

Battle of Localities

A comparative study of the Localities in
New York and Toronto using Data Science

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Battle of Localities – A comparative study of the Localities in New York and Toronto using Data Science

Introduction

Cities around the world are different demographically and culturally. However, cosmopolitan business centers around the world are diverse and have localities which can be grouped into similar clusters with venues and places which are similar.

People migrate to a different city or move to a different city for work. When they do so, they try to find localities similar to the ones they live in or localities with places of interest to them.

In this project, localities in the central business district of New York City and Toronto have been clustered and compared. Similar comparison can be done with other cities around the world.

The objective of this project is to find the most popular venues in a city, categorize them and cluster the localities in the city according to the category of popular venues. These cluster of venues are then compared with those of other cities.

This project is a part of the Coursera Capstone Course for IBM Data Science Professional Certificate. The project aims at showcasing the different skills learnt during the course including Data cleaning and formatting, Data Visualization, Maps, Clustering, etc.

Source of Data

In this report New York and Toronto has been considered for comparison of the localities. Data used in the project has been collected from multiple sources through internet.

Dataset with location details of different localities of New York have been taken from the geospatial data available at NYU Spatial Repository Data https://geo.nyu.edu/catalog/nyu_2451_34572.

Dataset about the different localities of Toronto has been taken from Wikipedia website available at https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M.

The geospatial data for the different locations of Toronto has been obtained using the geopy.geocoders package. The dataset with location data is also available at http://cocl.us/Geospatial_data.

Details of the popular venues in each locality has been obtained using Foursquare api.

Localities across the two cities are compared based on the category of the popular venues at each location. Clustering has been used to group similar localities together.

Methodology

Location data from the sources as mentioned above were cleaned and formatted to get details of the localities, borough, PIN codes and location coordinates (latitude and longitude).

The location coordinates were used to get the popular venues in and around the location using Foursquare API.

The locations were clustered using K means clustering and the clusters thus obtained were analyzed and were classified according to the category of popular venues in the location.

Data Preprocessing

Data obtained from different sources were cleaned and duplicates or missing data were removed.

Location coordinates (latitude and longitude) were then obtained and added to the data.

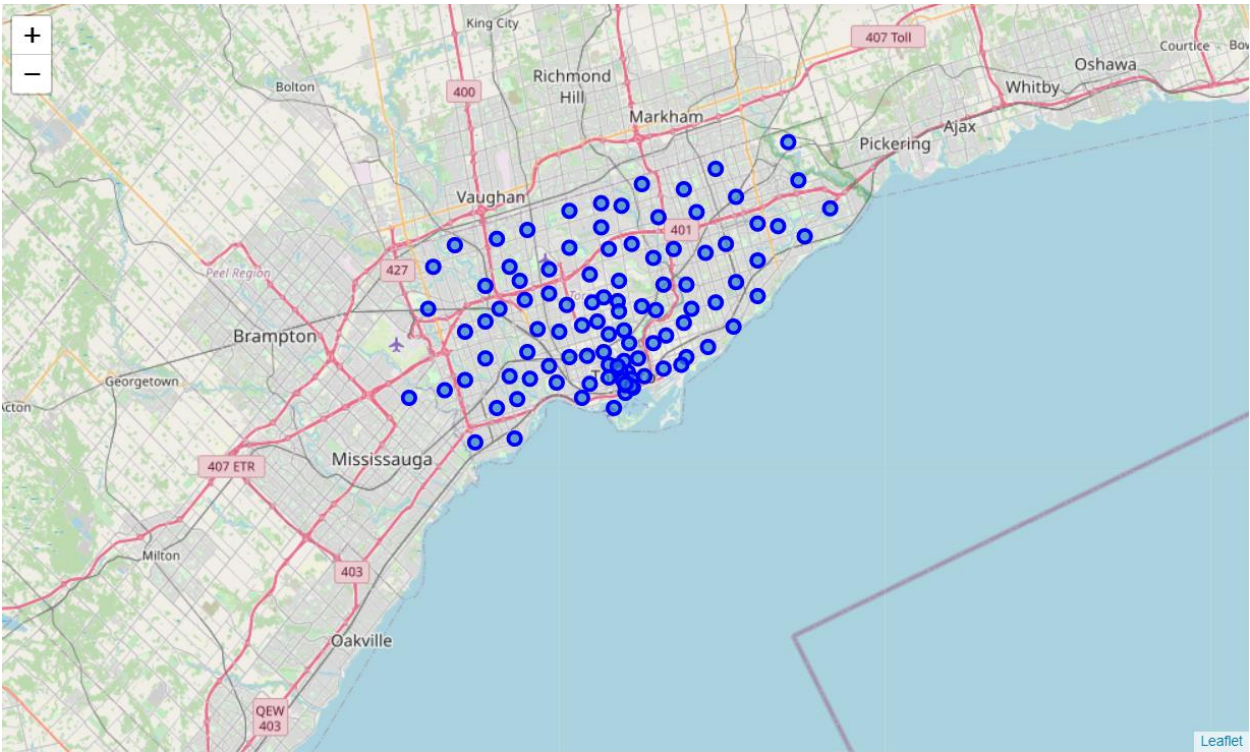
The data after these steps is as shown below:

Data on localities of Toronto:

PostalCode	Borough	Neighbourhood	Latitude	Longitude	
0	M1B	Scarborough	Malvern, Rouge	43.806686	-79.194353
1	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	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
...
98	M9N	York	Weston	43.706876	-79.518188
99	M9P	Etobicoke	Westmount Kingsview Village,	43.696319	-79.532242
100	M9R	Etobicoke	St. Phillips, Martin Grove ... South Steeles,	43.688905	-79.554724
101	M9V	Etobicoke	Silverstone, Humbergate, Jamest...	43.739416	-79.588437
102	M9W	Etobicoke	Northwest, West Humber - Clairville	43.706748	-79.594054

103 rows × 5 columns

Locations in Toronto on map:

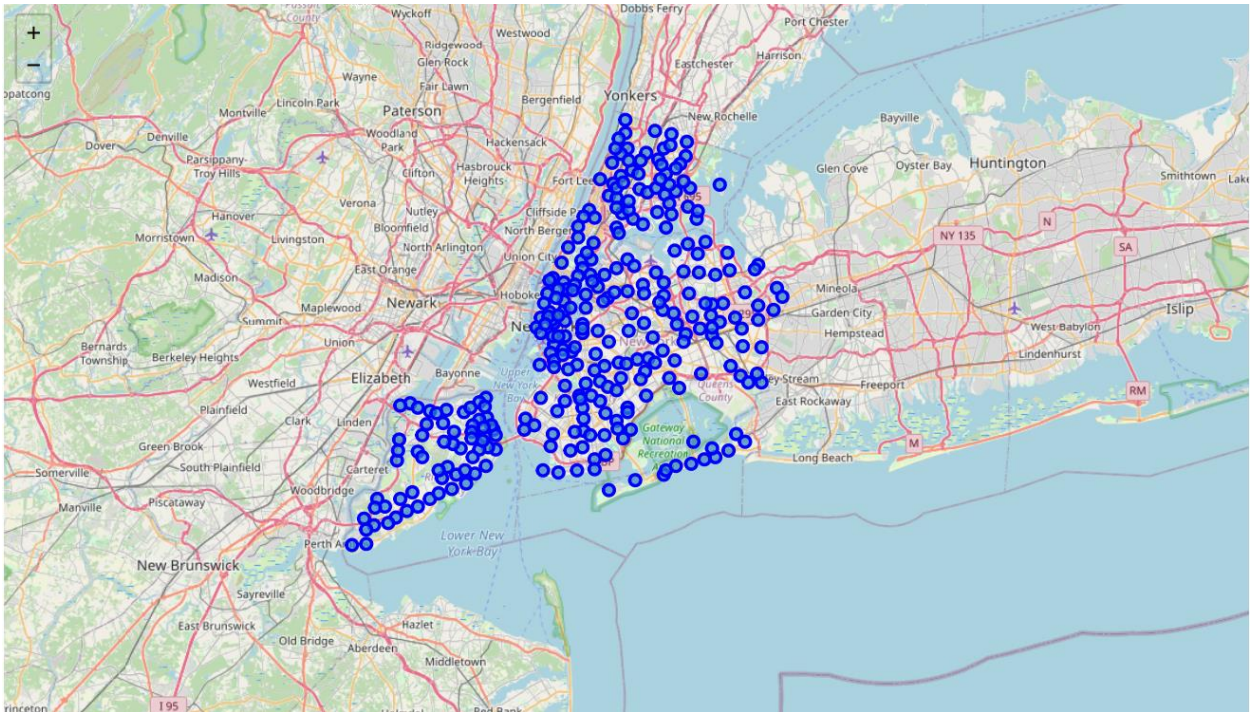


Data on localities of New York

	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
...
607	Manhattan	Hudson Yards	40.756658	-74.000111
608	Queens	Hammels	40.587338	-73.805530
609	Queens	Bayswater	40.611322	-73.765968
610	Queens	Queensbridge	40.756091	-73.945631
611	Staten Island	Fox Hills	40.617311	-74.081740

612 rows × 4 columns

Locations in New York on Map



Data Analysis

Location Clusters in Downtown Toronto

Amongst the boroughs of Toronto, Downtown Toronto is chosen for analysis of the locations and category of venues in them.

