

The Battle of Neighborhoods

Where in New York City should we open an Italian restaurant to have the best chance of being successful?

Where should we go in New York City if we want great Italian food?

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Introduction/Business problem

New York City's demographics show that it is a large and ethnically diverse metropolis, since many people from different cultural atmospheres have brought their families and dreams here, calling it home. It has been a center for trade and economic growth and it is the largest city in the United States. Over the last decade the city has been growing faster than the region. Throughout its history, New York City has 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. And with its diverse culture comes diverse food items. There are many restaurants in New York City, each belonging to different categories like Chinese, Italian, French etc.

So as part of this project we will list and visualize all major parts of New York City that has great Italian restaurants. Additionally, we will attempt to answer the questions:

- Where should we open an Italian restaurant to have the best chance of being successful?
- Where should we go in New York City if we want great Italian food?

What are all the factors we have to take into account:

- Competition in particular location
- Population
- Venue rating, tips, and likes

Finally, who would be interested in this project:

- An investor, who wants to open a new Italian restaurant, or a food chain owner, who wants to expand his business in the great city of New York
- Regular tourist, who wants a great Italian meal while visiting New York City

Data

In order to answer Project questions, data on New York City population, neighborhoods, boroughs to include boundaries, latitude, longitude, restaurants, and restaurant ratings, likes and tips are required:

- New York Population Data which will be used to get to know about the population across the boroughs
data source: https://en.wikipedia.org/wiki/New_York_City
- New York Neighborhood Data which will be used to get to know about the various neighborhoods and boroughs, latitudes, and longitudes
data source: https://cocl.us/new_york_dataset
- Geo-spatial data of the New York to get a better understanding of the neighborhoods in it and their corresponding locations in the Folium map
data source: <https://data.cityofnewyork.us/City-Government/Borough-Boundaries/tqmj-j8zm>
- All data related to locations and quality of Italian restaurants will be obtained via the FourSquare API utilized via the Request library in Python
data source: <https://foursquare.com/>

Methodology

- New York neighborhood data from https://cocl.us/new_york_dataset
- New York population data from https://en.wikipedia.org/wiki/New_York_City
- Borough Boundaries data from <https://data.cityofnewyork.us/City-Government/Borough-Boundaries/tqmj-j8zm>
- Italian Cuisine related data from Foursquare
- Filter the data for the required data acquired from Foursquare which is only about Italian Cuisine.
- Acquire the tips, likes and rating of every restaurant in the neighborhood of New York.
- Visualize the findings using Matplotlib and Folium for better understanding.

Exploratory data analysis

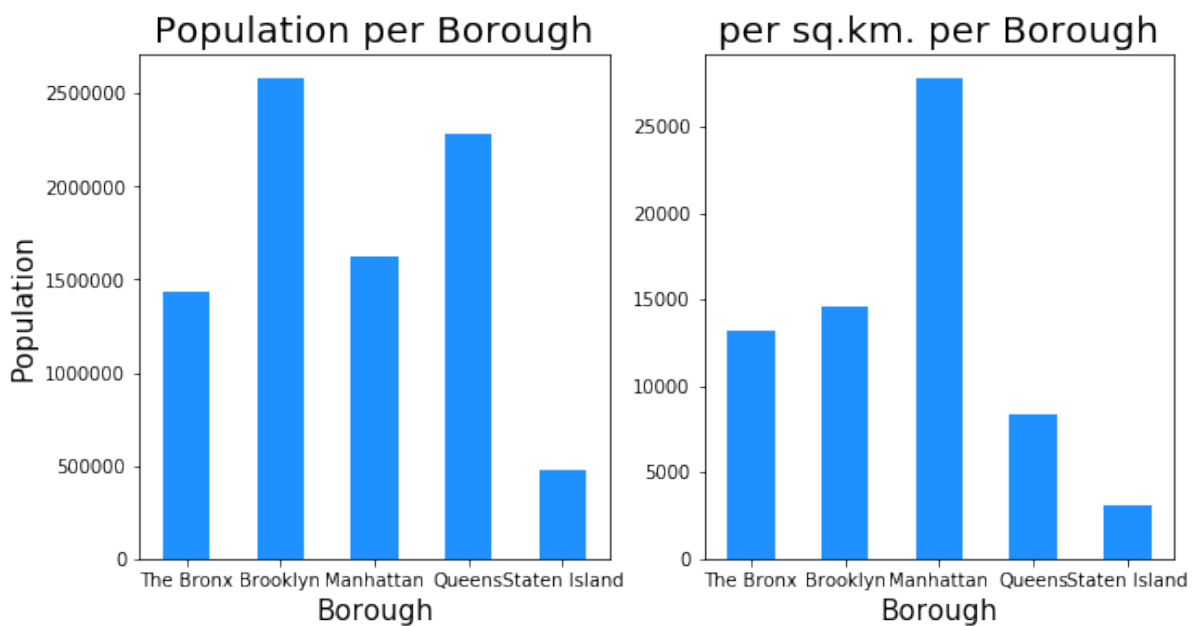
Download, load and transform data into Pandas dataframe

