FINAL REPORT

Capstone Project - The Battle of Neighborhoods

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 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. 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 neighborhoods 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, Thai, 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 Thai restaurants.

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

Q3) which areas have potential Thai Restaurant Market?

Q4) which all areas lack Thai Restaurants?

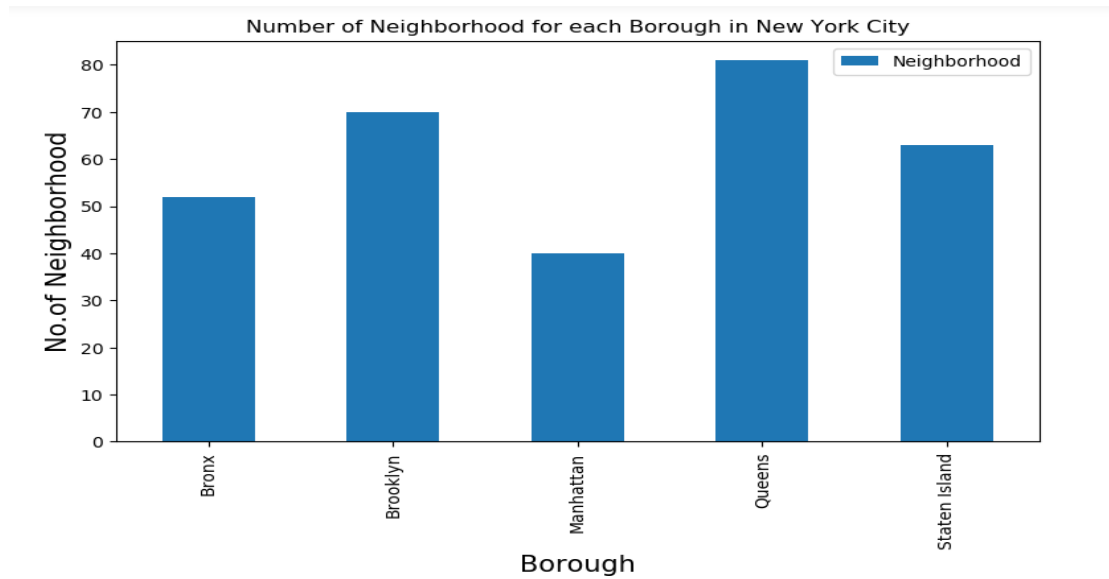Q5) which is the best place to stay if you prefer Thai Cuisine?

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, Thai, Indian, French

For this project we need the following data:

- New York City data that contains list Boroughs, Neighborhoods 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 neighborhoods of New York City

- Thai restaurants in each neighborhood of New York City.
  - Data source: Foursquare API
  - Description: By using this API we will get all the venues in each neighborhood. We can filter these venues to get only Thai 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 neighborhood using Foursquare API

Number of Neighborhood for each Borough in New York City

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

```
( 1 / 306 ) Thai Resturants in Wakefield, Bronx:0
( 2 / 306 ) Thai Resturants in Co-op City, Bronx:0
( 3 / 306 ) Thai Resturants in Eastchester, Bronx:0
( 4 / 306 ) Thai Resturants in Fieldston, Bronx:0
( 5 / 306 ) Thai Resturants in Riverdale, Bronx:0
( 6 / 306 ) Thai Resturants in Kingsbridge, Bronx:0
( 7 / 306 ) Thai Resturants in Marble Hill, Manhattan:1
( 8 / 306 ) Thai Resturants in Woodlawn, Bronx:0
( 9 / 306 ) Thai Resturants in Norwood, Bronx:0
( 10 / 306 ) Thai Resturants in Williamsbridge, Bronx:0
( 11 / 306 ) Thai Resturants in Baychester, Bronx:0
( 12 / 306 ) Thai Resturants in Pelham Parkway, Bronx:0
( 13 / 306 ) Thai Resturants in City Island, Bronx:0
( 14 / 306 ) Thai Resturants in Bedford Park, Bronx:0
( 15 / 306 ) Thai Resturants in University Heights, Bronx:0
( 16 / 306 ) Thai Resturants in Morris Heights, Bronx:0
( 17 / 306 ) Thai Resturants in Fordham, Bronx:0
( 18 / 306 ) Thai Resturants in East Tremont, Bronx:0
( 19 / 306 ) Thai Resturants in West Farms, Bronx:0
( 20 / 306 ) Thai Resturants in High  Bridge, Bronx:0
```

