Battle of neighbourhoods – Report

Description of problem and background:

New York city and Toronto city have been explored, segmented and clustered based on their neighbourhoods. Both the cities are very diverse and are financial capitals of their respective countries. This project is going to compare the neighbourhoods of both the cities and check for similarity and dissimilarity.

Most of the people who travel by flights to faraway places will have layover in major cities like New York and Toronto. Sometimes the layover would be more than 12 hours and people get frustrated waiting in the airport.
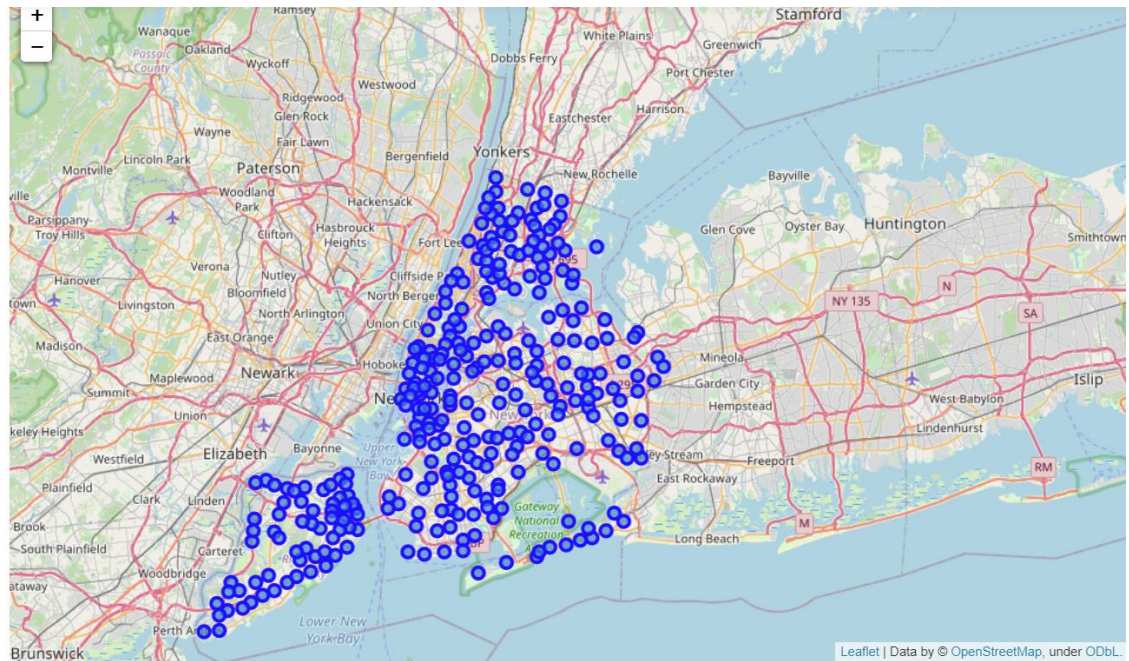
This project compares the two cities, checks for similarities and dissimilarities and analyses which city is better to visit for short period of time such as 12 hours to 24 hours.

Data:
i)   Data set for New York city is available in in the following link:
     https://cocl.us/new_york_dataset
ii) Data set for Toronto is available in the following link:
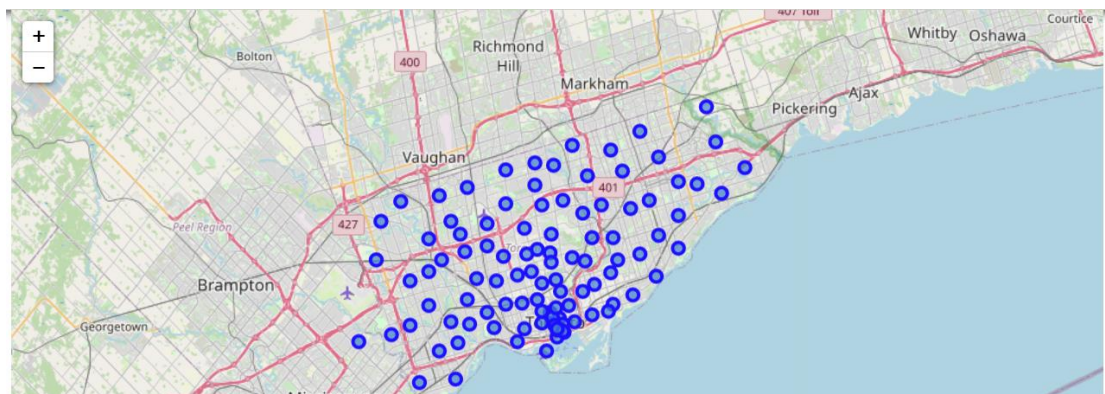   https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M

