Introduction

I would like to compare the similarities between the neighborhoods of Toronto and that of New York city.

Data Description

I would use the New York city data set from the Week 2 Lab, and the Toronto data set from the Week 3 Assignment, also the location data and neighborhood information provided in the Foursquare.
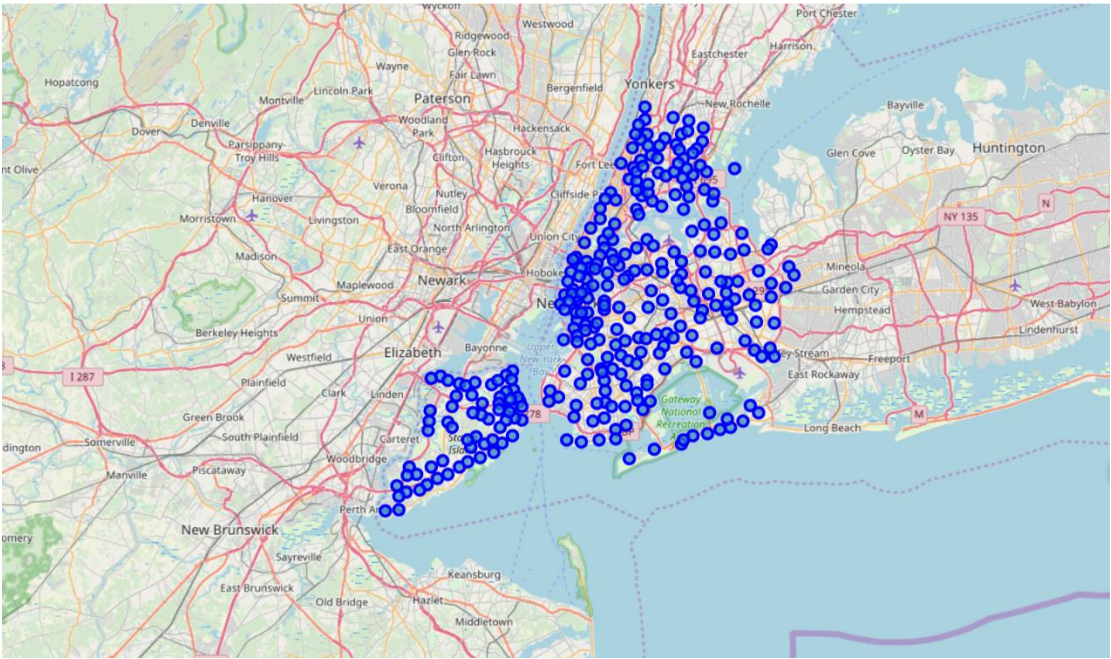
New York city data set and map

Toronto city data and map

```
In [72]: data.head()
```

Out[72]:

	Postcode	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
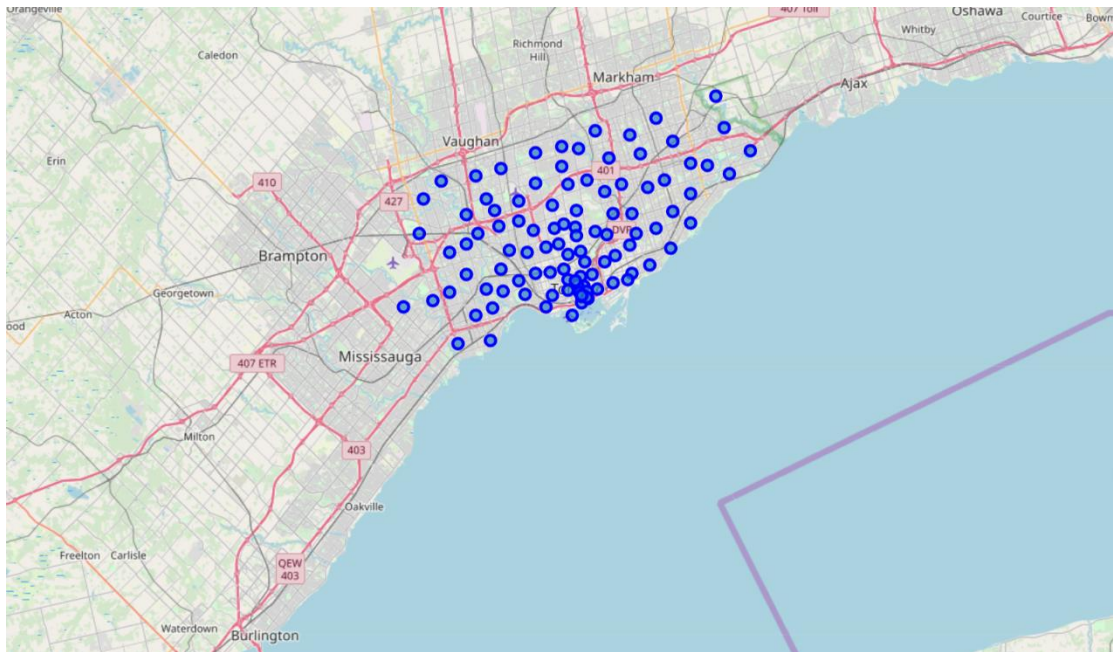
Methodology

