FINAL REPORT

Capstone Project - The Battle of Neighbourhoods -
"French Restaurants in New York"

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 over 8.3 million people in 2019, 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.

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.

French Population in New York

The French Embassy estimates that about 75,000 French citizens live in the New York metropolitan area, and since the early aughts, the French community in the city has seen an increase of about 45 percent. Those figures may be overblown, but the Frenchification of Brooklyn is impossible to deny. Today, over 60,000 French citizens and over 81,000 French speakers live in New York, but have no such hub. No wonder French is the fourth most spoken language in New York.

New Yorkers are extreme Francophiles : they love French culture, food, cinema; they associate it with a certain art de vivre, a quality of life that is reflected in art, fashion and gastronomy.

The French presence is truly felt through the hundreds of French shops and restaurants that mark the City's landscape.

Problem:

The objective is to locate and recommend which neighbourhood in New York City will be best choice to start a new French restaurant.

1) List and visualize all major parts of New York City that has great French restaurants.

2) what is best location in New York City for French Cuisine?

3) which areas have potential French Restaurant Market?

4) which all areas lack French Restaurants?

5) which is the best place to stay if you prefer French 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

  - Description: This data set contains the required information. And we will use this data set

    to explore various neighbourhoods of New York City

- French 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 French 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

We will call the above funtion to get the new york city data.

```
In [7]: ▶ new_york_data=get_new_york_data()
           new_york_data.head()
```
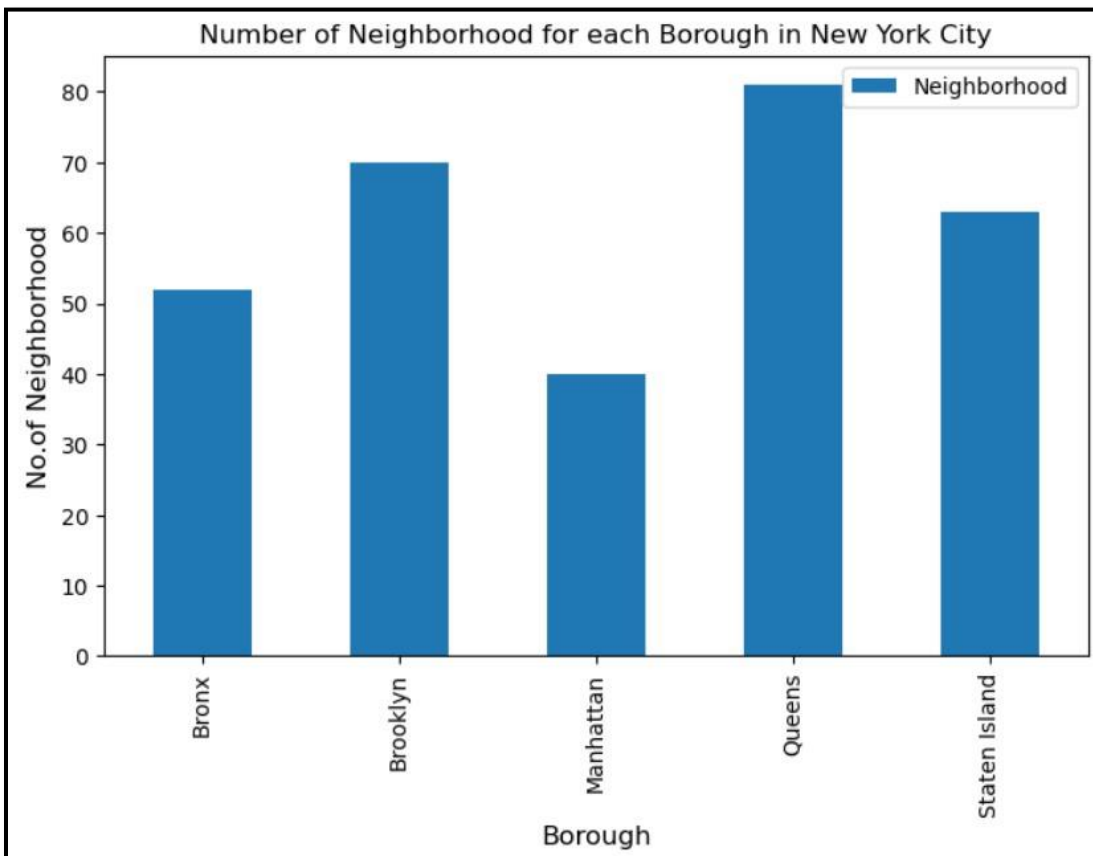
Out[7]:

	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 ) French Resturants in Wakefield, Bronx:0
( 1 / 306 ) French Resturants in Co-op City, Bronx:0
( 1 / 306 ) French Resturants in Eastchester, Bronx:0
( 1 / 306 ) French Resturants in Fieldston, Bronx:0
( 1 / 306 ) French Resturants in Riverdale, Bronx:0
( 1 / 306 ) French Resturants in Kingsbridge, Bronx:0
( 1 / 306 ) French Resturants in Marble Hill, Manhattan:0
( 1 / 306 ) French Resturants in Woodlawn, Bronx:0
( 1 / 306 ) French Resturants in Norwood, Bronx:0
( 1 / 306 ) French Resturants in Williamsbridge, Bronx:0
( 1 / 306 ) French Resturants in Baychester, Bronx:0
( 1 / 306 ) French Resturants in Pelham Parkway, Bronx:0
( 1 / 306 ) French Resturants in City Island, Bronx:1
( 2 / 306 ) French Resturants in Bedford Park, Bronx:0
( 2 / 306 ) French Resturants in University Heights, Bronx:0
( 2 / 306 ) French Resturants in Morris Heights, Bronx:0
( 2 / 306 ) French Resturants in Fordham, Bronx:0
( 2 / 306 ) French Resturants in East Tremont, Bronx:0
( 2 / 306 ) French Resturants in West Farms, Bronx:0
( 2 / 306 ) French Resturants in High  Bridge, Bronx:0
```

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

```
In [17]: ▶ french_rest_stats_ny.head()
```

Out[17]:

	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
0	Bronx	City Island	4d7aa83ee540f04d66ba16dc	Bistro SK	12	7.5	7
1	Brooklyn	Greenpoint	5bf358689fca56002c251a87	Citroën	24	8.4	3
2	Brooklyn	Greenpoint	58fd34584382ab70ad90083e	Chez Ma Tante	224	9.1	60
3	Brooklyn	Greenpoint	4bcf1883c564ef3ba33beff0	Le Gamin	161	7.8	73
4	Brooklyn	Windsor Terrace	4e7d174cb6340a4da75a2cca	Le Paddock	141	8.8	56

```
In [18]: ▶ french_rest_stats_ny.shape
   Out[18]: (89, 7)

In [19]: ▶ french_rest_ny.shape
   Out[19]: (89, 4)
```

5. We will then sort Neighbourhoods and Borough the data keeping Ratings as the constraint, in this example we chose 8.0 for rating.

```
In [31]: ▶ ny_neighborhood_stats.sort_values(['Average Rating'],ascending=False).head(10)

Out[31]:
              Neighborhood   Average Rating
         24   Greenwich Village        9.00
         43         South Side         9.00
         18         East Harlem        8.90
         34           Midtown          8.90
          9           Chelsea          8.90
         31      Lower East Side       8.85
         53          Yorkville         8.80
         52      Windsor Terrace       8.80
         38          North Side        8.70
         28       Lincoln Square       8.62
```

Above are the top neighborhoods with top average rating of French restaurants

Similarly we will find the average rating of French restaurants for each Borough.

```
In [32]: ▶ ny_borough_stats=french_rest_stats_ny.groupby('Borough',as_index=False).mean()[['Borough','Rating']]
           ny_borough_stats.columns=['Borough','Average Rating']

In [33]: ▶ ny_borough_stats.sort_values(['Average Rating'],ascending=False).head()