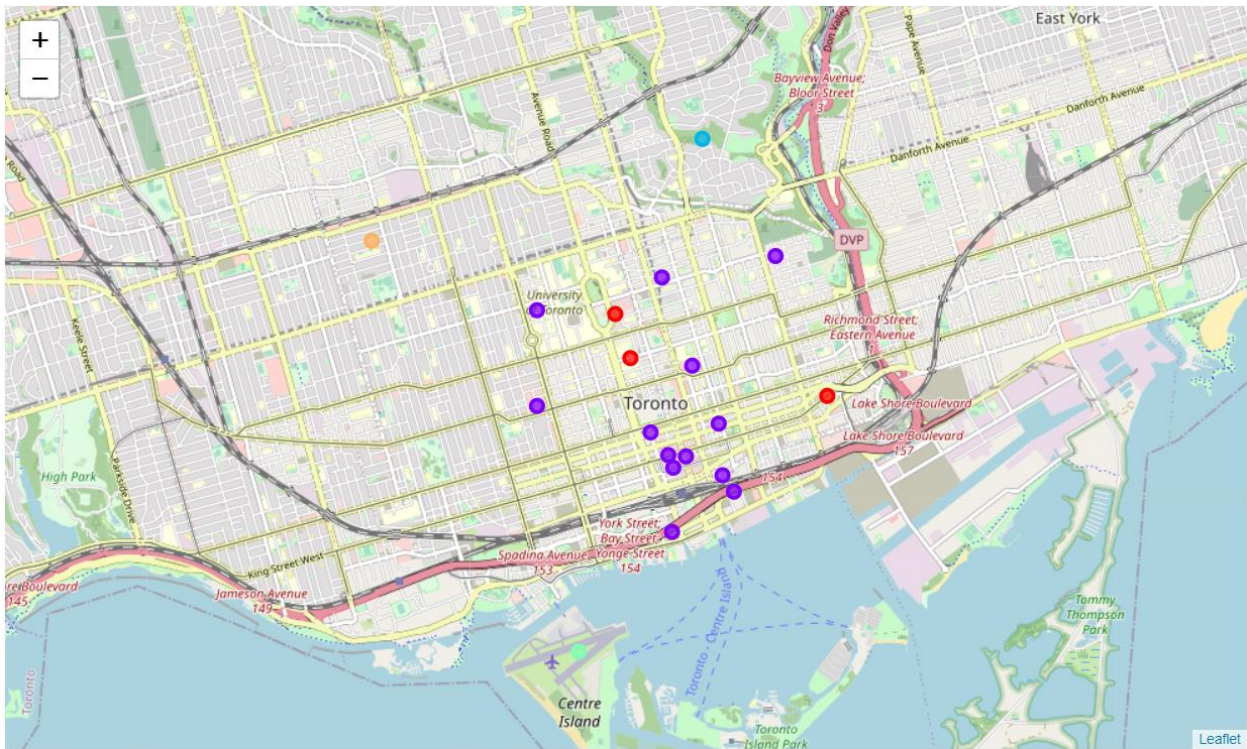
The data on the localities of Downtown Toronto are given below:

	PostalCode	Borough	Neighbourhood	Latitude	Longitude
0	M4W	Downtown Toronto	Rosedale	43.679563	-79.377529
1	M4X	Downtown Toronto	St. James Town, Cabbagetown	43.667967	-79.367675
2	M4Y	Downtown Toronto	Church and Wellesley	43.665860	-79.383160
3	M5A	Downtown Toronto	Regent Park, Harbourfront	43.654260	-79.360636
4	M5B	Downtown Toronto	Garden District, Ryerson	43.657162	-79.378937
5	M5C	Downtown Toronto	St. James Town	43.651494	-79.375418
6	M5E	Downtown Toronto	Berczy Park	43.644771	-79.373306
7	M5G	Downtown Toronto	Central Bay Street	43.657952	-79.387383
8	M5H	Downtown Toronto	Richmond, Adelaide, King	43.650571	-79.384568

9	M5J	Downtown Toronto	Harbourfront East, Union Station, Toronto Islands	43.640816	-79.381752
10	M5K	Downtown Toronto	Dominion Centre, Design Exchange	43.647177	-79.381576
11	M5L	Downtown Toronto	Commerce Court, Victoria Hotel	43.648198	-79.379817
12	M5S	Downtown Toronto	University of Toronto, Harbord	43.662696	-79.400049
13	M5T	Downtown Toronto	Kensington Market, Chinatown, Grange Park	43.653206	-79.400049
14	M5V	Downtown Toronto	CN Tower, King and Spadina, Railway Lands, Har...	43.628947	-79.394420
15	M5W	Downtown Toronto	Stn A PO Boxes	43.646435	-79.374846
16	M5X	Downtown Toronto	First Canadian Place, Underground city	43.648429	-79.382280
17	M6G	Downtown Toronto	Christie	43.669542	-79.422564
18	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government	43.662301	-79.389494

Popular venues in these localities were explored using Foursquare API and the locations were clustered using K Means Clustering method.

