

# Battle of neighbourhoods

## WEEK 2 REPORT

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# PROBLEM and BACKGROUND

In this exercise we compare New-York city and Toronto as tourist destinations - to get a view of their boroughs and neighbourhoods, and marked on map their key areas (as mentioned below) with respect to those neighbourhoods and boroughs

**Toronto - Downtown Toronto**

**New York - Manhattan**

The analysis will also then compare what are the hotspots for both Downtown Toronto and Manhattan which could help tourist to locate the most popular places in each neighbourhood by virtue of rankings. This will help them plan their travels to both these places accordingly and change their travel plan basis which city and area they are in. This will also be indicative of what are the main places/attractions to visit in a particular area of a city for the tourists such as cafes, restaurants, parks etc

REASON - Tourists most often visits those countries who are rich in heritage. Every city is unique in their own way and has something different to offer. and based on available information, and the comparison (the part of the information) between the two cities tourists can choose to plan their travel or visit a particular place according to their choice.

# Data sources and cleaning

For this problem, we will get the services of Foursquare API to explore the data of two cities, in terms of their neighborhoods. The data also include the information about the places around each neighborhood like restaurants, hotels, coffee shops, parks, theaters, art galleries, museums and many more. We selected one Borough from each city to analyze their neighborhoods. Manhattan from New York and Downtown Toronto from Toronto. These objects will be given priority on the basis of foot traffic (activity) in their respective neighborhoods which will help to locate the tourist's areas and hubs and helps us analyse the similarity or difference between two cities from tourist's perspective

# Methodology and Extraction

## Methodology

We will extract the data and analyse/visualise it for both the areas using the same method to arrive at information about each neighbourhood and its hotspot so as to compare the cities

## Extraction

the Downtown Toronto data is extracted and cleaned using the data from wikipedia page +.csv file locally stored on system and imported (source - kaggle) and verified using Foursquare API to get the coordinates for neighbourhood exploration

Manhattan data for New York City is extracted from .csv file locally stored on system and imported (source - kaggle) which is again verified and explored for coordinates using Foursquare API

# PROCESSING DATA

## Toronto (downtown toronto) Data extraction, cleaning and sorting

We begin by extracting data from the wikipedia source and merging it with .csv file (from kaggle) to build our dataframe (screenshot – first 5 rows)

Narrowing down data to Downtown Toronto and adding the coordinates as:

	Postcode	Borough_x	Neighbourhood	Neighborhood_x	Unnamed: 0	Borough_y	Neighborhood_y	Latitude	Longitude
0	M3A	North York	Parkwoods	NaN	0	North York	Parkwoods	43.753259	-79.329656
1	M4A	North York	Victoria Village	NaN	1	North York	Victoria Village	43.725882	-79.315572
2	M5A	Downtown Toronto	Regent Park, Harbourfront	NaN	2	Downtown Toronto	Harbourfront, Regent Park	43.654260	-79.360636
3	M6A	North York	Lawrence Manor, Lawrence Heights	NaN	3	North York	Lawrence Heights, Lawrence Manor	43.718518	-79.464763
4	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government	Queen's Park	4	Queen's Park	Queen's Park	43.662301	-79.389494

	Borough_x	Neighbourhood	Neighborhood_x	Unnamed: 0	Borough_y	Neighborhood_y	Latitude	Longitude
0	Downtown Toronto	Regent Park, Harbourfront	NaN	2	Downtown Toronto	Harbourfront, Regent Park	43.654260	-79.360636
1	Downtown Toronto	Queen's Park, Ontario Provincial Government	Queen's Park	4	Queen's Park	Queen's Park	43.662301	-79.389494
2	Downtown Toronto	Garden District, Ryerson	NaN	9	Downtown Toronto	Ryerson, Garden District	43.657162	-79.378937
3	Downtown Toronto	St. James Town	NaN	15	Downtown Toronto	St. James Town	43.651494	-79.375418
4	Downtown Toronto	Berczy Park	NaN	20	Downtown Toronto	Berczy Park	43.644771	-79.373306

## New York (Manhattan) Data extraction, cleaning and sorting

And narrowing down to Manhattan:

Unnamed: 0	index_right		Location Type	Incident Zip	City	Borough	Latitude	Longitude	num_calls	neighborhood
0	0	122	Club/Bar/Restaurant	10308.0	STATEN ISLAND	STATEN ISLAND	40.544096	-74.141155	40.0	Great Kill
1	1	122	Club/Bar/Restaurant	10308.0	STATEN ISLAND	STATEN ISLAND	40.544209	-74.141040	21.0	Great Kill
2	2	122	Club/Bar/Restaurant	10308.0	STATEN ISLAND	STATEN ISLAND	40.544528	-74.140673	21.0	Great Kill
3	3	122	Club/Bar/Restaurant	10308.0	STATEN ISLAND	STATEN ISLAND	40.544308	-74.140907	34.0	Great Kill
4	4	126	Club/Bar/Restaurant	10012.0	NEW YORK	MANHATTAN	40.729793	-73.998842	18.0	Greenwich Village