Download and scrape data on New York population

	Borough	Population	Persons_sqkm
0	The Bronx	1432132	13231
1	Brooklyn	2582830	14649
2	Manhattan	1628701	27826

	Borough	Population	Persons_sqkm
3	Queens	2278906	8354
4	Staten Island	476179	3132

Let's visualize data

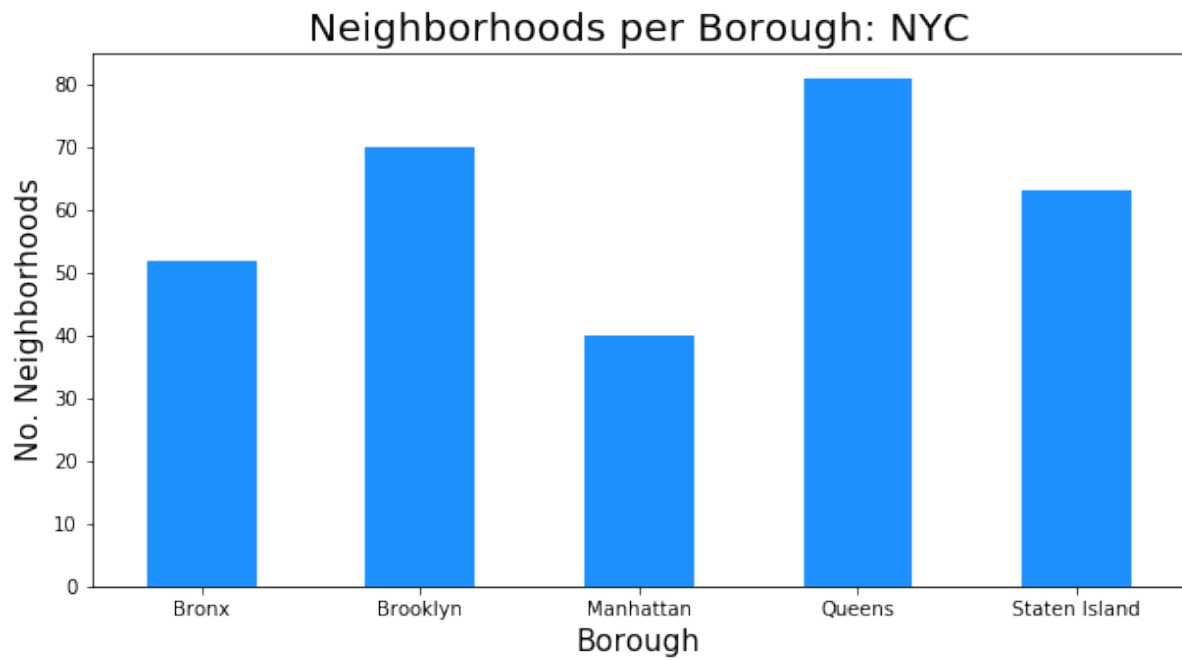


We can see that Brooklyn has highest population per borough, while Manhattan has highest density