The location maps for the clusters in Downtown Toronto are shown below:



The popular venues in the locations in each cluster is as shown below:

	Neighbo urhood	2nd Most Commo n Venue	3rd Most Commo n Venue	4th Most Commo n Venue	5th Most Commo n Venue	6th Most Commo n Venue	7th Most Commo n Venue	8th Most Commo n Venue	9th Most Commo n Venue	10th Most Commo n Venue
3	Regent Park, Harbour front	Bakery	Park	Theater	Breakfas t Spot	Yoga Studio	Perform ing Arts Venue	Café	Pub	Mexican Restaur ant
7	Central Bay Street	Café	Italian Restaur ant	Yoga Studio	Spa	Modern Europea n Restaur ant	Miscella neous Shop	Middle Eastern Restaur ant	Park	Bubble Tea Shop
18	Queen's Park, Ontario Provinci al Govern ment	Yoga Studio	Creperie	Smoothi e Shop	Bar	Distribu tion Center	Sandwic h Place	Diner	Mexican Restaur ant	Italian Restaur ant

The first cluster in Downtown Toronto, cluster 0, consists of places like bakery, cafe, park, theatre, yoga studio, spa, bar, etc. So, these are places of relaxation.

Neighbo urhood	2nd Most Commo n Venue	3rd Most Commo n Venue	4th Most Commo n Venue	5th Most Commo n Venue	6th Most Commo n Venue	7th Most Commo n Venue	8th Most Commo n Venue	9th Most Commo n Venue	10th Most Commo n Venue	
1	St. James Town,	Café	Italian Restaur ant	Restaur ant	Bakery	Playgro und	Caribbe an	Butcher	Pub	Bank

2	Cabbage town Church and Wellesley	Men's Store	Ramen Restaurant	Dance Studio	Creperie	Salon / Barbershop	Restaurant	Bookstore	Restaurant	Breakfast Spot	Bubble Tea Shop
4	Garden District, Ryerson	Coffee Shop	Clothing Store	Theater	Comic Shop	Shopping Mall	Japanese Restaurant	Sandwich Place	Bookstore		Ramen Restaurant
5	St. James Town	Farmers Market	Café	Restaurant	Japanese Restaurant	Coffee Shop	Latin American Restaurant	BBQ Joint	Creperie		Middle Eastern Restaurant
6	Berczy Park	Beer Bar	Farmers Market	Seafood Restaurant	Cocktail Bar	Bakery	Museum	Liquor Store	Restaurant		Creperie
8	Richmond, Adelaide, King Harbour front East, Union Station, Toronto Islands Toronto Dominion	Steakhouse	Coffee Shop	Gym / Fitness Center	Concert Hall	Restaurant	Plaza	Lounge	Monument / Landmark		Seafood Restaurant
9	East, Union Station, Toronto Islands Toronto Dominion	Park	Café	Plaza	Salad Place	Ice Cream Shop	Skating Rink	Basketball Stadium	Dessert Shop		Japanese Restaurant
10	Centre, Design Exchange Commerce Court, Victoria Hotel University of Toronto, Harbord Kensington Market, Chinatown, Grange Park Stn A PO Boxes	Café	Restaurant	Japanese Restaurant	Asian Restaurant	Sandwich Place	Pub	Beer Bar	Concert Hall		Bakery
11		Coffee Shop	Hotel	Gastropub	American Restaurant	Restaurant	Japanese Restaurant	Museum	Pub		Deli / Bodega
12		Bookstore	Sandwich Place	Bar	Bakery	Japanese Restaurant	Yoga Studio	Italian Restaurant	Noodle House		College Arts Building
13		Vietnamese Restaurant	Mexican Restaurant	Grocery Store	Jazz Club	Beer Bar	Dumpling Restaurant	Dessert Shop	Record Shop		Comfort Food Restaurant
15		Farmers Market	Cocktail Bar	Cosmetics Shop	Jazz Club	Seafood Restaurant	Restaurant	Creperie	Concert Hall		Bakery

16	First Canada n Place, Undergr ound city	Restaur ant	Coffee Shop	Seafood Restaur ant	Asian Restaur ant	Pizza Place	Pub	Booksto re	Sandwic h Place	Hotel
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The second cluster, cluster 1, consists of places like farmers market, steakhouse, restaurants, coffee shops, bar, etc. So, these are eateries and places for dining out.

	Neighbo urhood	2nd Most Commo n Venue	3rd Most Commo n Venue	4th Most Commo n Venue	5th Most Commo n Venue	6th Most Commo n Venue	7th Most Commo n Venue	8th Most Commo n Venue	9th Most Commo n Venue	10th Most Commo n Venue
0	Rosedal e	Playgro und	Trail	Yoga Studio	Comfort Food Restaur ant	Deli / Bodega	Dance Studio	Creperie	Cosmeti cs Shop	Concert Hall

The third cluster, cluster 2 consists of place with playground, trail, yoga studio, dance studio, etc. indicating that these are places for exercising and physical fitness.

