

# Final Report

## Capstone Project - The Battle of the Neighbourhoods

### Introduction:

New York is known as a “melting pot” of cultures and communities due to it being a key port for immigration. This has led to New York being the most linguistically diverse cities with as many as 800 languages spoken throughout.

This analysis will focus on the most populous county in New York State, Brooklyn. With around 2.5million residents, the borough maintains a distinct culture with many neighbourhoods being ethnic enclaves. Brooklyn has dozens of neighbourhoods that represent many of the major culturally identified groups of New York City and such a diverse culture brings a huge variety in restaurant cuisines, from Mexican food trucks, to your Italian family-owned restaurants. You definitely want to make sure you're getting the best Mexican food in the area, so one thing is key...location, location, location!

This project aims to analyse current Mexican restaurants in Brooklyn to determine which is the best neighbourhood for the client - a food blogger who has travelled to Brooklyn to write a report on Mexican cuisine.

### The Problem:

I will attempt to find answers to the following questions by firstly listing and visualising neighbourhoods of Brooklyn that have excellent Mexican restaurants.

1. What neighbourhoods have the most Mexican restaurants in Brooklyn?
2. Which areas lack Mexican restaurants?
3. What is the best area to live/stay in if you want to try the most highly rated Mexican restaurants in Brooklyn?

### Data Sources:

With Brooklyn’s ever-growing population and diversity in cultures there is significant variety in cuisines and restaurants. For this project I will use the following data sources:

- New York City data containing Boroughs and Neighbourhoods as well as latitude and longitude.
  - Data source: [https://cocl.us/new\\_york\\_dataset](https://cocl.us/new_york_dataset)
  - This dataset contains the information detailed above and will be used as the starting point to explore Brooklyn.
- Mexican restaurants for Brooklyn by neighbourhood
  - Data source: Foursquare API
  - This will provide information about all venues including name, location, menu, and photos. This will be the main data source as the information on Mexican restaurants will be available from this.

## Methodology:

### 1. I will begin by collecting New York City data from [https://cocl.us/new\\_york\\_dataset](https://cocl.us/new_york_dataset)

```
In [3]: def get_new_york_data():
        url='https://cocl.us/new_york_dataset'
        resp=requests.get(url).json()
        features=resp['features']

        #define columns
        column_names = ['Borough','Neighborhood','Latitude','Longitude']

        new_york_data = pd.DataFrame(columns=column_names)

        for data in features:
            borough = data['properties']['borough']
            neighborhood_name = data['properties']['name']

            neighborhood_latlon = data['geometry']['coordinates']
            neighborhood_lat = neighborhood_latlon[1]
            neighborhood_lon = neighborhood_latlon[0]

            new_york_data = new_york_data.append({'Borough': borough,
                                                  'Neighborhood': neighborhood_name,
                                                  'Latitude': neighborhood_lat,
                                                  'Longitude': neighborhood_lon}, ignore_index=True)

        return new_york_data
```

```
In [4]: new_york_data=get_new_york_data()
        new_york_data.head()
```

```
Out[4]:
```

	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

### 2. Filter this data to just the Brooklyn borough.

There are 306 neighbourhoods in New York, but I want to cut this down so that I only have neighborhoods in Brooklyn

```
In [6]: brooklyn = new_york_data[new_york_data['Borough']=='Brooklyn'].reset_index(drop=True)
        brooklyn.head()
```

```
Out[6]:
```