For both the New York city data and Toronto data, combined with location and neighborhood information, I used K-means to cluster the Borough and for each city, there are 5 clusters.

New York city clusters
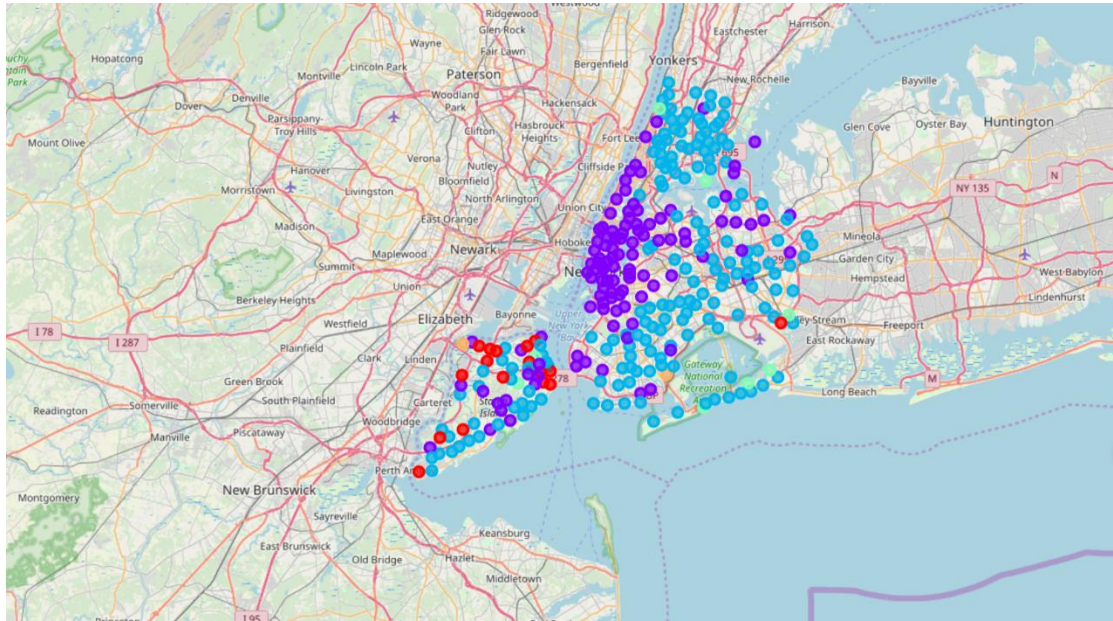
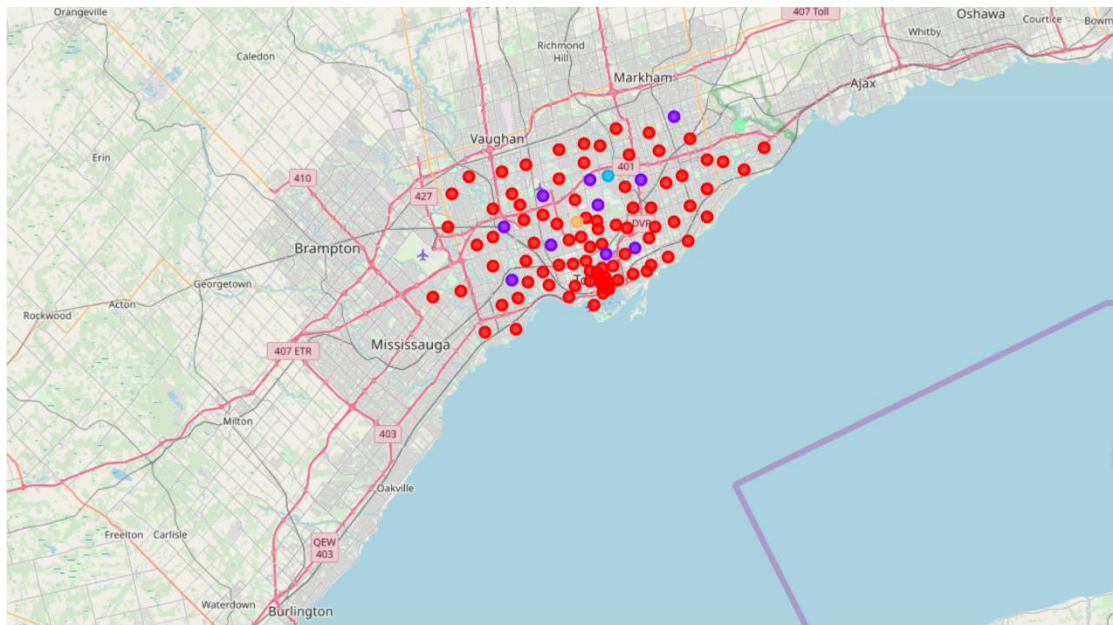**Toronto clusters**

