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Capstone Project- The Battle of Neighborhoods

Selecting the best location to open a SUSHI BAR IN Manhattan, New York

Introduction/Business Problem

- The City of New York is famous for its excellent cuisine. Its food culture includes an array of international cuisines influenced by the city's immigrant history.
- Sushi restaurants have become so popular in the United States now it seems that there is one on every corner, not only in major cities but also in smaller cities. Starting a sushi 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 sushi bars 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 sushi bar should be open in an area that inadequate neighborhood in this way the bar can attract more customers. Therefore, this analysis necessary to ensure that we have enough customers and that we are not so close to other sushi places.

Data Selection

- To identify the characteristics of our competitors' venues in Manhattan, we would first need to find out the number of sushi bars 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 1763 sushi bars are currently operating.

```
newyork_venues_sushi.shape
```

```
(1763, 7)
```

Next, we also used Google Map API to find their geographic coordinates of the 5 locations shortlisted for our sushi bar:

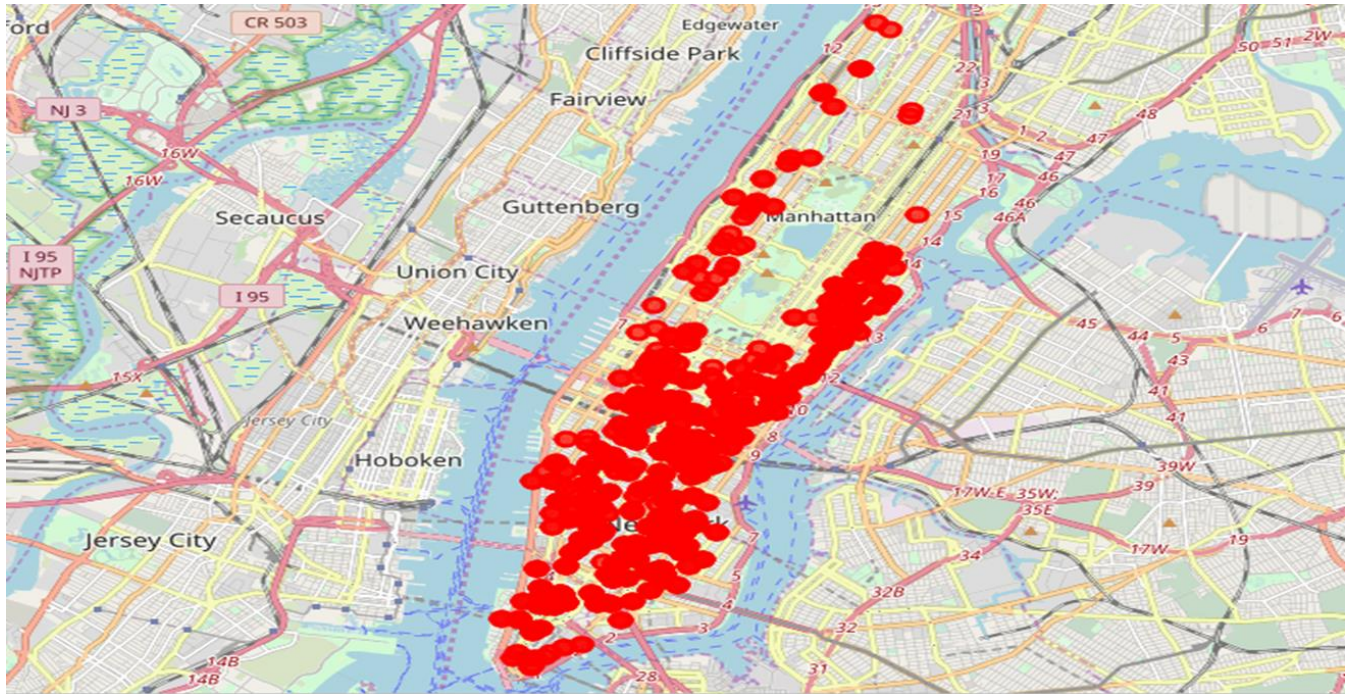
	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Fieldston	40.895437	-73.905643	Asian Tokyo	40.890839	-73.898335	Sushi Restaurant
1	Fieldston	40.895437	-73.905643	Yokohama	40.887214	-73.904708	Sushi Restaurant
2	Riverdale	40.890834	-73.912585	Planet Tokyo	40.886158	-73.909615	Sushi Restaurant
3	Riverdale	40.890834	-73.912585	Yokohama	40.887214	-73.904708	Sushi Restaurant
4	Kingsbridge	40.881687	-73.902818	Yokohama	40.887214	-73.904708	Sushi 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 sushi restaurant categories in each neighborhood.

