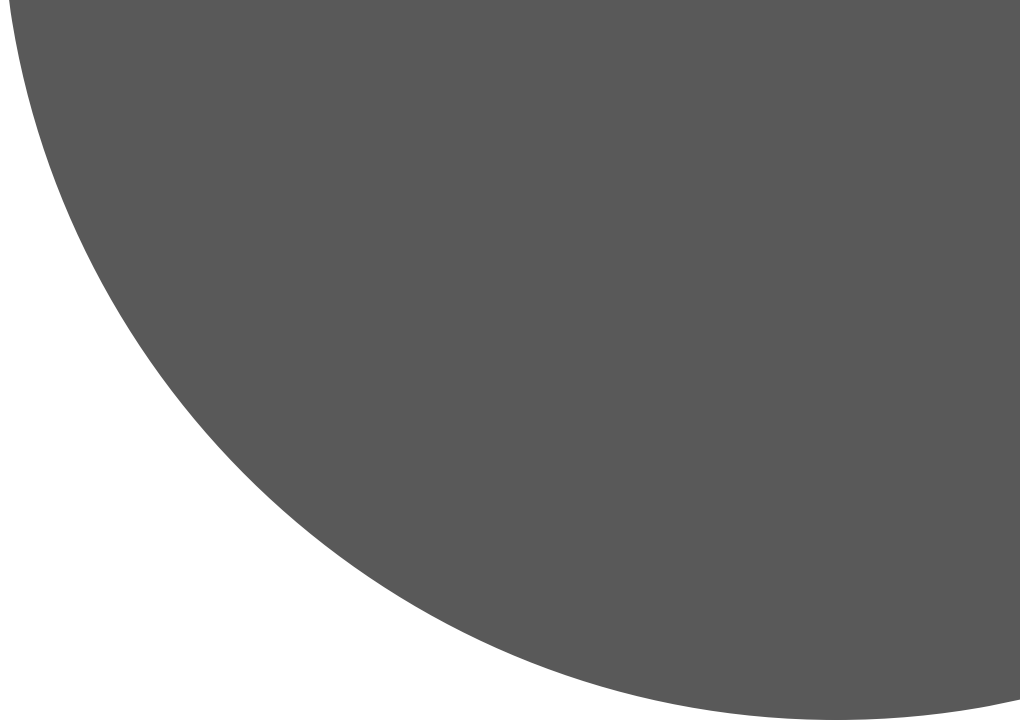
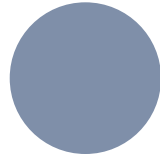
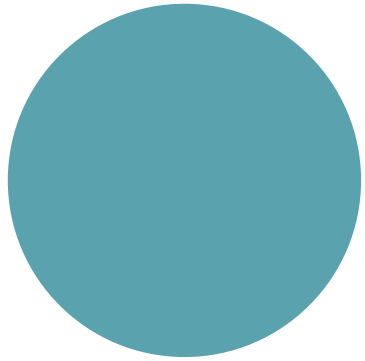


IBM Data Science Capstone Project





New York Italian Food Scene |

Background (1/2)

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 nearly 8.5 million people in 2014, 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. Over the last decade the city has been growing faster than the region. The New York region continues to be by far the leading metropolitan gateway for legal immigrants admitted into the United States.

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 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. English remains the most widely spoken language, although there are areas in the outer boroughs in which up to 25% of people speak English as an alternate language, and/or have limited or no English language fluency. English is least spoken in neighbourhoods such as Flushing, Sunset Park, and Corona.

With its diverse culture, comes diverse food items. There are many restaurants in New York City, each belonging to different categories like Italian, Chinese, Indian, French etc.

Background (2/2)

Italian restaurants have been an especially beloved fixture in America for at least a century. Featuring flying pizzas, slippery strands of spaghetti paired with plump meatballs that most have savoured since childhood, tomato sauce ladled and consumed by the pint, garlicky and buttered toasted bread quick to leave a grease stain, tender slices of veal, gooey eggplant Parmesan, gregarious owners, the air filled with Sinatra and Martin or Verdi and Donizetti, a lively and comfortable dining room, generous mounds of food, copious amounts of wine....one from this cluttered group of images might be the first evoked in the average American concerning Italian food.

