

**Explore and visualize all borough and neighborhoods that
has great middle eastern food and dishes.**

Final Report

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April 28, 2019

1. Introduction

1.1 Background

New York city is largest city in the US. New York is also the most populated city in the country. According to the “worldpopulationreview.com” web site New York population in 2019 reached 19.88 million. With such a diverse population, people from all races live in the state of New York, and different ethnic identities have make a rich culture diversity in the city. New York officials reports that over 200 nationalities were be a part of New York.

With its diverse culture and nationalities, comes diverse food dishes. There are many restaurants in New York city, each belongs to different race and ethnics like middle eastern, Italian, French, German, Chinese, Indian etc.

1.2 Problem

So, as for this project, we will search, explore and visualize all borough and neighborhoods that has great middle eastern food and dishes.

2. Data Sources and Description

2.1 Data Source

- **New York city data sets**

Data Set: https://cocl.us/new_york_dataset

Data Description: This data set is a json file contains boroughs and neighborhoods of New York city. We use this data to dive and explore different neighborhoods in New York city

- **Foursquare API data**

Data Set: Foursquare API

Data Description: we will use this Foursquare API to fetch all venues and places in each neighborhood. By filtering the results and get only middle eastern restaurants

- **GeoSpace Data**

Data Set: <https://data.cityofnewyork.us/City-Government/Borough-Boundaries/tqmj-j8zm>

Data Description: using this data to create a choropleth map New York borough boundary. This map will visualize the results of top middle east restaurants in New York neighborhoods

3. Work methodology (Our approach to use the Data)

The following steps shows our work flow:

- Fetching and storing the new York city data set from https://cocl.us/new_york_dataset
- Using API Foursquare to explore and find all Venus for each neighborhood
- Filtering the API Foursquare results to contain only Middle east results
- Searching for tips, ratings and likes using API Foursquare for each result
- Sorting the results by ratings, likes, tips and visualize these results using histogram or other suitable plotting techniques.
- Use the Geospatial Data a Choropleth map to visualize the ranks of neighborhood using folium Python library

4. Exploratory Data Analysis

4.1 Getting the New York data

We download the data set and stored into panda frame. Then we create horizontal histogram plot to display Number of Neighborhood for each Borough in New York City as it illustrated on the following figures

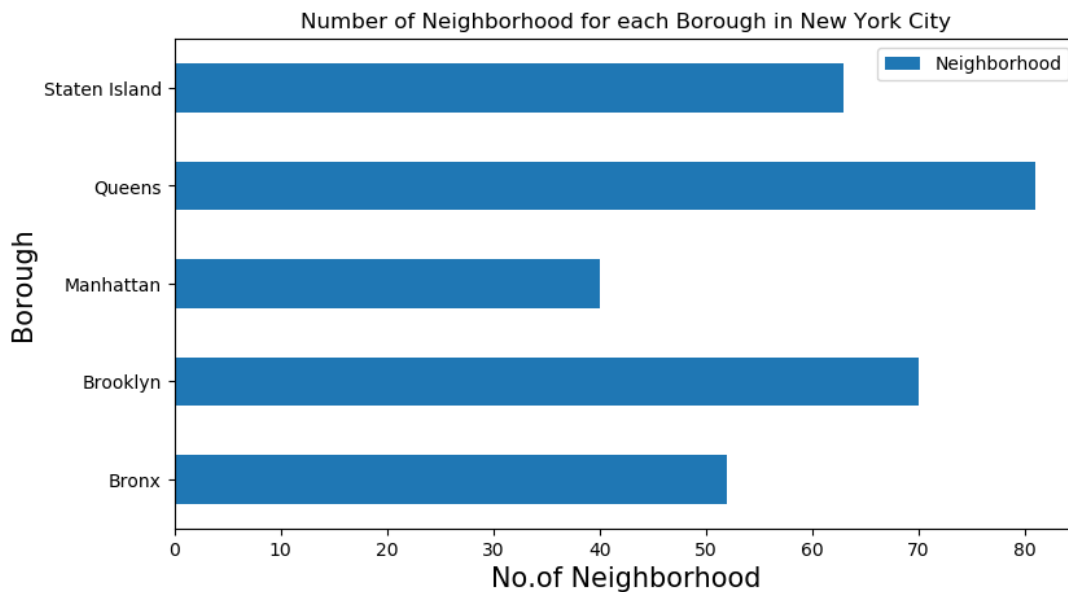
```
In [7]: new_york_data.head()
```

```
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 [10]: new_york_data.shape
```

```
Out[10]: (306, 4)
```