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

Sushi bars in Manhattan



Then using this feature to group the neighborhoods into clusters K-means clustering algorithm will be used to complete this task. And the Folium library to visualize the neighborhoods in Manhattan and its emerging clusters.

	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	


```
manhattan_merged.loc[manhattan_merged['Cluster_Labels'] == 1, 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
1 Chinatown	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant
18 Greenwich Village	Sushi Restaurant	Japanese Restaurant	Sake Bar	Grocery Store	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega
19 East Village	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant
20 Lower East Side	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant
21 Tribeca	Sushi Restaurant	Noodle House	Japanese Restaurant	Theme Restaurant	Vegetarian / Vegan Restaurant	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
22 Little Italy	Sushi Restaurant	Japanese Restaurant	Noodle House	Vegetarian / Vegan Restaurant	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant
23 Soho	Sushi Restaurant	Japanese Restaurant	Noodle House	Theme Restaurant	Vegetarian / Vegan Restaurant	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
31 NoHo	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant
32 Civic Center	Sushi Restaurant	Japanese Restaurant	Noodle House	Theme Restaurant	Vegetarian / Vegan Restaurant	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
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
37 SoHo/Venue Town	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant

Cluster 1

```
manhattan_merged.loc[manhattan_merged['cluster_labels'] == 2, 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
8 Upper East Side	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Grocery Store	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Hawaiian Restaurant
9 Yorkville	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Chinese Restaurant	Noodle House	Bakery	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant
10 Lenox Hill	Sushi Restaurant	Asian Restaurant	Japanese Restaurant	Grocery Store	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Hawaiian Restaurant
11 Roosevelt Island	Sushi Restaurant	Asian Restaurant	Japanese Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant
13 Lincoln Square	Sushi Restaurant	Japanese Restaurant	Smoothie Shop	Chinese Restaurant	Grocery Store	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Cocktail Bar	Deli / Bodega
14 Clinton	Sushi Restaurant	Japanese Restaurant	Poke Place	Chinese Restaurant	Cocktail Bar	Asian Restaurant	Seafood Restaurant	Sandwich Place	Salv Bar	Restaurant
15 Midtown	Sushi Restaurant	Asian Restaurant	Japanese Restaurant	Seafood Restaurant	Ramen Restaurant	Bakery	Vegetarian / Vegan Restaurant	Sandwich Place	Salv Bar	Restaurant
16 Murray Hill	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Restaurant	Bakery	Chinese Restaurant	Ramen Restaurant	Vegetarian / Vegan Restaurant	Salv Bar	Sandwich Place
17 Chelsea	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Vegetarian / Vegan Restaurant	Smoothie Shop	Seafood Restaurant	Sandwich Place	Salv Bar	Restaurant	Ramen Restaurant
24 West Village	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Salv Bar	Grocery Store	Asian Restaurant	Sandwich Place	Seafood Restaurant	Restaurant	Ramen Restaurant
25 Manhattan Valley	Sushi Restaurant	Hawaiian Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
27 Gramercy	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Chinese Restaurant	Noodle House	Bakery	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant
28 Battery Park City	Sushi Restaurant	Japanese Restaurant	Noodle House	Theme Restaurant	Vegetarian / Vegan Restaurant	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store
29 Financial District	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant
30 Carnegie Hill	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Chinese Restaurant	Noodle House	Bakery	Cocktail Bar	Deli / Bodega	Grocery Store	Hawaiian Restaurant
33 Midtown South	Sushi Restaurant	Asian Restaurant	Japanese Restaurant	Restaurant	Bakery	Chinese Restaurant	Ramen Restaurant	Vegetarian / Vegan Restaurant	Salv Bar	Sandwich Place
34 Sutton Place	Sushi Restaurant	Asian Restaurant	Japanese Restaurant	Shashoua	Seafood Restaurant	Deli / Bodega	Bakery	Chinese Restaurant	Cocktail Bar	Grocery Store

