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AIPI FINAL PROJECT

Improvement Over Airbnb Recommendations



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Problem To Solve

- New York is most favorable places for tourists: 65.2 m visitors in 2018
- Help tourists to make decisions that fulfill their need and help them have a better experience during their trips in New York

Current State

- Airbnb names can be misleading by containing certain characteristics in the listing description, like “close to subway”, “convenient”, “safe and quite”, etc.
- Airbnb booking system is inconsistent with unclear definition
- Recommends rooms partly based on the number of reviews and the ratings by customers; customer ratings might be biased:
 - Owners of listings might offer incentives for customers for high review
 - The most reviews are more recommended but the less reviewed could offer better service
 - Customer ratings are given based on these metrics: Cleanliness, Staff & Service, Amenities, Property condition & facilities

Key Stakeholders

- Tourists and business travelers that prefer at-home experience during their trips in New York
- Owners of the Airbnb listings and the hotels

Business Understanding

Some listing with low ratings and low amount of reviews are in the first page as well

No reviews from customers so we can only understand attributes of the listing from the description from owners

Listing with more higher reviews are recommended on the first page

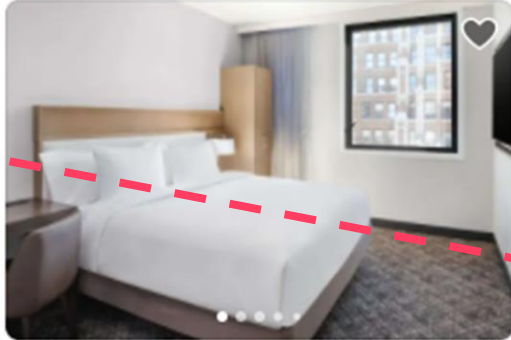
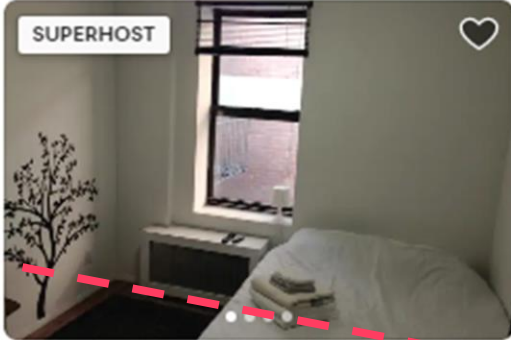




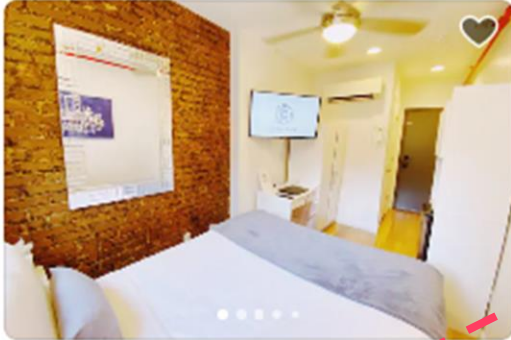
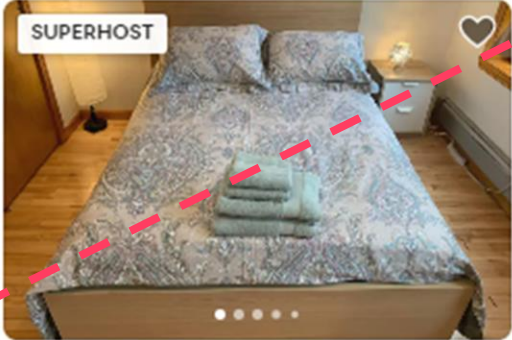

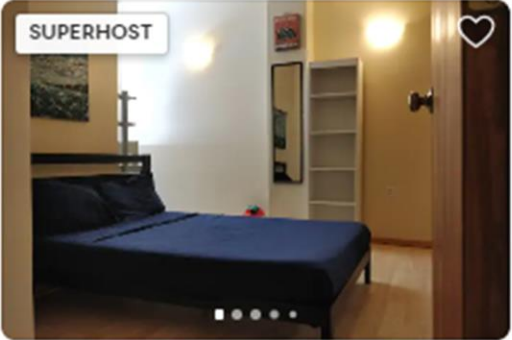


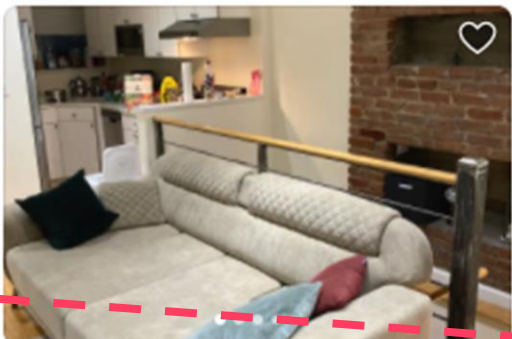
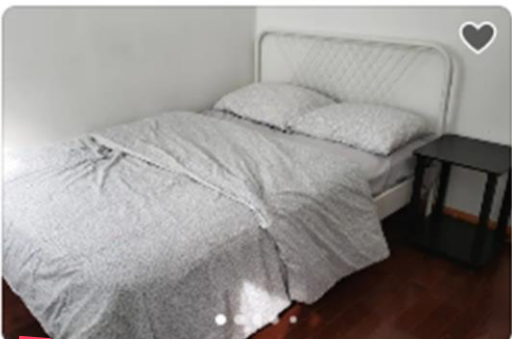
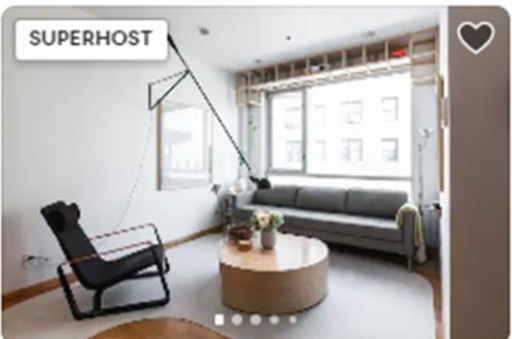
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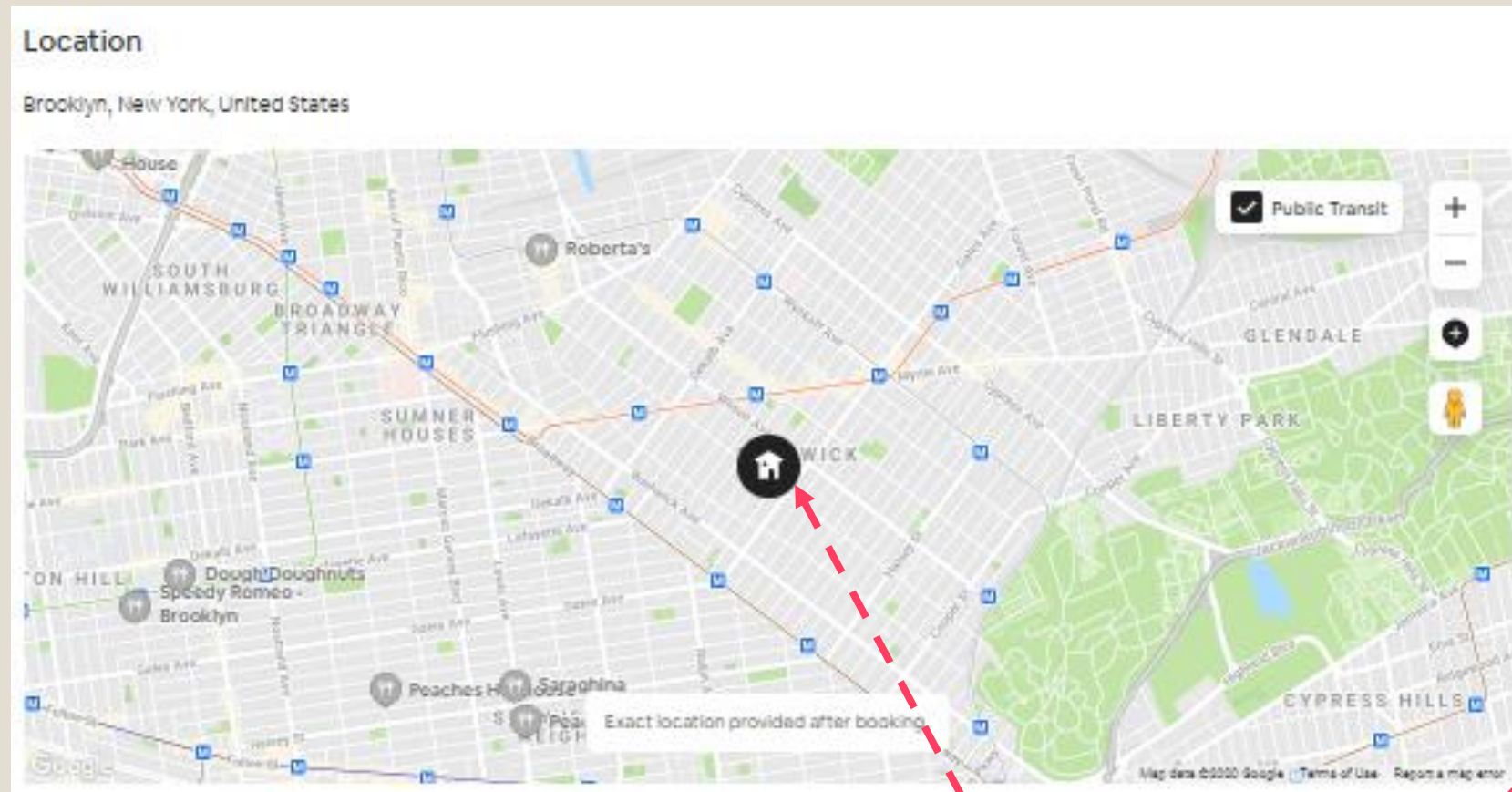
airbnb

