

Capstone Project - The Battle of Neighborhoods

electing the best location to open an Thai Restaurant in Manhattan, New York

Introduction/Business Problem

The New York City is having diverse food culture which includes many international cuisines due to the presence of immigrants in the city.

Thai restaurants have become so popular in the United States now seems that there is one on every corner, not only in major cities but also in smaller cities. Starting a Thai restaurant can be a great business opportunity, but you need to distinguish yourself from others to enjoy long-term success.

Business Problem

My client wants to open his business in Manhattan area, so I focus on that borough during my analysis. We define potential neighborhood based on the number of Thai restaurant which are operating right in each neighborhood. Manhattan has full potential but also is a very challenging district to open a business because of high competition. New Thai restaurant should be opened in an area of having less Thai restaurants so that the restaurant can attract more customers. Therefore, this analysis is necessary to ensure that we have enough customers and that we are not so close to other Thai places.

Data Selection

- To identify the characteristics of our competitors' venues in Manhattan, we would first need to find out the number of Thai Restaurants in Manhattan currently and their location.
- We then used Google Map API to find their geographic coordinates based on their postal code addresses.
- In Manhattan, there is 1014 Thai restaurants are currently operating.

```
newyork_venues_thai.shape
```

```
(1014, 7)
```

Data Selection

- Next, we also used Google Map API to find their geographic coordinates of the locations shortlisted for our Thai 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	10th Most Common Venue
0	Battery Park City	Thai Restaurant	Japanese Restaurant	Food Truck	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Indian Restaurant	Filipino Restaurant
1	Carnegie Hill	Thai Restaurant	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck
2	Central Harlem	Thai Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck	Filipino Restaurant
3	Chelsea	Thai Restaurant	Malay Restaurant	Japanese Restaurant	Food Truck	Chinese Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Indian Restaurant
4	Chinatown	Thai Restaurant	Asian Restaurant	Vietnamese Restaurant	Sushi Restaurant	Malay Restaurant	Filipino Restaurant	Wine Bar	Ramen Restaurant	Japanese Restaurant	Indian Restaurant
5	Civic Center	Thai Restaurant	Malay Restaurant	Japanese Restaurant	Food Truck	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Indian Restaurant
6	Clinton	Thai Restaurant	Ramen Restaurant	Food Truck	Chinese Restaurant	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Malay Restaurant	Japanese Restaurant

