Data Science Capstone Project – Italian Restaurants in New York City

Introduction/Business Problem

New York City has the largest population of Italian Americans in the United States of America and one of the most vibrant 'Little Italy' communities in North America. Over 1.3 million Italians and Italian-Americans live in the greater New York City metro area, with about 800,000 living within one of the five New York City boroughs. Many residents of New York and tourists alike explore New York City to try the authentic Italian Cuisine. The Tourism industry in New York is especially big, with a record high of 62.8 million tourists recorded in 2017. One of the questions a tourist may face is with a limited time to spend in the city, what are the best restaurants to dine at? In particular, which neighbourhood and restaurant should one visit for the best authentic Italian cuisine?

In this report, we seek to find the best Italian restaurants in New York using a data driven analysis of ratings and customer sentiments towards various Italian restaurants. The target audience for this data analysis is both restaurant customers and tourists as well as stakeholders of the restaurant & hospitality industry, and tourism industry.

We will dive into the data by first visualizing the major parts of New York City that have Italian restaurants. We will then find the best location in NYC for Italian Cuisine, and find the highest rated restaurant and neighborhood for Italian Cuisine.

Data

The data we will use to conduct this analysis is information on New York Boroughs and Neighborhoods, as well as Italian restaurant listings and ratings.
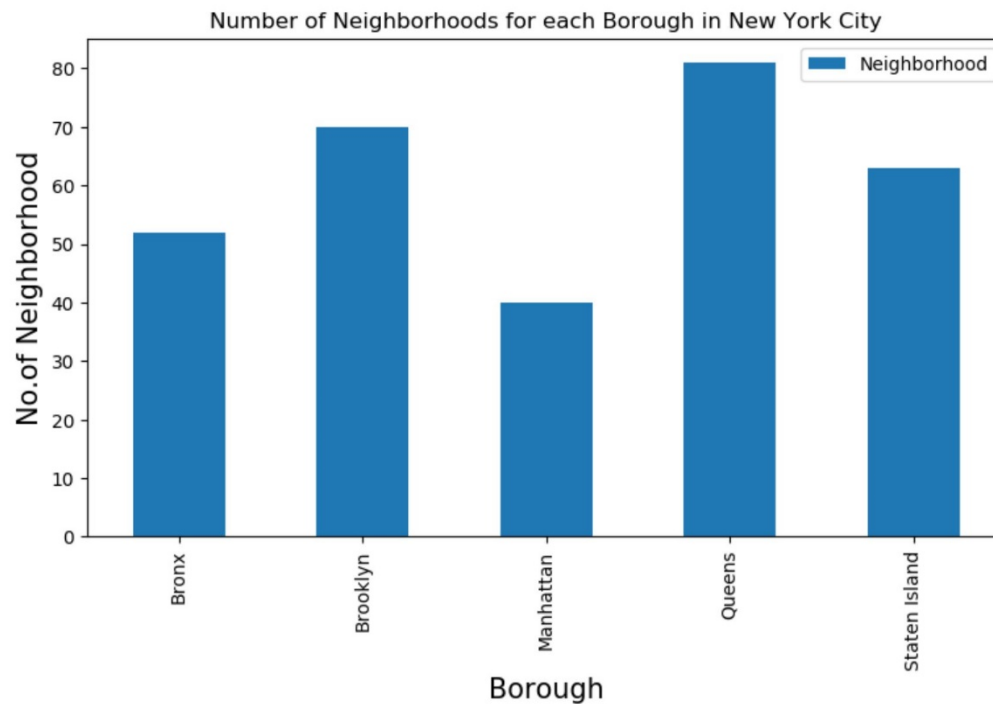
The Data will be sourced from:

1. Dataset on New York City containing a list of Boroughs, Neighborhoods, and their Latitude and Longitude Coordinates:
   Data set = https://cocl.us/new_york_dataset

2. The Foursquare API will provide data on all the Italian restaurants in New York City neighborhoods.

Methodology

To get a visualization of the number of neighborhoods per borough in New York City, we can plot the NYC data set using a bar plot from the matplotlib library in python.
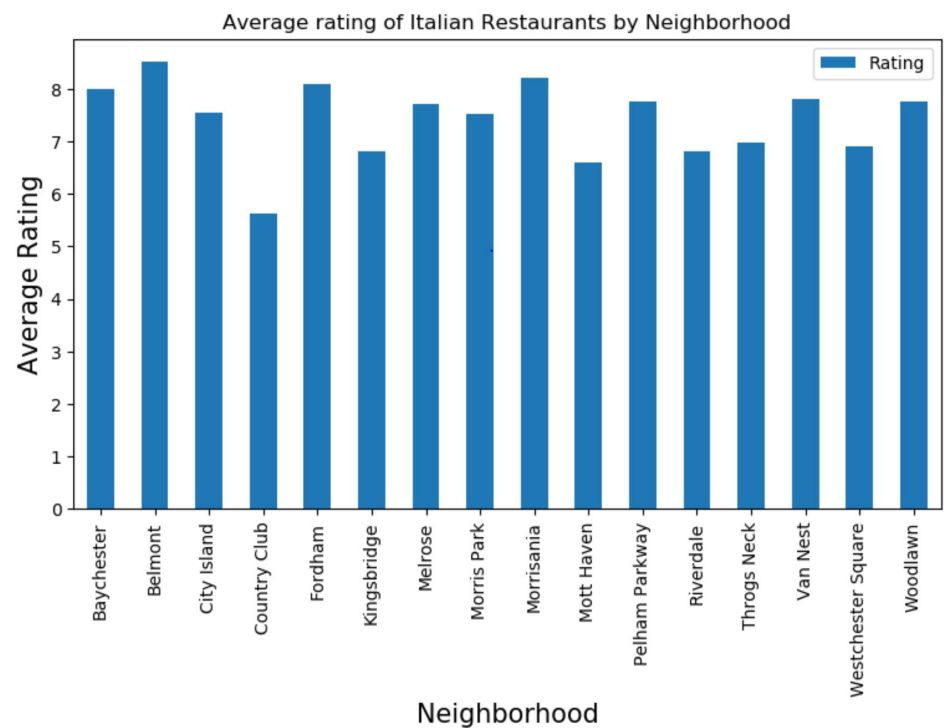
We then use the folium library to visualize the density of Italian Restaurants in New York City:

