

# The Battle of the Neighborhoods - Report

## 1.Introduction & Business Problem:

The purpose of this Capstone Project is to

- Help people in exploring better facilities around their neighbourhood. It will help people making smart and efficient decision on selecting great neighbourhood out of numbers of other neighbourhoods and
- To determine the best possible location to open an Restaurant on the different localities of the Toronto city based on the ease of accessibility by maximum number of people so that the revenue from the latest venture can be maximized, So need to choose the correct location to start their first venture(restaurants).

### Problem Background:

The City of New York & Toronto both are the most populous cities. Both the cities are very diverse and are the financial capitals of their respective countries. both the cities have below attractions:

1. Multicultural.
2. Provides lot of business opportunities and business friendly environment.
3. Attracted many different players into the market.
4. Global hub of business and commerce. The city is a major center for banking and finance, retailing, world trade, transportation, tourism, real estate, new media, traditional media, advertising, legal services, accountancy, insurance, theater, fashion, and the arts in the United States.

This also means that the market is highly competitive. As it is highly developed city so cost of doing business is also one of the highest. Thus, any new business venture or expansion needs to be analysed carefully. The insights derived from analysis will give good understanding of the business environment which help in strategically targeting the market. This will help in reduction of risk. And the Return on Investment will be reasonable.

### Problem Description:

#### **Finding a nice neighborhood to live in.**

These are few common things to consider during a relocation and they are very important for a healthy and stress-free life. And doing an Online search for these is time consuming. In this project, we aim to meet at least some common requirements like **public places, parks, restaurants etc.** and guide the project users to choose at least 1 or more neighborhoods for their consideration during their relocation. By rating the neighborhoods based upon the available amenities they have, we can recommend the neighborhood in a city in a ranked order. This is the goal of this project.

#### **Finding a place for new restaurant in the city of Toronto**

A restaurant is a business which prepares and serves food and The City of Toronto is famous for its excellent cuisine. So, it is evident that to survive in such competitive market it is very important to strategically plan. Various factors need to be studied in order to decide on the Location such as:

1. Population
2. Demographics

3. Who are the competitors in that location?
4. Segmentation of the Borough

### **Target Audience:**

Someone who wants to relocate to a city (New York and Toronto) based on available services. And someone who wants to open a new restaurant in Toronto City.

## **2.Data:**

**Foursquare API Data:** We will need data about different venues in different neighbourhoods of that specific borough. To gain that information, we will use “Foursquare” locational information. Foursquare is a location data provider with information about all manner of venues and events within an area of interest. Such information includes venue names, locations, menus and even photos. As such, the foursquare location platform will be used as the sole data source since all the stated required information can be obtained through the API.

After finding the list of neighbourhoods, we then connect to the Foursquare API to gather information about venues inside each neighbourhood. For each neighbourhood, we have chosen the radius to be 250 meters.

The data retrieved from Foursquare contained information of venues within a specified distance of the longitude and latitude of the postcodes. The information obtained per venue as follows:

1. Neighborhood
2. Neighborhood Latitude
3. Neighborhood Longitude
4. Venue
5. Name of the venue e.g. the name of a store or restaurant
6. Venue Latitude
7. Venue Longitude
8. Venue Category

### **Methodology:**

1. Getting the co-ordinates of the target city.
2. Getting the list of neighborhoods and their co-ordinates.
3. Exploring the most visited venues in the target localities.
4. Clustering the localities.
5. Analyzing the clusters formed.
6. Collecting information about the type of restaurants already present in a locality.
7. Public Programming Tools like **Folium** to visualize the neighborhoods in the city. Then based upon the analysis of the Foursquare information we can update the Folium visualization to reflect the number of amenities in a neighborhood
8. **K-Means Clustering Algorithm** to group amenities in an area, then we can reduce the number of individual amenities comparisons to be done against each neighborhood. We can do these comparisons against the types of amenities, individually and collectively.

