

Opening a restaurant in Manhattan

Introduction

Manhattan is one of the five boroughs of New York City and is arguably the most famous and developed one. It is considered the financial center of the world.

This project is going to be based on Data Science, and we'll be suggesting some favorite places in Manhattan where people looking forward to opening a new restaurant will be our stakeholders.

So here, being a Data Scientist we'll try to help these people by providing them with the analysis about which area to select to open a restaurant, which kind of cuisine should be available like for example, one should open a French restaurant or an Italian one and that too in which location so that the restaurant faces the least competition.

About the Dataset

In New York City there are a total of 5 Neighborhoods. Somehow we'll have to arrange this data set from somewhere. Luckily we have one at 2014 New York City Neighborhood Names.

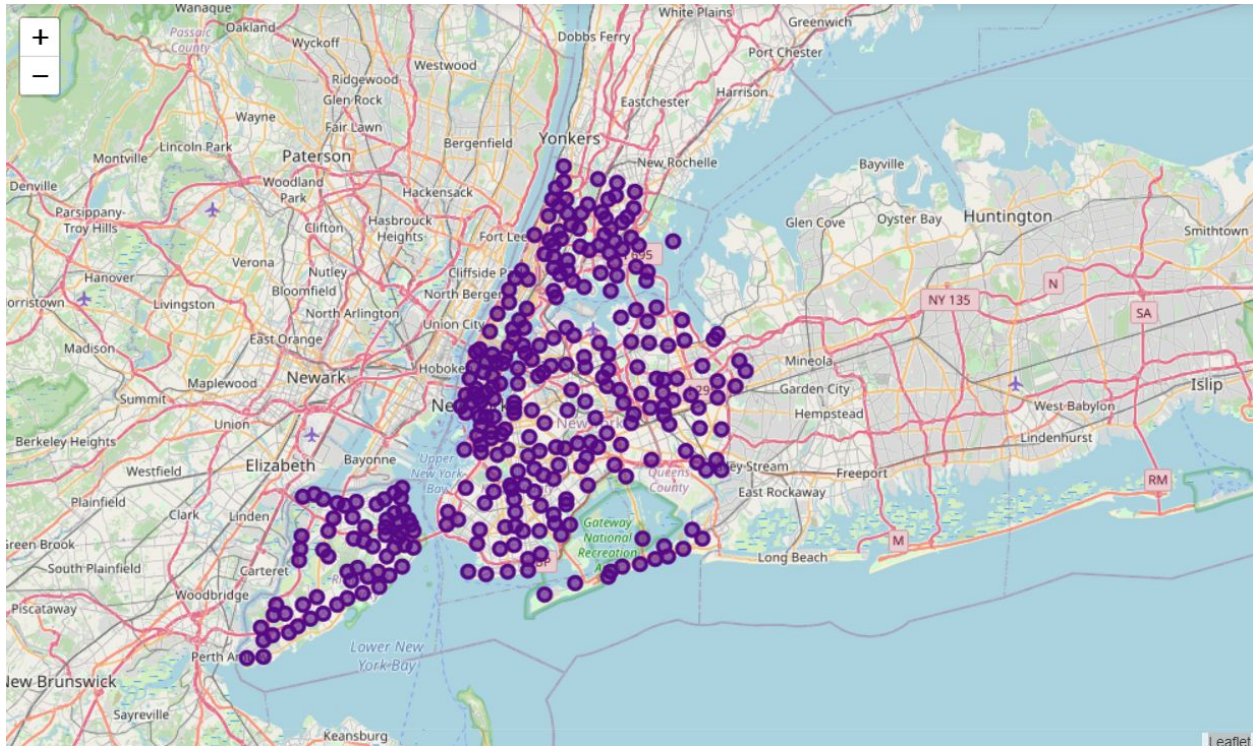
Moreover, we will rely on Foursquare API to get the venues in the neighborhoods of Manhattan.

The first five rows of the initial dataset looks like this.

	Borough	Neighborhood	Latitude	Longitude
0	Bronx	Wakefield	40.894705	-73.847201
1	Bronx	Co-op City	40.874294	-73.829939
2	Bronx	Eastchester	40.887556	-73.827806
3	Bronx	Fieldston	40.895437	-73.905643
4	Bronx	Riverdale	40.890834	-73.912585

Methodology

So, we are going to take this dataset and use this to mark all the neighborhoods in the city of New York using the Folium Library. The resultant Map looks like this.



After this we will create a dataframe that contains the Manhattan Data i.e. all the neighborhoods in Manhattan along with their latitude and Longitude coordinates.

