

Battle of Neighborhoods

Finding the best area to build a restaurant in Toronto.

1. Introduction / Business Problem

Toronto is the provincial capital of Ontario, and the most populous city in Canada. Toronto is an international centre of business, finance, arts, and culture, and is recognized as one of the most multicultural and cosmopolitan cities in the world. Toronto is surrounded by many cities and collectively called the GTA (Greater Toronto Area).

The diverse population of Toronto reflects its current and historical role as an important destination for immigrants to Canada. More than 50 percent of residents belong to a visible minority population group, and over 200 distinct ethnic origins are represented among its inhabitants. While the majority of Torontonians speak English as their primary language, over 160 languages are spoken in the city

Toronto is a prominent centre for music, theatre, motion picture production, and television production, and is home to the headquarters of Canada's major national broadcast networks and media outlets. Its varied cultural institutions, which include numerous museums and galleries, festivals and public events, entertainment districts, national historic sites, and sports activities, attract over 43 million tourists each year. Toronto is known for its many skyscrapers and high-rise buildings, in particular the tallest free-standing structure in the Western Hemisphere, the CN Tower.

Neighbourhoods:

Toronto encompasses a geographical area formerly administered by many separate municipalities. These municipalities have each developed a distinct history and identity over the years, and their names remain in common use among Torontonians. Former municipalities include East York, Etobicoke, Forest Hill, Mimico, North York, Parkdale, Scarborough, Swansea, Weston and York. Throughout the city there exist hundreds of small neighbourhoods and some larger neighbourhoods covering a few square kilometres.

The city of Toronto and GTA market is highly competitive. The cost of living is very high in Toronto and hence the cost of setting up business in Toronto is also very high. The business should be considered based upon Return on Investment (ROI).

Problem / Business Description:

A restaurant, or an eatery, is a business that prepares and serves food and drinks to customers. Meals are generally served and eaten on the premises, but many restaurants also offer take-out

and food delivery services. Restaurants vary greatly in appearance and offerings, including a wide variety of cuisines and service models ranging from inexpensive fast food restaurants and cafeterias, to mid-priced family restaurants, to high-priced luxury establishments.

Toronto is very famous for its diverse cuisine. The food culture is influenced by the diverse and multi-ethnic.

1. Italian immigrants- Pizza and Italian cuisine.
2. Indian immigrants - Indian restaurants offering a wide variety of Indian cuisine.
3. Chinese and Asian immigrants - Noodles and Chinese cuisine.
4. Middle eastern immigrants - Kebabs, falafels and other cuisine.
5. European immigrants - Cheesecakes, bagels, hotdogs, breads and other cuisine.

The objective is to locate and recommend the correct location to open the new restaurant. The neighbourhood which will be the best choice to open the new restaurant. Also understand the recommendations made.

2. Data Used:

The city in focus here is Toronto. The below datasets will be used for analysing.

2.1 The postal codes of Toronto can be obtained from the below dataset.

Use the Notebook to build the code to scrape the following Wikipedia page, https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M, in order to obtain the data that is in the table of postal codes and to transform the data into a pandas dataframe.

	Postal code	Borough	Neighborhood
0	M3A	North York	Parkwoods
1	M4A	North York	Victoria Village
2	M5A	Downtown Toronto	Regent Park / Harbourfront
3	M6A	North York	Lawrence Manor / Lawrence Heights
4	M7A	Downtown Toronto	Queen's Park / Ontario Provincial Government
5	M9A	Etobicoke	Islington Avenue
6	M1B	Scarborough	Malvern / Rouge
7	M3B	North York	Don Mills
8	M4B	East York	Parkview Hill / Woodbine Gardens
9	M5B	Downtown Toronto	Garden District, Ryerson
10	M6B	North York	Glencairn

The geospatial data, which has latitude and longitude information is in below dataset.

http://cocl.us/Geospatial_data

Geospatial_Coordinates

Postal Code	Latitude	Longitude
M1B	43.8066863	-79.1943534
M1C	43.7845351	-79.1604971
M1E	43.7635726	-79.1887115
M1G	43.7709921	-79.2169174
M1H	43.773136	-79.2394761
M1J	43.7447342	-79.2394761
M1K	43.7279292	-79.2620294
M1L	43.7111117	-79.2845772
M1M	43.716316	-79.2394761
M1N	43.692657	-79.2648481
M1P	43.7574096	-79.273304
M1R	43.7500715	-79.2958491

Also, the below data has been used.