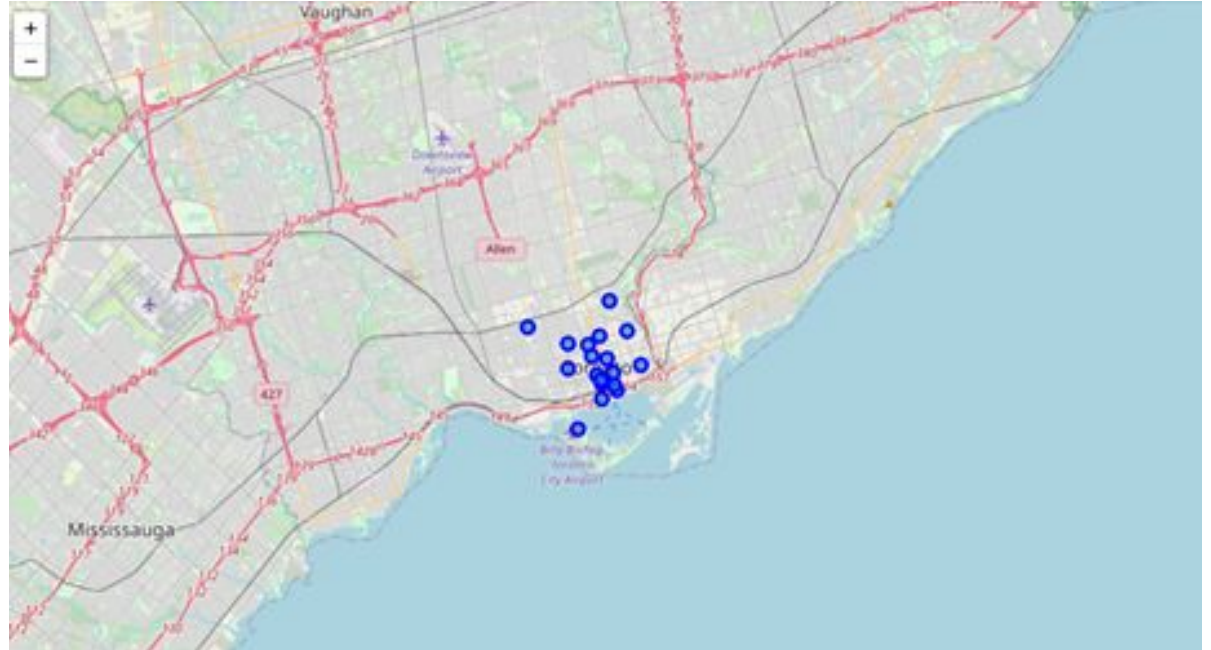
Unnamed: 0	index_right		Location Type	Incident Zip	City	Borough	Latitude	Longitude	num_calls	neighborhood
0	4	126	Club/Bar/Restaurant	10012.0	NEW YORK	MANHATTAN	40.729793	-73.998842	18.0	Greenwich Village
1	5	126	Club/Bar/Restaurant	10012.0	NEW YORK	MANHATTAN	40.727076	-74.000184	40.0	Greenwich Village
2	6	126	Club/Bar/Restaurant	10012.0	NEW YORK	MANHATTAN	40.729519	-73.999812	120.0	Greenwich Village
3	7	126	Club/Bar/Restaurant	10012.0	NEW YORK	MANHATTAN	40.729750	-73.999614	41.0	Greenwich Village
4	8	126	Club/Bar/Restaurant	10012.0	NEW YORK	MANHATTAN	40.729338	-74.001032	99.0	Greenwich Village