Data Acquisition:

i) The data for New York has all the information such as neighbourhood names, location details such as longitudes and latitudes.
ii) It consists of 5 boroughs and 306 neighbourhoods.
iii) The map of New York with all the neighbourhoods

Toronto data:

i) The data consists of Postal code, Neighbourhood name, and borough. I have used csv file: http://cocl.us/Geospatial_data for location details such as latitude and longitude.
ii) There are 103 neighbourhoods and 9 boroughs.
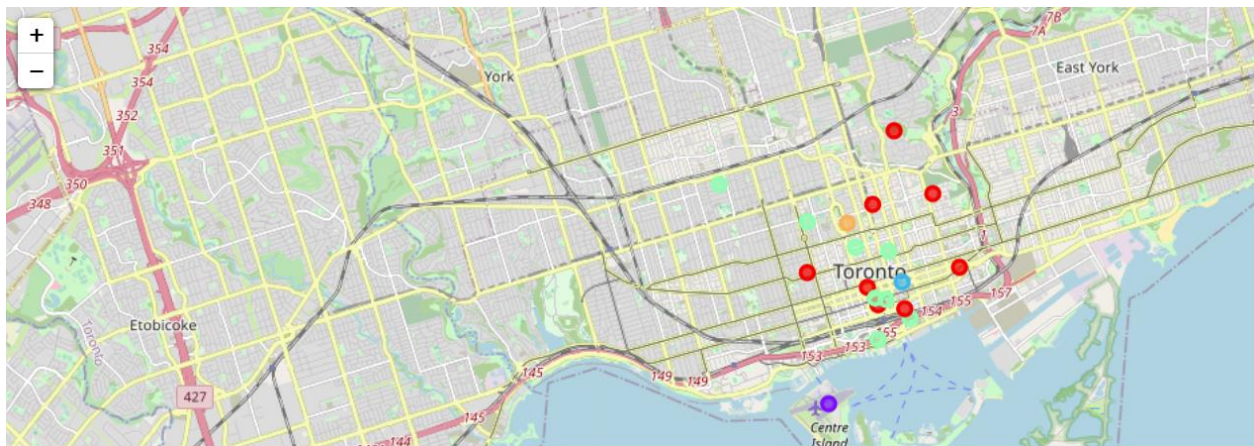iii) Map of Toronto with all the neighbourhoods:

Four-square API was is used to search for near by venues in each neighbourhood of Toronto city and New York city in the radius of 500 mt. The venue name and Venue category are extracted. The total number of venues in each category are counted and also the most frequent venue category for each neighbourhood is classified.
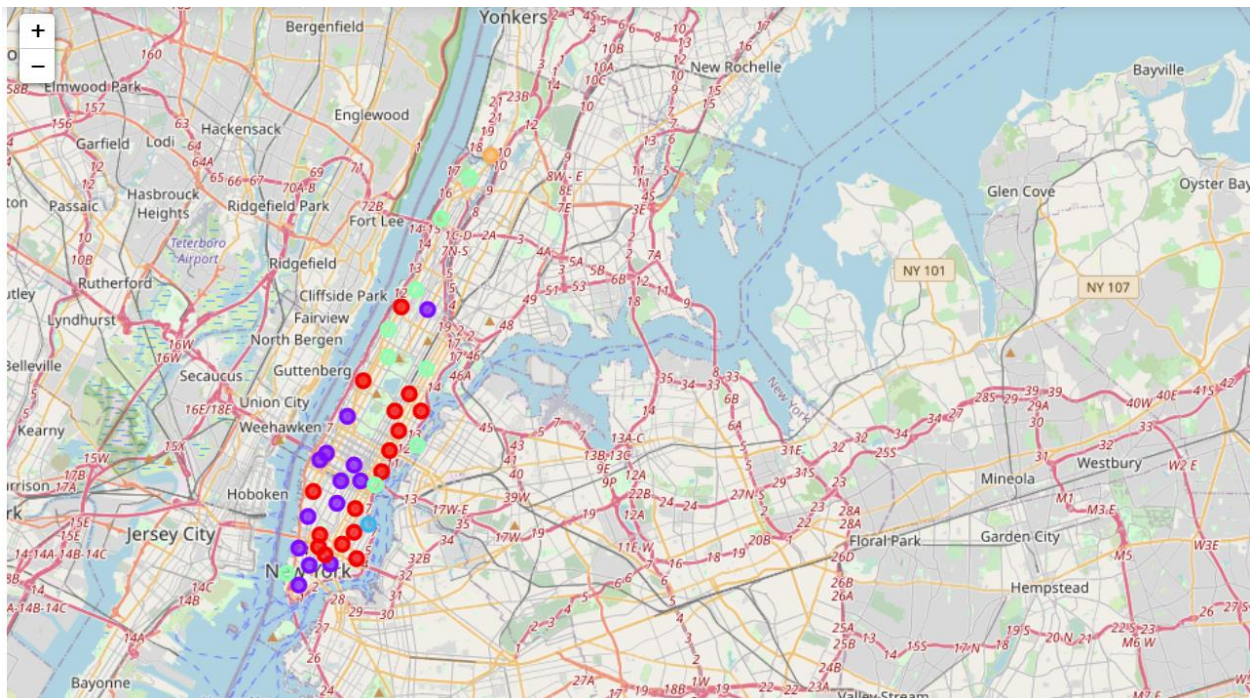
After retrieving all the data in the form of JSON file from Foursquare API. The data of near by venues in the radius of 500 mt of both Toronto Downtown and Manhattan.