### 3.Data Processing

We will be using the below datasets for analyzing Toronto and New York City

To get the data for Postal code of Canada

[https://en.wikipedia.org/wiki/List\\_of\\_postal\\_codes\\_of\\_Canada:\\_M](https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M)

To get the data Geo related data of Canada

[https://cocl.us/Geospatial\\_data](https://cocl.us/Geospatial_data)

To get the data for Postal code of New York

[https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-DS0701EN-SkillsNetwork/labs/newyork\\_data.json](https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDeveloperSkillsNetwork-DS0701EN-SkillsNetwork/labs/newyork_data.json)

To get the population data of Toronto

<https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/pd-pl/Tables/File.cfm?T=1201&SR=1&RPP=9999&PR=0&CMA=0&CSD=0&S=22&O=A&Lang=Eng&OFT=CSV>

**Data 1 : Toronto** Neighborhood has a total of 5 boroughs and 306 neighborhoods. In order to segment the neighborhoods and explore them, we will essentially need a dataset that contains the 5 boroughs and the neighborhoods that exist in each borough as well as the latitude and longitude coordinates of each neighborhood.

	PostalCode	Borough	Neighborhood	Latitude	Longitude
37	M4E	East Toronto	The Beaches	43.676357	-79.293031
40	M4J	East York/East Toronto	The Danforth East	43.685347	-79.338106
41	M4K	East Toronto	The Danforth West, Riverdale	43.679557	-79.352188
42	M4L	East Toronto	India Bazaar, The Beaches West	43.668999	-79.315572
43	M4M	East Toronto	Studio District	43.659526	-79.340923

**Data 2 :New York** In order to segment the neighborhoods and explore them, we will essentially need a dataset that contains the 5 boroughs and the neighborhoods that exist in each borough as well as the latitude and longitude coordinates of each neighborhood.

	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

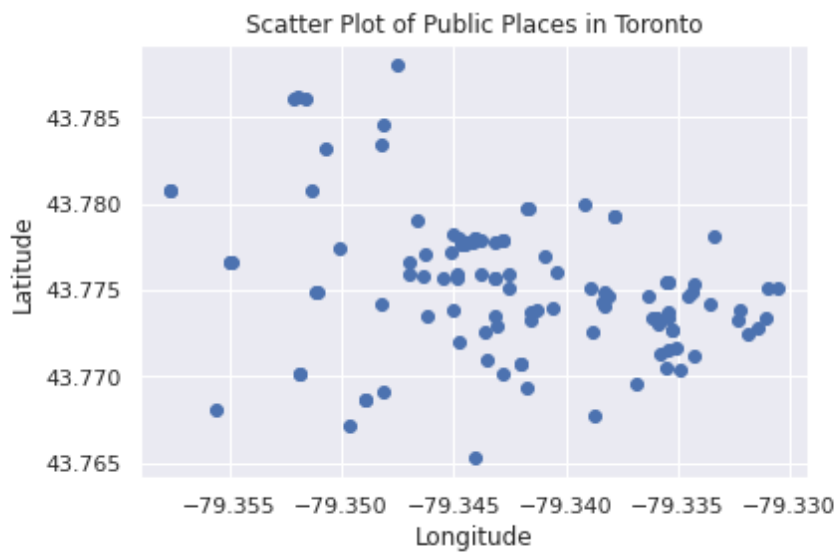
**Data 3 : Population of Toronto based on 2016**