	Neighbo urhood	2nd Most Commo n Venue	3rd Most Commo n Venue	4th Most Commo n Venue	5th Most Commo n Venue	6th Most Commo n Venue	7th Most Commo n Venue	8th Most Commo n Venue	9th Most Commo n Venue	10th Most Commo n Venue
14	CN Tower, King and Spadina, Railway Lands, Har...	Airport Service	Airport	Bar	Harbor / Marina	Coffee Shop	Rental Car Location	Boutiqu e	Sculptur e Garden	Boat or Ferry

The fourth cluster, cluster 3 consists of airport with other places around the airport. This may be classified as a transportation hub.

	Neighbo urhood	2nd Most Commo n Venue	3rd Most Commo n Venue	4th Most Commo n Venue	5th Most Commo n Venue	6th Most Commo n Venue	7th Most Commo n Venue	8th Most Commo n Venue	9th Most Commo n Venue	10th Most Commo n Venue
17	Christie	Café	Park	Athletic s & Sports	Baby Store	Coffee Shop	Nightclu b	Candy Store	Restaur ant	Italian Restaur ant

The fifth cluster, cluster 4 has park, sports center along with night club and restaurant. So, this may be classified as a place of recreation and relaxation.

Let us compare the localities of Toronto with that of New York city. The next step is clustering the localities of New York and comparing the two cities.

Location Clusters in Manhattan

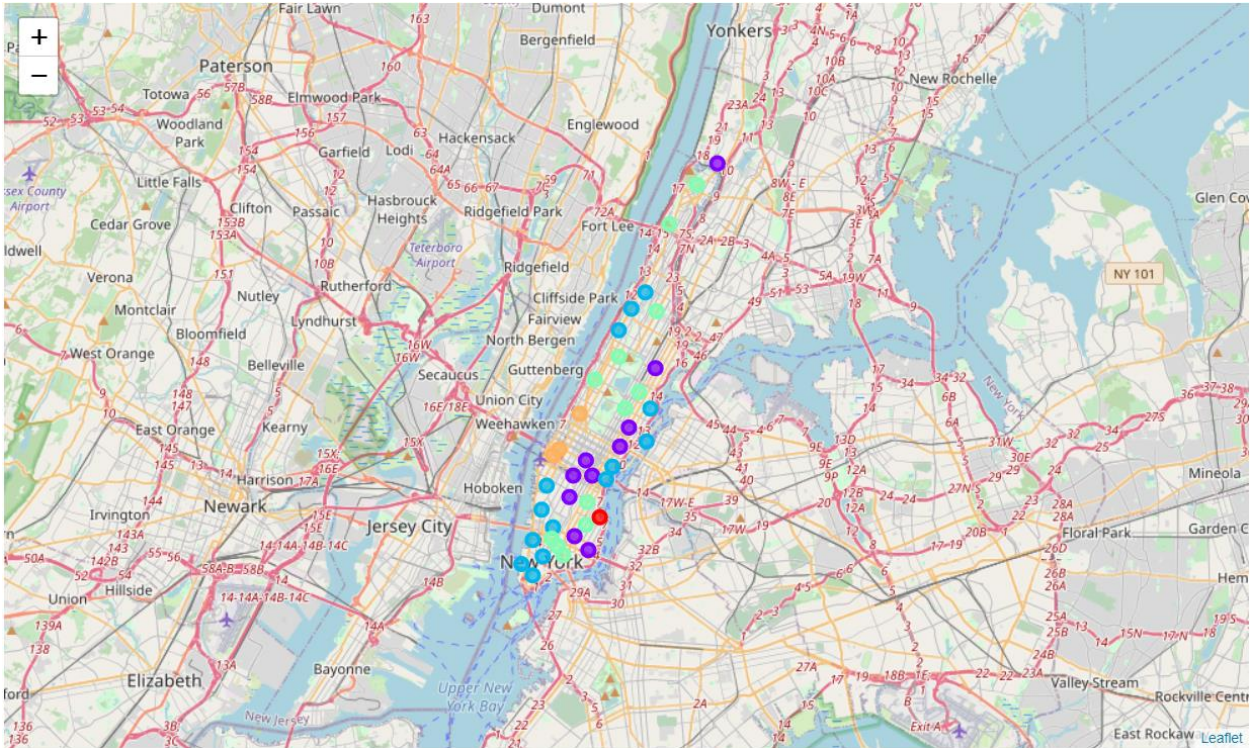
Manhattan is chosen as the central district of New York and the localities in Manhattan are analysed and clustered.