# Mapping Toronto and Manhattan Neighbourhoods

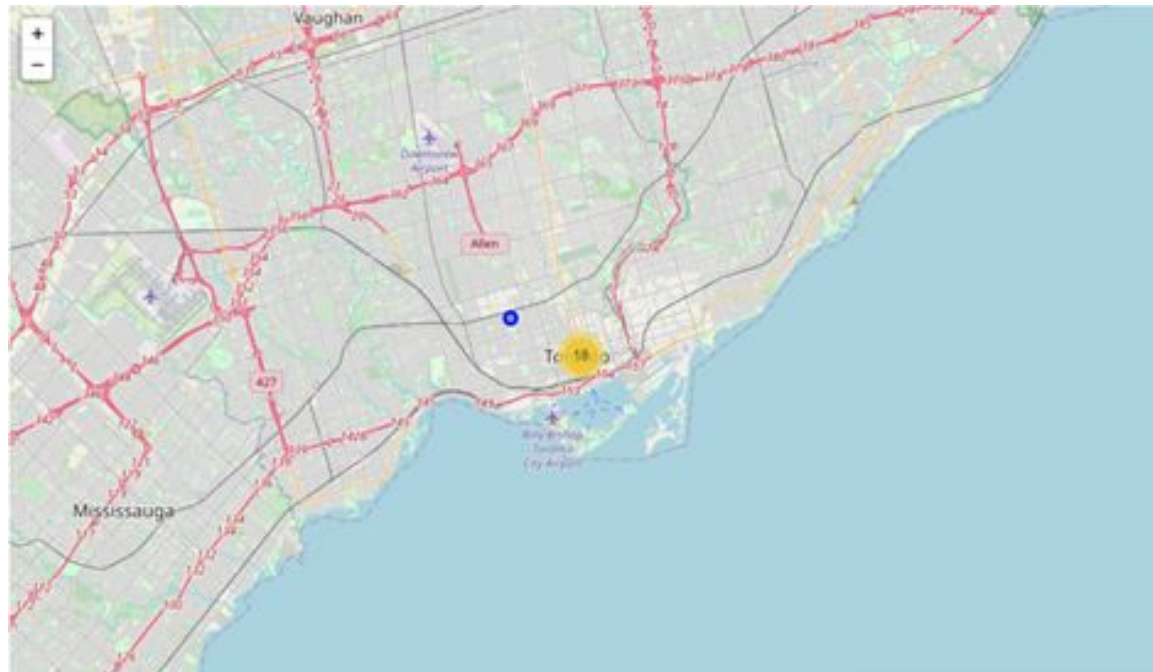
to get a good idea of the both the cities and their neighbourhoods we visually map them based on their boroughs- Downtown Toronto and Manhattan

Visualizing the selected borough neighborhoods so that we can get an idea or confirmation regarding the coordinates of that Borough.

## Map of Toronto neighbourhoods



Neighbourhood cluster for Toronto



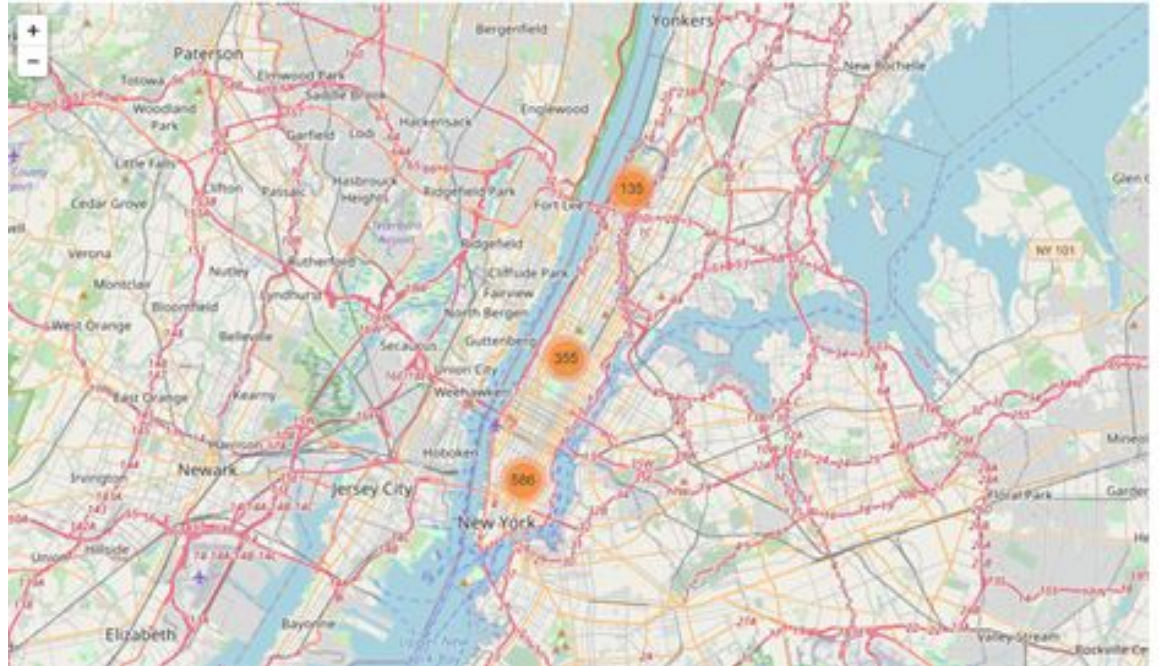


Repeating the same map visualization  
for Manhattan – New York



And building neighbourhood clusters  
for Manhattan

**The maps are built using the  
coordinates data – latitudes and  
longitudes which is then verified  
using Foursquare API**



# ANALYSIS

We calculate mean of the frequency of occurrence of each category (using one shot encoding) and picked top ten venues on that basis for each neighbourhood. It means the top venues are showing the foot traffic or the more visited places.

