Final report

The battle of the neighborhoods

Date: 04th August 2019

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1   Introduction

New York is one of the most popular major cities. Every year millions of people are visiting New York. And last year I was one of them ;-). Not only the citizens have to do one thing. Even the tourists have to do it ... eating.

Throughout the history of New York, it has been a hotspot for immigrants. This is why there is such a broad spectrum of the cuisine. You can get nearly everything from French, Indian over Chinese food. As Austrian I like the hearty cuisine as well as the sweet cuisine.

In this project I will focus on the restaurants which are selling desserts (i.e. Dessert Shop). I will analyse and visualise the parts of New York where the best Dessert Shops are.

This project could be the base for future projects. With some additional datasets it might be possible to do further analysis like:

- where is the best place to open a new restaurant?
- will there be a hard competitor in this area?
- are there enough restaurants in that area?

But now let us focus on this project.

2   Data

To achieve the goal of this project the following data is required:

- geographical data from New York
  - Borough
  - Neighborhoods
  - coordinates (longitude, latitude)
- restaurant information
  - classification (of venues)
  - name
  - address
  - likes and rating

The dataset of New York is taken from a public website (https://cocl.us/new_york_dataset).

The restaurant information comes from Foursquare.

3   Methodology

3.1   The approach

The approach to explore the data and to answer the question from the next paragraph includes the following steps:

- collect data about New York City
- collect data about all restaurants
- filter the collected data to focus on a category
- extend filtered data with ratings and likes
- rank the restaurants
- visualize the locations

3.2   Problem

What is the best place to get desserts?

Which areas have the potential to evolve the market of sweets?

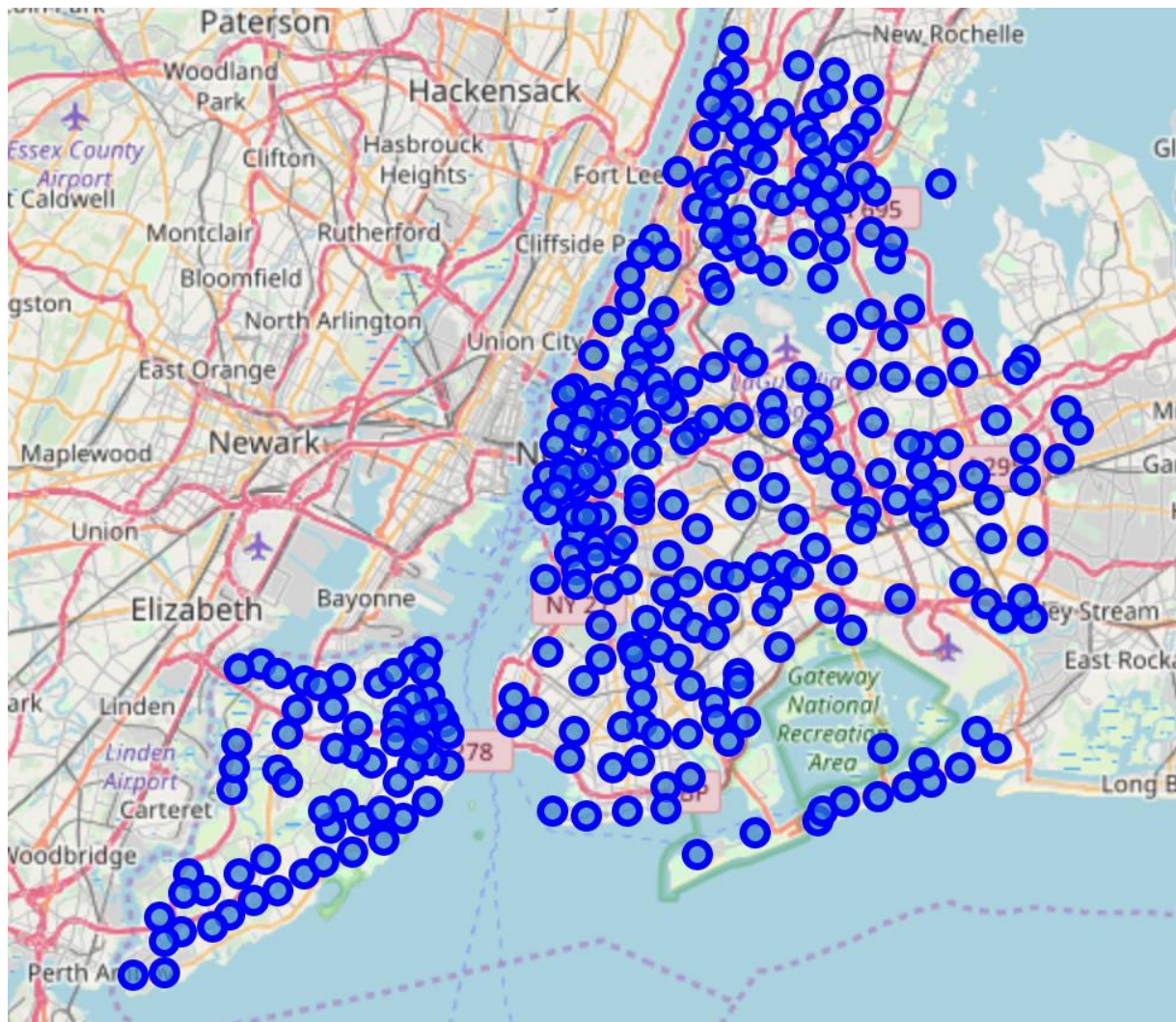Which areas have a lack of Dessert Shops?

3.3   Analysis

The first step, as in every python project, is to import the required libraries. I won't discuss this in detail. Details can be looked up directly in the code of the notebook.
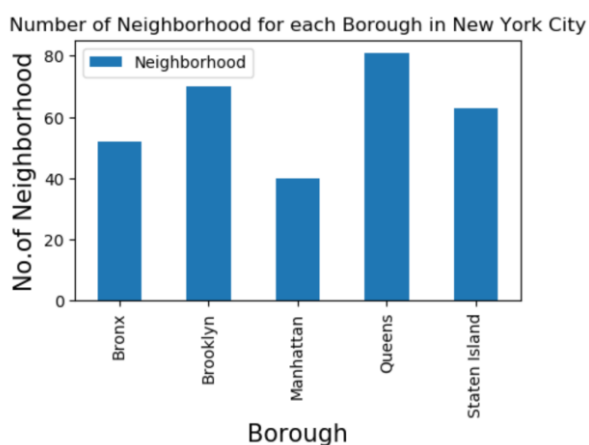
After the project is set up, the first major part begins. Collecting data about New York. Therefore, the JSON file from https://cocl.us/new_york_dataset is used. The output is a data frame which contains the boroughs, neighborhoods and the coordinates (i.e. longitude and latitude). The following picture shows the first 5 lines of the data.

	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 total 306 neighborhoods were found. All of them are visualized in the next picture.

The next information needed is how many boroughs are in New York and how many neighborhoods are in a borough.

In the above picture we can see that there are 5 boroughs. Queens has the most neighborhoods. Manhattan at least.
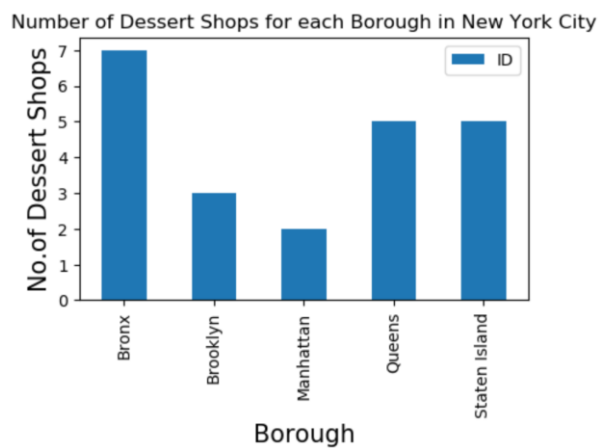
All this information should be enough for further analysis. Now it's time to get data about the restaurants. As I focused on Dessert Shops, this is our search criteria. The data source comes from

Fourquares. In the following step, the Foursquare API is queried to be give all venues back within the category "Dessert Shop".

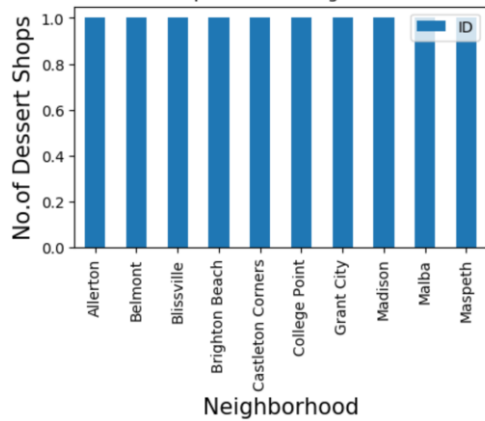The next picture shows the filtered data retrieved from Foursquares.

	Borough	Neighborhood	ID	Name
0	Bronx	Wakefield	4c537892fd2ea593cb077a28	Lollipops Gelato
1	Bronx	Riverdale	51cc87aa498e0e8caff2fe59	Menchie's
2	Bronx	Pelham Parkway	4c76e7da947ca1cd26c14537	Sal & Doms Bakery
3	Bronx	Belmont	4ae351a0f964a5205b9321e3	DeLillo Pastry Shop
4	Bronx	Spuyten Duyvil	51cc87aa498e0e8caff2fe59	Menchie's
5	Bronx	Olinville	4c76e7da947ca1cd26c14537	Sal & Doms Bakery
6	Brooklyn	Brighton Beach	4f25c695e4b067a3282c6735	Güllüoğlu Baklava & Cafe
7	Brooklyn	Park Slope	59da8dbd625a664540e7004d	Chocolateria
8	Manhattan	Soho	45e98bacf964a52080431fe3	MarieBelle
9	Queens	Maspeth	4de3d09f1f6e3190cd303468	Isabella's Ices
10	Queens	College Point	4bf86c605ec320a16ec788d3	La Cheesecake
11	Staten Island	Port Richmond	4bd30b57046076b024017571	CakeChef's Cookie Jar
12	Staten Island	Castleton Corners	4c1faef4bd9d9521e552983f	Alfonso's Pastry Shoppe
13	Staten Island	New Dorp	4d9788afa2c654817bf3db53	Something Sweet
14	Staten Island	Westerleigh	4bd30b57046076b024017571	CakeChef's Cookie Jar
15	Staten Island	Grant City	4bc111a6abf49521fe7dc093	Ralph's Famous Italian Ices
16	Manhattan	Sutton Place	554f5e1d498e084914465061	Woops!
17	Queens	Blissville	52ddb91611d2cc019dba3595	Made From Scratch
18	Queens	Middle Village	4bbe631782a2ef3b764b2bd2	Ralph's Famous Italian Ices
19	Queens	Malba	4c8a651d1eafb1f70add7935	Cascon Cheesecake
20	Brooklyn	Madison	4bc10a9df8219c745ac0b210	Michael's Pastry Shop
21	Bronx	Allerton	4c76e7da947ca1cd26c14537	Sal & Doms Bakery

There are 22 venues with the category Dessert Shop in New York City. How many there are in the boroughs can be seen in the next picture.

Number of Dessert Shops for each Borough in New York City

How many there are in the neighborhoods can be seen in the next picture.

Number of Dessert Shops for each Neighborhood in New York City

It seems that there is only one Dessert Shop per neighborhood.

To find out which one is the best, again the Foursquare API is used. The table is extended with the Likes, Ratings and Tips.

	Borough	Neighborhood	ID	Name	Likes	Rating	Tips
0	Bronx	Wakefield	4c537892fd2ea593cb077a28	Lollipops Gelato	18	8.5	4
1	Bronx	Riverdale	51cc87aa498e0e8caff2fe59	Menchie's	54	8.7	16
2	Bronx	Pelham Parkway	4c76e7da947ca1cd26c14537	Sal & Doms Bakery	32	8.7	11
3	Bronx	Belmont	4ae351a0f964a5205b9321e3	DeLillo Pastry Shop	84	8.4	28
4	Bronx	Spuyten Duyvil	51cc87aa498e0e8caff2fe59	Menchie's	54	8.7	16
5	Bronx	Olinville	4c76e7da947ca1cd26c14537	Sal & Doms Bakery	32	8.7	11
6	Brooklyn	Brighton Beach	4f25c695e4b067a3282c6735	Güllüoğlu Baklava & Cafe	46	7.7	11
7	Brooklyn	Park Slope	59da8dbd625a664540e7004d	Chocolateria	13	8.7	3
8	Manhattan	Soho	45e98bacf964a52080431fe3	MarieBelle	209	9.1	95
9	Queens	Maspeth	4de3d09f1f6e3190cd303468	Isabella's Ices	6	8.0	2
10	Queens	College Point	4bf86c605ec320a16ec788d3	La Cheesecake	24	8.7	9
11	Staten Island	Port Richmond	4bd30b57046076b024017571	CakeChef's Cookie Jar	39	8.9	27
12	Staten Island	Castleton Corners	4c1faef4bd9d9521e552983f	Alfonso's Pastry Shoppe	29	8.5	6
13	Staten Island	New Dorp	4d9788afa2c654817bf3db53	Something Sweet	29	7.8	11
14	Staten Island	Westerleigh	4bd30b57046076b024017571	CakeChef's Cookie Jar	39	8.9	27
15	Staten Island	Grant City	4bc111a6abf49521fe7dc093	Ralph's Famous Italian Ices	31	8.9	15
16	Manhattan	Sutton Place	554f5e1d498e084914465061	Woops!	38	8.6	12
17	Queens	Blissville	52ddb91611d2cc019dba3595	Made From Scratch	24	8.6	1
18	Queens	Middle Village	4bbe631782a2ef3b764b2bd2	Ralph's Famous Italian Ices	13	8.2	11
19	Queens	Malba	4c8a651d1eafb1f70add7935	Cascon Cheesecake	13	7.6	2
20	Brooklyn	Madison	4bc10a9df8219c745ac0b210	Michael's Pastry Shop	21	8.2	5
21	Bronx	Allerton	4c76e7da947ca1cd26c14537	Sal & Doms Bakery	32	8.7	11

To find the best valued shop the data is analyzed. It shows the shop with the most likes, rating and tips. The result was that one shop has the best values in all three categories.

```
Borough                      Manhattan
Neighborhood                      Soho
ID           45e98bacf964a52080431fe3
Name                         MarieBelle
Likes                             209
Rating                            9.1
Tips                               95
```

Now it is time to focus on the area of New York.

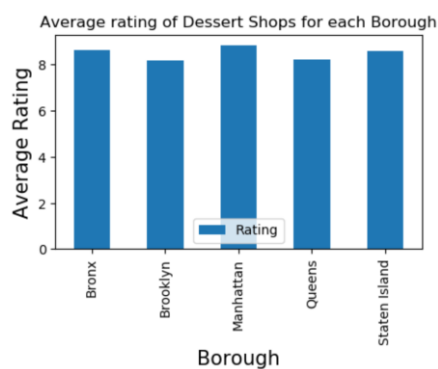Let's find out which neighborhood has the highest average rating.

	Neighborhood	Average Rating
17	Soho	9.1
21	Westerleigh	8.9
15	Port Richmond	8.9
6	Grant City	8.9
12	Olinville	8.7
18	Spuyten Duyvil	8.7
16	Riverdale	8.7
14	Pelham Parkway	8.7
13	Park Slope	8.7
0	Allerton	8.7
5	College Point	8.7
2	Blissville	8.6
19	Sutton Place	8.6
4	Castleton Corners	8.5
20	Wakefield	8.5
1	Belmont	8.4
10	Middle Village	8.2
7	Madison	8.2
9	Maspeth	8.0
11	New Dorp	7.8
3	Brighton Beach	7.7
8	Malba	7.6

In fact, ever neighborhood has only one shop the result is that the rating value of the shop represents the average value per neighborhood. If there are more shops per neighborhood the ranking might change.
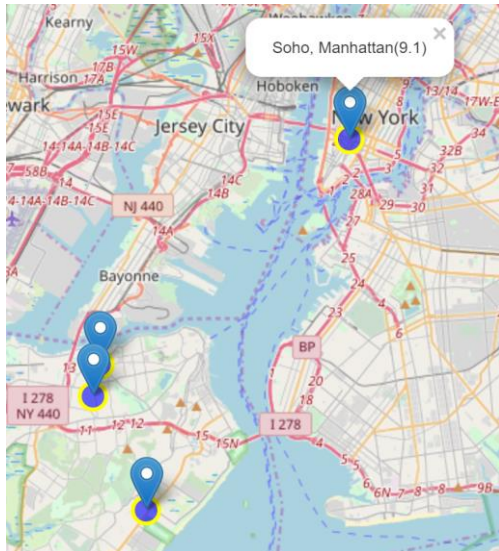
Let's do the same analysis for the boroughs.

	Borough	Average Rating
2	Manhattan	8.850000
0	Bronx	8.628571
4	Staten Island	8.600000
3	Queens	8.220000
1	Brooklyn	8.200000

Manhattan has the best average rating and Brooklyn the worst.

Average rating of Dessert Shops for each Borough

As last point I visualized the top 4 neighborhoods on a New York map and added the ratings to them.

4   Result

The best neighborhood for Dessert Shops is Soho (best ratings) followed by Westerleigh, Port Richmond and Grant City each equal.

Manhattan has the potential for Dessert Shops because it has the best average rating.

Brooklyn has the worst average rating for Dessert Shops.

The Bronx is the best place to stay for dining in a Dessert Shops because there are the most Dessert Shops.

5   Discussion

As mentioned in the introduction this analysis could be the base for future projects. With additional data it would be possible to do more analysis in depth. This could be:

- where is the best place to open a new restaurant?
- will there be a hard competitor in this area?
- are there enough restaurants in that area?
- Recommendation system for cuisine
- and so on …

6   Conclution

There are some limitations in this project. The only source for data to rate the venues comes from Foursquare. Normally it should be considered to analyze different data sources.