IBM

Applied Data Science Capstone Project

Consulting a New York business to extend its activity to Toronto

Thomas Charitakis

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1. Introduction

Living in the 2021, due to the constant competition among businesses to take a bigger market share, a lot of shopkeepers are trying to expand their activities in new places in order to invest their profits in a proper manner. But is expanding your activity to a new place the most profitable way to invest in?

Our response is undoubtedly yes. Any business that experiences growth at home looks further afield to expand their success. Expanding into new markets presents different challenges and approaches that work for one company may not work for another. Considering localization as a key factor for global growth is essential and businesses looking to grow need to dedicate time, energy and capital to truly knowing the areas they are hoping to expand into.

Most companies looking to expand into new markets want to boost their sales and have identified a market in which they can see the potential for growth. This can be a fine balance to achieve, as you need to ensure you keep current, loyal customers on side while impressing and persuading customers in the new region.

But of course you do not need to keep all of this in mind. As a company expertizing in consulting companies about strategies and organization matters we will make your life easy about what your next step should be and how to expand your business in a expedient way

2. Business problem

Due to the congested New York City a lot of businesses have come to us asking how to expand their activities in new places even it means to move to a new country. Depending on the market growth and news, Toronto is a city that is growing in a rapid tempo.

So as a consulting company we decided to make an analysis on the boroughs of New York and Toronto to see how close these cities are to each other in terms of market style and chances so that we can propose to our customers to move there.

3. Data Acquisition and Presentation

In order to fulfill our goal we needed to acquire data about demographic info for both cities in order to compare them and see where the main chances would be. We should get some data referring to the boroughs of each city, their neighborhoods and the venues that each city accommodates. Of course we need to get information about the coordinates of each neighborhood so that we can utilize the Foursquare API so that we can get the venues later in the process.

We found the New York Data from the IBM Developer Skills Network as there were a dataset ready to use, and we got our hands on to Toronto demographic data from a postal code list of the city in Wikipedia. We utilized the request, pandas and beautiful soup in order to store the data in pandas dataframe. The datasets are loaded and ready to proceed as you can see below.

New York Dataset

	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

Toronto Dataset

	Borough	Neighborhood	Latitude	Longitude
0	North York	Parkwoods	43.753259	-79.329656
1	North York	Victoria Village	43.725882	-79.315572
2	Downtown Toronto	Regent Park, Harbourfront	43.654260	-79.360636
3	North York	Lawrence Manor, Lawrence Heights	43.718518	-79.464763
4	Queen's Park	Ontario Provincial Government	43.662301	-79.389494

3. Methodology

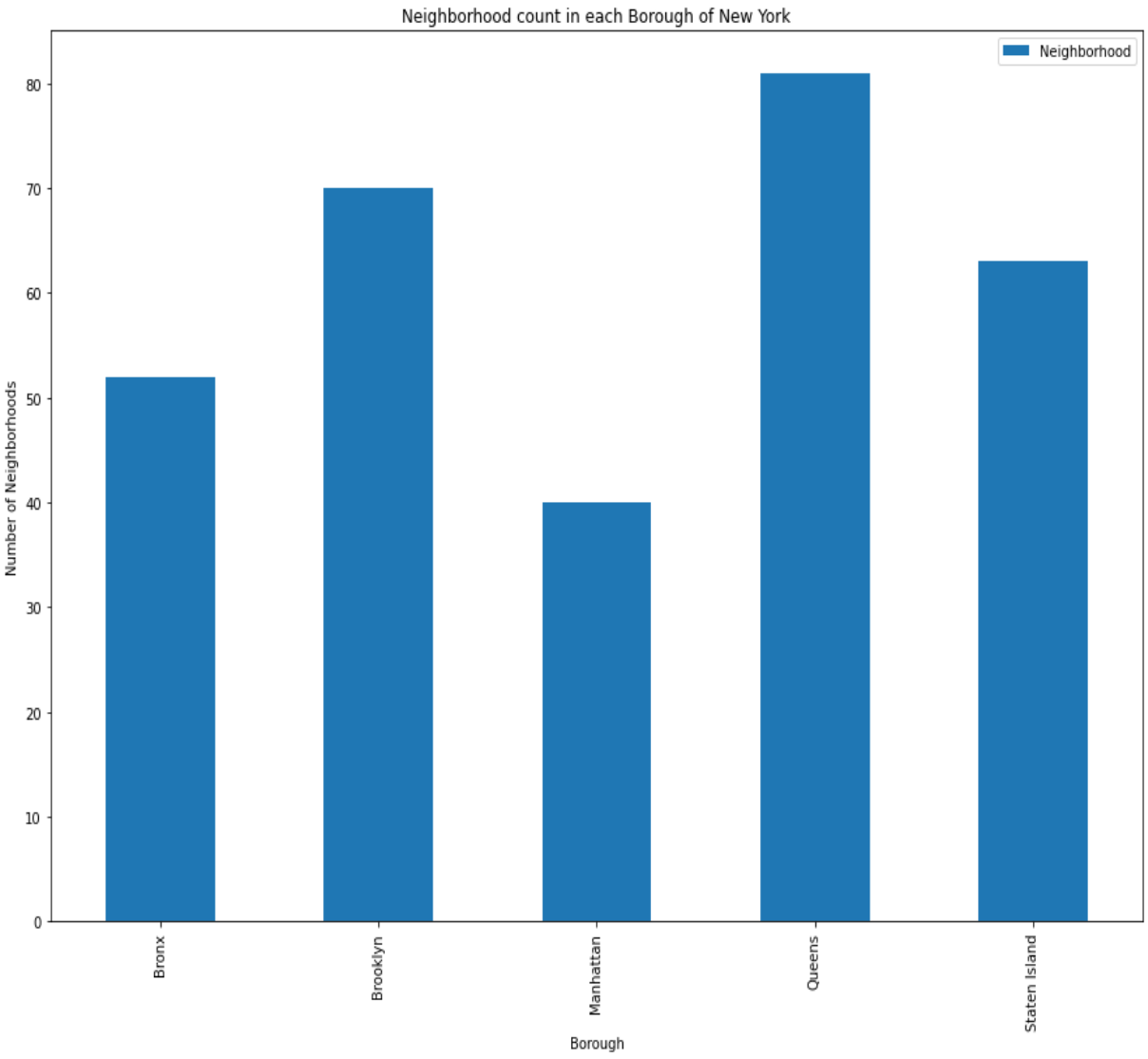
- **Data acquisition**

The first step is to collect the data. For the Toronto data we used the beautiful soup library to webscrape the html of the url https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M and then we store it in a pandas dataframe. Then we got the coordinates from a csv file which we load it in the dataframe using the pandas read function. For the New York data we load it as a json file using the library request and then we store it in a dataframe.

