

The background of the slide features a photograph of a dense urban landscape. In the foreground, there's a street with brick buildings, some with fire escapes, and a few cars and people. The middle ground shows more buildings, including a prominent red brick building with a green awning. In the background, a massive city skyline is visible under a hazy sky, with numerous skyscrapers of various heights and architectural styles.

# AIRBNB PRICE PREDICTION USING MACHINE LEARNING & TOPIC MODELING

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Luyuan Kong  
Metis SF

# Problem



Ren13744 in London, GB  
Level 2  
12-16-2019 10:25 AM



Mine was set at 70% below approximately than the going rate. I am virtually letting my rooms for free.



Ephraim0  
Level 10  
09-16-2016 09:02 AM



Hello Jean, I have used it and I've been unimpressed. I no longer use it. If you do use it, make sure you set your minimum at a price you're comfortable with. Stay far far away from airbnb suggested minimum pricing as the suggestions are absurd. Smart pricing really misses the mark and you will rarely get much of an increase from your minimum unless you set the minimum REALLY low as they suggest.



MissSwan

Feb '19

From what I have seen- "Smart Pricing" wants to lowball all of the hosts. It is constantly giving me tips about my rates which are very reasonable to be much much lower. Seriously though if I rented an entire 600sqft suite for \$25/night- I'd be an idiot. Just ignore it and set prices that work for you, your area, your seasons, and your events. ABB has no way of knowing all of these factors for every host around the world

# Problem

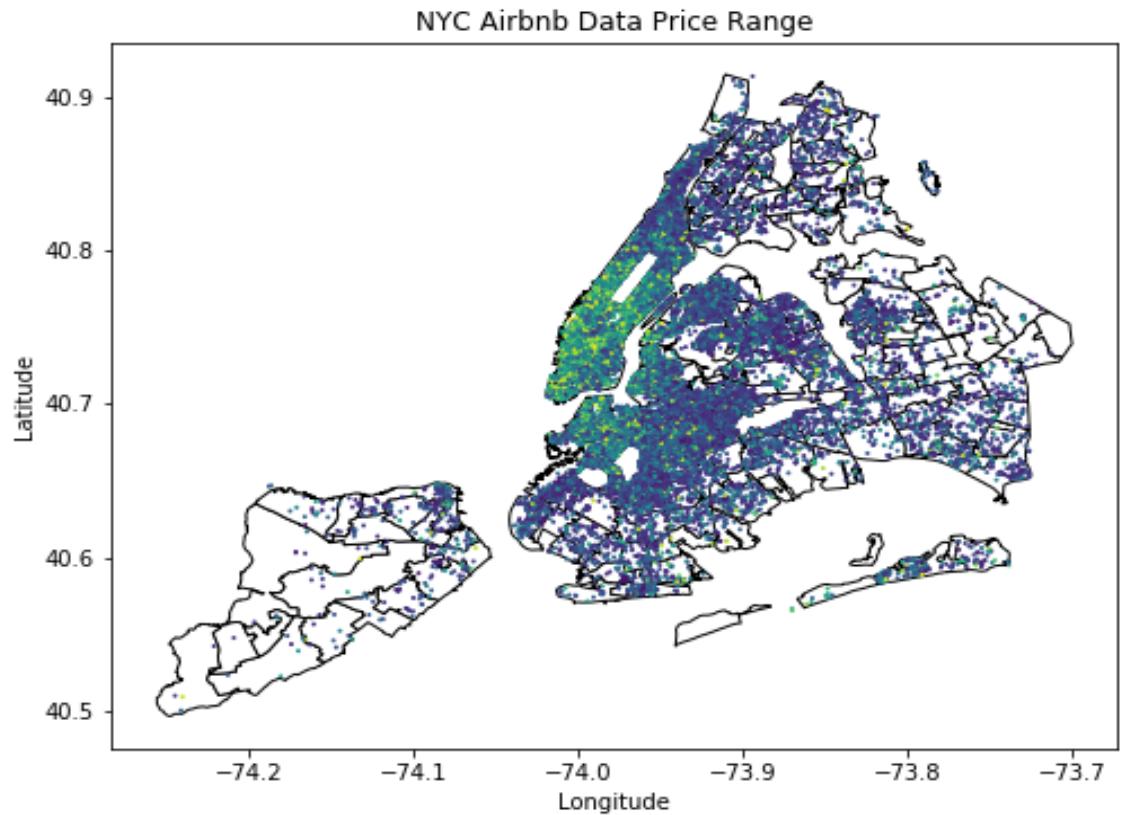
How Should I **Price** My Rental Property?

