Maximize Airbnb Hosts Profit During Holiday

Lu Sun, Qiyao Chen, Yang Cao, ChaoRan Huang, Jinrui Wang

Abstract

During holidays, hotels and Airbnb houses are in higher demand than usual, so hosts always increase the house rent in order to get more profit. To maximize Airbnb hosts' profit, what is the best house rent to set? When increasing the house rent, the occupancy will decrease based on our intuition. So we look at the trade off between house rent and occupancy, and then find the profit maximized price. In our project, we looked at 41,187 listings in New York city, and fitted a tree based model for the price and occupancy trade-off. Based on our model, for any given house listing in New York city, we can provide a house rent that can maximize the host's profit during the holiday.
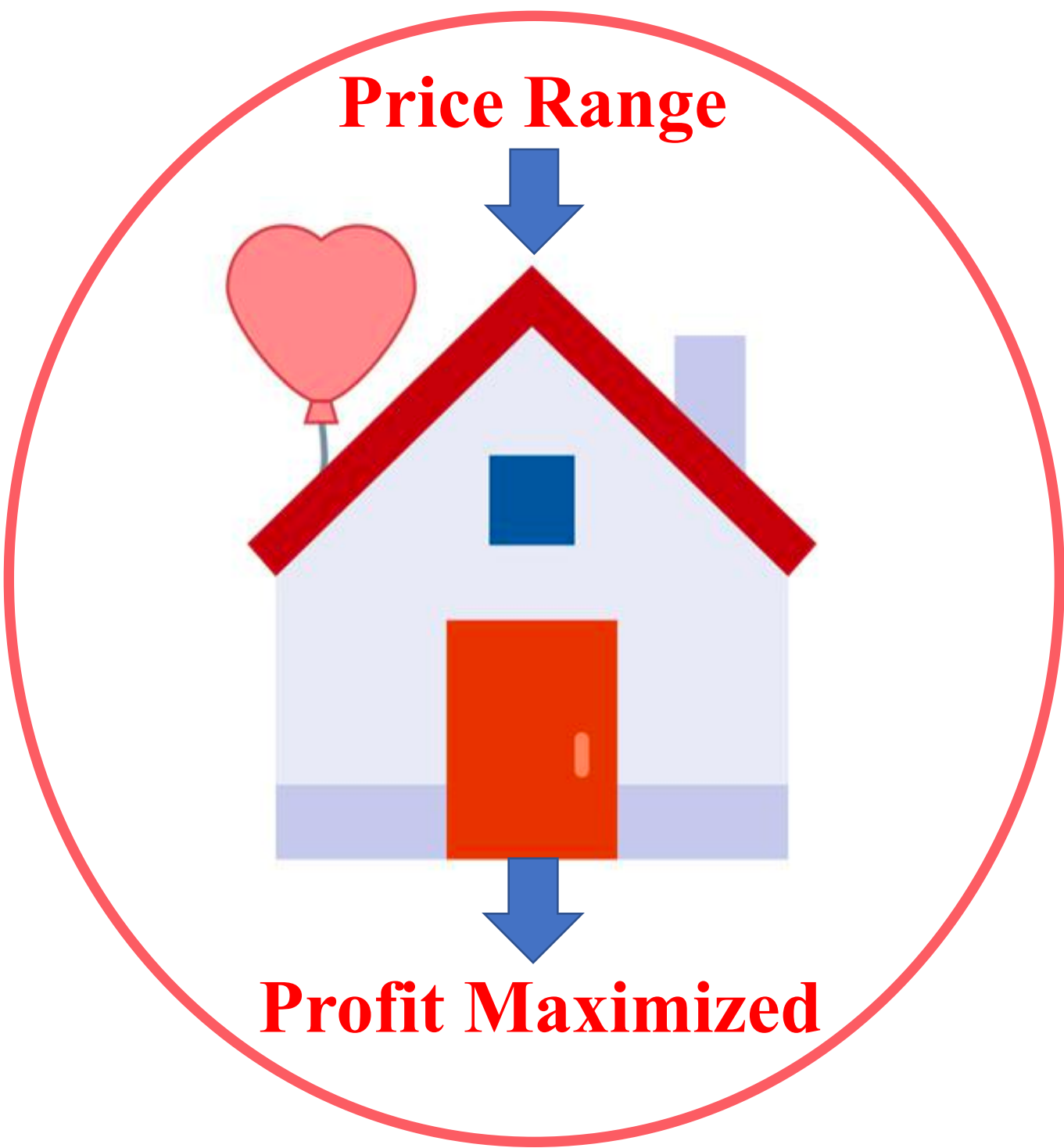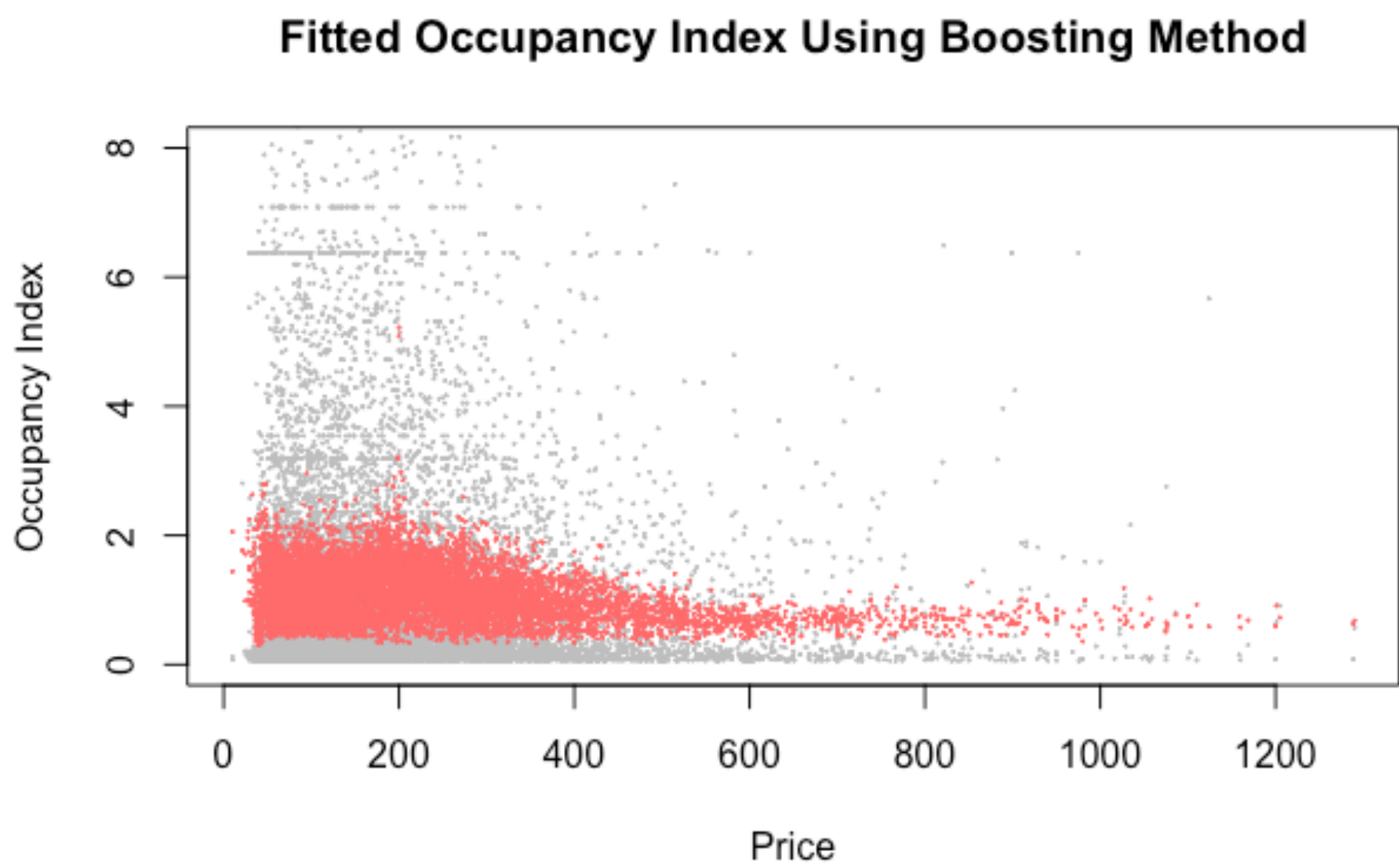
Data

