

# **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](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

```
In [6]: new_york_data=get_new_york_data()
```

```
In [7]: new_york_data.head()
```

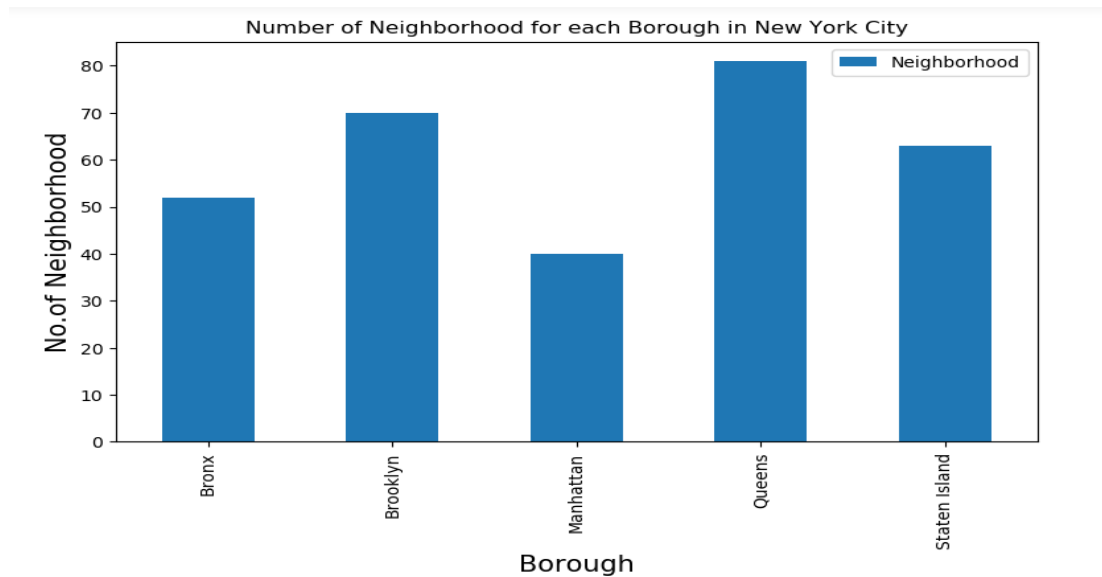
```
Out[7]:
```

|   | 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 |

```
In [8]: new_york_data.shape
```

```
Out[8]: (306, 4)
```

The above result shows that there are 306 different Neighborhoods in New York.



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

```
( 1 / 306 ) Indian Resturants in Wakefield, Bronx:0
( 2 / 306 ) Indian Resturants in Co-op City, Bronx:0
( 3 / 306 ) Indian Resturants in Eastchester, Bronx:0
( 4 / 306 ) Indian Resturants in Fieldston, Bronx:0
( 5 / 306 ) Indian Resturants in Riverdale, Bronx:0
( 6 / 306 ) Indian Resturants in Kingsbridge, Bronx:0
( 7 / 306 ) Indian Resturants in Marble Hill, Manhattan:0
( 8 / 306 ) Indian Resturants in Woodlawn, Bronx:1
( 9 / 306 ) Indian Resturants in Norwood, Bronx:0
( 10 / 306 ) Indian Resturants in Williamsbridge, Bronx:0
( 11 / 306 ) Indian Resturants in Baychester, Bronx:0
( 12 / 306 ) Indian Resturants in Pelham Parkway, Bronx:0
( 13 / 306 ) Indian Resturants in City Island, Bronx:0
( 14 / 306 ) Indian Resturants in Bedford Park, Bronx:0
( 15 / 306 ) Indian Resturants in University Heights, Bronx:0
```

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     | 7.6    | 10   |
| 1 | Bronx   | Parkchester    | 4c194631838020a13e78e561 | Melanies Roti Bar And Grill | 3     | 5.8    | 2    |
| 2 | Bronx   | Spuyten Duyvil | 4c04544df423a593ac83d116 | Cumin Indian Cuisine        | 13    | 6.1    | 9    |
| 3 | Bronx   | Concourse      | 551b7f75498e86c00a0ed2e1 | Hungry Bird                 | 8     | 6.9    | 3    |
| 4 | Bronx   | Unionport      | 4c194631838020a13e78e561 | Melanies Roti Bar And Grill | 3     | 5.8    | 2    |

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

|    | Neighborhood  | Average Rating |
|----|---------------|----------------|
| 12 | Civic Center  | 9.100000       |
| 69 | Tribeca       | 9.100000       |
| 0  | Astoria       | 9.000000       |
| 5  | Blissville    | 9.000000       |
| 75 | West Village  | 8.800000       |
| 44 | Midtown South | 8.800000       |
| 43 | Midtown       | 8.800000       |
| 29 | Gramercy      | 8.733333       |
| 25 | Fort Greene   | 8.700000       |
| 11 | Chelsea       | 8.700000       |

|   | Borough       | Average Rating |
|---|---------------|----------------|
| 2 | Manhattan     | 8.210000       |
| 1 | Brooklyn      | 7.700000       |
| 3 | Queens        | 6.552113       |
| 0 | Bronx         | 5.585714       |
| 4 | Staten Island | 3.533333       |