Out[33]:
              Borough    Average Rating
          1   Brooklyn        8.120833
          0    Bronx          7.500000
          2   Manhattan       4.078182
          3    Queens         0.000000
          4  Staten Island     0.000000
```

6. Next, we will consider all the neighbourhoods with average rating greater or equal 8.0 to visualize on map.

	Neighborhood	Average Rating
2	Bedford Stuyvesant	8.450000
3	Boerum Hill	8.550000
4	Brooklyn Heights	8.400000
5	Bushwick	8.250000
7	Carroll Gardens	8.400000
8	Central Harlem	8.400000
9	Chelsea	8.900000
10	Chinatown	8.600000
13	Clinton	8.200000
14	Clinton Hill	8.600000
15	Cobble Hill	8.400000
17	Downtown	8.466667
18	East Harlem	8.900000
20	Fort Greene	8.600000

7. We will join this dataset to original New York data to get longitude and latitude.
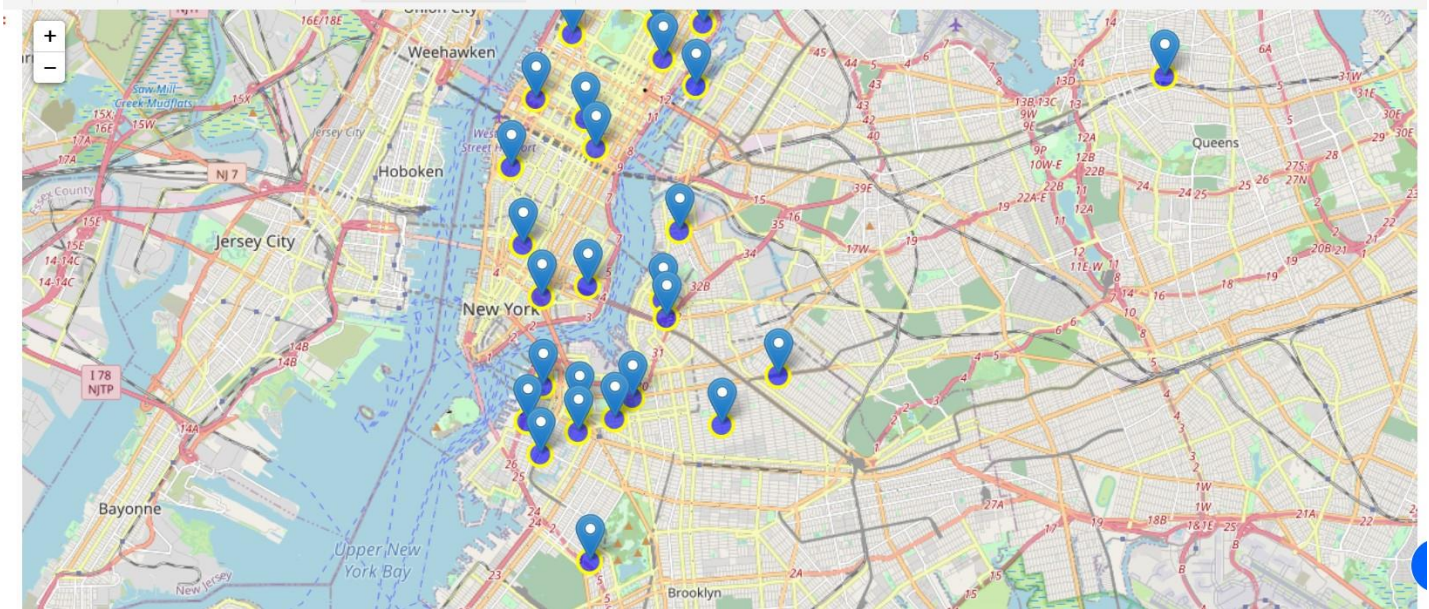
```
ny_neighborhood_stats.sort_values(['Average Rating'],ascending=False).head(10)
```

t[39]:

	Borough	Neighborhood	Latitude	Longitude	Average Rating
26	Brooklyn	South Side	40.710861	-73.958001	9.00
16	Manhattan	Greenwich Village	40.726933	-73.999914	9.00
21	Manhattan	Midtown	40.754691	-73.981669	8.90
13	Manhattan	East Harlem	40.792249	-73.944182	8.90
7	Staten Island	Chelsea	40.594726	-74.189560	8.90
6	Manhattan	Chelsea	40.744035	-74.003116	8.90
19	Manhattan	Lower East Side	40.717807	-73.980890	8.85
29	Manhattan	Yorkville	40.775930	-73.947118	8.80
28	Brooklyn	Windsor Terrace	40.656946	-73.980073	8.80
24	Brooklyn	North Side	40.714823	-73.958809	8.70

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

Neighbourhoods based on average rating:

Result:

So now we can answer the questions asked above in the Questions section:

1. The following location in New York City has great French restaurants.

	Borough	Neighborhood	Latitude	Longitude	Average Rating
26	Brooklyn	South Side	40.710861	-73.958001	9.00
16	Manhattan	Greenwich Village	40.726933	-73.999914	9.00
21	Manhattan	Midtown	40.754691	-73.981669	8.90
13	Manhattan	East Harlem	40.792249	-73.944182	8.90
7	Staten Island	Chelsea	40.594726	-74.189560	8.90
6	Manhattan	Chelsea	40.744035	-74.003116	8.90
19	Manhattan	Lower East Side	40.717807	-73.980890	8.85

2. Manhattan, Brooklyn and Bronx are the best Borough for French cuisine and The Queens and Staten Island have few French restaurant.
3. Manhattan have the best potential French Restaurant Market.
4. Brooklyn has the best likes and ratings for French Restaurants.
5. Both Manhattan and Brooklyn are the best place to stay if you prefer French Cuisine.

Conclusion:

There is always room for improvement and hence the above solution I have provided can also be improved for best results depending on the data we have.