Methodology

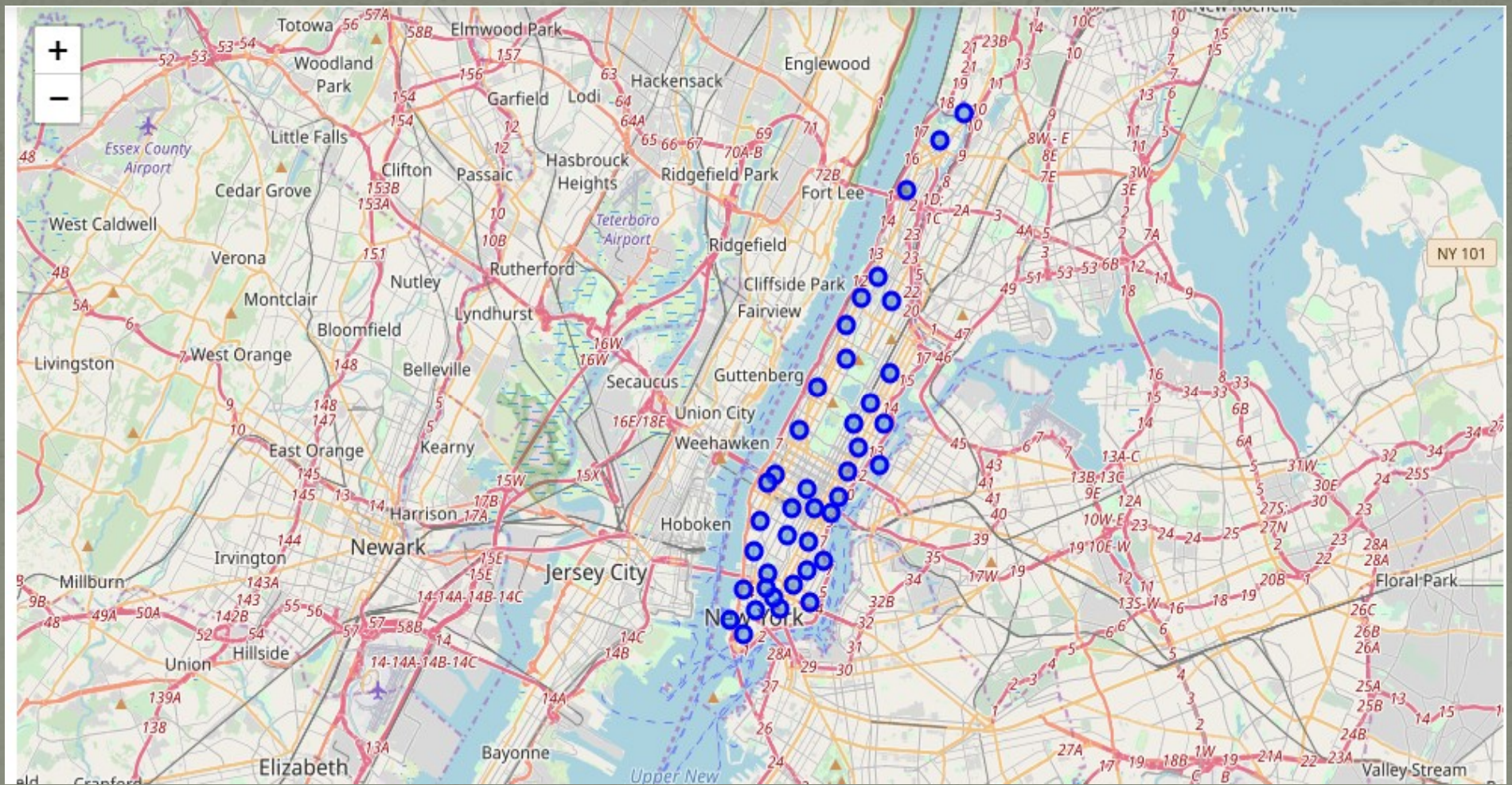
Addresses are converted into their equivalent latitude and longitude values.

Foursquare API is used to explore neighborhoods in Manhattan, New York. After that, explore function to get Thai restaurant categories in each neighborhood.

Methodology

[illegible]

Methodology



Thai Restaurants in Manhattan

Methodology

Then using this feature to group the neighborhoods into clusters K-means clustering algorithm will be use to complete this task. And also, the Foli library to visualize the neighborhoods in Manhattan and its emerg clusters.

	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	Battery Park City	Thai Restaurant	Japanese Restaurant	Food Truck	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Indian Restaurant	Filipino Restaurant
1	Carnegie Hill	Thai Restaurant	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck
2	Central Harlem	Thai Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck	Filipino Restaurant
3	Chelsea	Thai Restaurant	Malay Restaurant	Japanese Restaurant	Food Truck	Chinese Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Indian Restaurant
4	Chinatown	Thai Restaurant	Asian Restaurant	Vietnamese Restaurant	Sushi Restaurant	Malay Restaurant	Filipino Restaurant	Wine Bar	Ramen Restaurant	Japanese Restaurant	Indian Restaurant

Results

Using K-mean to clustering data area with less number of Thai restaurants.