New York | Nov 21 - 28 | Add guests

Become a host

Review COVID-19 travel restrictions before you book. [Learn more](#)

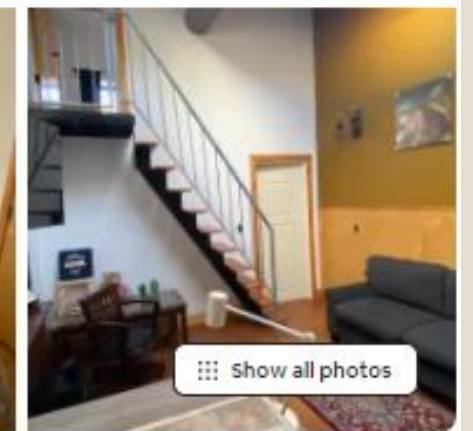
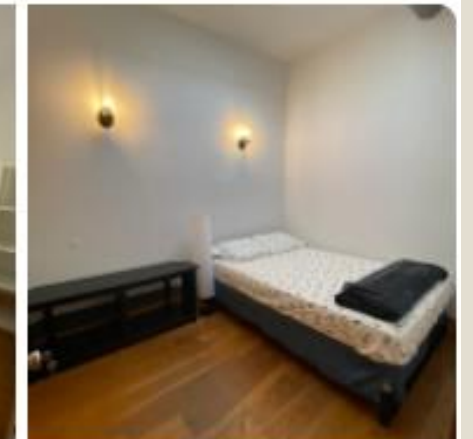
 <p>★ New Hotel room · Hell's Kitchen Best Hotel New York Times Square, King ... \$8 / night \$65 total</p>	 <p>SUPERHOST ★ 4.83 (104) Private room · Upper East Side Entire Apartment in Manhattan - Prime L... \$61 \$55 / night \$516 total</p>	 <p>★ 3.96 (46) Room in boutique hotel · Midtown Nobel Experience \$77 / night \$537 total</p>	 <p>SUPERHOST ★ 4.81 (32) Private room · Alphabet City Cozy Guest Quarters in East Village Pent... \$42 / night \$393 total</p>	 <p>★ 4.67 (164) Entire apartment · Manhattan Convenient, Central, Comfortable \$65 / night \$633 total</p>
 <p>★ New Entire loft · Williamsburg Come stay in our AMAZING Williamsbur... \$100 \$90 / night \$719 total</p>	 <p>★ New Entire apartment · Union Square Studio in the Heart of Chelsea W/ Share... \$64 \$55 / night \$432 total New lower price</p>	 <p>SUPERHOST ★ 4.91 (11) Entire apartment · Manhattan Magnificent 1Bedroom in the Lower East... \$87 \$74 / night \$694 total New lower price</p>	 <p>SUPERHOST ★ 4.85 (94) Private room · Brooklyn Nice Private room in quiet 2 level Browns... \$51 \$46 / night \$378 total Rare find</p>	 <p>SUPERHOST ★ 4.82 (22) Private room · Manhattan Hidden Spacious Gem Room \$32 / night \$290 total</p>
 <p>★ 4.53 (34) Entire apartment · Manhattan Sonder at Battery Park Studio with Wee... \$121 \$109 / night \$839 total</p>	 <p>★ 4.70 (196) Private room · Williamsburg Central Williamsburg Room \$90 \$47 / night \$410 total</p>	 <p>★ 5.0 (3) Shared room · Upper East Side Cozy room in Manhattan \$32 / night \$254 total</p>	 <p>★ 4.63 (19) Private room · Brooklyn PRIVATE CLEAN ROOM IN BAYRIDGE 3 \$27 / night \$237 total</p>	 <p>SUPERHOST ★ 4.95 (154) Private room · Williamsburg Clean private modern bedroom with bal... \$74 \$59 / night \$512 total</p>



3 Double rooms at loft in the heart of Bushwick

1 review · Brooklyn, New York, United States

[Share](#) [Save](#)



[Show all photos](#)

Private room in apartment hosted by O. Xavier

6 guests · 3 bedrooms · 3 beds · 1.5 shared baths



Enhanced Clean

This host committed to Airbnb's 5-step enhanced cleaning process. [Learn more](#)

Experienced host

O. Xavier has 99 reviews for other places.



Free cancellation until 1:00 PM on Nov 26

After that, cancel before 1:00 PM on Nov 27 and get a full refund, minus the first night and service fee. [Get details](#)

3 Double rooms at a cozy duplex studio for the backpacker, film lover, chill traveller.

Located in the heart of hip 420 friendly Bushwick, close to a variety of bars, thrift shops, art galleries, restaurants, coffee shops, clubs, and near public transportation, this is the perfect home base to discover New York and Brooklyn, 20 min by subway to Manhattan. Living room includes a top of the art TV and top notch sound system. Comes with Centralized AC and heater.

[Contact host](#)

\$200 / night

1 review

CHECK-IN 11/27/2020	CHECKOUT 11/29/2020
GUESTS 1 guest	

[Reserve](#)

You won't be charged yet

\$200 x 2 nights	\$400
Service fee	\$56
Total	\$456

[Report this listing](#)

To protect the privacy of the listing, only a general location is shown, which we can't measure how close it is to a subway station or get more info about the neighborhood

Customers can only tell some basic information about the neighborhood from the description, and no way to validate until they try this place

//03

Quantifying Expected Impact

- By adding more information about each Airbnb listing, customers can use this tool to better determine what best fits their needs
- Customers' satisfaction rate for each stay would increase, and Airbnb owners can better understand ways to improve their listing to attract more tourists

Success Metrics

- Technical: search tool to ask for users' input for hotel names, search the name in database, and return the related information about that hotel
- Business: The revenue and profitability will likely both go up for some of the Airbnb listings. Because of the more accurate match of customers' needs, there might be more higher reviews given by the customers.

Constraint

- The tool cannot cover all the aspects in the real world, it can only give people more information to look at

Define success targets for metrics

- The new searching tool needs to better help customers find the stay fits their needs, therefore, the returning customers would increase.

Defining Business Success

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New York Airbnb

New York Crime

New York Subway Station

Raw Data

New York Airbnb

[http://data.insideairbnb.com/
united-states/ny/new-york-
city/2020-09-
07/visualisations/listings.csv](http://data.insideairbnb.com/united-states/ny/new-york-city/2020-09-07/visualisations/listings.csv)

Crime Distribution Analysis

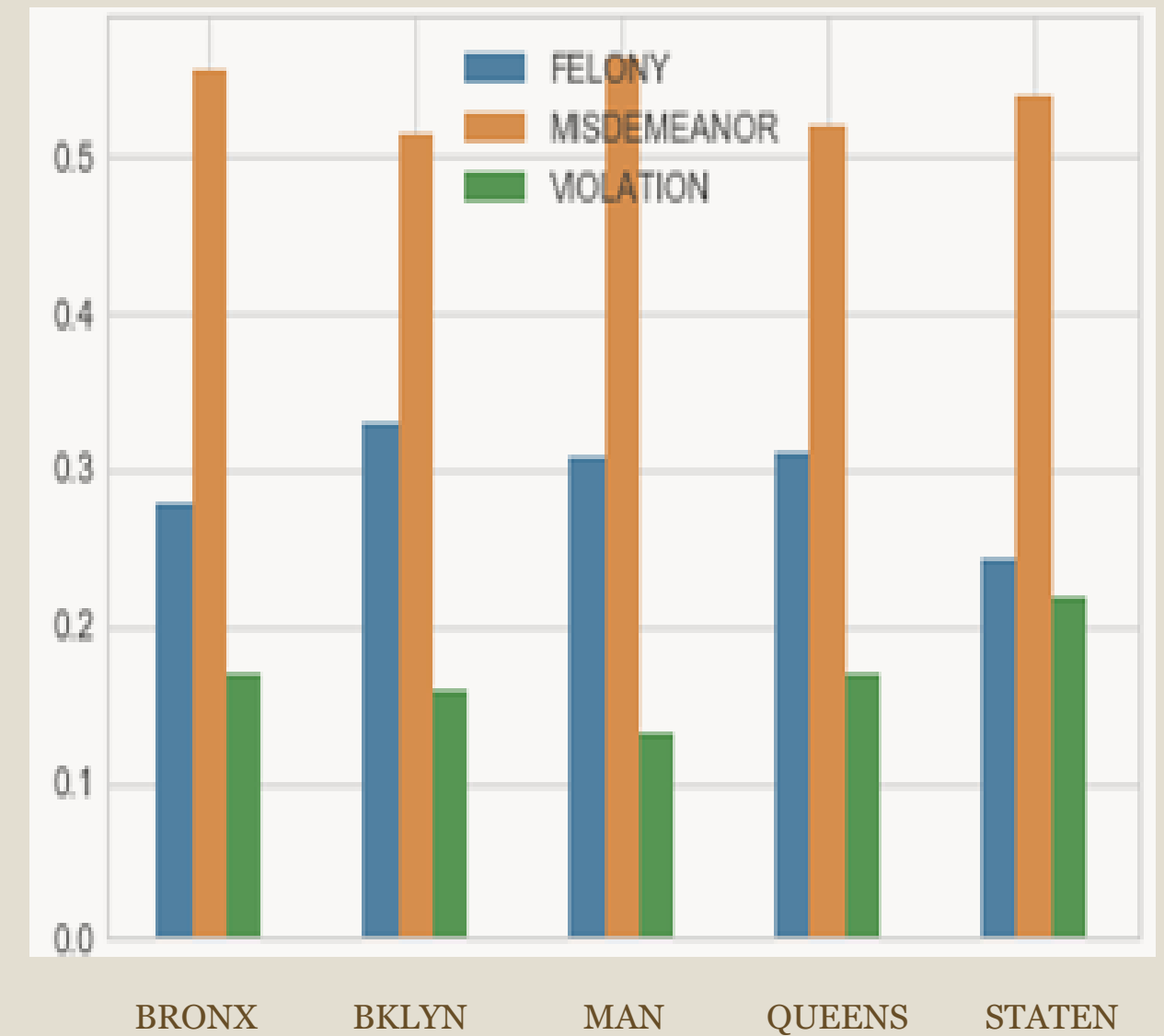
//09

- Misdemeanor is the major crime type
- BKLYN shows the highest Felony rate
- Staten island shows the lowest Felony rate

Definition of Crime Severity

- Felony
Burglary Robbery, Sex crimes, Dangerous weapons
- Misdemeanor
Dangerous Drugs, Impaired Driving, Frauds
- Violation
Disorderly conduct, Harassment

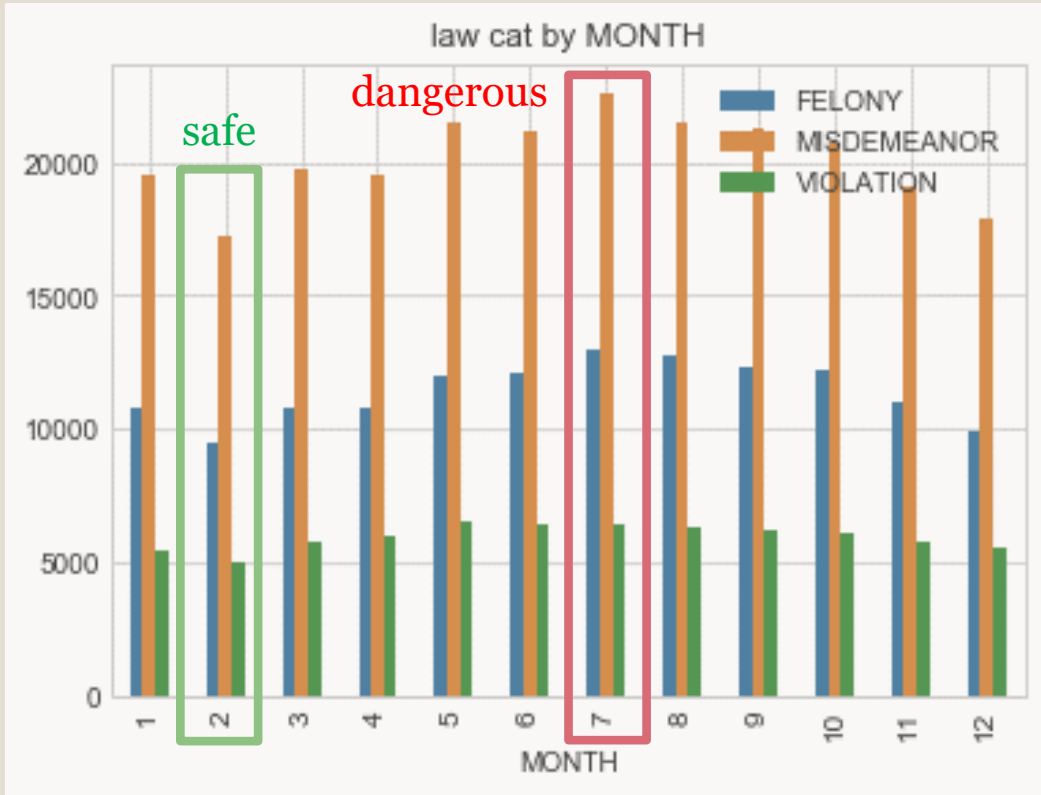
Percentage of Crime severity by Area



Crime Time Analysis

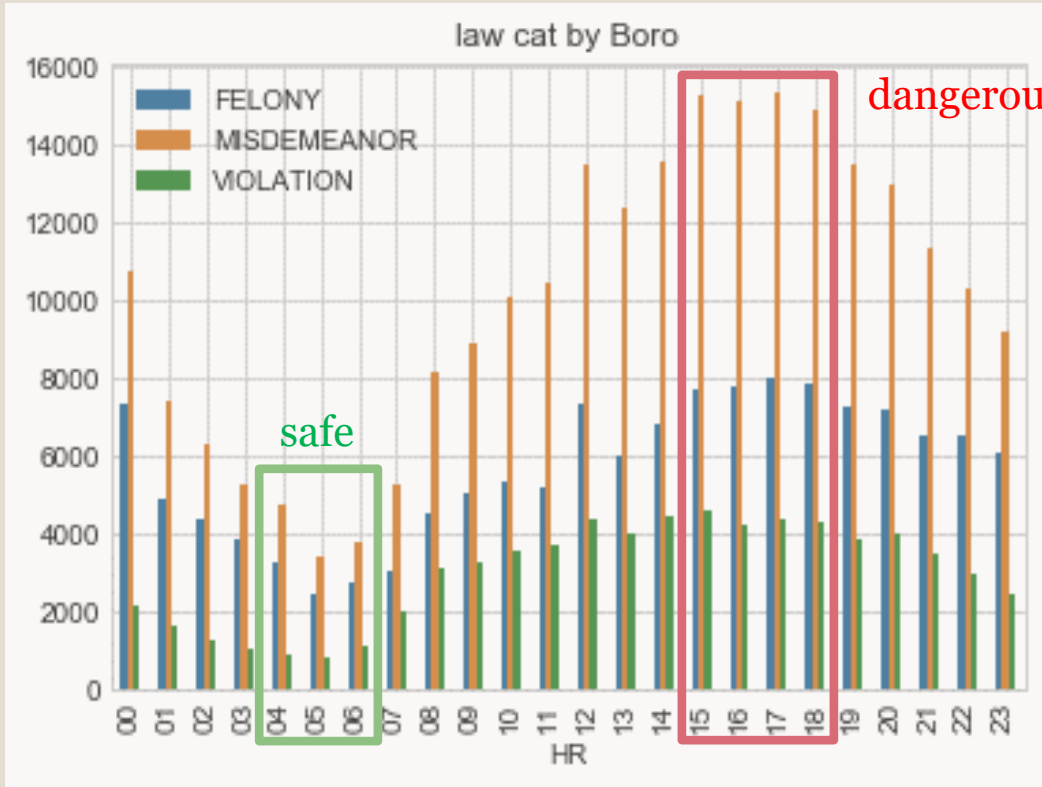
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Crime severity by month



