



BATTLE OF NEIGHBORHOODS CITY : TORONTO

Restaurant Business in Toronto Neighborhood.

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.



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.

Data Sources

- 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

Data Sources

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

http://cocl.us/Geospatial_data

Also, the below data has been used.

- Toronto wiki page.
- Cuisine of Toronto.
- 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

- Foursquare API

URL: <https://api.foursquare.com>

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

Methodology

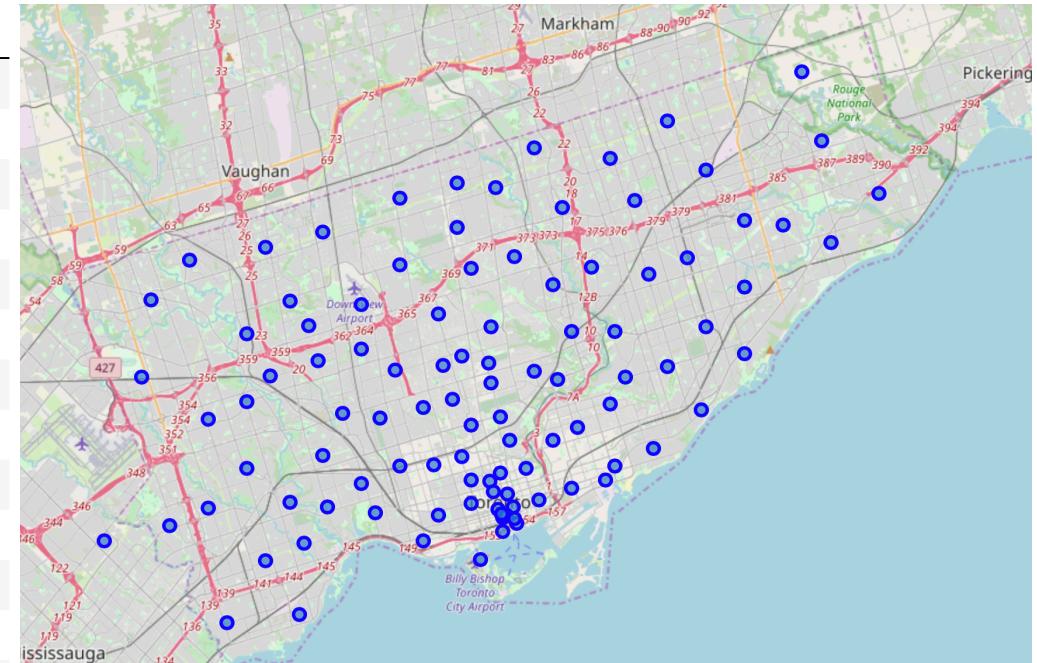
Exploratory Data Analysis

To observe datasets better, every dataset was cleaned into useful form.

Combined the postal code data with geospatial data containing latitudes and longitudes.

Segregated data based upon Borough and plotted the below neighborhood map of Toronto.

Postal code	Borough	Neighborhood	Latitude	Longitude	
2	M5A	Downtown Toronto	Regent Park / Harbourfront	43.654260	-79.360636
4	M7A	Downtown Toronto	Queen's Park / Ontario Provincial Government	43.662301	-79.389494
9	M5B	Downtown Toronto	Garden District, Ryerson	43.657162	-79.378937
15	M5C	Downtown Toronto	St. James Town	43.651494	-79.375418
19	M4E	East Toronto	The Beaches	43.676357	-79.293031
20	M5E	Downtown Toronto	Berczy Park	43.644771	-79.373306
24	M5G	Downtown Toronto	Central Bay Street	43.657952	-79.387383
25	M6G	Downtown Toronto	Christie	43.669542	-79.422564
30	M5H	Downtown Toronto	Richmond / Adelaide / King	43.650571	-79.384568
31	M6H	West Toronto	Dufferin / Dovercourt Village	43.669005	-79.442259
36	M5J	Downtown Toronto	Harbourfront East / Union Station / Toronto Is...	43.640816	-79.381752
37	M6J	West Toronto	Little Portugal / Trinity	43.647927	-79.419750