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	10th Most Common Venue
8	Upper East Side	Thai Restaurant	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck
9	Yorkville	Thai Restaurant	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck
12	Upper West Side	Thai Restaurant	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck
21	Tribeca	Thai Restaurant	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck
24	West Village	Thai Restaurant	Chinese Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck
26	Morningside Heights	Thai Restaurant	Indian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Food Truck	Filipino Restaurant
30	Carnegie Hill	Thai Restaurant	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck
37	Stuyvesant Town	Thai Restaurant	Sushi Restaurant	Wine Bar	Vietnamese Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck	Filipino Restaurant
39	Hudson Yards	Thai Restaurant	Food Truck	Chinese Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant

Result

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	10th Most Common Venue
13	Lincoln Square	Thai Restaurant	Ramen Restaurant	Food Truck	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant
14	Clinton	Thai Restaurant	Ramen Restaurant	Food Truck	Chinese Restaurant	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Malay Restaurant	Japanese Restaurant
15	Midtown	Thai Restaurant	Food Truck	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant
33	Midtown South	Thai Restaurant	Food Truck	Japanese Restaurant	Chinese Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Indian Restaurant
36	Tudor City	Thai Restaurant	Food Truck	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian 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
17	Chelsea	Thai Restaurant	Malay Restaurant	Japanese Restaurant	Food Truck	Chinese Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Indian Restaurant
27	Gramercy	Thai Restaurant	Food Truck	Chinese Restaurant	Malay Restaurant	Japanese Restaurant	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant
32	Civic Center	Thai Restaurant	Malay Restaurant	Japanese Restaurant	Food Truck	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Indian Restaurant
38	Flatiron	Thai Restaurant	Food Truck	Chinese Restaurant	Malay Restaurant	Japanese Restaurant	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant

result

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
1	Chinatown	Thai Restaurant	Asian Restaurant	Vietnamese Restaurant	Sushi Restaurant	Malay Restaurant	Filipino Restaurant	Wine Bar	Ramen Restaurant	Japanese Restaurant	Indian Restaurant
18	Greenwich Village	Thai Restaurant	Asian Restaurant	Sushi Restaurant	Chinese Restaurant	Wine Bar	Vietnamese Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant
19	East Village	Thai Restaurant	Sushi Restaurant	Chinese Restaurant	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Food Truck	Filipino Restaurant	Ramen Restaurant	Malay Restaurant
20	Lower East Side	Thai Restaurant	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Filipino Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant
22	Little Italy	Thai Restaurant	Asian Restaurant	Vietnamese Restaurant	Sushi Restaurant	Malay Restaurant	Filipino Restaurant	Wine Bar	Ramen Restaurant	Japanese Restaurant	Indian Restaurant
23	Soho	Thai Restaurant	Asian Restaurant	Sushi Restaurant	Malay Restaurant	Wine Bar	Vietnamese Restaurant	Ramen Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck
25	Manhattan Valley	Thai Restaurant	Indian Restaurant	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Food Truck
31	Noho	Thai Restaurant	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Filipino Restaurant	Chinese Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant

result

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
28	Battery Park City	Thai Restaurant	Japanese Restaurant	Food Truck	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Indian Restaurant	Filipino Restaurant
29	Financial District	Thai Restaurant	Japanese Restaurant	Food Truck	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Indian Restaurant	Filipino Restaurant

