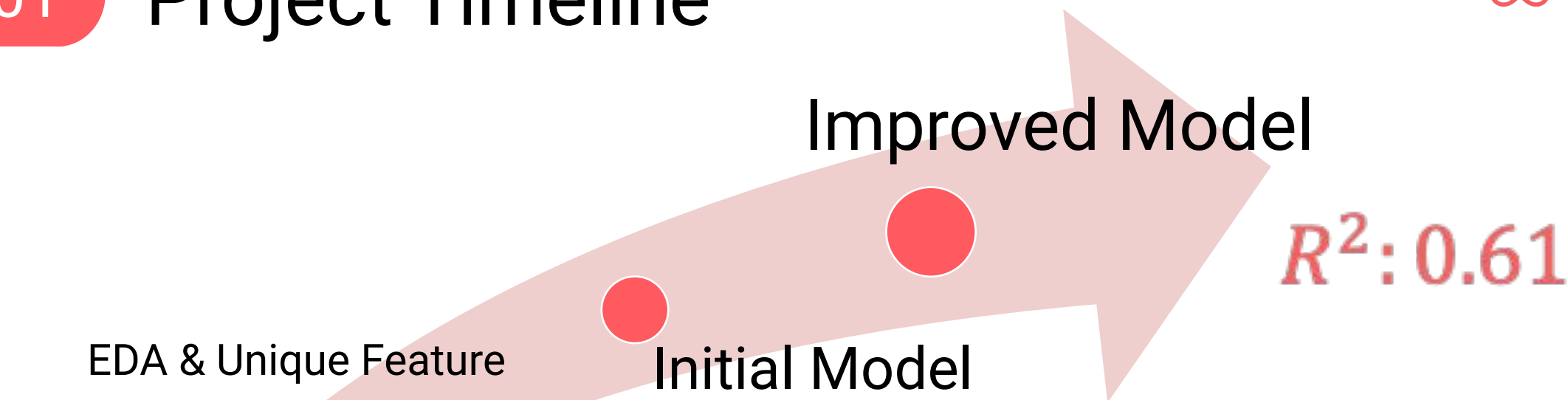
| Identify correlations

- What are the significant features?
- How can these features affect the **prices**?

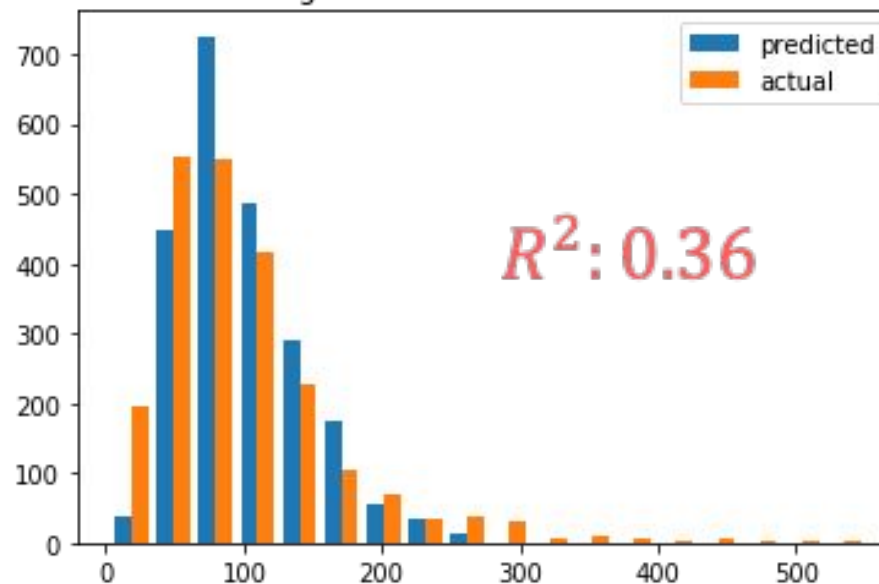
| Build a price prediction model

- What is an appropriate listing **price**?