Now, let's download and scrape data on New York neighborhoods, boroughs to include boundaries, latitude, longitude, restaurants, and restaurant ratings, likes and tips

	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

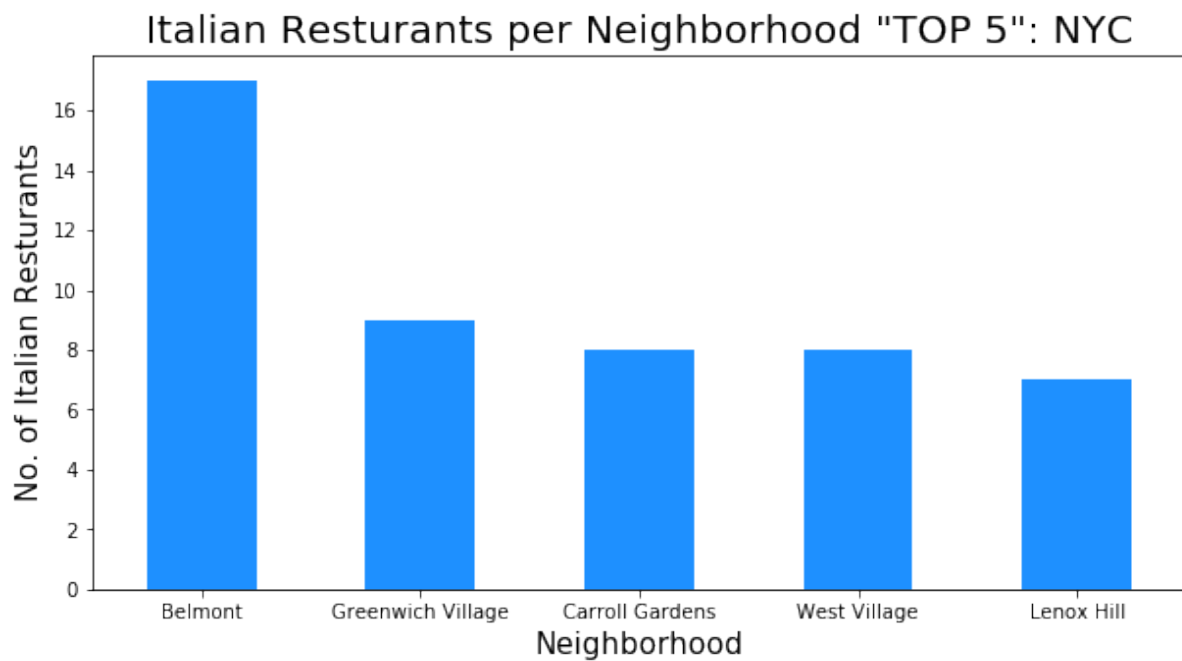
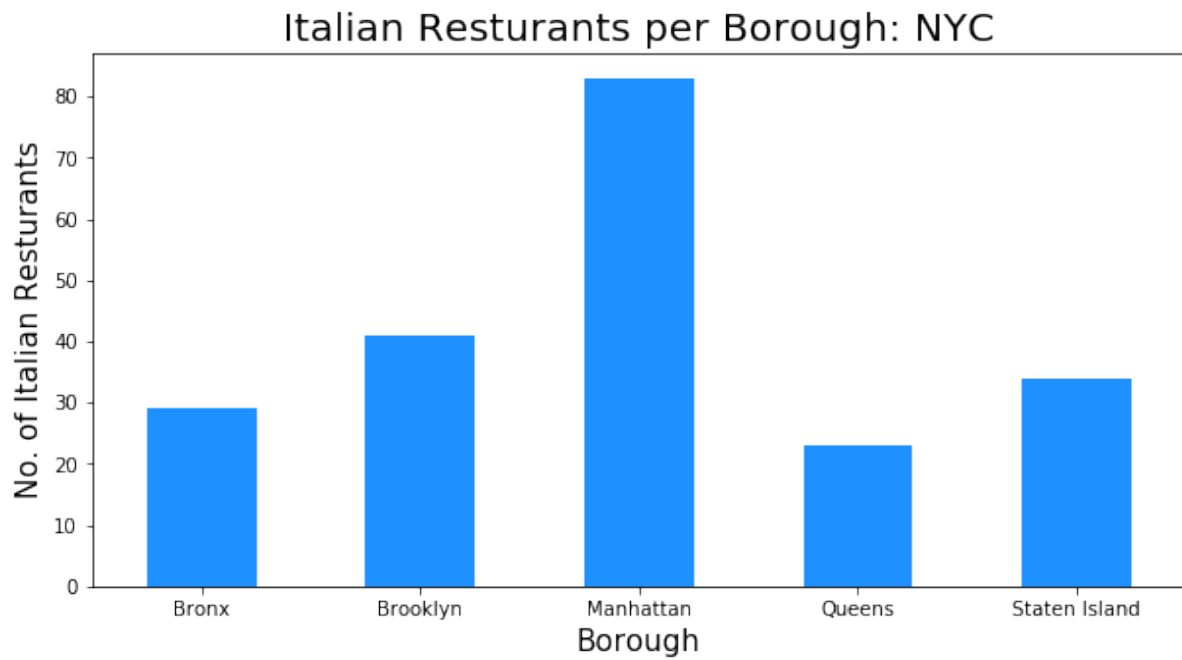
Now that we have our initial data, lets start analyzing it



