Peer-graded Assignment: Capstone Project - The Battle of Neighborhoods (Week 2)
Introduction:

Coffee has evolved from a luxury in the past to a commmondity - to some a need in the world today

Quoting it has been that over 2.25 billion cups of coffee are consumed in the world every day worldwide. Coffee has been a important part of human live's, be it for its caffine, aroma, or other functions. Nonetheless, it might have also become and international too for conneting people

Problem:

Since the early 2010s, cafe busines has been a strong interest till date. As such, this project will try recommend new cafe ventureses to select ideal locations to set up cafes by

- Location population
- Surrounding businesses concerns around region of Toronto, Canada

Location

Toronto, Canada

Data

The following datas will be acquired
- Postal codes of disctricts/regions in Toronto
- Point of Interest (POI)s or establishments in the regions using clustering

The regions/disctrict names wil be atttined by using wikipedia , while the clustering and mapping be done using foursquare API.
Approach: The datas will allow us to obtain clusters, and from the clusters to decide if the locations are likely idea for a cafe business to strive there. Analysis will be more geographical apporach than evalutation of the k-clusters; as such only observations can be provided, not full recommendations

Methodology¶

- Obtaining dataset

	Postal Code	Borough	Neighborhood	Latitude	Longitude
0	M4E	East Toronto	The Beaches	43.676357	-79.293031
1	M4K	East Toronto	The Danforth West, Riverdale	43.679557	-79.352188
2	M4L	East Toronto	India Bazaar, The Beaches West	43.668999	-79.315572
3	M4M	East Toronto	Studio District	43.659526	-79.340923
4	M4N	Central Toronto	Lawrence Park	43.728020	-79.388790
5	M4P	Central Toronto	Davisville North	43.712751	-79.390197
6	M4R	Central Toronto	North Toronto West, Lawrence Park	43.715383	-79.405678
7	M4S	Central Toronto	Davisville	43.704324	-79.388790
8	M4T	Central Toronto	Moore Park, Summerhill East	43.689574	-79.383160
9	M4V	Central Toronto	Summerhill West, Rathnelly, South Hill, Forest...	43.686412	-79.400049
10	M4W	Downtown Toronto	Rosedale	43.679563	-79.377529
11	M4X	Downtown Toronto	St. James Town, Cabbagetown	43.667967	-79.367675
12	M4Y	Downtown Toronto	Church and Wellesley	43.665860	-79.383160
13	M5A	Downtown Toronto	Regent Park, Harbourfront	43.654260	-79.360636
14	M5B	Downtown Toronto	Garden District, Ryerson	43.657162	-79.378937
15	M5C	Downtown Toronto	St. James Town	43.651494	-79.375418
16	M5E	Downtown Toronto	Berczy Park	43.644771	-79.373306
17	M5G	Downtown Toronto	Central Bay Street	43.657952	-79.387383
18	M5H	Downtown Toronto	Richmond, Adelaide, King	43.650571	-79.384568
19	M5J	Downtown Toronto	Harbourfront East, Union Station, Toronto Islands	43.640816	-79.381752
20	M5K	Downtown Toronto	Toronto Dominion Centre, Design Exchange	43.647177	-79.381576
21	M5L	Downtown Toronto	Commerce Court, Victoria Hotel	43.648198	-79.379817

- Obtain coordinates of Toronto, CA for mapping focus

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In [7]: address = 'Toronto, CA'

        geolocator = Nominatim(user_agent="ny_explorer")
        location = geolocator.geocode(address)
        latitude = location.latitude
        longitude = location.longitude
        print('The geograpical coordinate of Toronto,CA are {}, {}.'.format(latitude, longitude))