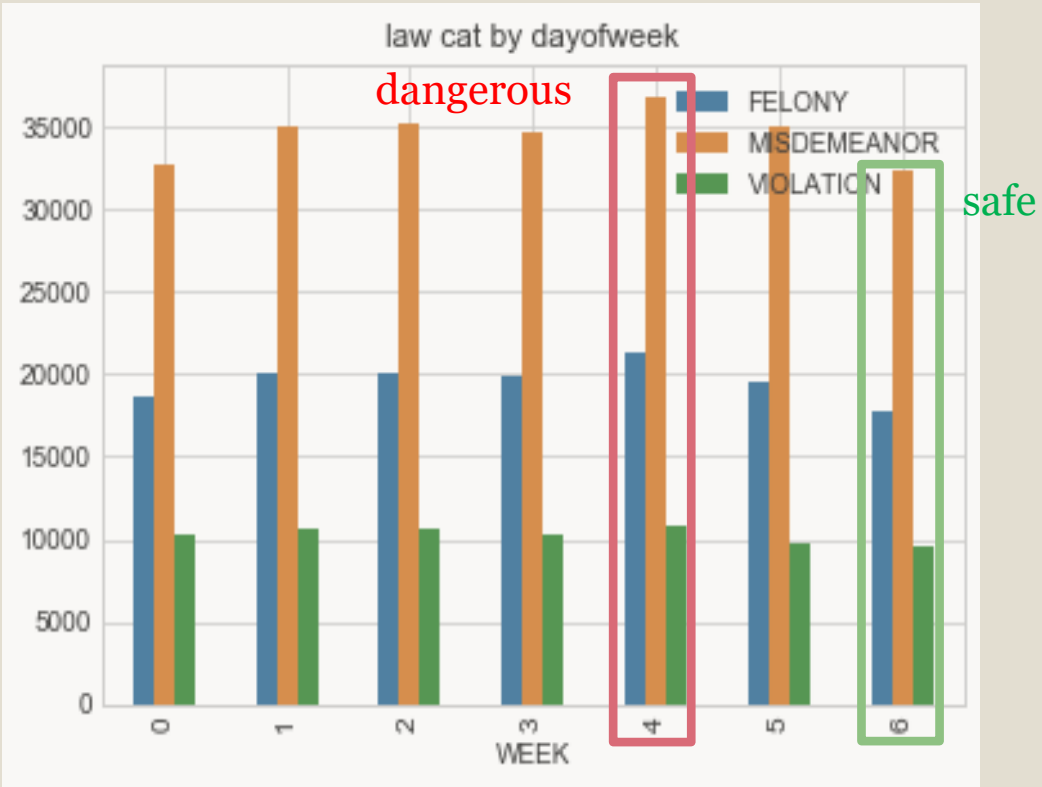
February is the safest month to travel

Crime severity by hour



More crimes happen in the afternoon

Crime severity by day of week

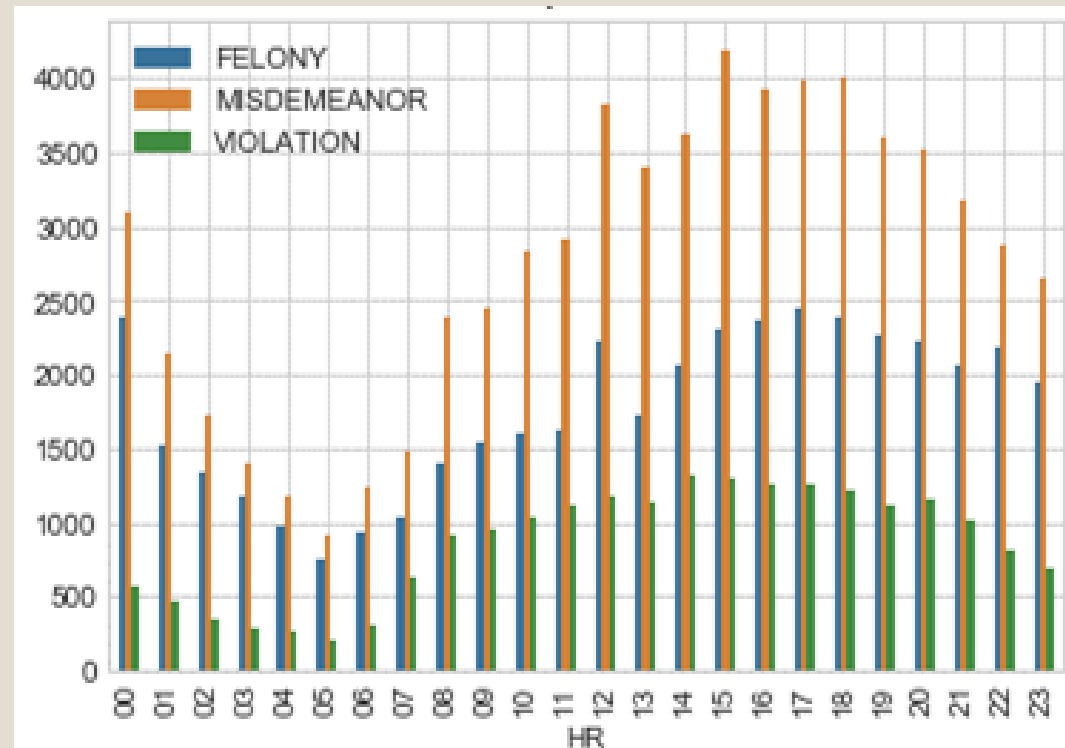


Weekends is safer than weekdays

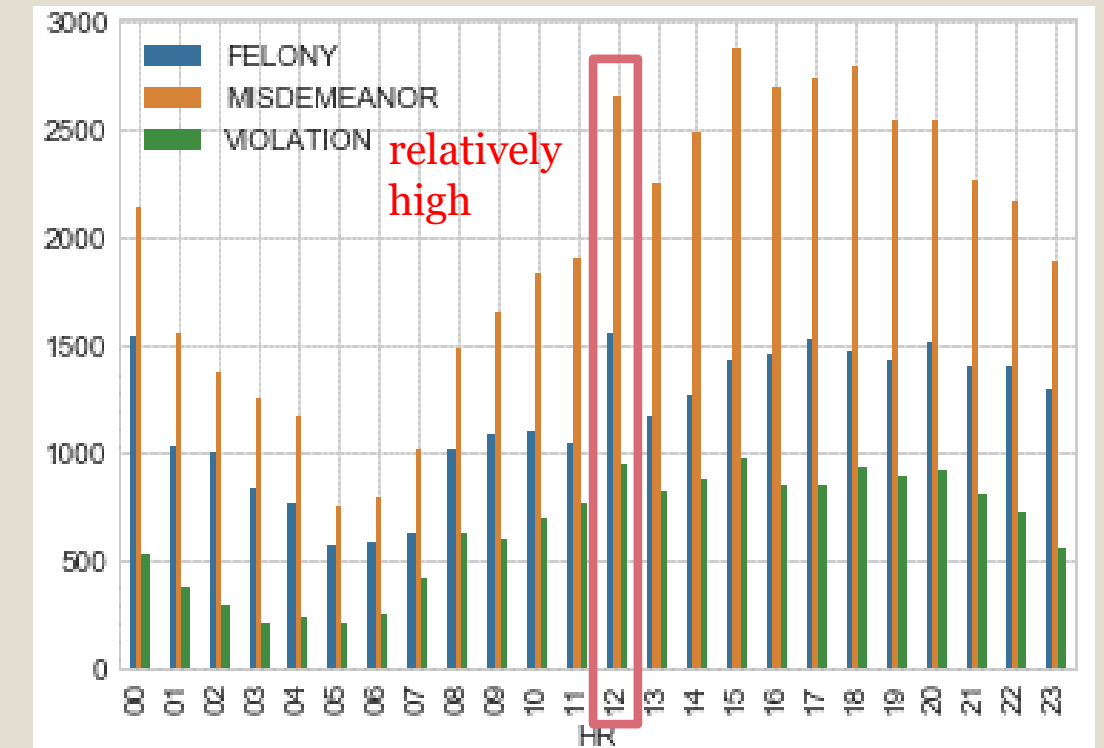
Crime Time Analysis – Cont'd

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By BROOKLYN

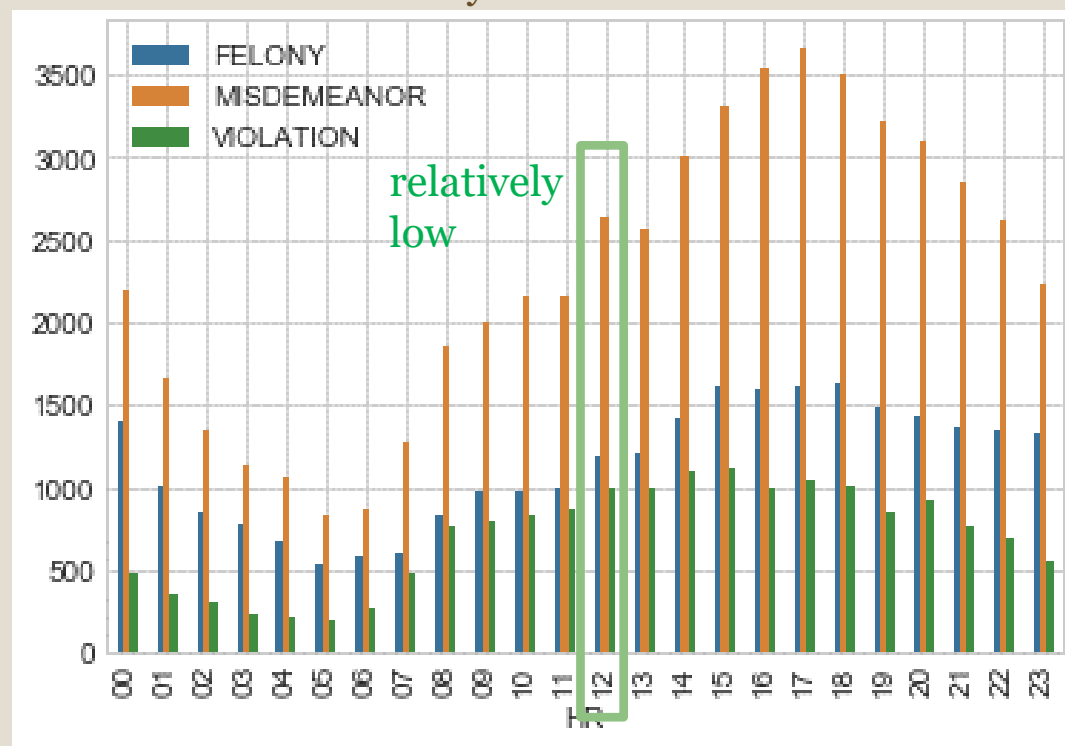


By Queens

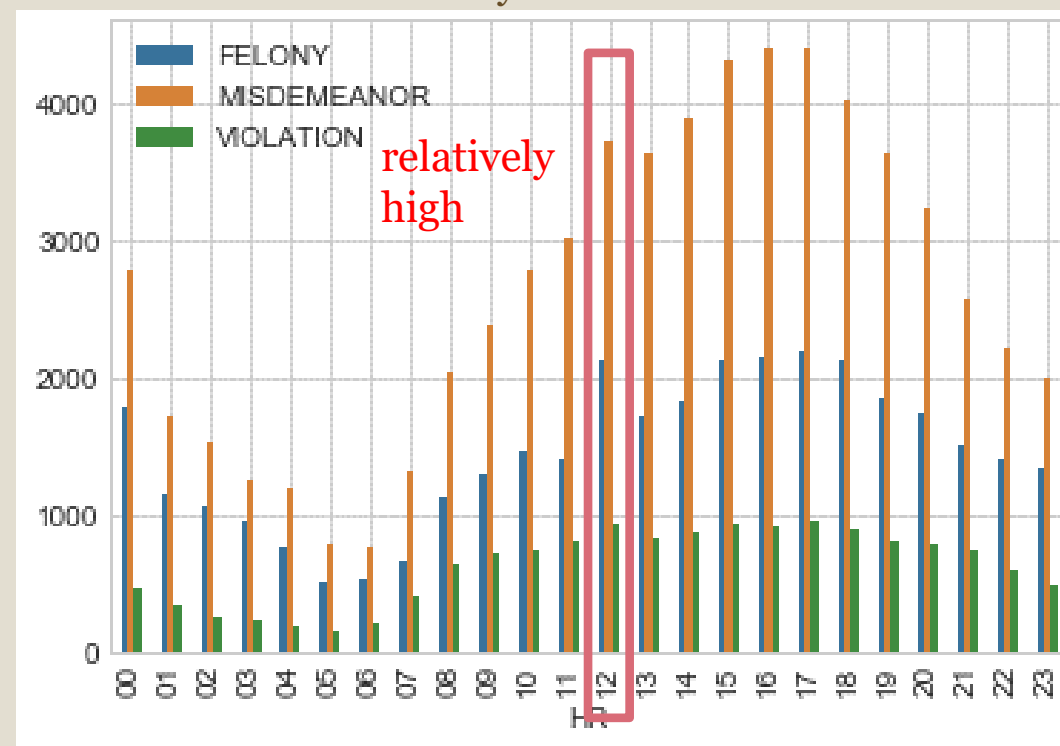


- Only Bronx keep low crime counts at noon
- Queens, Man and Staten island happen more felonious crimes at noon

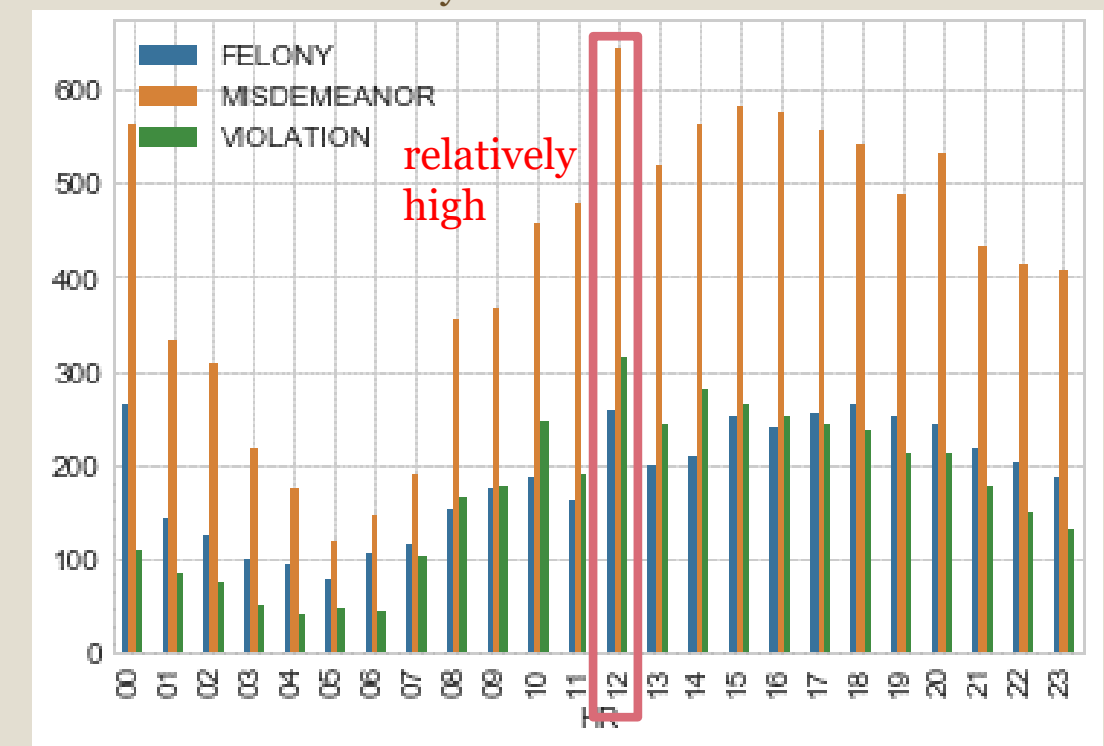
by BRONX



by MAN



By Staten Island



Detecting Airbnb Price Outliers

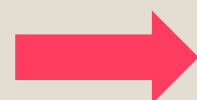
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Find mean & std of
price by neighborhood

		mean	std
neighbourhood	room_type		
Allerton	Entire home/apt	179.230769	226.431798
	Private room	57.333333	17.981472
Arden Heights	Entire home/apt	145.000000	46.486557
	Private room	125.000000	NaN
Arrochar	Entire home/apt	200.666667	204.465156
...
Woodlawn	Entire home/apt	176.000000	86.007752
	Private room	61.000000	24.248711
Woodside	Entire home/apt	159.642857	67.365897
	Private room	46.532468	27.596905
	Shared room	62.500000	58.523500

537 rows x 2 columns

Find
Outliers



Define Outliers: Price
w/ z-score >3 or <-3

```
outlier = newAB.loc[(newAB['zscore']>3) ^ (newAB['zscore']<-3)]  
outlier
```

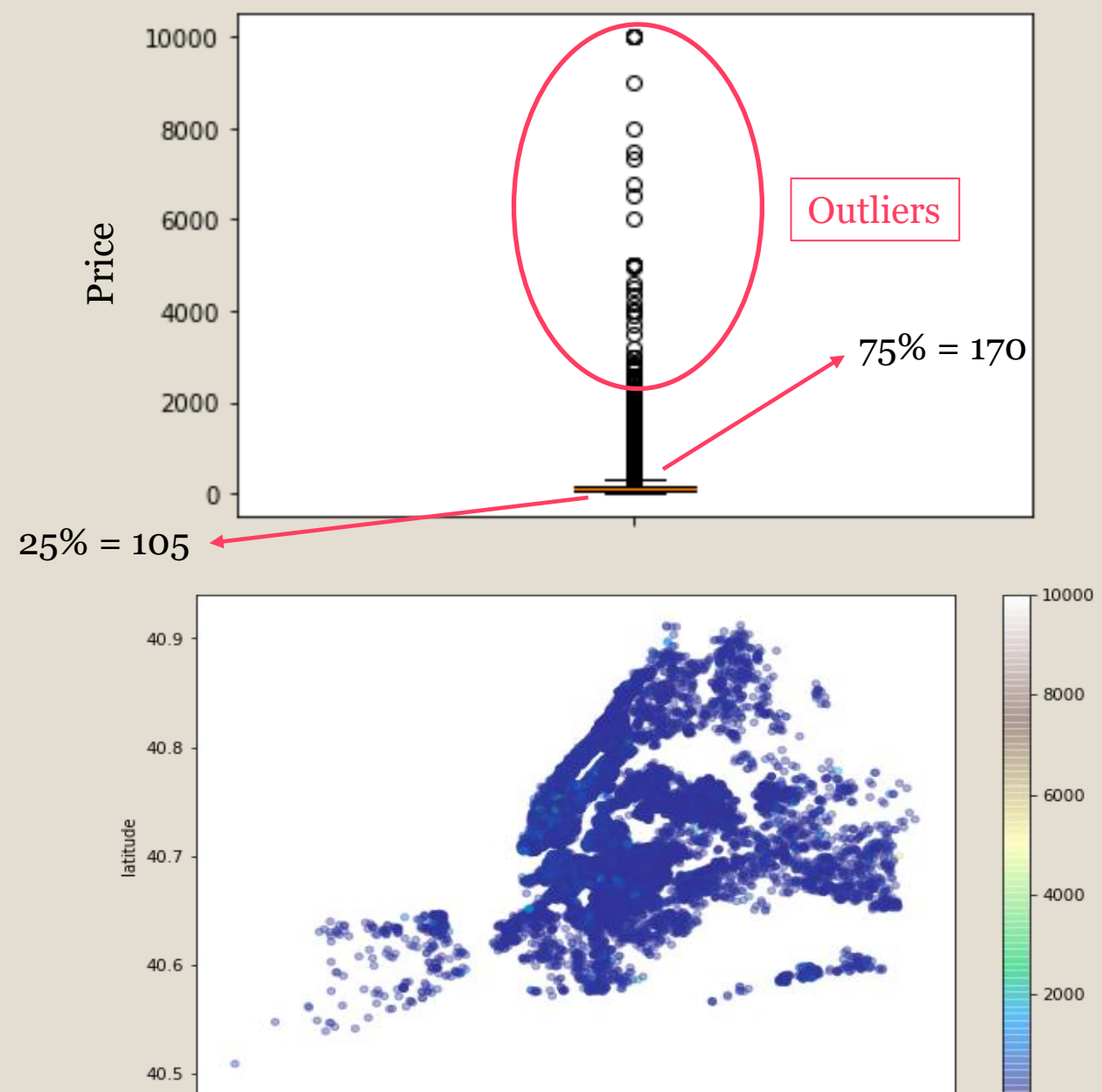