We can see that Queens has the highest, while Manhattan has the least number of neighborhoods in all five boroughs

Lets analyze further and see how many Italian restaurants there are in each neighborhood and borough and graph the results

	Borough	Neighborhood	ID	Name
0	Bronx	Woodlawn	511edb6de4b0d58346fd272d	Patrizia's Of Woodlawn
1	Bronx	Pelham Parkway	4bf96ae65317a593d837017f	Enzo's
2	Bronx	Pelham Parkway	4b47f069f964a5208c4426e3	Pasta Pasta
3	Bronx	City Island	4514ed4df964a520e5391fe3	Artie's Steak and Seafood
4	Bronx	Morris Park	4b10591af964a5205f6e23e3	Patricia's



We see that although Manhattan has the least number of nieghborhoods, it does have the highest number of Italian restaurants

Additionally, we see how many restaurants the top 5 neighborhoods have

Let's explore Belmont, neighborhood having the highest number of Italian restaurants

	Borough	Neighborhood	ID	Name
5	Bronx	Belmont	4acf80aef964a52025d420e3	Tino's Delicatessen
6	Bronx	Belmont	4af71916f964a520cf0522e3	Michaelangelo's Coal Fired Brick Oven Pizza Re...

	Borough	Neighborhood	ID	Name
7	Bronx	Belmont	59050f51b23dfa5f6649e678	Arthur Avenue Fiasco
8	Bronx	Belmont	4c9b9e7b9c663704b90463fd	Gerbasi Ristorante
9	Bronx	Belmont	4bb6470cef159c7465b275f7	Calabria Pork Store
10	Bronx	Belmont	4b5514c4f964a5207cda27e3	Enzo's
11	Bronx	Belmont	4af0fa29f964a52060e021e3	Antonio's Trattoria
12	Bronx	Belmont	4aa425bef964a5208e4520e3	Dominick's Restaurant
13	Bronx	Belmont	4c79d294278eb713f6a05580	Cafe al Mercato
14	Bronx	Belmont	4b5a4c8ff964a52049bb28e3	Emilia's Restaurant
15	Bronx	Belmont	4aa193d5f964a520124120e3	Mario's Restaurant & Catering
16	Bronx	Belmont	4b5bc595f964a520431529e3	Pasquale Riggaletto's
17	Bronx	Belmont	4cb0d382ef1b370419643e00	David Greco's Arthur Avenue Trattoria
18	Bronx	Belmont	4bc22a22920eb713bcc51b2c	Tra Di Noi
19	Bronx	Belmont	4bc67f1104e8b713a833362d	Ann & Tony's - An Original Arthur Avenue Resta...
20	Bronx	Belmont	53ff939c498e6b601dfa3979	San Gennaro Ristorante
21	Bronx	Belmont	44941e38f964a52081341fe3	Arthur Avenue Cafe