- From Inside Airbnb Website
- Everyday price and availability
- Divide into holiday and non-holiday and get 1104957 observations as in table

Listing	Year	Holiday	Price	Reviews
1050	2015	yes	price1	...
1050	2015	no	price2	...
1050	2016	yes	price3	...
1050	2016	no	price4	...
1050	2017	yes	price5	...
1050	2017	no	price6	...

- Pick only active house listing (available length > 30%)
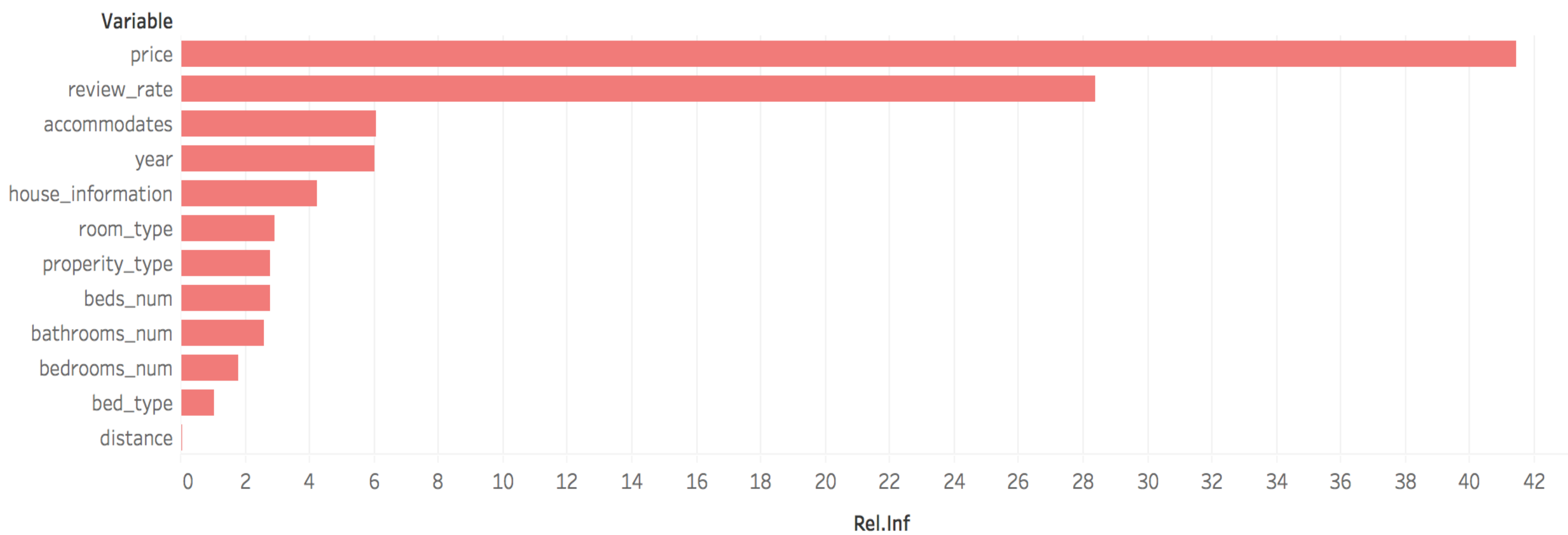
Price Range