Linear Regression Prediction vs. Actual Price





Inside Airbnb

- Listing lodging prices
- Ottawa, Ontario, Canada
- September, 2019



Property Sales in Ontario

- Property Selling prices
- Ontario, Canada
- July, 2016



Property Description Tone



Average Property Price



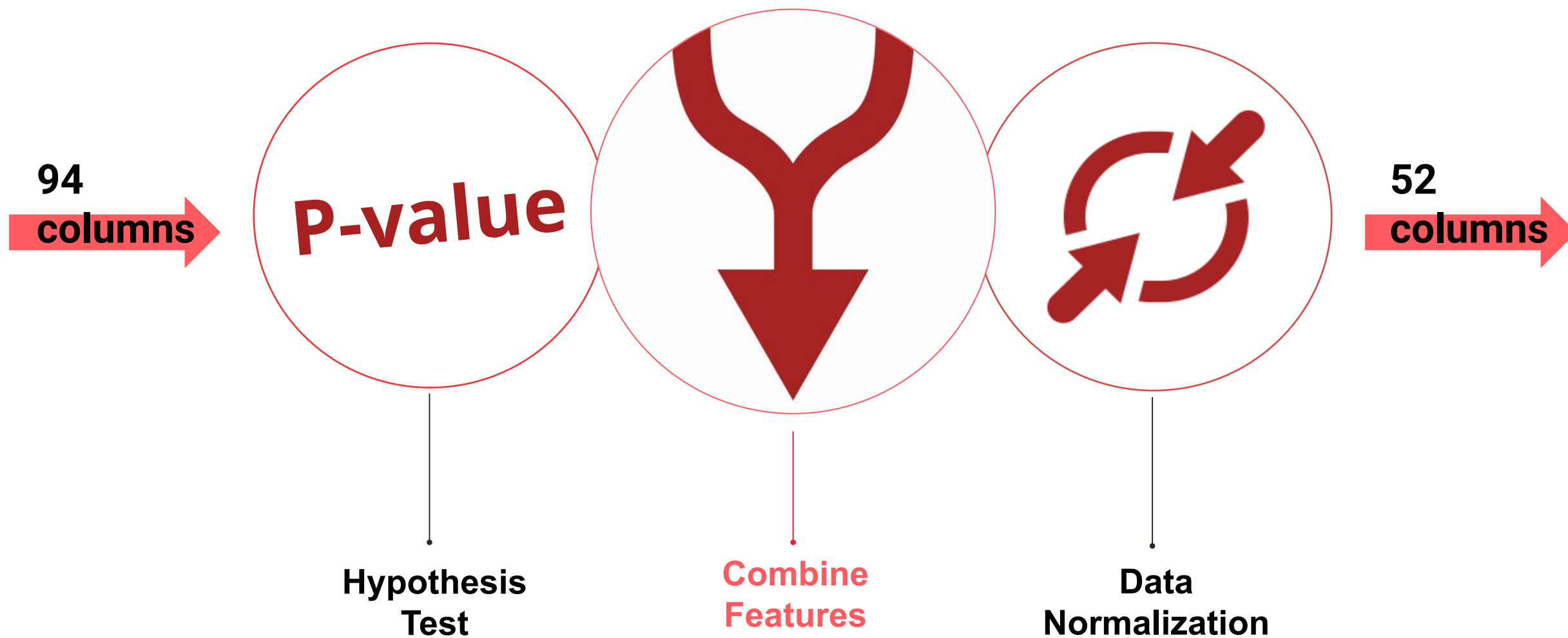
Fig.5 [6]

Distance To Downtown



Fig.6 [7]