There is much than more that, of course. Italian restaurants come in many guises these days, adapting to an ever-changing and -growing dining landscape, if seemingly always well-suited for the ever-growing waistlines. Today there are various different types that wave the banner of Italian food: sleek trattorias advertising a regional cuisine, national chains serving “Italian immigrant” fare, “Italian grilles,” long-lasting family-run favourites owned by a second- or third generation, Italian steakhouses, pizzerias, creative fine-dining temples that rival the top Michelin-starred restaurants in Italy, and even the humble hoagie shops.

Introduction

In one or more of its manifestations, Italian restaurants remain a common sight in New York. Serving as an introduction to Italian food for many, these have encouraged life-long infatuations, not just for the food served in these, but for food in general. Italian restaurants have also helped to broaden the palate of countless diners. This is probably especially so for Italian-Americans, who explored beyond a familiar base. With about 30% of diners claiming Italian as their favourite cuisine, new Italian-themed eateries continuing to open from coast-to-coast, and even French and resolutely American restaurants serving pastas and risottos, this popularity shows no sign of abating, even as Americans become more sophisticated and far-ranging in their dining habits. Reflecting that, Italian restaurants are even better than ever. These are also more diffuse and diverse, and continue to evolve.

Although it is easy to simply find Italian food in New York, it remains a difficult task to spot the best places, based on ratings and the most interesting neighbourhoods to experience great Italian food in the Big Apple. Moreover it is interesting to propose the best areas for stakeholders considering to open a new venue in NY. So as part of this project, we will list and visualize all major parts of New York City that provide great Italian restaurants, compare ratings, put in the map the best ones, finding how the Italian Restaurant scene is placed in NY today

Data to be used

1. Data source : https://cocl.us/new_york_dataset

Description - data set containing New York City data that contains list Boroughs, Neighbourhoods along with their latitude and longitude. And we will use this data set to explore various neighborhoods of New York city. Italian restaurants in each neighborhood of New York city.

2. Data source : **Foursquare API**

Description : By using this API we will get all the venues in each neighborhood. We can filter these venues to get Italian Restaurants only. Also we will pull Premium FourSquare data from each venue such as ratings, likes, tips etc

3. 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 to visualize choropleth map and map the strongest/weakest NY boroughs regarding Italian food landscape.

Approach

Collect the New York city data from https://cocl.us/new_york_dataset

Using FourSquare API we will find all venues for each neighborhood.

Filter out all venues that are Indian Restaurants.

Find rating , tips and like count for each Indian Restaurants using FourSquare API.

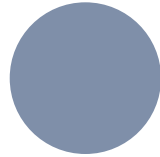
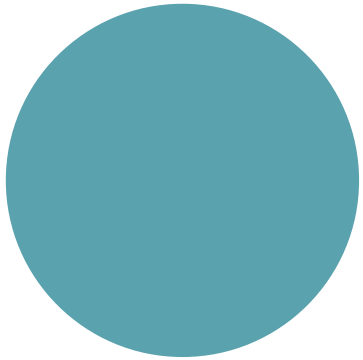
Using rating for each restaurant , we will sort that data.