# Data & Workflow

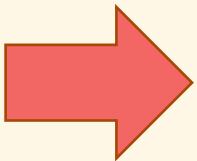
Data:  
NYC Airbnb (Inside Airbnb)

Modeling:  
Topic Modeling + Regression

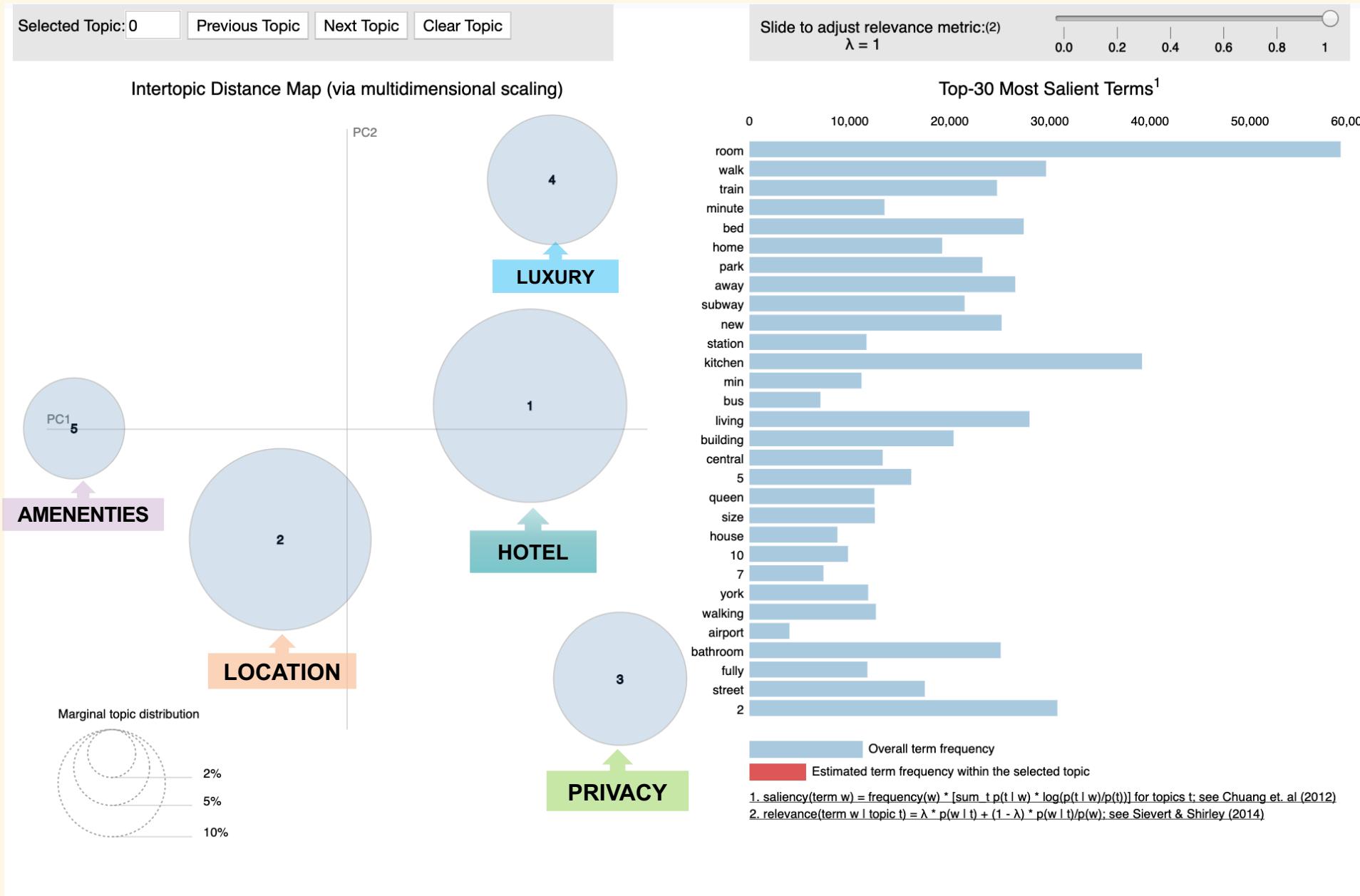
Results:  
Feature Importance



# Tools



# Results (topic modeling)



# Results (topic modeling)

## 1. HOTEL



minute, amenity, apartment, room, **building**, **hotel**, **city**, stay

## 2. LOCATION



minute, **park**, block, **restaurant**, **walk**, away, apartment, **subway**, manhattan

