

Final assignment: The Battle of Neighbourhoods

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1. Introduction

New York has a lot of restaurants, especially sushi restaurants, which have spread out in the recent years. You can find a lot of fast-food or Asian restaurants where you can buy sushi.

Everyone knows what sushi is, it is a Japanese dish of prepared vinegar rice, usually with some sugar and salt, accompanying a variety of ingredients, such as seafood, vegetables and occasionally tropical fruits.

Nevertheless, we are not really known if it is worth has a restaurant with an excellent cuisine where the quality of the seafood must be brilliant. Moreover, you have to know how much money you are willing to invest at the beginning and if you can bear to pay a high rent in the followings months when restaurant incomes are not yet so high.

2. Business Problem

Easily, you can set up a Sushi restaurant in New York that's why our client is interest in it. However, if you want to success you can't run it without a previous study. Therefore, he needs to know where it is the best place to do it because of the high competition. Our client is interested in run it in Manhattan.

We are going to analyse the area in order to avoid that his restaurant will be close to another ones. In addition, he has to consider if the restaurant is going to be a good restaurant with fresh seafood or just only fast-food sushi restaurant.

3. Data

New York comprises boroughs sitting where the Hudson River meets the Atlantic Ocean. They are:

1. Manhattan
2. Brooklyn
3. Queens
4. The Bronx
5. Staten Island

The data will be obtained from several sources:

- Foursquare Venues [categories](#). You can scroll down until Japanese restaurant and after that you should search the ID of Shushi Restaurant is:
4bf58dd8d48988d1d2941735
- We will use a dataset which contain the boroughs and its neighborhoods. In order to explore and segment the neighborhoods we will use a dataset which

contain the boroughs and its neighborhoods. In addition it should have neighborhoods coordinates. You can find this dataset, in the following [link](#)

4. Methodology

- We use Foursquare to explore the neighbourhoods in Manhattan, New York
- We use the latitude and longitude coordinates of addresses.
- We use explore function to see sushi restaurants in Manhattan.
- We print our results in a map using folium library
- We suggest what is the best place to set up a sushi restaurant

5. Results

Below, you can see a map , which contains sushi restaurants in Manhatan.



Figure 1: Map which shows Sushi restaurants in Manhattan

	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Neighborhood						
Battery Park City	21	21	21	21	21	21
Carnegie Hill	21	21	21	21	21	21
Central Harlem	3	3	3	3	3	3
Chelsea	44	44	44	44	44	44
Chinatown	26	26	26	26	26	26
Civic Center	32	32	32	32	32	32
Clinton	38	38	38	38	38	38
East Harlem	3	3	3	3	3	3
East Village	50	50	50	50	50	50
Financial District	21	21	21	21	21	21
Flatiron	50	50	50	50	50	50
Gramercy	47	47	47	47	47	47
Greenwich Village	49	49	49	49	49	49
Hamilton Heights	3	3	3	3	3	3
Hudson Yards	23	23	23	23	23	23
Inwood	4	4	4	4	4	4
Lenox Hill	33	33	33	33	33	33

Figure2: Neighborhoods grouped

	Neighborhood	Asian Restaurant	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japanese Restaurant	Noodle House	Poke Place
0	Marble Hill	0	0	0	0	0	0	0	0	0	0
1	Chinatown	0	0	0	0	0	0	0	1	0	0
2	Chinatown	0	0	0	0	0	0	0	0	0	0
3	Chinatown	0	0	0	0	0	0	0	0	0	0
4	Chinatown	0	0	0	0	0	0	0	1	0	0

Figure 3: Analyzing Each Neighbourhood

We group rows by neighbourhood and by taking the mean of the frequency of occurrence of each category

	Neighborhood	Asian Restaurant	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japanese Restaurant	Noodle House	Poke Place
0	Battery Park City	0.000000	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.095238	0.047619	0.0000
1	Carnegie Hill	0.047619	0.00	0.047619	0.000000	0.000000	0.000000	0.000000	0.095238	0.000000	0.0000
2	Central Harlem	0.000000	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.0000
3	Chelsea	0.045455	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.113636	0.000000	0.0000
4	Chinatown	0.000000	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.192308	0.000000	0.0000
5	Civic Center	0.000000	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.093750	0.031250	0.0000
6	Clinton	0.026316	0.00	0.026316	0.026316	0.000000	0.000000	0.000000	0.105263	0.000000	0.0263
7	East Harlem	0.000000	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.0000
8	East Village	0.000000	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.120000	0.000000	0.0000
9	Financial District	0.000000	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.190476	0.000000	0.0000
10	Flatiron	0.020000	0.00	0.020000	0.000000	0.000000	0.000000	0.000000	0.100000	0.000000	0.0000
11	Gramercy	0.000000	0.00	0.021277	0.000000	0.000000	0.000000	0.000000	0.148936	0.000000	0.0000
12	Greenwich Village	0.000000	0.00	0.000000	0.000000	0.000000	0.000000	0.000000	0.061224	0.000000	0.0000

Figure 4: mean of the frequency of occurrence of each category

Using K-means clustering algorithm we will find the most common venues and we will be able to know where the best place is to run the restaurant.

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
1	Chinatown	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
8	Upper East Side	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
9	Yorkville	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Chinese Restaurant	Noodle House	Bakery	Cocktail Bar	Deli / Bodega	Grocery Store
13	Lincoln Square	Sushi Restaurant	Japanese Restaurant	Smoothie Shop	Chinese Restaurant	Grocery Store	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Cocktail Bar
17	Chelsea	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Vegetarian / Vegan Restaurant	Smoothie Shop	Seafood Restaurant	Sandwich Place	Sake Bar	Restaurant
19	East Village	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
21	Tribeca	Sushi Restaurant	Noodle House	Japanese Restaurant	Theme Restaurant	Vegetarian / Vegan Restaurant	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega
22	Little Italy	Sushi Restaurant	Japanese Restaurant	Noodle House	Vegetarian / Vegan Restaurant	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store

Figure 5: K means most common venues

Cluster 0

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
1	Chinatown	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
8	Upper East Side	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
9	Yorkville	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Chinese Restaurant	Noodle House	Bakery	Cocktail Bar	Deli / Bodega	Grocery Store
13	Lincoln Square	Sushi Restaurant	Japanese Restaurant	Smoothie Shop	Chinese Restaurant	Grocery Store	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Cocktail Bar
17	Chelsea	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Vegetarian / Vegan Restaurant	Smoothie Shop	Seafood Restaurant	Sandwich Place	Sake Bar	Restaurant
19	East Village	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
21	Tribeca	Sushi Restaurant	Noodle House	Japanese Restaurant	Theme Restaurant	Vegetarian / Vegan Restaurant	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega
22	Little Italy	Sushi Restaurant	Japanese Restaurant	Noodle House	Vegetarian / Vegan Restaurant	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
23	Soho	Sushi Restaurant	Japanese Restaurant	Noodle House	Theme Restaurant	Vegetarian / Vegan Restaurant	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega

Cluster 1

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
10	Lenox Hill	Sushi Restaurant	Asian Restaurant	Japanese Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
14	Clinton	Sushi Restaurant	Japanese Restaurant	Poke Place	Chinese Restaurant	Cocktail Bar	Asian Restaurant	Seafood Restaurant	Sandwich Place	Sake Bar
15	Midtown	Sushi Restaurant	Asian Restaurant	Seafood Restaurant	Japanese Restaurant	Ramen Restaurant	Bakery	Vegetarian / Vegan Restaurant	Sandwich Place	Sake Bar
16	Murray Hill	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Restaurant	Bakery	Chinese Restaurant	Ramen Restaurant	Vegetarian / Vegan Restaurant	Sake Bar
33	Midtown South	Sushi Restaurant	Asian Restaurant	Japanese Restaurant	Restaurant	Bakery	Chinese Restaurant	Ramen Restaurant	Vegetarian / Vegan Restaurant	Sake Bar
34	Sutton Place	Sushi Restaurant	Asian Restaurant	Japanese Restaurant	Steakhouse	Seafood Restaurant	Deli / Bodega	Bakery	Chinese Restaurant	Cocktail Bar
39	Hudson Yards	Sushi Restaurant	Asian Restaurant	Japanese Restaurant	Cocktail Bar	Poke Place	Seafood Restaurant	Sandwich Place	Sake Bar	Restaurant

Cluster 2

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Marble Hill	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japan Restaurant
2	Washington Heights	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japan Restaurant
3	Inwood	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japan Restaurant
4	Hamilton Heights	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japan Restaurant
5	Manhattanville	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japan Restaurant
6	Central Harlem	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japan Restaurant
7	East Harlem	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japan Restaurant

Cluster 3

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Marble Hill	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japan Restaurant
2	Washington Heights	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japan Restaurant
3	Inwood	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japan Restaurant
4	Hamilton Heights	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japan Restaurant
5	Manhattanville	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japan Restaurant
6	Central Harlem	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japan Restaurant
7	East Harlem	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japan Restaurant

Cluster 4

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
11	Roosevelt Island	Sushi Restaurant	Asian Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japanese Restaurant
18	Greenwich Village	Sushi Restaurant	Japanese Restaurant	Sake Bar	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
26	Morningside Heights	Sushi Restaurant	Hawaiian Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Japanese Restaurant
35	Turtle Bay	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Steakhouse	Seafood Restaurant	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
36	Tudor City	Sushi Restaurant	Asian Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Steakhouse	Smoothie Shop	Seafood Restaurant	Sandwich Place	Sake Bar	Restaurant

In the following map you could see the results:

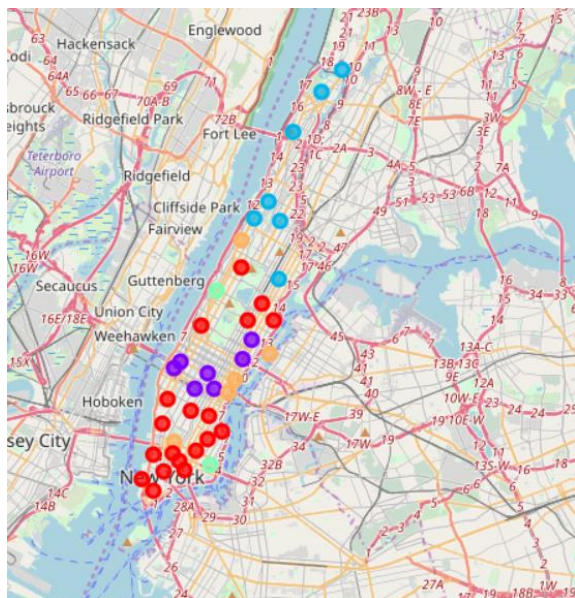


Figure 6: Clustering Sushi Restaurant
Manhattan

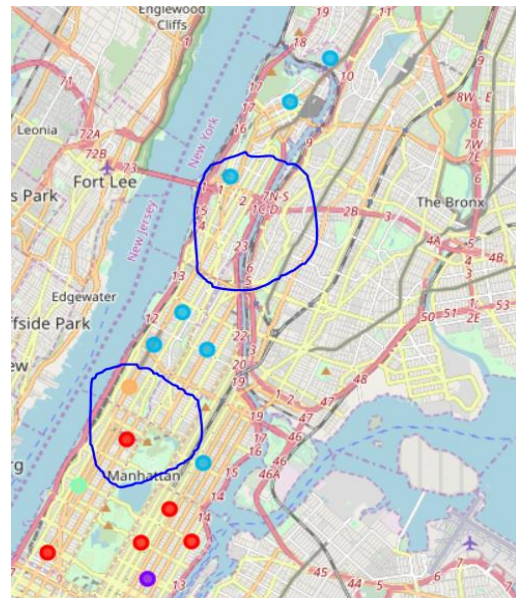


Figure 7: Best places to set up Sushi
Restaurant in Manhattan

6. Discussion

As you can see in the map the best places to set up a restaurant in Manhattan are located in the north and in the centre, close to Central Park.

In addition, we have realised that it is very risky set up a sushi restaurant in the South of Manhattan because of high competition.

A possible improvement may be to consider the population in the different areas and know the number of tourists. Furthermore, the client should consider the prices of the

different areas and think if he is going to set up a restaurant or just only a sushi shop to take away.

7. Conclusion

We can conclude that the main goal of this project, which is given an approximation of what is the best place in Manhattan to set up a restaurant, has been achieved successfully.

If you want to set up a Sushi restaurant, I suggest that you should do in the North of Manhattan or in the centre, close to Central Park.