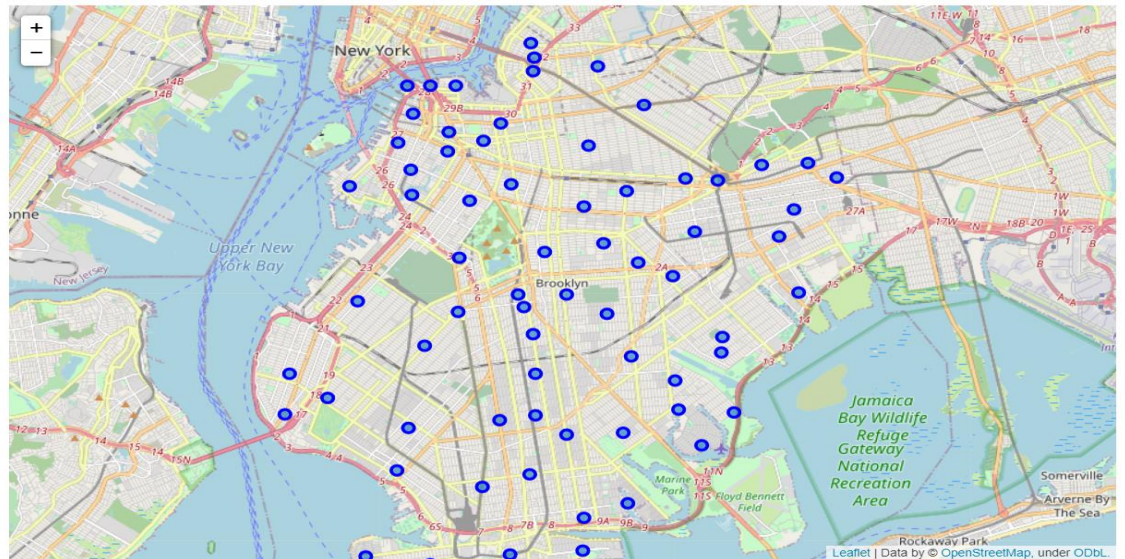
	Borough	Neighborhood	Latitude	Longitude
0	Brooklyn	Bay Ridge	40.625801	-74.030621
1	Brooklyn	Bensonhurst	40.611009	-73.995180
2	Brooklyn	Sunset Park	40.645103	-74.010316
3	Brooklyn	Greenpoint	40.730201	-73.954241
4	Brooklyn	Gravesend	40.595260	-73.973471

```
In [7]: brooklyn.shape
```

```
Out[7]: (70, 4)
```

As we can see, there are 70 neighbourhoods in Brooklyn.

Out[9]:



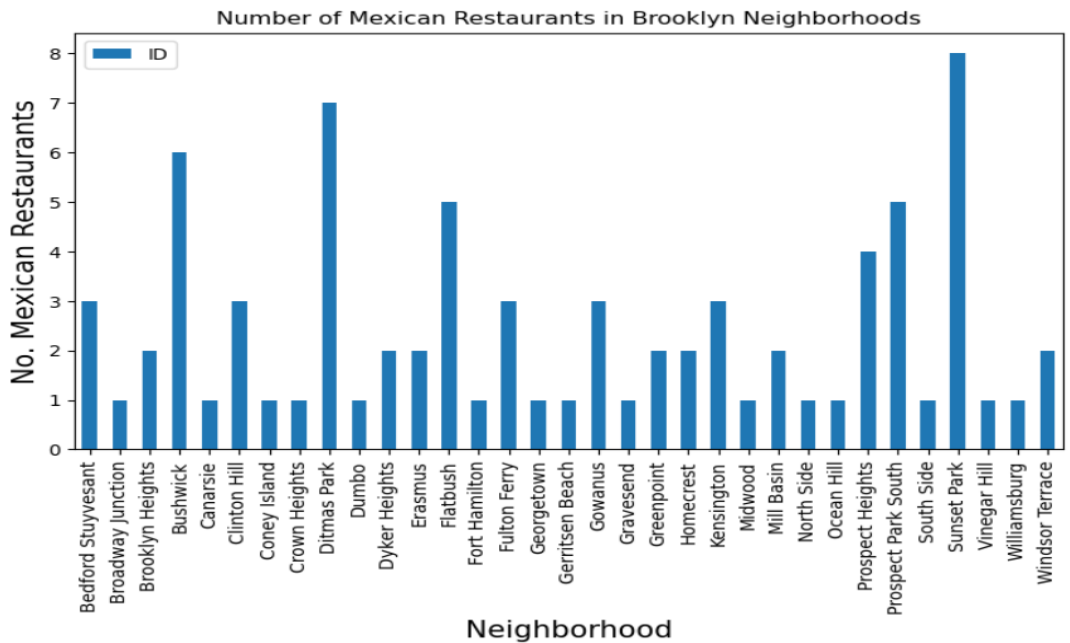
The map above is showing all the neighbourhoods in Brooklyn. Now that we have this information, we can start utilising Foursquare API to explore the neighbourhoods and segment them.

