REPORT

The Battle of Neighborhoods

1. Introduction

1.1 Background

   The City of New York is the most crowded and popular US. It is a harmony of cultures
   and cuisines. Opening a new business can be a good opportunity in New York.
   However, it is also risky because of the competitive market and high operating costs.
   Making right choices take the most important factor. Selecting the right place for the
   business is going to be helpful to increase chances of being successful.

1.2 Problem

   An investor wants to open a new business in Manhattan, the budget for this business
   is limited. This business will focus on restaurant supplies and food for Mediterranean
   restaurants. I will help my client to analyze the provided data and help him to find the
   best place for this business. Planning before investment will be crucial. This place
   should be close to most of the target restaurants.

1.3 Target Audience

   This project will be helpful anyone interested in opening restaurant business in
   Manhattan.

2. Data

   New York has a total of 5 boroughs and 306 neighborhoods. In order to segment 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 latitude
   and longitude coordinates of each neighborhood. Luckily, this dataset exists for free on
   the web. Here is the link to the dataset:
   https://geo.nyu.edu/catalog/nyu_2451_34572

   To analyze venue categories and their locations:
   Foursquare developer portal
   Venues Categories: https://developer.foursquare.com/docs/resources/categories
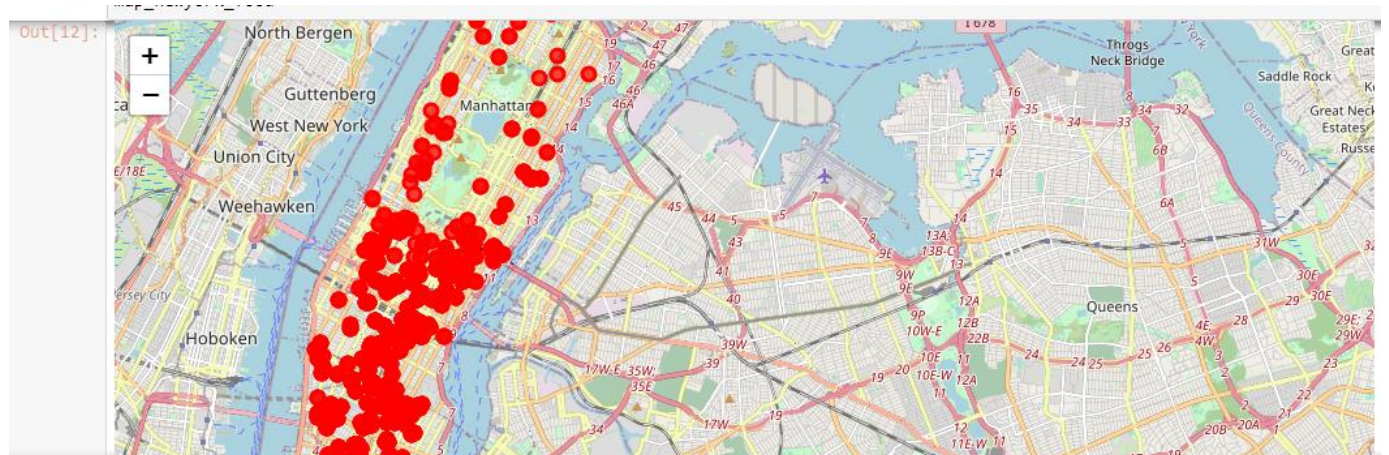   Mediterranean Restaurant id:4bf58dd8d48988d1c0941735

3. Methodology

I used pandas to generate data frames from New York Json file. Using the generated data frames and Foursquare developer API I was able to find venues in each neighborhood.

Out[9]:

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Marble Hill	40.876551	-73.910660	Maramana	40.869294	-73.916895	Mediterranean Restaurant
1	Chinatown	40.715618	-73.994279	Petisco Vegano	40.714040	-73.988815	Vegetarian / Vegan Restaurant
2	Chinatown	40.715618	-73.994279	Empire Gyro	40.722566	-73.988487	Mediterranean Restaurant
3	Chinatown	40.715618	-73.994279	Zerza	40.717697	-73.988310	Moroccan Restaurant
4	Chinatown	40.715618	-73.994279	Zyara Restaurant & Cafe	40.719541	-73.984832	Mediterranean Restaurant

In [ ]:

I used Folium library to visualize the geographic coordinate of the neighborhoods.

I used Clustering (k-means clustering) was used to find the clusters of similar neighborhoods.

