

FINAL REPORT

Capstone Project - The Battle of Neighbourhoods

Introduction:

New York City's demographics show that it is a large and ethnically diverse metropolis. It is the largest city in the United States with a long history of international immigration. New York City was home to nearly 8.5 million people in 2014, accounting for over 40% of the population of New York State and a slightly lower percentage of the New York metropolitan area, home to approximately 23.6 million. Over the last decade the city has been growing faster than the region. The New York region continues to be by far the leading metropolitan gateway for legal immigrants admitted into the United States.

New York City has also been a major point of entry for immigrants; the term "melting pot" was coined to describe densely populated immigrant neighbourhoods on the Lower East Side. As many as 800 languages are spoken in New York, making it the most linguistically diverse city in the world. English remains the most widely spoken language, although there are areas in the outer boroughs in which up to 25% of people speak English as an alternate language, and/or have limited or no English language fluency. English is least spoken in neighbourhoods such as Flushing, Sunset Park, and Corona.

With its diverse culture, comes diverse food items. There are many restaurants in New York City, each belonging to different categories like Chinese, Indian, and French etc.

Problem:

To find the answers to the following questions:

Q1) List and visualize all major parts of New York City that has great Indian restaurants.

Q2) what is best location in New York City for Indian Cuisine?

Q3) which areas have potential Indian Restaurant Market?

Q4) which all areas lack Indian Restaurants?

Q5) which is the best place to stay if you prefer Indian Cuisine?

Data Section:

New York City's demographics show that it is a large and ethnically diverse metropolis. With its diverse culture, comes diverse food items. There are many restaurants in New York City, each belonging to different categories like Chinese, Indian, and French etc.

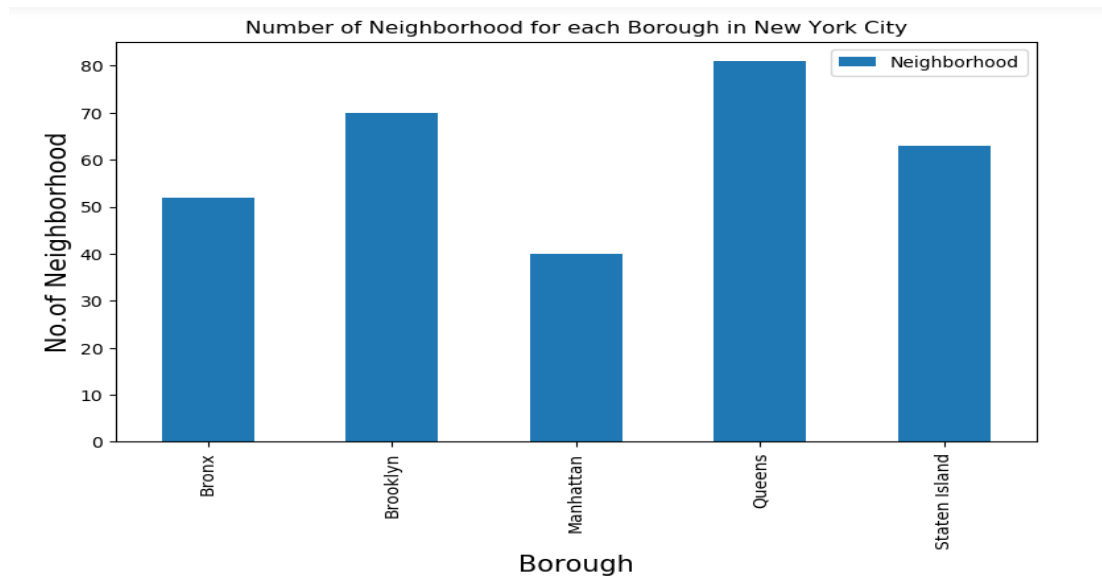
For this project we need the following data:

- New York City data that contains list Boroughs, Neighbourhoods along with their latitude and longitude.
 - Data source : https://cocl.us/new_york_dataset
 - Description: This data set contains the required information. And we will use this data set to explore various neighbourhoods of New York City
- Indian restaurants in each neighbourhood of New York City.
 - Data source : Foursquare API
 - Description: By using this API we will get all the venues in each neighbourhood. We can filter these venues to get only Indian restaurants.
- GeoSpace data
 - Data source : <https://data.cityofnewyork.us/City-Government/Borough-Boundaries/tqmj-j8zm>
 - Description: By using this geo space data we will get the New York Borough boundaries that will help us visualize choropleth map.