	id	name	latitude	longitude	neighbourhood_group	neighbourhood	room_type	price	mean	std	zscore
65	8810949	NYC Upscale Midtown East 3BR Apt	40.74867	-73.96734	Manhattan	Midtown	Entire home/apt	1170	265.455944	270.919813	3.338789
108	12870225	Fab 3BR UN Plaza with River Views	40.75260	-73.96789	Manhattan	Midtown	Entire home/apt	1100	265.455944	270.919813	3.080410
140	14408114	Unparalleled Luxury in Midtown Manhattan	40.76455	-73.97959	Manhattan	Midtown	Entire home/apt	2500	265.455944	270.919813	8.247991
155	15347268	Modern Luxury 2 Bed/ 2 Bath apartment in Midtown!	40.75425	-73.98312	Manhattan	Midtown	Entire home/apt	2000	265.455944	270.919813	6.402426
159	15857259	5 Star Luxury 2 BR Suite Heart of Manhattan	40.76110	-73.97412	Manhattan	Midtown	Entire home/apt	1999	265.455944	270.919813	6.398735
...
25170	34518079	Park Avenue Suite with Large Outdoor Terrace	40.74392	-73.98638	Manhattan	Midtown	Hotel room	1286	321.797297	270.957510	3.558501
25171	34518082	Approx. 980 sqft Suite with Large Outdoor Terrace	40.74392	-73.98638	Manhattan	Midtown	Hotel room	1186	321.797297	270.957510	3.189440
25366	41348519	Attic with Queen Bed	40.81512	-73.81752	Bronx	Throgs Neck	Private room	105	52.933333	16.628146	3.131237
25395	34718633	Mott Haven Dorm CC	40.80893	-73.93111	Bronx	Port Morris	Shared room	24	24.909091	0.301511	-3.015113
25490	34470953	Chelsea Pines Inn - Hide Away Suite	40.73968	-74.00455	Manhattan	West Village	Hotel room	362	124.000000	75.871902	3.136866