Number of Airbnb Nearby



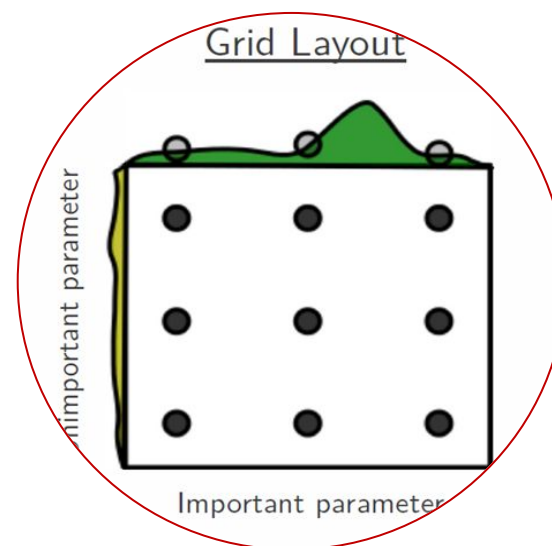
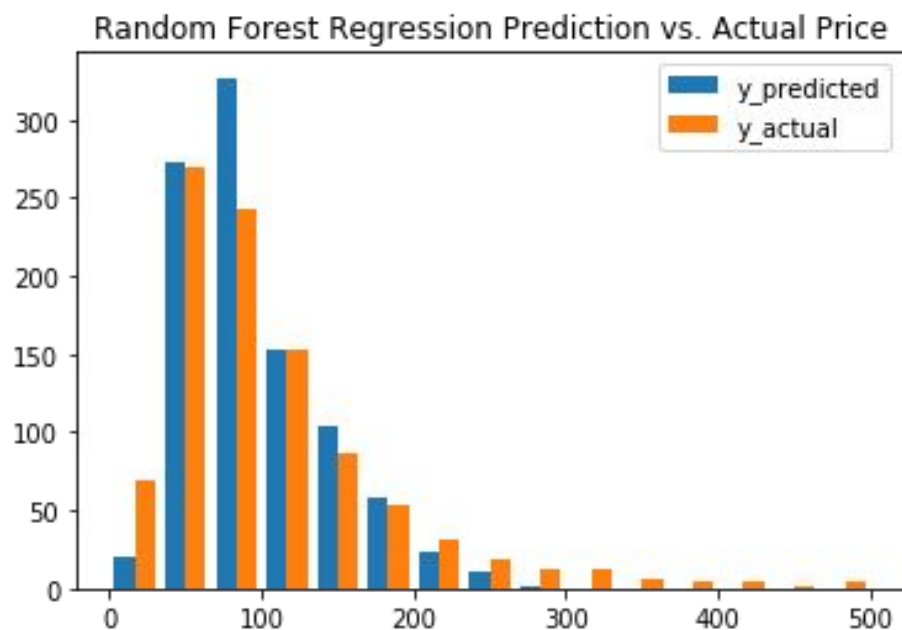


Fig.7 [8]

Grid
Search

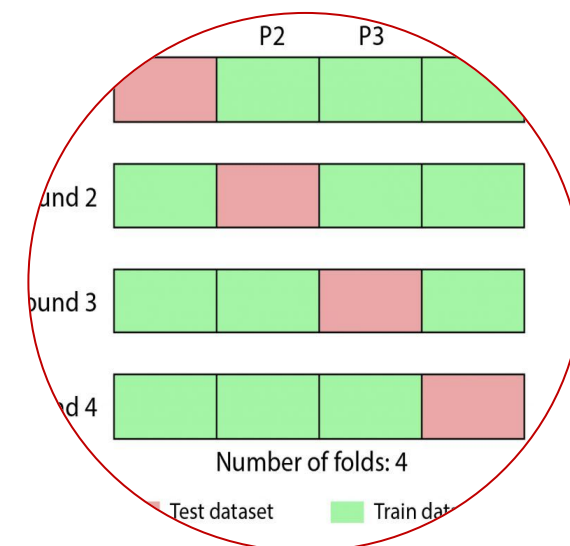


Fig.8 [9]