According to the total number of venues in each category I used K-means clustering algorithm to cluster the data

Toronto downtown map with neighbourhoods clustered:

Manhattan map with neighbourhoods clustered:

Toronto:

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	Regent Park, Harbourfront	Coffee Shop	Park	Bakery	Pub	Café	Breakfast Spot	Restaurant	Theater	Mexican Restaurant	Performing Arts Venue
7	Richmond, Adelaide, King	Coffee Shop	Café	Gym	Restaurant	Hotel	Clothing Store	Bar	Thai Restaurant	Steakhouse	Lounge
9	Toronto Dominion Centre, Design Exchange	Coffee Shop	Hotel	Café	Restaurant	Salad Place	Seafood Restaurant	American Restaurant	Japanese Restaurant	Asian Restaurant	Deli / Bodega
12	Kensington Market, Chinatown, Grange Park	Café	Coffee Shop	Mexican Restaurant	Vietnamese Restaurant	Vegetarian / Vegan Restaurant	Gaming Cafe	Burger Joint	Pizza Place	Bar	Park
14	Rosedale	Park	Trail	Playground	Cosmetics Shop	Dog Run	Distribution Center	Discount Store	Diner	Dessert Shop	Department Store
15	Stn A PO Boxes	Coffee Shop	Café	Gym	Pub	Japanese Restaurant	Restaurant	Italian Restaurant	Hotel	Seafood Restaurant	Beer Bar
16	St. James Town, Cabbagetown	Coffee Shop	Italian Restaurant	Bakery	Café	Pizza Place	Restaurant	Pub	Liquor Store	Beer Store	Sandwich Place
18	Church and Wellesley	Coffee Shop	Japanese Restaurant	Sushi Restaurant	Gay Bar	Restaurant	Yoga Studio	Hotel	Mediterranean Restaurant	Men's Store	Bubble Tea Shop

The most common venues are coffee shop, park, cafe, hotel, trail, restaurants.

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
13	CN Tower, King and Spadina, Railway Lands, Har...	Airport Service	Airport Lounge	Boutique	Sculpture Garden	Plane	Rental Car Location	Boat or Ferry	Bar	Harbor / Marina	Coffee Shop

The most common venues are airport, boutique

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
3	St. James Town	Café	Coffee Shop	Restaurant	Clothing Store	Cocktail Bar	Cosmetics Shop	American Restaurant	Italian Restaurant	Park	Beer Bar

The most common venues are café, coffee shop, restaurant.