3. Find all venues for each neighbourhood in Brooklyn using Foursquare API.
4. Filter this data to just Mexican restaurants.

```
In [13]: column_names=['Borough', 'Neighborhood', 'ID','Name']
mexican_venues=pd.DataFrame(columns=column_names)
count=1
for row in brooklyn.values.tolist():
    Borough, Neighborhood, Latitude, Longitude=row
    venues = get_venues(Latitude,Longitude)
    mexican_restaurants=venues[venues['Category']=='Mexican Restaurant']
    print('{',count,'/',len(brooklyn),'}','Mexican Restaurants in '+Neighborhood+', '+Borough+' :'+str(len(mexican_restaurants)))
    for restaurant_detail in mexican_restaurants.values.tolist():
        id, name , category=restaurant_detail
        mexican_venues = mexican_venues.append({'Borough': Borough,
                                                'Neighborhood': Neighborhood,
                                                'ID': id,
                                                'Name' : name
                                                }, ignore_index=True)
    count+=1

( 1 / 70 ) Mexican Restaurants in Bay Ridge, Brooklyn:0
( 2 / 70 ) Mexican Restaurants in Bensonhurst, Brooklyn:0
( 3 / 70 ) Mexican Restaurants in Sunset Park, Brooklyn:8
( 4 / 70 ) Mexican Restaurants in Greenpoint, Brooklyn:2
( 5 / 70 ) Mexican Restaurants in Gravesend, Brooklyn:1
( 6 / 70 ) Mexican Restaurants in Brighton Beach, Brooklyn:0
( 7 / 70 ) Mexican Restaurants in Sheepshead Bay, Brooklyn:0
( 8 / 70 ) Mexican Restaurants in Manhattan Terrace, Brooklyn:0
( 9 / 70 ) Mexican Restaurants in Flatbush, Brooklyn:5
( 10 / 70 ) Mexican Restaurants in Crown Heights, Brooklyn:1
```

Here I made a call to Foursquare to retrieve the number of restaurants in Brooklyn that were classified as Mexican Restaurants. The results showed that there were 79 Mexican restaurants across the 70 neighbourhoods. I displayed the results in a bar chart to highlight the neighbourhoods with the most Mexican restaurants, and those with the fewest.



By looking at this chart, without taking any ratings or tips into account, Sunset Park and Ditmas Park have the highest number of Mexican restaurants in Brooklyn. Therefore, if you wanted to stay in Brooklyn close to multiple Mexican restaurants, Sunset Park or Ditmas Park would be a good place to stay. Or if you were to open a Mexican restaurant with a common Mexican restaurant scene, they might be a good place to start.

If you were to open a Mexican restaurant in Brooklyn, and you wanted to open in an area with a small Mexican restaurant scene you might look to areas such as Williamsburg, Canarsie, or Georgetown to name a few, where there is only 1 Mexican restaurant in that neighbourhood.

Now we want a better idea of whether these restaurants are any good.

- Using Foursquare API, I will collect Ratings, Tips, and Likes for all Mexican restaurants in Brooklyn.

Out[18]:

	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
0	Brooklyn	Sunset Park	49bc364ff964a5201f541fe3	Tacos Matamoros	131	8.2	61
1	Brooklyn	Sunset Park	4b5415ecf964a520d3b127e3	Ricos Tacos	38	7.5	38
2	Brooklyn	Sunset Park	4b5cff55f964a520424e29e3	Maria's Bistro Mexicano	88	8.7	41
3	Brooklyn	Sunset Park	4c9521df82b56dcbc5fbd5aa	Tacos El Bronco	176	8.7	46
4	Brooklyn	Sunset Park	55a85c0f498ee3c735f1fa8d	Jalapeño Restaurant	5	7.4	2

I decided to interrogate this information a bit more and identified the restaurants with the highest likes, rating, and tips.

```
In [30]: #Most Likes
mexican_ratings.iloc[mexican_ratings['Likes'].idxmax()]
```

```
Out[30]: Borough          Brooklyn
Neighborhood      Brooklyn Heights
ID                4f69f2b76d86f87117bb13ab
Name              Gran Eléctrica
Likes              640
Rating             8.6
Tips              199
Name: 37, dtype: object
```

```
In [31]: #Highest rating
mexican_ratings.iloc[mexican_ratings['Rating'].idxmax()]
```

```
Out[31]: Borough          Brooklyn
Neighborhood      Gowanus
ID                4a88784bf964a520900620e3
Name              Reyes Deli & Grocery
Likes              142
Rating             9.2
Tips              39
Name: 38, dtype: object
```

```
In [32]: #Most tips
mexican_ratings.iloc[mexican_ratings['Tips'].idxmax()]
```

