

Capstone Project - The Battle of Neighborhoods



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Introduction/Business Problem

Problem Statement: Comparing the neighborhoods of the two cities i.e. New York City & Toronto and determining whether they are similar or dissimilar?

Toronto is the provincial capital of Ontario and the most populous city in Canada. It is an international centre of business, finance, arts, and culture, and is recognized as one of the most multicultural and cosmopolitan cities in the world, whereas New York (also called New York City, short form NYC) is the biggest city in the United States, located in the state of New York. It is the financial capital of the US since it is home to the nation's stock market, Wall Street, and the One World Trade Center. It is also the home of the United Nations Headquarters.

From above we can understand that how popular both the cities are, so if a person needs to understand that how far both the cities are similar or dissimilar or what kind of diversity or similarity both the cities have then one needs to have a clear idea about its geographical distribution and what all neighborhoods they have and popular venues in them which make them the most popular cities of the world. So let's have a look at the neighborhoods / boroughs of both the cities.

Neighborhoods of Toronto by district:

- Old Toronto
 - Downtown Core (Central Toronto)
 - East Toronto
 - North Toronto
 - West Toronto
- East York
- Etobicoke
- North York
- Scarborough
- York

Neighborhoods of New York City by boroughs:

- The Bronx
- Brooklyn
- Manhattan
- Queens
- Staten Island

Both the cities have quite a huge geographical area i.e. Toronto is widespread across 630 sq.km whereas the New York City has an area of 830sq.km. So exploring each and every neighborhood based on the venues returned by each neighborhoods is quite a heavy task, so to narrow down the result and avoiding the overfitting of the model by removing the noise which can occur if we consider each and every neighborhood. That's why I have focused on the most popular neighborhoods of both the cities i.e. Old Toronto which consists of Central / Downtown Toronto, East Toronto, West Toronto & South Toronto for Toronto, and Manhattan for the New York City which is well renowned and by far the most popular borough in the NYC.

Data Collection

Toronto: Toronto, the capital of the province of Ontario, is a major Canadian city along Lake Ontario's northwestern shore. It's a dynamic metropolis with a core of soaring skyscrapers, all dwarfed by the iconic, free-standing CN Tower. Toronto also has many green spaces, from the orderly oval of Queen's Park to 400-acre High Park and its trails, sports facilities and zoo.

In order to determine and find out the most common venues I needed to scrape the data from the website i.e. https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M which contains the Postal Code, Neighborhoods & Boroughs for the Toronto City. But this information was not indeed enough, I also needed the latitude & longitude value for each of the neighborhoods, so to do that I took the help geopy library so fetch the latitude and longitude value for each and every neighborhood.

New York City: New York City comprises 5 boroughs sitting where the Hudson River meets the Atlantic Ocean. At its core is Manhattan, a densely populated borough that's among the world's major commercial, financial and cultural centers. Its iconic sites include skyscrapers such as the Empire State Building and sprawling Central Park. Broadway theater is staged in neon-lit Times Square.

To fetch the New York City data a json file was readily available on the following link https://cocl.us/new_york_dataset the only challenge with this was to extract the data from the json file and store the resultant in the form of pandas data frame.

Methodology

While comparing both the cities it was extremely important to select the appropriate data in the right format which was not readily available and another challenging task was to preprocess it so that it could be fine tune further for fetching the neighborhoods and the most popular venues in the vicinity of those neighborhoods. This section is divided into two parts where in each part I have explained the process of preprocessing the data for each cities and how the EDA (Exploratory Data Analysis) was performed on it.

Toronto:

Step 1: Pre-Processing the Data

1. Scraped the data from the following url with the help of Beautiful Soup Library.
https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M
2. Converted the scraped data into pandas data frame by fulfilling below mentioned parameters:
 - The dataframe consist of 3 columns: PostalCode, Borough, and Neighborhood.
 - Only processed the cells that have an assigned borough. Ignored the cells with a borough that is **Not assigned**.
 - More than one neighborhood existed in one postal code area. For example, in the table on the Wikipedia page, I have notice that **M5A** is listed twice and has two neighborhoods: **Harbourfront** and **Regent Park**. These two rows were combined into one row with the neighborhoods separated with a comma as shown below in the table
 - If a cell had a borough but a **Not assigned** neighborhood, then the neighborhood was kept same as the borough. So for the **9th** cell in the table on the Wikipedia page, the value of the Borough and the Neighborhood columns is **Queen's Park**.

	PostalCode	Borough	Neighbourhood
0	M1B	Scarborough	Rouge, Malvern
1	M1C	Scarborough	Highland Creek, Rouge Hill, Port Union
2	M1E	Scarborough	Guildwood, Morningside, West Hill
3	M1G	Scarborough	Woburn
4	M1H	Scarborough	Cedarbrae
5	M1J	Scarborough	Scarborough Village
6	M1K	Scarborough	East Birchmount Park, Ionview, Kennedy Park

3. Appending the geospatial coordinates in the resultant dataframe:

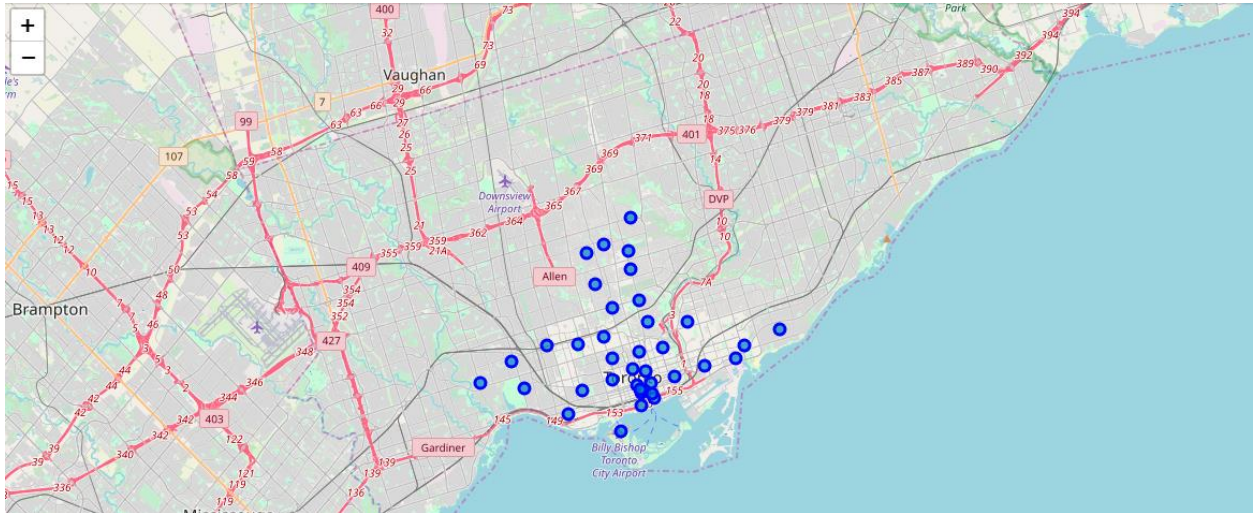
	PostalCode	Borough	Neighbourhood	Latitude	Longitude
0	M1B	Scarborough	Rouge, Malvern	43.806686	-79.194353
1	M1C	Scarborough	Highland Creek, Rouge Hill, Port Union	43.784535	-79.160497
2	M1E	Scarborough	Guildwood, Morningside, West Hill	43.763573	-79.188711
3	M1G	Scarborough	Woburn	43.770992	-79.216917
4	M1H	Scarborough	Cedarbrae	43.773136	-79.239476
5	M1J	Scarborough	Scarborough Village	43.744734	-79.239476
6	M1K	Scarborough	East Birchmount Park, Ionview, Kennedy Park	43.727929	-79.262029

