

THE BATTLE OF NEIGHBORHOODS

A cluster view on **Airbnb** options in **Manhattan**



Introduction

Nowadays **Airbnb users/tourists** visiting Manhattan could easily get overwhelmed by the **seemingly infinite possibilities for their choice, both because of the thousands of Airbnb hosts options and of the extensive list of venues and things to do around the city.**

To help them we'll analyze Foursquare and Airbnb data so we can compare the neighborhoods both in terms of Airbnb options and venues to enjoy while visiting the city.

Data

The main objective of this analysis is to compare, in a meaningful way for a tourist planning to visit and to rent an Airbnb, neighborhoods of New York city. Using the Foursquare API combined with Airbnb data the objective of this analysis is to build up categories of neighborhoods based on:

- Airbnb listings in the areas (Quantity of options)
- Airbnb listings prices (Price feature will be a main one defining clusters)
- Airbnb listing type of place (whole apartment, one room)
- Quantity of interesting venues around according to Foursquare Explore query
- Categories of venues around according to Foursquare

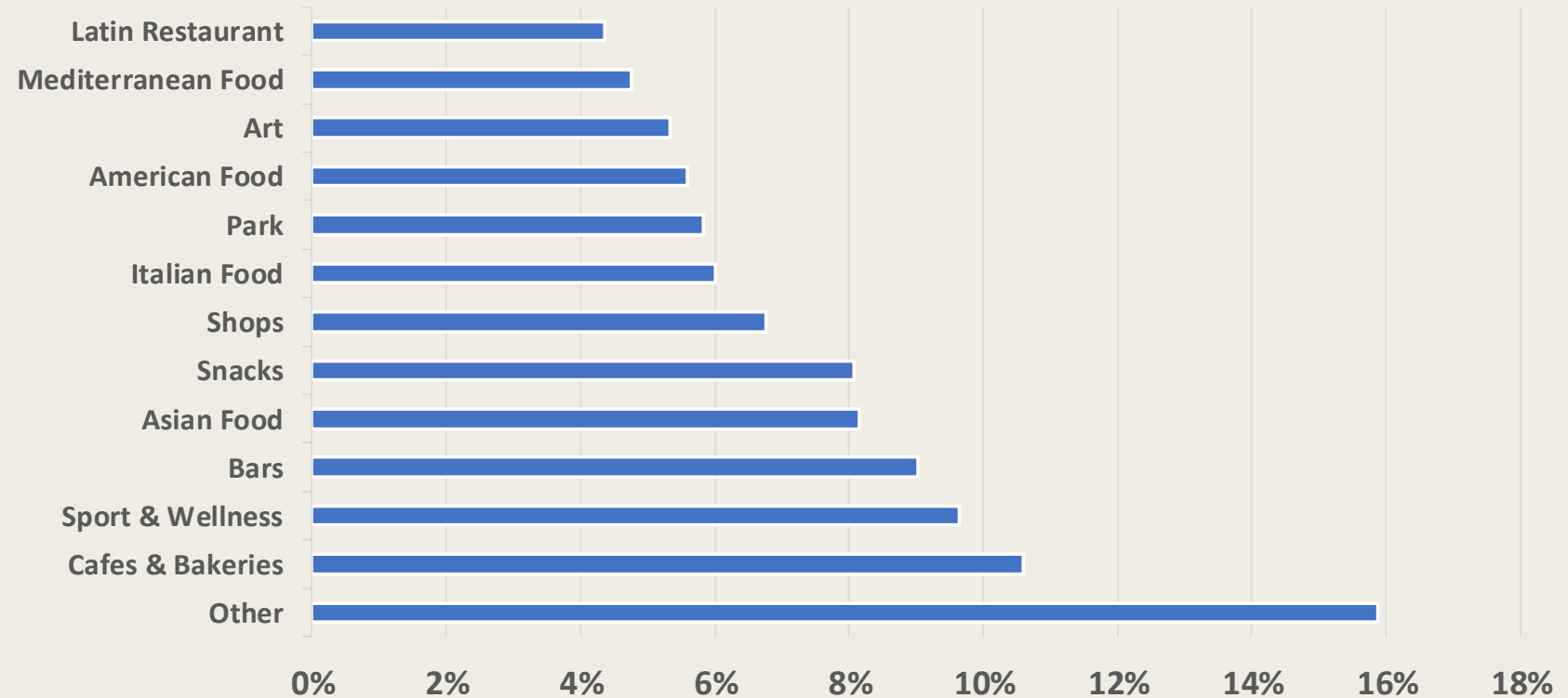
Once categories are built based on all this data, we can analyse which type of neighborhood is better suited for different types of tourists and create a list of recommendations based on a robust analysis.

