

Introduction

For people who want to open a new coffee shop in Toronto, a main question is in which neighborhoods the coffee shop are most popular. So in this project, I will investigate the popularity of coffee shop in neighborhoods of Toronto, and clustering the neighborhoods according to the top 5 venues in the neighborhoods. By analyzing the ranks of coffee shop in each clusters and by the top 5 venues in each cluster, I want to give advice for the choice of locations for coffee shop.

Data

I obtain the neighborhoods information of Toronto from Wikipedia, and then obtain the latitude and longitude of them by CSV file in http://cocl.us/Geospatial_data. Combining them to get a data frame of neighborhoods information;

[10]:

	Postal Code	Borough	Neighborhood	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

Then I use Foursquare API to collect the information of popular venues in each neighborhood, I choose the top 5 venues in each neighborhoods and make a new data frame:

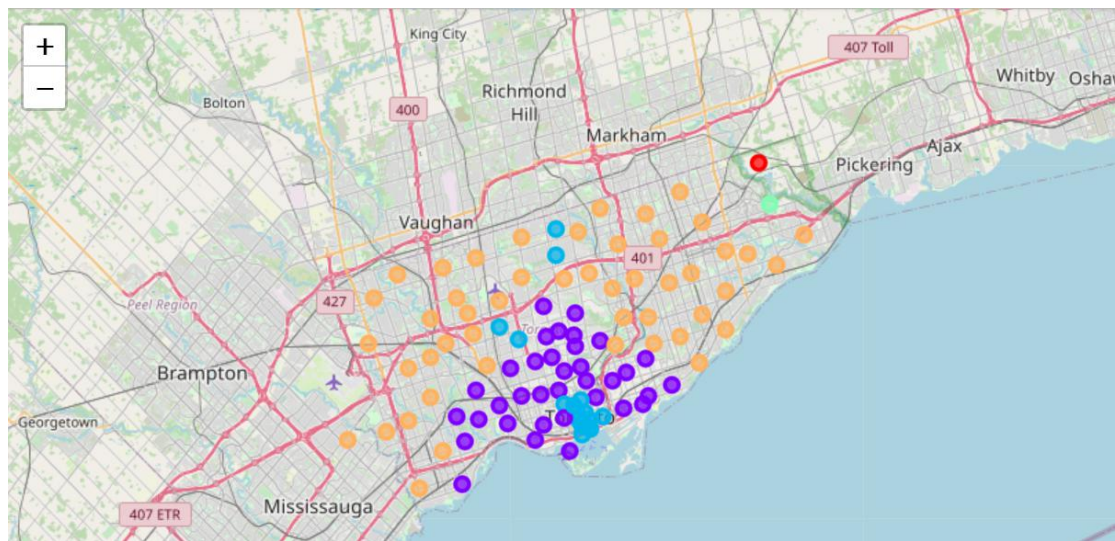
	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Agincourt	Chinese Restaurant	Coffee Shop	Restaurant	Pharmacy	Cantonese Restaurant
1	Alderwood, Long Branch	Coffee Shop	Fast Food Restaurant	Department Store	Pizza Place	Breakfast Spot
2	Bathurst Manor, Wilson Heights, Downsview North	Coffee Shop	Pizza Place	Park	Bank	Deli / Bodega
3	Bayview Village	Park	Chinese Restaurant	Coffee Shop	Shopping Mall	Bank
4	Bedford Park, Lawrence Manor East	Coffee Shop	Sushi Restaurant	Italian Restaurant	Bakery	Sandwich Place

Methodology

I use k means clustering to cluster the neighborhoods of Toronto, based on the top 5 venues of it. I choose to split the neighborhoods into 5 clusters, and the resulting table is:

	Postal Code	Borough	Neighborhood	Latitude	Longitude	Cluster	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	M1B	Scarborough	Malvern, Rouge	43.806686	-79.194353	0	3	Zoo Exhibit	Restaurant	Fast Food Restaurant	Athletics & Sports	Bus Station
1	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	43.784535	-79.160497	0	4	Breakfast Spot	Pizza Place	Coffee Shop	Pet Store	Bank
2	M1E	Scarborough	Guildwood, Morningside, West Hill	43.763573	-79.188711	0	4	Pizza Place	Coffee Shop	Park	Bank	Breakfast Spot
3	M1G	Scarborough	Woburn	43.770992	-79.216917	0	4	Coffee Shop	Fast Food Restaurant	Discount Store	Bank	Sandwich Place
4	M1H	Scarborough	Cedarbrae	43.773136	-79.239476	0	4	Coffee Shop	Clothing Store	Gas Station	Sandwich Place	Bank