Data on the locations in Manhattan are given below:

Borough	Neighborhood	Latitude	Longitude
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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
5	Manhattan	Manhattanville	40.816934	-73.957385
6	Manhattan	Central Harlem	40.815976	-73.943211
7	Manhattan	East Harlem	40.792249	-73.944182
8	Manhattan	Upper East Side	40.775639	-73.960508
9	Manhattan	Yorkville	40.775930	-73.947118
10	Manhattan	Lenox Hill	40.768113	-73.958860
11	Manhattan	Roosevelt Island	40.762160	-73.949168
12	Manhattan	Upper West Side	40.787658	-73.977059
13	Manhattan	Lincoln Square	40.773529	-73.985338
14	Manhattan	Clinton	40.759101	-73.996119
15	Manhattan	Midtown	40.754691	-73.981669
16	Manhattan	Murray Hill	40.748303	-73.978332
17	Manhattan	Chelsea	40.744035	-74.003116
18	Manhattan	Greenwich Village	40.726933	-73.999914
19	Manhattan	East Village	40.727847	-73.982226
20	Manhattan	Lower East Side	40.717807	-73.980890
21	Manhattan	Tribeca	40.721522	-74.010683
22	Manhattan	Little Italy	40.719324	-73.997305
23	Manhattan	Soho	40.722184	-74.000657
24	Manhattan	West Village	40.734434	-74.006180
25	Manhattan	Manhattan Valley	40.797307	-73.964286
26	Manhattan	Morningside Heights	40.808000	-73.963896
27	Manhattan	Gramercy	40.737210	-73.981376
28	Manhattan	Battery Park City	40.711932	-74.016869
29	Manhattan	Financial District	40.707107	-74.010665
30	Manhattan	Carnegie Hill	40.782683	-73.953256
31	Manhattan	Noho	40.723259	-73.988434
32	Manhattan	Civic Center	40.715229	-74.005415
33	Manhattan	Midtown South	40.748510	-73.988713
34	Manhattan	Sutton Place	40.760280	-73.963556
35	Manhattan	Turtle Bay	40.752042	-73.967708
36	Manhattan	Tudor City	40.746917	-73.971219
37	Manhattan	Stuyvesant Town	40.731000	-73.974052
38	Manhattan	Flatiron	40.739673	-73.990947
39	Manhattan	Hudson Yards	40.756658	-74.000111

Popular venues in these locations were analyzed using Foursquare API and the locations were clustered. Location of these clusters are shown in the map below:



Popular venues in the locations in each cluster were analyzed. Data on each location cluster in Manhattan is shown below:

Neighb orhood	1st Most Comm on Venue	2nd Most Comm on Venue	3rd Most Comm on Venue	4th Most Comm on Venue	5th Most Comm on Venue	6th Most Comm on Venue	7th Most Comm on Venue	8th Most Comm on Venue	9th Most Comm on Venue	10th Most Comm on Venue	
37	Stuyves ant Town	Park	Baseba ll Field	Coffee Shop	Farmer s Market	Gas Station	Boat or Ferry	Bistro	Gym / Fitness Center	Bar	Cocktai l Bar

The first cluster in Manhattan, cluster 0, has neighbourhoo having park, baseball field, coffee shp, boat or ferry, gym, etc. So, this cluster may be defined as sports center.

Neighb orhood	1st Most Comm on Venue	2nd Most Comm on Venue	3rd Most Comm on Venue	4th Most Comm on Venue	5th Most Comm on Venue	6th Most Comm on Venue	7th Most Comm on Venue	8th Most Comm on Venue	9th Most Comm on Venue	10th Most Comm on Venue	
0	Marble Hill	Gym	Sandwich Place	Discou nt Store	Coffee Shop	Yoga Studio	Diner	Pizza Place	Steakh ouse	Supple ment Shop	Seafood Restaura nt
7	East Harlem	Mexica n Restaur ant	Thai Restaur ant	Bakery	Latin Americ an Restaur ant	New Americ an Restaur ant	Taco Place	Street Art	Steakh ouse	Café	French Restaura nt
10	Lenox Hill	Gym	Burger Joint	Thai Restaur ant	Lingeri e Store	College Acade mic	Restaur ant	Gift Shop	Taco Place	Coffee Shop	Cocktail Bar