6. Next we will consider all the neighbourhoods with average rating greater or equal 9.0 to visualize on map.

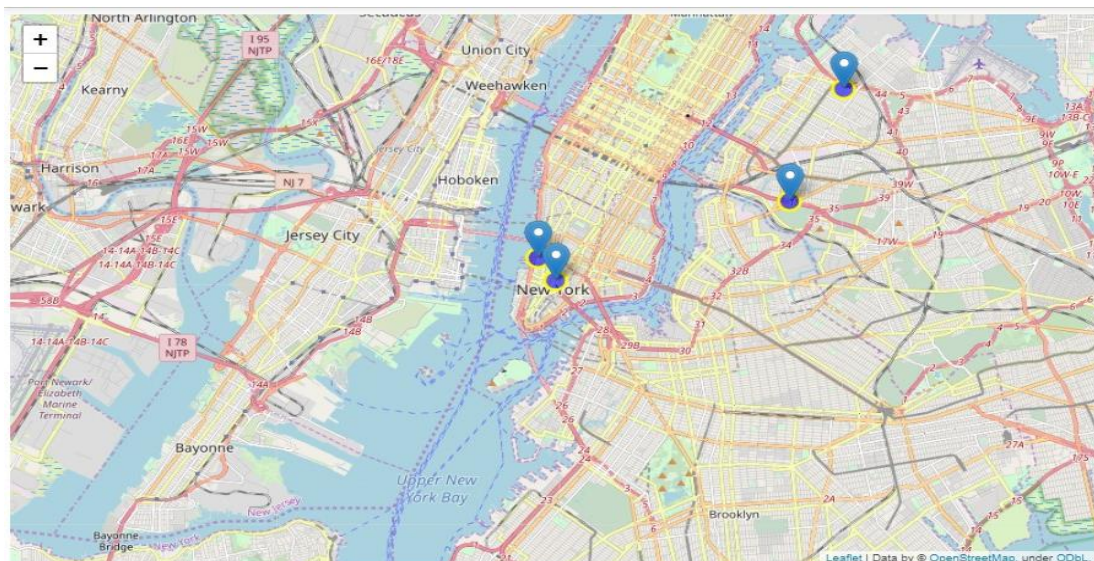
|    | Neighborhood | Average Rating |
|----|--------------|----------------|
| 0  | Astoria      | 9.0            |
| 5  | Blissville   | 9.0            |
| 12 | Civic Center | 9.1            |
| 69 | Tribeca      | 9.1            |

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

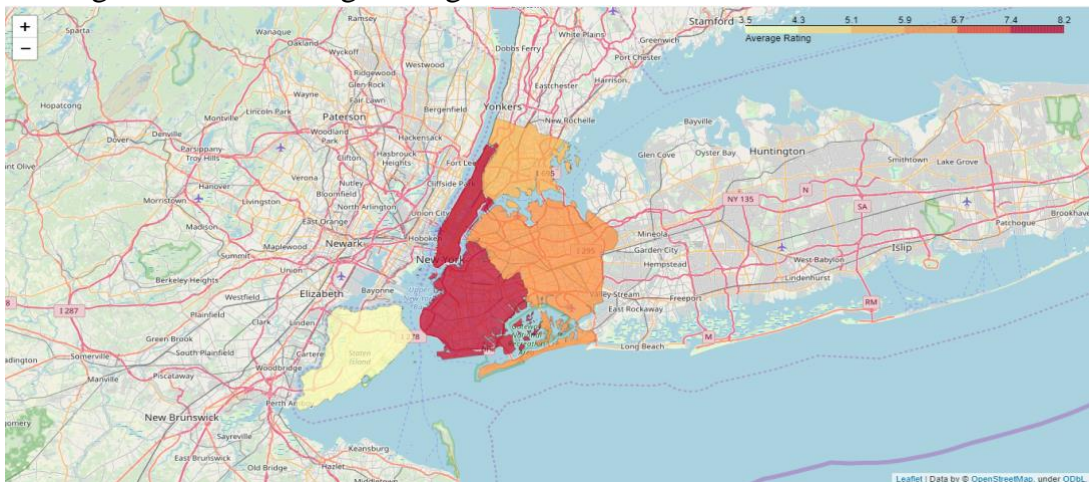
|   | Borough   | Neighborhood | Latitude  | Longitude  | Average Rating |
|---|-----------|--------------|-----------|------------|----------------|
| 0 | Queens    | Astoria      | 40.768509 | -73.915654 | 9.0            |
| 1 | Queens    | Blissville   | 40.737251 | -73.932442 | 9.0            |
| 2 | Manhattan | Civic Center | 40.715229 | -74.005415 | 9.1            |
| 3 | Manhattan | Tribeca      | 40.721522 | -74.010683 | 9.1            |

8. 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    | Astoria      | 40.768509 | -73.915654 | 9.0            |
| 1 | Queens    | Blissville   | 40.737251 | -73.932442 | 9.0            |
| 2 | Manhattan | Civic Center | 40.715229 | -74.005415 | 9.1            |
| 3 | Manhattan | Tribeca      | 40.721522 | -74.010683 | 9.1            |

2. Astoria (Queens), Blissville (Queens), Civic Center (Manhattan) are some of the best neighbourhoods for Indian cuisine.
3. Manhattan have potential Indian Restaurant Market.
4. Staten Island ranks 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.