

Smeet's Final Report

The Battle of Neighborhoods

Introduction:

New York City is one of the most diverse cities in the United States. It is one of the largest cities in the United States and is home to different ethnic groups due to the long history of international immigration. Today, NYC's population is over 18 million people, and has been growing faster than the region itself. The New York region continues to be the leading metropolitan gateway for many legal immigrants coming into the United States.

New York City has been known as a "melting pot", as it has been a major entry point to many immigrants of different ethnic backgrounds. New York City is also the most linguistically diverse city in the world, as there are more than 100 languages spoken in the city. English is still the most spoken language, but there are boroughs where there is limited to no English spoken. English is the least spoken in neighborhoods in Queens such as Corona and Flushing.

With all this influx of diverse culture comes many different cuisines. There are many restaurants in New York City that belong to different ethnic categories such as Indian, Italian, Chinese, etc.

Problem:

For a newcomer in New York City, they would like to find answers to the following questions regarding Indian Restaurants in the area:

1. List and visualize all the parts of New York City that have great Indian Restaurants.
2. What is the best location in New York City for Indian cuisine?
3. Which area lacks Indian restaurants?
4. Where is the best place to stay in New York City if you prefer Indian cuisine?

Data Section:

For being able to assess Indian restaurants with respect to NYC neighborhoods, we will need the following data:

- New York City data that contains Boroughs and Neighborhoods, with their respective latitude and longitude:
 - Data Source: https://cocl.us/new_york_dataset
 - Data Purpose: This data set contains the information mentioned above and will be used to explore different neighborhoods in New York City
- Indian Restaurants in each NYC neighborhood:
 - Data Source: Foursquare API
 - Data Purpose: This API will allow us to get the venues in each neighborhood and we can filter them to only yield us Indian Restaurants.
- Geospace Data:
 - Data Source:
<https://data.cityofnewyork.us/City-Government/Borough-Boundaries/tqmj-j8zm>

- Data Purpose: This geospace data will allow us to get the New York City borough boundaries that will help us graphically visualize a choropleth map of indian restaurants.

Methodology:

1. We start our investigation by collecting the New York City data from the following link "https://cocl.us/new_york_dataset"
2. We find all the venues for each neighborhood by utilizing the Foursquare API:

```
In [38]: new_york_data = get_new_york_data()
```

```
In [39]: new_york_data.head()
```

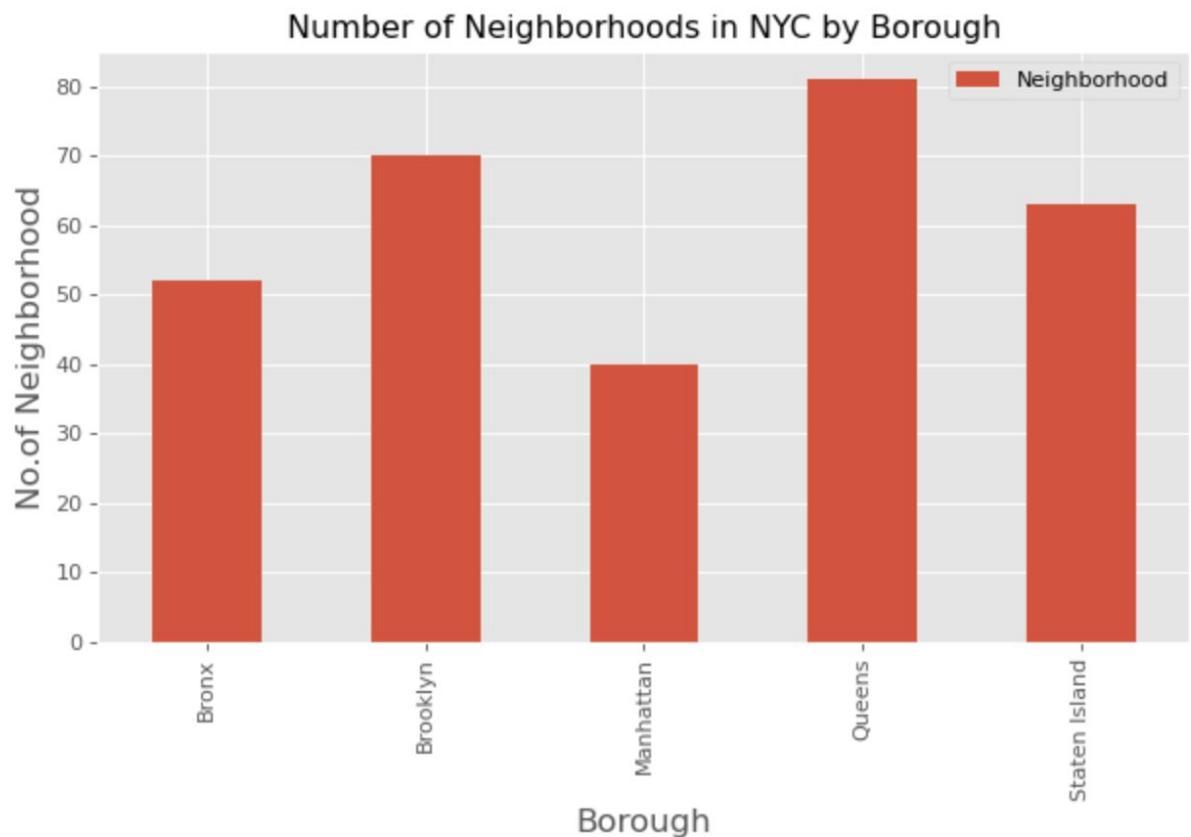
```
Out[39]:
```

| | 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 [40]: new_york_data.shape
```