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
2	Garden District, Ryerson	Clothing Store	Coffee Shop	Café	Bubble Tea Shop	Japanese Restaurant	Cosmetics Shop	Pizza Place	Bookstore	Middle Eastern Restaurant	Lingerie Store
4	Berczy Park	Coffee Shop	Cheese Shop	Farmers Market	Beer Bar	Seafood Restaurant	Café	Bakery	Cocktail Bar	Restaurant	Eastern European Restaurant
5	Central Bay Street	Coffee Shop	Sandwich Place	Café	Italian Restaurant	Salad Place	Japanese Restaurant	Bubble Tea Shop	Burger Joint	Department Store	New American Restaurant
6	Christie	Grocery Store	Café	Park	Coffee Shop	Athletics & Sports	Restaurant	Italian Restaurant	Nightclub	Diner	Baby Store
8	Harbourfront East, Union Station, Toronto Islands	Coffee Shop	Aquarium	Hotel	Café	Scenic Lookout	Italian Restaurant	Brewery	Fried Chicken Joint	Restaurant	Bank
10	Commerce Court, Victoria Hotel	Coffee Shop	Restaurant	Café	Hotel	Gym	American Restaurant	Seafood Restaurant	Deli / Bodega	Beer Bar	Bar
11	University of Toronto, Harbord	Café	Restaurant	Bar	Japanese Restaurant	Sandwich Place	Bookstore	Bakery	Yoga Studio	Italian Restaurant	Beer Bar
17	First Canadian Place, Underground city	Coffee Shop	Café	Hotel	Restaurant	Japanese Restaurant	Gym	Seafood Restaurant	Steakhouse	Asian Restaurant	American Restaurant

The most common venues are clothing store, coffee shop, grocery store, café, restaurants, aquarium, hotel

Cluster: 5

	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	Queen's Park, Ontario Provincial Government	Coffee Shop	Gym	Diner	Portuguese Restaurant	Persian Restaurant	Park	Mexican Restaurant	Japanese Restaurant	Italian Restaurant	Hobby Shop

The most common venues are coffee shop, gym and diner.

New York:

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
5	Manhattanville	Coffee Shop	Mexican Restaurant	Italian Restaurant	Bar	Bus Stop	Seafood Restaurant	Dumpling Restaurant	Café	Lounge	Sushi Restaurant
8	Upper East Side	Italian Restaurant	Coffee Shop	Bakery	Gym / Fitness Center	Yoga Studio	French Restaurant	Hotel	Pizza Place	Spa	Exhibit
9	Yorkville	Italian Restaurant	Gym	Bar	Coffee Shop	Sushi Restaurant	Pizza Place	Deli / Bodega	Wine Shop	Japanese Restaurant	Diner
10	Lenox Hill	Sushi Restaurant	Coffee Shop	Pizza Place	Italian Restaurant	Café	Cocktail Bar	Burger Joint	Gym	Gym / Fitness Center	Salad Place
12	Upper West Side	Italian Restaurant	Coffee Shop	Wine Bar	Mediterranean Restaurant	Bakery	Bar	Dessert Shop	Indian Restaurant	Vegetarian / Vegan Restaurant	Thai Restaurant
17	Chelsea	Coffee Shop	Art Gallery	American Restaurant	Hotel	Seafood Restaurant	French Restaurant	Bakery	Italian Restaurant	Bar	Cocktail Bar
18	Greenwich Village	Italian Restaurant	Sushi Restaurant	Café	Clothing Store	Indian Restaurant	Gym	Ice Cream Shop	Chinese Restaurant	Gourmet Shop	Dessert Shop
19	East Village	Bar	Ice Cream Shop	Mexican Restaurant	Wine Bar	Pizza Place	Cocktail Bar	Italian Restaurant	Speakeasy	Vietnamese Restaurant	Coffee Shop
20	Lower East Side	Chinese Restaurant	Coffee Shop	Cocktail Bar	Bakery	Café	Art Gallery	Japanese Restaurant	Mediterranean Restaurant	Bubble Tea Shop	French Restaurant
22	Little Italy	Bakery	Bubble Tea Shop	Café	Italian Restaurant	Chinese Restaurant	Coffee Shop	Mediterranean Restaurant	Hotel	Ice Cream Shop	Sandwich Place
23	Soho	Italian Restaurant	Coffee Shop	Clothing Store	Boutique	Mediterranean Restaurant	Salon / Barbershop	Hotel	Bakery	Vegetarian / Vegan Restaurant	Dessert Shop

The most common venues are coffee shop, Restaurants with different cuisines, bar, bakery, clothing store, café, pizza place