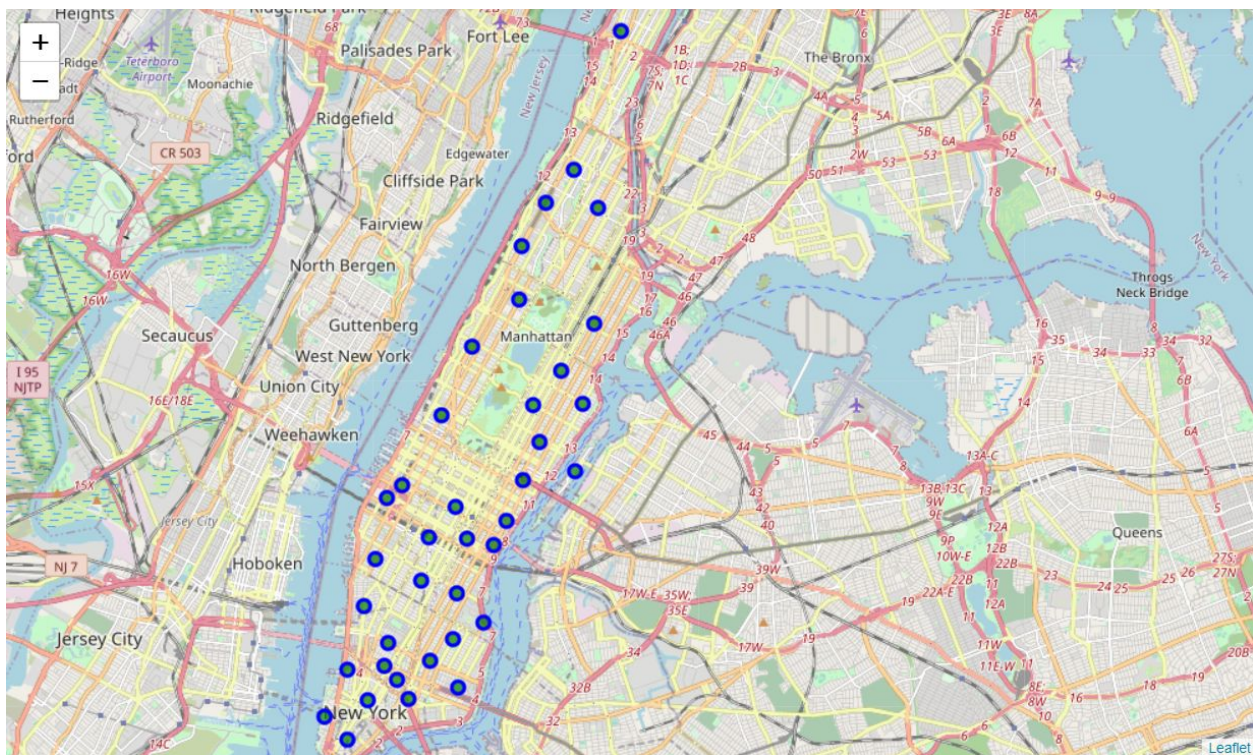
The data looks like this:

	Borough	Neighborhood	Latitude	Longitude
0	Manhattan	Marble Hill	40.876551	-73.910660
1	Manhattan	Chinatown	40.715618	-73.994279
2	Manhattan	Washington Heights	40.851903	-73.936900
3	Manhattan	Inwood	40.867684	-73.921210
4	Manhattan	Hamilton Heights	40.823604	-73.949688

Now, using this data we will visualize the neighborhood in Manhattan using the Folium Library.

Discussions

The Map looks like this:



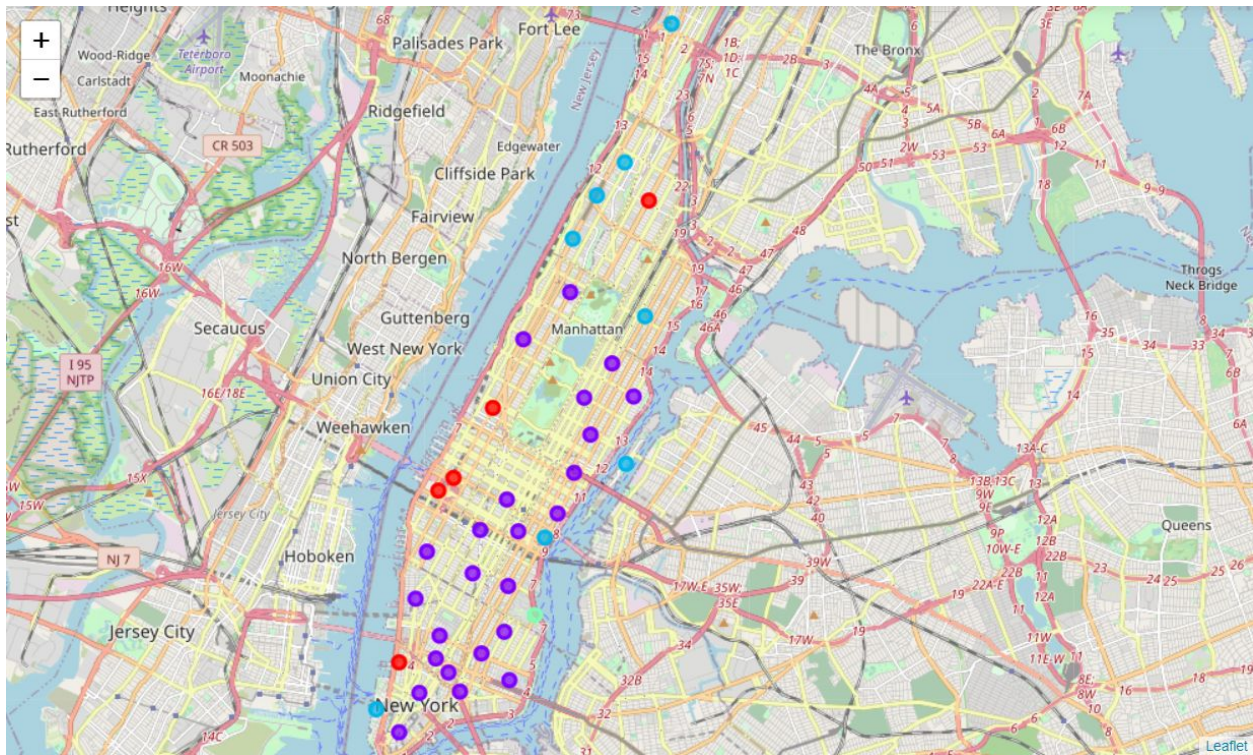
Now, we'll make use of the Foursquare API to explore the neighborhoods and segment them.

We'll then find the top venues of each neighborhood which looks like this:

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Battery Park City	Park	Hotel	Gym	Coffee Shop	Memorial Site
1	Carnegie Hill	Coffee Shop	Pizza Place	Café	Bookstore	Gym / Fitness Center
2	Central Harlem	African Restaurant	Chinese Restaurant	Gym / Fitness Center	American Restaurant	Cosmetics Shop
3	Chelsea	Art Gallery	Coffee Shop	Ice Cream Shop	Café	American Restaurant
4	Chinatown	Chinese Restaurant	Bakery	Cocktail Bar	Bubble Tea Shop	Ice Cream Shop

Then ,we'll use KMeans Clustering and cluster the neighborhoods and Label them from 1to 5.

Then using folium library we will plot all the clusters on the map of Manhattan,



This image shows us the clusters of neighborhoods in Manhattan.

Result

The list of all the clusters and their top 5 venues are shown below:

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
6	Central Harlem	African Restaurant	Chinese Restaurant	Gym / Fitness Center	American Restaurant	Cosmetics Shop
13	Lincoln Square	Plaza	Café	Italian Restaurant	Performing Arts Venue	Concert Hall
14	Clinton	Theater	Gym / Fitness Center	Italian Restaurant	Coffee Shop	Wine Shop
21	Tribeca	Italian Restaurant	American Restaurant	Park	Wine Bar	Spa
39	Hudson Yards	Italian Restaurant	Hotel	Gym / Fitness Center	Bar	Gym