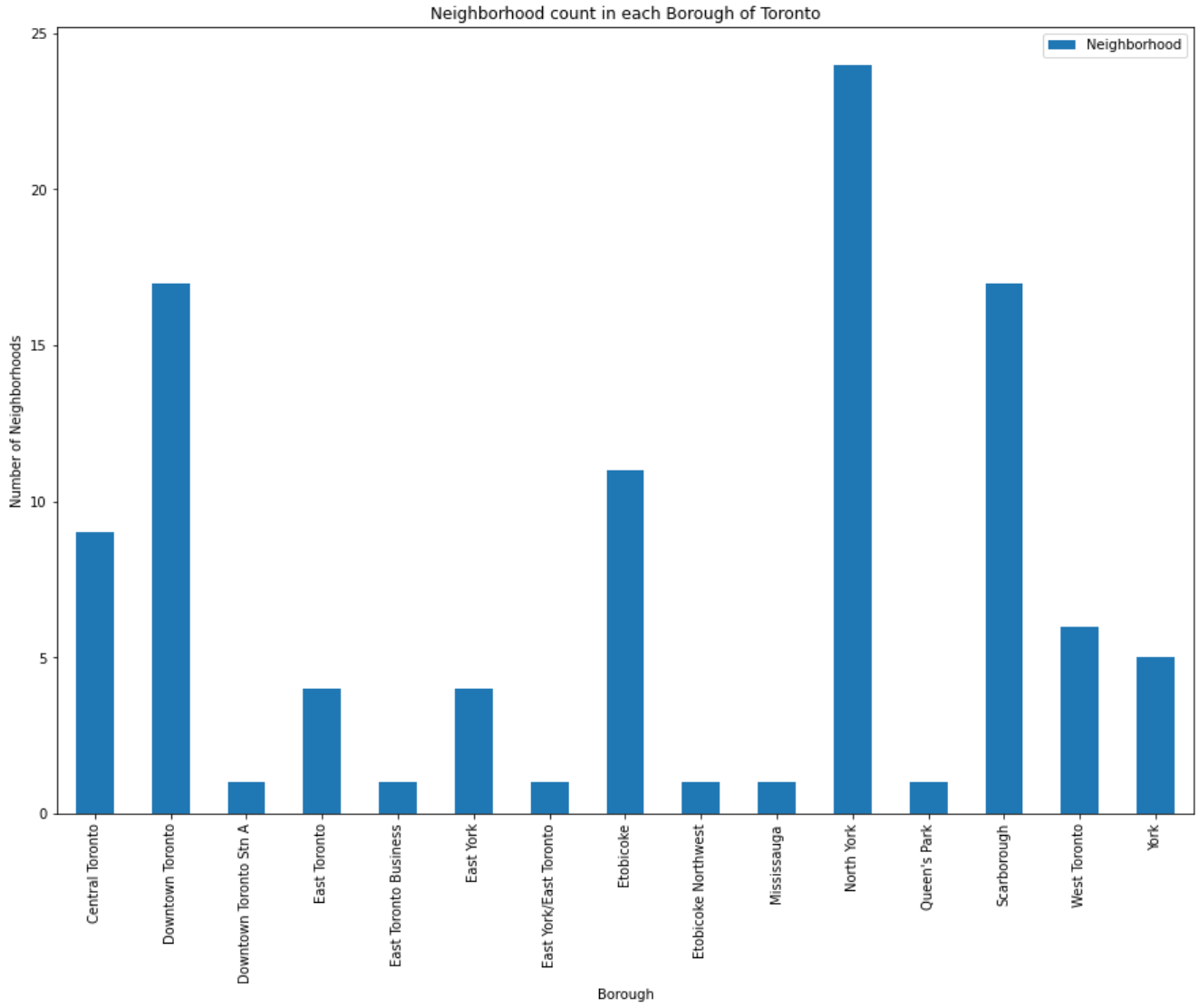
- **EDA (Exploratory Data Analysis)**

We then grouped each data set by the Borough and then we made some plots showing the neighborhood number of each Borough in order to get some information about the demographic features of each town

Neighborhood Count in each borough of New York



Neighborhood Count in each borough of Toronto

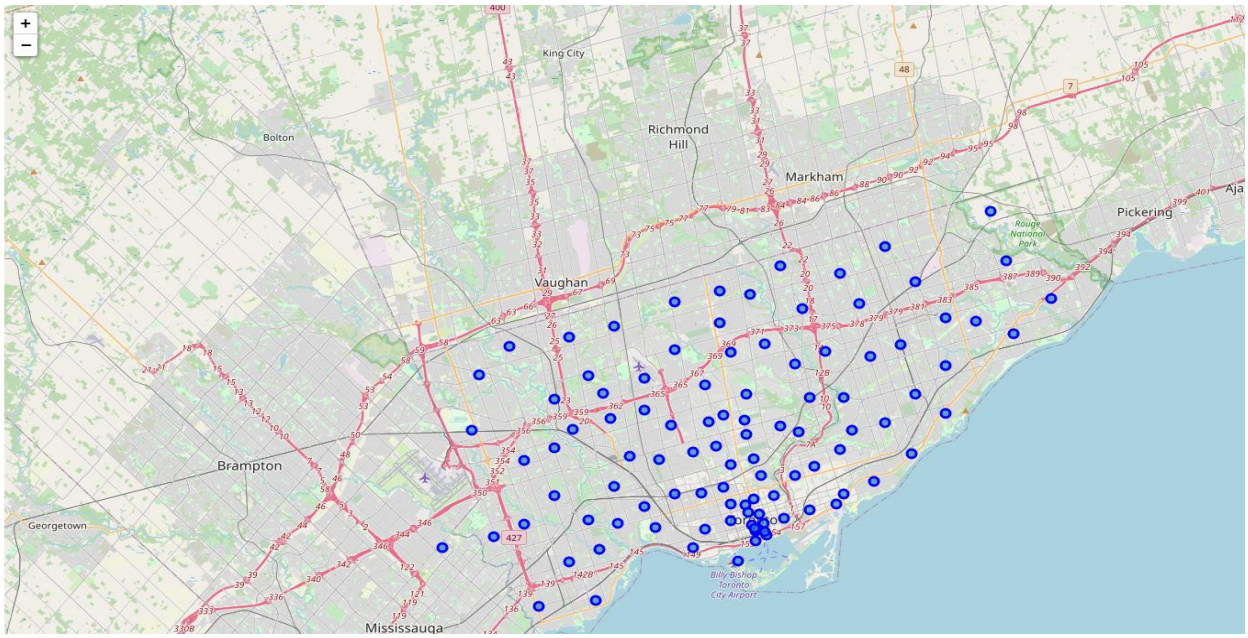


As we can see Toronto has much more uneven Boroughs than New York but we'll keep in mind that North York and Queens respectively have the most neighborhoods

Furtherely, we used the folium package to draw a map of the two cities with their neighborhoods

New York

Toronto



We can clearly see that New York City is much more congested that Toronto.

- **Acquire the Venues using the Foursquare API**

We then proceeded with the utilization of the foursquare API in order to get the venues for each neighborhood in order to store it in a data frame.