Out[21]:

	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	
0	Manhattan	Marble Hill	40.876551	-73.910660	1	Mediterranean Restaurant	Wine Bar	Hookah Bar	Bistro	Café	Cocktail Bar	Eastern European Restaurant	Egyptian Restaurant	R
1	Manhattan	Chinatown	40.715618	-73.994279	1	Mediterranean Restaurant	Moroccan Restaurant	Egyptian Restaurant	Falafel Restaurant	Vegetarian / Vegan Restaurant	Wine Bar	Greek Restaurant	Bistro	
2	Manhattan	Washington Heights	40.851903	-73.936900	2	Kebab Restaurant	Wine Bar	Hookah Bar	Bistro	Café	Cocktail Bar	Eastern European Restaurant	Egyptian Restaurant	R
3	Manhattan	Inwood	40.867684	-73.921210	1	Mediterranean Restaurant	Wine Bar	Hookah Bar	Bistro	Café	Cocktail Bar	Eastern European Restaurant	Egyptian Restaurant	R
4	Manhattan	Hamilton Heights	40.823604	-73.949688	4	Moroccan Restaurant	Mediterranean Restaurant	Greek Restaurant	Wine Bar	Hookah Bar	Bistro	Café	Cocktail Bar	R

4. Result

Neighborhoods with the higher number of Mediterranean restaurants

Cluster 4

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In [26]: manhattan_merged.loc[manhattan_merged['Cluster Labels'] == 3, manhattan_merged.columns[[1] + list(range(5, manhattan_merged.shap
```

Out[26]:

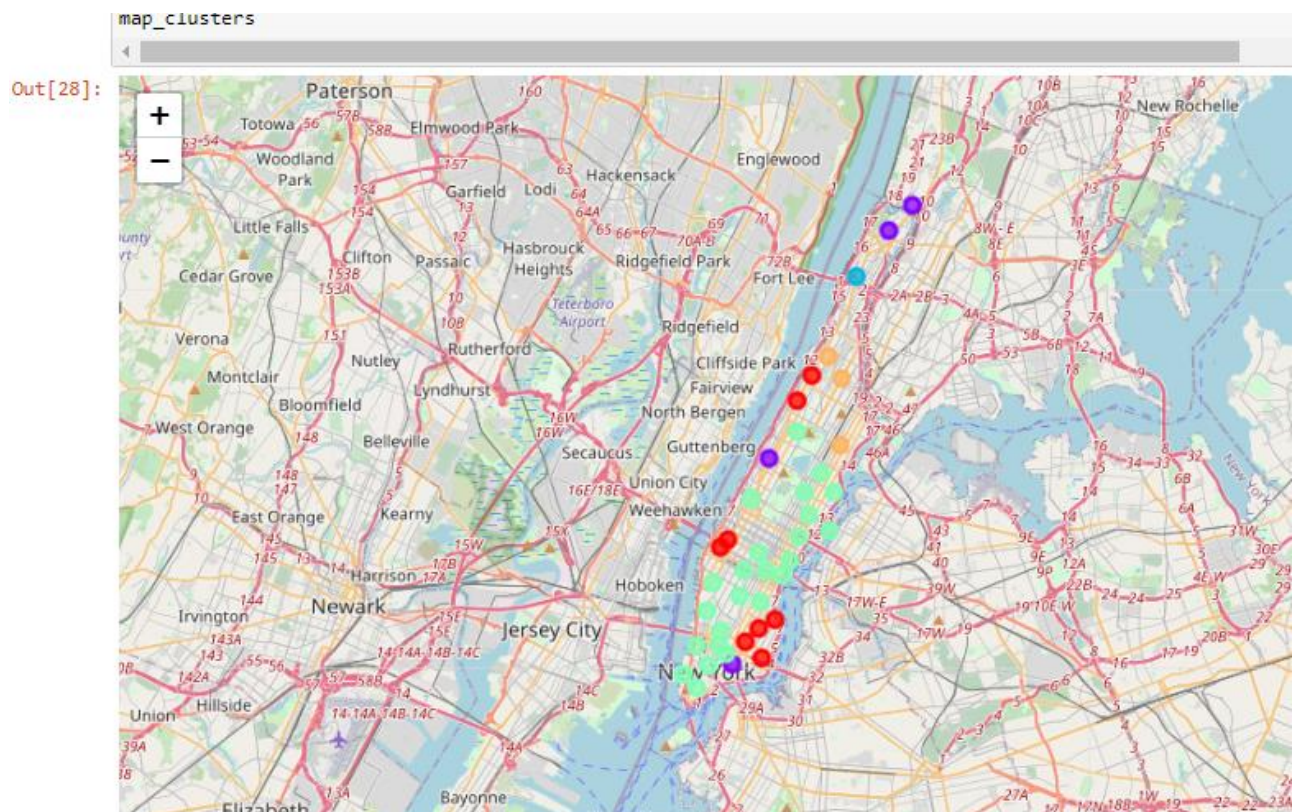|	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
8	Upper East Side	Mediterranean Restaurant	Middle Eastern Restaurant	French Restaurant	Wine Bar	Hookah Bar	Bistro	Café	Cocktail Bar	Eastern European Restaurant	Egyptian Restaurant
9	Yorkville	Mediterranean Restaurant	Pizza Place	French Restaurant	Wine Bar	Hookah Bar	Bistro	Café	Cocktail Bar	Eastern European Restaurant	Egyptian Restaurant
10	Lenox Hill	Mediterranean Restaurant	Turkish Restaurant	Bar	Middle Eastern Restaurant	Italian Restaurant	French Restaurant	Greek Restaurant	Bistro	Café	Cocktail Bar
11	Roosevelt Island	Mediterranean Restaurant	Bar	Turkish Restaurant	Middle Eastern Restaurant	Italian Restaurant	Greek Restaurant	Bistro	Café	Cocktail Bar	Eastern European Restaurant
13	Lincoln Square	Mediterranean Restaurant	Turkish Restaurant	Lounge	Israeli Restaurant	Gastropub	Moroccan Restaurant	Falafel Restaurant	Food Truck	Hookah Bar	Greek Restaurant
15	Midtown	Mediterranean Restaurant	Turkish Restaurant	Moroccan Restaurant	Hookah Bar	Greek Restaurant	Kosher Restaurant	Falafel Restaurant	Italian Restaurant	Food Truck	Wine Bar
16	Murray Hill	Mediterranean Restaurant	Turkish Restaurant	Greek Restaurant	Falafel Restaurant	Food Truck	Middle Eastern Restaurant	Lebanese Restaurant	Kosher Restaurant	Wine Bar	Gastropub
17	Chelsea	Mediterranean Restaurant	Moroccan Restaurant	Falafel Restaurant	Israeli Restaurant	Tapas Restaurant	Middle Eastern Restaurant	Food Truck	Vegetarian / Vegan Restaurant	Gastropub	Bistro
18	Greenwich Village	Mediterranean Restaurant	Moroccan Restaurant	Food Truck	Falafel Restaurant	Wine Bar	Tapas Restaurant	Egyptian Restaurant	Italian Restaurant	French Restaurant	Hookah Bar
21	Tribeca	Mediterranean Restaurant	Food Truck	Greek Restaurant	Middle Eastern Restaurant	Egyptian Restaurant	Falafel Restaurant	Italian Restaurant	Wine Bar	Bistro	Café
22	Little Italy	Mediterranean Restaurant	Moroccan Restaurant	Falafel Restaurant	Food Truck	Egyptian Restaurant	Italian Restaurant	Vegetarian / Vegan Restaurant	Wine Bar	Greek Restaurant	Bistro
23	Soho	Mediterranean Restaurant	Food Truck	Moroccan Restaurant	Falafel Restaurant	Greek Restaurant	Egyptian Restaurant	Italian Restaurant	Wine Bar	Bistro	Café

Cluster 1

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In [23]: manhattan_merged.loc[manhattan_merged['Cluster Labels'] == 0, manhattan_merged.columns[[1] + list(range(5, manhattan_merged.shape
```