Although Manhattan has the highest number of Italian restaurants as borough, Belmont actually located in the borough of Bronx

Let's find the rating, likes and tips of each Italian restaurant in NYC

	Likes	Rating	Tips
count	210.000000	210.000000	210.000000

	Likes	Rating	Tips
mean	146.709524	7.381429	56.804762
std	299.366454	2.176228	122.457277
min	0.000000	0.000000	0.000000
25%	13.250000	7.300000	7.000000
50%	35.000000	8.000000	16.500000
75%	107.250000	8.500000	42.500000
max	2491.000000	9.500000	1136.000000

Let's examine resturant which has maximum Likes

```

Borough           Manhattan
Neighborhood      Little Italy
ID                4cc6222106c25481d7a4a047
Name              Rubirosa Ristorante
Likes            2491
Rating           9.3
Tips             824
Name: 113, dtype: object

```

Let's examine resturant which has maximum Rating

```

Borough           Brooklyn
Neighborhood      Bushwick
ID                5a98aed16a59506d7a60d67c
Name              Carmenta's
Likes            56
Rating           9.5
Tips             21
Name: 38, dtype: object

```

Let's examine resturant which has maximum number of Tips

```

Borough           Staten Island
Neighborhood      West Brighton
ID                4b5b58dbf964a52088f628e3

```

```
Name                Panini Grill
Likes                21
Rating              8.6
Tips                1136
Name: 153, dtype: object
```

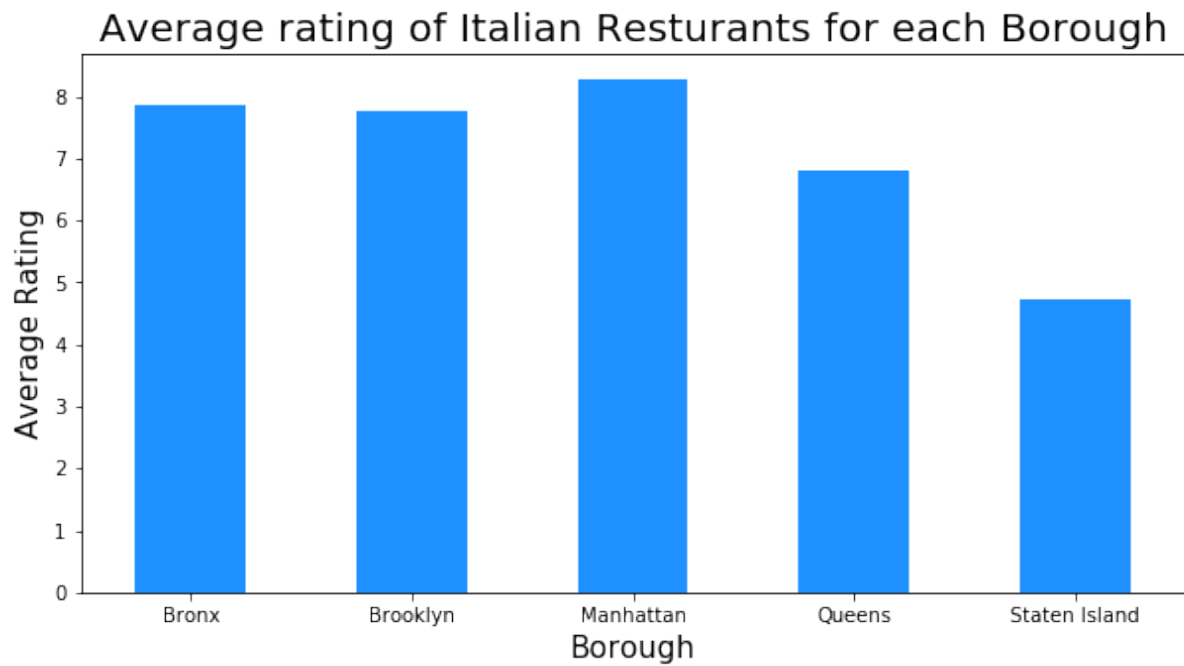
Let's find average restaurants rating for each neighborhood and display top 5