4.2 Searching boroughs and neighborhoods that contains middle eastern restaurants

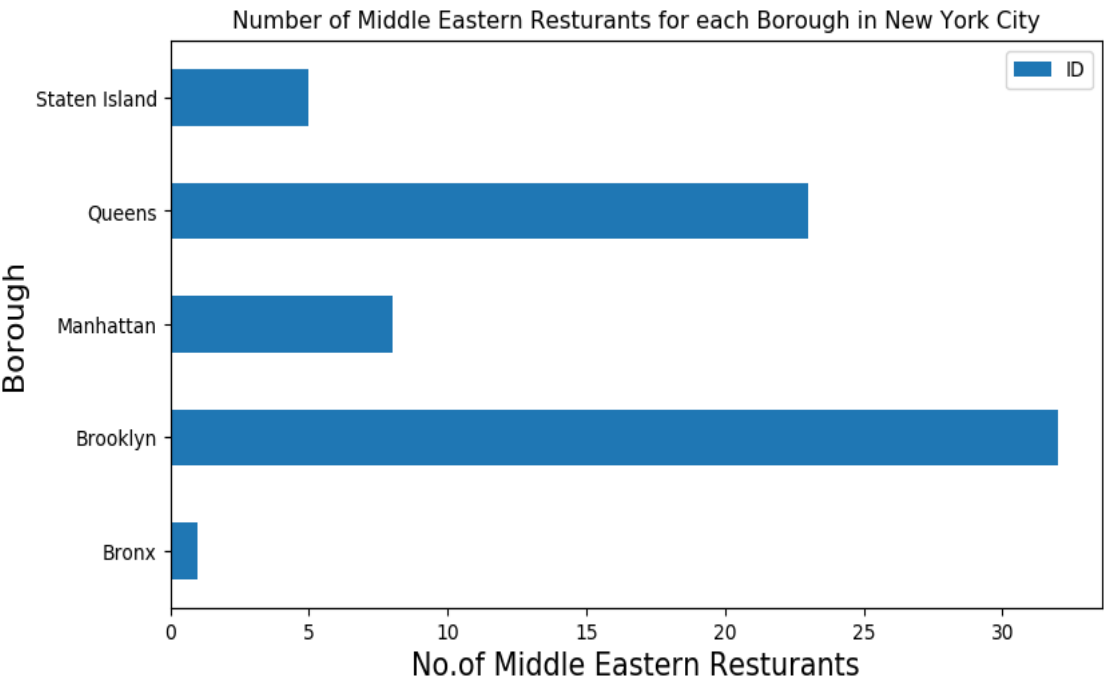
Using the Foursquare API along with New York data we create panda data frame of all middle eastern restaurants in New York boroughs and neighbors, also we histogram the number of restaurants in each borough and neighborhoods as it illustrated in the following figure. We found 69 middle eastern restaurants.

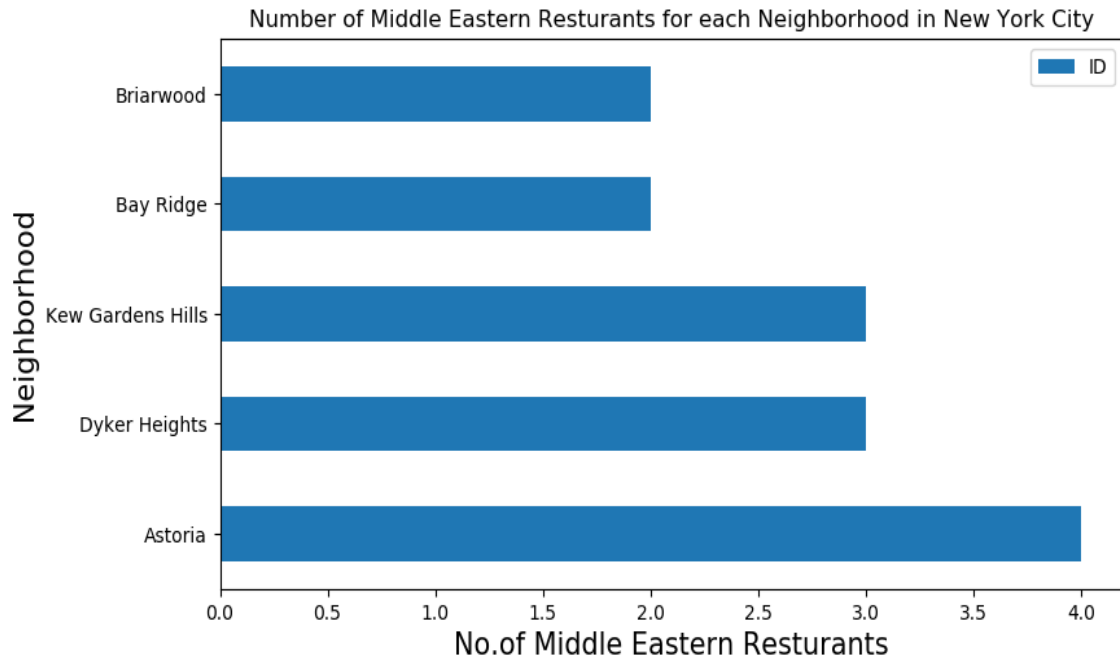
Out[10]:

	Borough	Neighborhood	ID	Name
0	Bronx	Morris Heights	4b298f71f964a520eba024e3	Golan Heights
1	Brooklyn	Bay Ridge	4b6785d6f964a520aa532be3	Karam
2	Brooklyn	Bay Ridge	58bee70d5804ea784f84ad53	Ruzana
3	Brooklyn	Manhattan Terrace	4cd2f57125ee6dcb7054470f	Aksaray Gyro
4	Brooklyn	Flatbush	4d90d33b5091a1cdf601c401	Gyro King

```
In [11]: middle_eastern_ny_rest.shape
```

Out[11]: (69, 4)





4.3 Prepare list that contains middle eastern restaurants with user likes, tips, and ratings

Also from the API Foursquare we retrieved the likes, ratings and tips for each restaurants as it illustrated in the following figure

Out[51]:

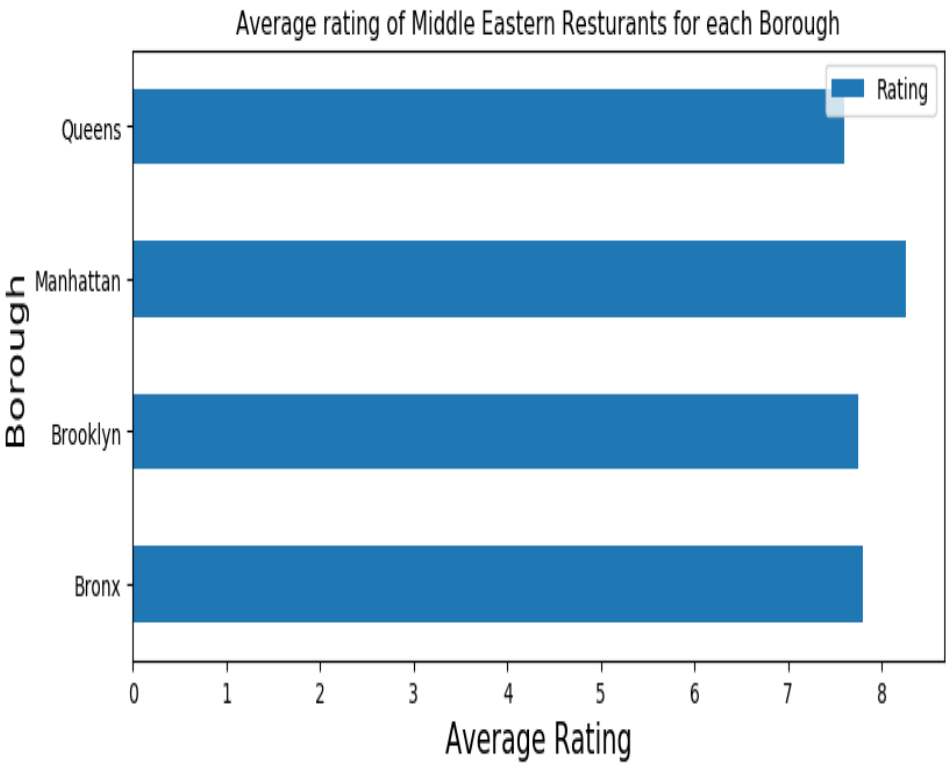
	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
0	Bronx	Morris Heights	4b298f71f964a520eba024e3	Golan Heights	20	7.8	10
1	Brooklyn	Bay Ridge	4b6785d6f964a520aa532be3	Karam	66	8.8	36
2	Brooklyn	Bay Ridge	58bee70d5804ea784f84ad53	Ruzana	9	7.7	4
3	Brooklyn	Manhattan Terrace	4cd2f57125ee6dcb7054470f	Aksaray Gyro	12	7.3	1
4	Brooklyn	Flatbush	4d90d33b5091a1cdf601c401	Gyro King	12	7.7	6