Results

The datasets are correctly clustered, we could see the great difference between the rows in different clusters.

New York city

In [77]: nycluster1.head()

Out[77]:

	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
193	Deli / Bodega	Market	Department Store	Event Service	Eye Doctor	Factory	Falafel Restaurant	Farm	Farmers Market	Fast Food Restaurant
198	Bus Stop	Deli / Bodega	Park	Discount Store	Playground	Bowling Alley	Fish Market	Factory	Falafel Restaurant	Farm
206	Italian Restaurant	Deli / Bodega	Bus Stop	Irish Pub	Fish & Chips Shop	Event Space	Eye Doctor	Factory	Falafel Restaurant	Farm
217	Italian Restaurant	Cosmetics Shop	Bus Stop	Mexican Restaurant	Thrift / Vintage Store	Deli / Bodega	Diner	Flower Shop	Farm	Farmers Market
219	Golf Course	Burger Joint	American Restaurant	Bus Stop	Flower Shop	Factory	Falafel Restaurant	Farm	Farmers Market	Fast Food Restaurant

In [78]: nycluster2.head()

Out[78]:

	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
9	Caribbean Restaurant	Dance Studio	Bar	Nightclub	Soup Place	Filipino Restaurant	Eye Doctor	Factory	Falafel Restaurant	Farm
12	Harbor / Marina	Seafood Restaurant	Thrift / Vintage Store	History Museum	French Restaurant	Spanish Restaurant	Music Venue	Smoke Shop	Boat or Ferry	Sandwich Place
28	Deli / Bodega	Coffee Shop	Juice Bar	Pizza Place	Sports Bar	Baseball Field	Bar	Asian Restaurant	Italian Restaurant	American Restaurant
39	Italian Restaurant	Pizza Place	Donut Shop	Coffee Shop	Deli / Bodega	Asian Restaurant	Park	Spa	Sports Bar	Bar
46	Spa	Greek Restaurant	Pizza Place	American Restaurant	Grocery Store	Sushi Restaurant	Bagel Shop	Middle Eastern Restaurant	Bar	Chinese Restaurant

In [79]: nycluster3.head()

Out[79]:

	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	Donut Shop	Dessert Shop	Ice Cream Shop	Gas Station	Caribbean Restaurant	Sandwich Place	Pharmacy	Laundromat	Field	Eye Doctor
1	Bus Station	Restaurant	Gift Shop	Fast Food Restaurant	Grocery Store	Mattress Store	Basketball Court	Baseball Field	Bagel Shop	Pharmacy
2	Caribbean Restaurant	Deli / Bodega	Diner	Donut Shop	Pizza Place	Seafood Restaurant	Metro Station	Fast Food Restaurant	Bowling Alley	Convenience Store
3	Bus Station	Plaza	River	Yoga Studio	Fish & Chips Shop	Event Space	Eye Doctor	Factory	Falafel Restaurant	Farm
4	Park	Home Service	Bus Station	Food Truck	Gym	Medical Supply Store	Baseball Field	Bank	Moving Target	Plaza

In [80]: nycluster4.head()

Out[80]:

	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	Park	Boat or Ferry	Moving Target	Pool	Bus Stop	South American Restaurant	Grocery Store	Fish & Chips Shop	Factory	Falafel Restaurant
35	Park	Intersection	Pharmacy	Thai Restaurant	Bus Line	Bank	Tennis Stadium	Factory	Falafel Restaurant	Farm
179	Beach	Yoga Studio	Gaming Cafe	Eye Doctor	Factory	Falafel Restaurant	Farm	Farmers Market	Fast Food Restaurant	Field
188	Caribbean Restaurant	Park	Cosmetics Shop	Train Station	Filipino Restaurant	Event Space	Eye Doctor	Factory	Falafel Restaurant	Farm
192	Park	Yoga Studio	Fish & Chips Shop	Event Space	Eye Doctor	Factory	Falafel Restaurant	Farm	Farmers Market	Fast Food Restaurant