## 3. PRIVACY



room, **guest**, place, **private**, space, bathroom, home, **shared**, living

## 4. LUXURY



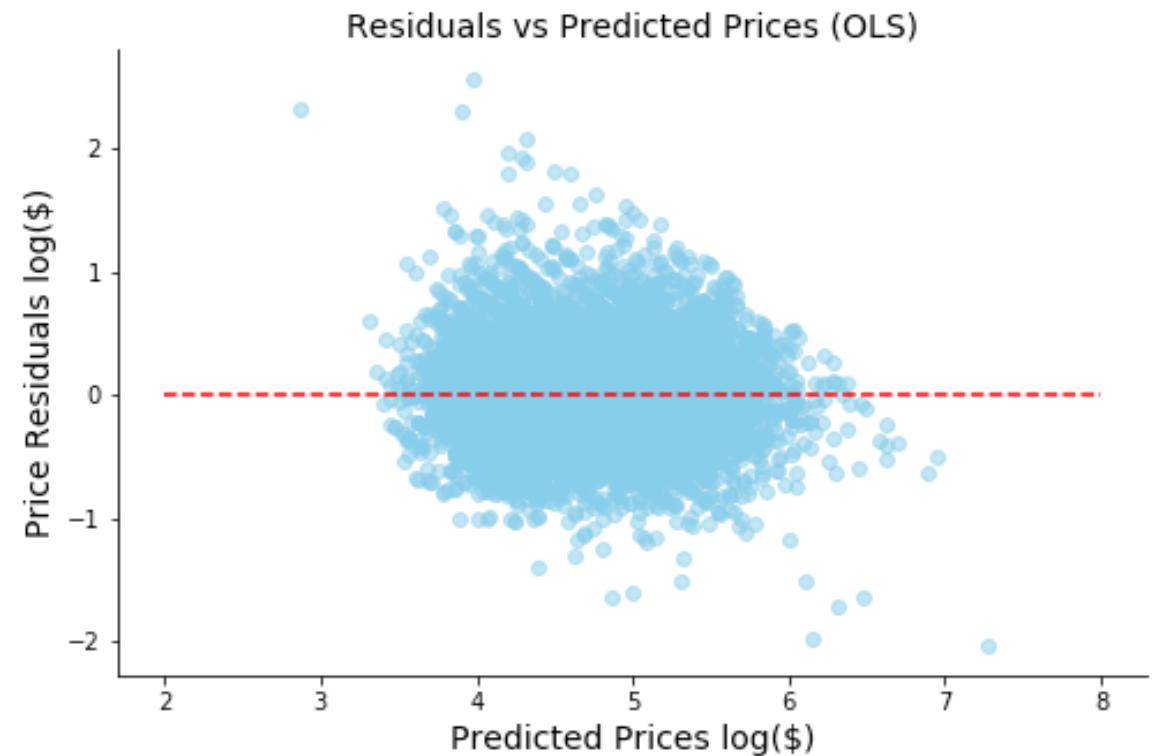
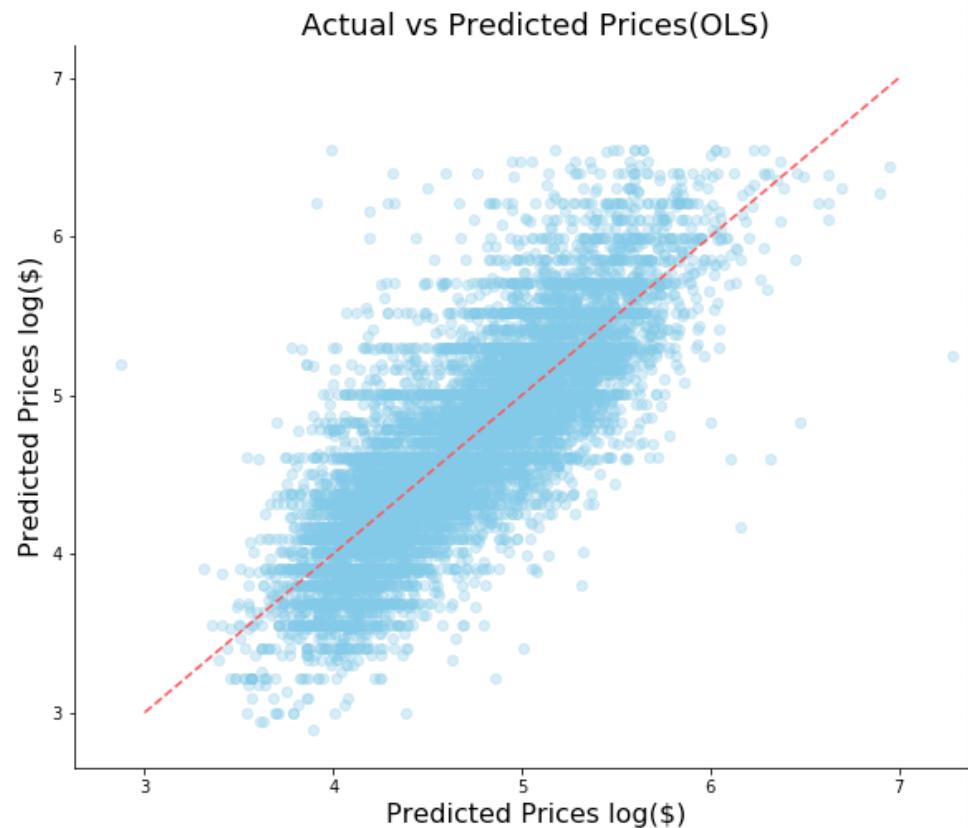
apartment, bedroom, floor, **space**, **large**, building, room, **window**