Libraries to be used

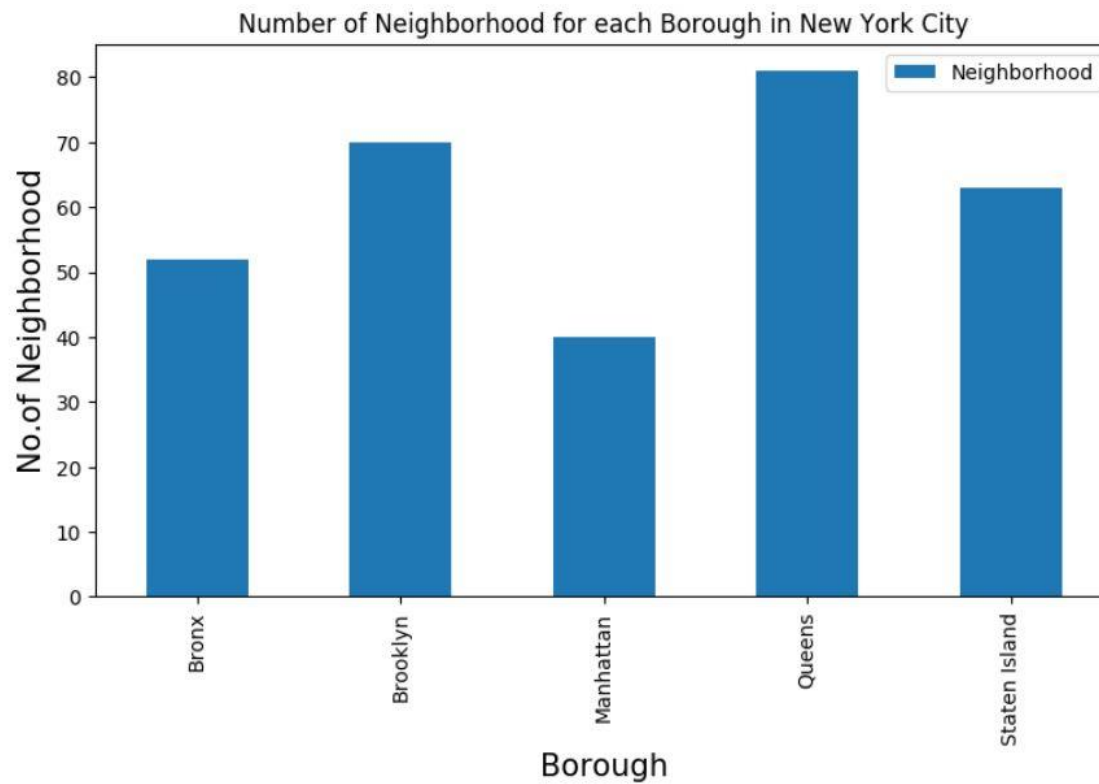
Pandas and numpy for handling data.

Request module for using FourSquare API.

Geopy to get co-ordinates of City of New York.



Analysis | (week 2)



Number of neighborhoods
in each Borough

Step 1

Load data
from https://cocl.us/new_york_dataset

- in pandas
Dataframe.

Getting Latitude and
Longitude for each
address geopy
library.

```
id, name , category=restaurant_detail
Italian_rest_ny = Italian_rest_ny.append({'Borough': Borc
                                           'Neighborhood': M
                                           'ID': id,
                                           'Name' : name
                                           }, ignore_index=Tr

count+=1
done
297 / 306 ) Italian Restaurants in Madison, Brooklyn:1
done
298 / 306 ) Italian Restaurants in Bronxdale, Bronx:5
done
299 / 306 ) Italian Restaurants in Allerton, Bronx:0
done
300 / 306 ) Italian Restaurants in Kingsbridge Heights, Bro
done
301 / 306 ) Italian Restaurants in Erasmus, Brooklyn:0
done
302 / 306 ) Italian Restaurants in Hudson Yards, Manhattan:
done
303 / 306 ) Italian Restaurants in Hammels, Queens:0
done
304 / 306 ) Italian Restaurants in Bayswater, Queens:0
done
305 / 306 ) Italian Restaurants in Queensbridge, Queens:3
done
306 / 306 ) Italian Restaurants in Fox Hills, Staten Island
```

As result –

We have 306 rows like this.

