Capstone Project - The Battle of Neighborhoods

Selecting the best location to open an Indian Restaurant in Brooklyn, New York

Introduction/Business Problem

- The City of New York is famous for its excellent cuisine. It's food culture includes an array of international cuisines influenced by the city's immigrant history.

- Indian 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 an Indian 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 Brooklyn area, so I focus on that borough during my analysis. We define potential neighborhood based on the number of Indian Restaurants which are operating right in each neighborhood. Brooklyn has full potential but also is a very challenging district to open a business because of high competition. New Indian Restaurant should be open in an area that inadequate neighborhood in this way the Restaurant can attract more customers. Therefore, this analysis necessary to ensure that we have enough customers and that we are not so close to other Indian Restaurants

Data Selection

- To identify the characteristics of our competitors' venues in Brooklyn, we would first need to find out the number of Indian Restaurants in Brooklyn currently and their location.

- We then used Geocoder to find their geographic coordinates of new York city to create a folium map.

- Using Foursquare API to explore the Indian Restaurants operating in Brooklyn.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Bay Ridge	40.625801	-74.030621	Bombay Grill	40.622331	-74.031561	Indian Restaurant
1	Bay Ridge	40.625801	-74.030621	Mohims Indian Cuisine	40.632732	-74.027260	Indian Restaurant
2	Bay Ridge	40.625801	-74.030621	King of Tandoor	40.631836	-74.032477	Indian Restaurant
3	Bay Ridge	40.625801	-74.030621	India Passage	40.631856	-74.027576	Indian Restaurant
4	Bay Ridge	40.625801	-74.030621	Taj Mahal	40.632373	-74.027193	Indian Restaurant

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(272, 7)
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Methodology

- Aaddresses are stored and visualized using their equivalent latitude and longitude values.
- Foursquare API is used to explore neighborhoods in Brooklyn, New York.
- After that, explore function to get Indian Restaurants categories in each neighborhood.

	Neighborhood	Café	Caribbean Restaurant	Chinese Restaurant	Coffee Shop	Food Truck	Halal Restaurant	Indian Chinese Restaurant	Indian Restaurant	Indian Sweet Shop	North Indian Restaurant
0	Bay Ridge	0	0	0	0	0	0	0	1	0	0
1	Bay Ridge	0	0	0	0	0	0	0	1	0	0
2	Bay Ridge	0	0	0	0	0	0	0	1	0	0
3	Bay Ridge	0	0	0	0	0	0	0	1	0	0
4	Bay Ridge	0	0	0	0	0	0	0	1	0	0

Indian Restaurants in Brooklyn

- Then using this feature to 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 Brooklyn 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
0	Bath Beach	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
1	Bay Ridge	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
2	Bedford Stuyvesant	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
3	Bensonhurst	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
4	Boerum Hill	Indian Restaurant	Chinese Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Caribbean Restaurant

Results

- 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
0	Bay Ridge	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
1	Bensonhurst	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
2	Sunset Park	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
3	Greenpoint	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
5	Brighton Beach	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
6	Sheepshead Bay	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
7	Manhattan Terrace	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
9	Crown Heights	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
10	East Flatbush	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
12	Windsor Terrace	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
13	Prospect Heights	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
15	Williamsburg	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
16	Bushwick	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
17	Bedford Stuyvesant	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
19	Cobble Hill	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
20	Carroll Gardens	Indian Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant

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
57	Remsen Village	Caribbean Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Restaurant	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant

Cluster 2

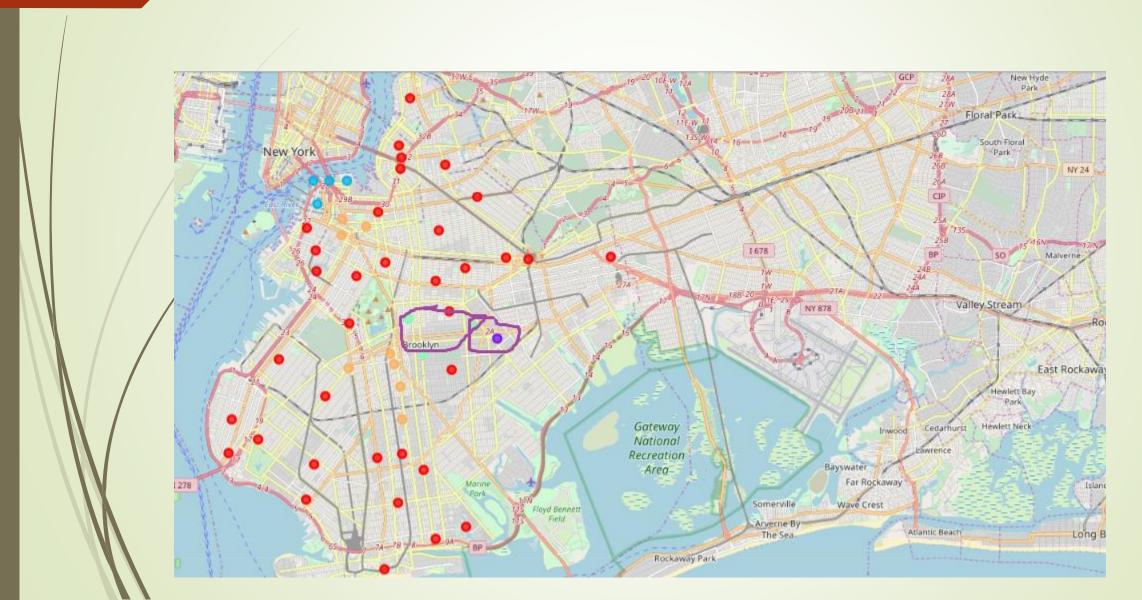|	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue
18	Brooklyn Heights	Indian Restaurant	Indian Sweet Shop	North Indian Restaurant	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
61	Fulton Ferry	Indian Restaurant	Food Truck	Indian Sweet Shop	North Indian Restaurant	Indian Chinese Restaurant	Halal Restaurant	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
62	Vinegar Hill	Indian Sweet Shop	Indian Restaurant	North Indian Restaurant	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant
65	Dumbo	Indian Restaurant	Indian Sweet Shop	North Indian Restaurant	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean 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
42	Prospect Lefferts Gardens	Indian Restaurant	Coffee Shop	Caribbean Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Chinese Restaurant
56	Rugby	Indian Restaurant	Caribbean Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant
69	Erasmus	Indian Restaurant	Caribbean Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant

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	
8	Flatbush	Indian Restaurant	Halal Restaurant	Café	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	C
11	Kensington	Indian Restaurant	Indian Chinese Restaurant	North Indian Restaurant	Indian Sweet Shop	Halal Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant	
23	Fort Greene	Indian Restaurant	Chinese Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Caribbean Restaurant	
40	Downtown	Indian Restaurant	Chinese Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Caribbean Restaurant	
41	Boerum Hill	Indian Restaurant	Chinese Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	Caribbean Restaurant	
46	Midwood	Indian Restaurant	Halal Restaurant	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Food Truck	Coffee Shop	Chinese Restaurant	Caribbean Restaurant	
47	Prospect Park South	Indian Restaurant	Caribbean Restaurant	Café	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	
54	Ditmas Park	Indian Restaurant	Caribbean Restaurant	Café	North Indian Restaurant	Indian Sweet Shop	Indian Chinese Restaurant	Halal Restaurant	Food Truck	Coffee Shop	

Based on data frame analysis above Cluster 1 (Ramsen Village) and Cluster 3 (Rugby, erasmus, PL gardens) areas are the best places to open a new Indian Restaurants 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.

- Ramsen Village, is one of the good locations to open an Indian restaurant but Indian restaurants are second most common place instead of first.

- Rugby, Erasmus and PL gardens are the neighborhoods which have the potential to be a good spot for an Indian Restaurant.

- It can be done more detailed analysis by adding other factors such as transportation, demographics of inhabitants.

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 into a fully fledged application that could support the opening a business idea in an unknown location.