409 rows x 11 columns

Detecting Airbnb Price Outliers – Cont'd

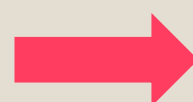
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W/ Outliers

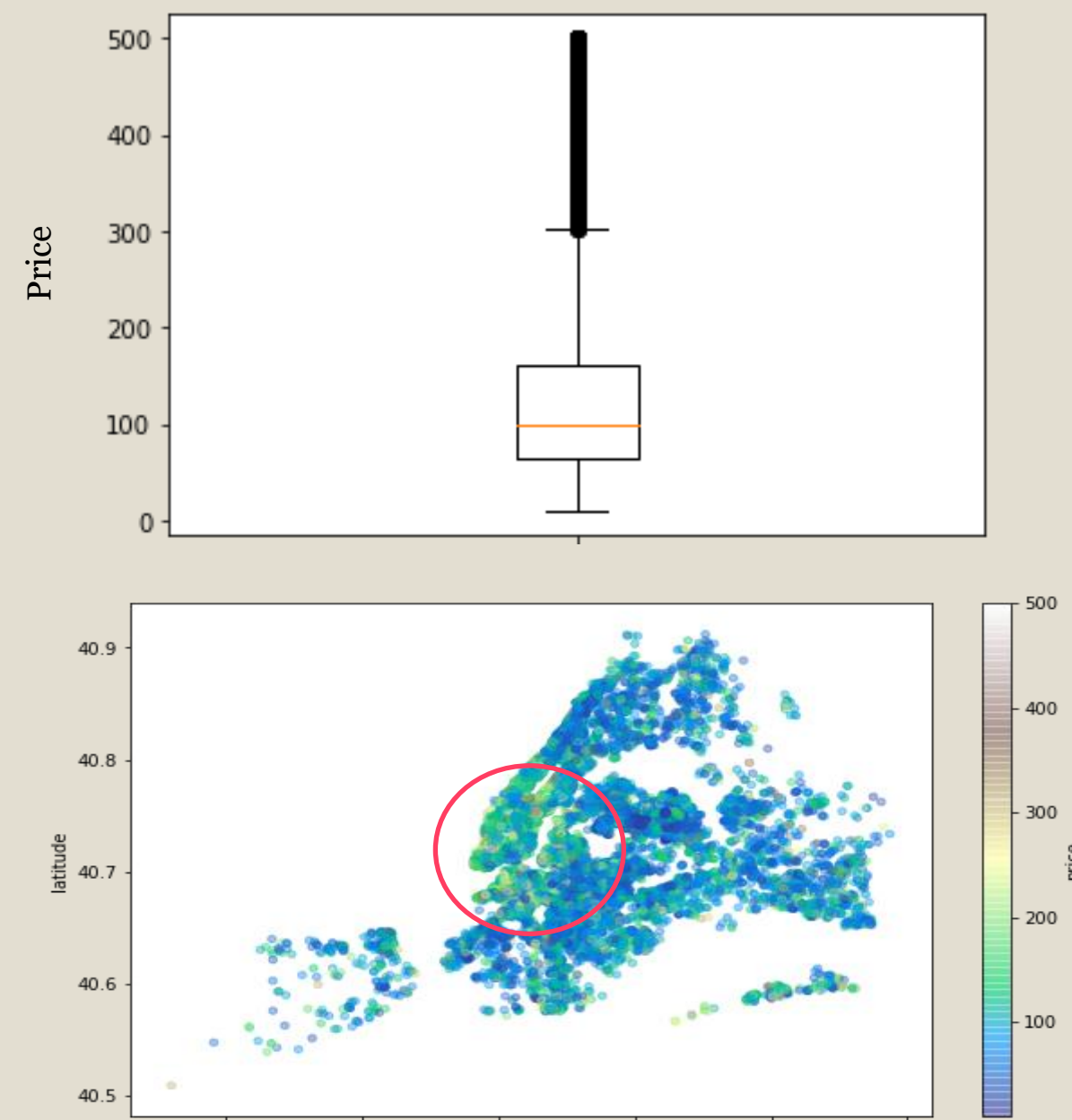


Hard to distinguish price difference by area

Drop
Outliers



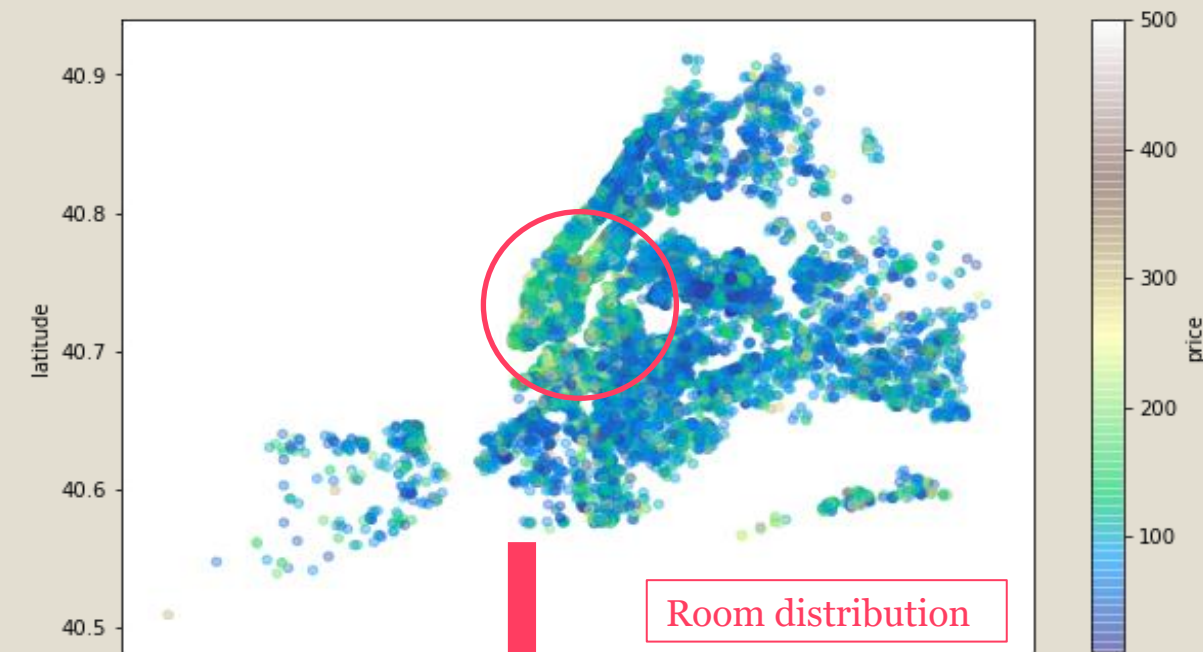
W/O Outliers