Step 2

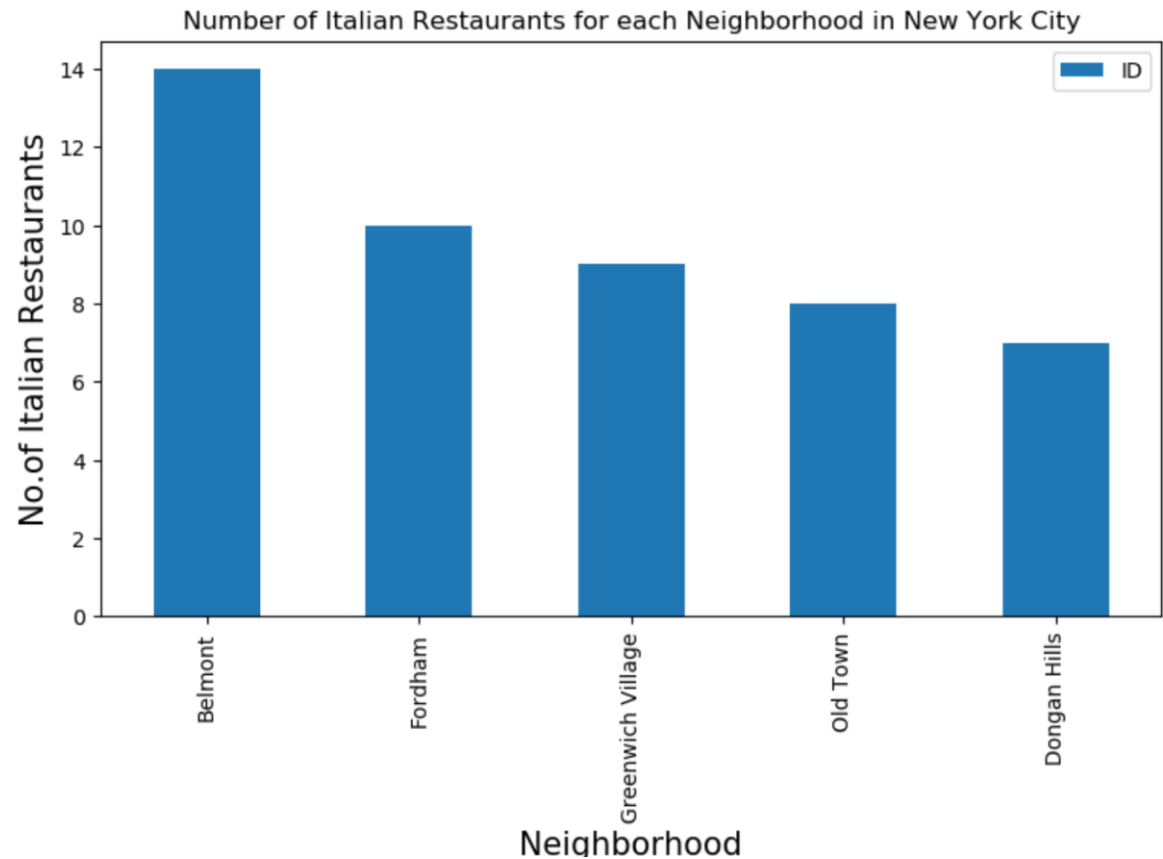
- Filtering out which **Borough** (and then Neighborhood) have maximum number of Italian Restaurants using FourSquare API.



Result – Brooklyn has maximum number of Italian Restaurants

Step 2

- Filter out which **Neighborhood** have maximum number of Italian Restaurants using FourSquare API.



Result – Belmont has maximum number of Restaurants

List of Restaurants in Belmont

```
Italian_rest_ny[Italian_rest_ny['Neighborhood']=='Belmont']
```

```
3]:
```

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

Step 3

- Get likes, ratings, tips on each of Italian Restaurant using FourSquare API

```
Italian_rest_stats_ny.head(200)
```

```
9]:
```

