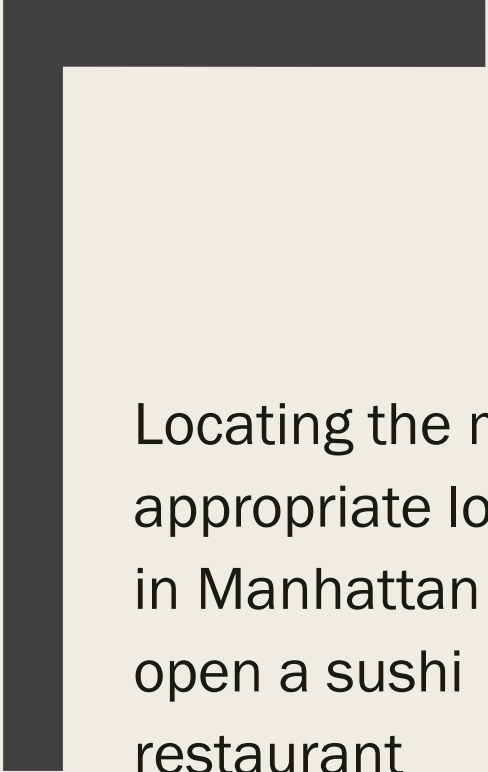



CAPSTONE PROJECT THE BATTLE OF NEIGHBORHOODS



Locating the most
appropriate location
in Manhattan to
open a sushi
restaurant



Introduction

- The famous sin city of Gotham have a population of 19.5 million people as of July 1, 2019 (U.S.A Census Bureau). It's the 4th largest city in the United States with 65.1 million visitors in 2018. New York is the financial capital of U.S.A and one of the most diverse states in the country. Its utterly diverse and host many different type of ethnicity therefore it provides lot of business oppourtunities and have a natural business friendly environment. From ages ago, the city of sin has attracted many different competitors into the market. New York is a global hub of business and commerce. The city is a major center for banking and finance, retailing, world trade, transportation, tourism, real estate, new media, traditional media, advertising, legal services, accountancy, insurance, theater, fashion, and the arts in the United States.
- This also means that the market is highly competitive. As it is highly developed city so cost of doing business is also one of the highest. Therefore, it is essential to analysis the market and data carefully and thoroughly. The insights derived from analysis will give good understanding of the business environment which help in strategically targeting the market. This will help in reduction of risk. And the return on Investment will be reasonable.
- The truth is that as much as there are many fine restaurants in New York – Asian, Middle Eastern, Latin and American restaurants, you can struggle to find an authentic Japanese restaurant that is only speclize in serving sushi.

Business Problem

My client- Sushi Dai, a famous restaurant chain in Japan is looking to expand operation into the U.S. through New York. They want to create a high-end restaurant that serve fresh raw fishes caught from the pacific ocean. To them every customer counts and everyone is a VIP when you dine at their chain.

Since the New York's demography is scattered, my client needs deep insight from available data in order to decide where to establish it's first restaurant.

Our company is an expert in data analytics and spends a lot of resources on research and provides customers with data insight.

Data Selection

- First, we use foursquare to find out the number of sushi restaurant in Manhattan
- Currently, there are 1096 sushi restaurant in business.

```
newyork_venues_sushi.shape
```

```
(1096, 7)
```

Data Selection

- We then shortlist five areas that are more appropriate for the opening of a sushi restaurant

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Marble Hill	40.876551	-73.910660	Planet Tokyo	40.886233	-73.909479	Sushi Restaurant
1	Chinatown	40.715618	-73.994279	Nakaji	40.715791	-73.996855	Sushi Restaurant
2	Chinatown	40.715618	-73.994279	Shinsen	40.715608	-73.996611	Japanese Restaurant
3	Chinatown	40.715618	-73.994279	Whole Foods Sushi Bar	40.724000	-73.992277	Sushi Restaurant
4	Chinatown	40.715618	-73.994279	Douzo	40.719069	-73.990781	Japanese Restaurant

01

Addresses are converted into their equivalent latitude and longitude values.