	Neighborhood	Average Rating
12	Bushwick	9.5
11	Boerum Hill	9.1
52	Little Italy	9.0
44	Hamilton Heights	9.0
84	Tribeca	8.9

And the same for each borough

	Borough	Average Rating
2	Manhattan	8.275904
0	Bronx	7.872414
1	Brooklyn	7.765854
3	Queens	6.791304
4	Staten Island	4.714706

Graph results



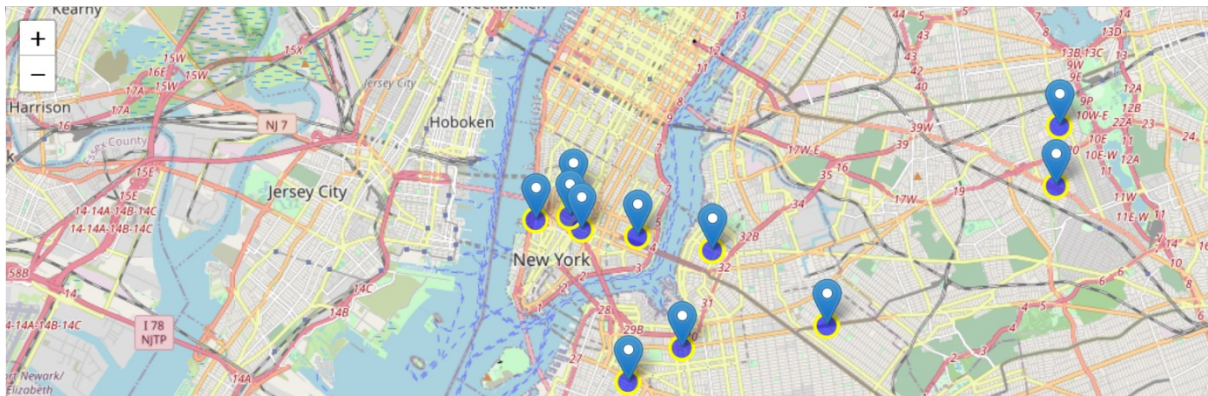
Manhattan has the highest average rating for Italian restaurants, followed by Bronx and Brooklyn

We will consider all the neighborhoods with average rating greater or equal 8.5 to visualize on map