Cross
Validation

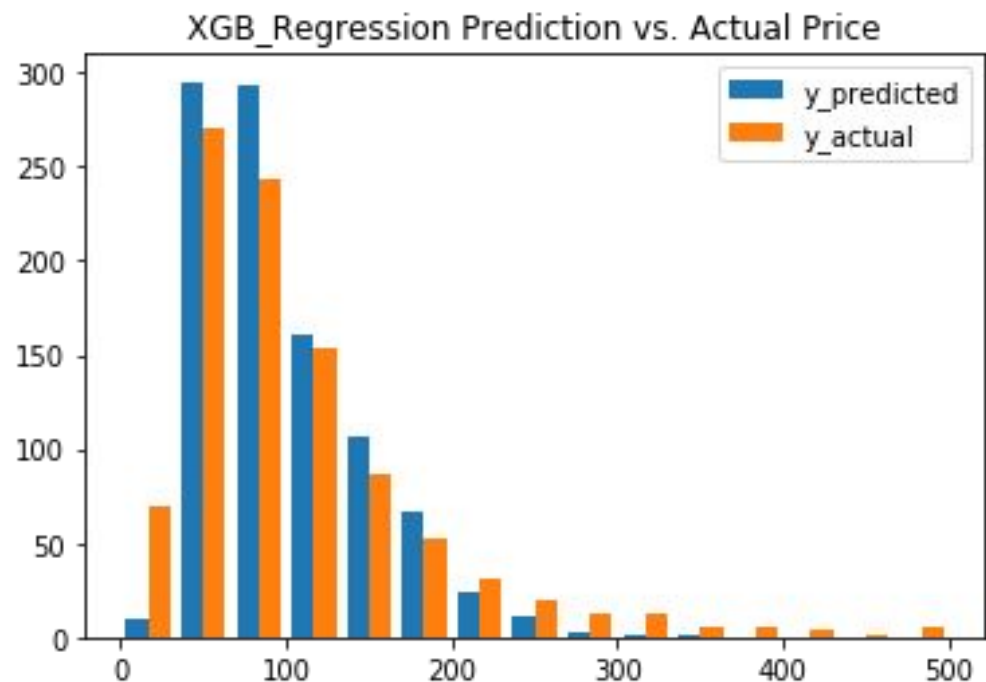
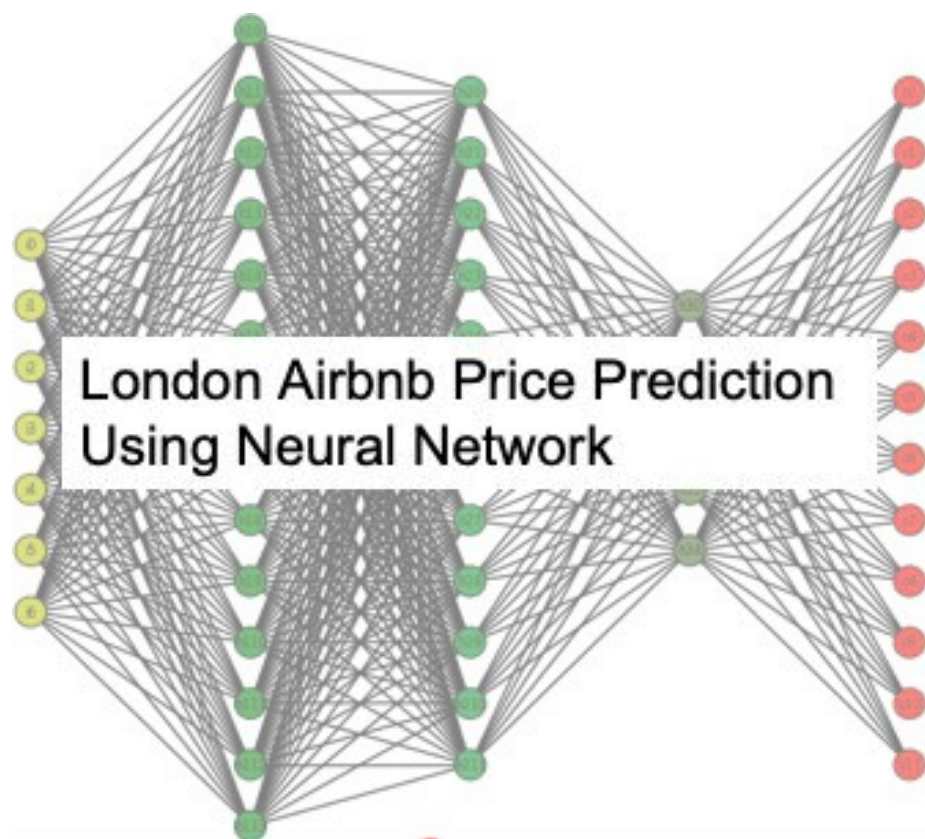


Fig.9 [10]


XGB Model
(Decision Tree Ensembles)

BENCHMARK

 $R^2: 0.71$

V.S.

Our Models	R^2
Linear Regression	0.46
Random Forest Regression	0.56
XGBoost Regression	0.61



I have an empty apartment to rent, but I've never used Airbnb before... What should I do?

Lodging condition:

- Apartment
- 2 bedrooms
- 2 bathrooms
- 4 guests
- extra person: \$25
- no free parking
- no shampoo provided

Housing Price Guides in Ottawa**Lodging Type**

- Apartment
- House
- Shared room with the host

Please enter the number of bedrooms: _____

Please enter the number of bathrooms: _____

Please enter the number of guests allowed: _____

...
...
...

Predicted Price

$$= (9.95 + 1*(-0.94) + 2*(1.17) + 2*(0.43) + 4*(0.302) + \sqrt{25}*(-0.13) + \dots)^2$$

= \$153.066

Is there
anything I
could add to
raise the price?