1. Toronto wiki page.
2. Cuisine of Toronto.
3. Neighbourhoods of Toronto.

<https://en.wikipedia.org/wiki/Toronto>

https://en.wikipedia.org/wiki/Cuisine_in_Toronto

https://en.wikipedia.org/wiki/List_of_neighbourhoods_in_Toronto

3. Methodology:

The data for postal code, borough and neighborhood was scraped from wiki pages.

Postal code	Borough	Neighborhood
0	M3A	North York
1	M4A	North York
2	M5A	Downtown Toronto
3	M6A	North York
4	M7A	Downtown Toronto
5	M9A	Etobicoke
6	M1B	Scarborough
7	M3B	North York
8	M4B	East York
9	M5B	Downtown Toronto
10	M6B	North York

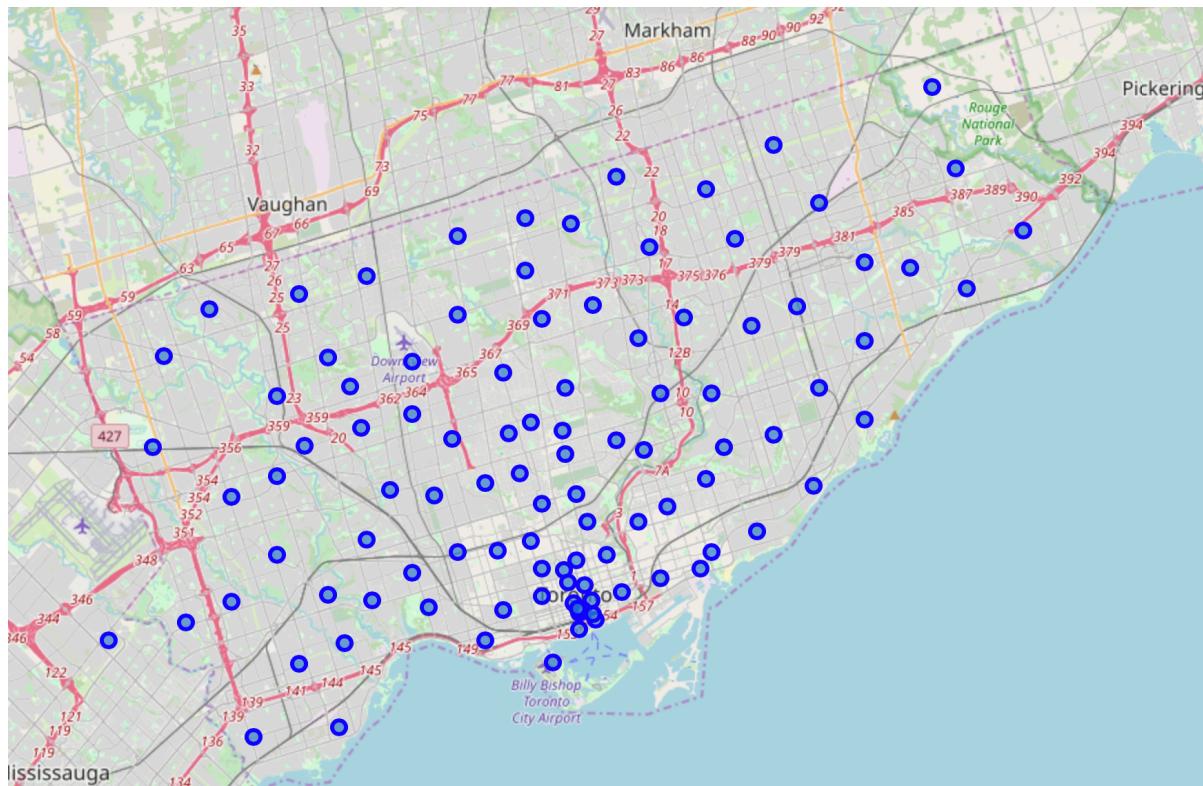
The geographical coordinates were sourced from
https://cocl.us/Geospatial_data

	Postal Code	Latitude	Longitude
0	M1B	43.806686	-79.194353
1	M1C	43.784535	-79.160497
2	M1E	43.763573	-79.188711
3	M1G	43.770992	-79.216917
4	M1H	43.773136	-79.239476

The above two datasets were merged to obtain the below dataset.