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

	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
0	Manhattan	Marble Hill	4a739e29f964a520f5dc1fe3	Siam Square	15	7.0	13
1	Bronx	Country Club	4b4c90d3f964a52046b626e3	Honey's Thai Pavilion	19	7.5	27
2	Bronx	Parkchester	5585c948498e0bd8a8a706f1	Thai Cuisine	17	6.9	1
3	Bronx	Van Nest	5585c948498e0bd8a8a706f1	Thai Cuisine	17	6.9	1
4	Bronx	Spuyten Duyvil	4a739e29f964a520f5dc1fe3	Siam Square	15	7.0	13

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

	Neighborhood	Average Rating
5	Chinatown	9.25
24	Prospect Lefferts Gardens	9.00
9	Crown Heights	8.70
10	Downtown	8.60
1	Boerum Hill	8.60
26	Red Hook	8.40
3	Bushwick	8.40
4	Carroll Gardens	8.30
12	East Williamsburg	8.30
16	Gowanus	8.30

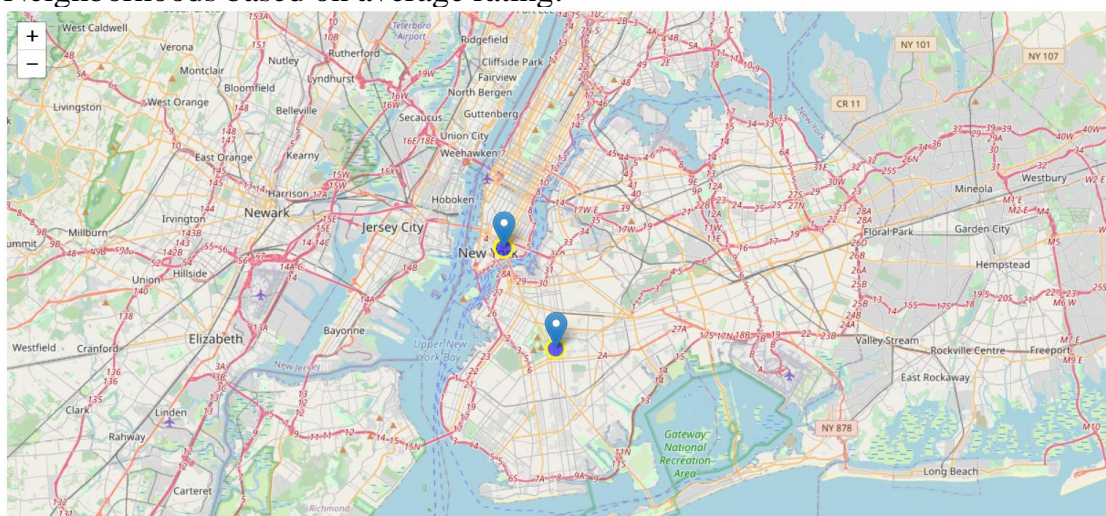6. Next, we will consider all the neighborhoods with average rating greater or equal 9.0 to visualize on map.

	Neighborhood	Average Rating
5	Chinatown	9.25
24	Prospect Lefferts Gardens	9.00

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

	Borough	Neighborhood	Latitude	Longitude	Average Rating
0	Manhattan	Chinatown	40.715618	-73.994279	9.25
1	Brooklyn	Prospect Lefferts Gardens	40.658420	-73.954899	9.00

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

Neighborhoods 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 Thai restaurants.

	Borough	Neighborhood	Latitude	Longitude	Average Rating
0	Manhattan	Chinatown	40.715618	-73.994279	9.25
1	Brooklyn	Prospect Lefferts Gardens	40.658420	-73.954899	9.00

2. Chinatown (Manhattan), Prospect Lefferts Garden (Brooklyn) are the best neighborhoods for Thai cuisine.
3. Manhattan have potential Thai Restaurant Market.
4. Gowanus ranks last in average rating of Thai Restaurants.
5. Manhattan is the best place to stay if you prefer Thai 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.