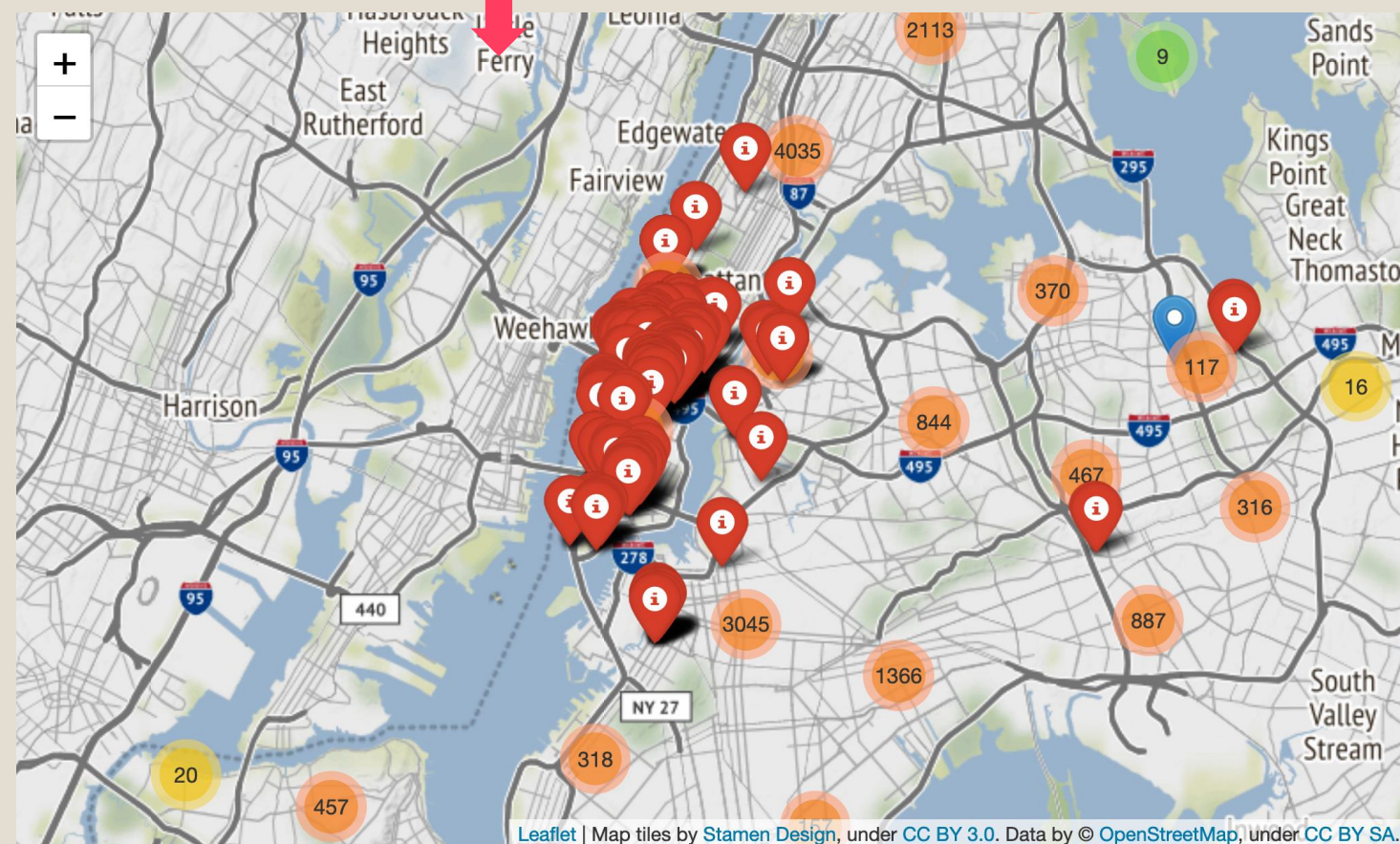
Man and West Brooklyn have higher price

Airbnb Price by Room Type

//09



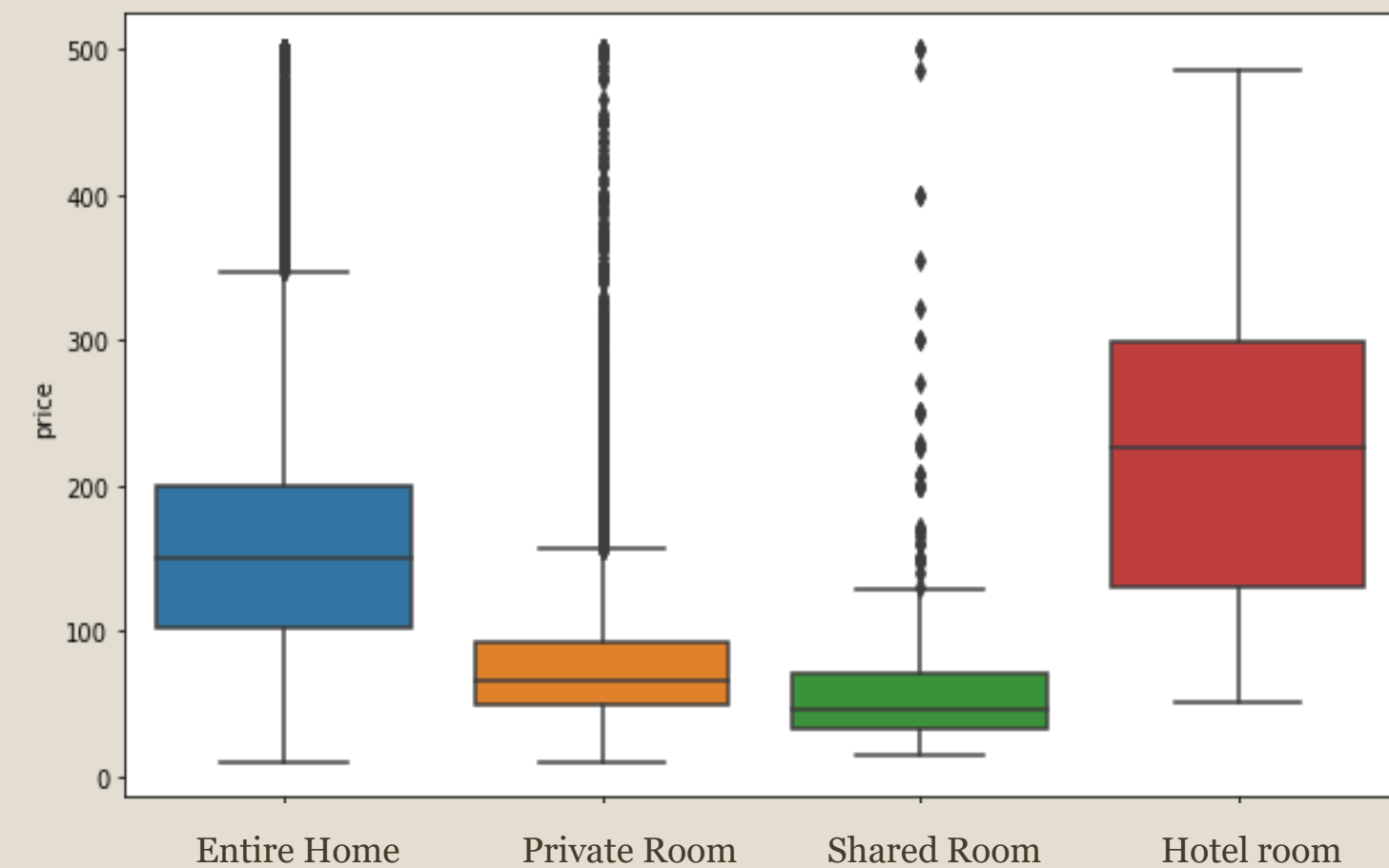
Room distribution



Conclusion:

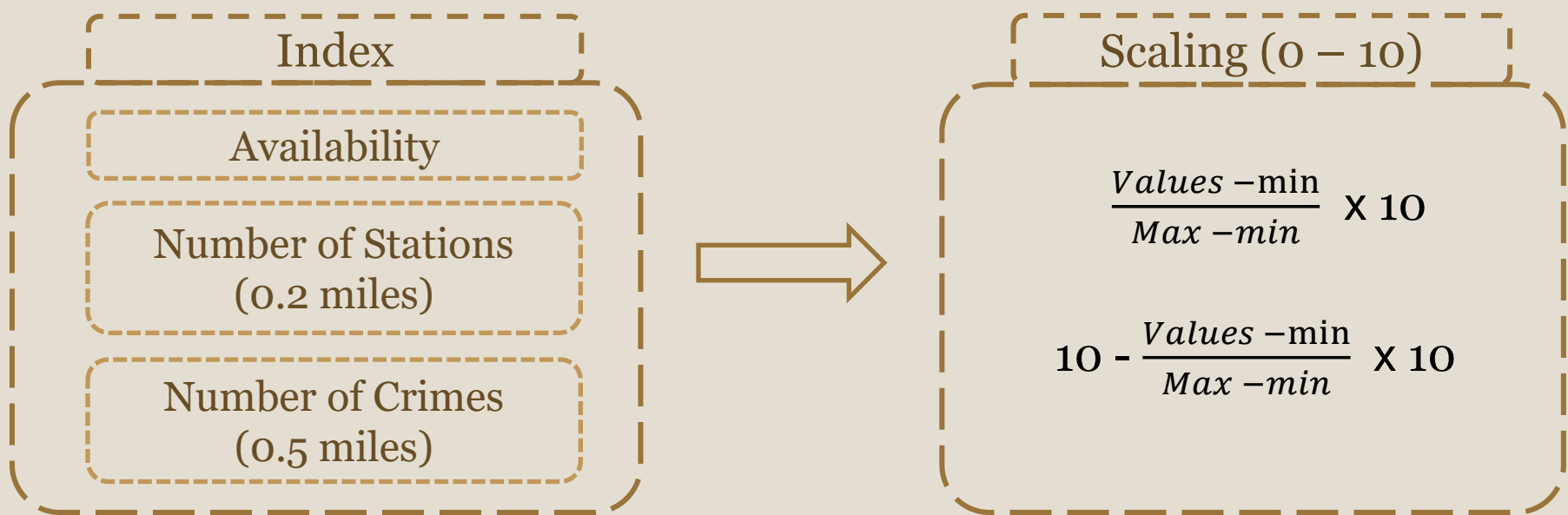
- Hotel Room Price is higher than others
- More hotel room types of Airbnb in Manhattan

