Final Report
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Introduction

The city of NewYork is one the most developed cities in the United States of America. As it is highly developed so cost of doing business is also one of the highest. Thus any new business venture has to undergo some sort of Analysis.

Business Problem

Sushi has become a very common cuisine. So starting a sushi restaurant in NewYork can be a great business oppurtunity.

Location analysis

Analysis of the location is very important as it becomes a strategic point as to keep the prices, on raw materials, and the cost of each dish. This would help maximize profits.

Target audience

The objective is to locate and recommend to the management which neighborhood of Newyork city will be best choice to start a restaurant. The Management also expects to understand the rationale of the recommendations made.

This would interest anyone who wants to start a new restaurant in Newyork city.

Data

Data 1:
Newyork has a total of 5 boroughs and 306 neighborhoods. In order to segement the neighborhoods and explore them, we will essentially need a dataset that contains the 5 boroughs and the neighborhoods that exist in each borough as well as the the latitude and logitude coordinates of each neighborhood. https://geo.nyu.edu/catalog/nyu_2451_34572

	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
5	Bronx	Kingsbridge	40.881687	-73.902818
6	Manhattan	Marble Hill	40.876551	-73.910660
7	Bronx	Woodlawn	40.898273	-73.867315
8	Bronx	Norwood	40.877224	-73.879391
9	Bronx	Williamsbridge	40.881039	-73.857446
10	Bronx	Baychester	40.866858	-73.835798
11	Bronx	Pelham Parkway	40.857413	-73.854756

Data 2:

From Foursquare Venues Categories https://developer.foursquare.com/docs/resources/categories Sushi category Id - 4bf58dd8d48988d1d2941735

	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	Yokohama	40.887214	-73.904708	Sushi Restaurant
3	Riverdale	40.890834	-73.912585	Planet Tokyo	40.886158	-73.909615	Sushi Restaurant
4	Kingsbridge	40.881687	-73.902818	Yokohama	40.887214	-73.904708	Sushi Restaurant

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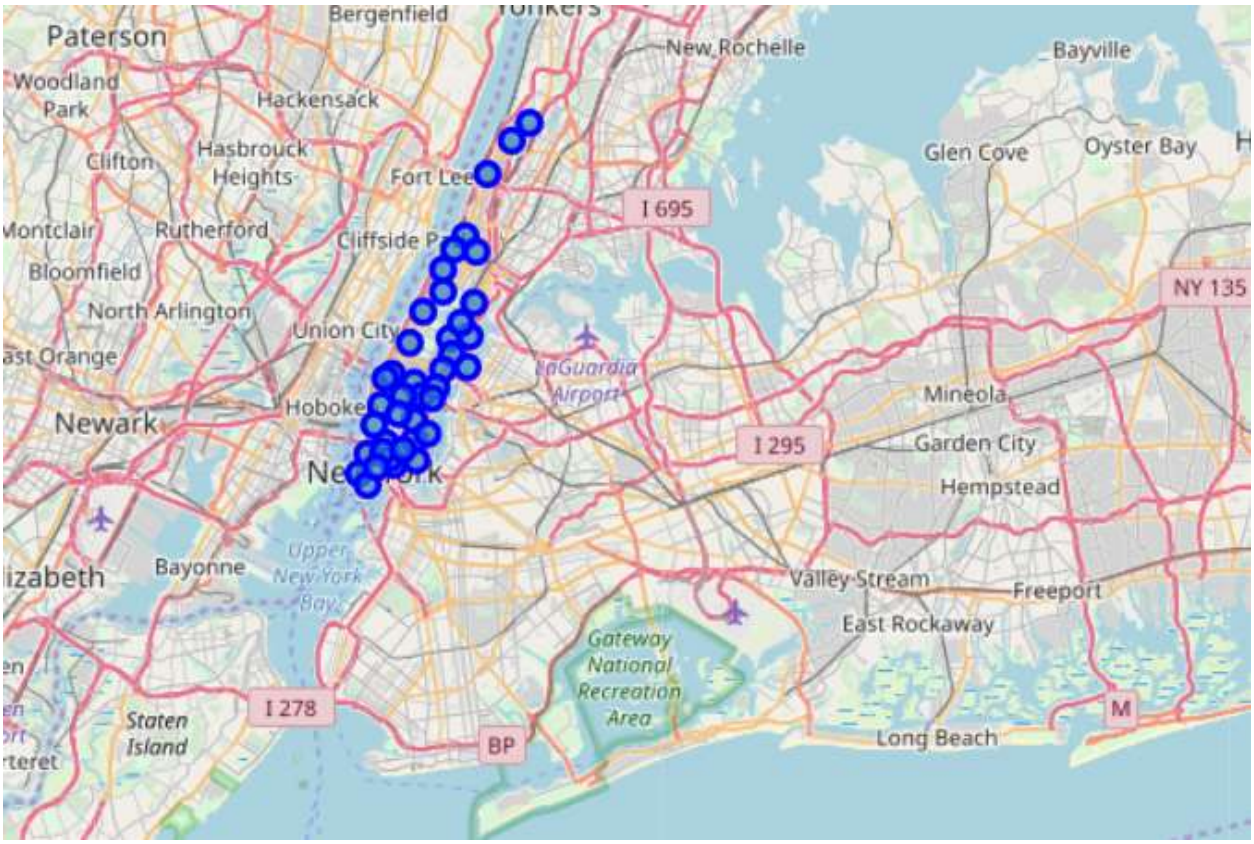
3. Methodology:

In this project, I have implemented the similar way as in week 3 lab.

Plot of every location from data 1 on the map of New York city



Then I have obtained the dataframe containing all the sushi restaurants in the area

```
[10]: newyork_venues_sushi = getNearbyVenues(names=neighborhoods_dataframe['Neighborhood'], latitudes=neighborhoods_dataframe['Latitude'], longitudes
      newyork_venues_sushi.head()
```

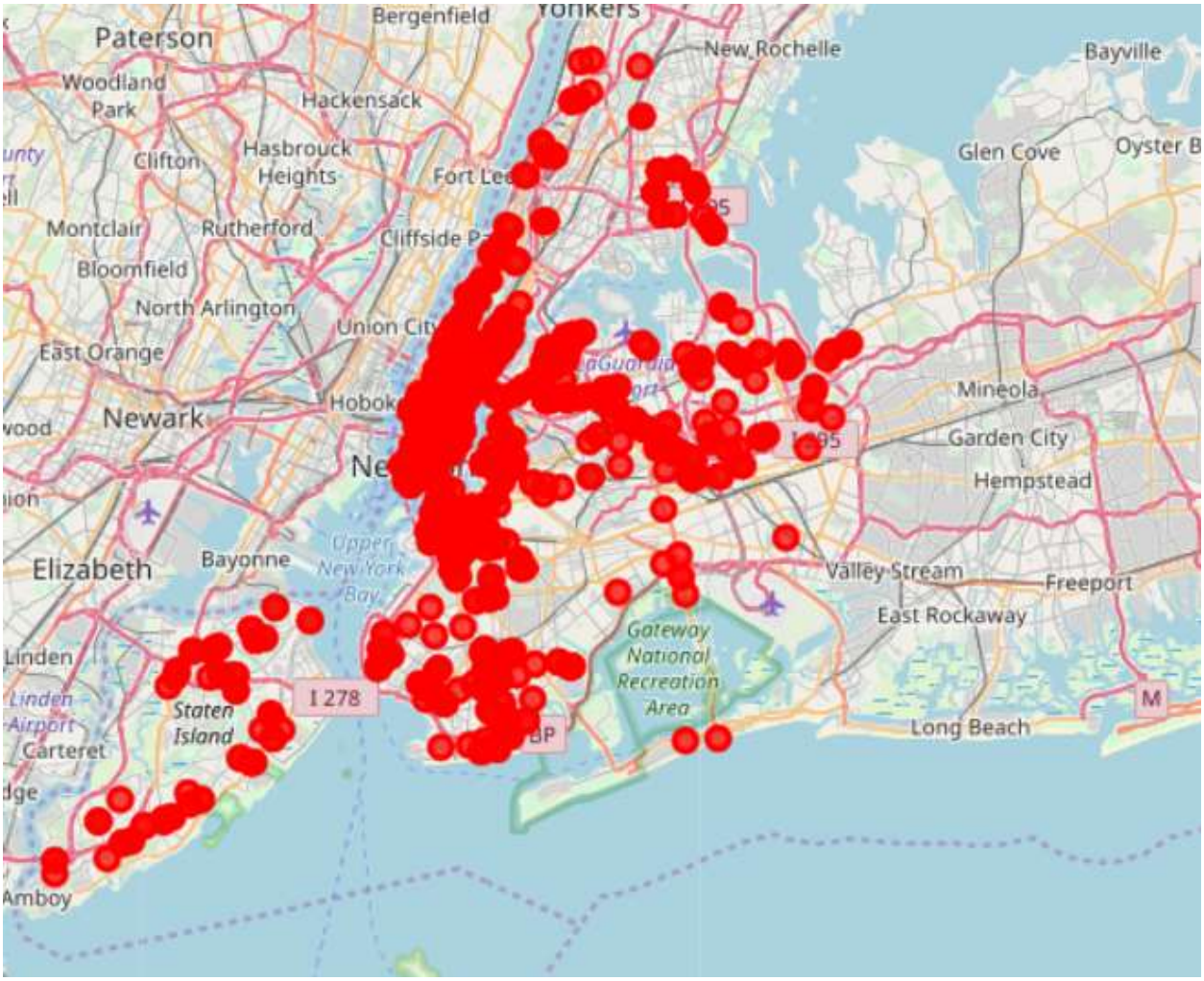
Out[10]:

	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	Yokohama	40.887214	-73.904708	Sushi Restaurant
3	Riverdale	40.890834	-73.912585	Planet Tokyo	40.886158	-73.909615	Sushi Restaurant
4	Kingsbridge	40.881687	-73.902818	Yokohama	40.887214	-73.904708	Sushi Restaurant

```
[11]: newyork_venues_sushi.shape
```

Out[11]: (1763, 7)

A map which shows the location of every sushi restaurant in the manhattan region



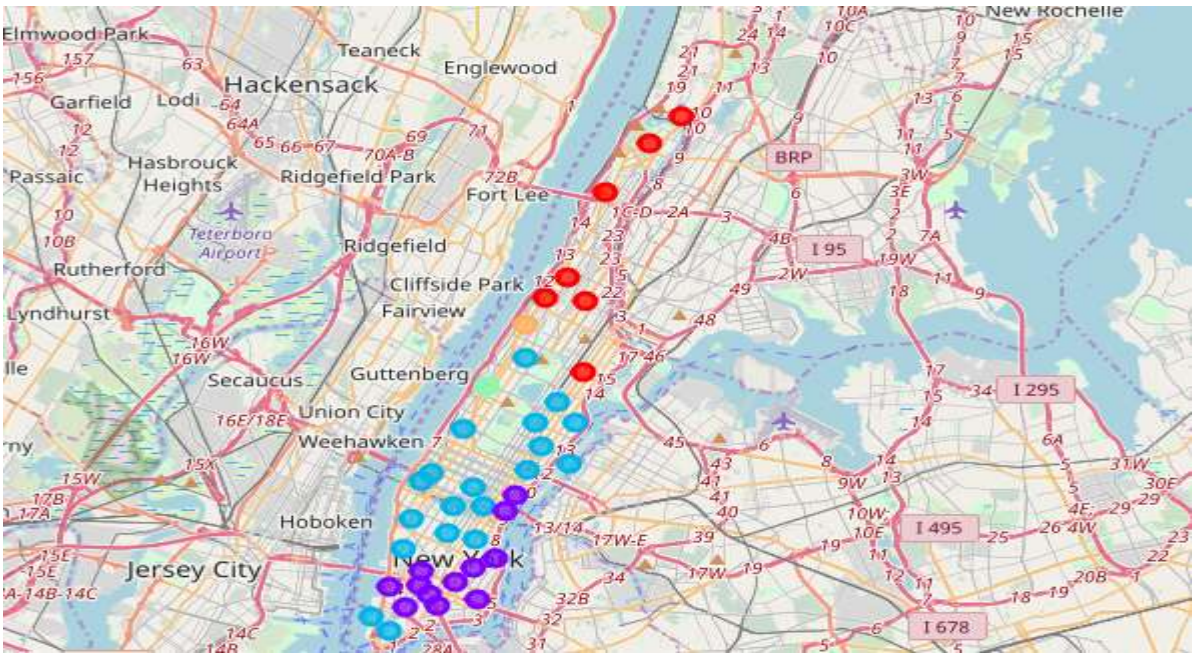
Sushi bars in the new York region

	Neighborhood	Asian Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Fish Market	...	Sake Bar	Sandwich Place	Seafood Restaurant	Smoothie Shop	Snack Place	Steakhouse	Sushi Restaurant	Thai Restaurant	Theme Restaurant	Vege / Rest
0	Fieldston	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	1	0	0	
1	Fieldston	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	1	0	0	
2	Riverdale	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	1	0	0	
3	Riverdale	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	1	0	0	
4	Kingsbridge	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	1	0	0	

5 rows × 31 columns

Using the Kmeans library for clustering and using folium library to visualize the points

	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	Annadale	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega
1	Arden Heights	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega
2	Astoria	Sushi Restaurant	Asian Restaurant	Japanese Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar
3	Astoria Heights	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega
4	Auburndale	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega



Results

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

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
3	Fieldston	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega
4	Riverdale	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega
5	Kingsbridge	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega
6	Marble Hill	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega
7	Woodlawn	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	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	10th Most Common Venue
142	Maspeth	Japanese Restaurant	Sushi Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar
182	Holliswood	Japanese Restaurant	Vegetarian / Vegan Restaurant	Theme Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega
191	Rockaway Park	Japanese Restaurant	Vegetarian / Vegan Restaurant	Theme Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega
239	Charleston	Japanese Restaurant	Vegetarian / Vegan Restaurant	Theme Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega
300	Erasmus	Asian Restaurant	Japanese Restaurant	Theme Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega

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
29	Country Club	Sushi Restaurant	Asian Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega
37	Pelham Bay	Sushi Restaurant	Asian Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega
38	Schuylerville	Sushi Restaurant	Chinese Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Cocktail Bar	Deli / Bodega
46	Bay Ridge	Sushi Restaurant	Japanese Restaurant	Asian Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar
48	Sunset Park	Asian Restaurant	Sushi Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega
52	Sheepshead Bay	Sushi Restaurant	Poke Place	Japanese Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese 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
83	Marine Park	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar
84	Clinton Hill	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar
91	Bergen Beach	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar
93	Prospect Park South	Asian Restaurant	Sushi Restaurant	Japanese Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar
94	Georgetown	Sushi Restaurant	Chinese Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Cocktail Bar
95	East Williamsburg	Sushi Restaurant	Japanese Restaurant	Vegetarian / Vegan Restaurant	Korean Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar

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
80	Borough Park	Kosher Restaurant	Theme Restaurant	Bakery	Bubble Tea Shop	Burger Joint	Café	Chinese Restaurant	Cocktail Bar	Deli / Bodega	Fish Market

From this it is clearly observed that it is better to set up a sushi restaurant in areas covered in cluster 3 and cluster 4

Discussion

In this section, I would be discussing the observations I have noted and the recommendation that I can make based on the results.

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.

FourSquare is a good source of data but when I exceed my hourly limit it keeps locking me out for a day.

Conclusion

Although all of the goals of this project were met there is definitely 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

As per the neighborhood or restaurant type mentioned like Sushi restaurants analysis can be checked. A venue with lowest risk and competition can be identified.