Cluster 2

Cluster 3

```
manhattan_merged.loc[manhattan_merged['Cluster Labels'] == 3, manhattan_merged.columns[[1] + list(range(5, manhattan_merged.shape[1]))]]
```

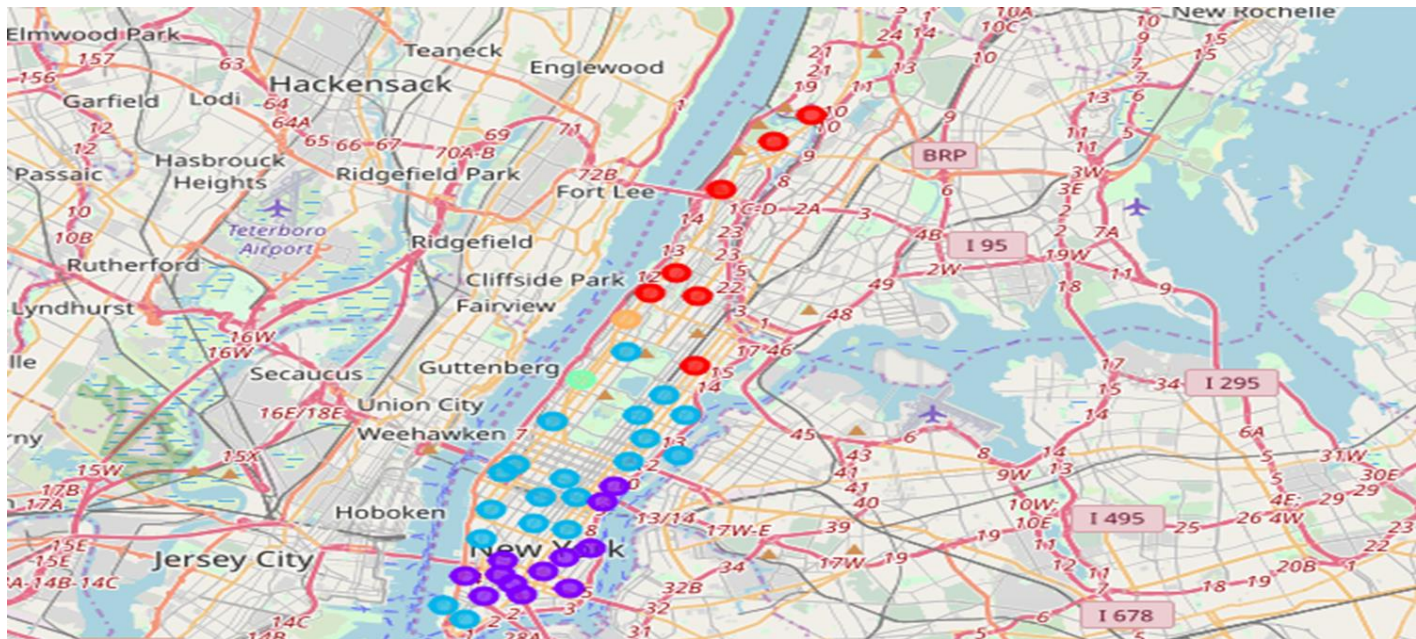
	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
12	Upper West Side	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Grocery Store	Noodle House	Bakery	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Hawaiian Restaurant