4.4 Find the average rate for middle eastern restaurants and create a list of top averaged restaurants

We calculate the mean (rating) for the retrieved restaurant in order to find the average rating for the restaurants and create a list of top restaurants as it illustrated in the following figure. We discovered that the average rating is eight

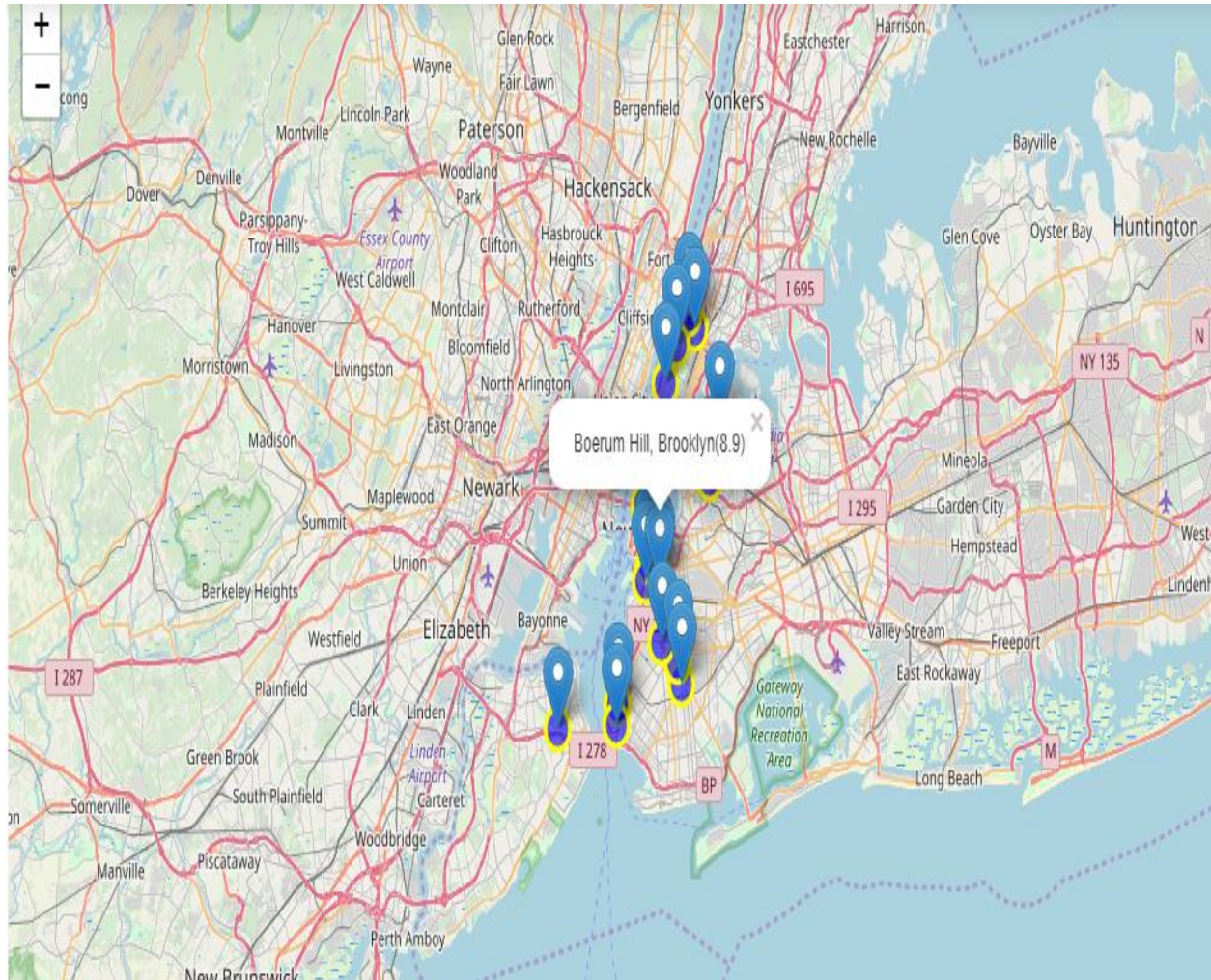
Out[81]:

	Neighborhood	Average Rating	Borough_x	Latitude_x	Longitude_x	Borough_y	Latitude_y	Longitude_y
0	Astoria	8.00	Queens	40.768509	-73.915654	Queens	40.768509	-73.915654
1	Bay Ridge	8.25	Brooklyn	40.625801	-74.030621	Brooklyn	40.625801	-74.030621
2	Boerum Hill	8.90	Brooklyn	40.685683	-73.983748	Brooklyn	40.685683	-73.983748
3	Brooklyn Heights	8.65	Brooklyn	40.695864	-73.993782	Brooklyn	40.695864	-73.993782
4	Central Harlem	8.10	Manhattan	40.815976	-73.943211	Manhattan	40.815976	-73.943211