Step 2: Exploratory Data Analysis

1. Used the geopy python library to fetch the latitude and longitude values of Toronto city.
2. Create a map of Toronto with neighborhoods superimposed on top with the help of folium library.



- Now to concise down the result we have selected the Boroughs of Old Toronto only, so that we can precisely explore the neighborhoods of particular or well know region.

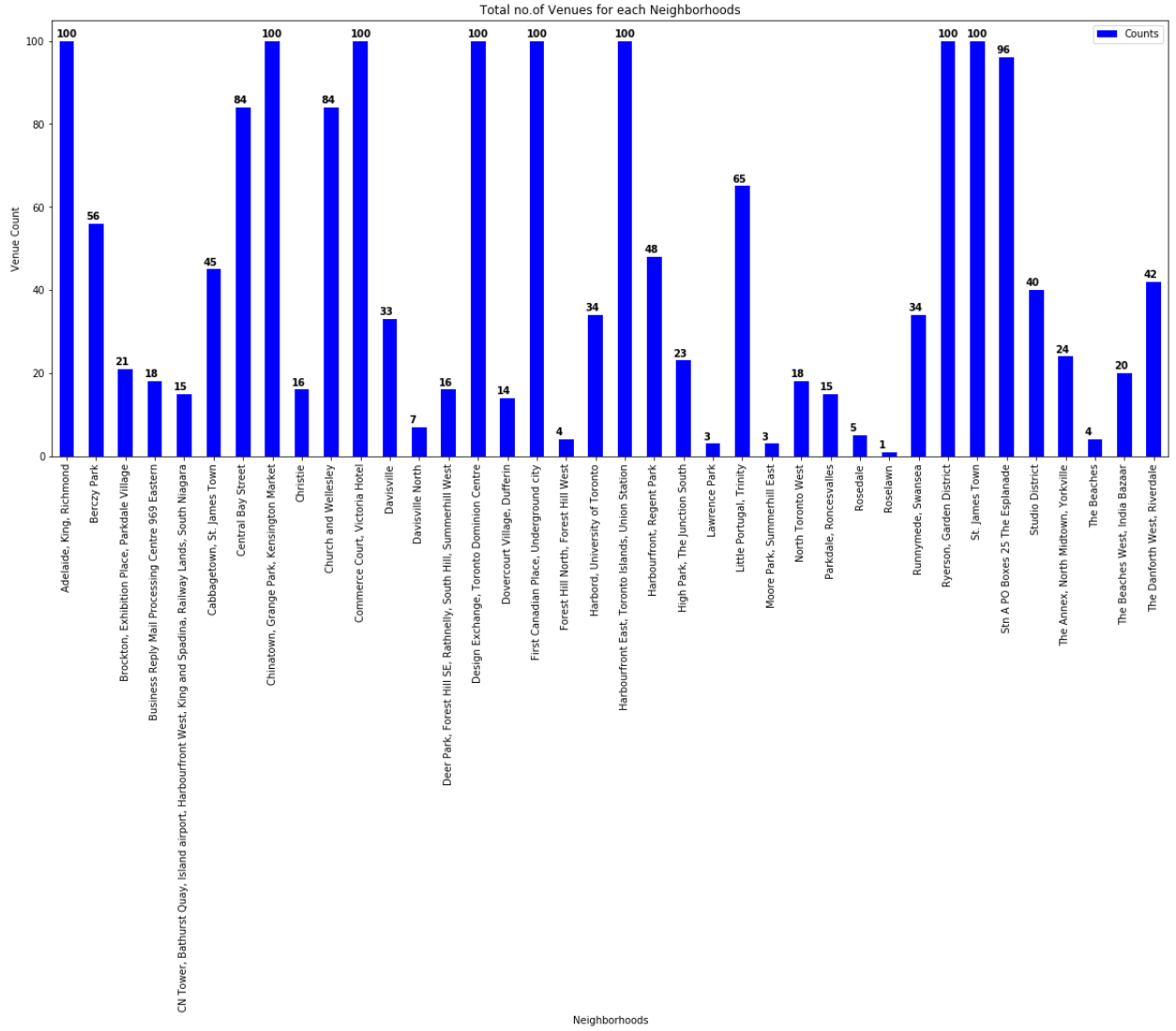


- Now we have explored each and every neighborhood by finding top 100 venues in the vicinity of 500 meters for each neighborhood, this task was achieved with the help of Foursquare API.
- Since the result that we returned were in the form of json format, so eventually I defined a function that would convert the json result in the pandas dataframe. Following below is the snapshot of the table.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	The Beaches	43.676357	-79.293031	Glen Manor Ravine	43.676821	-79.293942	Trail
1	The Beaches	43.676357	-79.293031	The Big Carrot Natural Food Market	43.678879	-79.297734	Health Food Store
2	The Beaches	43.676357	-79.293031	Grover Pub and Grub	43.679181	-79.297215	Pub
3	The Beaches	43.676357	-79.293031	Upper Beaches	43.680563	-79.292869	Neighborhood
4	The Danforth West, Riverdale	43.679557	-79.352188	Pantheon	43.677621	-79.351434	Greek Restaurant
5	The Danforth West, Riverdale	43.679557	-79.352188	Dolce Gelato	43.677773	-79.351187	Ice Cream Shop
6	The Danforth West, Riverdale	43.679557	-79.352188	MenEssentials	43.677820	-79.351265	Cosmetics Shop

(1699, 7)

- Now we can see from above that for a neighborhood there were too many venues returned for it. So to summarize the result we group the data with their neighborhoods and plot the bar graph of the resultant dataframe to visualize the count of venues for each neighborhood. By analyzing the data I realized that their were only 239 unique categories or venues returned by the neighborhoods.



New York City:

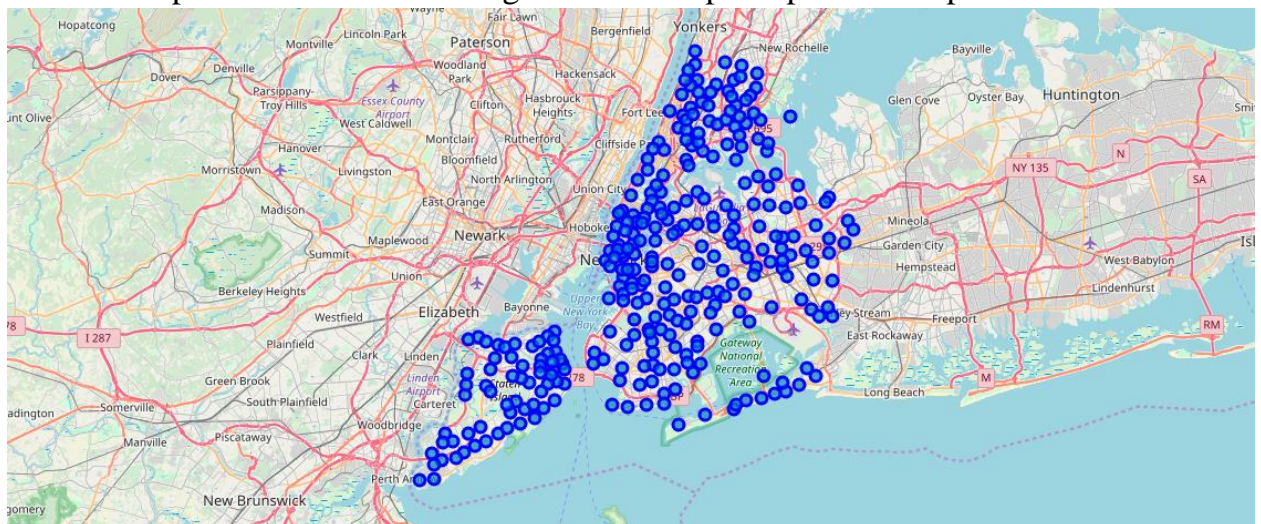
Step 1: Pre-Processing the Data

1. Downloaded the data from the following url which was available in json format.
https://cocl.us/new_york_dataset.
2. Extracted the features from the dataset and transformed into pandas dataframe as show below.

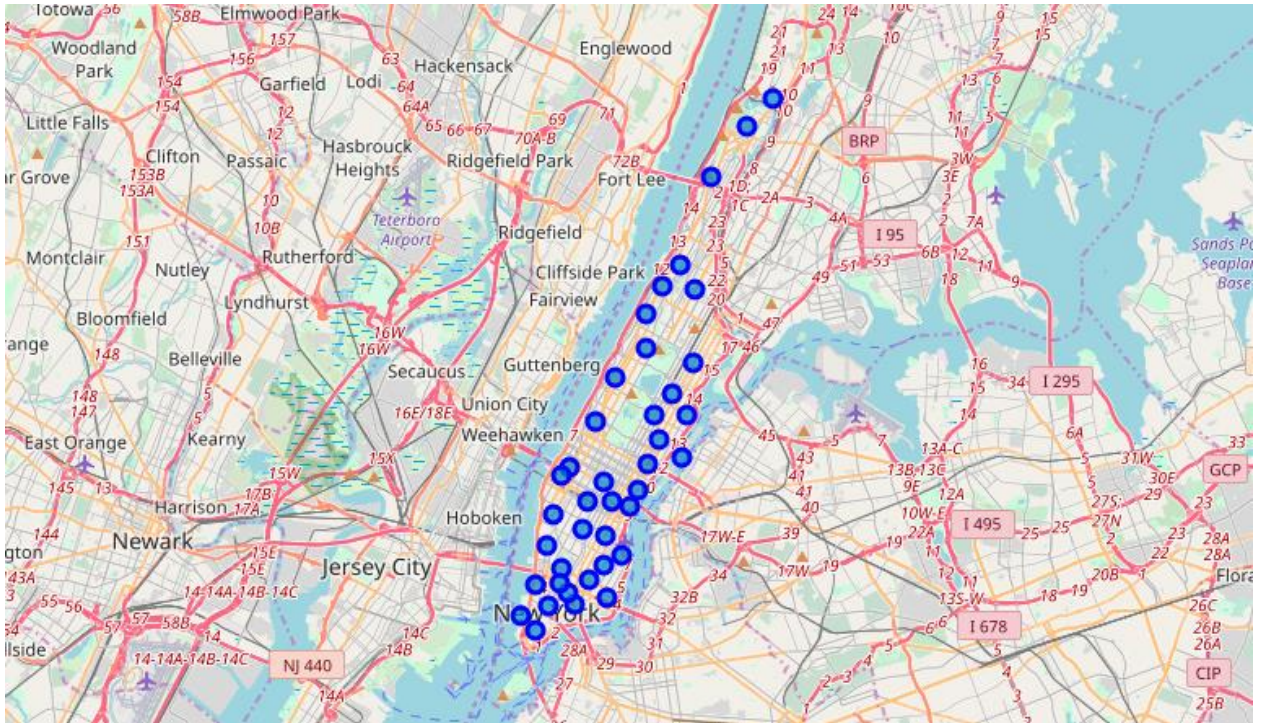
	Borough	Neighborhood	Latitude	Longitude
0	Bronx	Wakefield	40.894705	-73.847201
1	Bronx	Co-op City	40.874294	-73.829939
2	Bronx	Eastchester	40.887556	-73.827806
3	Bronx	Fieldston	40.895437	-73.905643
4	Bronx	Riverdale	40.890834	-73.912585
5	Bronx	Kingsbridge	40.881687	-73.902818
6	Manhattan	Marble Hill	40.876551	-73.910660
7	Bronx	Woodlawn	40.898273	-73.867315
8	Bronx	Norwood	40.877224	-73.879391
9	Bronx	Williamsbridge	40.881039	-73.857446

Step 2: Exploratory Data Analysis

1. Used the geopy python library to fetch the latitude and longitude values of New York city.
2. Create a map of New York with neighborhoods superimposed on top of it.



- Now to concise down the result we have selected the Manhattan Borough only, so that we can precisely explore the neighborhoods of particular or well know region.

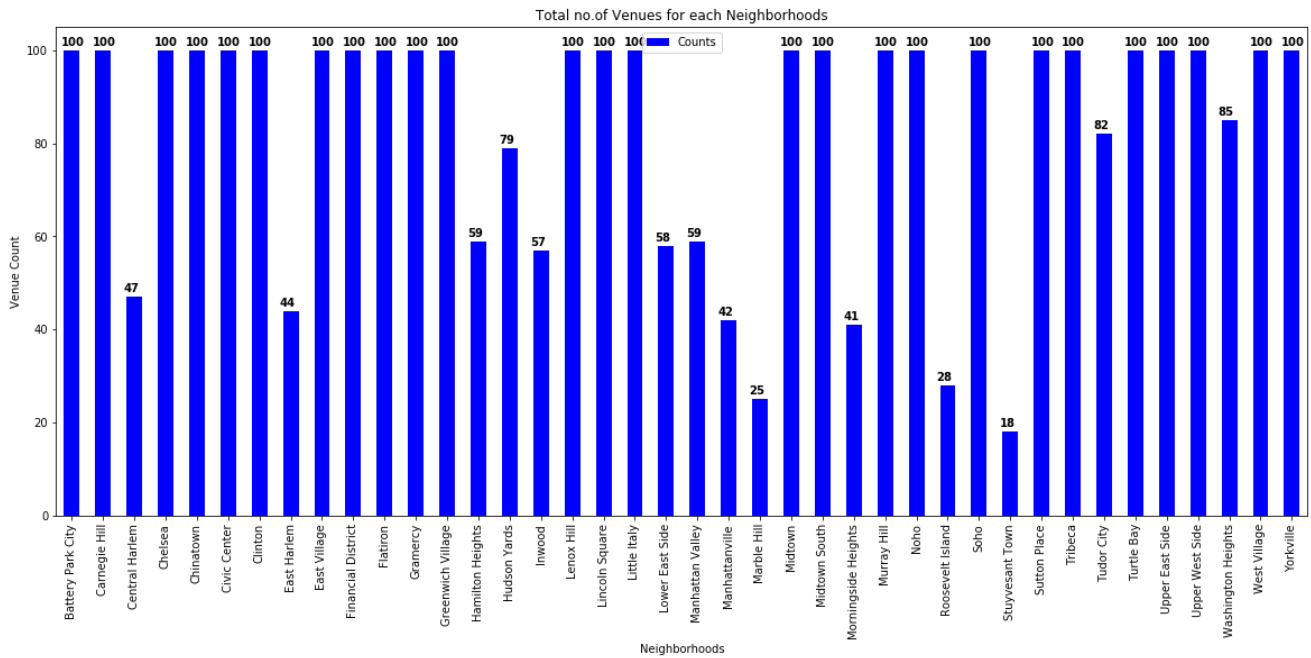


- Now we have explored each and every neighborhood by finding top 100 venues in the vicinity of 500 meters for each neighborhood, this task was achieved with the help of Foursquare API.
- Since the result that we returned were in the form of json format, so eventually I defined a function that would convert the json result in the pandas dataframe. Following below is the snapshot of the table.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Marble Hill	40.876551	-73.91066	Arturo's	40.874412	-73.910271	Pizza Place
1	Marble Hill	40.876551	-73.91066	Bikram Yoga	40.876844	-73.906204	Yoga Studio
2	Marble Hill	40.876551	-73.91066	Tibbett Diner	40.880404	-73.908937	Diner
3	Marble Hill	40.876551	-73.91066	Starbucks	40.877531	-73.905582	Coffee Shop
4	Marble Hill	40.876551	-73.91066	Dunkin'	40.877136	-73.906666	Donut Shop

(3324, 7)

6. Now we can see from above that for a neighborhood there were too many venues returned for it. So to summarize the result we group the data with their neighborhoods and plot the bar graph of the resultant dataframe to visualize the count of venues for each neighborhood. By analyzing the data I realized that there were only 341 unique categories or venues returned by the neighborhoods.



Results

Now since we explored the two popular cities and find out the unique neighborhoods within them, now it was the time to analyze the each and every neighborhood and find out the most common venues among those neighborhoods and cluster them together.

1. To find most common venues we'll first perform one-hot encoding on the above data.

Toronto:

	Neighbourhood	Afghan Restaurant	Airport	Airport Food Court	Airport Gate	Airport Lounge	Airport Service	Airport Terminal	American Restaurant	Antique Shop	...	Toy / Game Store	Trail	Train Station	Vegetarian / Vegan Restaurant	Video Game Store	Video Store	Vietnamese Restaurant	Wine Bar	Women's Store	Yoga Studio
0	The Beaches	0	0	0	0	0	0	0	0	0	...	0	1	0	0	0	0	0	0	0	0
1	The Beaches	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0	0	0
2	The Beaches	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0	0	0
3	The Beaches	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0	0	0
4	The Beaches	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0	0	0	0

(1699, 239)

New York City:

	Neighborhood	Accessories Store	Adult Boutique	Afghan Restaurant	African Restaurant	American Restaurant	Antique Shop	Arcade	Arepa Restaurant	Argentinian Restaurant	...	Video Store	Vietnamese Restaurant	Volleyball Court	Waterfront	Whisky Bar	Wine Bar	Wine Shop
0	Marble Hill	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0
1	Marble Hill	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0
2	Marble Hill	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0
3	Marble Hill	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0
4	Marble Hill	0	0	0	0	0	0	0	0	0	...	0	0	0	0	0	0	0

(3324, 342)

2. Now I have performed frequency distribution, by taking mean of the frequency of occurrence from each category.

Toronto:

(38, 239)

	Neighbourhood	Afghan Restaurant	Airport	Airport Food Court	Airport Gate	Airport Lounge	Airport Service	Airport Terminal	American Restaurant	Antique Shop	...	Toy / Game Store	Trail	Train Station	Vegetarian / Vegan Restaurant	Video Game Store	Video Store	Vietnamese Restaurant	Wine Bar	Women's Store
0	Adelaide, King, Richmond	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.03	0.0	...	0.0	0.0	0.0	0.010000	0.0	0.0	0.0	0.01	0.01
1	Berczy Park	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.00	0.0	...	0.0	0.0	0.0	0.017544	0.0	0.0	0.0	0.00	0.00
2	Brockton, Exhibition Place, Parkdale Village	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.00	0.0	...	0.0	0.0	0.0	0.000000	0.0	0.0	0.0	0.00	0.00
3	Business Reply Mail Processing Centre 969 Eastern	0.0	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.00	0.0	...	0.0	0.0	0.0	0.000000	0.0	0.0	0.0	0.00	0.00
4	CN Tower, Bathurst Quay, Island airport, Harbo...	0.0	0.071429	0.071429	0.071429	0.142857	0.142857	0.142857	0.00	0.0	...	0.0	0.0	0.0	0.000000	0.0	0.0	0.0	0.00	0.00

New York City:

(3324, 342)

	Neighborhood	Accessories Store	Adult Boutique	Afghan Restaurant	African Restaurant	American Restaurant	Antique Shop	Arcade	Arepa Restaurant	Argentinian Restaurant	...	Video Store	Vietnamese Restaurant	Volleyball Court	Waterfront	Whisky Bar	Wine Bar
0	Battery Park City	0.000000	0.00	0.00	0.00000	0.010000	0.00	0.00	0.000000	0.000000	...	0.00	0.000000	0.00	0.000000	0.00	0.010000
1	Carnegie Hill	0.000000	0.00	0.00	0.00000	0.010000	0.00	0.00	0.000000	0.010000	...	0.00	0.020000	0.00	0.000000	0.00	0.010000
2	Central Harlem	0.000000	0.00	0.00	0.06383	0.042553	0.00	0.00	0.000000	0.000000	...	0.00	0.000000	0.00	0.000000	0.00	0.000000
3	Chelsea	0.000000	0.00	0.00	0.00000	0.030000	0.01	0.00	0.000000	0.000000	...	0.00	0.000000	0.00	0.000000	0.00	0.000000
4	Chinatown	0.000000	0.00	0.00	0.00000	0.040000	0.00	0.00	0.000000	0.000000	...	0.00	0.040000	0.00	0.000000	0.00	0.000000

3. Now to interpret I have find out the 10 most common venues and put into pandas dataframe.

Toronto:

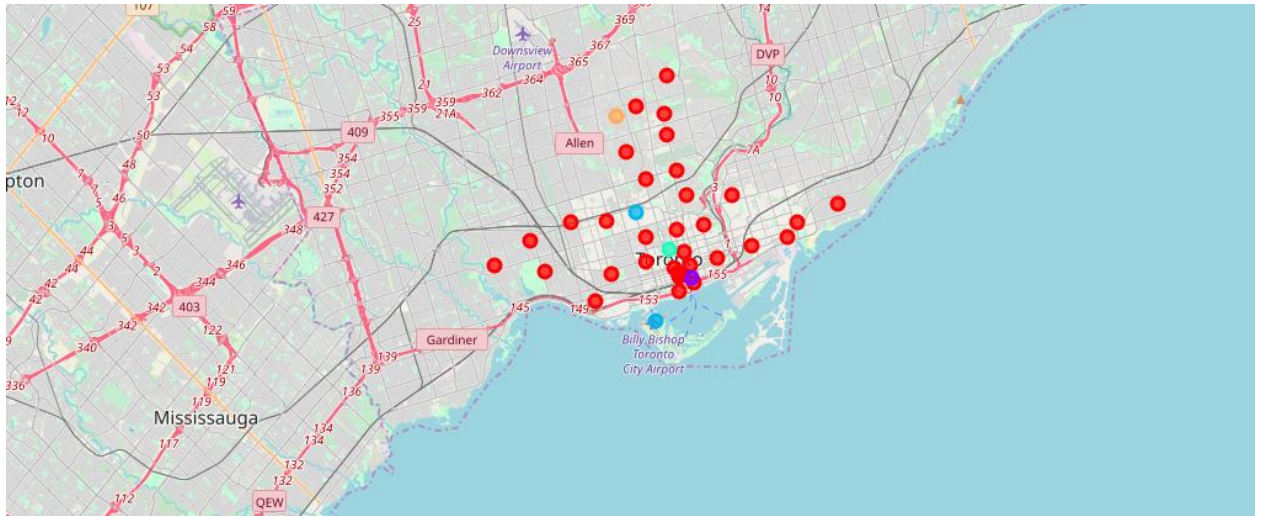
	Neighbourhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Adelaide, King, Richmond	Coffee Shop	Café	Thai Restaurant	Bar	Steakhouse	Breakfast Spot	Gym	Asian Restaurant	Hotel	American Restaurant
1	Berczy Park	Coffee Shop	Cocktail Bar	Steakhouse	Seafood Restaurant	Beer Bar	Café	Cheese Shop	Farmers Market	Bakery	Concert Hall
2	Brockton, Exhibition Place, Parkdale Village	Breakfast Spot	Coffee Shop	Café	Italian Restaurant	Pet Store	Climbing Gym	Restaurant	Caribbean Restaurant	Burrito Place	Stadium
3	Business Reply Mail Processing Centre 969 Eastern	Light Rail Station	Yoga Studio	Garden Center	Farmers Market	Smoke Shop	Fast Food Restaurant	Brewery	Park	Burrito Place	Spa
4	CN Tower, Bathurst Quay, Island airport. Harbo...	Airport Lounge	Airport Service	Airport Terminal	Plane	Airport	Airport Food Court	Airport Gate	Coffee Shop	Harbor / Marina	Sculpture Garden

New York City:

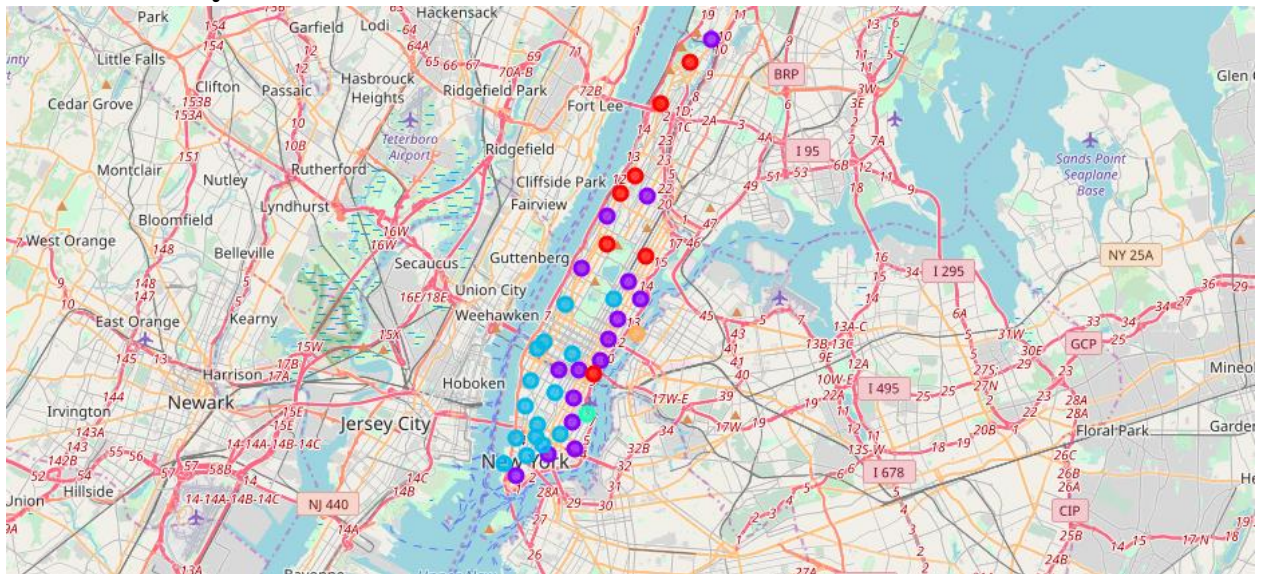
	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Battery Park City	Park	Coffee Shop	Hotel	Memorial Site	Italian Restaurant	Wine Shop	Gym	Women's Store	Clothing Store	Playground
1	Carnegie Hill	Coffee Shop	Pizza Place	Cosmetics Shop	Bar	Café	French Restaurant	Japanese Restaurant	Grocery Store	Yoga Studio	Spa
2	Central Harlem	African Restaurant	Bar	Chinese Restaurant	Gym / Fitness Center	Seafood Restaurant	Public Art	Cosmetics Shop	Deli / Bodega	American Restaurant	Fried Chicken Joint
3	Chelsea	Coffee Shop	Italian Restaurant	Ice Cream Shop	Nightclub	Bakery	Hotel	American Restaurant	Seafood Restaurant	Art Gallery	Theater
4	Chinatown	Chinese Restaurant	Cocktail Bar	American Restaurant	Vietnamese Restaurant	Salon / Barbershop	Bubble Tea Shop	Bakery	Spa	Ice Cream Shop	Dumpling Restaurant

4. Now I have cluster the above data into 5 cluster based on the similarity of most common venues among them.

Toronto:



New York City:



Discussion

As seen above we have cluster the neighborhoods of both the cities i.e. Toronto and New York City, now to get deeper knowledge I have analyzed each and every cluster of both the cities and compare whether both the cities are similar or not.

Toronto:

Cluster 0:

	Neighbourhood	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	The Beaches	0	Trail	Pub	Health Food Store	Coffee Shop	Donut Shop	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant	Yoga Studio
1	The Danforth West, Riverdale	0	Greek Restaurant	Coffee Shop	Italian Restaurant	Ice Cream Shop	Furniture / Home Store	Yoga Studio	Bookstore	Brewery	Bubble Tea Shop	Burger Joint
2	The Beaches West, India Bazaar	0	Pizza Place	Sushi Restaurant	Ice Cream Shop	Italian Restaurant	Liquor Store	Fish & Chips Shop	Fast Food Restaurant	Movie Theater	Park	Pet Store
3	Studio District	0	Café	Coffee Shop	Italian Restaurant	Bakery	American Restaurant	Yoga Studio	Convenience Store	Brewery	Seafood Restaurant	Sandwich Place
4	Lawrence Park	0	Park	Bus Line	Dim Sum Restaurant	Swim School	Yoga Studio	Donut Shop	Fish & Chips Shop	Filipino Restaurant	Fast Food Restaurant	Farmers Market
5	Davisville North	0	Sandwich Place	Clothing Store	Dog Run	Breakfast Spot	Hotel	Gym	Park	Dance Studio	Food & Drink Shop	Dumpling Restaurant
6	North Toronto West	0	Coffee Shop	Clothing Store	Sporting Goods Shop	Yoga Studio	Furniture / Home Store	Dessert Shop	Diner	Rental Car Location	Restaurant	Chinese Restaurant
7	Davisville	0	Pizza Place	Sandwich Place	Dessert Shop	Italian Restaurant	Café	Restaurant	Coffee Shop	Sushi Restaurant	Thai Restaurant	Pharmacy
8	Moore Park, Summerhill East	0	Playground	Gym	Park	Restaurant	Dive Bar	Fast Food Restaurant	Farmers Market	Falafel Restaurant	Event Space	Ethiopian Restaurant
9	Deer Park, Forest Hill SE, Rathnelly, South Hi...	0	Coffee Shop	Pub	American Restaurant	Sushi Restaurant	Restaurant	Bagel Shop	Sports Bar	Supermarket	Liquor Store	Light Rail Station
10	Rosedale	0	Park	Playground	Building	Trail	Dog Run	Filipino Restaurant	Fast Food Restaurant	Farmers Market	Falafel Restaurant	Event Space
11	Cabbagetown, St. James Town	0	Park	Coffee Shop	Bakery	Café	Convenience Store	Restaurant	Italian Restaurant	Pizza Place	Pub	Beer Store
12	Church and Wellesley	0	Coffee Shop	Japanese Restaurant	Sushi Restaurant	Gay Bar	Restaurant	Pub	Bubble Tea Shop	Burger Joint	Fast Food Restaurant	Café
13	Harbourfront, Regent Park	0	Coffee Shop	Café	Park	Pub	Bakery	Restaurant	Breakfast Spot	Mexican Restaurant	Theater	Spa
14	Ryerson, Garden District	0	Coffee Shop	Clothing Store	Cosmetics Shop	Middle Eastern Restaurant	Café	Italian Restaurant	Pizza Place	Plaza	Tea Room	Theater
15	St. James Town	0	Hotel	Café	Restaurant	Italian Restaurant	Coffee Shop	Breakfast Spot	Clothing Store	Cocktail Bar	Bakery	Beer Bar
16	Berczy Park	0	Coffee Shop	Cocktail Bar	Steakhouse	Seafood Restaurant	Beer Bar	Café	Cheese Shop	Farmers Market	Bakery	Concert Hall
18	Adelaide, King, Richmond	0	Coffee Shop	Café	Thai Restaurant	Bar	Steakhouse	Breakfast Spot	Gym	Asian Restaurant	Hotel	American Restaurant

19	Harbourfront East, Toronto Islands, Union Station	0	Coffee Shop	Aquarium	Hotel	Italian Restaurant	Café	Pizza Place	Sporting Goods Shop	Fried Chicken Joint	Bakery	Brewery
20	Design Exchange, Toronto Dominion Centre	0	Coffee Shop	Café	Hotel	Restaurant	American Restaurant	Deli / Bodega	Gastropub	Italian Restaurant	Bar	Bakery
21	Commerce Court, Victoria Hotel	0	Coffee Shop	Café	Hotel	Restaurant	American Restaurant	Gastropub	Deli / Bodega	Steakhouse	Gym	Bakery
23	Forest Hill North, Forest Hill West	0	Trail	Park	Sushi Restaurant	Jewelry Store	Fast Food Restaurant	Filipino Restaurant	Farmers Market	Falafel Restaurant	Doner Restaurant	Event Space
25	Harbord, University of Toronto	0	Café	Bakery	Japanese Restaurant	Bookstore	Restaurant	Bar	Poutine Place	Beer Bar	Beer Store	Sandwich Place
26	Chinatown, Grange Park, Kensington Market	0	Café	Vegetarian / Vegan Restaurant	Chinese Restaurant	Vietnamese Restaurant	Bar	Mexican Restaurant	Dumpling Restaurant	Bakery	Coffee Shop	Donut Shop
29	First Canadian Place, Underground city	0	Coffee Shop	Café	Hotel	Restaurant	Steakhouse	American Restaurant	Bar	Asian Restaurant	Gym	Gastropub
30	Christie	0	Café	Grocery Store	Park	Convenience Store	Coffee Shop	Baby Store	Restaurant	Italian Restaurant	Diner	Nightclub
31	Dovercourt Village, Dufferin	0	Pharmacy	Supermarket	Bakery	Park	Coffee Shop	Café	Middle Eastern Restaurant	Bar	Bank	Music Venue
32	Little Portugal, Trinity	0	Bar	Coffee Shop	Asian Restaurant	Cocktail Bar	Pizza Place	Café	Bakery	Restaurant	French Restaurant	Men's Store
33	Brockton, Exhibition Place, Parkdale Village	0	Breakfast Spot	Coffee Shop	Café	Italian Restaurant	Pet Store	Climbing Gym	Restaurant	Caribbean Restaurant	Burrito Place	Stadium
34	High Park, The Junction South	0	Café	Mexican Restaurant	Park	Music Venue	Flea Market	Cajun / Creole Restaurant	Bookstore	Speakeasy	Fried Chicken Joint	Furniture / Home Store
35	Parkdale, Roncesvalles	0	Gift Shop	Breakfast Spot	Bar	Eastern European Restaurant	Movie Theater	Restaurant	Dog Run	Italian Restaurant	Coffee Shop	Bank
36	Runnymede, Swansea	0	Coffee Shop	Café	Pizza Place	Italian Restaurant	Diner	Sushi Restaurant	Vegetarian / Vegan Restaurant	Gourmet Shop	Falafel Restaurant	Electronics Store
37	Business Reply Mail Processing Centre 969 Eastern	0	Light Rail Station	Yoga Studio	Garden Center	Farmers Market	Smoke Shop	Fast Food Restaurant	Brewery	Park	Burrito Place	Spa

Cluster 1:

	Neighbourhood	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
28	Stn A PO Boxes 25 The Esplanade	1	Coffee Shop	Restaurant	Café	Seafood Restaurant	Italian Restaurant	Cocktail Bar	Beer Bar	Hotel	Lounge	Farmers Market

Cluster 2:

	Neighbourhood	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
24	The Annex, North Midtown, Yorkville	2	Café	Sandwich Place	Coffee Shop	Pizza Place	Indian Restaurant	Park	Liquor Store	Jewish Restaurant	BBQ Joint	Pub
27	CN Tower, Bathurst Quay, Island airport, Harbo...	2	Airport Lounge	Airport Service	Airport Terminal	Plane	Airport	Airport Food Court	Airport Gate	Coffee Shop	Harbor / Marina	Sculpture Garden

Cluster 3:

	Neighbourhood	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
17	Central Bay Street	3	Coffee Shop	Ice Cream Shop	Italian Restaurant	Sandwich Place	Burger Joint	Café	Bakery	Bubble Tea Shop	Salad Place	Restaurant

Cluster 4:

	Neighbourhood	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
22	Roselawn	4	Garden	Yoga Studio	Flower Shop	Fish Market	Fish & Chips Shop	Filipino Restaurant	Fast Food Restaurant	Farmers Market	Falafel Restaurant	Event Space

New York City:

Cluster 0:

	Neighborhood	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
2	Washington Heights	Café	Mobile Phone Shop	Bakery	Grocery Store	Supermarket	Deli / Bodega	Coffee Shop	Park	Clothing Store	Chinese Restaurant
3	Inwood	Mexican Restaurant	Café	Lounge	Pizza Place	Park	Bakery	Frozen Yogurt Shop	Deli / Bodega	Restaurant	Spanish Restaurant
4	Hamilton Heights	Mexican Restaurant	Café	Pizza Place	Coffee Shop	Liquor Store	Indian Restaurant	Sushi Restaurant	Park	Deli / Bodega	Sandwich Place
5	Manhattanville	Italian Restaurant	Deli / Bodega	Park	Coffee Shop	Mexican Restaurant	Seafood Restaurant	Café	Bike Trail	Lounge	Sushi Restaurant
7	East Harlem	Mexican Restaurant	Bakery	Deli / Bodega	Pizza Place	Thai Restaurant	Latin American Restaurant	French Restaurant	Steakhouse	Spanish Restaurant	Seafood Restaurant
25	Manhattan Valley	Pizza Place	Indian Restaurant	Coffee Shop	Yoga Studio	Café	Mexican Restaurant	Thai Restaurant	Deli / Bodega	Playground	Bar
36	Tudor City	Café	Mexican Restaurant	Park	Pizza Place	Greek Restaurant	Sushi Restaurant	Deli / Bodega	Spanish Restaurant	Restaurant	Burger Joint

Cluster 1:

	Neighborhood	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	Marble Hill	Sandwich Place	Coffee Shop	Discount Store	Yoga Studio	Diner	Steakhouse	Supplement Shop	Shopping Mall	Seafood Restaurant	Tennis Stadium
1	Chinatown	Chinese Restaurant	Cocktail Bar	American Restaurant	Vietnamese Restaurant	Salon / Barbershop	Bubble Tea Shop	Bakery	Spa	Ice Cream Shop	Dumpling Restaurant
6	Central Harlem	African Restaurant	Bar	Chinese Restaurant	Gym / Fitness Center	Seafood Restaurant	Public Art	Cosmetics Shop	Deli / Bodega	American Restaurant	Fried Chicken Joint
9	Yorkville	Italian Restaurant	Bar	Coffee Shop	Gym	Pizza Place	Sushi Restaurant	Wine Shop	Ice Cream Shop	Mexican Restaurant	Deli / Bodega
10	Lenox Hill	Coffee Shop	Italian Restaurant	Sushi Restaurant	Pizza Place	Cosmetics Shop	Burger Joint	Gym	Gym / Fitness Center	Sporting Goods Shop	Thai Restaurant
12	Upper West Side	Italian Restaurant	Bar	Wine Bar	Mediterranean Restaurant	Cosmetics Shop	Coffee Shop	Vegetarian / Vegan Restaurant	Indian Restaurant	Bakery	Bookstore
16	Murray Hill	Coffee Shop	Sandwich Place	Hotel	Japanese Restaurant	Italian Restaurant	Gym / Fitness Center	Gym	French Restaurant	Bar	Sushi Restaurant
19	East Village	Bar	Wine Bar	Ice Cream Shop	Pizza Place	Chinese Restaurant	Mexican Restaurant	Cocktail Bar	Ramen Restaurant	Speakeasy	Coffee Shop
20	Lower East Side	Coffee Shop	Pizza Place	Café	Sandwich Place	Art Gallery	Bakery	Ramen Restaurant	Chinese Restaurant	Japanese Restaurant	Cocktail Bar
26	Morningside Heights	Park	Coffee Shop	American Restaurant	Bookstore	Food Truck	Tennis Court	Sandwich Place	Burger Joint	Deli / Bodega	Café
27	Gramercy	Italian Restaurant	Bar	American Restaurant	Pizza Place	Bagel Shop	Cocktail Bar	Mexican Restaurant	Ice Cream Shop	Thai Restaurant	Grocery Store
29	Financial District	Coffee Shop	Hotel	Wine Shop	Gym	American Restaurant	Pizza Place	Steakhouse	Gym / Fitness Center	Event Space	Cocktail Bar
30	Carnegie Hill	Coffee Shop	Pizza Place	Cosmetics Shop	Bar	Café	French Restaurant	Japanese Restaurant	Grocery Store	Yoga Studio	Spa
33	Midtown South	Korean Restaurant	Hotel	Dessert Shop	Japanese Restaurant	Hotel Bar	American Restaurant	Coffee Shop	Cosmetics Shop	Gastropub	Gym / Fitness Center
34	Sutton Place	Gym / Fitness Center	Italian Restaurant	Furniture / Home Store	Indian Restaurant	Juice Bar	Gym	Pizza Place	Dessert Shop	American Restaurant	French Restaurant
35	Turtle Bay	Italian Restaurant	Coffee Shop	Steakhouse	Sushi Restaurant	Wine Bar	Ramen Restaurant	Indian Restaurant	Japanese Restaurant	French Restaurant	Park

Cluster 2:

	Neighborhood	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	Upper East Side	Italian Restaurant	Exhibit	Art Gallery	Bakery	Coffee Shop	Gym / Fitness Center	Juice Bar	French Restaurant	Hotel	Spa
13	Lincoln Square	Gym / Fitness Center	Theater	Plaza	Café	Concert Hall	Italian Restaurant	Performing Arts Venue	Park	Opera House	Indie Movie Theater
14	Clinton	Theater	Gym / Fitness Center	Italian Restaurant	Hotel	American Restaurant	Wine Shop	Coffee Shop	Spa	Sandwich Place	Food Court
15	Midtown	Hotel	Coffee Shop	Theater	Clothing Store	Cocktail Bar	Sporting Goods Shop	Bakery	Bookstore	Spa	Japanese Restaurant
17	Chelsea	Coffee Shop	Italian Restaurant	Ice Cream Shop	Nightclub	Bakery	Hotel	American Restaurant	Seafood Restaurant	Art Gallery	Theater
18	Greenwich Village	Italian Restaurant	Sushi Restaurant	Clothing Store	Seafood Restaurant	Indian Restaurant	Cosmetics Shop	Café	French Restaurant	Chinese Restaurant	Cocktail Bar
21	Tribeca	Italian Restaurant	Park	Café	American Restaurant	Spa	Boutique	Wine Bar	Gym	Greek Restaurant	Coffee Shop
22	Little Italy	Bakery	Café	Italian Restaurant	Sandwich Place	Bubble Tea Shop	Clothing Store	Salon / Barbershop	Mediterranean Restaurant	Ice Cream Shop	Women's Store
23	Soho	Clothing Store	Boutique	Women's Store	Art Gallery	Shoe Store	Italian Restaurant	Men's Store	Mediterranean Restaurant	Furniture / Home Store	Bakery
24	West Village	Italian Restaurant	Cosmetics Shop	New American Restaurant	Cocktail Bar	American Restaurant	Wine Bar	Park	Jazz Club	Coffee Shop	Bakery
28	Battery Park City	Park	Coffee Shop	Hotel	Memorial Site	Italian Restaurant	Wine Shop	Gym	Women's Store	Clothing Store	Playground
31	NoHo	Italian Restaurant	French Restaurant	Art Gallery	Cocktail Bar	Coffee Shop	Rock Club	Pizza Place	Mexican Restaurant	Sushi Restaurant	Boutique
32	Civic Center	Italian Restaurant	Gym / Fitness Center	French Restaurant	Hotel	Sandwich Place	Sporting Goods Shop	American Restaurant	Bakery	Cocktail Bar	Coffee Shop
38	Flairston	Gym / Fitness Center	Gym	Yoga Studio	American Restaurant	Japanese Restaurant	Cosmetics Shop	Salon / Barbershop	New American Restaurant	Dessert Shop	Cycle Studio
39	Hudson Yards	American Restaurant	Italian Restaurant	Café	Gym / Fitness Center	Restaurant	Spanish Restaurant	Hotel	Theater	Ice Cream Shop	Coffee Shop

Cluster 3:

	Neighborhood	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
37	Stuyvesant Town	Bar	Playground	Park	Pet Service	Farmers Market	Basketball Court	Baseball Field	Gas Station	Fountain	Harbor / Marina

Cluster 4:

	Neighborhood	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
11	Roosevelt Island	Park	Sandwich Place	Coffee Shop	Playground	Dry Cleaner	Plaza	Café	Farmers Market	Supermarket	Metro Station

Conclusion

Now as we have seen the both the cities and their clustering neighborhoods we can tell that both the cities are much similar to each other where a there is a lot of variety for each type of cuisine similar style of restaurants, cafes, Shops, etc.

Both the cities are quite prominent and has everything in their vicinity though the choices and the no of venues are quite more and diverse in the Manhattan of the New York City while comparing with Toronto. Also the New York city is quite a developed city when seen in front with the Toronto, so if a person needs to explore either of one cities or needs to go on a vacation where the person aims for better choices and variety then the New York city is the one which the person is looking for. But still the taste of both the cities is very similar and the kind of lifestyle that we can assume by analyzing the above neighboring venues that both the cities share.