Out[23]:

	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
5	Manhattanville	Mediterranean Restaurant	Moroccan Restaurant	Wine Bar	Café	Greek Restaurant	Hookah Bar	Bistro	Cocktail Bar	Eastern European Restaurant	Egyptian Restaurant
14	Clinton	Mediterranean Restaurant	Moroccan Restaurant	Falafel Restaurant	Hookah Bar	Turkish Restaurant	Lounge	Italian Restaurant	Food Truck	Wine Bar	Gastropub
19	East Village	Mediterranean Restaurant	Moroccan Restaurant	Hookah Bar	Wine Bar	Bistro	Eastern European Restaurant	Falafel Restaurant	Food Truck	French Restaurant	Israeli Restaurant
20	Lower East Side	Mediterranean Restaurant	Moroccan Restaurant	Hookah Bar	Wine Bar	Middle Eastern Restaurant	Eastern European Restaurant	Falafel Restaurant	Food Truck	Vegetarian / Vegan Restaurant	Gastropub
26	Morningside Heights	Mediterranean Restaurant	Café	Wine Bar	Moroccan Restaurant	Falafel Restaurant	Hookah Bar	Bistro	Cocktail Bar	Eastern European Restaurant	Egyptian Restaurant
31	Noho	Mediterranean Restaurant	Moroccan Restaurant	Hookah Bar	Food Truck	Wine Bar	Middle Eastern Restaurant	Eastern European Restaurant	Lebanese Restaurant	Egyptian Restaurant	Falafel Restaurant
37	Stuyvesant Town	Mediterranean Restaurant	Hookah Bar	Moroccan Restaurant	Bistro	Middle Eastern Restaurant	Eastern European Restaurant	Food Truck	Wine Bar	Greek Restaurant	Café

Clusters on the map

Cluster 1   Cluster 2   Cluster 3   Cluster 4   Cluster 5

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map_clusters
```

Out[28]:

5. **Discussion**

5 clusters found.

Potential clusters suitable for the business are Cluster 4 and Cluster 1.

6. **Conclusion**

There are many clusters with the target restaurants, among these clusters locating the business in the area of cluster4 will be more reasonable