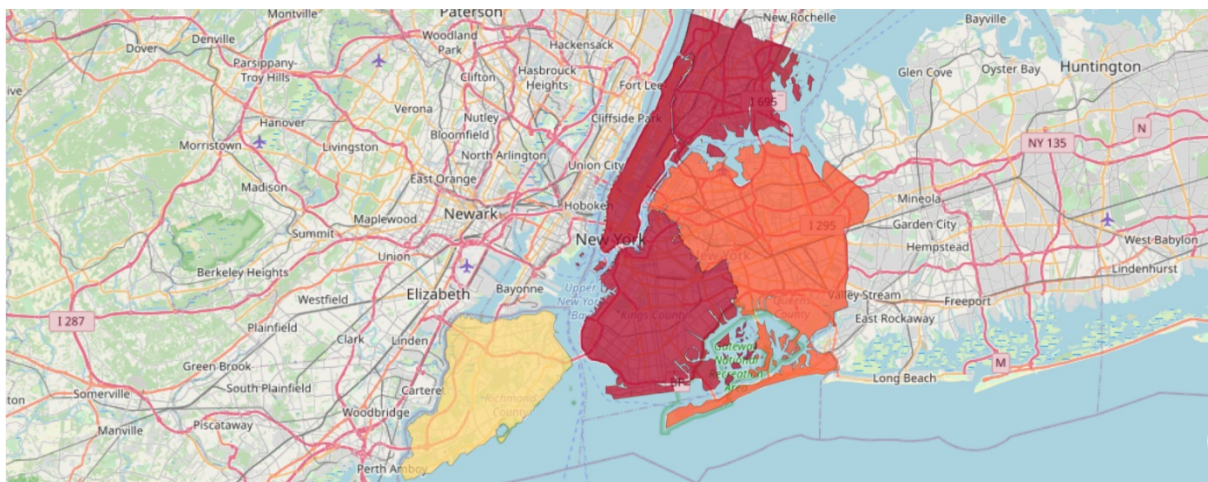
	Borough	Neighborhood	Latitude	Longitude	Average Rating
0	Brooklyn	Boerum Hill	40.685683	-73.983748	9.100000
1	Brooklyn	Bushwick	40.698116	-73.925258	9.500000
2	Manhattan	Carnegie Hill	40.782683	-73.953256	8.500000
3	Brooklyn	Clinton Hill	40.693229	-73.967843	8.650000
4	Queens	Corona	40.742382	-73.856825	8.700000
5	Manhattan	Greenwich Village	40.726933	-73.999914	8.777778
6	Manhattan	Hamilton Heights	40.823604	-73.949688	9.000000
7	Manhattan	Little Italy	40.719324	-73.997305	9.000000
8	Manhattan	Lower East Side	40.717807	-73.980890	8.500000
9	Bronx	Morris Park	40.847549	-73.850402	8.600000

	Borough	Neighborhood	Latitude	Longitude	Average Rating
10	Brooklyn	North Side	40.714823	-73.958809	8.800000
11	Bronx	Pelham Gardens	40.862966	-73.841612	8.500000
12	Brooklyn	Prospect Lefferts Gardens	40.658420	-73.954899	8.500000
13	Queens	Rego Park	40.728974	-73.857827	8.500000
14	Manhattan	Soho	40.722184	-74.000657	8.733333

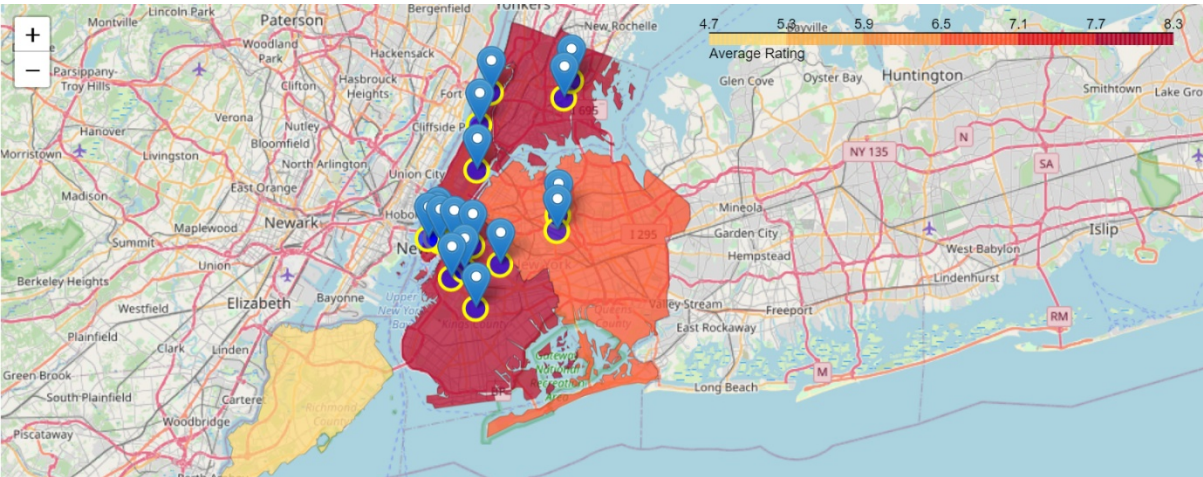
Let's create a map



Now that we have visualized the Neighborhoods, let's visualize Boroughs based on average rating