	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
0	Bronx	Riverdale	55aaee4d498e3cbb70e625d6	Bella Notte Pizzeria	9.0	7.3	4.0
1	Bronx	Kingsbridge	55aaee4d498e3cbb70e625d6	Bella Notte Pizzeria	9.0	7.3	4.0
2	Bronx	Woodlawn	511edb6de4b0d58346fd272d	Patrizia's Of Woodlawn	18.0	8.3	14.0
3	Bronx	Woodlawn	4d3cb3026b3d236a066a6364	Rivers Edge	10.0	6.8	8.0
4	Bronx	Baychester	4c9518076b35a143d5dc21dc	Fratelli's	22.0	8.5	6.0
5	Bronx	Baychester	5411894d498e4a254a11a46c	Olive Garden	26.0	7.4	8.0
6	Bronx	Pelham Parkway	4bf96ae65317a593d837017f	Enzo's	26.0	8.7	11.0
7	Bronx	Pelham Parkway	4b10591af964a5205f6e23e3	Patricia's	84.0	8.6	39.0
8	Bronx	Pelham Parkway	4b47f069f964a5208c4426e3	Pasta Pasta	9.0	6.4	8.0
9	Bronx	City Island	4514ed4df964a520e5391fe3	Artie's Steak and Seafood	44.0	8.3	27.0
10	Bronx	City Island	55905336498e1a9217de2a7a	Scavello's On The Island	13.0	8.3	2.0

Step 3

- Get likes, ratings, tips on each of Italian Restaurant using FourSquare API

```
ny_neighborhood_stats.sort_values(['Average Rating']
```

```
[55]:
```

	Neighborhood	Average Rating
20	Bushwick	9.150000
17	Boerum Hill	9.100000
41	Downtown	9.100000
133	Sunnyside	9.100000
102	Noho	9.066667
70	Greenwich Village	9.000000
127	Soho	8.983333
82	Little Italy	8.933333
29	Civic Center	8.900000

Winner

- The NY Italian Restaurant having maximum Likes

```
# Restaurant with maximum Likes
Italian_rest_stats_ny.iloc[Italian_rest_stats_ny['Likes']]
```

Borough	Manhattan
Neighborhood	Greenwich Village
ID	4cc6222106c25481d7a4a047
Name	Rubirosa Ristorante
Likes	2491
Rating	9.3
Tips	824
Name: 233, dtype: object	

Winner

- The NY Italian Restaurant having maximum Ratings

```
# Restaurant with maximum Rating
Italian_rest_stats_ny.iloc[Italian_rest_stats_ny['Rating']]
```

Borough	Brooklyn
Neighborhood	Bushwick
ID	5a98aed16a59506d7a60d67c
Name	Carmenta's
Likes	57
Rating	9.5
Tips	21

Winner

- The NY Italian Restaurant having maximum Tips

```
# Restaurant with maximum Tips
Italian_rest_stats_ny.iloc[Italian_rest_stats_ny['Tips'].idxmax()]
```

Borough	Staten Island
Neighborhood	West Brighton
ID	4b5b58dbf964a52088f628e3
Name	Panini Grill
Likes	21
Rating	8.6
Tips	1136