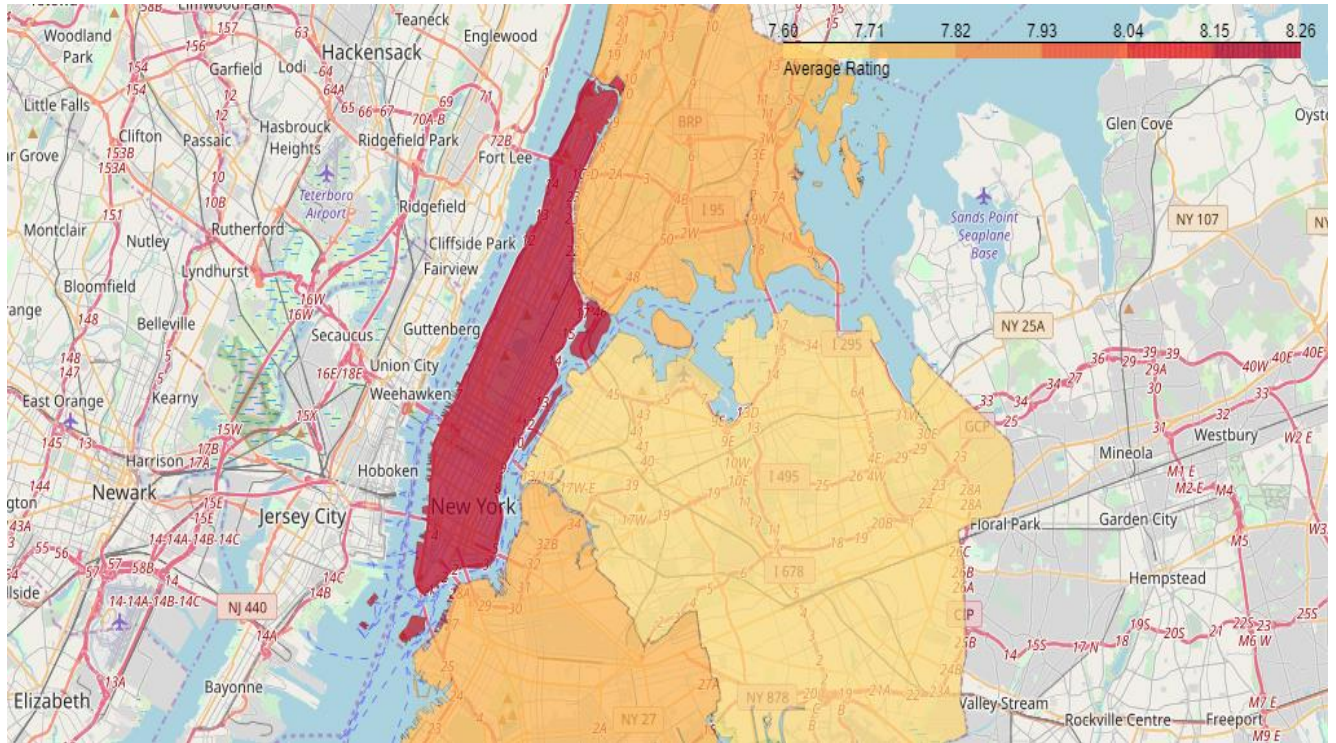
4.5 Create a map with pop-up text for the top averaged restaurants

After creating the top middle eastern restaurants. We create a map (using folium library) with pop-up text that shows these restaurants as it illustrated in the following figure



4.6 Create choropleth map that shows the boundaries for the averaged restaurants and ratings

Using the geo location library for New York city, we create choropleth map shows the boroughs boundaries for middle eastern restaurants along with the average rating as it illustrated in the following figure



5. Conclusion

In this project, I explored the New York boroughs and neighborhoods to find top rated middle eastern restaurants. I used free limited Foursquare API to fetch the required categories (likes, ratings, tips). With API Foursquare data and New York data set, I retrieved all the boroughs and neighborhoods. This method can be useful to discovering new places before we decide to go or even to open new business.

6. Future Directions

I was being able to explore and discover New York boroughs and neighborhoods using location data. This technique and data sets can give much opportunities and hopes to persons, companies to start their business, start-up projects, travel destinations. We need more physical data to improve our results and accuracy of data.

Also we can use clustering techniques to compare different New York boroughs and neighborhoods based on financial and other related data (medical, population, crime rates, etc.)