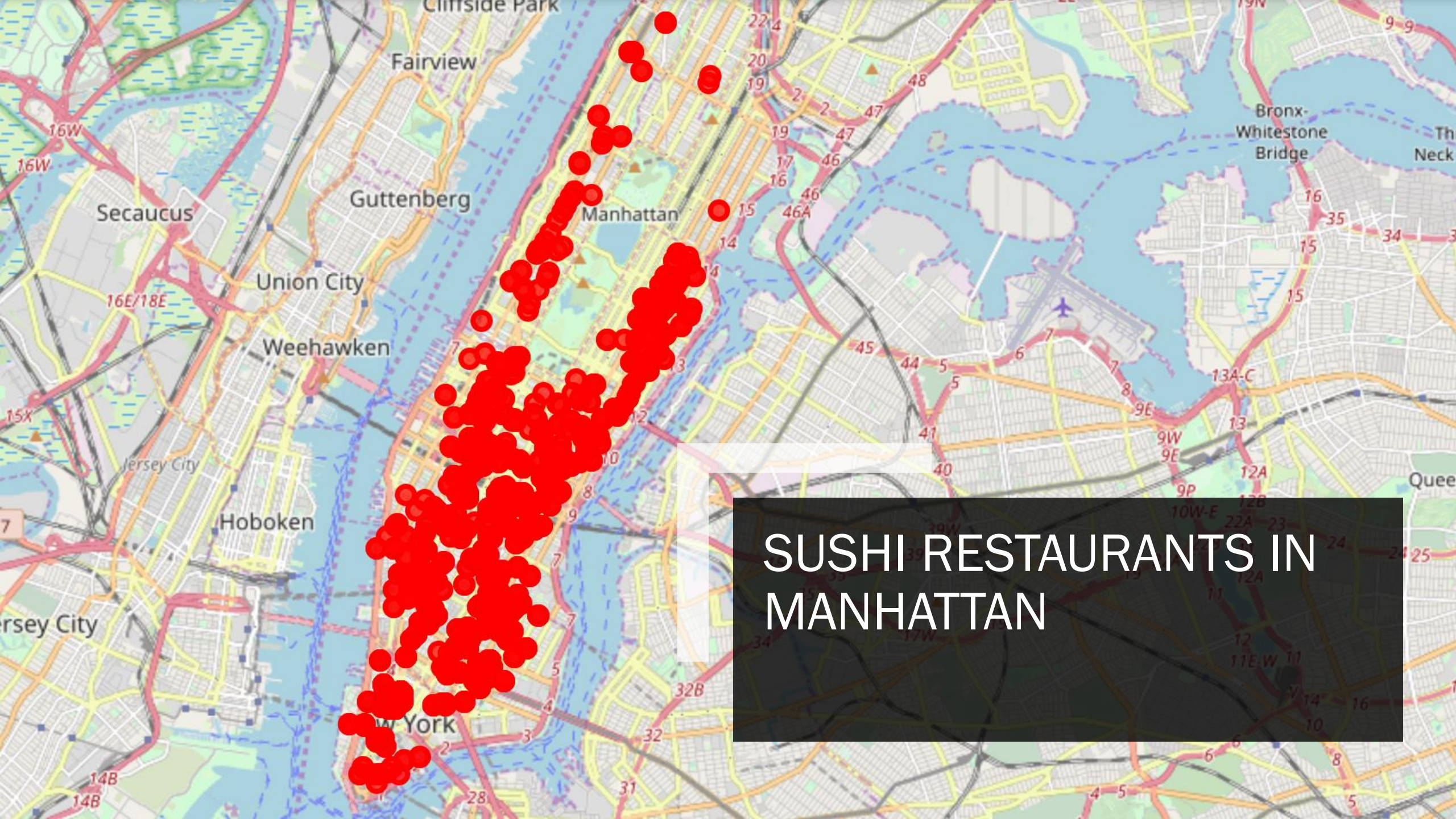
02

Foursquare API is used to explore neighborhoods in Manhattan, New York.

03

After that, explore function to get sushi restaurant categories in each neighborhood.

Methodology



SUSHI RESTAURANTS IN MANHATTAN

Methodology

- We group the neighborhoods into clusters K-means clustering algorithm will be use to complete this task. And also, the Folium library to visualize the neighborhoods in Manhattan and its emerging 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
Battery Park City	Sushi Restaurant	Japanese Restaurant	Noodle House	Theme Restaurant	Vegetarian / Vegan Restaurant	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
Carnegie Hill	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Chinese Restaurant	Noodle House	Bakery	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant
Central Harlem	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japanese Restaurant
Chelsea	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Vegetarian / Vegan Restaurant	Smoothie Shop	Seafood Restaurant	Sandwich Place	Sake Bar	Restaurant	Ramen Restaurant
Chinatown	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant

Results

- Using K-mean to clustering data area with less number of sushi bars

Cluster 0

	Borough	Neighborhood	Latitude	Longitude	Cluster Labels	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
0	Manhattan	Marble Hill	40.876551	-73.910660	0	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar
1	Manhattan	Chinatown	40.715618	-73.994279	0	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant
2	Manhattan	Washington Heights	40.851903	-73.936900	0	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar
3	Manhattan	Inwood	40.867684	-73.921210	0	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar
4	Manhattan	Hamilton Heights	40.823604	-73.949688	0	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar

Result

■ Cluster 1

	Borough	Neighborhood	Latitude	Longitude	Cluster Labels	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	Manhattan	Marble Hill	40.876551	-73.910660	1	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japanese Restaurant
1	Manhattan	Chinatown	40.715618	-73.994279	2	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant
2	Manhattan	Washington Heights	40.851903	-73.936900	1	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japanese Restaurant
3	Manhattan	Inwood	40.867684	-73.921210	1	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japanese Restaurant
4	Manhattan	Hamilton Heights	40.823604	-73.949688	1	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japanese Restaurant

Result

■ 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	Japanese Restaurant
2	Washington Heights	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japanese Restaurant
3	Inwood	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japanese Restaurant
4	Hamilton Heights	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japanese Restaurant
5	Manhattanville	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japanese Restaurant
6	Central Harlem	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japanese Restaurant
7	East Harlem	Sushi Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant	Japanese Restaurant

Result

Cluster 3

```
manhattan_merged.loc[manhattan_merged['Cluster Labels'] == 3, manhattan_merged.columns[[1] + list(range(5, manhattan_merged.shape[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
12	Upper West Side	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Grocery Store	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Hawaiian Restaurant

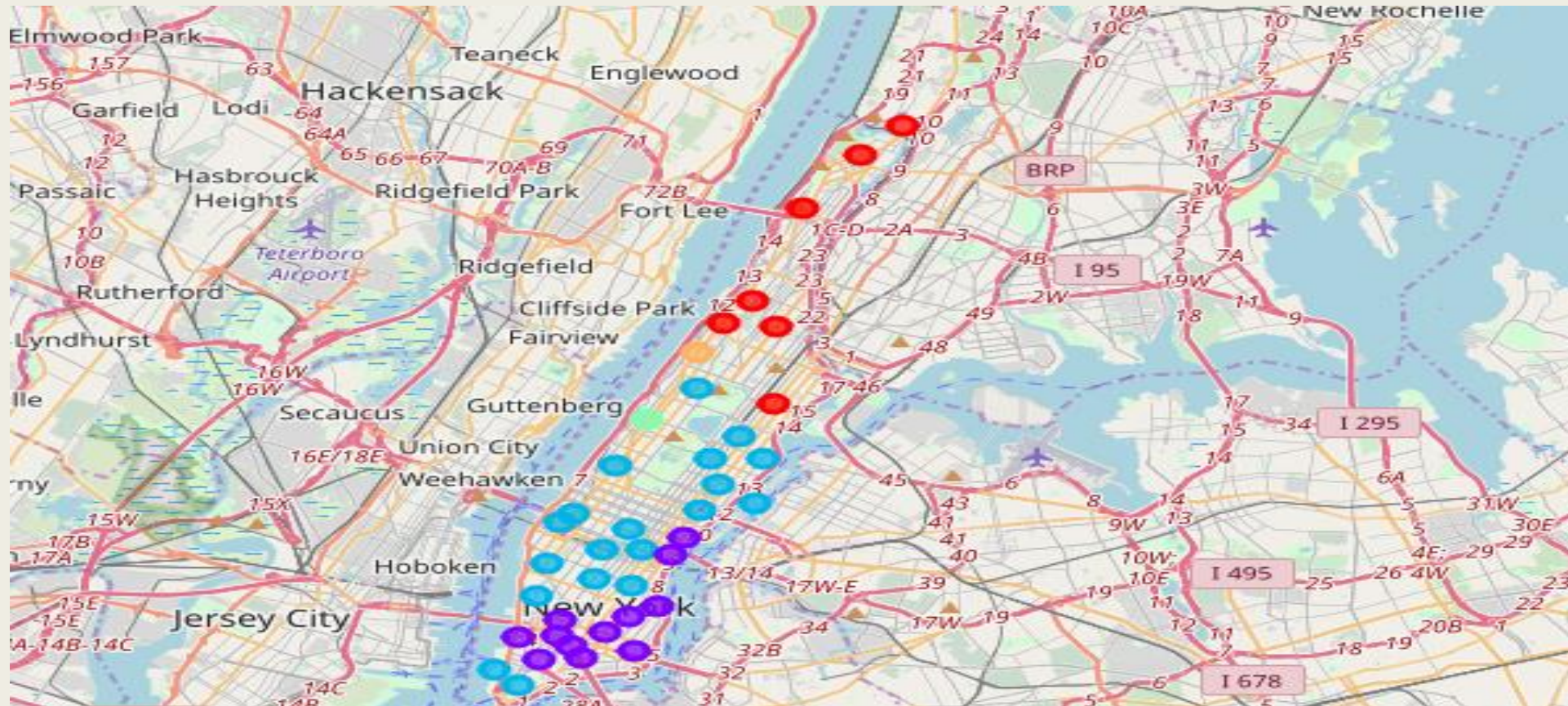
Result

Cluster 4

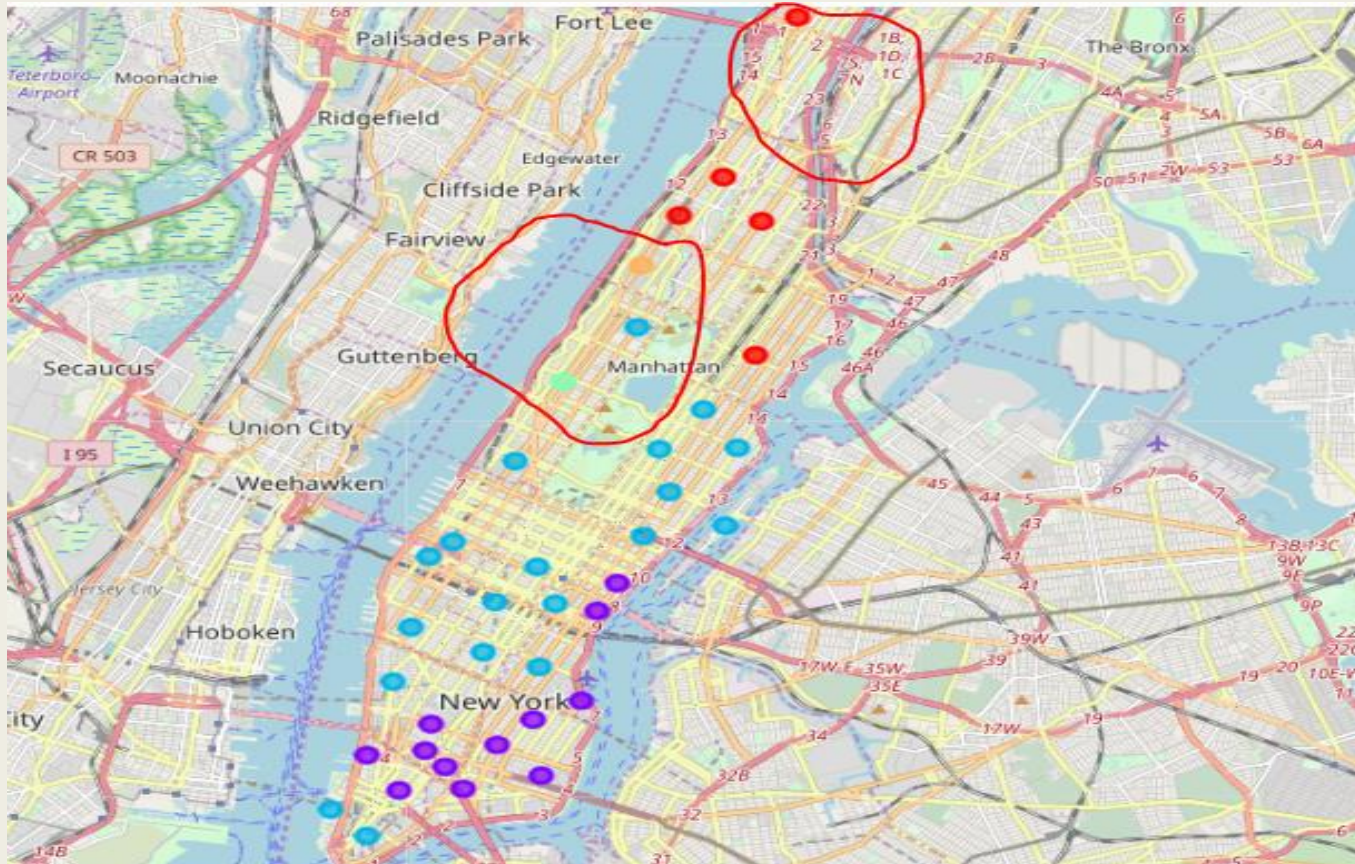
```
manhattan_merged.loc[manhattan_merged['Cluster Labels'] == 4, manhattan_merged.columns[[1] + list(range(5, manhattan_merged.shape[1]))]]
```

	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
26	Morningside Heights	Sushi Restaurant	Hawaiian Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Japanese Restaurant

Result



Result



Based on dataframe analysis above Cluster 3 (Upper West Side) and Cluster 4 (Morningside Heights) areas are the best places to open a new sushi bar business.

Discussion

If more data is readily available, a more accurate analysis could be done. And potentially more time is needed to perform more in-depth analysis.

High competition in Midtown and Soho making it very risky to open business in these areas. Central Harlem has also potential where closes to Morningside Heights area.

More in deep analysis could be done by adding other factors such as transportation, demographics of inhabitants.

Conclusion

- There is room for improvement for this project is more data is readily available. This could easily be developed into a fully pledged application that could support Sushi- Dai to open its first location in NYC.