## **DOWNTOWN TORONTO – Analysis**

We extract the venues/tourist attraction hotspots using the footfall frequency for the below mentioned neighbourhoods

- Regent Park, Harbourfront
- Queen's Park, Ontario Provincial Government
- Garden District, Ryerson
- St. James Town
- Berczy Park
- Central Bay Street
- Christie
- Richmond, Adelaide, King
- Harbourfront East, Union Station, Toronto Islands
- Toronto Dominion Centre, Design Exchange
- Commerce Court, Victoria Hotel
- University of Toronto, Harbord
- Kensington Market, Chinatown, Grange Park
- CN Tower, King and Spadina, Railway Lands, Harbourfront West, Bathurst Quay, South Niagara, Island airport
- Rosedale ETC.

The venue analysis gives me the following information in a ranking format as below:

	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	Berczy Park	Beer Bar	Farmers Market	Park	Seafood Restaurant	Museum	Cocktail Bar	Coffee Shop	Concert Hall	Liquor Store	Bistro
1	CN Tower, King and Spadina, Railway Lands, Har...	Airport Lounge	Airport Service	Airport Terminal	Sculpture Garden	Harbor / Marina	Boat or Ferry	Coffee Shop	Bar	Rental Car Location	Boutique
2	Central Bay Street	Coffee Shop	Gastropub	Spa	Modern European Restaurant	Miscellaneous Shop	Café	Middle Eastern Restaurant	Park	Bubble Tea Shop	Ramen Restaurant
3	Christie	Grocery Store	Café	Park	Italian Restaurant	Coffee Shop	Candy Store	Restaurant	Baby Store	Athletics & Sports	Nightclub
4	Church and Wellesley	Park	Bubble Tea Shop	Ramen Restaurant	Salon / Barbershop	Juice Bar	Creperie	Dance Studio	Bookstore	Diner	Breakfast Spot
5	Commerce Court, Victoria Hotel	Café	Gastropub	Coffee Shop	Restaurant	Museum	Bakery	Gym / Fitness Center	Sandwich Place	American Restaurant	Gluten-free Restaurant
6	First Canadian Place, Underground city	Café	Restaurant	Coffee Shop	Gastropub	Steakhouse	Pizza Place	Pub	Seafood Restaurant	Speakeasy	Asian Restaurant
7	Garden District, Ryerson	Café	Art Gallery	Electronics Store	Ramen Restaurant	Sandwich Place	Music Venue	College Rec Center	Diner	Mexican Restaurant	Plaza
8	Harbourfront East, Union Station, Toronto Islands	Park	Hotel	Plaza	New American Restaurant	Lake	Salad Place	Japanese Restaurant	Deli / Bodega	Skating Rink	Ice Cream Shop
9	Kensington Market, Chinatown, Grange Park	Café	Wine Bar	Cocktail Bar	Vietnamese Restaurant	Gourmet Shop	Fish Market	Farmers Market	Dessert Shop	Coffee Shop	Cheese Shop
10	Queen's Park, Ontario Provincial Government	Sushi Restaurant	Coffee Shop	Yoga Studio	Beer Bar	Fried Chicken Joint	Fast Food Restaurant	Hobby Shop	Distribution Center	Discount Store	Italian Restaurant
11	Regent Park, Harbourfront	Coffee Shop	Park	Breakfast Spot	Performing Arts Venue	Farmers Market	Pub	Restaurant	Bakery	Spa	Distribution Center
12	Richmond, Adelaide, King	Coffee Shop	Lounge	Monument / Landmark	Seafood Restaurant	Asian Restaurant	Smoke Shop	Speakeasy	Concert Hall	Steakhouse	Sushi Restaurant
13	Rosedale	Park	Playground	Trail	Comfort Food Restaurant	Dance Studio	Creperie	Cosmetics Shop	Concert Hall	Comic Shop	Wine Bar
14	St. James Town	Gastropub	Coffee Shop	Café	Hotel	Middle Eastern Restaurant	Poke Place	Cosmetics Shop	Creperie	Restaurant	Italian Restaurant