Postal code	Borough	Neighborhood	Latitude	Longitude	
0	M3A	North York	Parkwoods	43.753259	-79.329656
1	M4A	North York	Victoria Village	43.725882	-79.315572
2	M5A	Downtown Toronto	Regent Park / Harbourfront	43.654260	-79.360636
3	M6A	North York	Lawrence Manor / Lawrence Heights	43.718518	-79.464763
4	M7A	Downtown Toronto	Queen's Park / Ontario Provincial Government	43.662301	-79.389494

Plotting the above neighborhood dataset.



Figured out Top 5 restaurant venues in every neighborhood to understand the preference in every area.

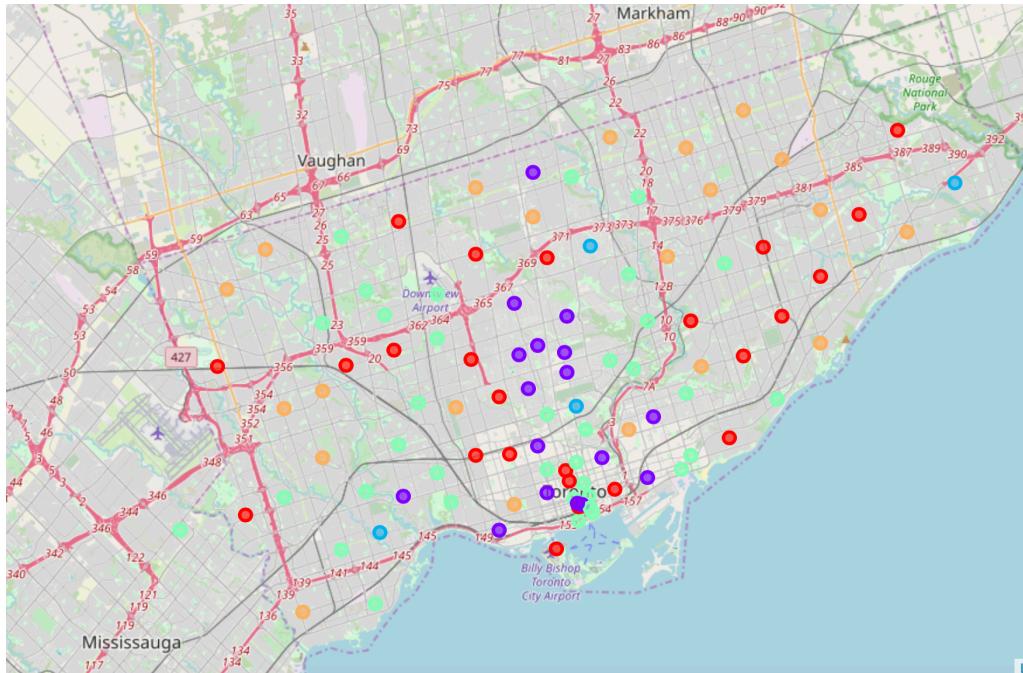
From top venue data acquired from Foursquare, we used one hot encoding to understand which venue categories are most popular.

----Agincourt----									
				venue	freq				
0	Caribbean Restaurant				0.2				
1	Cantonese Restaurant				0.1				
2	Indian Restaurant				0.1				
3	Chinese Restaurant				0.1				
4	Sri Lankan Restaurant				0.1				
----Alderwood / Long Branch----									
				venue	freq				
0	Pizza Place				0.2				
1	Pub				0.1				
2	Moroccan Restaurant				0.1				
3	Coffee Shop				0.1				
4	Sandwich Place				0.1				
									
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	
0	Agincourt	Caribbean Restaurant	Malay Restaurant	Breakfast Spot	Cantonese Restaurant	Sri Lankan Restaurant	Indian Restaurant	Bakery	Chinese Restaurant
1	Alderwood / Long Branch	Pizza Place	Grocery Store	Moroccan Restaurant	Sandwich Place	Coffee Shop	Pub	Discount Store	Pharmacy
2	Bathurst Manor / Wilson Heights / Downsview North	Coffee Shop	Deli / Bodega	Ice Cream Shop	Bridal Shop	Ski Chalet	Middle Eastern Restaurant	Mediterranean Restaurant	Restaurant
3	Bayview Village	Gas Station	Bank	Japanese Restaurant	Café	Chinese Restaurant	Grocery Store	Restaurant	Yoga Studio
4	Bedford Park / Lawrence Manor East	Pub	Italian Restaurant	Café	Sports Club	Comfort Food Restaurant	Bagel Shop	Indian Restaurant	Thai Restaurant

K-Means Clustering - Based upon common categories Boroughs were grouped into 5 clusters and displayed on map using colors.