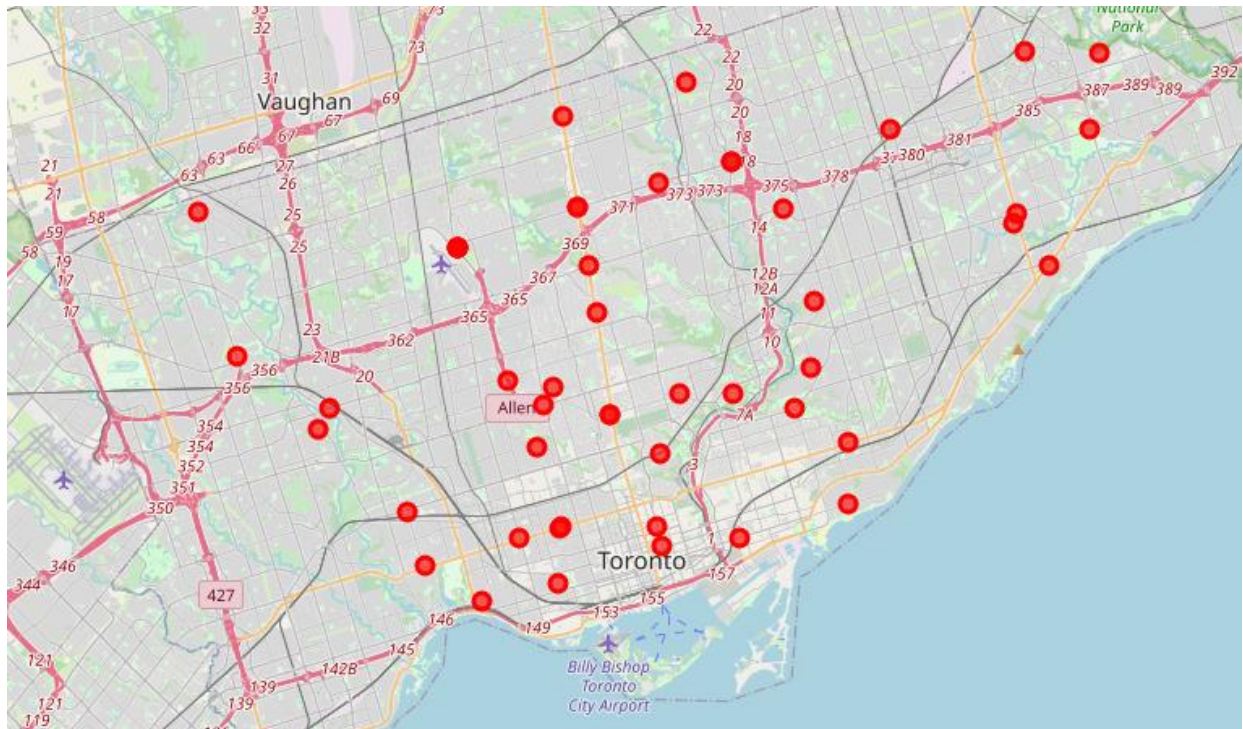
	PostalCode	Population_2016
1	A0A	46587.0
2	A0B	19792.0
3	A0C	12587.0
4	A0E	22294.0
5	A0G	35266.0

## 4.Data Analysis using Clustering

To get the most common venues in Toronto City

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
Berczy Park	Coffee Shop	Cocktail Bar	Bakery	Seafood Restaurant	Farmers Market	Restaurant	Cheese Shop	Pharmacy	Beer Bar	Diner
Brockton, Parkdale Village, Exhibition Place	Café	Bakery	Breakfast Spot	Nightclub	Coffee Shop	Furniture / Home Store	Convenience Store	Restaurant	Italian Restaurant	Stadium
N Tower, King and Spadina, Railway Lands, Har...	Airport Service	Airport Terminal	Boutique	Coffee Shop	Airport	Airport Food Court	Airport Gate	Airport Lounge	Sculpture Garden	Harbor / Marina
Central Bay Street	Coffee Shop	Italian Restaurant	Café	Sandwich Place	Japanese Restaurant	Salad Place	Burger Joint	Bubble Tea Shop	Pizza Place	Poke Place
Christie	Grocery Store	Café	Park	Coffee Shop	Italian Restaurant	Bank	Candy Store	Baby Store	Restaurant	Nightclub