In [81]: nycluster5.head()

Out[81]:

	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
76	Locksmith	Pool	Yoga Studio	Fish & Chips Shop	Event Space	Eye Doctor	Factory	Falafel Restaurant	Farm	Farmers Market
257	Locksmith	Yoga Studio	Ethiopian Restaurant	Event Space	Eye Doctor	Factory	Falafel Restaurant	Farm	Farmers Market	Fast Food Restaurant

Toronto

In [82]: `trcluster1.head()`

Out[82]:

	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	History Museum	Bar	Yoga Studio	Diner	Farmers Market	Falafel Restaurant	Event Space	Ethiopian Restaurant	Empanada Restaurant	Electronics Store
2	Spa	Pizza Place	Electronics Store	Medical Center	Mexican Restaurant	Intersection	Rental Car Location	Breakfast Spot	Discount Store	Event Space
3	Coffee Shop	Convenience Store	Korean Restaurant	Yoga Studio	Discount Store	Farmers Market	Falafel Restaurant	Event Space	Ethiopian Restaurant	Empanada Restaurant
4	Bank	Hakka Restaurant	Bakery	Caribbean Restaurant	Thai Restaurant	Gas Station	Fried Chicken Joint	Athletics & Sports	Dumpling Restaurant	Drugstore
5	Playground	Cosmetics Shop	Yoga Studio	Dim Sum Restaurant	Falafel Restaurant	Event Space	Ethiopian Restaurant	Empanada Restaurant	Electronics Store	Eastern European Restaurant

In [83]: `trcluster2.head()`

Out[83]:

	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
14	Playground	Park	Yoga Studio	Dim Sum Restaurant	Falafel Restaurant	Event Space	Ethiopian Restaurant	Empanada Restaurant	Electronics Store	Eastern European Restaurant
23	Park	Convenience Store	Bar	Bank	Yoga Studio	Dog Run	Farmers Market	Falafel Restaurant	Event Space	Ethiopian Restaurant
25	Park	Food & Drink Shop	Yoga Studio	Diner	Falafel Restaurant	Event Space	Ethiopian Restaurant	Empanada Restaurant	Electronics Store	Eastern European Restaurant
30	Airport	Park	Playground	Snack Place	Yoga Studio	Dim Sum Restaurant	Event Space	Ethiopian Restaurant	Empanada Restaurant	Electronics Store
40	Park	Pizza Place	Convenience Store	Coffee Shop	Yoga Studio	Diner	Falafel Restaurant	Event Space	Ethiopian Restaurant	Empanada Restaurant

In [84]: `trcluster3.head()`

Out[84]:

	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
20	Cafeteria	Yoga Studio	Field	Farmers Market	Falafel Restaurant	Event Space	Ethiopian Restaurant	Empanada Restaurant	Electronics Store	Eastern European Restaurant

In [85]: `trcluster4.head()`

Out[85]:

	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	Fast Food Restaurant	Yoga Studio	Comic Shop	Farmers Market	Falafel Restaurant	Event Space	Ethiopian Restaurant	Empanada Restaurant	Electronics Store	Eastern European Restaurant

In [86]: `trcluster5.head()`

Out[86]:

	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
63	Garden	Field	Farmers Market	Falafel Restaurant	Event Space	Ethiopian Restaurant	Empanada Restaurant	Electronics Store	Eastern European Restaurant	Dumpling Restaurant

Discussion

The clusters are not really uniformly distributed, which means that some clusters include more Borough and others are less, and the difference of numbers of Borough in different clusters are pretty large.

New York city

```
In [74]: print(nycluster1.shape)
         print(nycluster2.shape)
         print(nycluster3.shape)
         print(nycluster4.shape)
         print(nycluster5.shape)

(17, 10)
(109, 10)
(170, 10)
(8, 10)
(2, 10)
```

Toronto

```
In [75]: print(trcluster1.shape)
         print(trcluster2.shape)
         print(trcluster3.shape)
         print(trcluster4.shape)
         print(trcluster5.shape)

         (88, 10)
         (10, 10)
         (1, 10)
         (1, 10)
         (1, 10)
```

Conclusion

There are some of the regions are similar between the two cities.