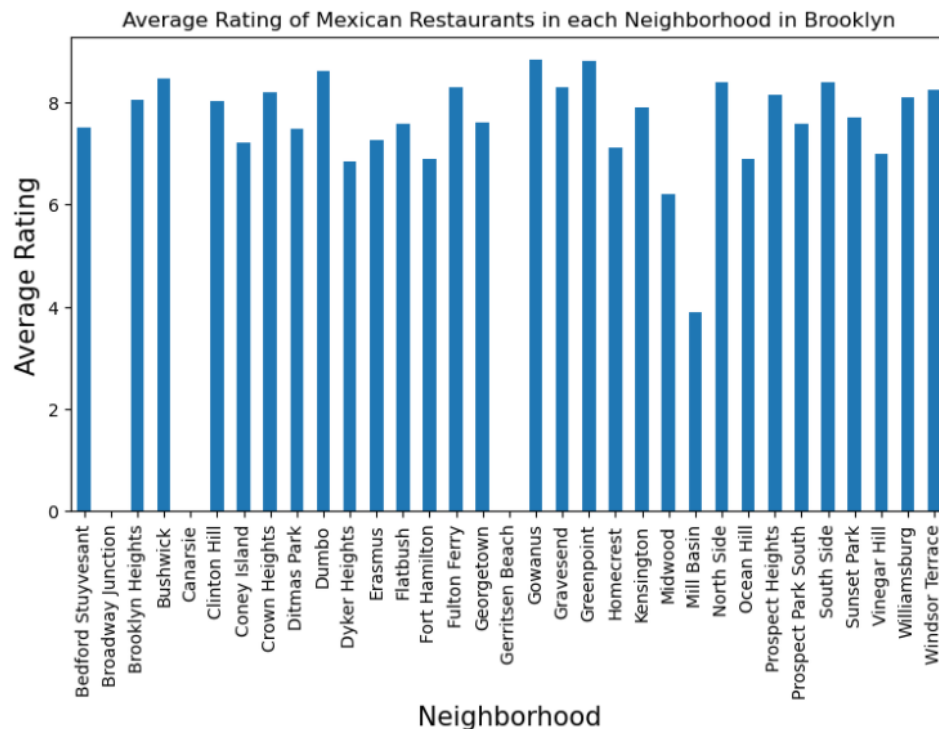
```
Out[32]: Borough          Brooklyn
Neighborhood      Brooklyn Heights
ID                4f69f2b76d86f87117bb13ab
Name              Gran Eléctrica
Likes              640
Rating             8.6
Tips              199
Name: 37, dtype: object
```

The results were very interesting. The areas that ranked the highest were not in the top 2 neighbourhoods for quantity of Mexican restaurants. The data also shows that Gran Electrica in Brooklyn Heights is the place to be if you're looking at the number of likes and tips. However, the highest ranking is Reyes Deli & Grocery in Gowanus.

- I will sort neighbourhoods with Ratings as the constraint.

```
Out[34]:
```

	Neighborhood	Average Rating
17	Gowanus	8.833333
19	Greenpoint	8.800000
9	Dumbo	8.600000
3	Bushwick	8.466667
28	South Side	8.400000
24	North Side	8.400000
18	Gravesend	8.300000
14	Fulton Ferry	8.300000
32	Windsor Terrace	8.250000
7	Crown Heights	8.200000



From this graph we could easily see that some neighbourhoods had no data, this is likely due to there being no ratings.

- I will then consider all neighbourhoods that have a Mexican restaurant with an average rating of  $\geq 8.0$ .

Out[38]:

	Neighborhood	Average Rating
2	Brooklyn Heights	8.050000
3	Bushwick	8.466667
5	Clinton Hill	8.033333
7	Crown Heights	8.200000
9	Dumbo	8.600000

The reason for 8.0 and above was due to the above graph. It is likely if you are flexible on area, you would want to go to a restaurant with a higher than average rating. This reduced the data significantly down to 13 neighbourhoods with an average rating of  $\geq 8.0$ .

- I will join this data to the Brooklyn dataset to retrieve location data.