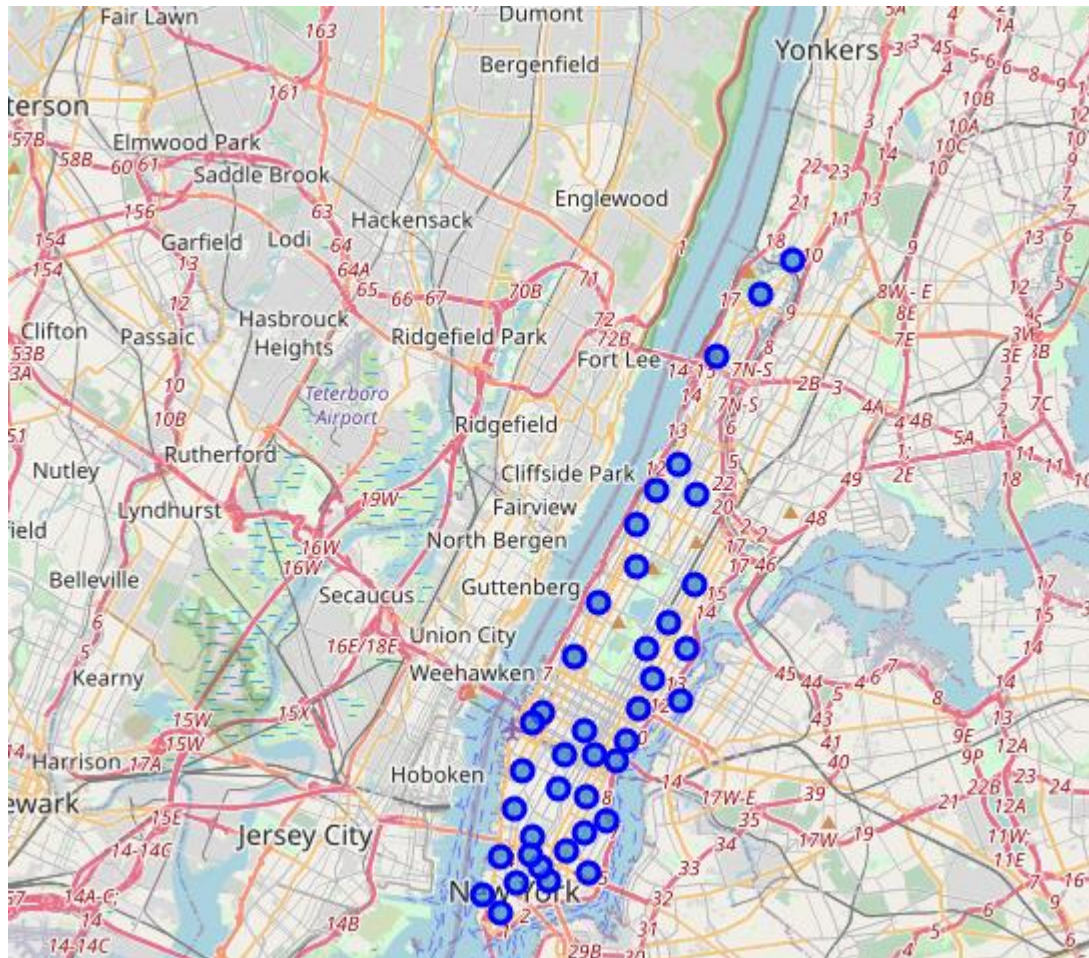




## To get the most common venues in Manhattan City

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
Battery Park City	Airport Terminal	Airport Service	Sculpture Garden	Plane	Boat or Ferry	Rental Car Location	Boutique	Harbor / Marina	Coffee Shop	Airport Lounge
Carnegie Hill	Coffee Shop	Café	Hotel	Gym	Japanese Restaurant	Restaurant	Steakhouse	Seafood Restaurant	American Restaurant	Salad Place
Central Harlem	Department Store	Park	Pizza Place	Gym / Fitness Center	Breakfast Spot	Playground	Food & Drink Shop	Hotel	Sandwich Place	Dog Run
Chelsea	Coffee Shop	Cocktail Bar	Bakery	Pharmacy	Cheese Shop	Restaurant	Seafood Restaurant	Beer Bar	Farmers Market	Gourmet Shop
Chinatown	Park	Convenience Store	Wine Bar	Discount Store	Falafel Restaurant	Event Space	Ethiopian Restaurant	Escape Room	Electronics Store	Eastern European Restaurant