						Buildin g						
15	Midto wn	Hotel	Sportin g Goods Shop	Tailor Shop	Clothin g Store	Bookst ore	French Restaur ant	Chines e Restaur ant	Salad Place	Szechu an Restaur ant	Cycle Studio	
16	Murray Hill	Japane se Restaur ant	Hotel	Burger Joint	Coffee Shop	Jewish Restaur ant	Tea Room	Sushi Restaur ant	Bar	Grocer y Store	Restaura nt	
20	Lower East Side	Chines e Restaur ant	Japane se Restaur ant	Ramen Restaur ant	Coffee Shop	Café	Art Gallery	Filipino Restaur ant	Bubble Tea Shop	French Restaur ant	Mexican Restaura nt	
31	Noho	Wine Shop	Ice Cream Shop	Cocktai l Bar	Rock Club	Coffee Shop	French Restaur ant	Indie Movie Theate r	Deli / Bodega	Bookst ore	Boutique	
33	Midto wn South	Korean Restaur ant	Fried Chicke n Joint	Hotel	Coffee Shop	Buildin g	Clothin g Store	Lingeri e Store	Grocer y Store	Leather Goods Store	Snack Place	
34	Sutton Place	Gym / Fitness Center	Gym	Grocer y Store	Italian Restaur ant	Beer Garden	Indian Restaur ant	Deli / Bodega	Greek Restaur ant	Gourm et Shop	Steakho use	
38	Flatiro n	Cycle Studio	Japane se Restaur ant	Furnitu re / Home Store	Thai Restaur ant	Coffee Shop	Salad Place	Russian Restaur ant	Gift Shop	Donut Shop	Tapas Restaura nt	

The second cluster, cluster 1, consists of places like Gym, yoga studio along with sports good shop, book store, etc. So, the cluster may be defined as places for spending leisure time and exercises.

	Neighb orhood	1st Most Comm on Venue	2nd Most Comm on Venue	3rd Most Comm on Venue	4th Most Comm on Venue	5th Most Comm on Venue	6th Most Comm on Venue	7th Most Comm on Venue	8th Most Comm on Venue	9th Most Comm on Venue	10th Most Comm on Venue
4	Hamilt on Heights	Coffee Shop	Yoga Studio	Mexica n Restaur ant	Caribb ean Restaur ant	Cocktai l Bar	Café	Latin Americ an Restaur ant	Medit erranea n Restaur ant	Japane se Restaur ant	Burger Joint
5	Manha ttanvill e	Seafoo d Restaur ant	Coffee Shop	Mexica n Restaur ant	Italian Restaur ant	Ramen Restaur ant	Bar	Gastro pub	Sushi Restaur ant	Climbin g Gym	Boutiq ue
9	Yorkvill e	Italian Restaur ant	Wine Shop	Coffee Shop	Deli / Bodega	Gym	Park	Bagel Shop	Diner	Liquor Store	Sushi Restaur ant
11	Roosev elt Island	Deli / Bodega	Cosmet ics Shop	Restaur ant	Farmer s Market	Bubble Tea Shop	Food & Drink Shop	Dry Cleaner	Super market	Dog Run	School
17	Chelse a	Theate r	Hotel	Ice Cream Shop	Coffee Shop	Chines e Restaur ant	Beer Bar	Café	Taco Place	New Americ an Restaur ant	Sushi Restaur ant

18	Greenwich Village	Italian Restaurant	Sushi Restaurant	French Restaurant	Cosmetics Shop	Clothing Store	Café	Bagel Shop	Coffee Shop	Sandwich Place	New American Restaurant
21	Tribeca	Men's Store	Wine Shop	Spa	American Restaurant	Greek Restaurant	Park	Dog Run	Café	Salad Place	Coffee Shop
24	West Village	Italian Restaurant	Cocktail Bar	Coffee Shop	American Restaurant	Gourmet Shop	Theater	French Restaurant	Candy Store	Speakeasy	Mediterranean Restaurant
26	Morningside Heights	Park	American Restaurant	Bookstore	Coffee Shop	Burger Joint	Food Truck	Café	Mexican Restaurant	Farmers Market	Frozen Yogurt Shop
28	Battery Park City	Memorial Site	Park	Food Court	Plaza	Coffee Shop	Gym	Building	Scenic Lookout	Sandwich Place	Gourmet Shop
29	Financial District	Coffee Shop	Steakhouse	Gym / Fitness Center	Bagel Shop	Falafel Restaurant	Café	Museum	Food Court	Event Space	Mediterranean Restaurant
32	Civic Center	Gym / Fitness Center	Spa	Bakery	Cocktail Bar	French Restaurant	Taco Place	Sushi Restaurant	Furniture / Home Store	Martial Arts School	Medical Center
35	Turtle Bay	Karaoke Bar	Seafood Restaurant	Park	Coffee Shop	Duty-free Shop	Tennis Court	Greek Restaurant	Cocktail Bar	Gift Shop	Sushi Restaurant
36	Tudor City	Park	Mexican Restaurant	Yoga Studio	Café	Greek Restaurant	Taco Place	Sushi Restaurant	Boxing Gym	Bridge	Burger Joint

The third locality, locality 2, has coffee shops, cafe, karaoke bar, cocktail bar along with spa, park, etc. The cluster may be defined as placed for outing and relaxation.