Methodology:

1. We begin by collecting the New York city data from the following link "https://cocl.us/new_york_dataset"
2. We will find all venues for each neighbourhood using Foursquare API

	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



3. We will then filter out all venues with Indian restaurant for further analysis.

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( 1 / 306 ) Indian Restaurants in Wakefield, Bronx:0
['Bronx', 'Wakefield', 40.89470517661, -73.84720052054902]
( 2 / 306 ) Indian Restaurants in Co-op City, Bronx:0
['Bronx', 'Co-op City', 40.87429419303012, -73.82993910812398]
( 3 / 306 ) Indian Restaurants in Eastchester, Bronx:0
['Bronx', 'Eastchester', 40.80755677350775, -73.82780644716412]
( 4 / 306 ) Indian Restaurants in Fieldston, Bronx:0
['Bronx', 'Fieldston', 40.89543742690383, -73.90564259591682]
( 5 / 306 ) Indian Restaurants in Riverdale, Bronx:0
['Bronx', 'Riverdale', 40.890834493891305, -73.9125854610857]
( 6 / 306 ) Indian Restaurants in Kingsbridge, Bronx:0
['Bronx', 'Kingsbridge', 40.88168737120521, -73.90281798724604]
( 7 / 306 ) Indian Restaurants in Marble Hill, Manhattan:0
['Manhattan', 'Marble Hill', 40.87655077879964, -73.91005965862981]
( 8 / 306 ) Indian Restaurants in Woodlawn, Bronx:1
['Bronx', 'Woodlawn', 40.89827261213805, -73.86731496814176]
( 9 / 306 ) Indian Restaurants in Norwood, Bronx:0
['Bronx', 'Norwood', 40.87722415599446, -73.8793907395681]
( 10 / 306 ) Indian Restaurants in Williamsbridge, Bronx:0
['Bronx', 'Williamsbridge', 40.88103887819211, -73.85744642974207]
( 11 / 306 ) Indian Restaurants in Baychester, Bronx:0
['Bronx', 'Baychester', 40.866858107252696, -73.83579759808117]
( 12 / 306 ) Indian Restaurants in Pelham Parkway, Bronx:0
['Bronx', 'Pelham Parkway', 40.85741349808865, -73.85475564017999]
( 13 / 306 ) Indian Restaurants in City Island, Bronx:0
['Bronx', 'City Island', 40.84724670491813, -73.78648845267413]
( 14 / 306 ) Indian Restaurants in Bedford Park, Bronx:0
['Bronx', 'Bedford Park', 40.870185164975325, -73.8859121841913]
( 15 / 306 ) Indian Restaurants in University Heights, Bronx:0
['Bronx', 'University Heights', 40.8557270719664, -73.9104159619131]
```

4. Next using Foursquare API, we will find the Ratings, Tips, and Number of Likes for all the Indian Restaurants.

	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
0	Bronx	Woodlawn	4c0448d9310fc9b6bf1dc761	Curry Spot	5	8.0	10
1	Bronx	Unionport	4c194631838020a13e78e561	Melanies Roti Bar And Grill	3	6.3	2
2	Brooklyn	Bay Ridge	545835a1498e820edc6f636f	Bombay Grill	14	6.9	4
3	Brooklyn	Greenpoint	51a5445c498ee0f182370cb2	Agra Taj Mahal	34	7.1	16
4	Brooklyn	Bushwick	5169f5c4e4b0c7fcb77a0f3c	Agra Heights	12	5.7	5

