

# Compare the neighborhoods of New York and Toronto

## 1. Introduction

Before my vacation, I plan to have a trip in New York City or the city of Toronto. Both of them are very diverse and are the financial capitals of their respective countries. It's too difficult to decide which one is better for my trip. One interesting idea would be to compare the neighborhoods of the two cities and determine which city is better for my trip?

## 2. Data

### a) New York (Manhattan)

For New York City, I need a dataset that contains the boroughs and the neighborhoods that exist in each borough as well as the latitude and longitude coordinates of each neighborhood. Here is the link to the dataset: [https://geo.nyu.edu/catalog/nyu\\_2451\\_34572](https://geo.nyu.edu/catalog/nyu_2451_34572)  
Transform the data into a pandas dataframe.

	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

Let's simplify the above dataset and segment and cluster only the neighborhoods in Manhattan. Let's slice the original dataframe and create a new dataframe of the Manhattan data.

	Borough	Neighborhood	Latitude	Longitude
0	Manhattan	Marble Hill	40.876551	-73.910660
1	Manhattan	Chinatown	40.715618	-73.994279
2	Manhattan	Washington Heights	40.851903	-73.936900
3	Manhattan	Inwood	40.867684	-73.921210
4	Manhattan	Hamilton Heights	40.823604	-73.949688

Get 3309 venue of 329 Category in 40 Neighborhood by Foursquare API.

	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	Land & Sea Restaurant	40.877885	-73.905873	Seafood Restaurant

b) Toronto

For Toronto, I could get the dataset that contains the boroughs and the neighborhoods from [https://en.wikipedia.org/wiki/List\\_of\\_postal\\_codes\\_of\\_Canada:\\_M](https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M) . I could get the location (latitude & longitude) by [http://cocl.us/Geospatial\\_data](http://cocl.us/Geospatial_data) .

Get 1692 venue of 234 Category in 38 Neighborhood by Foursquare API.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	The Beaches	43.676357	-79.293031	The Big Carrot Natural Food Market	43.678879	-79.297734	Health Food Store
1	The Beaches	43.676357	-79.293031	Grover Pub and Grub	43.679181	-79.297215	Pub
2	The Beaches	43.676357	-79.293031	Starbucks	43.678798	-79.298045	Coffee Shop
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

3. Analysis

a) New York (Manhattan)

For New York City, Get 329 Category in 40 Neighborhood. I group rows by neighborhood and by taking the mean of the frequency of occurrence of each category.

	Neighborhood	Accessories Store	Adult Boutique	Afghan Restaurant	African Restaurant	American Restaurant	Animal Shelter	Antique Shop	Arcade	Arepa Restaurant	Argentinian Restaurant	Art Gallery	Art Museum	Arts & Crafts Store	Asian Restaurant
0	Battery Park City	0.000000	0.00	0.00	0.000000	0.010000	0.00	0.00	0.00	0.000000	0.000000	0.000000	0.00	0.000000	0.000000
1	Carnegie Hill	0.000000	0.00	0.00	0.000000	0.010000	0.00	0.00	0.00	0.000000	0.010000	0.000000	0.01	0.000000	0.000000
2	Central Harlem	0.000000	0.00	0.00	0.068182	0.045455	0.00	0.00	0.00	0.000000	0.000000	0.022727	0.00	0.000000	0.000000
3	Chelsea	0.000000	0.00	0.00	0.000000	0.040000	0.00	0.01	0.00	0.000000	0.000000	0.020000	0.00	0.000000	0.020000
4	Chinatown	0.000000	0.00	0.00	0.000000	0.040000	0.00	0.00	0.00	0.000000	0.000000	0.000000	0.00	0.000000	0.020000
5	Civic Center	0.000000	0.00	0.00	0.000000	0.020000	0.00	0.01	0.00	0.000000	0.000000	0.020000	0.00	0.000000	0.010000
6	Clinton	0.000000	0.00	0.00	0.000000	0.040000	0.00	0.00	0.00	0.000000	0.000000	0.000000	0.00	0.000000	0.000000
7	East Harlem	0.000000	0.00	0.00	0.000000	0.000000	0.00	0.00	0.00	0.000000	0.000000	0.000000	0.00	0.000000	0.000000
8	East Village	0.000000	0.00	0.00	0.000000	0.020000	0.00	0.01	0.00	0.020000	0.010000	0.000000	0.00	0.000000	0.000000
9	Financial District	0.010000	0.00	0.00	0.000000	0.020000	0.00	0.00	0.00	0.000000	0.000000	0.000000	0.00	0.000000	0.010000
10	Flatiron	0.000000	0.00	0.00	0.000000	0.040000	0.00	0.00	0.00	0.000000	0.000000	0.000000	0.00	0.000000	0.000000
11	Gramercy	0.000000	0.00	0.00	0.000000	0.040000	0.00	0.00	0.01	0.000000	0.000000	0.010000	0.00	0.000000	0.000000

Then I get the top 10 venues for each neighborhood.

	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	Wine Shop	Italian Restaurant	Gym	Fountain	Cupcake Shop	Plaza	Pizza Place
1	Carnegie Hill	Pizza Place	Coffee Shop	Café	Cosmetics Shop	French Restaurant	Gym	Japanese Restaurant	Spa	Yoga Studio	Bar
2	Central Harlem	African Restaurant	Chinese Restaurant	American Restaurant	French Restaurant	Cosmetics Shop	Public Art	Seafood Restaurant	Pizza Place	Bookstore	Gym / Fitness Center
3	Chelsea	Coffee Shop	Italian Restaurant	Ice Cream Shop	Nightclub	Bakery	American Restaurant	Theater	Hotel	Seafood Restaurant	Market
4	Chinatown	Chinese Restaurant	Bubble Tea Shop	American Restaurant	Vietnamese Restaurant	Cocktail Bar	Dim Sum Restaurant	Noodle House	Hotpot Restaurant	Ice Cream Shop	Bakery

## b) Toronto

I group rows by neighborhood and by taking the mean of the frequency of occurrence of each category, and then get the top 10 venues for each neighborhood.

	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	Adelaide, King, Richmond	Coffee Shop	Café	Steakhouse	Thai Restaurant	Bar	Burger Joint	Bakery	Asian Restaurant	Sushi Restaurant	American Restaurant
1	Berczy Park	Coffee Shop	Cocktail Bar	Italian Restaurant	Café	Seafood Restaurant	Cheese Shop	Farmers Market	Restaurant	Steakhouse	Bakery
2	Brockton, Exhibition Place, Parkdale Village	Coffee Shop	Café	Breakfast Spot	Gym	Furniture / Home Store	Performing Arts Venue	Pet Store	Nightclub	Climbing Gym	Caribbean Restaurant
3	Business Reply Mail Processing Centre 969 Eastern	Yoga Studio	Garden	Smoke Shop	Brewery	Light Rail Station	Farmers Market	Spa	Fast Food Restaurant	Burrito Place	Restaurant
4	CN Tower, Bathurst Quay, Island airport, Harbo...	Airport Lounge	Airport Service	Airport Terminal	Boat or Ferry	Boutique	Airport	Airport Food Court	Airport Gate	Harbor / Marina	Plane
5	Cabbagetown, St. James Town	Coffee Shop	Restaurant	Café	Italian Restaurant	Bakery	Pub	Pizza Place	Outdoor Sculpture	Pharmacy	Breakfast Spot
6	Central Bay Street	Coffee Shop	Café	Italian Restaurant	Bubble Tea Shop	Burger Joint	Bar	Sushi Restaurant	Thai Restaurant	Spa	Chinese Restaurant
7	Chinatown, Grange Park, Kensington Market	Bar	Café	Vegetarian / Vegan Restaurant	Coffee Shop	Bakery	Chinese Restaurant	Mexican Restaurant	Vietnamese Restaurant	Arts & Crafts Store	Caribbean Restaurant
8	Christie	Grocery Store	Café	Park	Nightclub	Diner	Baby Store	Italian Restaurant	Restaurant	Coffee Shop	Convenience Store

## 4. Cluster Neighborhoods

Run k-means to cluster the neighborhood into 5 clusters for New York and Toronto.

### a) New York (Manhattan)

NY Cluster 1 Food, Shopping, Art

	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
1	Chinatown	Chinese Restaurant	Bubble Tea Shop	American Restaurant	Cocktail Bar	Vietnamese Restaurant	Dim Sum Restaurant	Hotpot Restaurant	Salon / Barbershop	Noodle House	Bakery
6	Central Harlem	African Restaurant	Seafood Restaurant	French Restaurant	Gym / Fitness Center	Chinese Restaurant	Cosmetics Shop	American Restaurant	Spa	Gym	Liquor Store
8	Upper East Side	Italian Restaurant	Exhibit	Art Gallery	Juice Bar	Bakery	Coffee Shop	French Restaurant	Hotel	Gym / Fitness Center	Boutique
13	Lincoln Square	Gym / Fitness Center	Theater	Italian Restaurant	Plaza	Concert Hall	Café	French Restaurant	Performing Arts Venue	Park	Indie Movie Theater
14	Clinton	Theater	American Restaurant	Italian Restaurant	Coffee Shop	Wine Shop	Hotel	Gym	Spa	Gym / Fitness Center	Wine Bar
15	Midtown	Hotel	Clothing Store	Coffee Shop	Steakhouse	Theater	American Restaurant	Bakery	Bookstore	Sporting Goods Shop	Spa
18	Greenwich Village	Italian Restaurant	Clothing Store	French Restaurant	Sushi Restaurant	Seafood Restaurant	Indian Restaurant	Boutique	Café	Chinese Restaurant	Caribbean Restaurant
21	Tribeca	Italian Restaurant	Park	American Restaurant	Spa	Café	Boutique	Coffee Shop	Wine Bar	Gym	Greek Restaurant
22	Little Italy	Bakery	Café	Yoga Studio	Ice Cream Shop	Sandwich Place	Salon / Barbershop	Seafood Restaurant	Chinese Restaurant	Bubble Tea Shop	Clothing Store
23	Soho	Clothing Store	Boutique	Women's Store	Shoe Store	Men's Store	Art Gallery	Mediterranean Restaurant	Italian Restaurant	Coffee Shop	Yoga Studio
24	West Village	Italian Restaurant	New American Restaurant	Cosmetics Shop	Gastropub	Wine Bar	Jazz Club	Park	French Restaurant	Bakery	American Restaurant
32	Civic Center	Gym / Fitness Center	Bakery	Italian Restaurant	French Restaurant	Cocktail Bar	Gym	Park	Coffee Shop	Sandwich Place	Spa
33	Midtown South	Korean Restaurant	Japanese Restaurant	Coffee Shop	Cosmetics Shop	Hotel Bar	Hotel	Bakery	Italian Restaurant	Cocktail Bar	Gym / Fitness Center
38	Flatiron	Italian Restaurant	Yoga Studio	American Restaurant	Gym	Gym / Fitness Center	Sporting Goods Shop	Bakery	Clothing Store	Cosmetics Shop	Cycle Studio
39	Hudson Yards	Coffee Shop	Italian Restaurant	Hotel	Café	Theater	American Restaurant	Restaurant	Art Gallery	Gym	Gym / Fitness Center

## . NY Cluster 2 Food (Italian), Bar, Spa

	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
5	Manhattanville	Deli / Bodega	Mexican Restaurant	Italian Restaurant	Seafood Restaurant	Burger Joint	Fried Chicken Joint	Bike Trail	Sushi Restaurant	Supermarket	Diner
9	Yorkville	Italian Restaurant	Coffee Shop	Bar	Gym	Pizza Place	Sushi Restaurant	Deli / Bodega	Mexican Restaurant	Japanese Restaurant	Bakery
10	Lenox Hill	Italian Restaurant	Coffee Shop	Sushi Restaurant	Gym / Fitness Center	Pizza Place	Burger Joint	Gym	Sporting Goods Shop	Bakery	Thai Restaurant
12	Upper West Side	Italian Restaurant	Bar	Coffee Shop	Bakery	Vegetarian / Vegan Restaurant	Burger Joint	Indian Restaurant	Wine Bar	Dessert Shop	Cosmetics Shop
16	Murray Hill	Coffee Shop	Hotel	Japanese Restaurant	Bar	Gym	Italian Restaurant	Spa	French Restaurant	Sandwich Place	Salon / Barbershop
17	Chelsea	Coffee Shop	Italian Restaurant	Ice Cream Shop	Bakery	American Restaurant	Nightclub	Hotel	Theater	Seafood Restaurant	Asian Restaurant
19	East Village	Bar	Ice Cream Shop	Wine Bar	Cocktail Bar	Mexican Restaurant	Pizza Place	Ramen Restaurant	Chinese Restaurant	Korean Restaurant	Bagel Shop
25	Manhattan Valley	Coffee Shop	Pizza Place	Mexican Restaurant	Spa	Indian Restaurant	French Restaurant	Thai Restaurant	Deli / Bodega	Yoga Studio	Café
27	Gramercy	Italian Restaurant	Coffee Shop	Cocktail Bar	American Restaurant	Wine Shop	Bagel Shop	Grocery Store	Thrift / Vintage Store	Mexican Restaurant	Restaurant
30	Carnegie Hill	Pizza Place	Coffee Shop	Cosmetics Shop	Café	Yoga Studio	Spa	Bar	Bookstore	French Restaurant	Gym
31	Noho	Italian Restaurant	French Restaurant	Cocktail Bar	Coffee Shop	Grocery Store	Gift Shop	Sushi Restaurant	Hotel	Bookstore	American Restaurant
34	Sutton Place	Gym / Fitness Center	Italian Restaurant	Indian Restaurant	Juice Bar	Furniture / Home Store	American Restaurant	Bakery	Dessert Shop	Beer Garden	Coffee Shop
35	Turtle Bay	Italian Restaurant	Sushi Restaurant	Wine Bar	Coffee Shop	Hotel	Japanese Restaurant	Indian Restaurant	French Restaurant	Café	Noodle House

## NY Cluster 3 Sport

```
manhattan_merged.loc[manhattan_merged['Cluster Labels'] == 2, manhattan_merged.columns[[1] + list(range(5, manhattan_merged.shape[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
37	Stuyvesant Town	Bar	Park	Playground	Basketball Court	Baseball Field	Gas Station	Harbor / Marina	German Restaurant	Boat or Ferry	Cocktail Bar

## NY Cluster 4 Coffee

```
manhattan_merged.loc[manhattan_merged['Cluster Labels'] == 3, manhattan_merged.columns[[1] + list(range(5, manhattan_merged.shape[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
11	Roosevelt Island	Park	Sandwich Place	Japanese Restaurant	Deli / Bodega	Bubble Tea Shop	Bus Line	Bus Station	School	Scenic Lookout	Coffee Shop
26	Morningside Heights	Coffee Shop	Bookstore	American Restaurant	Food Truck	Park	Tennis Court	Deli / Bodega	Burger Joint	Sandwich Place	Farmers Market
28	Battery Park City	Coffee Shop	Park	Hotel	Wine Shop	Italian Restaurant	Burger Joint	Cupcake Shop	Department Store	Plaza	Food Court
29	Financial District	Coffee Shop	Hotel	Steakhouse	Bar	Gym	Wine Shop	Pizza Place	Food Truck	Café	Italian Restaurant

## NY Cluster 5 Food (Mexican)

manhattan\_merged.loc[manhattan\_merged['Cluster Labels'] == 4, manhattan\_merged.columns[[1] + list(range(5, manhattan\_merged.shape[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	Coffee Shop	Discount Store	Yoga Studio	Kids Store	Steakhouse	Supplement Shop	Shopping Mall	Shoe Store	Tennis Stadium	Gym
2	Washington Heights	Café	Bakery	Mobile Phone Shop	Deli / Bodega	Sandwich Place	Chinese Restaurant	Supermarket	Grocery Store	Gym	Shoe Store
3	Inwood	Mexican Restaurant	Café	Lounge	Pizza Place	Deli / Bodega	Wine Bar	Bakery	American Restaurant	Chinese Restaurant	Restaurant
4	Hamilton Heights	Mexican Restaurant	Coffee Shop	Café	Deli / Bodega	Pizza Place	Liquor Store	Indian Restaurant	Sushi Restaurant	Sandwich Place	Yoga Studio
7	East Harlem	Mexican Restaurant	Bakery	Deli / Bodega	Latin American Restaurant	Thai Restaurant	Clothing Store	Gym	Grocery Store	Coffee Shop	Cocktail Bar
20	Lower East Side	Chinese Restaurant	Art Gallery	Coffee Shop	Café	Japanese Restaurant	Sandwich Place	Ramen Restaurant	Pizza Place	Latin American Restaurant	Cocktail Bar
36	Tudor City	Mexican Restaurant	Park	Greek Restaurant	Café	Pizza Place	Dog Run	Hotel	Deli / Bodega	Diner	Restaurant

b) Toronto

Toronto Cluster 1 Food, coffee, Pub



	Borough	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	East Toronto	0	Health Food Store	Coffee Shop	Pub	Dim Sum Restaurant	Falafel Restaurant	Event Space	Ethiopian Restaurant	Electronics Store	Eastern European Restaurant	Dumpling Restaurant
1	East Toronto	0	Greek Restaurant	Coffee Shop	Ice Cream Shop	Italian Restaurant	Bookstore	Pizza Place	Diner	Caribbean Restaurant	Pub	Restaurant
2	East Toronto	0	Park	Brewery	Burrito Place	Steakhouse	Food & Drink Shop	Intersection	Sushi Restaurant	Pub	Ice Cream Shop	Fish & Chips Shop
3	East Toronto	0	Café	Coffee Shop	Bakery	Gastropub	American Restaurant	Italian Restaurant	Yoga Studio	Cheese Shop	Juice Bar	Bookstore
4	Central Toronto	0	Dim Sum Restaurant	Bus Line	Park	Swim School	Falafel Restaurant	Event Space	Ethiopian Restaurant	Electronics Store	Eastern European Restaurant	Dumpling Restaurant
5	Central Toronto	0	Park	Hotel	Sandwich Place	Burger Joint	Food & Drink Shop	Clothing Store	Breakfast Spot	Gym	Eastern European Restaurant	Dumpling Restaurant
6	Central Toronto	0	Coffee Shop	Clothing Store	Sporting Goods Shop	Cosmetics Shop	Sandwich Place	Salon / Barbershop	Rental Car Location	Chinese Restaurant	Park	Dessert Shop
7	Central Toronto	0	Sandwich Place	Pizza Place	Dessert Shop	Italian Restaurant	Café	Sushi Restaurant	Pharmacy	Coffee Shop	Indian Restaurant	Greek Restaurant
8	Central Toronto	0	Playground	Women's Store	Dessert Shop	Falafel Restaurant	Event Space	Ethiopian Restaurant	Electronics Store	Eastern European Restaurant	Dumpling Restaurant	Donut Shop
9	Central Toronto	0	Coffee Shop	Pub	Fried Chicken Joint	American Restaurant	Sports Bar	Bagel Shop	Supermarket	Sushi Restaurant	Light Rail Station	Pizza Place
10	Downtown Toronto	0	Park	Playground	Trail	Women's Store	Dessert Shop	Event Space	Ethiopian Restaurant	Electronics Store	Eastern European Restaurant	Dumpling Restaurant
11	Downtown Toronto	0	Coffee Shop	Restaurant	Café	Italian Restaurant	Bakery	Pub	Pizza Place	Outdoor Sculpture	Pharmacy	Breakfast Spot
12	Downtown Toronto	0	Japanese Restaurant	Coffee Shop	Sushi Restaurant	Gay Bar	Restaurant	Bubble Tea Shop	Men's Store	Café	Burger Joint	Mediterranean Restaurant
13	Downtown Toronto	0	Coffee Shop	Pub	Bakery	Park	Café	Mexican Restaurant	Breakfast Spot	Theater	Gym / Fitness Center	Health Food Store
14	Downtown Toronto	0	Coffee Shop	Clothing Store	Café	Cosmetics Shop	Tea Room	Ramen Restaurant	Plaza	Bar	Pizza Place	Bubble Tea Shop
15	Downtown Toronto	0	Coffee Shop	Restaurant	Café	Hotel	Breakfast Spot	Italian Restaurant	Park	Clothing Store	Gastropub	Cosmetics Shop
16	Downtown Toronto	0	Coffee Shop	Cocktail Bar	Italian Restaurant	Café	Seafood Restaurant	Cheese Shop	Farmers Market	Restaurant	Steakhouse	Bakery
17	Downtown Toronto	0	Coffee Shop	Café	Italian Restaurant	Bubble Tea Shop	Burger Joint	Bar	Sushi Restaurant	Thai Restaurant	Spa	Chinese Restaurant
18	Downtown Toronto	0	Coffee Shop	Café	Steakhouse	Thai Restaurant	Bar	Burger Joint	Bakery	Asian Restaurant	Sushi Restaurant	American Restaurant
19	Downtown Toronto	0	Coffee Shop	Aquarium	Hotel	Italian Restaurant	Café	Pizza Place	Brewery	Restaurant	Scenic Lookout	Bakery
20	Downtown Toronto	0	Coffee Shop	Hotel	Café	American Restaurant	Restaurant	Gastropub	Deli / Bodega	Burger Joint	Bar	Seafood Restaurant
21	Downtown Toronto	0	Coffee Shop	Café	Hotel	Restaurant	American Restaurant	Seafood Restaurant	Bakery	Steakhouse	Italian Restaurant	Gym
23	Central Toronto	0	Trail	Jewelry Store	Sushi Restaurant	Bus Line	Women's Store	Diner	Falafel Restaurant	Event Space	Ethiopian Restaurant	Electronics Store
25	Downtown Toronto	0	Café	Coffee Shop	Bar	Japanese Restaurant	Bookstore	Restaurant	Bakery	Dessert Shop	Pub	Chinese Restaurant
26	Downtown Toronto	0	Bar	Café	Vegetarian / Vegan Restaurant	Coffee Shop	Bakery	Chinese Restaurant	Mexican Restaurant	Vietnamese Restaurant	Arts & Crafts Store	Caribbean Restaurant
29	Downtown Toronto	0	Coffee Shop	Café	Hotel	Restaurant	Steakhouse	American Restaurant	Bar	Gastropub	Bakery	Asian Restaurant
30	Downtown Toronto	0	Grocery Store	Café	Park	Nightclub	Diner	Baby Store	Italian Restaurant	Restaurant	Coffee Shop	Convenience Store
31	West Toronto	0	Bakery	Supermarket	Discount Store	Pharmacy	Bank	Middle Eastern Restaurant	Bar	Café	Pool	Liquor Store
32	West Toronto	0	Bar	Coffee Shop	Asian Restaurant	Bakery	Pizza Place	Restaurant	Cocktail Bar	Café	Men's Store	Vietnamese Restaurant
33	West Toronto	0	Coffee Shop	Café	Breakfast Spot	Gym	Furniture / Home Store	Performing Arts Venue	Pet Store	Nightclub	Climbing Gym	Caribbean Restaurant
34	West Toronto	0	Café	Mexican Restaurant	Grocery Store	Arts & Crafts Store	Sandwich Place	Fast Food Restaurant	Bookstore	Flea Market	Speakeasy	Cajun / Creole Restaurant
35	West Toronto	0	Breakfast Spot	Gift Shop	Bookstore	Eastern European Restaurant	Italian Restaurant	Restaurant	Bank	Bar	Movie Theater	Dessert Shop
36	West Toronto	0	Café	Coffee Shop	Pizza Place	Sushi Restaurant	Italian Restaurant	Tea Room	Gourmet Shop	Dessert Shop	Bar	Spa
37	East Toronto	0	Yoga Studio	Garden	Smoke Shop	Brewery	Light Rail Station	Farmers Market	Spa	Fast Food Restaurant	Burrito Place	Restaurant

## Toronto Cluster 2

	Borough	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	Central Toronto	1	Café	Coffee Shop	Sandwich Place	Pizza Place	Liquor Store	BBQ Joint	Vegetarian / Vegan Restaurant	Pub	Cosmetics Shop	History Museum

## Toronto Cluster 3

	Borough	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	Downtown Toronto	2	Coffee Shop	Restaurant	Café	Seafood Restaurant	Beer Bar	Fast Food Restaurant	Hotel	Italian Restaurant	Cocktail Bar	Art Gallery

## Toronto Cluster 4

	Borough	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	Central Toronto	3	Garden	Home Service	Women's Store	Farmers Market	Falafel Restaurant	Event Space	Ethiopian Restaurant	Electronics Store	Eastern European Restaurant	Dumpling Restaurant

## Toronto Cluster 5

	Borough	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
27	Downtown Toronto	4	Airport Lounge	Airport Service	Airport Terminal	Boat or Ferry	Boutique	Airport	Airport Food Court	Airport Gate	Harbor / Marina	Plane

## 5. Result

From cluster result, we could see that New York is quite different from Toronto. In New York, each cluster has obvious features, such cluster1 has more shopping and art, cluster2 has more Bar and Spa. But in Toronto, different venues are evenly distributed in neighborhoods.

I plan go to New York for the vacation, epically in Neighborhoods of cluster 1 and 2.

## 6. Conclusion

K-means clustering algorithm could be used for segmenting and clustering the neighborhoods of cities.