Profit Maximized

Occupancy

- Estimated using equation: Occupancy index= (review numbers/0.72)*5.1
- Around 72% Airbnb customers leave reviews after a stay
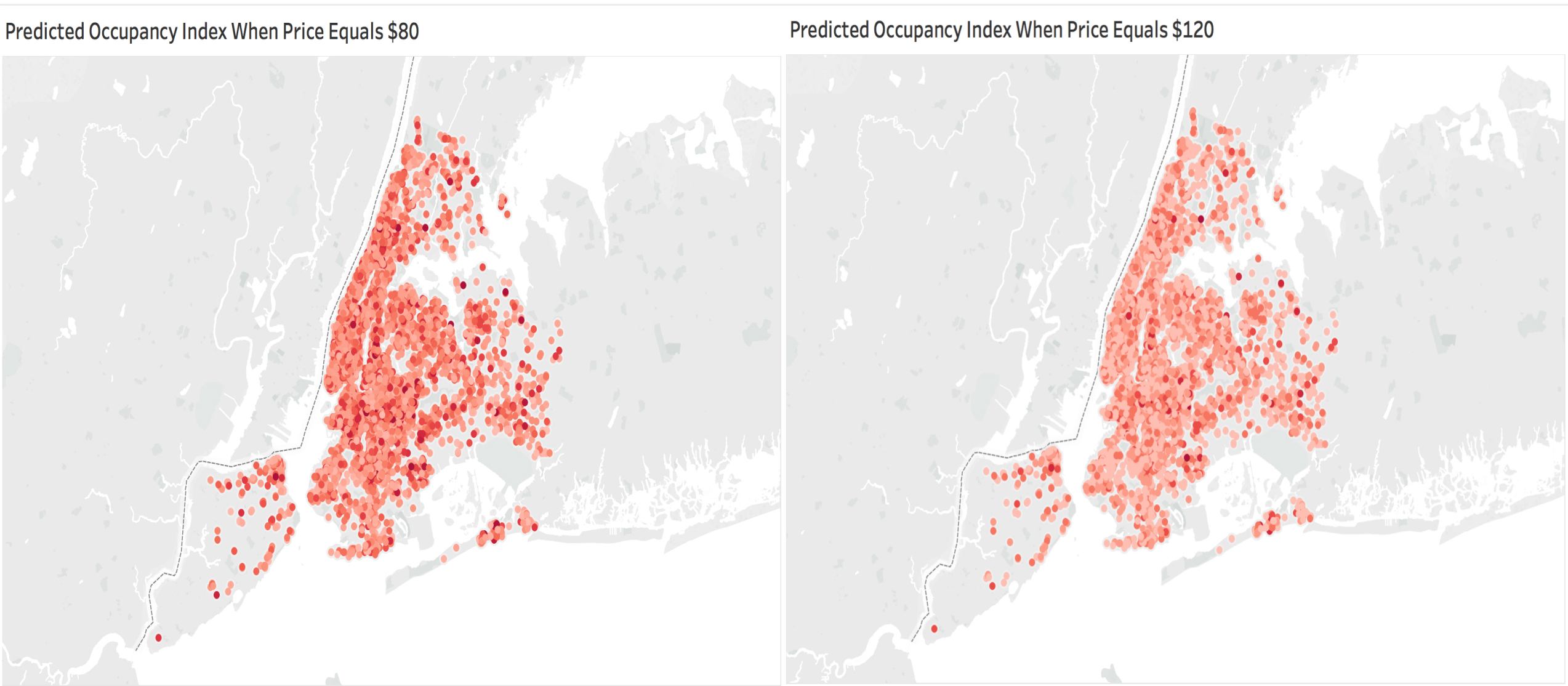- The average Airbnb stay length is 5.1 nights

Predictors

- Price, Year, Room_type, Property_type, Bed_type
- Review_rate: the average house review rate during a certain period
- Accommodates: the number of accommodates
- House_informtion: a summary of house amenity
- Beds_num: the total number of beds in the house
- Bathrooms_num: the total number of bathrooms
- Bedrooms_num: the total number of bedrooms
- Distance: the distance from main city landmarks