To get a visualization of the number of Italian restaurants grouped by neighborhood in New York City, we use the Foursquare data and filter for 'Italian Restaurants', then show the data using a bar plot from the matplotlib library in python.

For more specific analysis of restaurant ratings, we can plot the average rating of Italian restaurants by neighborhood in NYC:

Average rating of Italian Restaurants by Neighborhood

More specific analysis yields a table sorted for Borough, Neighborhood, Restaurant Name, Restaurant Likes, Ratings, and Tips. The example below shows the Bronx borough and the first 5 restaurants with listed likes, ratings, and tips. We want to find the highest rated Italian restaurant in NYC.

	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
0	Bronx	Riverdale	55aaee4d498e3cbb70e625d6	Bella Notte Pizzeria	9	6.8	4
1	Bronx	Kingsbridge	55aaee4d498e3cbb70e625d6	Bella Notte Pizzeria	9	6.8	4
2	Bronx	Woodlawn	511edb6de4b0d58346fd272d	Patrizia's Of Woodlawn	18	8.6	14
3	Bronx	Woodlawn	4d3cb3026b3d236a066a6364	Rivers Edge	10	6.9	8
4	Bronx	Baychester	4c9518076b35a143d5dc21dc	Fratelli's	22	8.7	6

Results

We find that the highest rated restaurants in New York City are located in the Belmont neighborhood, with an average rating of 8.51 for all Italian restaurants.

	Neighborhood	Average Rating
1	Belmont	8.514286
8	Morrisania	8.200000
4	Fordham	8.077778
0	Baychester	8.000000
13	Van Nest	7.800000
10	Pelham Parkway	7.766667
15	Woodlawn	7.750000
6	Melrose	7.700000
2	City Island	7.533333
7	Morris Park	7.520000

Then, more specifically, we wish to know which is the highest rated Italian Restaurant in Belmont to dine at. We list the restaurants:

	Borough	Neighborhood	ID	Name
43	Bronx	Belmont	4acf80aef964a52025d420e3	Tino's Delicatessen
44	Bronx	Belmont	4bb6470cef159c7465b275f7	Calabria Pork Store
45	Bronx	Belmont	4af0fa29f964a52060e021e3	Antonio's Trattoria
46	Bronx	Belmont	4a8e261cf964a5201c1220e3	Roberto's
47	Bronx	Belmont	4af71916f964a520cf0522e3	Michaelangelo's Coal Fired Brick Oven Pizza Re...
48	Bronx	Belmont	4b5a4c8ff964a52049bb28e3	Emilia's Restaurant
49	Bronx	Belmont	59050f51b23dfa5f6649e678	Arthur Avenue Fiasco
50	Bronx	Belmont	4aa425bef964a5208e4520e3	Dominick's Restaurant
51	Bronx	Belmont	4c79d294278eb713f6a05580	Cafe al Mercato
52	Bronx	Belmont	4bc22a22920eb713bcc51b2c	Tra Di Noi
53	Bronx	Belmont	4aa193d5f964a520124120e3	Mario's Restaurant & Catering
54	Bronx	Belmont	4b5514c4f964a5207cda27e3	Enzo's
55	Bronx	Belmont	4cb0d382ef1b370419643e00	David Greco's Arthur Avenue Trattoria
56	Bronx	Belmont	53ff939c498e6b601dfa3979	San Gennaro Ristorante
57	Bronx	Belmont	4b5bc595f964a520431529e3	Pasquale Riggaletto's

Then we filter for the highest rating:

```
1  # Restaurant with the highest rating
2  italian_rest_stats_ny.iloc[italian_rest_stats_ny['Rating'].idxmax()]
```

```
Name              Tino's Delicatessen
Likes                            145
Rating                           9.2
Tips                              48
```

We find the highest rated restaurant is ***Tino's Delicatessen*** with a rating of 9.2, located in Belmonte.

Discussion

Through analysis of neighborhood data and foursquare data we have access to a list of Italian restaurants in New York and their ratings. By clustering and segmenting the data, we find that Belmont of The Bronx is the neighborhood in all of NYC with the most Italian Restaurants. We then find the highest rated restaurant is Tino's Delicatessen with a rating of 9.2, which is located in Belmont. In the future, a more thorough analysis would consist of using multiple datasets beyond just the Foursquare data set.

Conclusion

Our goal was to find the neighborhood with the highest rated Italian restaurants and also the top rated Restaurant in order to make recommendations to tourists and residents of New York City. Through this analysis of Italian Restaurants in New York, we found that the neighborhood with the highest rated restaurants was Belmonte. We also found that the highest rated restaurant was Tino's Delicatessen with a rating of 9.2.