If a shampoo is included:

New Price

$$= (9.95 + 1*(-0.94) + 2*(1.17) + 2*(0.43) + 4*(0.302) + \sqrt{25}*(-0.13) + 0.445\dots)^2$$

= **\$164.28**

\$11

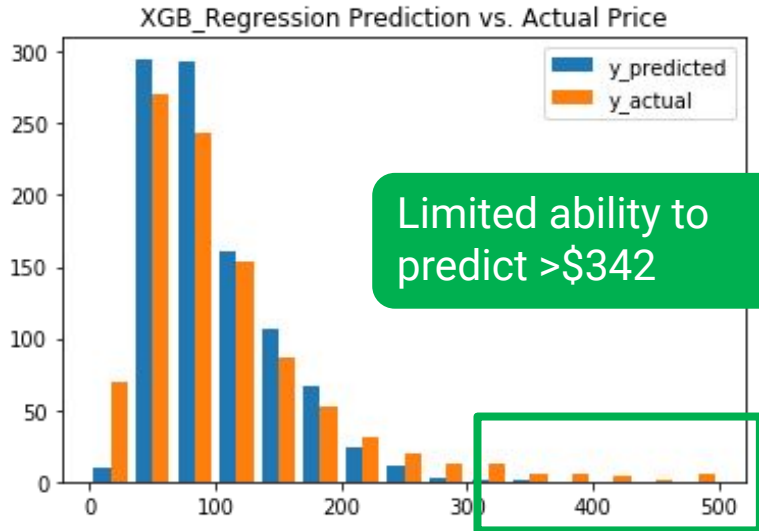
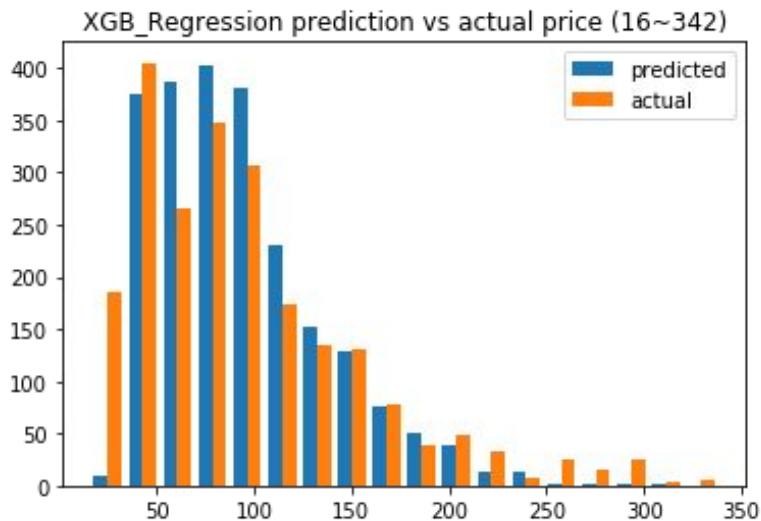


\$3.96

Pantene Pro-v Ultimate 10
Bb Shampoo Pantene
Walmart.ca

Fig.10 [11]

1

 $R^2: 0.59$  $R^2: 0.61$ 

2

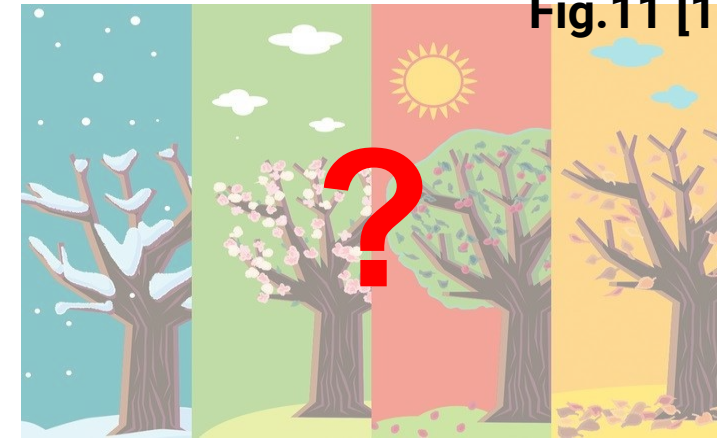


Fig.11 [12]

Cannot predict seasonal or event-based price fluctuations



Fig.12 [13]

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