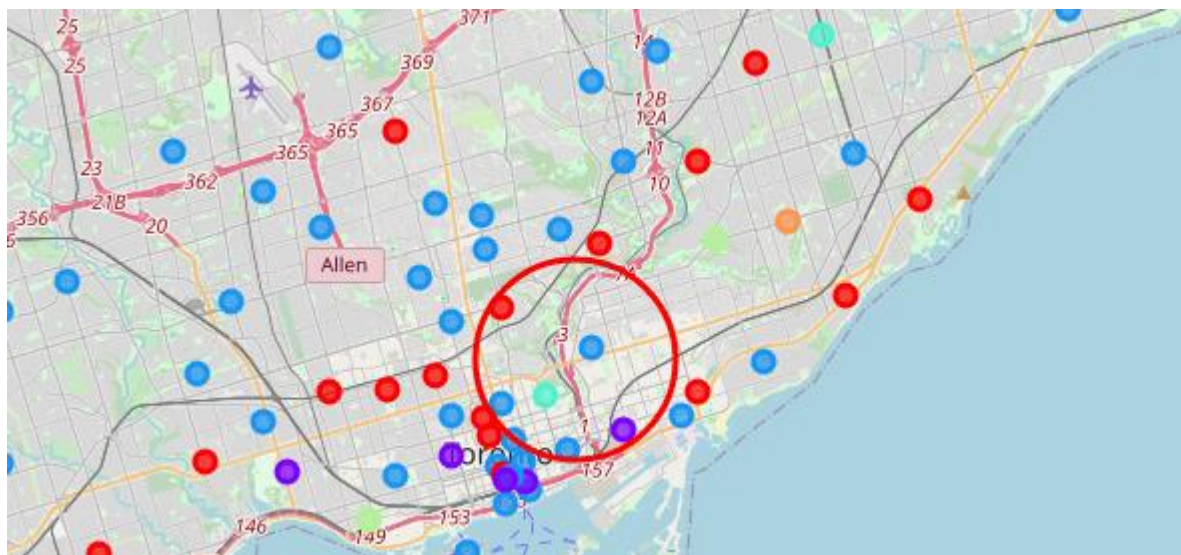




Analysis the best venues in the city of Toronto for the different kind of cuisines

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
Agincourt	Breakfast Spot	Latin American Restaurant	Food	Doner Restaurant	Dumpling Restaurant	Eastern European Restaurant	Empanada Restaurant	Ethiopian Restaurant	Falafel Restaurant	Fast Food Restaurant
Alderwood, Long Branch	Pizza Place	Pub	Coffee Shop	Sandwich Place	Falafel Restaurant	Dim Sum Restaurant	Diner	Doner Restaurant	Dumpling Restaurant	Eastern European Restaurant
Bathurst Manor, Wilson Heights, Downsview North	Coffee Shop	Pizza Place	Sandwich Place	Diner	Fried Chicken Joint	Ice Cream Shop	Middle Eastern Restaurant	Sushi Restaurant	Restaurant	Deli / Bodega
Bayview Village	Chinese Restaurant	Japanese Restaurant	Café	Wings Joint	Fish & Chips Shop	Dumpling Restaurant	Eastern European Restaurant	Empanada Restaurant	Ethiopian Restaurant	Falafel Restaurant
Bedford Park, Lawrence Manor East	Restaurant	Sandwich Place	Italian Restaurant	Coffee Shop	Pub	Café	Fast Food Restaurant	Indian Restaurant	Pizza Place	Comfort Food Restaurant

Best place to open a restaurant in Central Toronto.



## 5.Data Analysis using Clustering

To personal preferences they can choose to live in neighborhood based on below cluster studies

### In the city of Toronto

Central Toronto has below most common venues

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
Central Toronto	1	Restaurant	Park	Trail	Summer Camp	Diner	Event Space	Ethiopian Restaurant	Escape Room	Electronics Store	Eastern European Restaurant

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Downtown and East Toronto has below most common venues

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
East York/East Toronto	2	Park	Convenience Store	Yoga Studio	Distribution Center	Farmers Market	Falafel Restaurant	Event Space	Ethiopian Restaurant	Escape Room	Electronics Store
Downtown Toronto	2	Park	Playground	Trail	Yoga Studio	Diner	Event Space	Ethiopian Restaurant	Escape Room	Electronics Store	Eastern European Restaurant

Similarly, **In the Manhattan city** chinatown and Soho has below most common vendues

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
Chinatown	Park	Convenience Store	Wine Bar	Discount Store	Falafel Restaurant	Event Space	Ethiopian Restaurant	Escape Room	Electronics Store	Eastern European Restaurant
Roosevelt Island	Park	Playground	Trail	Wine Bar	Dessert Shop	Ethiopian Restaurant	Escape Room	Electronics Store	Eastern European Restaurant	Dumpling Restaurant
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
Soho	Home Service	Music Venue	Garden	Pool	Wine Bar	Discount Store	Distribution Center	Dog Run	Doner Restaurant	Donut Shop

Similarly , If any one wants to open a new restaurant in the city of Toronto the most desirable place is Central Toronto.

### Conclusion:

1) If you need to find a nice neighbourhood to live in **Toronto** city you can either go for the Central Toronto, Downtown or East Toronto based on the individual preferences

Like if you mostly looking for park your first choice to be **Downtown** or in case if you are looking for best restaurant your first choice will be **Central Toronto**

2) Similarly, find a nice neighbourhood to live in New York Manhattan city you can either go for the Chinatown, Soho and Roosevelt Island based on the individual preferences

Like if you mostly looking for park your first choice to be **Roosevelt Island** or in case if you are looking for best home-services your first choice will be **Soho**.

3) **Central Toronto** has more places in Toronto when compared to all remaining neighborhoods. So, when a person wants to relocate based upon all the available public amenities, they can recognize that Downtown Toronto is the best of all the available options. The above deductions is purely done based upon the quantity of the public amenities available and not on the quality of these services