Findings

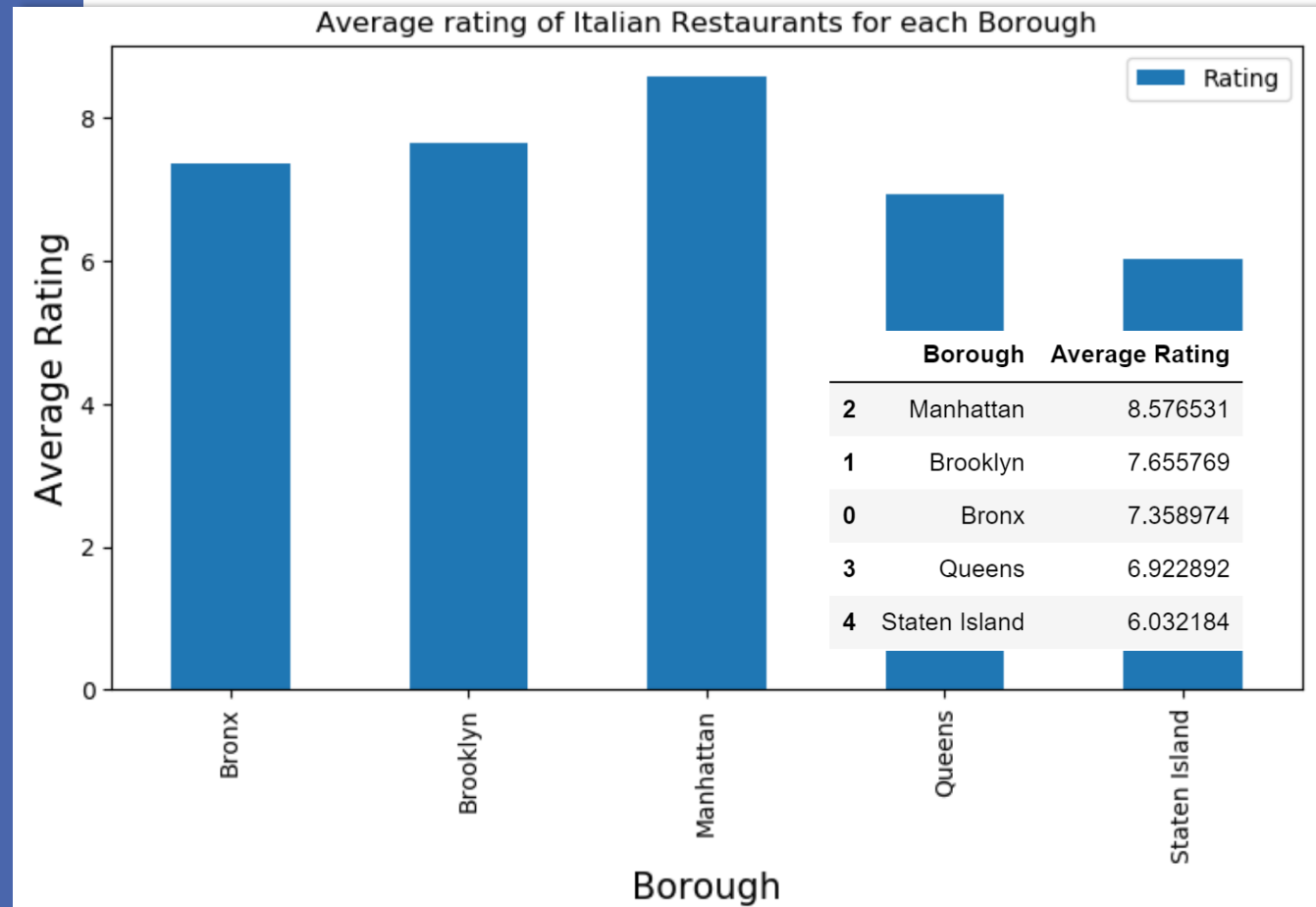
- NY neighborhoods with the venues having maximum Ratings

```
ny_neighborhood_stats.sort_values(['Average Rating'])
```

	Neighborhood	Average Rating
20	Bushwick	9.150000
17	Boerum Hill	9.100000
41	Downtown	9.100000
133	Sunnyside	9.100000
102	Noho	9.066667
70	Greenwich Village	9.000000
127	Soho	8.983333
82	Little Italy	8.933333
29	Civic Center	8.900000