Postal code	Borough	Neighborhood	Latitude	Longitude	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	
0	M3A	North York	Parkwoods	43.753259	-79.329656	4	Pharmacy	Fish & Chips Shop	Park	Fast Food Restaurant	Food & Drink Shop	Grocery Store	Café
1	M4A	North York	Victoria Village	43.725882	-79.315572	0	Coffee Shop	Sporting Goods Shop	Grocery Store	Café	Portuguese Restaurant	Intersection	Park
2	M5A	Downtown Toronto	Regent Park / Harbourfront	43.654260	-79.360636	0	Coffee Shop	Spa	Historic Site	Park	Farmers Market	Distribution Center	Bakery
3	M6A	North York	Lawrence Manor / Lawrence Heights	43.718518	-79.464763	3	Restaurant	Sushi Restaurant	Fast Food Restaurant	Dessert Shop	Vietnamese Restaurant	Boutique	Athletics & Sports
4	M7A	Downtown Toronto	Queen's Park / Ontario Provincial Government	43.662301	-79.389494	0	Coffee Shop	Yoga Studio	Distribution Center	Mexican Restaurant	Beer Bar	Italian Restaurant	Bubble Tea Shop

Map of clusters in different colors.



4. Results:

Every Cluster displayed certain characteristics.

Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue
1	North York	0	Coffee Shop
			Sporting Goods Shop
2	Downtown Toronto	0	Coffee Shop
			Spa
4	Downtown Toronto	0	Coffee Shop
			Yoga Studio
Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue
35	East York	1	Café
			Pizza Place
43	West Toronto	1	Coffee Shop
			Café
48	Downtown Toronto	1	Café
			Museum
52	North York	1	Korean Restaurant
			Coffee Shop
Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue
12	Scarborough	2	Italian Restaurant
			Playground
45	North York	2	Park
			Pool
83	Central Toronto	2	Park
			Grocery Store
101	Etobicoke	2	Park
			Italian Restaurant

Cluster 0 : Most preferred venue is Coffee shop, Spa, Yoga

Cluster 1 : Most preferred venue is Café / Coffee shop, restaurants.

Cluster 2 : Most preferred venues are Park, Playground, Pool, Italian restaurants.

Cluster Characteristics Continued..

Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue
3	North York	3 Restaurant	Sushi Restaurant
7	North York	3 Japanese Restaurant	Restaurant
9	Downtown Toronto	3 Comic Shop	Electronics Store
11	Etobicoke	3 Pizza Place	Mexican Restaurant

Cluster 3 : Most preferred venue are Restaurants

Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue
0	North York	4 Pharmacy	Fish & Chips Shop
5	Etobicoke	4 Pharmacy	Café
8	East York	4 Pizza Place	Bakery
18	Scarborough	4 Pizza Place	Restaurant

Cluster 4 : Most preferred venues are Pharmacy, pizza places, restaurants.

5. Discussion:

- Upon analysis through K-means clustering, we obtained the clusters of Boroughs in Toronto.
- The clusters depict a pattern of what is sellable in different boroughs.
- In Downtown Area, Cafes are mostly popular. Most offices have their own cafeterias, which also impacts restaurant business. Plus, the cost of opening is very high compared to other parts of the city. Parking in downtown is also a big reason of families preferring other parts of the city.
- North York area has many restaurants and is the most preferred location. The restaurants are mainly Japanese and Korean.
- Other areas include, Etobicoke, Scarborough, which are also very popular in terms of Indian restaurants.

6. Conclusion:

Below are the places which was most preferable for a new restaurant.

Downtown: Café / Coffee shops.

Central Toronto: Italian restaurants

North York: Japanese Restaurants

Scarborough: Indian restaurants