Foursquare Data

Manhattan neighborhoods and venue categories fetched with Foursquare



Categories of venues



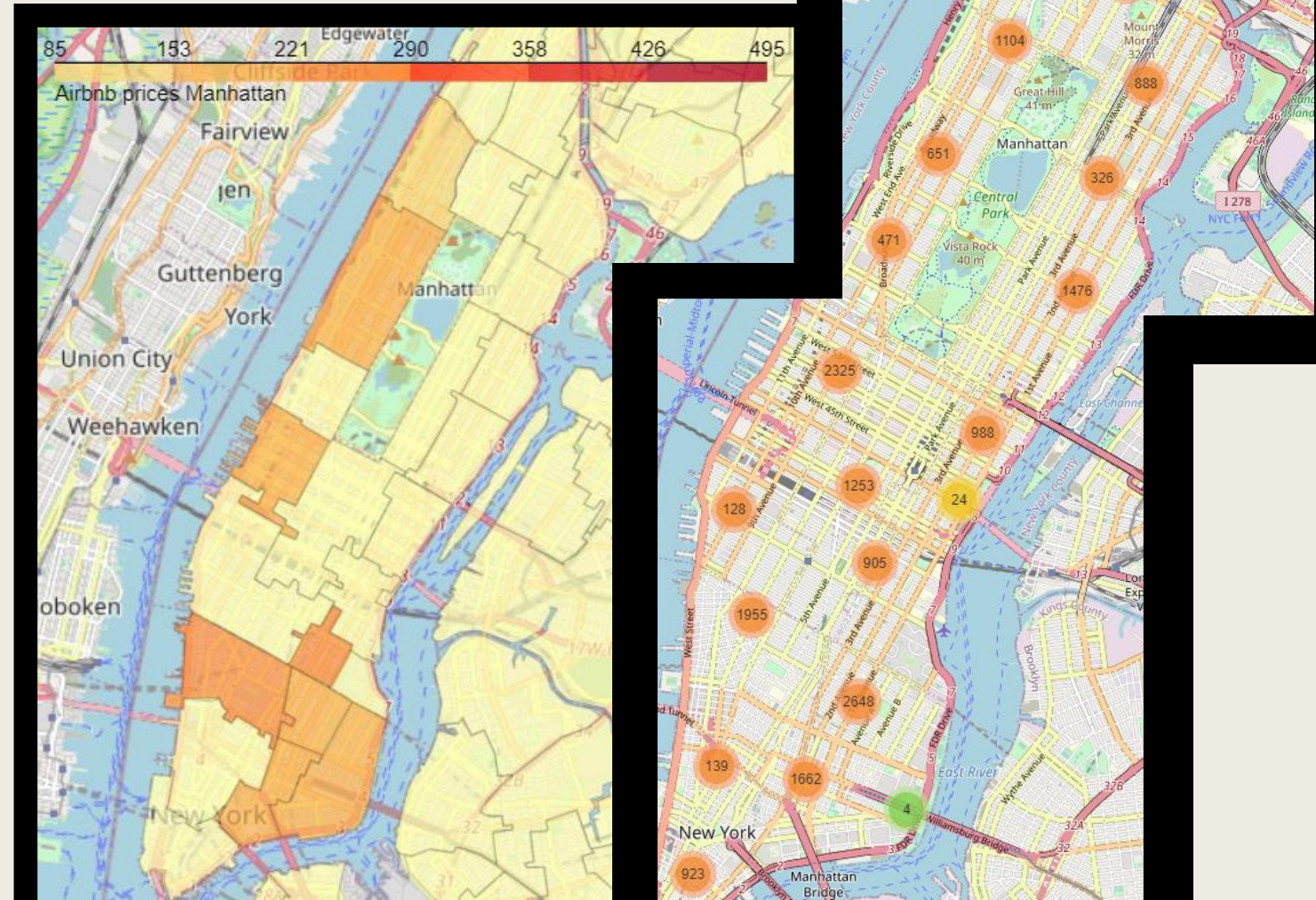
Airbnb Data

Manhattan's Airbnb average prices and listing totals respectively

The visual analysis of Airbnb data already provides us a taste of what our clusters can look like based on prices and quantity of accommodation options.

We see exclusive neighbourhoods like Tribeca, with very high prices and few accommodation options.

And on the other hand neighbourhoods like East Village with prices around the average and with plenty of options for accommodations.



Methodology

The clustering method that will be used in this exercise will be the K-Means. The idea behind it is to partition n observations into k clusters in which each observation belongs to the cluster with the nearest mean (cluster centers or cluster centroid), serving as a prototype of the cluster.