        The geograpical coordinate of Toronto,OH are 43.6534817, -79.3839347.
```
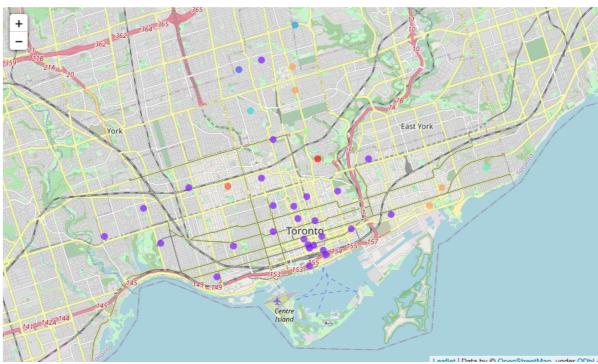
- Data showing top 10 POIs for each neighbourhood

	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
0	M4E	East Toronto	The Beaches	43.676357	-79.293031	5	Trail	Asian Restaurant	Health Food Store	Pub	Doner Resta
1	M4K	East Toronto	The Danforth West, Riverdale	43.679557	-79.352188	1	Greek Restaurant	Italian Restaurant	Coffee Shop	Restaurant	Ice Cr Shop
2	M4L	East Toronto	India Bazaar, The Beaches West	43.668999	-79.315572	8	Sandwich Place	Park	Pizza Place	Steakhouse	Ice Cr Shop
3	M4M	East Toronto	Studio District	43.659526	-79.340923	1	Café	Coffee Shop	Bakery	Gastropub	Brewe
4	M4N	Central Toronto	Lawrence Park	43.728020	-79.388790	3	Park	Photography Studio	Bus Line	Swim School	Depar Store
5	M4P	Central Toronto	Davisville North	43.712751	-79.390197	8	Park	Pizza Place	Breakfast Spot	Hotel	Sandw Place
6	M4R	Central Toronto	North Toronto West, Lawrence Park	43.715383	-79.405678	1	Clothing Store	Coffee Shop	Yoga Studio	Chinese Restaurant	Spa
7	M4S	Central Toronto	Davisville	43.704324	-79.388790	8	Dessert Shop	Café	Sandwich Place	Pizza Place	Sushi Resta
8	M4T	Central Toronto	Moore Park, Summerhill East	43.689574	-79.383160	6	Trail	Park	Gym	Tennis Court	Doner Resta
9	M4V	Central Toronto	Summerhill West, Rathnelly, South Hill, Forest...	43.686412	-79.400049	1	Coffee Shop	Pub	Pizza Place	Sushi Restaurant	Bank
10	M4W	Downtown Toronto	Rosedale	43.679563	-79.377529	0	Park	Playground	Trail	Yoga Studio	Deli / Bodeg
11	M4X	Downtown Toronto	St. James Town, Cabbagetown	43.667967	-79.367675	1	Coffee Shop	Pizza Place	Italian Restaurant	Bakery	Park

- **Clustering Map using foursquare and folium clustering**

Legends -

Cluster 1 = Purple   Cluster 2 – Dark   Cluster 3 = Blue

Cluster 4 = Light Blue   Cluster 5 = Green   Cluster 6 = Cyan

Cluster 8 = Beige   Cluster 9 = Blood orange   Cluster 0 = Red

Results

- Café and Coffee shops has one of the highest frequency appearing in the table of top 10, which implies that coffee culture in Toronto is strong and ideal for venturing into the coffee business
- Based on the clustering outcome, setting up a business in District 1 is ideal, especially near the Toronto downtown
- However, rentals around downtown is expected to be high so low risk ventures can try the region between cluster 2, 4 ,8 centred at Ellington

Discussion

- The mapping and clustering has it limitations as there are other factors to be considered, such as business legistratives and standard of living
- Business trends are always changing, so such a one-time off analysis is not sufficient enough to band it in a good confidence interval of expectation

Conclusion

Toronto has been shown to be an ideal location for cafe business based on the data's revelations of the popularity of cafes and coffee shops, however there are more indepth business constrains and concerned to be considered. A more indepth regression study will be needed to have a better prediction and a display of CBA (Cost Benefit Analysis)

In [ ]: