Introduction

New York City (NYC), often called The City or simply New York (NY), is the most populous city in the United States. With an estimated 2019 population of 8,336,817 distributed over about 302.6 square miles (784 km2), New York is also the most densely populated major city in the United States. With almost 20 million people in its metropolitan statistical area and approximately 23 million in its combined statistical area, it is one of the world's most populous megacities.

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.

Throughout its history, New York City has been a major point of entry for immigrants; the term "melting pot" was coined to describe densely populated immigrant neighborhoods 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.

With various ethic groups residing together, there are businesses small and large owned by them too. This project focuses on 'Indian Restaurants' in NYC.

Source - Wikipedia

Data

1. List of Boroughs, Neighborhoods with latitudes and longitudes
    - Source - https://cocl.us/new_york_dataset
    - Description - A data frame with information is created using the data set. Longitudes and latitudes are obtained using geopy.
2. Indian restaurants in NYC
    - Source – Foursquare API
    - Description – Indian restaurants will be filtered out from venue data obtained via Foursqaure. Further information like rating and tips are used for analysis in later stages. Specific restaurants will be mapped using folium.

Methodology

1. Obtain and filter relevant NYC data from https://cocl.us/new_york_dataset
2. Obtain venues in each neighbourhood using Foursquare
3. Filter Indian restaurants
4. Obtain rating, tips and other parameters for said restaurants
5. Rank restaurants using data
6. Visualize ranked data using Folium

Results

After importing necessary libraries and defining functions, NYC data is obtained from Foursquare

```
[6]: new_york_data.head()
```

[6]:

	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

Venue information from Foursquare is obtained for every neighborhood and 'Indian Restaurants' are filtered out

```
indian_rest_ny.head()
```

[63]:

	Borough	Neighborhood	ID	Name
0	Bronx	Woodlawn	4c0448d9310fc9b6bf1dc761	Curry Spot
1	Bronx	Parkchester	4c194631838020a13e78e561	Melanies Roti Bar And Grill
2	Bronx	Spuyten Duyvil	4c04544df423a593ac83d116	Cumin Indian Cuisine
3	Bronx	Concourse	551b7f75498e86c00a0ed2e1	Hungry Bird
4	Bronx	Unionport	4c194631838020a13e78e561	Melanies Roti Bar And Grill

Using Premium Foursquare calls, data like Tips, Rating and Likes are obtained to rank data

```
[12]: indian_rest_stats_ny1.head()
```

[12]:

	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
0	Bronx	Woodlawn	4c0448d9310fc9b6bf1dc761	Curry Spot	5	7.8	10
1	Bronx	Parkchester	4c194631838020a13e78e561	Melanies Roti Bar And Grill	3	6.0	2
2	Bronx	Spuyten Duyvil	4c04544df423a593ac83d116	Cumin Indian Cuisine	13	6.0	9
3	Bronx	Concourse	551b7f75498e86c00a0ed2e1	Hungry Bird	8	6.8	3
4	Bronx	Unionport	4c194631838020a13e78e561	Melanies Roti Bar And Grill	3	6.0	2

```
[27]: indian_rest_stats_ny.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 145 entries, 0 to 144
Data columns (total 7 columns):
 #   Column        Non-Null Count  Dtype
---  ------        --------------  -----
 0   Borough       145 non-null    object
 1   Neighborhood  145 non-null    object
 2   ID            145 non-null    object
 3   Name          145 non-null    object
 4   Likes         145 non-null    float64
 5   Rating        145 non-null    float64
 6   Tips          145 non-null    float64
dtypes: float64(3), object(4)
memory usage: 8.1+ KB
```

After converting column data types appropriately, restaurant data is analyzed

Identifying restaurant with maximum likes

```
[28]: indian_rest_stats_ny.iloc[indian_rest_stats_ny['Likes'].idxmax()]
```

```
[28]: Borough                       Manhattan
      Neighborhood                    Tribeca
      ID              4bbb9dbded7776b0e1ad3e51
      Name                    Tamarind TriBeCa
      Likes                                590
      Rating                               8.6
      Tips                                 148
      Name: 41, dtype: object
```

Identifying restaurant with maximum tips

[29]:
```
indian_rest_stats_ny.iloc[indian_rest_stats_ny['Tips'].idxmax()]
```

[29]:
```
Borough                          Manhattan
Neighborhood                       Gramercy
ID              4a12eb1ff964a52099771fe3
Name                               Dhaba
Likes                                497
Rating                               8.3
Tips                                 164
Name: 50, dtype: object
```

Identifying restaurant with maximum rating

[30]:
```
indian_rest_stats_ny.iloc[indian_rest_stats_ny['Rating'].idxmax()]
```

[30]:
```
Borough                            Queens
Neighborhood                       Astoria
ID              4aa56c81f964a5204e4820e3
Name                  Seva Indian Cuisine
Likes                                239
Rating                                 9
Tips                                 133
Name: 53, dtype: object
```

We create a new dataframe showing average rating for every neighborhood

[35]:
```
ny_neighborhood_stats=indian_rest_stats_ny.groupby('Neighborhood',as_index=False).mean()[['Neighborhood','Rating']]
ny_neighborhood_stats.columns=['Neighborhood','Average Rating']
ny_neighborhood_stats.sort_values(['Average Rating'],ascending=False).head(10)
```

[35]:

	Neighborhood	Average Rating
0	Astoria	9.0
61	Sunnyside	9.0
6	Blissville	9.0
14	Clinton Hill	8.8
25	Fort Greene	8.8
48	Prospect Heights	8.7
30	Greenwich Village	8.6
65	Tribeca	8.6
13	Civic Center	8.6
63	Sutton Place	8.5

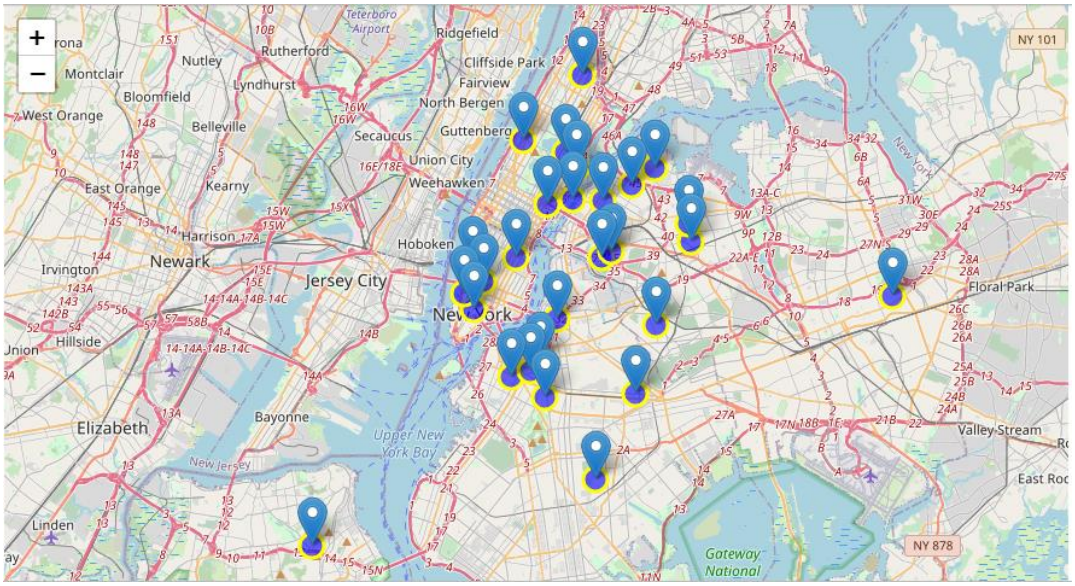
Similarly, average rating per borough is visualized in a dataframe

[32]:
```
ny_borough_stats=indian_rest_stats_ny.groupby('Borough',as_index=False).mean()[['Borough','Rating']]
ny_borough_stats.columns=['Borough','Average Rating']
ny_borough_stats.sort_values(['Average Rating'],ascending=False).head()
```

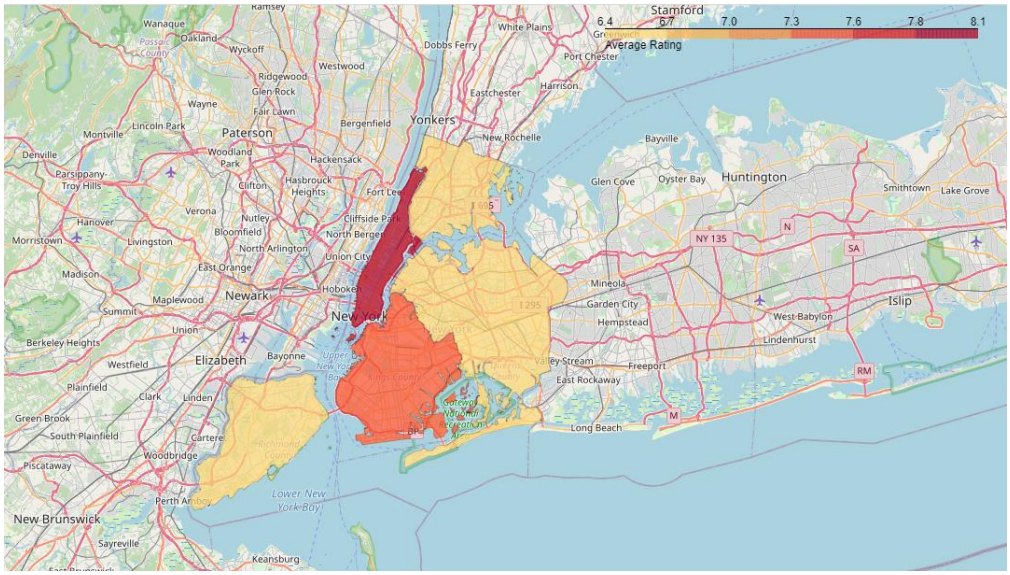
[32]:

	Borough	Average Rating
2	Manhattan	8.121212
1	Brooklyn	7.429630
0	Bronx	6.566667
3	Queens	6.478378
4	Staten Island	6.400000

All neighborhoods with average rating above 8.0 are identified and mapped using Folium



Map of Boroughs based on rating



Discussion

1. Astoria(Queens), Blissvile(Queens) and Boerum Hill (Brooklyn) are amongst the best neighborhoods for Indian Restaurants

2. Amongst boroughs, Manhattan is the best for Indian Restaurants followed by Brooklyn and Bronx

Conclusion

NYC is filled with quality Indian Restaurants and also provide an outline of best neighborhoods to stay in. This analysis is useful not only for migrants interested in Indian cuisine but also individuals/groups who would like to start businesses in these areas.