Model

- Use boosted regression tree method
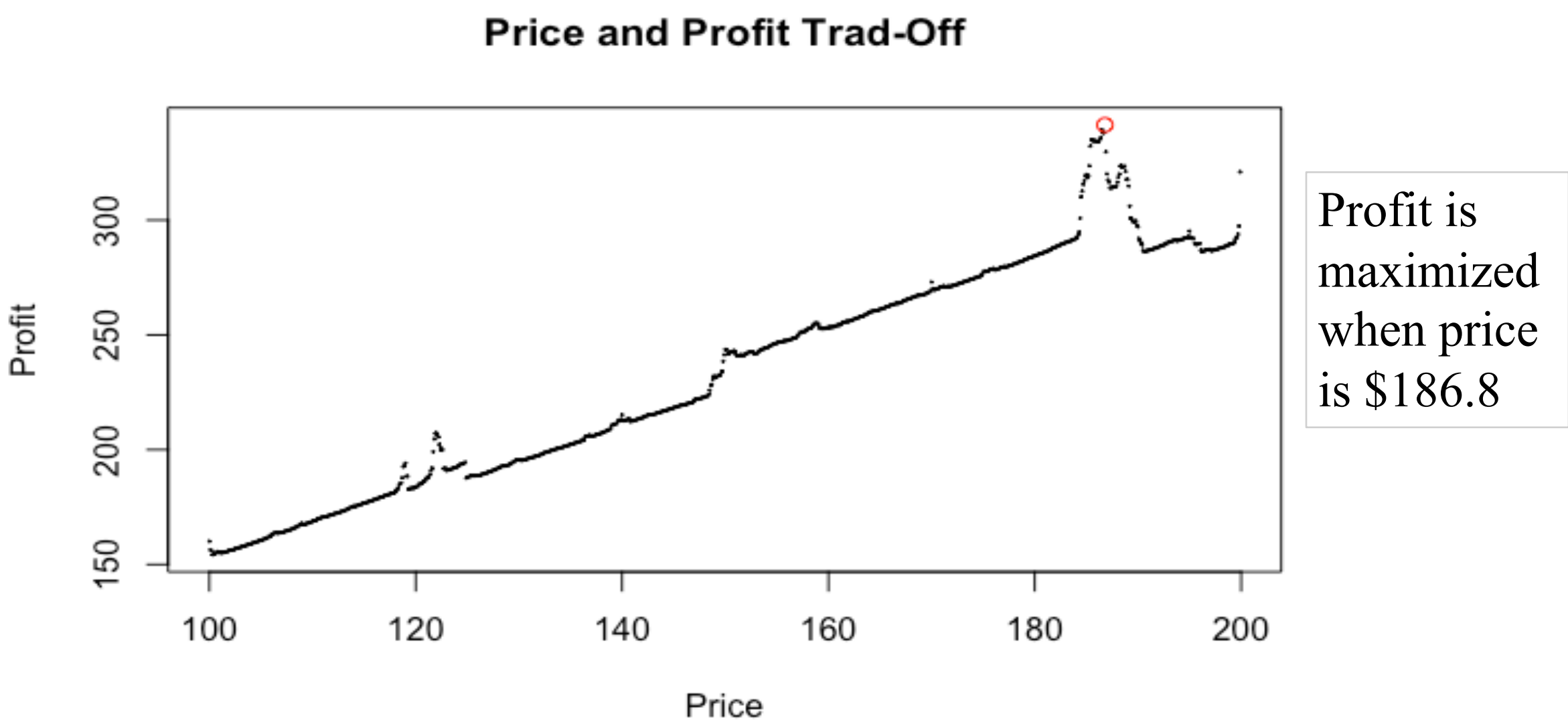- Fitting 5000 trees with depth is 8

Fitted Occupancy Index Using Boosting Method

Importance Table Using Boosting Method

Result

1. Occupancy Comparison: price = $80 (left) VS price = $120 (right)

Predicted Occupancy Index When Price Equals $80

Predicted Occupancy Index When Price Equals $120

2. Case Study for house listing #1050

Price and Profit Trad-Off

Profit is maximized when price is $186.8

Conclusion

Our project looked at the Airbnb listings data in New York city from year 2015 to 2017. After comparing several models, we find out the boosted regression model can provide the best prediction for occupancy index using price and house information. The usefulness of this model is given any Airbnb house in New York city, our model can provide the host an idea about what price to increase during holiday to get their profit maximized.