Cluster 4

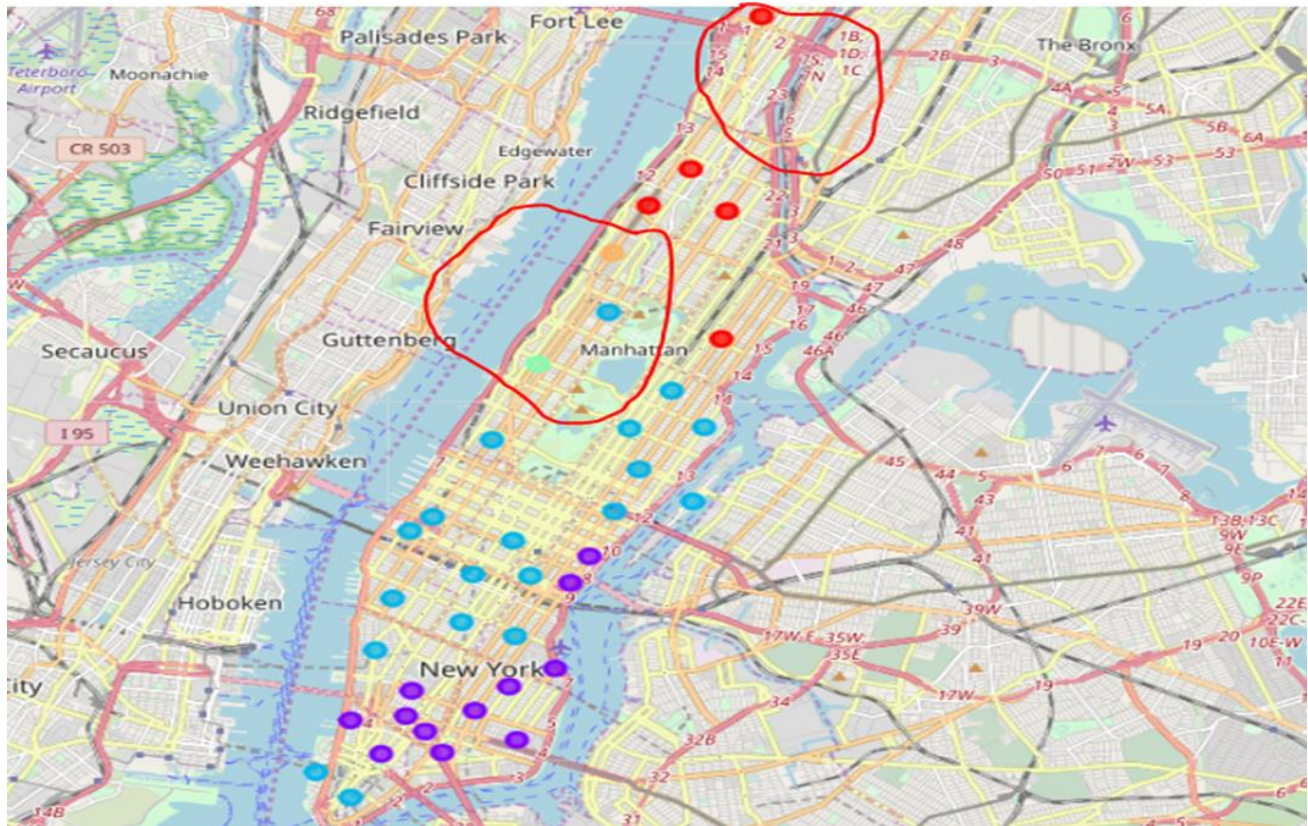
```
manhattan_merged.loc[manhattan_merged['Cluster Labels'] == 4, manhattan_merged.columns[[1] + list(range(5, manhattan_merged.shape[1]))]]
```

	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

Results



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

This analysis is performed on limited data. This may be right or may be wrong. But if good amount of data is available there is scope to come up with better results. There is high competition in Midtown and Soho, so it is very risky to open business in these areas. Central Harlem has also potential where closes to Morningside Heights area. It can be done more detailed analysis by adding other factors such as transportation, demographics of inhabitants.

Conclusion

Although all the goals of this project were met there is room for further improvement and development as noted below. However, the goals of the project were met and, with some more work, could easily be developed into a fully-fledged application that could support the opening a business idea in an unknown location.