## New York - MANHATTAN – Analysis

The analysis gives us the information for Manhattan tourist places as below:

	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	Central Park	Clothing Store	Playground	Italian Restaurant	Sandwich Place	Dog Run	Park	Outdoor Sculpture	Steakhouse	American Restaurant	Hotel
1	Chelsea	Nightclub	Hotel	Coffee Shop	Italian Restaurant	Gym / Fitness Center	Café	Cocktail Bar	Juice Bar	Theater	Yoga Studio
2	Chinatown	Chinese Restaurant	Bar	American Restaurant	Bakery	Cocktail Bar	Noodle House	Sandwich Place	Boutique	Dumpling Restaurant	Dim Sum Restaurant
3	East Harlem	Mexican Restaurant	Pizza Place	Bakery	Taco Place	Deli / Bodega	Café	Cosmetics Shop	Thai Restaurant	Donut Shop	Italian Restaurant
4	East Village	Bar	Coffee Shop	Cocktail Bar	Italian Restaurant	Pizza Place	Vietnamese Restaurant	Japanese Restaurant	Mexican Restaurant	Vegetarian / Vegan Restaurant	Ice Cream Shop
5	Financial District	Pizza Place	Coffee Shop	Pet Store	Mexican Restaurant	Sandwich Place	Café	Playground	Hotel	Burger Joint	Greek Restaurant
6	Flatiron District	Spa	Japanese Restaurant	Furniture / Home Store	Café	Gym / Fitness Center	Cycle Studio	Coffee Shop	Korean Restaurant	Italian Restaurant	American Restaurant
7	Gramercy	American Restaurant	Italian Restaurant	Bar	Café	Food Truck	Pizza Place	Pub	Wine Bar	New American Restaurant	Cheese Shop
8	Greenwich Village	Italian Restaurant	Indian Restaurant	Bar	Chinese Restaurant	Vietnamese Restaurant	Coffee Shop	Wine Bar	Sushi Restaurant	Café	Bubble Tea Shop
9	Harlem	African Restaurant	Mexican Restaurant	Deli / Bodega	Cosmetics Shop	Bar	Seafood Restaurant	Southern / Soul Food Restaurant	Coffee Shop	Grocery Store	Sandwich Place
10	Hell's Kitchen	Bar	Mexican Restaurant	Thai Restaurant	Pizza Place	Theater	Wine Bar	Italian Restaurant	Coffee Shop	Hotel	Ramen Restaurant
11	Inwood	Wine Bar	Spanish Restaurant	Restaurant	Mexican Restaurant	Bank	Latin American Restaurant	Bar	Bakery	Pizza Place	Cocktail Bar
12	Kips Bay	Bar	Thai Restaurant	Sushi Restaurant	Cocktail Bar	Bakery	Ice Cream Shop	Pub	Italian Restaurant	Taco Place	Sandwich Place
13	Little Italy	Italian Restaurant	Bakery	Tea Room	Gourmet Shop	Chinese Restaurant	Sandwich Place	Coffee Shop	Wine Bar	Vietnamese Restaurant	Café
14	Lower East Side	Coffee Shop	Cocktail Bar	Bar	Asian Restaurant	Bakery	Pizza Place	Boutique	Rock Club	Sandwich Place	Mexican Restaurant
15	Midtown	Italian Restaurant	Bakery	Hotel	Indian Restaurant	Coffee Shop	Ramen Restaurant	American Restaurant	Pizza Place	Sandwich Place	French Restaurant
16	Morningside Heights	Chinese Restaurant	Coffee Shop	American Restaurant	Mexican Restaurant	Bookstore	Bar	Seafood Restaurant	Italian Restaurant	Liquor Store	Juice Bar

# Result

After clustering the data of the respective neighbourhoods, both cities (Boroughs) venues which can be explored and attract the tourists are much similar in features like food places, clubs, museums, parks etc

## Observations and Recommendation

The number of options to explore as tourist attractions are more in Manhattan than in Downtown Toronto

Additionally Toronto has highest footfall in cafes as the first choice venue which shows the local and tourist behaviour in downtown toronto in comparison to Manhattan where people mostly visit restaurants and bars for first choice in most of neighbourhoods

# Conclusion

The downtown Toronto and Manhattan neighbourhoods have a lot of similar venues but vary in size and number of places to explore

## Future Direction

the Analysis can be expanding to analyse different clusters in these neighbourhoods based on the venues and can be then mapped to determine the discriminating venue categories that distinguish each cluster.

Furthermore the analysis can be expanded to other boroughs and neighbourhoods.