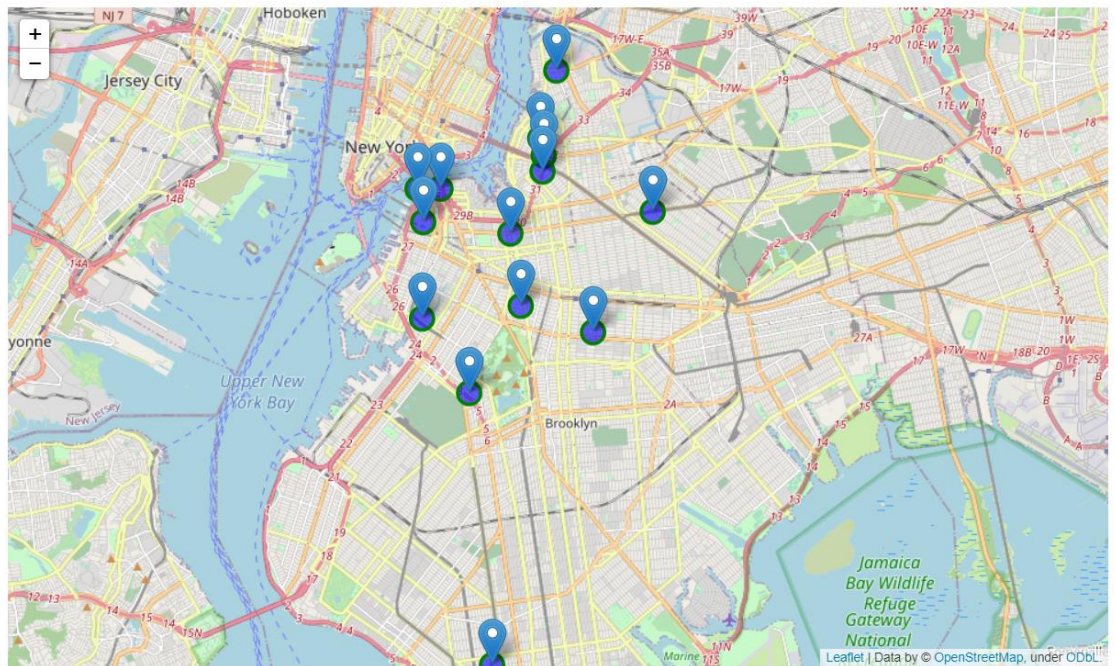


Out[41]:

	Borough	Neighborhood	Latitude	Longitude	Average Rating
0	Brooklyn	Brooklyn Heights	40.695864	-73.993782	8.050000
1	Brooklyn	Bushwick	40.698116	-73.925258	8.466667
2	Brooklyn	Clinton Hill	40.693229	-73.967843	8.033333
3	Brooklyn	Crown Heights	40.670829	-73.943291	8.200000
4	Brooklyn	Dumbo	40.703176	-73.988753	8.600000
5	Brooklyn	Fulton Ferry	40.703281	-73.995508	8.300000
6	Brooklyn	Gowanus	40.673931	-73.994441	8.833333
7	Brooklyn	Gravesend	40.595260	-73.973471	8.300000
8	Brooklyn	Greenpoint	40.730201	-73.954241	8.800000
9	Brooklyn	North Side	40.714823	-73.958809	8.400000
10	Brooklyn	Prospect Heights	40.676822	-73.964859	8.150000
11	Brooklyn	South Side	40.710861	-73.958001	8.400000
12	Brooklyn	Williamsburg	40.707144	-73.958115	8.100000
13	Brooklyn	Windsor Terrace	40.656946	-73.980073	8.250000

9. Finally, I will use Folium to display the neighbourhoods with the average Mexican restaurant rating  $\geq 8.0$ .

Out[46]:



## Results:

Now I can answer the questions that I asked at the beginning:

*What neighbourhoods have the most Mexican restaurants in Brooklyn?*

Sunset Park and Ditmas Park have the most Mexican restaurants with a total of 8 and 7 respectively.

*Which areas lack Mexican restaurants?*

There are some areas of Brooklyn with no Mexican restaurants such as Brownsville or Rugby. However, there are many with just 1 such as Williamsburg, Broadway Junction, and Georgetown.

*What is the best area to live/stay in if you want to try the most highly rated Mexican restaurants in Brooklyn?*

Looking at the map, the best neighbourhood would be Gowanus with an average rating of 8.83. However, Gran Electrica in Brooklyn Heights has the highest number of tips and likes.

### **Conclusion:**

For the food blogger in Brooklyn I would recommend visiting Reyes Deli & Grocery in Gowanus, Brooklyn for the most highly rated Mexican restaurant in Brooklyn. However, there is always room for improvement and the above solution can be developed depending on additional data sources.