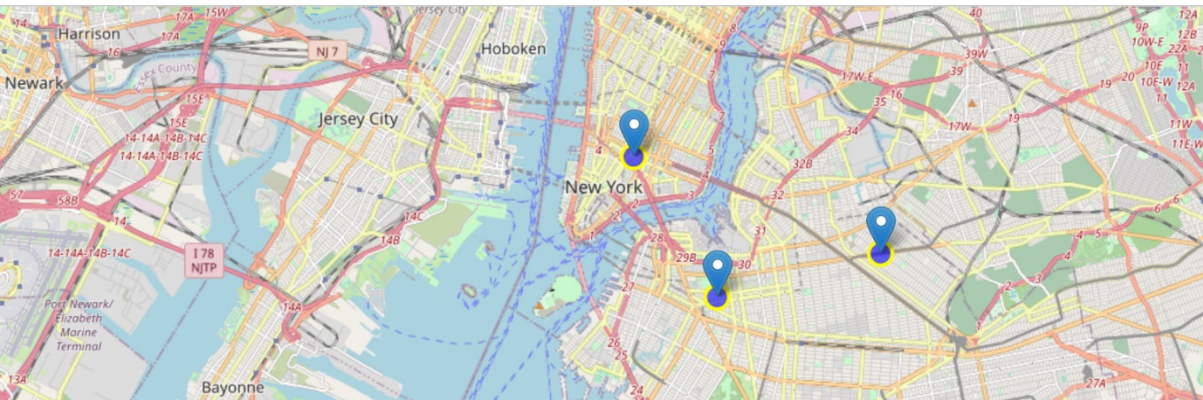
Combine both maps for better visualization



Finally, let's map top 3 ranked Italian restaurants across the City for those who want the best Italian cuisine

Let's prepare data, sort restaurants based on rating

	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
38	Brooklyn	Bushwick	5a98aed16a59506d7a60d67c	Carmenta's	56	9.5	21
50	Brooklyn	Fort Greene	5a00f3538496ca58fd9e2856	Evelina Restaurant	190	9.4	34
113	Manhattan	Little Italy	4cc6222106c25481d7a4a047	Rubirosa Ristorante	2491	9.3	824



Results

Brooklyn and Queens are most populated, while Manhattan most dense boroughs in New York City. Manhattan and Bronx have the best rated Italian restaurants on average. Queens and Bronx have the least number of Italian restaurants per borough, however Belmont in Bronx is the neighborhood with the most Italian restaurants per neighborhood. Despite Manhattan having the least number of neighborhoods, it has the most Italian restaurants per borough, followed by

Brooklyn. The best restaurant based on likes is in Little Italy, Manhattan, best restaurant based and rating in Bushwick, Brooklyn.

Conclusion

Based on information, I would state that Manhattan and Brooklyn are the best locations for Italian cuisine in New York. To have a best shot of success, I would open an Italian restaurant in Bronx, excluding Belmont neighborhood (as it has highest number of restaurants per neighborhood). Bronx has multiple neighborhoods with average rating exceeding 7.87, second highest in the City, and has least number of Italian restaurants, making competition easier than in other boroughs. Finally, for the best Italian meal, top 3 ranked restaurants are: Carmenta's (9.5) Bushwick, Brooklyn; Evelina Restaurant (9.4) Fort Greene, Brooklyn; Rubirosa Ristorante (9.3) Little Italy, Manhattan. All of the above analysis is dependant on the accuracy of Foursquare data and ranked purely on basis of rating of restaurants.