Price by Room Type



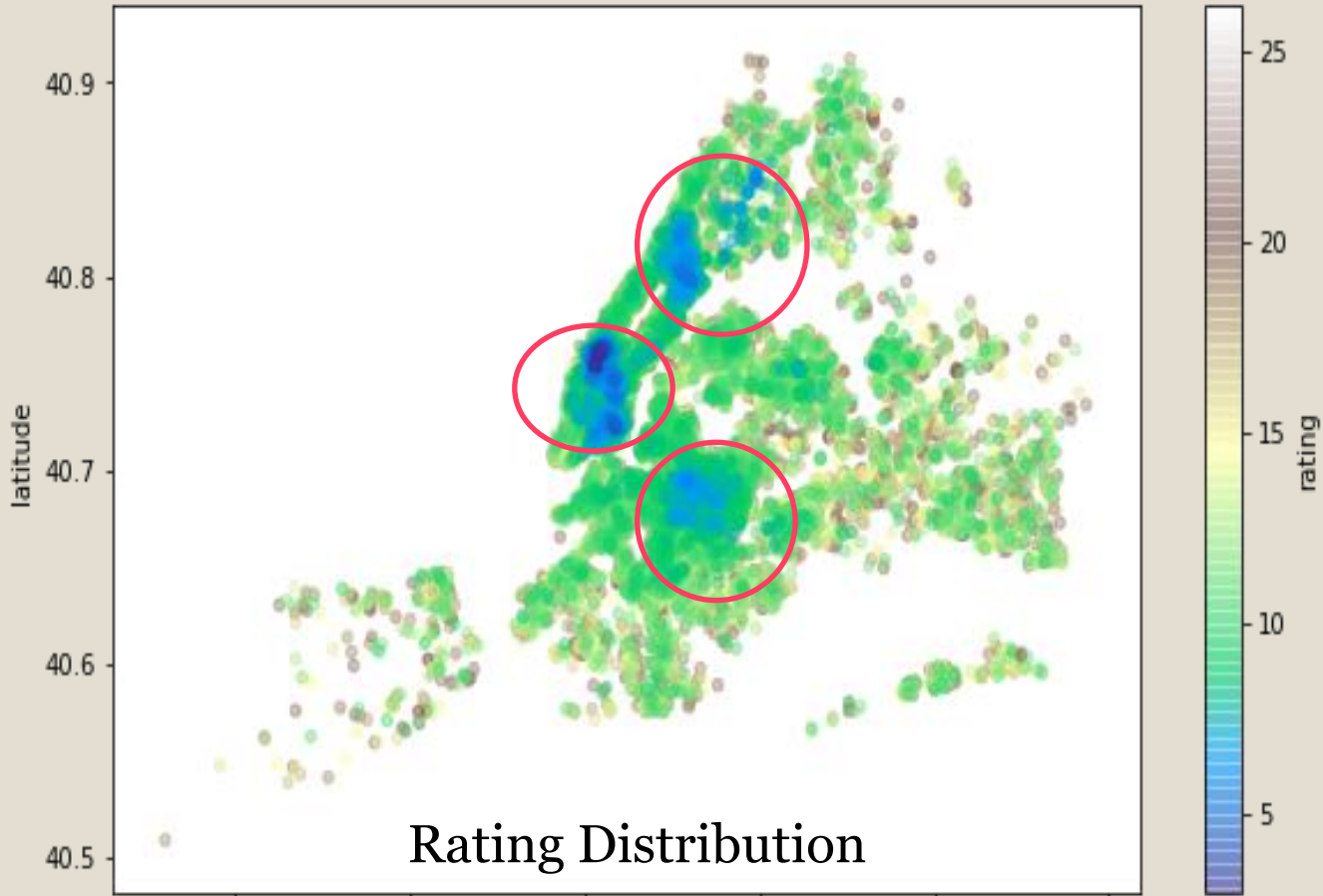
Airbnb Scoring Metrics

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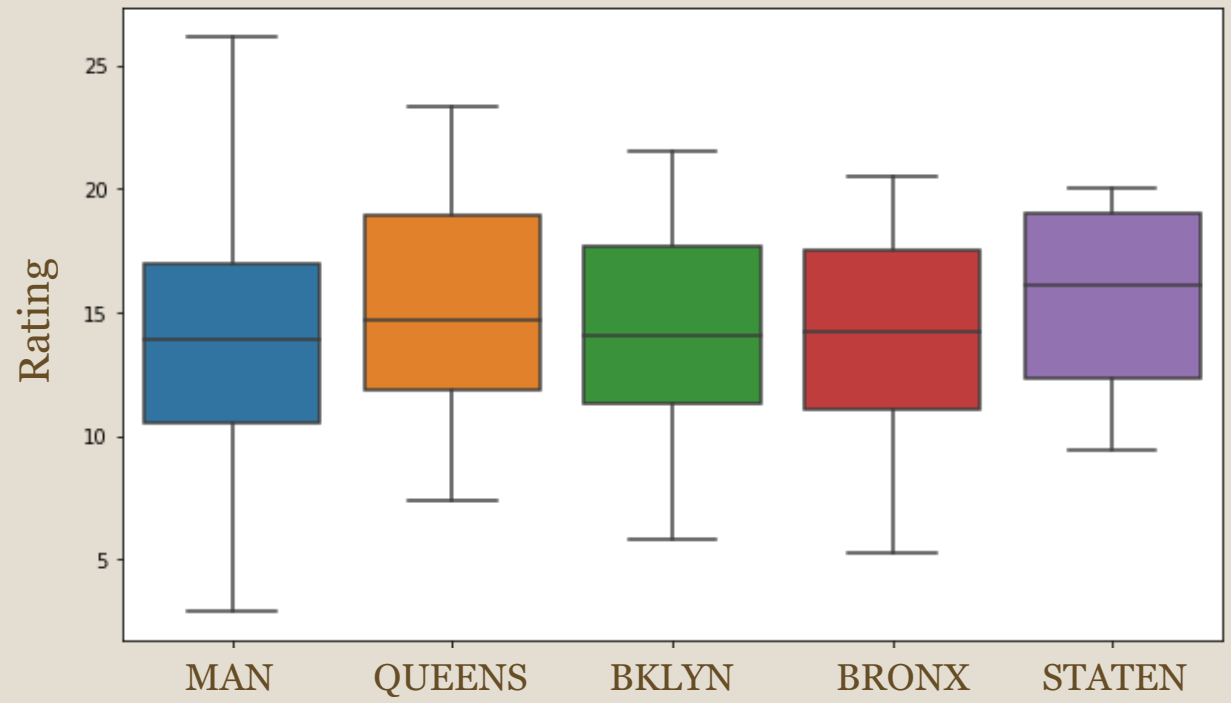


Rating Distribution

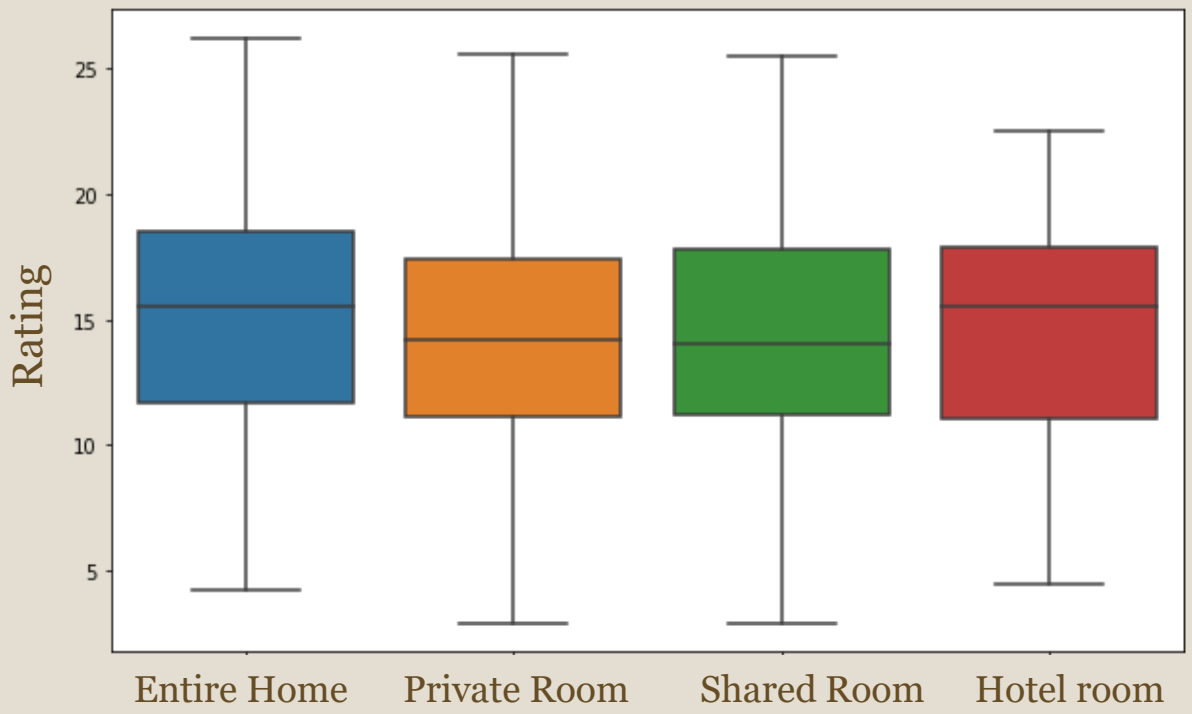
- Blue Area 
- Green Area 
- Grey Area 



Rating By Area



Rating By Room Type



Demo: Top 10 Airbnbs By District

//09