	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	Spa	Sandwich Place	Noodle House	Indie Movie Theater	Roof Deck	Boutique	Bubble Tea Shop	Spanish Restaurant	Salon / Barber shop
2	Washington Heights	Café	Deli / Bodega	Wine Shop	Park	Bakery	Scenic Lookout	Latin American Restaurant	Market	Coffee Shop	Tapas Restaurant
3	Inwood	Mexican	Wine Bar	Deli / Bodega	Park	Frozen Yogurt Shop	Restaurant	Bakery	Café	Yoga Studio	Latin American

6	Central Harlem	French Restaurant	African Restaurant	American Restaurant	Chinese Restaurant	Cosmetics Shop	Bagel Shop	Music Venue	Library	Gym / Fitness Center	Ethiopian Restaurant
	Upper East Side	Italian Restaurant	Hotel	American Restaurant	Bakery	Pet Store	Sculpture Garden	Salad Place	Sandwich Place	Coffee Shop	Chocolate Shop
	Upper West Side	Bakery	American Restaurant	Italian Restaurant	Bar	Movie Theater	Bagel Shop	Seafood Restaurant	Greek Restaurant	Ramen Restaurant	Juice Bar
19	East Village	Pizza Place	Korean Restaurant	Wine Bar	Vietnamese Restaurant	Gift Shop	Coffee Shop	Swiss Restaurant	Beer Store	Juice Bar	Beer Bar
22	Little Italy	Ice Cream Shop	Café	Wine Bar	Sandwich Place	Coffee Shop	Cocktail Bar	Chinese Restaurant	Clothing Store	Snack Place	Bakery
23	Soho	Clothing Store	Shoe Store	Sporting Goods Shop	Men's Store	Boutique	Italian Restaurant	Tea Room	Dance Studio	Salon / Barber shop	Miscellaneous Shop
25	Manhattan Valley	Bar	Coffee Shop	Playground	Pizza Place	Yoga Studio	Bubble Tea Shop	Caribbean Restaurant	Cosmetics Shop	Park	Ethiopian Restaurant
27	Gramer cy	Pizza Place	Thrift / Vintage Store	Coffee Shop	American Restaurant	Bagel Shop	Cocktail Bar	Gourmet Shop	Sushi Restaurant	Liquor Store	Bike Rental / Bike Share
30	Carnegie Hill	Pizza Place	Bookstore	Coffee Shop	Gym	Gym / Fitness Center	Italian Restaurant	Café	Dance Studio	Restaurant	Shipping Store

The fourth cluster, cluster 3, has venues of eateries like restaurant, bakery, bar, pizza place, etc. So, the cluster may be defined as favourite place for dining and eateries.

	Neighb orhood	1st Most Comm on Venue	2nd Most Comm on Venue	3rd Most Comm on Venue	4th Most Comm on Venue	5th Most Comm on Venue	6th Most Comm on Venue	7th Most Comm on Venue	8th Most Comm on Venue	9th Most Comm on Venue	10th Most Comm on Venue
13	Lincoln Square	Theate r	Movie Theate r	Concer t Hall	Perfor ming Arts Venue	Plaza	Mexica n Restaur ant	Library	Movie Theate r	Cycle Studio	Circus
14	Clinton	Theate r	Gym / Fitness Center	Sportin g Goods Shop	Café	Super market	French Restaur ant	Sports Bar	Medit erranea n Restaur ant	Buildin g	Movie Theate r
39	Hudson Yards	Americ an Restaur ant	Gym / Fitness Center	Hotel	Comedy Club	Camer a Store	Buildin g	Music School	Furnitu re / Home Store	Super market	Cocktai l Bar

The fifth cluster, cluster 4 has venues like theater, concert halls, performing arts venue, comedy halls. So, the localities grouped under this cluster are recreation places.

Discussion

It is observed that the location clusters in the two cities are very similar. For example, Rosedale in Toronto is very similar to Stuyvesant Town in New York.

Similarly, clusters with places of dining and eateries are similar in both the cities.

There are clusters with places of recreation, entertainment and live performance which are similar in both the cities.

Places with Coffee Shops, markets, gym, spa, etc are also similar in both the cities.

Thus, people living in these cosmopolitan cities or persons migrating from them may find places of interest as per their interest common in both the cities.

Conclusion

Data Science can be used in our daily lives. As in the case described in this project, places of interest may be suggested to tourists or visitors to a place based on their preferences or the city location where they reside.

Cosmopolitan cities may have cultural and political differences across the globe, but people travelling or migrating to these cities will always find places of their interest which are quite similar to the places in their home cities.

Appendix

Detailed analysis of the data can be seen through the following link:

<https://github.com/tpattanayak/Battle-of-localities/blob/main/Battle%20of%20localities%20-%20Clustering%20and%20Comparison%20of%20localities%20in%20NYC%20and%20Toronto.ipynb>