Result

Cluster 5

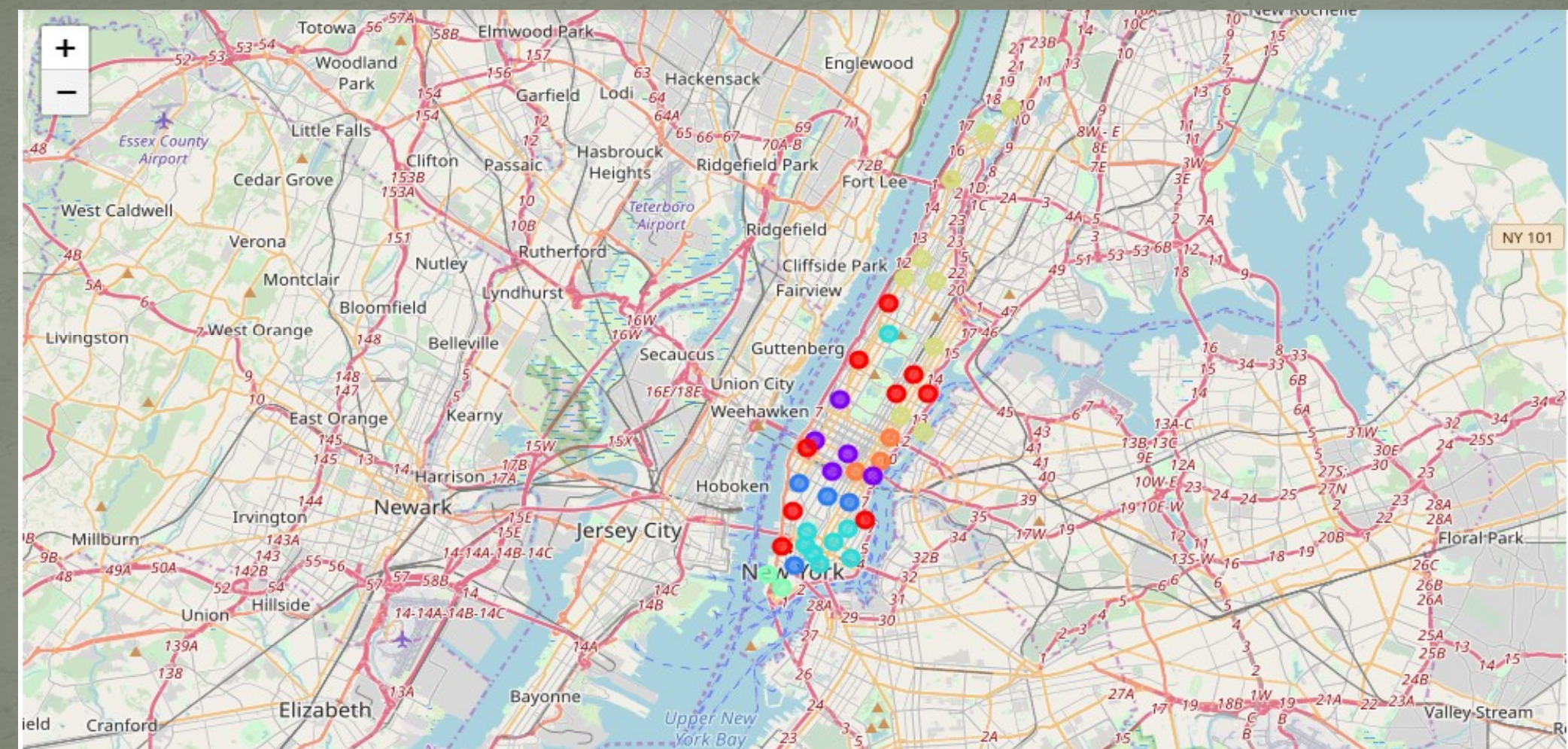
	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Marble Hill	Thai Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck	Filipino Restaurant
2	Washington Heights	Thai Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck	Filipino Restaurant
3	Inwood	Thai Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck	Filipino Restaurant
4	Hamilton Heights	Thai Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck	Filipino Restaurant
5	Manhattanville	Thai Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck	Filipino Restaurant
6	Central Harlem	Thai Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck	Filipino Restaurant
7	East Harlem	Thai Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck	Filipino Restaurant
10	Lenox Hill	Thai Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck	Filipino Restaurant
11	Roosevelt Island	Thai Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant	Food Truck	Filipino Restaurant

result

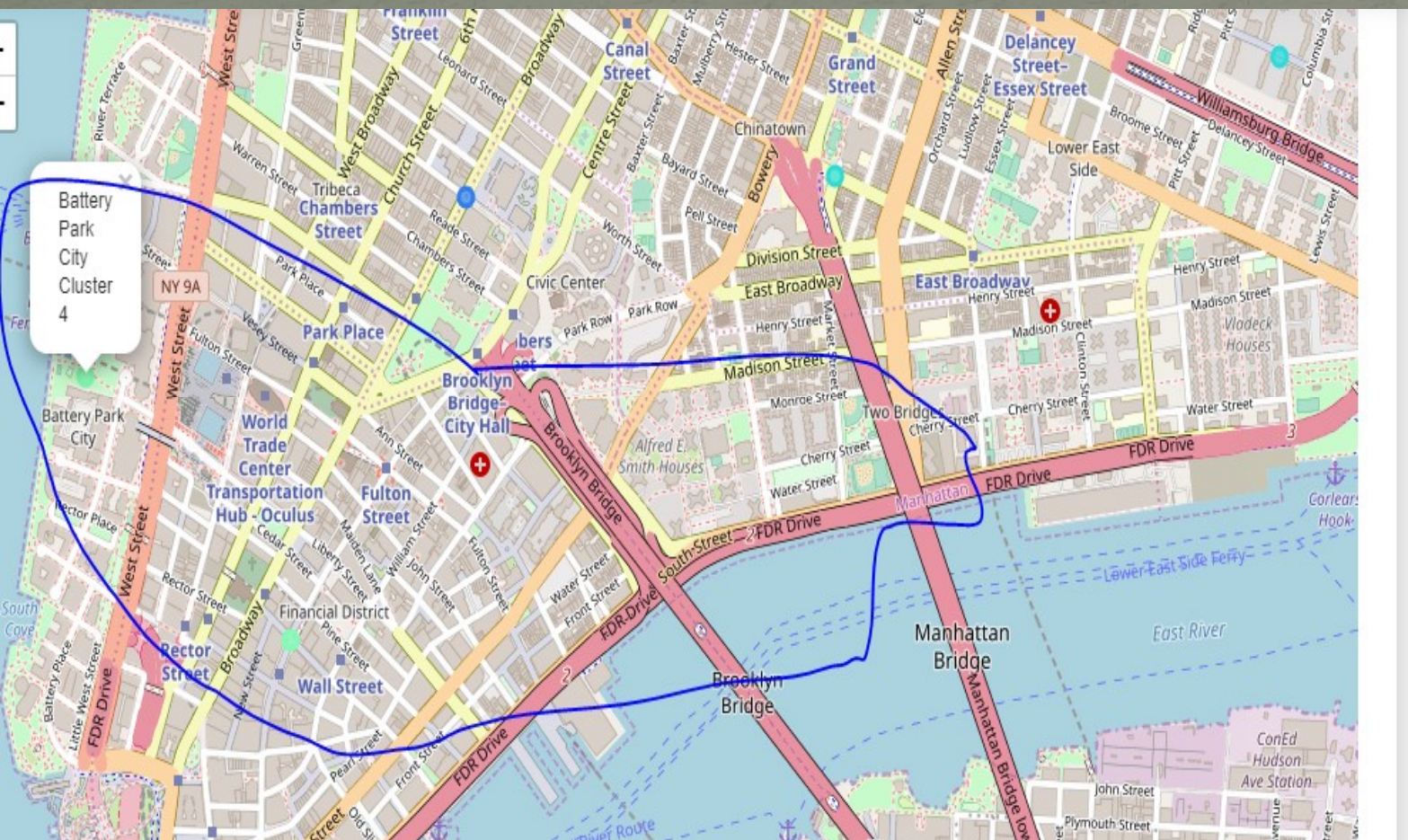
Cluster 6

	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
16	Murray Hill	Thai Restaurant	Food Truck	Asian Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant
34	Sutton Place	Thai Restaurant	Food Truck	Chinese Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant	Indian Restaurant
35	Turtle Bay	Thai Restaurant	Food Truck	Asian Restaurant	Chinese Restaurant	Wine Bar	Vietnamese Restaurant	Sushi Restaurant	Ramen Restaurant	Malay Restaurant	Japanese Restaurant

result



result



Based on Dataframe and analysis above Cluster 4 (Battery Park City and Financial District) areas are the best place to open a new sushi bar

discussion

- This analysis is performed on limited data. This not be correct completely but if good amount of data is available there is scope to come up with better results.
- There is high competition in Midtown and Noho so it is very risky to open business in these areas.
- It can be done more detailed analysis by adding other factors such as transportation, demographics of inhabitants.

Conclusion

- The goal of selecting a location for a new Thai restaurant is fulfilled in this project but we can use this foursquare tool as a location estimator app for future businesses with the help of some more data and considering some other factors.