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
1	Chinatown	Chinese Restaurant	Bakery	Cocktail Bar	Vietnamese Restaurant	Dessert Shop	Noodle House	Salon / Barbershop	Optical Shop	Spa	American Restaurant
6	Central Harlem	African Restaurant	French Restaurant	American Restaurant	Chinese Restaurant	Cosmetics Shop	Seafood Restaurant	Bar	Public Art	Dessert Shop	Southern / Soul Food Restaurant
13	Lincoln Square	Plaza	Café	Theater	Concert Hall	Italian Restaurant	Performing Arts Venue	Gym / Fitness Center	Clothing Store	American Restaurant	Wine Shop
14	Clinton	Theater	Gym / Fitness Center	Italian Restaurant	Cocktail Bar	American Restaurant	Coffee Shop	Sandwich Place	Gym	Wine Shop	Spa
15	Midtown	Hotel	Coffee Shop	Clothing Store	Bakery	Sporting Goods Shop	Theater	Steakhouse	Bookstore	Café	Sandwich Place
16	Murray Hill	Sandwich Place	Coffee Shop	American Restaurant	Japanese Restaurant	Gym / Fitness Center	Hotel	Bar	Burger Joint	Mediterranean Restaurant	Pizza Place
21	Tribeca	Park	Italian Restaurant	Wine Bar	Spa	American Restaurant	Greek Restaurant	Coffee Shop	Café	French Restaurant	Art Gallery
24	West Village	Italian Restaurant	American Restaurant	New American Restaurant	Cocktail Bar	Park	Wine Bar	Coffee Shop	Jazz Club	Cosmetics Shop	Theater
29	Financial District	Coffee Shop	Pizza Place	Café	Cocktail Bar	Bar	Italian Restaurant	Gym	Gym / Fitness Center	Steakhouse	Park
32	Civic Center	Coffee Shop	Hotel	Cocktail Bar	Gym / Fitness Center	French Restaurant	Yoga Studio	Spa	Italian Restaurant	Park	Sporting Goods Shop

The most common venues are coffee shop, restaurants with different cuisines, theater, hotel, café, gym, pizza place, clothing store

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	Park	Boat or Ferry	Bar	Baseball Field	Pet Service	Gas Station	Bistro	Farmers Market	Gym / Fitness Center	Cocktail Bar

The most common venues are park, boat and bar

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
2	Washington Heights	Café	Bakery	Chinese Restaurant	Mobile Phone Shop	Deli / Bodega	Grocery Store	Latin American Restaurant	Supermarket	Tapas Restaurant	Italian Restaurant
3	Inwood	Mexican Restaurant	Restaurant	Café	Lounge	Frozen Yogurt Shop	Bakery	Pizza Place	Park	Chinese Restaurant	Caribbean Restaurant
4	Hamilton Heights	Pizza Place	Deli / Bodega	Coffee Shop	Café	Mexican Restaurant	Bakery	Park	Cocktail Bar	Sandwich Place	School
7	East Harlem	Mexican Restaurant	Thai Restaurant	Bakery	Deli / Bodega	Latin American Restaurant	Sandwich Place	Spanish Restaurant	Gas Station	Cocktail Bar	Liquor Store
11	Roosevelt Island	Park	Scenic Lookout	Gym	Dry Cleaner	Greek Restaurant	Baseball Field	Outdoors & Recreation	Liquor Store	Sandwich Place	Coffee Shop
25	Manhattan Valley	Bar	Thai Restaurant	Pizza Place	Mexican Restaurant	Coffee Shop	Café	Latin American Restaurant	Gym / Fitness Center	Grocery Store	Malay Restaurant
26	Morningside Heights	Park	American Restaurant	Coffee Shop	Bookstore	Deli / Bodega	Burger Joint	Sandwich Place	Greek Restaurant	Supermarket	Café
28	Battery Park City	Park	Hotel	Gym	Coffee Shop	Shopping Mall	Memorial Site	Food Court	BBQ Joint	Boat or Ferry	Sandwich Place
36	Tudor City	Park	Café	Deli / Bodega	Mexican Restaurant	Diner	Coffee Shop	Sushi Restaurant	Spanish Restaurant	Gym	Garden

The most common venues are café, park, bar, restaurants with different cuisine, scenic lookout, hotel, bakery

Cluster: 5

	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	Gym	Sandwich Place	Big Box Store	Supplement Shop	Steakhouse	Pizza Place	Shopping Mall	Seafood Restaurant	Yoga Studio

The most common venues are coffee shop, gym, sandwich place

Results:

Both New York and Toronto have a lot of places in common. There are many coffee shops, cafes, bars, parks, pizza places to hangout. There are restaurants with different cuisines such as Thai, Japanese, Italian etc. There are clothing stores for shopping as well.

In Toronto there is aquarium, trail etc. People who like adventure and like to go out on trail would love Toronto.

In New York there is boating or ferry, scenic lookout places. People who like to have peaceful time and enjoy scenic beauty would love New York.