## 5. AMENENTIES



bed, bedroom, room, apartment, kitchen, queen, tv, size, bathroom

# Results(regression)



Adjusted R<sup>2</sup> Score: 0.64

MAE: \$ 24.02, Mean: \$137.05

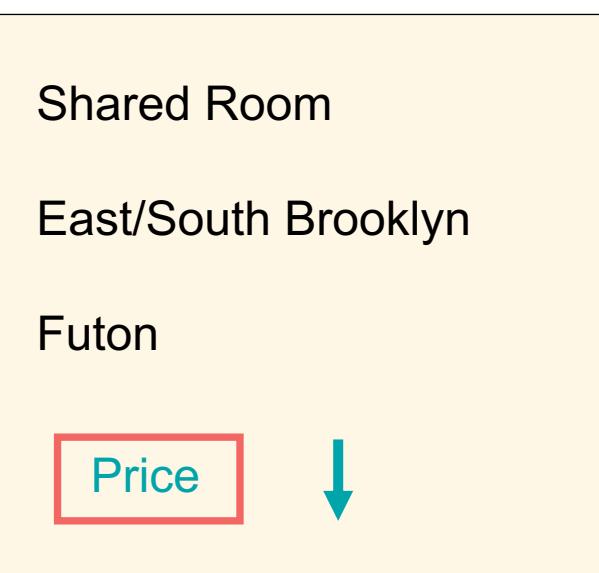
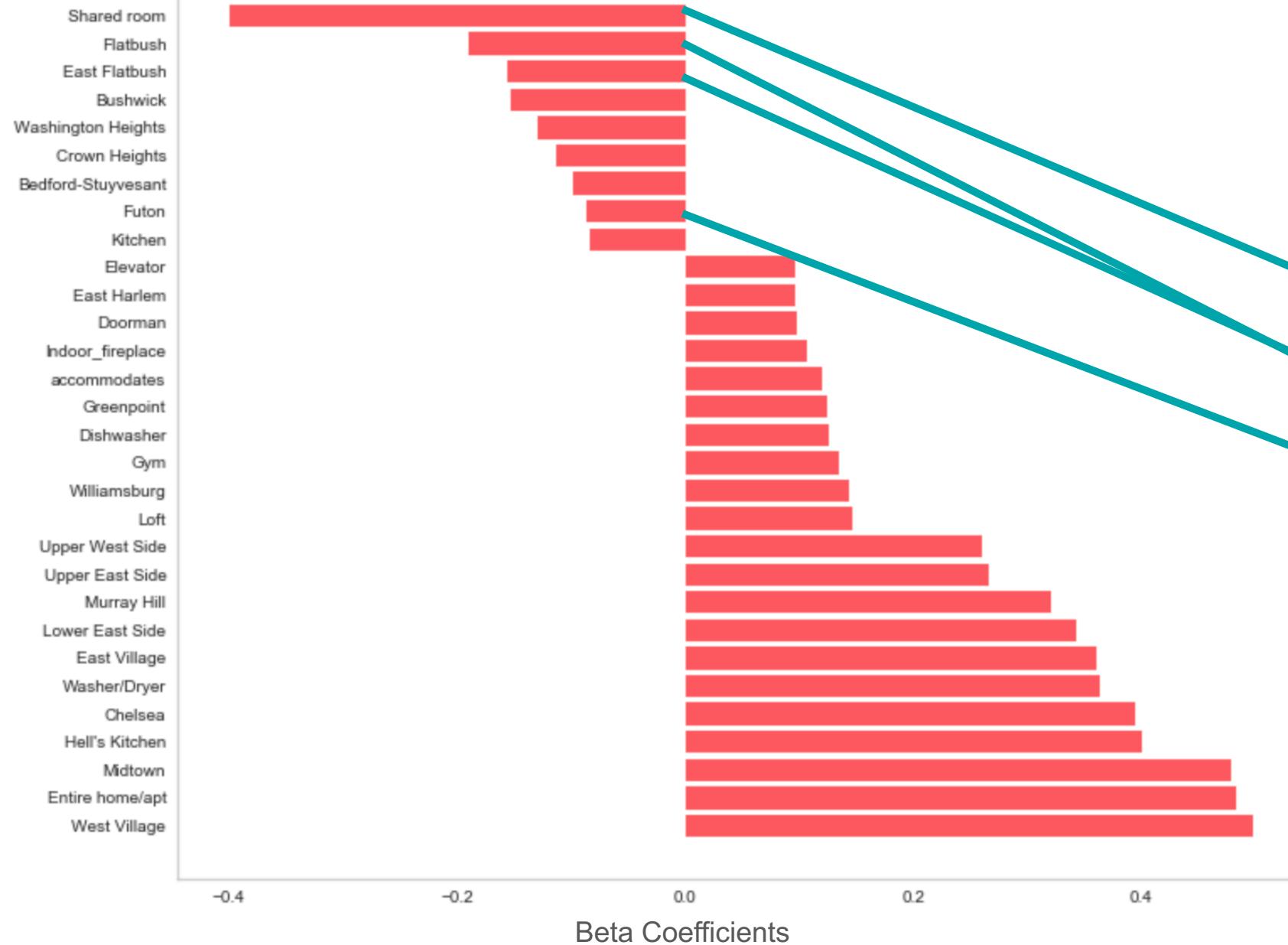
## Results (regression)

Feature Importance



# Results (regression)

Feature Importance



# Key Takeaways

- Location: Manhattan Midtown Area or Williamsburg
- Room Type: Entire Place
- Amenities: Washer/Dryer, Gym, Dishwasher, Indoor fireplace



# Future Work

1. Gather more data to analyze price fluctuation based on time
2. Load NYC subway station data and build a new feature such as distance to the station

# Thank you!



kassenger



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luyuankong

# Appendix

1. [https://www.researchgate.net/publication/334783073\\_Airbnb\\_Price\\_Prediction\\_Using\\_Machine\\_Learning\\_and\\_Sentiment\\_Analysis](https://www.researchgate.net/publication/334783073_Airbnb_Price_Prediction_Using_Machine_Learning_and_Sentiment_Analysis)
2. <https://towardsdatascience.com/smarter-pricing-for-airbnb-using-machine-learning-413053a48793>
3. [http://cs229.stanford.edu/proj2019aut/data/assignment\\_308832\\_raw/26647491.pdf](http://cs229.stanford.edu/proj2019aut/data/assignment_308832_raw/26647491.pdf)
4. <http://insideairbnb.com/about.html>