

Coursera Capstone
IBM Applied Data Science Capstone

Opening a store in Toronto, Canada



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Introduction:

My brother had told to me, he wanted to open a store in Toronto, Canada due to earning more income for his family. And sometimes he was so confused with many questions when he wanted to open his store such as: location, investment, staff,... and the biggest question is where should his store be located? I will solve this question for him.

Business problem:

This is an important step in opening a store, but some owner is usually skipped this step to save time and cost. However, this is the first reason lead to losses and closures of stores in the future.

Due to a store can't attract all customers. In that case, you must be targeted your objective customers and besides that, you have to find out information about your competitors in order to get the advantages. So, when you find out information, you must answer these questions:

- What kind store/shop you want to open?
- Where is your competitors?
- What kind of products did your competitors sell?
- What strength and weakness do they have?
- What is surrounding stores/shops?
- Where do you open a store/shop?
- What kind of customer do you want to serve?

When you have answered all of this question, the next step is making ideas for your store/shop. Ideas should be based on your objective customer and amount of investment. Ideas include style, business model, product, etc. Your ideas should catch the trend of the market.

Then you need to choose the store/shop model. A store/shop style is very large. So you need to decide your kind of store/shop.

And when you completed the ideas. You must find out where your store/shop should be located. You must choose the suitable position because it has the large impact on your future store/shop. I will solve this problem in this report.

Data

To define my problem, I will explore data:

- Number of stores/shops in the neighborhood
- I will find out where there are a small number of stores/shops, and in each borough I will find out how many each kind of stores/shops.

Data source:

- Number of stores/shops in Toronto, Canada
- Foursquare API

Sources of data:

Wikipedia page: https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M. This website contains a list of neighborhood in Canada. I will use the web scraping techniques to get data from the Wikipedia page by using the help of Python request and BeautifulSoup package. Then I will get location (latitude, longitude) from each neighborhood (using Python Geocoder package) and make the map based on these locations.

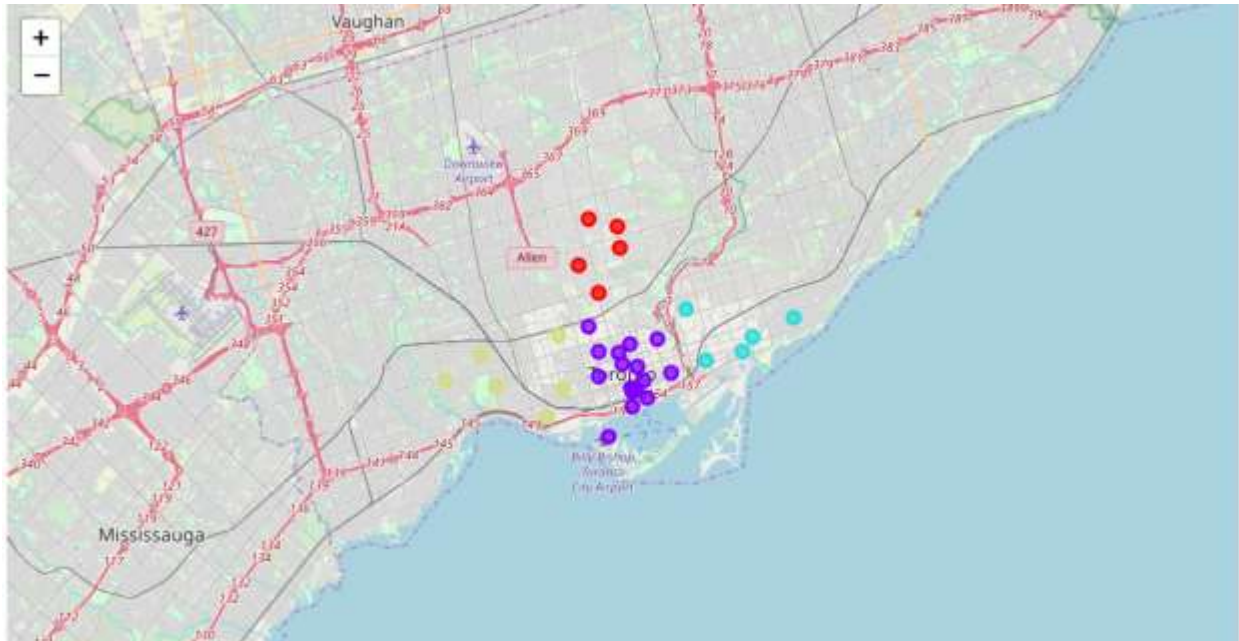
After that, I will use Foursquare API to get the venue data for all neighborhoods. Foursquare has a large database about places, information for each place. Foursquare will provide many categories of the venue data. In this project I will use this data and many data science skills to solve the problem business (web scraping, interface with Foursquare API, cleaning data, K-mean clustering and map visualization (folium)).

Method:

- Step 1: Get list of neighborhoods of Toronto.
- Step 2: Get location of each neighborhood.
- Step 3: Using Foursquare to get top 5 venues that in a radius of 500 meters
- Step 4: Check how many venues for each neighborhood and unique category.
- Step 5: Analysis each neighborhood (Taking the mean of the frequency occurrence of each venue category.)
- Step 6: Using K-mean to clustering data to 3 cluster base on latitude and longitude.

Results:

The result from the K-mean clustering show that we can categorize neighborhood into 4 cluster base on the latitude and longitude:



- On the center area of Toronto: (Cluster 0)

Cluster 1

```
neighborhoods_merged.loc[neighborhoods_merged['Cluster Labels'] == 0]
```

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	PostalCode	Borough	Latitude	Longitude	Cluster Labels
10	Davisville	Dessert Shop	Coffee Shop	Sporting Goods Shop	M4S	Central Toronto	43.704324	-79.388790	0
11	Davisville North	Clothing Store	Food & Drink Shop	Sporting Goods Shop	M4P	Central Toronto	43.712751	-79.390197	0
12	Deer Park,Forest Hill SE,Rathnelly,South Hill,...	Coffee Shop	Liquor Store	Sporting Goods Shop	M4V	Central Toronto	43.686412	-79.400049	0
15	Forest Hill North,Forest Hill West	Jewelry Store	Sporting Goods Shop	Dessert Shop	M5P	Central Toronto	43.696948	-79.411307	0
21	North Toronto West	Sporting Goods Shop	Coffee Shop	Dessert Shop	M4R	Central Toronto	43.715383	-79.405678	0

- On the right area of Toronto: (Cluster 1)

Cluster 2

```
neighborhoods_merged.loc[neighborhoods_merged['Cluster Labels'] == 1]
```

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	Postal Code	Borough	Latitude	Longitude	Cluster Labels
0	Berczy Park	Liquor Store	Sporting Goods Shop	Dessert Shop	M5E	Downtown Toronto	43.644771	-79.373306	1
3	CN Tower, Bathurst Quay, Island airport, Harbourf...	Coffee Shop	Sporting Goods Shop	Pet Store	M5V	Downtown Toronto	43.628947	-79.384420	1
4	Cabbagetown, St. James Town	Jewelry Store	Sporting Goods Shop	Dessert Shop	M4X	Downtown Toronto	43.667967	-79.367675	1
5	Central Bay Street	Coffee Shop	Sporting Goods Shop	Pet Store	M5G	Downtown Toronto	43.657952	-79.387383	1
6	Chinatown, Grange Park, Kensington Market	Arts & Crafts Store	Coffee Shop	Pet Store	M5T	Downtown Toronto	43.653206	-79.400049	1
8	Church and Wellesley	Bubble Tea Shop	Sporting Goods Shop	Pet Store	M4Y	Downtown Toronto	43.665880	-79.383160	1
9	Commerce Court, Victoria Hotel	Coffee Shop	Sporting Goods Shop	Pet Store	M5L	Downtown Toronto	43.648198	-79.379817	1
13	Design Exchange, Toronto Dominion Centre	Coffee Shop	Sporting Goods Shop	Pet Store	M5K	Downtown Toronto	43.647177	-79.381576	1
14	First Canadian Place, Underground city	Coffee Shop	Sporting Goods Shop	Pet Store	M5X	Downtown Toronto	43.648429	-79.382280	1
16	Harbord, University of Toronto	Dessert Shop	Sporting Goods Shop	Pet Store	M5S	Downtown Toronto	43.662696	-79.400049	1
17	Harbourfront	Coffee Shop	Sporting Goods Shop	Pet Store	M5A	Downtown Toronto	43.654260	-79.380636	1
18	Harbourfront East, Toronto Islands, Union Station	Sporting Goods Shop	Dessert Shop	Pet Store	M5J	Downtown Toronto	43.640816	-79.381752	1
23	Queen's Park	Coffee Shop	Sporting Goods Shop	Pet Store	M7A	Downtown Toronto	43.662301	-79.389494	1
25	Ryerson, Garden District	Clothing Store	Comic Shop	Sporting Goods Shop	M5B	Downtown Toronto	43.657162	-79.378937	1
26	St. James Town	Coffee Shop	Sporting Goods Shop	Pet Store	M5C	Downtown Toronto	43.651494	-79.375418	1
28	The Annex, North Midtown, Yorkville	Coffee Shop	Sporting Goods Shop	Pet Store	M5R	Central Toronto	43.672710	-79.405678	1

- On the above area of Toronto: (Cluster 2)

Cluster 3

```
neighborhoods_merged.loc[neighborhoods_merged['Cluster Labels'] == 2]
```

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	PostalCode	Borough	Latitude	Longitude	Cluster Labels
2	Business Reply Mail Processing Centre 989 Eastern	Comic Shop	Sporting Goods Shop	Pet Store	M7Y	East Toronto	43.662744	-79.321558	2
27	Studio District	Ice Cream Shop	Cheese Shop	Coffee Shop	M4M	East Toronto	43.659526	-79.340923	2
29	The Beaches	Health Food Store	Sporting Goods Shop	Dessert Shop	M4E	East Toronto	43.676357	-79.293031	2
30	The Beaches West, India Bazaar	Fish & Chips Shop	Liquor Store	Ice Cream Shop	M4L	East Toronto	43.668999	-79.315572	2
31	The Danforth West, Riverdale	Ice Cream Shop	Cosmetics Shop	Sporting Goods Shop	M4K	East Toronto	43.679557	-79.352188	2

- On the left area of Toronto: (Cluster 3)

Cluster 4

```
: neighborhoods_merged.loc[neighborhoods_merged['Cluster Labels'] == 3]
```

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	PostalCode	Borough	Latitude	Longitude	Cluster Labels
1	Brookton, Exhibition Place, Parkdale Village	Coffee Shop	Furniture / Home Store	Pet Store	M6K	West Toronto	43.636847	-79.428191	3
7	Christie	Grocery Store	Candy Store	Coffee Shop	M6G	Downtown Toronto	43.669542	-79.422564	3
19	High Park, The Junction South	Arts & Crafts Store	Furniture / Home Store	Dessert Shop	M6P	West Toronto	43.661608	-79.464763	3
20	Little Portugal, Trinity	Ice Cream Shop	Sporting Goods Shop	Dessert Shop	M6J	West Toronto	43.647927	-79.419750	3
22	Parkdale, Roncesvalles	Gift Shop	Dessert Shop	Coffee Shop	M6R	West Toronto	43.648980	-79.456325	3
24	Runnymede, Swansea	Fish & Chips Shop	Coffee Shop	Pet Store	M6S	West Toronto	43.651571	-79.484450	3

Conclusion:

Due to the demanding of my brother to open a store in Toronto. I would recommend him

- **On the left area of Toronto (Cluster 3):** I would like to recommend him to avoid opening the furniture store on the left Toronto due to it already has 2 furniture store. On these area, I would recommend him to open a coffee shop instead.
- **On the center area of Toronto (Cluster 0):** I would like him not to open the coffee shop in here due to most of coffee shop was located in here. Beside that, opening a furniture store is the great idea in this area.
- **On the above area of Toronto (Cluster 2):** I would like him should consider the furniture shop in here due to it has no furniture store in this area.

- **On the right area of Toronto (Cluster 1):** I would like him should consider the furniture shop in here due to it has no furniture store in this area.

In general, Toronto is the best place for my brother to open a furniture shop due to it has a very small quantity of furniture shops. Beside that, the price of hiring a place to open a store in this area should be consider but I would not like to mention it on this Notebook.