Toronto Venues Dataframe

	Borough	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	North York	Parkwoods	43.753259	-79.329656	Brookbanks Park	43.751976	-79.332140	Park
1	North York	Parkwoods	43.753259	-79.329656	Brookbanks Pool	43.751389	-79.332184	Pool
2	North York	Parkwoods	43.753259	-79.329656	Variety Store	43.751974	-79.333114	Food & Drink Shop
3	North York	Victoria Village	43.725882	-79.315572	Victoria Village Arena	43.723481	-79.315635	Hockey Arena
4	North York	Victoria Village	43.725882	-79.315572	Portugril	43.725819	-79.312785	Portuguese Restaurant

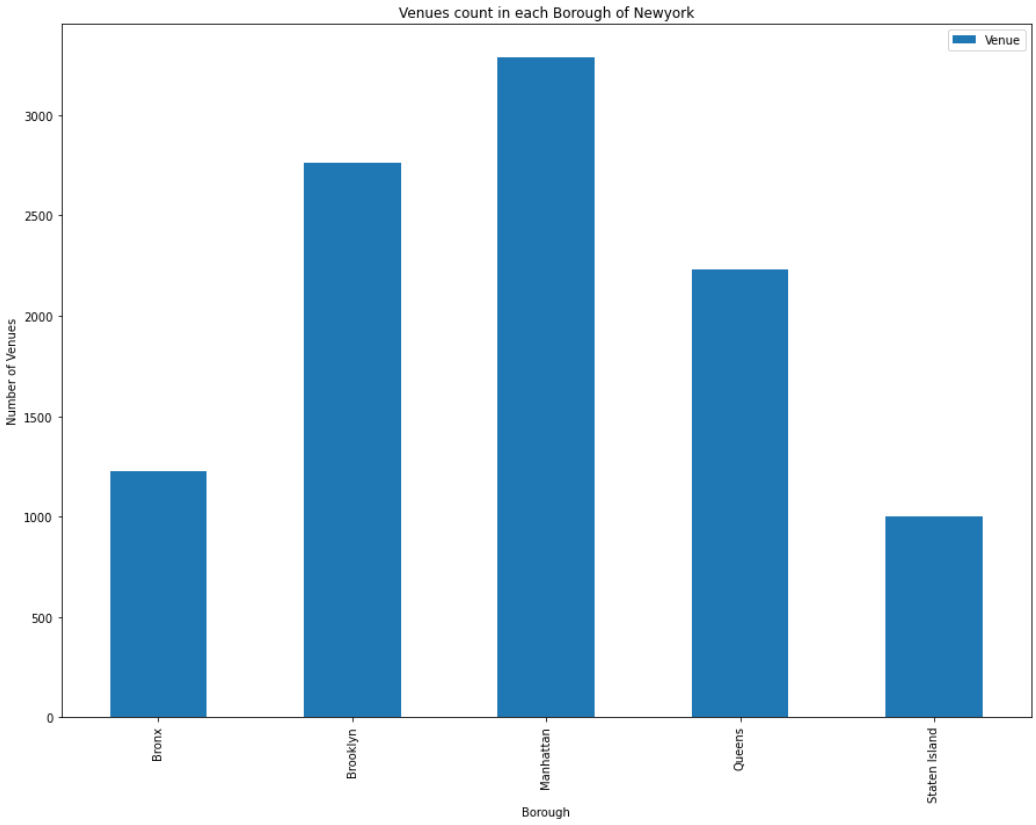
New York Venues Dataframe

	Borough	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Bronx	Wakefield	40.894705	-73.847201	Lollipops Gelato	40.894123	-73.845892	Dessert Shop
1	Bronx	Wakefield	40.894705	-73.847201	Rite Aid	40.896649	-73.844846	Pharmacy
2	Bronx	Wakefield	40.894705	-73.847201	Walgreens	40.896528	-73.844700	Pharmacy
3	Bronx	Wakefield	40.894705	-73.847201	Carvel Ice Cream	40.890487	-73.848568	Ice Cream Shop
4	Bronx	Wakefield	40.894705	-73.847201	Dunkin'	40.890459	-73.849089	Donut Shop

We were then ready to make some more graphs according to the venues of each borough or in contrast with the neighborhood number.

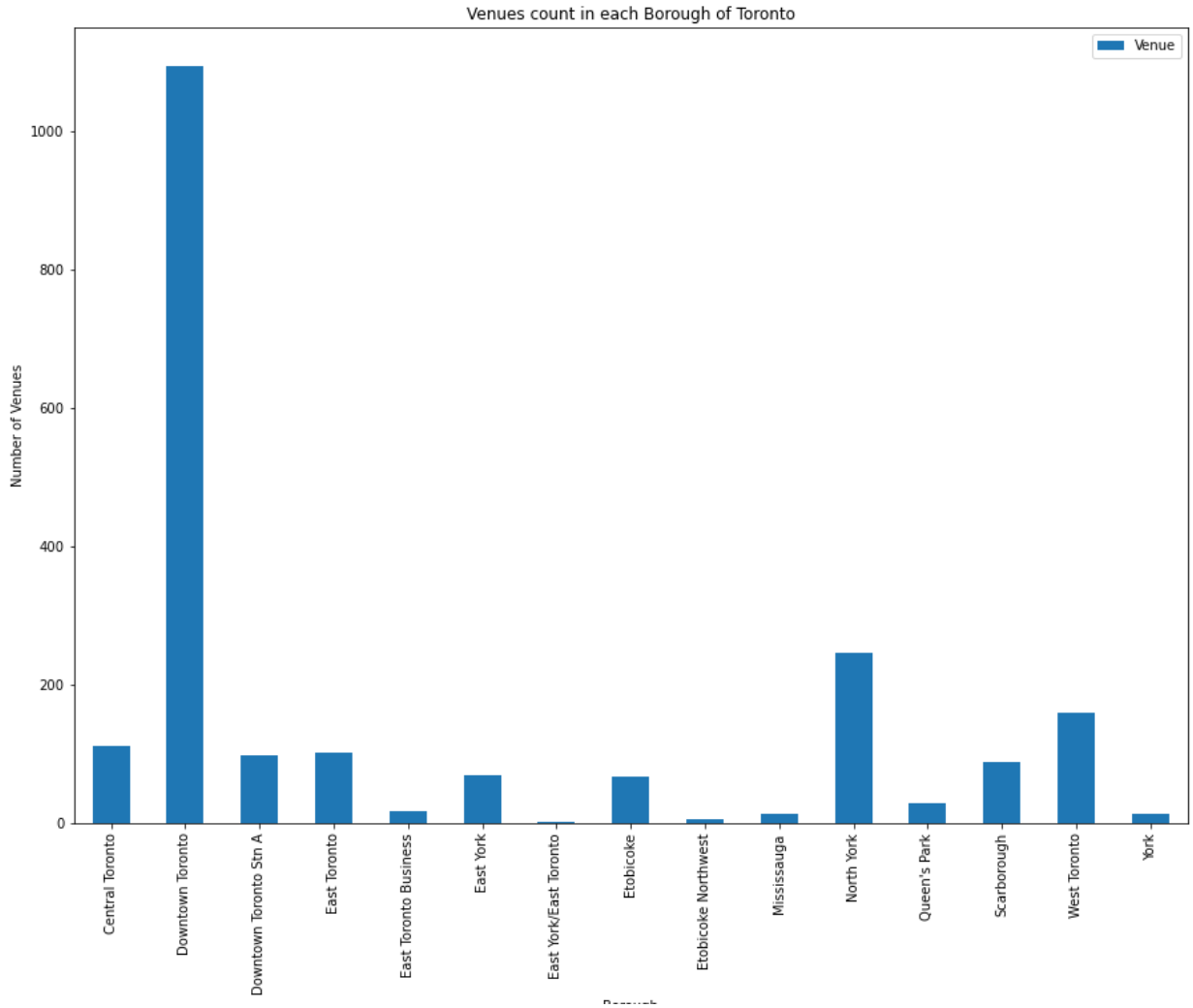
Venues Count in each Borough of

New York



We can see that despite the fact that Manhattan has the least neighborhoods is the most congested borough in terms of venues

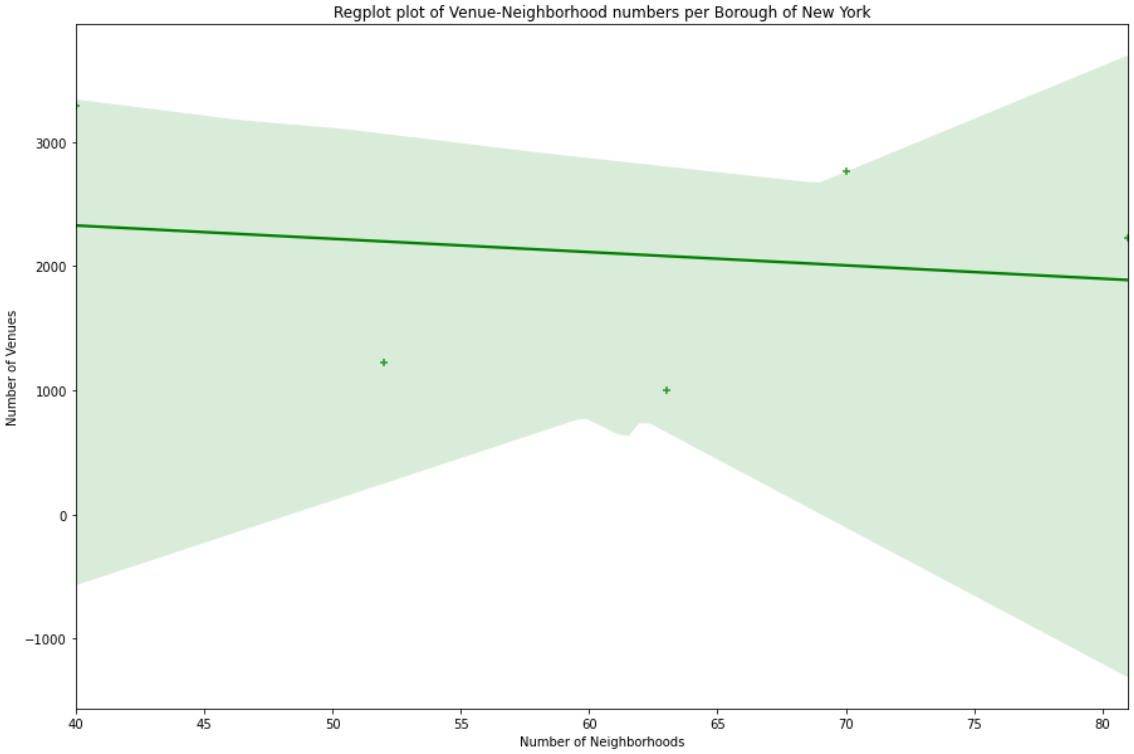
Venues Count in each Borough of Toronto



Like in New York, in Toronto also Downtown Toronto is the Borough with the more venues despite the fact that it is not the biggest borough

Regplot of Venue-Neighborhood per Borough

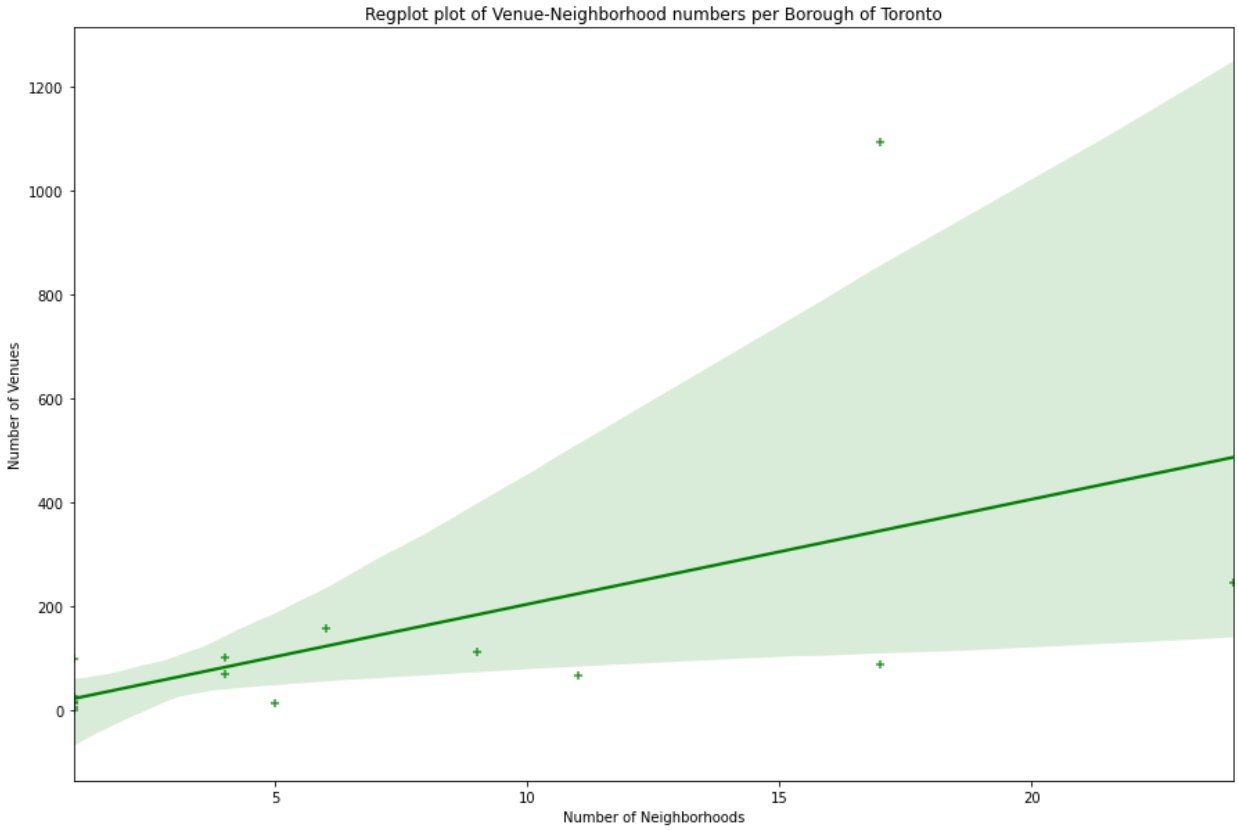
Of New York



We can see that in New York there is a slightly negative relationship of the neighborhood-venue count

Regplot of Venue-Neighborhood per Borough

Toronto



On the other hand in Toronto the relationship of the number of the neighborhoods and the venues are slightly positive.

- **One-hot encoding**

The next step it was to organize each venue category and perform one-hot encoding to analyze each Borough as shown in the tables below

New York top 5 categories per Borough

```
----Bronx----
            venue  freq
0    Pizza Place  0.08
1     Donut Shop  0.04
2  Grocery Store  0.04
3  Deli / Bodega  0.04
4    Bus Station  0.03


----Brooklyn----
                venue  freq
0         Pizza Place  0.05
1         Coffee Shop  0.04
2              Bakery  0.03
3                 Bar  0.03
4  Mexican Restaurant  0.02


----Manhattan----
                  venue  freq
0    Italian Restaurant  0.04
1           Coffee Shop  0.04
2  Gym / Fitness Center  0.02
3          Cocktail Bar  0.02
4                   Gym  0.02


----Queens----
                venue  freq
0       Deli / Bodega  0.04
1         Pizza Place  0.04
2  Chinese Restaurant  0.03
3              Bakery  0.03
4         Supermarket  0.02


----Staten Island----
                venue  freq
0         Pizza Place  0.06
1  Italian Restaurant  0.05
2       Deli / Bodega  0.04
3            Bus Stop  0.04
4         Coffee Shop  0.03
```

Toronto top 5 categories per Borough

----Central Toronto----

	venue	freq
0	Coffee Shop	0.07
1	Park	0.06
2	Sandwich Place	0.06
3	Pizza Place	0.05
4	Café	0.05

----East York----

	venue	freq
0	Coffee Shop	0.06
1	Bank	0.06
2	Sporting Goods Shop	0.04
3	Burger Joint	0.04
4	Pizza Place	0.04

----North York----

	venue	freq
0	Coffee Shop	0.07
1	Clothing Store	0.06
2	Restaurant	0.04
3	Pizza Place	0.03
4	Grocery Store	0.03

----Downtown Toronto----

	venue	freq
0	Coffee Shop	0.10
1	Café	0.05
2	Hotel	0.03
3	Restaurant	0.03
4	Bakery	0.02

----East York/East Toronto----

	venue	freq
0	Convenience Store	0.5
1	Park	0.5
2	Accessories Store	0.0
3	Mobile Phone Shop	0.0
4	Motel	0.0

----Queen's Park----

	venue	freq
0	Coffee Shop	0.21
1	Sushi Restaurant	0.07
2	Yoga Studio	0.04
3	Japanese Restaurant	0.04
4	Smoothie Shop	0.04

----Downtown Toronto Stn A----

	venue	freq
0	Coffee Shop	0.12
1	Seafood Restaurant	0.04
2	Japanese Restaurant	0.03
3	Cocktail Bar	0.03
4	Hotel	0.03

----Etobicoke----

	venue	freq
0	Pizza Place	0.12
1	Sandwich Place	0.07
2	Pharmacy	0.06
3	Coffee Shop	0.04
4	Grocery Store	0.04

----Scarborough----

	venue	freq
0	Bank	0.04
1	Coffee Shop	0.04
2	Bakery	0.04
3	Chinese Restaurant	0.04
4	Pizza Place	0.03

----East Toronto----

	venue	freq
0	Greek Restaurant	0.08
1	Coffee Shop	0.06
2	Italian Restaurant	0.05
3	Ice Cream Shop	0.04
4	Brewery	0.04

----Etobicoke Northwest----

	venue	freq
0	Garden Center	0.2
1	Truck Stop	0.2
2	Bar	0.2
3	Drugstore	0.2
4	Rental Car Location	0.2

----West Toronto----

	venue	freq
0	Café	0.07
1	Coffee Shop	0.06
2	Bar	0.06
3	Italian Restaurant	0.04
4	Breakfast Spot	0.03

----East Toronto Business----

	venue	freq
0	Yoga Studio	0.06
1	Auto Workshop	0.06
2	Park	0.06
3	Comic Shop	0.06
4	Recording Studio	0.06

----Mississauga----

	venue	freq
0	Coffee Shop	0.21
1	Hotel	0.14
2	Mediterranean Restaurant	0.07
3	Gas Station	0.07
4	Middle Eastern Restaurant	0.07

----York----

	venue	freq
0	Park	0.21
1	Convenience Store	0.07
2	Coffee Shop	0.07
3	Women's Store	0.07
4	Pizza Place	0.07

We got the best 5 categories of venues of each Borough for both cities and then we proceeded with creating a table having all boroughs for both cities with the 10 most common categories descending

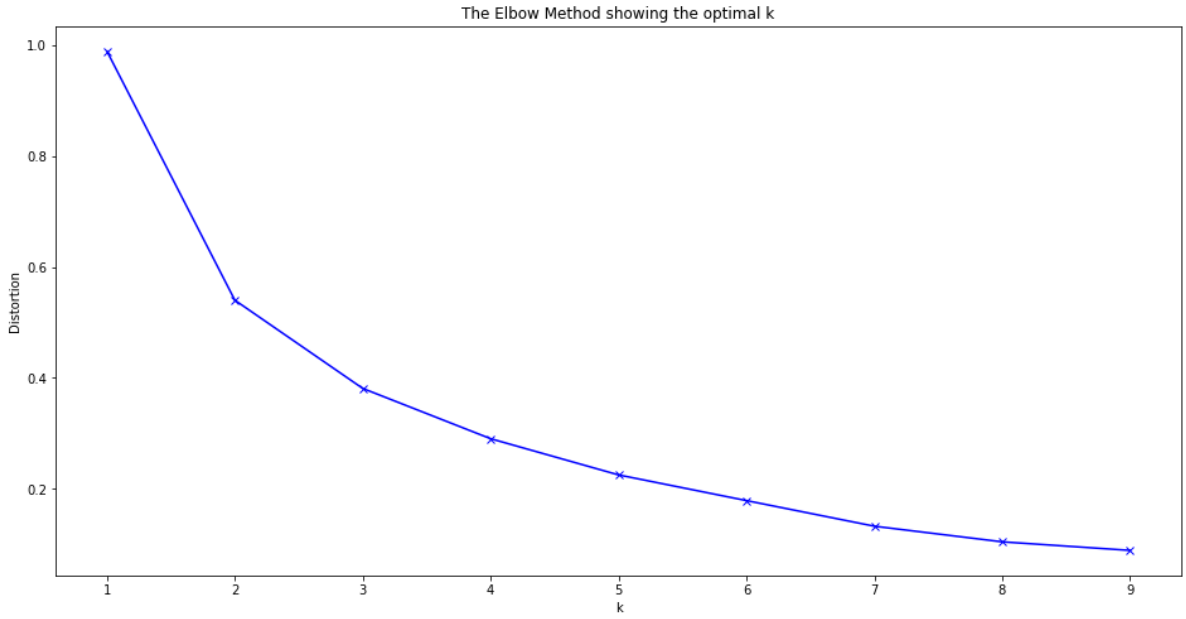
Top 10 Categories per Borough for Both Cities

	Borough	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Central Toronto	Coffee Shop	Park	Sandwich Place	Pizza Place	Café	Restaurant	Sushi Restaurant	Dessert Shop	Clothing Store	Italian Restaurant
1	Downtown Toronto	Coffee Shop	Café	Restaurant	Hotel	Japanese Restaurant	Italian Restaurant	Park	Bakery	Clothing Store	Gym
2	Downtown Toronto Stn A	Coffee Shop	Seafood Restaurant	Japanese Restaurant	Cocktail Bar	Hotel	Restaurant	Italian Restaurant	Beer Bar	Café	Bakery
3	East Toronto	Greek Restaurant	Coffee Shop	Italian Restaurant	Ice Cream Shop	Brewery	Bakery	Restaurant	Café	Bookstore	Pub
4	East Toronto Business	Yoga Studio	Auto Workshop	Park	Comic Shop	Recording Studio	Restaurant	Farmers Market	Fast Food Restaurant	Skate Park	Burrito Place
5	East York	Coffee Shop	Bank	Sporting Goods Shop	Burger Joint	Pizza Place	Indian Restaurant	Athletics & Sports	Beer Store	Supermarket	Sandwich Place
6	East York/East Toronto	Convenience Store	Park	Accessories Store	Mobile Phone Shop	Motel	Moroccan Restaurant	Monument / Landmark	Molecular Gastronomy Restaurant	Modern European Restaurant	Middle Eastern Restaurant
7	Etobicoke	Pizza Place	Sandwich Place	Pharmacy	Coffee Shop	Grocery Store	Gym	Fast Food Restaurant	Discount Store	Bakery	Café
8	Etobicoke Northwest	Garden Center	Truck Stop	Bar	Drugstore	Rental Car Location	Motel	Moroccan Restaurant	Monument / Landmark	Molecular Gastronomy Restaurant	Accessories Store
9	Mississauga	Coffee Shop	Hotel	Mediterranean Restaurant	Gas Station	Middle Eastern Restaurant	Sandwich Place	American Restaurant	Gym	Burrito Place	Fried Chicken Joint
10	North York	Coffee Shop	Clothing Store	Restaurant	Pizza Place	Grocery Store	Bank	Fast Food Restaurant	Sandwich Place	Japanese Restaurant	Park
11	Queen's Park	Coffee Shop	Sushi Restaurant	Yoga Studio	Japanese Restaurant	Smoothie Shop	Mexican Restaurant	Café	Fried Chicken Joint	Sandwich Place	Beer Bar
12	Scarborough	Bank	Coffee Shop	Bakery	Chinese Restaurant	Pizza Place	Breakfast Spot	Fast Food Restaurant	Bus Station	Thai Restaurant	Lounge
13	West Toronto	Café	Bar	Coffee Shop	Italian Restaurant	Bakery	Breakfast Spot	Restaurant	Diner	Pizza Place	Park
14	York	Park	Convenience Store	Coffee Shop	Women's Store	Pizza Place	Hockey Arena	Field	Turkish Restaurant	Pool	Discount Store
15	Bronx	Pizza Place	Deli / Bodega	Donut Shop	Grocery Store	Italian Restaurant	Pharmacy	Sandwich Place	Bus Station	Chinese Restaurant	Bank
16	Brooklyn	Pizza Place	Coffee Shop	Bar	Bakery	Deli / Bodega	Italian Restaurant	Grocery Store	Chinese Restaurant	Café	Ice Cream Shop
17	Manhattan	Coffee Shop	Italian Restaurant	American Restaurant	Bakery	Café	Pizza Place	Park	Bar	Hotel	Gym / Fitness Center
18	Queens	Pizza Place	Deli / Bodega	Chinese Restaurant	Bakery	Donut Shop	Bar	Pharmacy	Bank	Italian Restaurant	Sandwich Place
19	Staten Island	Pizza Place	Italian Restaurant	Bus Stop	Deli / Bodega	Coffee Shop	Pharmacy	Bagel Shop	Chinese Restaurant	Bar	American Restaurant

- **Elbow method and K-Means Clustering**

We then use the k-means clustering algorithm to group the boroughs into clusters that aim to partition ‘n’ observations into k clusters in which each observation belongs to one cluster.

Here elbow method is used to determine the optimum value of k to perform the k-means method.



As the graph suggests the optimum k with the least distortion is at a number of three. And then we were ready to continue with the modeling method

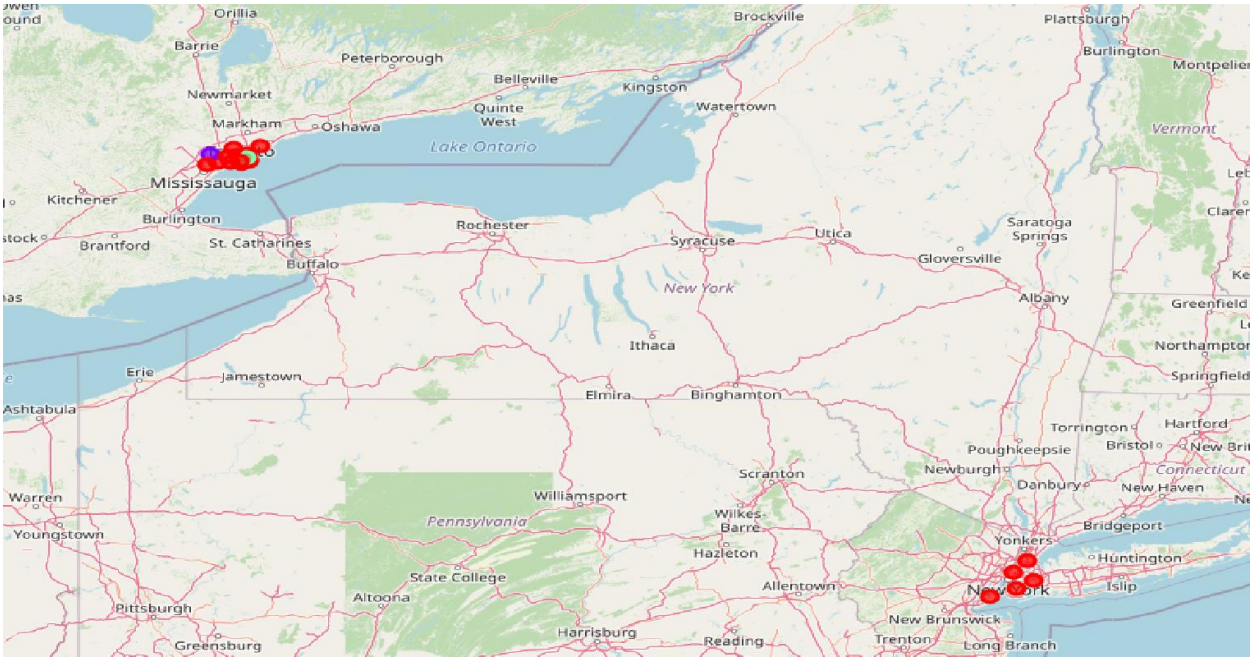
4. Results and discussion

	Borough	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Central Toronto	43.701980	-79.398954	0	Coffee Shop	Park	Sandwich Place	Pizza Place	Café	Restaurant	Sushi Restaurant	Dessert Shop	Clothing Store	Italian Restaurant
1	Downtown Toronto	43.654624	-79.384184	0	Coffee Shop	Café	Restaurant	Hotel	Japanese Restaurant	Italian Restaurant	Park	Bakery	Clothing Store	Gym
2	Downtown Toronto Stn A	43.646435	-79.374846	0	Coffee Shop	Seafood Restaurant	Japanese Restaurant	Cocktail Bar	Hotel	Restaurant	Italian Restaurant	Beer Bar	Café	Bakery
3	East Toronto	43.671110	-79.325428	0	Greek Restaurant	Coffee Shop	Italian Restaurant	Ice Cream Shop	Brewery	Bakery	Restaurant	Café	Bookstore	Pub
4	East Toronto Business	43.662744	-79.321558	0	Yoga Studio	Auto Workshop	Park	Comic Shop	Recording Studio	Restaurant	Farmers Market	Fast Food Restaurant	Skate Park	Burrito Place
5	East York	43.704043	-79.335287	0	Coffee Shop	Bank	Sporting Goods Shop	Burger Joint	Pizza Place	Indian Restaurant	Athletics & Sports	Beer Store	Supermarket	Sandwich Place
6	East York/East Toronto	43.685347	-79.338106	2	Convenience Store	Park	Accessories Store	Mobile Phone Shop	Motel	Moroccan Restaurant	Monument / Landmark	Molecular Gastronomy Restaurant	Modern European Restaurant	Middle Eastern Restaurant
7	Etobicoke	43.655797	-79.537348	0	Pizza Place	Sandwich Place	Pharmacy	Coffee Shop	Grocery Store	Gym	Fast Food Restaurant	Discount Store	Bakery	Café
8	Etobicoke Northwest	43.706748	-79.594054	1	Garden Center	Truck Stop	Bar	Drugstore	Rental Car Location	Motel	Moroccan Restaurant	Monument / Landmark	Molecular Gastronomy Restaurant	Accessories Store
9	Mississauga	43.636966	-79.615819	0	Coffee Shop	Hotel	Mediterranean Restaurant	Gas Station	Middle Eastern Restaurant	Sandwich Place	American Restaurant	Gym	Burrito Place	Fried Chicken Joint
10	North York	43.750727	-79.429338	0	Coffee Shop	Clothing Store	Restaurant	Pizza Place	Grocery Store	Bank	Fast Food Restaurant	Sandwich Place	Japanese Restaurant	Park
11	Queen's Park	43.662301	-79.389494	0	Coffee Shop	Sushi Restaurant	Yoga Studio	Japanese Restaurant	Smoothie Shop	Mexican Restaurant	Café	Fried Chicken Joint	Sandwich Place	Beer Bar
12	Scarborough	43.766229	-79.249085	0	Bank	Coffee Shop	Bakery	Chinese Restaurant	Pizza Place	Breakfast Spot	Fast Food Restaurant	Bus Station	Thai Restaurant	Lounge
13	West Toronto	43.652653	-79.449290	0	Café	Bar	Coffee Shop	Italian Restaurant	Bakery	Breakfast Spot	Restaurant	Diner	Pizza Place	Park
14	York	43.690797	-79.472633	0	Park	Convenience Store	Coffee Shop	Women's Store	Pizza Place	Hockey Arena	Field	Turkish Restaurant	Pool	Discount Store
15	Bronx	40.850482	-73.873442	0	Pizza Place	Deli / Bodega	Donut Shop	Grocery Store	Italian Restaurant	Pharmacy	Sandwich Place	Bus Station	Chinese Restaurant	Bank
16	Brooklyn	40.651089	-73.952999	0	Pizza Place	Coffee Shop	Bar	Bakery	Deli / Bodega	Italian Restaurant	Grocery Store	Chinese Restaurant	Café	Ice Cream Shop
17	Manhattan	40.762438	-73.975329	0	Coffee Shop	Italian Restaurant	American Restaurant	Bakery	Café	Pizza Place	Park	Bar	Hotel	Gym / Fitness Center
18	Queens	40.706424	-73.824131	0	Pizza Place	Deli / Bodega	Chinese Restaurant	Bakery	Donut Shop	Bar	Pharmacy	Bank	Italian Restaurant	Sandwich Place
19	Staten Island	40.588851	-74.137414	0	Pizza Place	Italian Restaurant	Bus Stop	Deli / Bodega	Coffee Shop	Pharmacy	Bagel Shop	Chinese Restaurant	Bar	American Restaurant

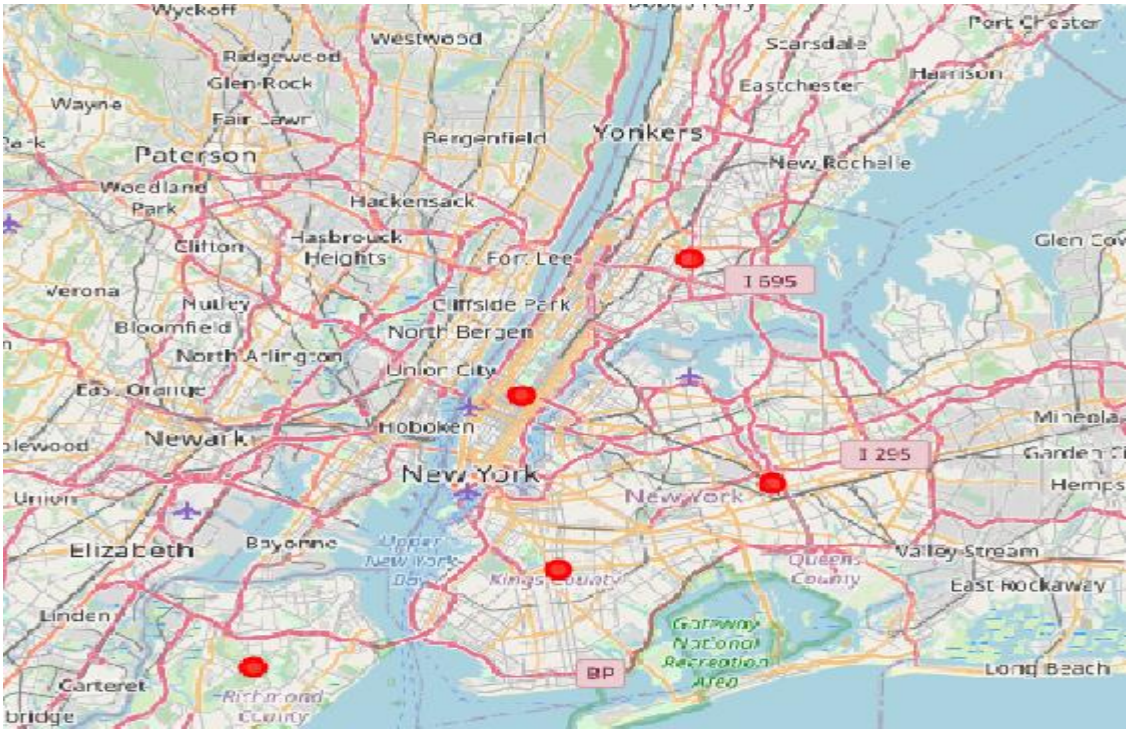
The above table shows each borough for both cities with the 10 most common category venues per borough as well as the cluster that each borough fits in.

Let’s get a look on the map where each color represents a specific cluster

Toronto-New York Cluster Map



New York Map



Toronto Map

As we can see clearly these two cities are very similar. Toronto is a city which the majority of it's boroughs are very common with the New York city. Actually if an entrepreneur is thinking to branch out on Toronto from New York he must be reassured. From this study we can see that almost every borough of Toronto is alike New York's. Let's examine the clusters even more

Cluster 1

	Borough	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Central Toronto	Coffee Shop	Park	Sandwich Place	Pizza Place	Café	Restaurant	Sushi Restaurant	Dessert Shop	Clothing Store	Italian Restaurant
1	Downtown Toronto	Coffee Shop	Café	Restaurant	Hotel	Japanese Restaurant	Italian Restaurant	Park	Bakery	Clothing Store	Gym
2	Downtown Toronto Stn A	Coffee Shop	Seafood Restaurant	Japanese Restaurant	Cocktail Bar	Hotel	Restaurant	Italian Restaurant	Beer Bar	Café	Bakery
3	East Toronto	Greek Restaurant	Coffee Shop	Italian Restaurant	Ice Cream Shop	Brewery	Bakery	Restaurant	Café	Bookstore	Pub
4	East Toronto Business	Yoga Studio	Auto Workshop	Park	Comic Shop	Recording Studio	Restaurant	Farmers Market	Fast Food Restaurant	Skate Park	Burrito Place
5	East York	Coffee Shop	Bank	Sporting Goods Shop	Burger Joint	Pizza Place	Indian Restaurant	Athletics & Sports	Beer Store	Supermarket	Sandwich Place
7	Etobicoke	Pizza Place	Sandwich Place	Pharmacy	Coffee Shop	Grocery Store	Gym	Fast Food Restaurant	Discount Store	Bakery	Café
9	Mississauga	Coffee Shop	Hotel	Mediterranean Restaurant	Gas Station	Middle Eastern Restaurant	Sandwich Place	American Restaurant	Gym	Burrito Place	Fried Chicken Joint
10	North York	Coffee Shop	Clothing Store	Restaurant	Pizza Place	Grocery Store	Bank	Fast Food Restaurant	Sandwich Place	Japanese Restaurant	Park
11	Queen's Park	Coffee Shop	Sushi Restaurant	Yoga Studio	Japanese Restaurant	Smoothie Shop	Mexican Restaurant	Café	Fried Chicken Joint	Sandwich Place	Beer Bar
12	Scarborough	Bank	Coffee Shop	Bakery	Chinese Restaurant	Pizza Place	Breakfast Spot	Fast Food Restaurant	Bus Station	Thai Restaurant	Lounge
13	West Toronto	Café	Bar	Coffee Shop	Italian Restaurant	Bakery	Breakfast Spot	Restaurant	Diner	Pizza Place	Park
14	York	Park	Convenience Store	Coffee Shop	Women's Store	Pizza Place	Hockey Arena	Field	Turkish Restaurant	Pool	Discount Store
15	Bronx	Pizza Place	Deli / Bodega	Donut Shop	Grocery Store	Italian Restaurant	Pharmacy	Sandwich Place	Bus Station	Chinese Restaurant	Bank
16	Brooklyn	Pizza Place	Coffee Shop	Bar	Bakery	Deli / Bodega	Italian Restaurant	Grocery Store	Chinese Restaurant	Café	Ice Cream Shop
17	Manhattan	Coffee Shop	Italian Restaurant	American Restaurant	Bakery	Café	Pizza Place	Park	Bar	Hotel	Gym / Fitness Center
18	Queens	Pizza Place	Deli / Bodega	Chinese Restaurant	Bakery	Donut Shop	Bar	Pharmacy	Bank	Italian Restaurant	Sandwich Place
19	Staten Island	Pizza Place	Italian Restaurant	Bus Stop	Deli / Bodega	Coffee Shop	Pharmacy	Bagel Shop	Chinese Restaurant	Bar	American Restaurant

Cluster 2

	Borough	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
8	Etobicoke Northwest	Garden Center	Truck Stop	Bar	Drugstore	Rental Car Location	Motel	Moroccan Restaurant	Monument / Landmark	Molecular Gastronomy Restaurant	Accessories Store

Cluster 3

	Borough	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
6	East York/East Toronto	Convenience Store	Park	Accessories Store	Mobile Phone Shop	Motel	Moroccan Restaurant	Monument / Landmark	Molecular Gastronomy Restaurant	Modern European Restaurant	Middle Eastern Restaurant

We can see that the majority of Toronto's Boroughs are like the New York Boroughs meaning that they are consisted mainly from fast food shops, parks, and cafeterias. On the other hand, Etobicoke Northwest and East York are the two exceptions that are made up from retail shops or specific cousin restaurants.

6. Conclusion

In this project an attempt has been made to make use of the Foursquare API to get the most common venues for each borough of the two requested cities in order to compare them and find out how close they are to each other. The way to find this out is by utilizing the k-means method in order to cluster the boroughs and make some comments on the results. Every customer who thinks of expanding his business from New York to Toronto can now be assured of the circumstances and can decide e.g. If he needs to expand on a Borough with the same opportunities or in a market that his sector is not so common yet.