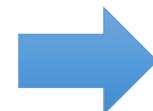
Methodology

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



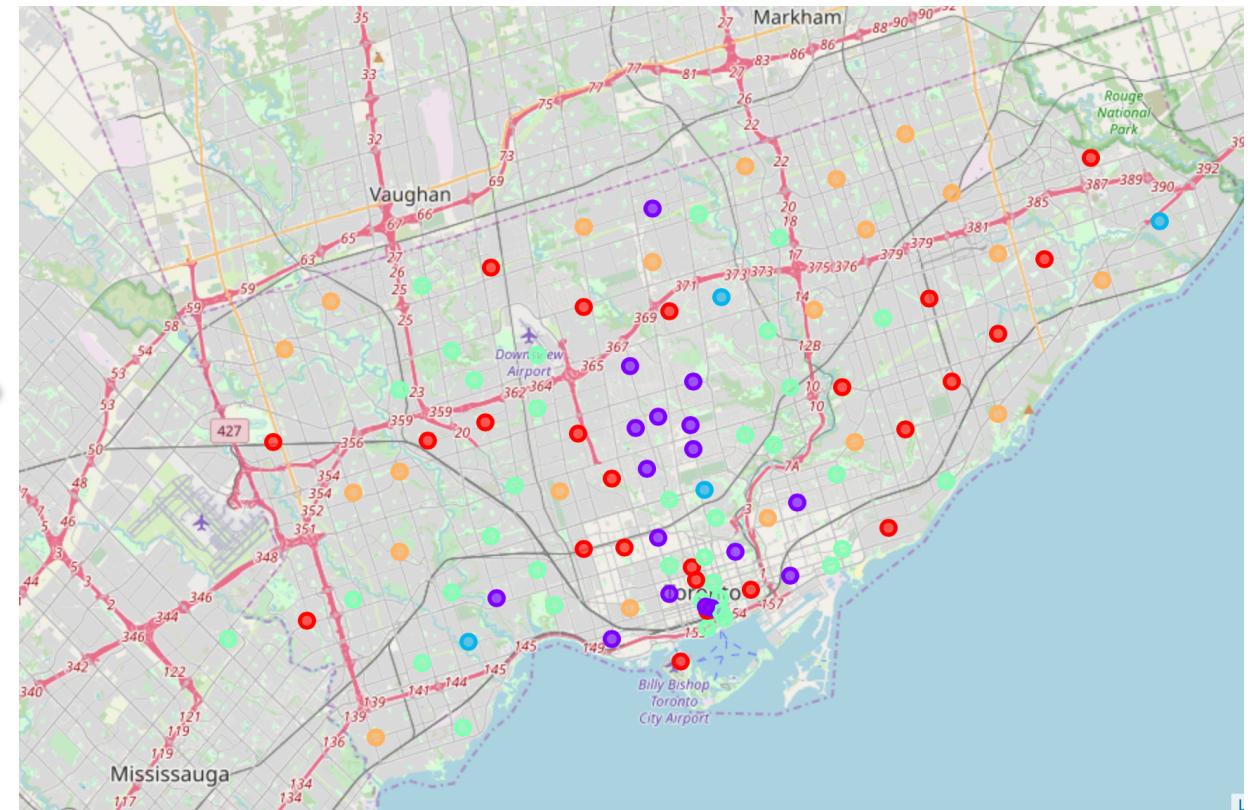
	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue
0	Agincourt	Caribbean Restaurant	Malay Restaurant	Breakfast Spot	Cantonese Restaurant	Sri Lankan Restaurant	Indian 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

Methodology

- K-Means Clustering

Based upon common categories Boroughs were grouped into clusters and displayed on map using colors.

Postal code	Borough	Neighborhood	Latitude	Longitude	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	
0	M3A	North York	Parkwoods	43.753259	-79.329656	4	Pharmacy	Fish & Chips Shop
1	M4A	North York	Victoria Village	43.725882	-79.315572	0	Coffee Shop	Sporting Goods Shop
2	M5A	Downtown Toronto	Regent Park / Harbourfront	43.654260	-79.360636	0	Coffee Shop	Spa
3	M6A	North York	Lawrence Manor / Lawrence Heights	43.718518	-79.464763	3	Restaurant	Sushi Restaurant
4	M7A	Downtown Toronto	Queen's Park / Ontario Provincial Government	43.662301	-79.389494	0	Coffee Shop	Yoga Studio



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.

Results

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
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 3 : Most preferred venue are Restaurants

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

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.

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