Then I plot the result into map by Folium:



Results

Then I look at each cluster of neighborhoods:

Cluster 1:

	Borough	Cluster	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
16	Scarborough	0	0	Golf Course	Farm	Playground	Trail	Sculpture Garden

This area is not suitable for opening a new coffee shop. It is a place for outdoor activities.

Cluster 2:

	Borough	Cluster	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
36	East York	2	1	Park	Coffee Shop	Pizza Place	Café	Thai Restaurant
37	East Toronto	2	1	Coffee Shop	Pub	Breakfast Spot	Beach	Japanese Restaurant
38	East York	2	1	Coffee Shop	Indian Restaurant	Park	Bakery	Grocery Store
40	East York	2	1	Café	Greek Restaurant	Coffee Shop	Bakery	Gastropub
41	East Toronto	2	1	Café	Greek Restaurant	Park	Vietnamese Restaurant	Bakery
42	East Toronto	2	1	Park	Café	Brewery	Coffee Shop	Beach
43	East Toronto	2	1	Coffee Shop	Park	Bakery	Vietnamese Restaurant	Brewery
44	Central Toronto	4	1	Coffee Shop	Italian Restaurant	Sushi Restaurant	Pizza Place	Pub

The hot pots of this cluster is mainly comprise of restaurants and coffee shop, therefore, it would be a suitable place to open a new coffee shop.

Cluster 3

	Borough	Cluster	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
21	North York	4	2	Korean Restaurant	Coffee Shop	Bubble Tea Shop	Café	Middle Eastern Restaurant
22	North York	4	2	Korean Restaurant	Grocery Store	Japanese Restaurant	Bubble Tea Shop	Supermarket
52	Downtown Toronto	3	2	Coffee Shop	Japanese Restaurant	Café	Park	Diner
53	Downtown Toronto	3	2	Coffee Shop	Park	Japanese Restaurant	Café	Restaurant
54	Downtown Toronto	3	2	Coffee Shop	Park	Gastropub	Japanese Restaurant	Café

This cluster has hot pots such as bubble tea shop and coffee shop, along with some restaurant. It would be a nice place for opening a new coffee shop, but be ware that there might be a tight competition between coffee shops and bubble tea shops.

Cluster 4

	Borough	Cluster	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Scarborough	0	3	Zoo Exhibit	Restaurant	Fast Food Restaurant	Athletics & Sports	Bus Station

Zoo area, not suitable for a new coffee shop.

Cluster 5

	Borough	Cluster	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
1	Scarborough	0	4	Breakfast Spot	Pizza Place	Coffee Shop	Pet Store	Bank
2	Scarborough	0	4	Pizza Place	Coffee Shop	Park	Bank	Breakfast Spot
3	Scarborough	0	4	Coffee Shop	Fast Food Restaurant	Discount Store	Bank	Sandwich Place
4	Scarborough	0	4	Coffee Shop	Clothing Store	Gas Station	Sandwich Place	Bank
5	Scarborough	0	4	Coffee Shop	Fast Food Restaurant	Pizza Place	Sandwich Place	Grocery Store
6	Scarborough	0	4	Coffee Shop	Grocery Store	Chinese Restaurant	Fast Food Restaurant	Pharmacy
7	Scarborough	2	4	Coffee Shop	Fast Food Restaurant	Sandwich Place	Pizza Place	Hardware Store

Places around working place or entertainment places, where fast food restaurants are quite

popular. It would be a nice place to run a coffee shop.

Discussion

This project can be further explored by merging the density of similar shops, the general house rent in neighborhoods to evaluate whether it is suitable for opening a new coffee shop.

Conclusion

In conclusion, Cluster 2, 3 and 5 are suitable for opening a new coffee shop.