Cluster 1

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
1	Chinatown	Chinese Restaurant	Bakery	Cocktail Bar	Bubble Tea Shop	Ice Cream Shop
8	Upper East Side	Italian Restaurant	Coffee Shop	Gym / Fitness Center	Bakery	Exhibit
9	Yorkville	Coffee Shop	Gym	Italian Restaurant	Bar	Deli / Bodega
10	Lenox Hill	Italian Restaurant	Coffee Shop	Pizza Place	Café	Cocktail Bar
12	Upper West Side	Italian Restaurant	Bar	Wine Bar	Indian Restaurant	Dessert Shop
15	Midtown	Coffee Shop	Hotel	Bakery	Theater	Clothing Store
16	Murray Hill	Hotel	Sandwich Place	Pizza Place	Gym / Fitness Center	Japanese Restaurant
17	Chelsea	Art Gallery	Coffee Shop	Ice Cream Shop	Café	American Restaurant
18	Greenwich Village	Italian Restaurant	Café	Sushi Restaurant	Gym	Chinese Restaurant
19	East Village	Bar	Mexican Restaurant	Coffee Shop	Cocktail Bar	Japanese Restaurant
20	Lower East Side	Chinese Restaurant	Bakery	Ramen Restaurant	Art Gallery	Café
22	Little Italy	Spa	Bubble Tea Shop	Mediterranean Restaurant	Italian Restaurant	Bakery
23	Soho	Italian Restaurant	Sandwich Place	Mediterranean Restaurant	Coffee Shop	Bakery
24	West Village	Italian Restaurant	Wine Bar	New American Restaurant	Pizza Place	Bakery
25	Manhattan Valley	Coffee Shop	Yoga Studio	Bar	Pizza Place	Mexican Restaurant
27	Gramercy	Bagel Shop	Coffee Shop	Pizza Place	Bar	Mexican Restaurant
29	Financial District	Coffee Shop	Pizza Place	American Restaurant	Event Space	Hotel
30	Carnegie Hill	Coffee Shop	Pizza Place	Café	Bookstore	Gym / Fitness Center
31	Noho	Italian Restaurant	Coffee Shop	Pizza Place	Sandwich Place	Grocery Store
32	Civic Center	Coffee Shop	Hotel	Cocktail Bar	French Restaurant	Spa
33	Midtown South	Korean Restaurant	Hotel	Japanese Restaurant	Café	Dessert Shop
34	Sutton Place	Gym / Fitness Center	Coffee Shop	Park	Italian Restaurant	Gym
35	Turtle Bay	Italian Restaurant	Coffee Shop	Sushi Restaurant	Café	Seafood Restaurant
38	Flatiron	Gym / Fitness Center	Café	Italian Restaurant	Yoga Studio	Vegetarian / Vegan Restaurant

Cluster 2

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
2	Washington Heights	Café	Bakery	Mobile Phone Shop	Donut Shop	Bank
3	Inwood	Lounge	Mexican Restaurant	Café	Restaurant	Bakery
4	Hamilton Heights	Pizza Place	Coffee Shop	Café	Deli / Bodega	Mexican Restaurant
5	Manhattanville	Coffee Shop	Seafood Restaurant	Mexican Restaurant	Park	Italian Restaurant
7	East Harlem	Mexican Restaurant	Bakery	Thai Restaurant	Latin American Restaurant	Deli / Bodega
11	Roosevelt Island	Bubble Tea Shop	Residential Building (Apartment / Condo)	Sandwich Place	Liquor Store	Dry Cleaner
26	Morningside Heights	Park	Coffee Shop	Bookstore	American Restaurant	Burger Joint
28	Battery Park City	Park	Hotel	Gym	Coffee Shop	Memorial Site
36	Tudor City	Café	Park	Mexican Restaurant	Pizza Place	Sushi Restaurant

Cluster 3

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
37	Stuyvesant Town	Boat or Ferry	Playground	Park	Bar	Farmers Market

Cluster 4

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Marble Hill	Sandwich Place	Gym	Coffee Shop	Yoga Studio	Diner

Cluster 5

Conclusion

Report of cluster 1

We can clearly see that this cluster, which is represented by red color on the map has a lot of Italian Restaurants. Therefore opening an italian restaurant would be a really bad idea in this region. In case you just want to open a cafe or a coffee shop this could be a good place since it doesn't have much competition in this sector.

Report of Cluster 2

This cluster covers the majority of the region in Manhattan ,and it's clearly visible that it has a lot of restaurants and in such huge amounts ,so this region should not be considered for opening any restaurant or a cafe.

Report of cluster 3

This region doesn't have a lot of restaurants especially if someone wants to open an Italian restaurant....this is the most favourable region to do so. Especially, near the Columbia University in the 116th street. It doesn't have much competition and this region is well populated as well.

Report of cluster 4

So, this place may not be good for opening any restaurant because this region basically consists of Boat Yards and people who would come in this region are most likely to go and enjoy their time on the boat. However, if someone wants to open a takeaway restaurant it might be a good place because people who are going on boat may like to carry some food with them.

Report of cluster 5

This region is slightly away from the residential area, so there might not be that many customers present in this region. Therefore, I would not recommend opening a restaurant here.

Final Recommendation by me

If someone actually wants to open a restaurant in Manhattan and wants to make profit out of it, they should open an Italian restaurant and that too in the regions of cluster 3.

Why Italian? Because, the data above directs us to a conclusion that people in New York City love to eat Italian Cuisine.

What would be the best spot? According to me, the best spot would be somewhere near 116th street near Columbia University.

-Shashank Verma