```
Out[40]: (306, 4)
```

According to the dataset, there are 306 neighborhoods in New York



- We then filter out all venues by Indian Restaurants 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
( 16 / 306 ) Indian Resturants in Morris Heights, Bronx:0
( 17 / 306 ) Indian Resturants in Fordham, Bronx:0
( 18 / 306 ) Indian Resturants in East Tremont, Bronx:0
( 19 / 306 ) Indian Resturants in West Farms, Bronx:0
```

- Using the Foursquare API, we find the Ratings, Tips, and Number of Likes of every Indian Restaurant:

| | Borough | Neighborhood | ID | Name | Likes | Rating | Tips |
|---|---------|----------------|--------------------------|-----------------------------|-------|--------|------|
| 0 | Bronx | Woodlawn | 4c0448d9310fc9b6bf1dc761 | Curry Spot | 5 | 7.9 | 10 |
| 1 | Bronx | Parkchester | 4c194631838020a13e78e561 | Melanies Roti Bar And Grill | 3 | 6.3 | 2 |
| 2 | Bronx | Spuyten Duyvil | 4c04544df423a593ac83d116 | Cumin Indian Cuisine | 13 | 5.8 | 9 |
| 3 | Bronx | Concourse | 551b7f75498e86c00a0ed2e1 | Hungry Bird | 8 | 7.1 | 3 |
| 4 | Bronx | Unionport | 4c194631838020a13e78e561 | Melanies Roti Bar And Grill | 3 | 6.3 | 2 |

5. We sort the Neighborhoods and Borough data keeping the Ratings as a constraint:

| | Neighborhood | Average Rating |
|----|---------------------------|----------------|
| 29 | Greenwich Village | 9.00 |
| 67 | Tribeca | 9.00 |
| 72 | West Village | 8.95 |
| 49 | Prospect Heights | 8.90 |
| 50 | Prospect Lefferts Gardens | 8.70 |
| 10 | Chelsea | 8.70 |
| 70 | Upper West Side | 8.55 |
| 45 | North Side | 8.50 |
| 60 | South Side | 8.50 |
| 22 | Fort Greene | 8.50 |

| | Borough | Average Rating |
|---|---------------|----------------|
| 1 | Brooklyn | 6.552000 |
| 0 | Bronx | 5.566667 |
| 2 | Manhattan | 5.348649 |
| 3 | Queens | 0.000000 |
| 4 | Staten Island | 0.000000 |

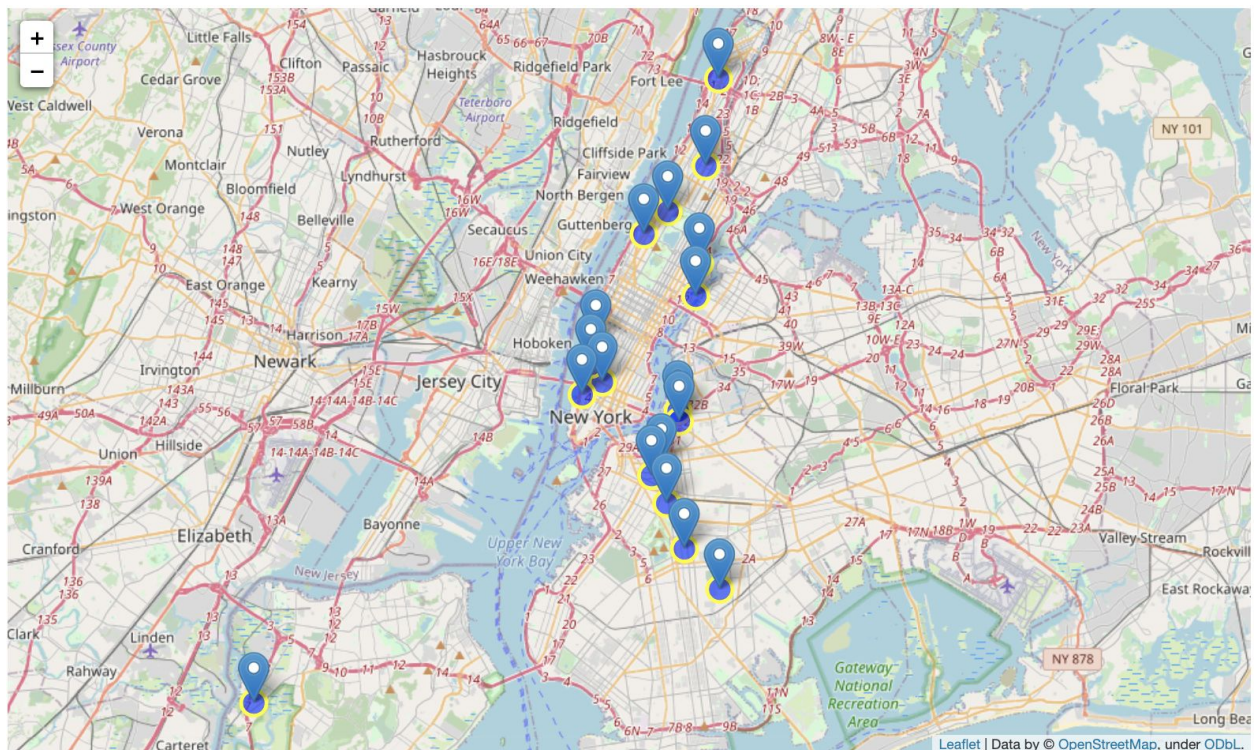
6. Next, we display a table of all the neighborhoods with an average rating of 8.0 or greater to visualize on a map:

| | Neighborhood | Average Rating |
|----|---------------------------|----------------|
| 9 | Central Harlem | 8.000000 |
| 10 | Chelsea | 8.700000 |
| 12 | Clinton Hill | 8.150000 |
| 16 | East Flatbush | 8.400000 |
| 22 | Fort Greene | 8.500000 |
| 29 | Greenwich Village | 9.000000 |
| 40 | Manhattan Valley | 8.050000 |
| 45 | North Side | 8.500000 |
| 49 | Prospect Heights | 8.900000 |
| 50 | Prospect Lefferts Gardens | 8.700000 |
| 58 | Roosevelt Island | 8.200000 |
| 60 | South Side | 8.500000 |
| 67 | Tribeca | 9.000000 |
| 70 | Upper West Side | 8.550000 |
| 71 | Washington Heights | 8.100000 |
| 72 | West Village | 8.950000 |
| 75 | Yorkville | 8.166667 |

- We now join this dataset with the original New York dataset to retrieve the latitude and longitude:

| | Borough | Neighborhood | Latitude | Longitude | Average Rating |
|----|---------------|---------------------------|-----------|------------|----------------|
| 13 | Manhattan | Tribeca | 40.721522 | -74.010683 | 9.00 |
| 6 | Manhattan | Greenwich Village | 40.726933 | -73.999914 | 9.00 |
| 16 | Manhattan | West Village | 40.734434 | -74.006180 | 8.95 |
| 9 | Brooklyn | Prospect Heights | 40.676822 | -73.964859 | 8.90 |
| 2 | Staten Island | Chelsea | 40.594726 | -74.189560 | 8.70 |
| 1 | Manhattan | Chelsea | 40.744035 | -74.003116 | 8.70 |
| 10 | Brooklyn | Prospect Lefferts Gardens | 40.658420 | -73.954899 | 8.70 |
| 14 | Manhattan | Upper West Side | 40.787658 | -73.977059 | 8.55 |
| 5 | Brooklyn | Fort Greene | 40.688527 | -73.972906 | 8.50 |
| 8 | Brooklyn | North Side | 40.714823 | -73.958809 | 8.50 |

- Lastly, we visualize the Neighborhoods and Boroughs based on the Average Rating by using the Python Folium library imported in the beginning of this project:



Results:

The questions presented in the Question section of this report can now be answered as follows:

1. The following locations in New York City have the best Indian Restaurants:

| | Borough | Neighborhood | Latitude | Longitude | Average Rating |
|----|---------------|---------------------------|-----------|------------|----------------|
| 13 | Manhattan | Tribeca | 40.721522 | -74.010683 | 9.00 |
| 6 | Manhattan | Greenwich Village | 40.726933 | -73.999914 | 9.00 |
| 16 | Manhattan | West Village | 40.734434 | -74.006180 | 8.95 |
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| 5 | Brooklyn | Fort Greene | 40.688527 | -73.972906 | 8.50 |
| 8 | Brooklyn | North Side | 40.714823 | -73.958809 | 8.50 |

2. What is the best location in New York City for Indian cuisine?
 - a. Tribeca, Greenwich Village, and the West Village are the best neighborhoods for Indian cuisine.
3. Which area lacks Indian restaurants?
 - a. Staten Island lacks Indian Restaurants.
4. Where is the best place to stay in New York City if you prefer Indian cuisine?
 - a. Manhattan is the best place to stay if you prefer Indian cuisine.

Conclusion:

There is always room for improvement for finding restaurants in NYC and the solution I have provided above can be improved for the best results depending on any new data that emerges in the future. However, from the data I have gathered, it is recommended that if people moving to NYC would prefer Indian cuisine, they should live in Manhattan as they have the neighborhoods that have the highest rated Indian restaurants.