Findings

- NY Boroughs sorted by their Italian restaurant Ratings



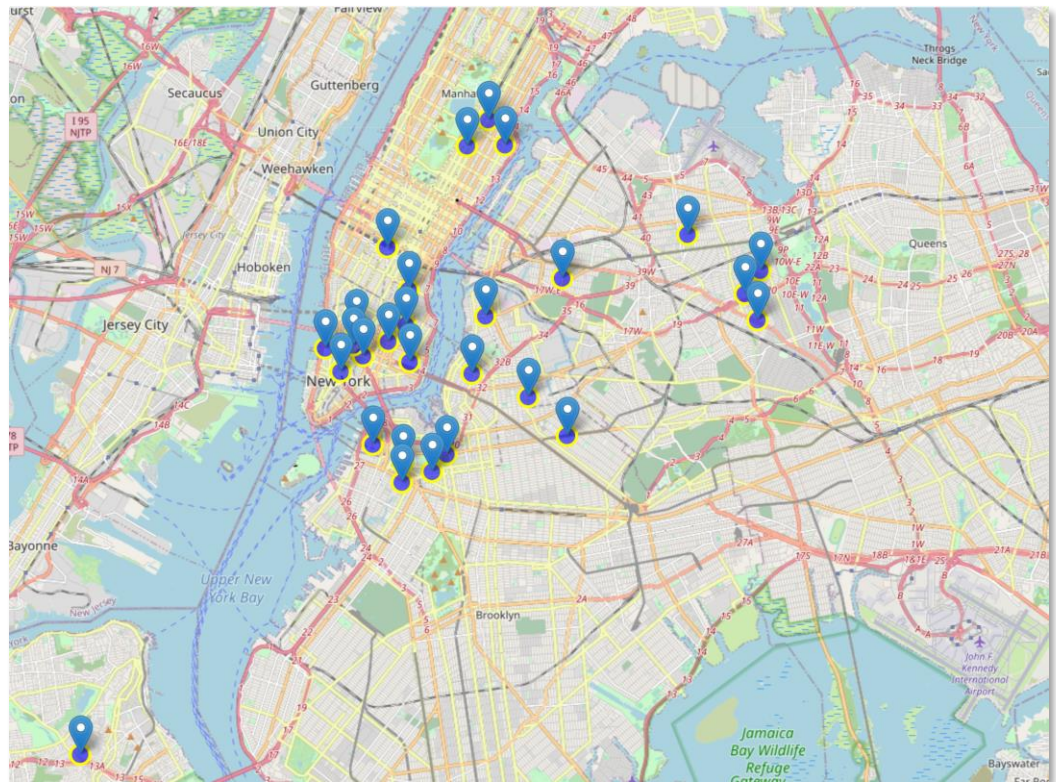
Findings

- Mapping venues with **maximum Ratings**

	Borough	Neighborhood	Latitude	Longitude	Average Rating
0	Brooklyn	Boerum Hill	40.685683	-73.983748	9.100000
1	Brooklyn	Brooklyn Heights	40.695864	-73.993782	8.650000
2	Brooklyn	Bushwick	40.698116	-73.925258	9.150000
3	Manhattan	Carnegie Hill	40.782683	-73.953256	8.700000
4	Manhattan	Civic Center	40.715229	-74.005415	8.900000
5	Brooklyn	Clinton Hill	40.693229	-73.967843	8.600000
6	Queens	Corona	40.742382	-73.856825	8.600000
7	Brooklyn	Downtown	40.690844	-73.983463	9.100000
8	Manhattan	East Village	40.727847	-73.982226	8.600000
9	Brooklyn	East Williamsburg	40.708492	-73.938858	8.566667
10	Brooklyn	Fort Greene	40.688527	-73.972906	8.600000
11	Manhattan	Gramercy	40.737210	-73.981376	8.600000
12	Brooklyn	Greenpoint	40.730201	-73.954241	8.800000
13	Manhattan	Greenwich Village	40.726933	-73.999914	9.000000
14	Manhattan	Hamilton Heights	40.823604	-73.949688	8.850000
15	Queens	Jackson Heights	40.751981	-73.882821	8.600000
16	Queens	Lefrak City	40.736075	-73.862525	8.500000
17	Manhattan	Little Italy	40.719324	-73.997305	8.933333
18	Manhattan	Lower East Side	40.717807	-73.980890	8.666667
19	Manhattan	Midtown South	40.748510	-73.988713	8.600000
20	Manhattan	Noho	40.723259	-73.988434	9.066667
21	Brooklyn	North Side	40.714823	-73.958809	8.900000
22	Bronx	Pelham Gardens	40.862966	-73.841612	8.500000
23	Queens	Rego Park	40.728974	-73.857827	8.500000
24	Manhattan	Soho	40.722184	-74.000657	8.983333
25	Queens	Sunnyside	40.740176	-73.926916	9.100000
26	Staten Island	Sunnyside	40.612760	-74.097126	9.100000
27	Manhattan	Tribeca	40.721522	-74.010683	8.600000
28	Manhattan	Upper East Side	40.775639	-73.960508	8.642857
29	Manhattan	Washington Heights	40.851903	-73.936900	8.500000

Findings

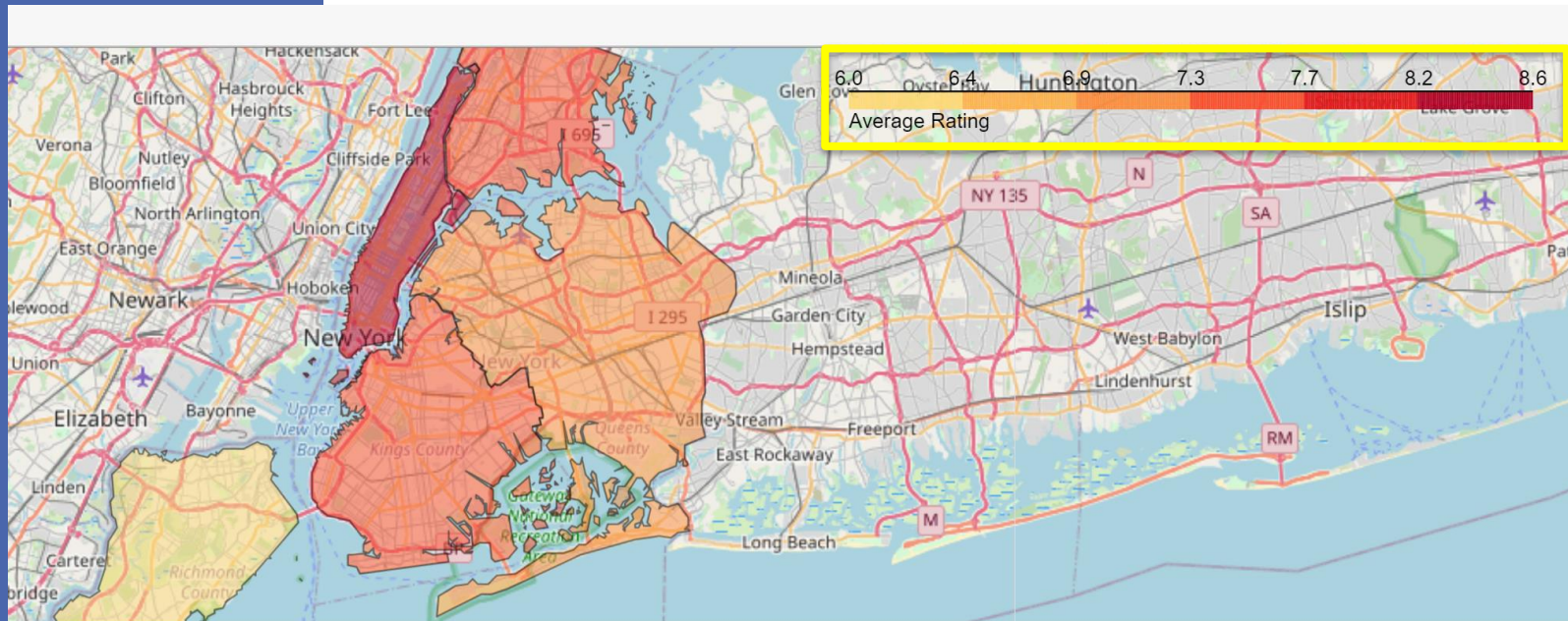
- **Plotting venues with maximum Ratings on the NY map**



Findings

- Visualizing the Italian Food scene Score & Potential of NY

Boroughs based on their Italian Restaurant Ratings



Conclusion

Belmond (Manhattan) is the most crowded neighborhood but the top 3 are in Brooklyn (Bushwick, Heights, Boreum Hill).

Manhattan has great **potential** Italian Restaurant Market

Staten Island (Old Town) ranks last in average rating and has less Italian Restaurants.

Brooklyn is the best place to stay if you prefer Italian Cuisine.