

# **FINAL REPORT**

## **Capstone Project - The Battle of Neighbourhoods**

### **1) 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 km<sup>2</sup>), New York is also the most densely populated major city in the United States. Located at the southern tip of the U.S. state of New York, the city is the centre of the New York metropolitan area, the largest metropolitan area in the world by urban landmass. 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 has been described as the cultural, financial, and media capital of the world, significantly influencing commerce, entertainment, research, technology, education, politics, tourism, art, fashion, and sports. New York City is composed of five boroughs, each of which is a county of the State of New York. The five boroughs—Brooklyn, Queens, Manhattan, the Bronx, and Staten Island—were consolidated into a single city in 1898.

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. Lot of tourists all around the world visit the city.

### **2) Problem:**

To find the solution to following questions:

- a) List and visualize all the neighbourhoods and borough of the New York City.
- b) Find the central point of New York where are most of the Indian restaurants.
- c) Find hotels in the vicinity of Indian restaurants.

### 3) Data Section:

New York City's demographics show that it is a large and ethnically diverse. 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.
- Use geopy library to get the latitude and longitude of New York city.

### 4) Methodology:

We begin by using this link: “[https://cocl.us/new\\_york\\_dataset](https://cocl.us/new_york_dataset)” to explore the data and find the New York city’s neighbourhood and boroughs.

```
neighborhoods.head()
```

```
]:
```

	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

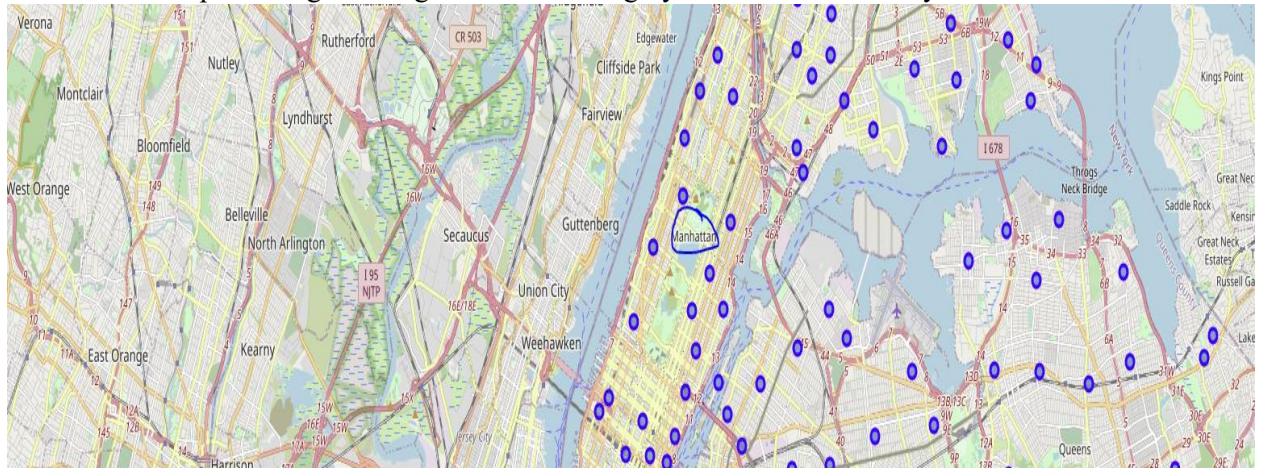
```
print('The dataframe has {} boroughs and {} neighborhoods'.format(
    len(neighborhoods['Borough'].unique()),
    neighborhoods.shape[0]
))
```

The dataframe has 5 boroughs and 306 neighborhoods.

Then we focus on Manhattan as it centre to tourist attraction and has most of Indian Restaurants.

