

## **Title: Choosing a location to open a coffee shop in Toronto**

### **1. Introduction about a business problem and people interested in this project**

According to a recent study reported by telegraph, Canada's place is at number 10 among twenty countries in the world that drink more coffee per capita. Also, the Coffee Association of Canada sated that 2/3 of Canadians enjoy at least one cup a day with the average at 3.2 cups/day in 2018 (see at <https://coffeebi.com/2019/02/18/the-canadian-coffee-consumption-2019/>). As a results, businessmen will be interest in invest their money on coffee in Canada.

Based on this trend above, a businessman from Toronto, Canada, who love drinking coffee would like to open a coffee shop in his city. Similar to the national scale, people in Toronto consume a lot of coffee (see at <https://www.cbc.ca/news/business/canada-coffee-tim-hortons-1.3745971>). However, there are two questions are raised as: (1) Which neighbourhood will be chosen?; and (2) After choosing a neighbourhood, which specific location should be chosen to open the coffee shop. The businessman need to answer these two questions to go ahead his plan for opening the coffee shop. Indeed, he needs to consider the following things:

- In general, do people in Toronto like coffee and what are their habits for drinking coffee?
- At the smaller scale, which neighbourhood in Toronto seems to consume highest coffee production? Then, he should identify the potential place for opening the coffee shop.

## **2. Data will be used to solve the problem and the source of the data**

For the Toronto neighbourhood data, a Wikipedia page ([https://en.wikipedia.org/wiki/List\\_of\\_postal\\_codes\\_of\\_Canada:\\_M](https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M)) exists that has all the information we need to explore and cluster the neighbourhoods in Toronto.

Using the Foursquare location data to find out the top most common venues for each neighbourhood in Toronto with their frequencies. In addition, all information about venues such as coordination, ratings ... can be obtained by Foursquare location data.

### **3. Methodology**

To identify the most potential location for open a coffee shop in Toronto, there are some following methodologies and assumptions below.

- If coffee shop is on the list of the top most common venues for at least one neighbourhood, opening a coffee shop in Toronto seems to be feasible.
- If coffee shop is the top most common venues for several neighbourhoods, we need to find out which neighbourhood can be the best one. In order to obtain this, we should develop a model based on the data and initial results above. A simple model can be built by taking into account with the frequency of café, which is an alternative for consumers to drink a cup of coffee. The critical value is a deduction between frequency of coffee shop and frequency of café (frequency of coffee shop minus frequency of café). The reason for that is that café can be an alternative for people enjoying a cup of coffee. A neighbourhood with highest critical value is chosen.
- After choosing a neighbourhood, which specific location should be considered? A criteria for choosing a location can be is an area where there are as many as venues relating coffee. The reasons for that it is easier for more people to recognise/notice a new coffee shop when they visit the existing famous coffee venues or search these shops online. However, this assumption will cause a main drawback, which is how to attract consumers of the existing good shops to buy product in the new shop. The quality and prices of coffee in the new shop can overcome this drawback. However, the quality and prices of the new shop is out of scope for this assignment, and normally this is a responsibility of the new shop owner, not by a data scientist.

## 4. Results

Table 1 shows neighbourhoods in Toronto where coffee shop is the 1st most common venues.

**Table 1: 5 neighbourhoods showing the 10 most common venues**

No	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	9th Most Common Venue	10th Most Common Venue
0	Berczy Park	Coffee Shop	Cocktail Bar	Café	Cheese Shop	Seafood Restaurant	Bakery	Restaurant	Beer Bar	Lounge	Liquor Store
1	Brockton, Parkdale Village, Exhibition Place	Café	Coffee Shop	Breakfast Spot	Bakery	Performing Arts Venue	Pet Store	Convenience Store	Climbing Gym	Restaurant	Burrito Place
2	Business reply mail Processing Centre, South C...	Park	Auto Workshop	Comic Shop	Pizza Place	Butcher	Restaurant	Burrito Place	Brewery	Light Rail Station	Skate Park
3	CN Tower, King and Spadina, Railway Lands, Har...	Airport Service	Airport Lounge	Airport Terminal	Coffee Shop	Harbor / Marina	Plane	Rental Car Location	Sculpture Garden	Boutique	Boat or Ferry
4	Central Bay Street	Coffee Shop	Sandwich Place	Japanese Restaurant	Italian Restaurant	Café	Department Store	Thai Restaurant	Bubble Tea Shop	Burger Joint	Bar

This proves that opening a coffee shop in Toronto appears to be feasible.

All neighbourhoods where coffee shop is the most common venue are chosen for next step. Table 2 shows 13 potential neighbourhoods.

**Table 2: 13 potential neighbourhoods with a coffee shop as the 1st most common venue**

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	9th Most Common Venue	10th Most Common Venue
Berczy Park	Coffee Shop	Cocktail Bar	Café	Cheese Shop	Seafood Restaurant	Bakery	Restaurant	Beer Bar	Lounge	Liquor Store
Central Bay Street	Coffee Shop	Sandwich Place	Japanese Restaurant	Italian Restaurant	Café	Department Store	Thai Restaurant	Bubble Tea Shop	Burger Joint	Bar
Church and Wellesley	Coffee Shop	Sushi Restaurant	Japanese Restaurant	Gay Bar	Restaurant	Bubble Tea Shop	Pub	Pizza Place	Dance Studio	Yoga Studio
Commerce Court, Victoria Hotel	Coffee Shop	Café	Restaurant	Hotel	American Restaurant	Gym	Italian Restaurant	Japanese Restaurant	Seafood Restaurant	Beer Bar
First Canadian Place, Underground city	Coffee Shop	Café	Restaurant	Hotel	Gym	Seafood Restaurant	American Restaurant	Salad Place	Japanese Restaurant	Asian Restaurant
Harbourfront East, Union Station, Toronto Islands	Coffee Shop	Aquarium	Hotel	Café	Scenic Lookout	Fried Chicken Joint	Sporting Goods Shop	Italian Restaurant	Restaurant	Brewery
Queen's Park, Ontario Provincial Government	Coffee Shop	Sushi Restaurant	Diner	Bar	Beer Bar	Smoothie Shop	Music Venue	Sandwich Place	Distribution Center	Discount Store
Regent Park, Harbourfront	Coffee Shop	Bakery	Park	Pub	Breakfast Spot	Café	Theater	Hotel	Ice Cream Shop	Spa
Richmond, Adelaide, King	Coffee Shop	Café	Restaurant	Gym	Deli / Bodega	Hotel	Thai Restaurant	Salad Place	Sushi Restaurant	Cosmetics Shop
St. James Town	Coffee Shop	Café	Restaurant	Cocktail Bar	Gastropub	American Restaurant	Moroccan	Creperie	Gym	Department Store

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	9th Most Common Venue	10th Most Common Venue
							Restaurant			
St. James Town, Cabbagetown	Coffee Shop	Bakery	Chinese Restaurant	Pizza Place	Restaurant	Pub	Café	Italian Restaurant	Butcher	Japanese Restaurant
Stn A PO Boxes	Coffee Shop	Café	Seafood Restaurant	Japanese Restaurant	Hotel	Italian Restaurant	Cocktail Bar	Beer Bar	Restaurant	Art Gallery
Toronto Dominion Centre, Design Exchange	Coffee Shop	Hotel	Café	Restaurant	American Restaurant	Salad Place	Italian Restaurant	Japanese Restaurant	Seafood Restaurant	Tea Room

The critical value is a deduction between frequency of coffee shop and frequency of café (frequency of coffee shop minus frequency of café). Table 3 shows frequency of coffee shop, café and critical value for 13 potential neighbourhoods, which is sorted from the highest critical value to the smallest critical value.

**Table 3: 13 potential neighbourhoods with the critical value of frequency**

Neighborhood	Café	Coffee Shop	critical_value
Queen's Park, Ontario Provincial Government	0.027778	0.222222222	0.194444444
Regent Park, Harbourfront	0.043478	0.173913043	0.130434783
Central Bay Street	0.045455	0.166666667	0.121212121
Harbourfront East, Union Station, Toronto Islands	0.04	0.13	0.09
Church and Wellesley	0.013158	0.078947368	0.065789474
Stn A PO Boxes	0.041237	0.103092784	0.06185567
Richmond, Adelaide, King	0.053191	0.106382979	0.053191489
Berczy Park	0.034483	0.086206897	0.051724138
Commerce Court, Victoria Hotel	0.07	0.12	0.05
Toronto Dominion Centre, Design Exchange	0.07	0.1	0.03
St. James Town, Cabbagetown	0.046512	0.069767442	0.023255814
First Canadian Place, Underground city	0.08	0.1	0.02
St. James Town	0.064103	0.064102564	0

As can be seen from Table 3, the neighbourhood of Queen's Park, Ontario Provincial Government has the highest critical value, therefore is chosen for next step. The next step is to determine locations of coffee shops in this neighbourhood. Table 4 shows all coffee shops with their location in the neighbourhood.

**Table 4: All coffee shops with their location in the neighbourhood**

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Queen's Park, Ontario Provincial Government	43.6623	-79.3895	Neo Coffee Bar	43.66014	-79.3859	Coffee Shop
Queen's Park, Ontario Provincial Government	43.6623	-79.3895	Coffee Public	43.66076	-79.3862	Coffee Shop
Queen's Park, Ontario Provincial Government	43.6623	-79.3895	Starbucks	43.6582	-79.389	Coffee Shop

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Queen's Park, Ontario Provincial Government	43.6623	-79.3895	Tim Hortons	43.66104	-79.3938	Coffee Shop
Queen's Park, Ontario Provincial Government	43.6623	-79.3895	Starbucks	43.66089	-79.3937	Coffee Shop
Queen's Park, Ontario Provincial Government	43.6623	-79.3895	Tim Hortons	43.65941	-79.3912	Coffee Shop
Queen's Park, Ontario Provincial Government	43.6623	-79.3895	Tim Hortons	43.65818	-79.3907	Coffee Shop
Queen's Park, Ontario Provincial Government	43.6623	-79.3895	Tim Hortons	43.65891	-79.3887	Coffee Shop

Next step is find out how many venues relating coffee are located in an areas of 8 coffee shops in Table 4 within a distance of 200 meters. Table 5 shows an example for Neo Coffee Bar and Table 6 summaries number of venues relating for 8 coffee shops above.

**Table 5: Venues relating coffee in an area of Neo Coffee Bar**

id	location.address	location.lat	location.lng	name
5db70a0c306d6b000861ac9f	770 Bay Street Unit 3	43.66014	-79.38587	Neo Coffee Bar
4b156e98f964a520cbac23e3	801 Bay St	43.660714	-79.385491	Timothy's World Coffee
4bce5e21cc8cd13a7359c4cf	444 Yonge St	43.660467	-79.384654	Timothy's World Coffee
568bcf61498e3aaff5e351f8	800 Bay St	43.660763	-79.386184	Coffee Public
5a81ae339deb7d369fa7f146	44 Gerrard St W	43.658833	-79.383684	Hailed Coffee
56b2d97f498ebb2041ae6502	800 Bay St	43.66115	-79.386199	Coffee Place
5d850196f516bc00089d2488	800 Bay St	43.660867	-79.386206	800 Coffee Bar
537d4d6d498ec171ba22e7fe	82 Gerrard Street W	43.658421	-79.385613	Jimmy's Coffee

**Table 6: Number of venues relating for 8 coffee shops**

Neighborhood	Venue	Venue Latitude	Venue Longitude	Venue Category	Number of venues relating coffee
Queen's Park, Ontario Provincial Government	Neo Coffee Bar	43.66014	-79.3859	Coffee Shop	8
Queen's Park, Ontario Provincial Government	Coffee Public	43.66076	-79.3862	Coffee Shop	7
Queen's Park, Ontario Provincial Government	Starbucks	43.6582	-79.389	Coffee Shop	2
Queen's Park, Ontario Provincial Government	Tim Hortons	43.66104	-79.3938	Coffee Shop	1
Queen's Park, Ontario Provincial Government	Starbucks	43.66089	-79.3937	Coffee Shop	2
Queen's Park, Ontario Provincial Government	Tim Hortons	43.65941	-79.3912	Coffee Shop	1
Queen's Park, Ontario Provincial Government	Tim Hortons	43.65818	-79.3907	Coffee Shop	1
Queen's Park, Ontario Provincial Government	Tim Hortons	43.65891	-79.3887	Coffee Shop	1

## 5. Discussion

There are some following findings to discuss:

- Opening a coffee shop in Toronto appears to be feasible as there are 13 neighbourhoods where coffee shop is the 1st most common venues. These neighbourhoods seem to be good place for choosing.
- Among 13 neighbourhoods, the neighbourhood of Queen's Park, Ontario Provincial Government has the highest critical value, which prove the frequency of coffee shop is really great whilst the frequency of café is quite small. The alternative of café cannot attract people to drink coffee, compared to the coffee shops.
- There are 8 main coffee shops in the neighbourhood of Queen's Park, Ontario Provincial Government. Of these, the area nearby Neo Coffee Bar has highest number of venues relating coffee. This implies that residents in this area can go to the coffee shop frequently and this area take advantages to attract people in its neighbourhood. As a results, there is a great chance to open a new coffee shop in this area. In addition, it seems to be easier for more people to recognise/notice a new coffee shop when they visit the existing famous coffee venues or search these shops online in this area.

## **6. Conclusion**

- Opening a new coffee shop in Toronto will be considered by businessmen.
- The methodology to identify a potential location for opening the new coffee can be acceptable by using the available data on internet and the Foursquare location data. The model to obtain the maximum chance for attractiveness of new coffee shop is very simple, however it can be feasible based on the available data.
- The results appear to sensible and show that the area nearby Neo Coffee Bar is recommended to open the new coffee shop.