The dataset used to run the K-Means algorithm was the one created merging all the data we collected in the previous section from both Foursquare and Airbnb. From there, the calculations were done to input the euclidian differences for all features we listed and it generated the following clusters:

Cluster	Price	# Listings	Type	Things to do	avg availability year	# reviews
0	AVG LOW	AVG HIGH	Both entire home and rooms	Latin restaurants, art, cafes&bakery	AVG	HIGH
1	AVG HIGH	AVG LOW	Mainly Entire home	Italian restaurants, cafes, snacks	AVG	LOW
2	AVG	HIGH	Mainly Entire home	Art, bar, cafes&bakery,specialities restaurants	HIGH	AVG
3	LOW	LOW	Mainly Private rooms	Parks, sports, cafes	LOW	LOW
4	AVG	AVG	Both entire home and rooms	Cafes, speciality restaurants, bars, art	AVG	HIGH
5	LOW	HIGH	Mainly Private rooms	Specialty restaurant, shops, bars	AVG	HIGH
6	HIGH	LOW	Mainly Entire home	Parks, cafes, sport, restaurants	HIGH	LOW
7	LOW	AVG LOW	Mainly Private rooms	Asian restaurants, cafes, snacks	LOW	AVG

The clusters will then be defined trying to group Manhattan's neighbourhoods as best as possible regarding these features. From there we will be able to understand where different types of tourists might be happier with their accomodation choices in NY:

Results

Having created the clusters and analyzing what defines them we can try to define what kind of tourists could be more inclined to choose between the clusters according to their preferences, for the sake of illustration, “marketing” categories were created for the clusters, trying to resonate in terms of the definitions that compose them:

0	Chelsea
0	East Harlem
1	Gramercy
1	Greenwich Village
1	Little Italy
1	Murray Hill
1	Soho
1	Turtle Bay
2	Clinton
2	East Village
2	Midtown
2	Upper East Side
2	Upper West Side
3	Civic Center
3	Marble Hill
3	Roosevelt Island
3	Stuyvesant Town
4	Financial District
4	Lower East Side
4	Washington Heights
4	West Village
5	Central Harlem
6	Battery Park City
6	Flatiron
6	Noho
6	Tribeca
7	Chinatown
7	Inwood
7	Morningside Heights

Cluster	Price	# Listings	Type	Things to do
0	AVG LOW	AVG HIGH	Both entire home and rooms	Latin restaurants, art, cafes&bakery
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Cluster	Type of tourism	Brand name
0	All types, avg prices, art, food, cafes lots of reviews	Flexible art, food and coffee
1	Couples/ Families, high budget, italian restaurants, cafes, snacks	Italian and coffee classics
2	Most options, avg price, art, bars, cafes and food	The Cosmopolitan right mix
3	Solo, Low budget, cafe, outside	Solo outside adventures
4	All types, all budgets, cafes & bakeries, food	Budget Italian and coffee classics
5	Solo, low budget, food and shop	Budget solo
6	Couples/ Families, high budget, parks, landmarks, food	High end NY: outside and food
7	Solo, low budget, food and bars	Solo food and coffee

Results

With the help of the map visualization and the deeper cluster definitions we can easily spot some general trends that are interesting:

- In general we can see a lot of options and availabilities for Manhattan, however the prices are usually very high compared to other metropolis.

- In some hip neighborhoods with only few listings and availability we see big prices being charged and only whole apartments being rented. We see that in the examples in cluster 6.

- Our cluster 2 includes locations in the heart of Manhattan and we can easily spot a big amount of available listings. It does seem that offer is following up the demand as the prices are not extremely above average.

- Our cluster 1 seems like an ensemble of some classic locations, with plenty of New York's favorite foodies' attractions, pizza places and cafes. Demand seems to be still above offered in this cluster though, which sees prices above average.

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Discussion & Conclusion

- Tourists traveling solo and with low budget (mainly private rooms to rent here) might find it best to pick **neighborhoods in clusters 3, 5 or 7**. From the full of listings options Central Harlem to neighborhoods with way less options like Roosevelt island, solo budget travelers can still find things to do (and eat) around these picks

- Tourists travelling in couple or families and with some spare budget to spend will definitely have the time of their lives picking options **from clusters 1 or 6**. Although these might **not have a lot of options always available**, they will find all the most searched experiences of NY around the block. **Cafes, Italian places, art and parks**. Besides that these listings are in **average very well reviewed** so they will have no problems finding something that pleases them (if they start searching in time).

- Our average tourist, not wanting to pay too much above the average price and still wanting to be in very central locations with plenty of the typical cafes, bars, galleries and Central Park will definitely find a proper **option in Cluster 2**. With the biggest amounts of listing options and prices just around the average these neighbourhoods are just the **right mix!**

As we might have previously suspected, there's no major winner from this battle of neighborhoods. What we can see is a rich list of options that are set to suit all types of tourists (and budgets) coming to New York city's Manhattan. Hopefully this analysis can serve as a small "2 cents" for someone undecided about where to rent an accommodation in the cosmopolitan capital of the modern world.

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