5. We will then sort Neighbourhoods and Borough the data keeping Ratings as the constraint.

	Neighborhood	Average Rating
26	Tribeca	9.1
20	Noho	8.8
6	Chelsea	8.7
18	Midtown	8.7
9	Fort Greene	8.7
22	Prospect Lefferts Gardens	8.6
21	North Side	8.5
25	Sutton Place	8.4
8	Flatiron	8.4
12	Greenwich Village	8.4

	Borough	Average Rating
2	Manhattan	8.266667
4	Staten Island	8.100000
1	Brooklyn	7.400000
0	Bronx	7.150000
3	Queens	6.300000

6. Next we will consider all the neighbourhoods with average rating greater or equal 8.0 to visualize on map.

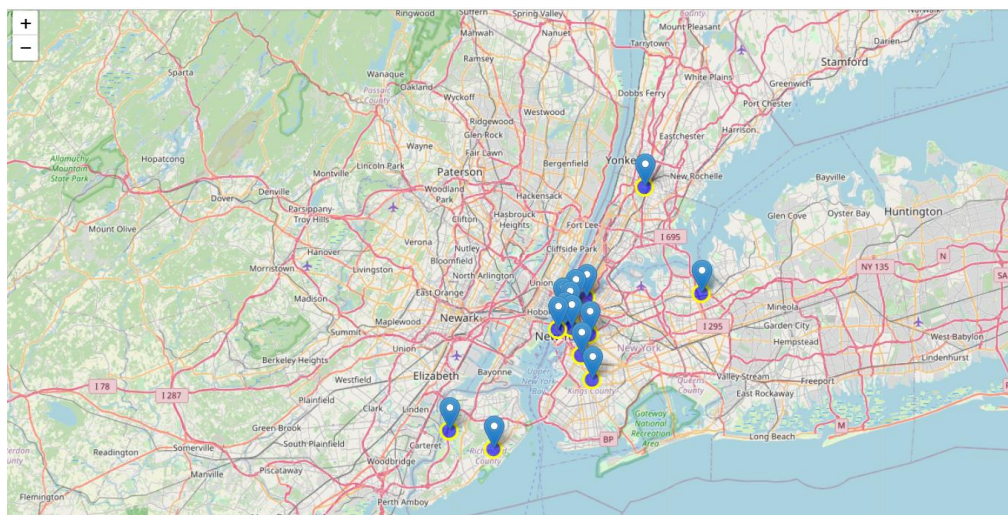
	Neighborhood	Average Rating
2	Bayside	8.2
6	Chelsea	8.7
8	Flatiron	8.4
9	Fort Greene	8.7
12	Greenwich Village	8.4
18	Midtown	8.7
19	New Dorp	8.1
20	Noho	8.8
21	North Side	8.5
22	Prospect Lefferts Gardens	8.6
25	Sutton Place	8.4
26	Tribeca	9.1
29	Woodlawn	8.0

- We will join this dataset to original New York data to get longitude and latitude.

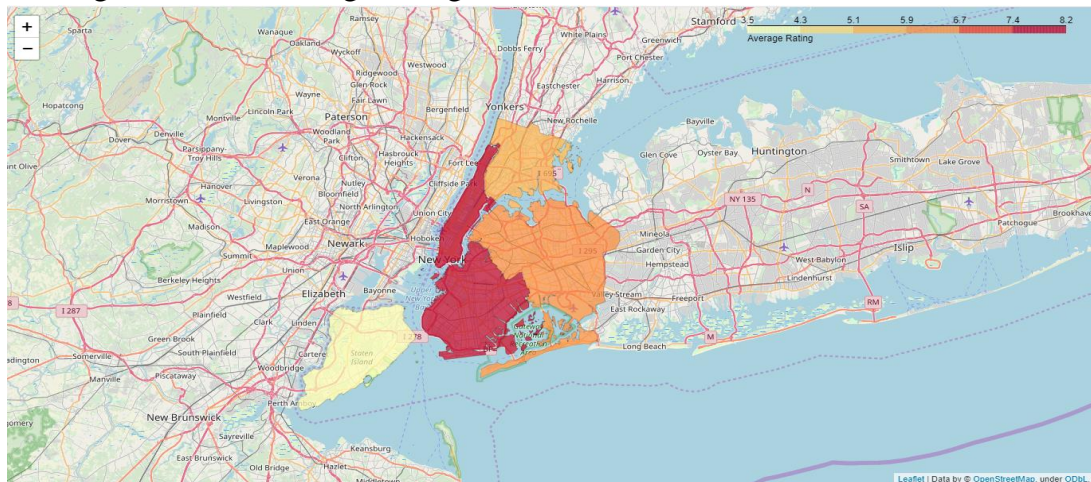
	Borough	Neighborhood	Latitude	Longitude	Average Rating
0	Queens	Bayside	40.766041	-73.774274	8.2
1	Manhattan	Chelsea	40.744035	-74.003116	8.7
2	Staten Island	Chelsea	40.594726	-74.189560	8.7
3	Manhattan	Flatiron	40.739673	-73.990947	8.4
4	Brooklyn	Fort Greene	40.688527	-73.972906	8.7
5	Manhattan	Greenwich Village	40.726933	-73.999914	8.4
6	Manhattan	Midtown	40.754691	-73.981669	8.7
7	Staten Island	New Dorp	40.572572	-74.116479	8.1
8	Manhattan	Noho	40.723259	-73.988434	8.8
9	Brooklyn	North Side	40.714823	-73.958809	8.5
10	Brooklyn	Prospect Lefferts Gardens	40.658420	-73.954899	8.6
11	Manhattan	Sutton Place	40.760280	-73.963556	8.4
12	Manhattan	Tribeca	40.721522	-74.010683	9.1
13	Bronx	Woodlawn	40.898273	-73.867315	8.0

- Finally, we will visualize the Neighbourhoods and Borough based on average Rating using python's Folium library.

Neighbourhoods based on average rating:



Borough based on average rating:



Result:

So now we can answer the questions asked above in the Questions section:

Answers:

1. The following location in New York City has great Indian restaurants.

	Borough	Neighborhood	Latitude	Longitude	Average Rating
0	Queens	Bayside	40.766041	-73.774274	8.2
1	Manhattan	Chelsea	40.744035	-74.003116	8.7
2	Staten Island	Chelsea	40.594726	-74.189560	8.7
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13	Bronx	Woodlawn	40.898273	-73.867315	8.0

2. Manhattan is the best neighbourhood for Indian cuisine.
3. Brooklyn is a competitor neighbourhood in Indian Restaurant Market.
4. Staten Island and Bronx rank last in average rating of Indian Restaurants.
5. Manhattan is the best place to stay if you prefer Indian Cuisine.

Conclusion:

There is always room for improvement and hence the above solution I have provided can also be improved for best results depending upon the data we have.