	Borough	Neighborhood	Latitude	Longitude
0	Manhattan	Marble Hill	40.876551	-73.910660
1	Manhattan	Chinatown	40.715618	-73.994279
2	Manhattan	Washington Heights	40.851903	-73.936900
3	Manhattan	Inwood	40.867684	-73.921210
4	Manhattan	Hamilton Heights	40.823604	-73.949688

Manhattan's Map showing the Neighbourhoods using Python's Folium Library



Then we filter out on number of Hotels through foursquare in Manhattan

	name	categories	address	cc	city	country	crossStreet	distance	formattedAddress	labeledLatLngs	lat	lng
0	Hotel Wales	Hotel	1295 Madison Ave	US	New York	United States	92nd St	648	[1295 Madison Ave (92nd St), New York, NY 1012...	[{"label": "display", "lat": 40.7847375, "lng": -73.955713}	40.784737	-73.955713
1	Days Inn Hotel New York City-Broadway	Hotel	215 West 94th Street	US	New York	United States	at Broadway	1106	[215 West 94th Street (at Broadway), New York, NY 10025, United Sta...	[{"label": "display", "lat": 40.7932977, "lng": -73.973298}	40.793298	-73.972092
2	Broadway Hotel	Hostel	230 W 101st St	US	New York	United States	at Broadway	1247	[230 W 101st St (at Broadway), New York, NY 10024, United Sta...	[{"label": "display", "lat": 40.79793166906806, "lng": -73.969834}	40.797932	-73.969834
3	Belnord Hotel	Hotel	209 W 87th St	US	New York	United States	Broadway	1280	[209 W 87th St (Broadway), New York, NY 10024, United Sta...	[{"label": "display", "lat": 40.7889054, "lng": -73.975054}	40.788905	-73.975054
4	Hotel 99 Lic	Hotel	244 W 99th St	US	New York	United States	NaN	1194	[244 W 99th St, New York, NY 10025, United Sta...	[{"label": "display", "lat": 40.79669018312864, "lng": -73.970555}	40.796690	-73.970555
5	Excelsior Hotel NYC	Hotel	45 W 81st St	US	New York	United States	at Columbus Ave	1399	[45 W 81st St (at Columbus Ave), New York, NY 10024, United Sta...	[{"label": "display", "lat": 40.78294941406415, "lng": -73.973964}	40.782949	-73.973964
6	Hotel Alexander New York	Hotel	306 W 94th St	US	New York	United States	NaN	1360	[306 W 94th St, New York, NY 10025, United Sta...	[{"label": "display", "lat": 40.79403677901636, "lng": -73.974951}	40.794037	-73.974951
7	Hotel Beacon NYC	Hotel	2130 Broadway	US	New York	United States	at 75th St	2049	[2130 Broadway (at 75th St), New York, NY 10024, United Sta...	[{"label": "display", "lat": 40.780778, "lng": -73.981218}	40.780778	-73.981218

Then I found out number of Indian Restaurants closer to these hotels

```
[('Hotel Wales', 5), ('Renaissance New York Hotel 57', 3), ('The Algonquin Hotel, Autograph Collection', 3),
at The Algonquin Hotel Times Square, Autograph Collection', 2), ('Broadway Hotel', 1), ('Belnord Hotel', 1),
Park', 1), ('6 Columbus, a SIXTY Hotel', 1), ('The Premier Hotel New York', 1), ('Sanctuary Hotel New York',
monico', 1), ('The Empire Hotel Rooftop', 1), ('The Empire Hotel Lobby Bar', 1), ('The Lexington Hotel, Auto
elsior Hotel NYC', 0), ('Hotel Alexander New York', 0), ('Hotel Beacon NYC', 0), ('Swimming Pool @ ONE UN PL
0), ('Gardens Suites Hotel by Affinia', 0), ('Sheraton New York Times Square Hotel', 0), ('Hotel Berkens', 0
1', 0), ('The Hotel @ Times Square', 0), ('The Hotel @ NYC', 0), ('Chambers Hotel', 0), ('Hotel Pennsylvania
('Mobar at Mandarin Oriental Hotel', 0)]
```

## **5) Result:**

We found that there are 5 Indian Restaurants under 10 mile radius of 'Hotel Wales' at Manhattan.

## **6) Conclusion:**

There is always different ways to find out the solution to problem. I have found a small glimpse of how real life problems could be solved through Data Science.

Finally you have any friend visiting New York, they can use this to find out which hotels would fit best to their dietary need. I have given an example of Indian Restaurant but this can be used to find out any cuisine which a tourist is interested in.