

Determining the location of a coffee shop in the city of Toronto, Canada

Reem Ajlan

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1. Introduction

1.1 Background

Toronto is the capital of Ontario in Canada. The number of population was recorded in 2016 to be over 2.5 million. It is the most popular city in Canada and one of the most multicultural and cosmopolitan cities in the world. Toronto was named previously as the town of York. It was established by British in 1793 and designed as the capital of Upper Canada.

Toronto plays a role as an important destination for immigrants to Canada. Therefore, it has a diverse population. About 50 percent only of residents are the original resident. More than 160 languages are spoken in Toronto, but the majority of Toronto people speak English [1](#)

1.2 Problem

Aser is an owner of a coffee shop in the downtown of Toronto. He used to live and work close to his coffee shop. He loves his coffee shop a lot and he takes very good care of it. Therefore, he used to go to it after work and spend the whole evening serving clients and making sure that they are happy and satisfied.

Recently, he got a job offer in Scarborough. However, given the far distance from his current place, he unfortunately must move since he decided to accept the offer. He knew that the time he moves, it would be difficult for him to keep coming to the coffee shop and to keep the work going perfectly as usual.

Therefore, he decided to relocate his coffee shop to be close to where he would live and work in Scarborough. This is a big decision to take because he might lose some of his clients. Therefore, before he moves forward with his decision, he needs to know if this is the right decision to take. He asked for a help to discover Scarborough and compare between the two neighborhoods.

1.3 Interest

Why would you be interested in this article?

- 1- If you have a business in Toronto and you want to change the location.
- 2- If you want to start a new business in Toronto and need to know more about locations and neighborhoods.

3- If you want to move to either Downtown Toronto or Scarborough in Toronto and need to discover the area.

4- If you want to visit Toronto and want to find the best coffee shops.

For the above four conditions, this article will be helpful.

This model is specified to discover two neighborhoods in Toronto, Downtown Toronto and Scarborough.

2. Data acquisition and cleaning

2.1 Data sources

In order to answer the above questions, we need data containing Toronto neighborhoods, boroughs to include boundaries, latitude, longitude, coffee shops, and coffee shops ratings and tips.

The data with Toronto neighborhoods will be obtained from a Wikipedia page [here](#) that has all the information we need to explore and cluster the neighborhoods in Toronto. We will scrape the Wikipedia page and wrangle the data, clean it, and then read it into a pandas data frame so that it is in a structured format. Toronto data containing neighborhood boundaries will be obtained from [here](#). All data related to locations of coffee shops will be obtained via the FourSquare API utilized via the Request library in Python.

The data containing neighborhoods and boundaries will be used to discover coffee shops around the new neighborhood via the FourSquare API utilized. This discovery will give us an idea if opening a new coffee shop would be a good idea.

2.2 Data cleaning

Data downloaded or scraped from multiple sources were combined into one table. Then, cells with “not assigned” were dropped from the borough. Additionally, rows with the same postal code were combined and separated with a comma. If a cell had a borough but a not assigned neighborhood, then the neighborhood was named by the borough. Latitude and longitude were added to the table, by running the function head() the table will look like the following.

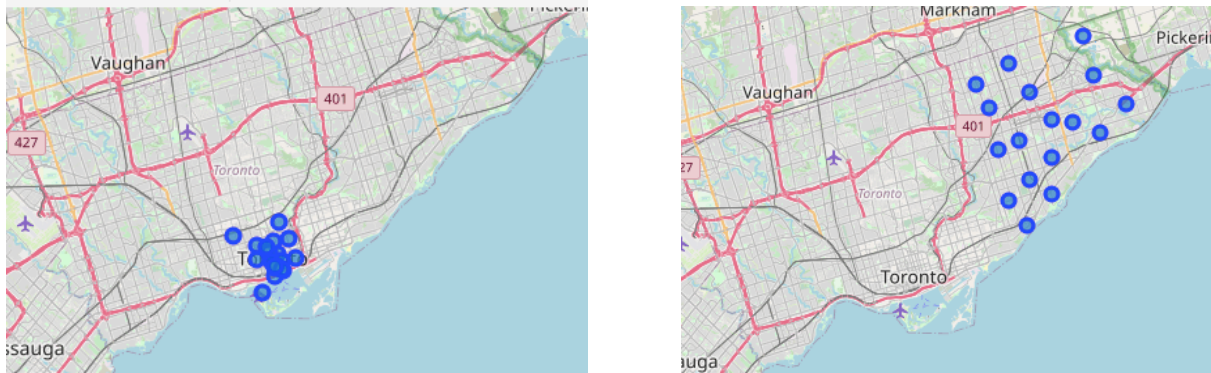
	Postal Code	Borough	Neighbourhood	Latitude	Longitude
0	M1B	Scarborough	Malvern, Rouge	43.806686	-79.194353
1	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	43.784535	-79.160497
2	M1E	Scarborough	Guildwood, Morningside, West Hill	43.763573	-79.188711
3	M1G	Scarborough	Woburn	43.770992	-79.216917
4	M1H	Scarborough	Cedarbrae	43.773136	-79.239476

3. Methodology

Several libraries were imported at the first. Some of these libraries are Numpy that is used to perform a number of mathematical operations on arrays such as statistical

routines, Pandas that is used to manipulate and analyze data, Requests that is used to send all kinds of HTTP requests, and finally Matplotlib that is used for plotting.

The first step that was done is plotting the two boroughs separately in order to understand the two locations. To do this, I established two data frames with the two boroughs. Then, locations were visualized on a map using the function `folium.Map`, look at the two locations on map.



The map on the left is Downtown Toronto and the map on the right is Scarborough

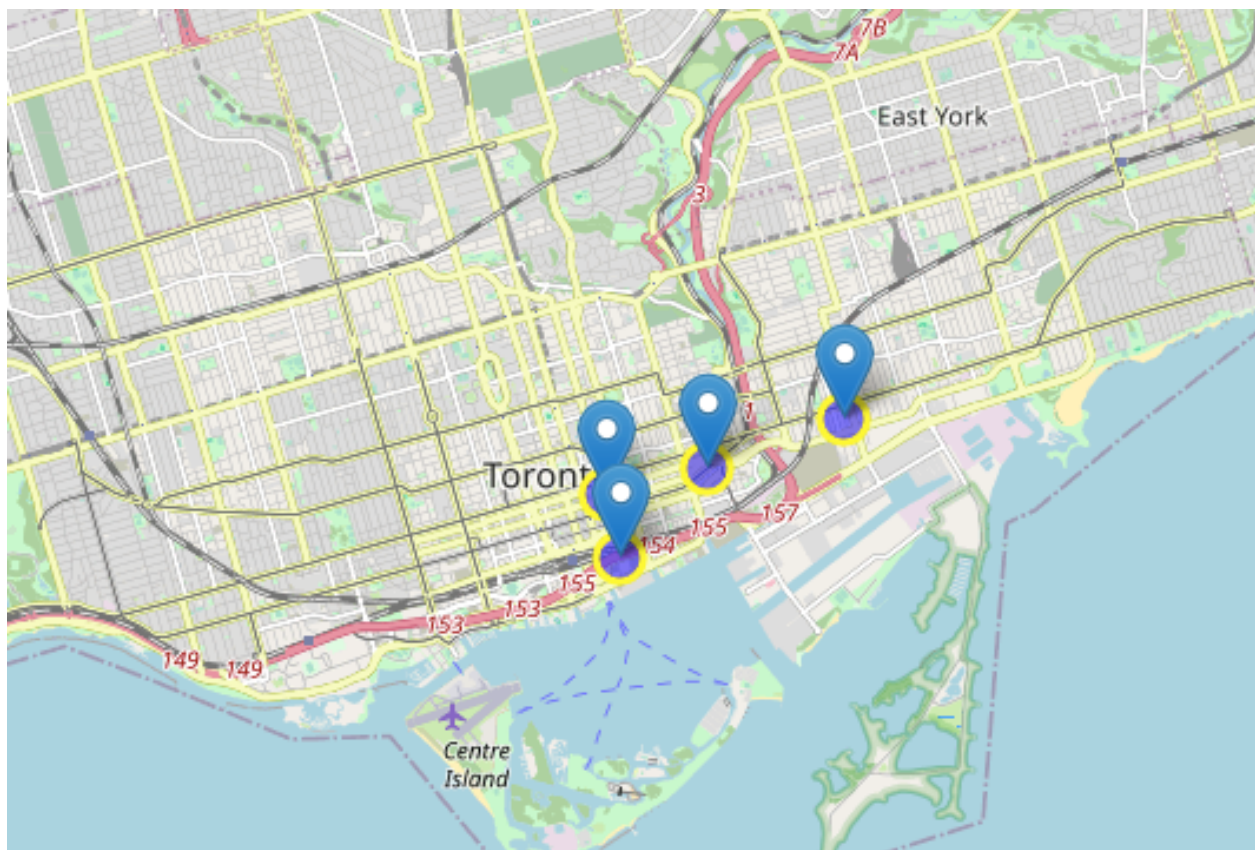
Second, the function `count()` was used to identify the number of neighborhoods in each borough. Then, the data was displayed using the function `plt.show()`.

Then, data about locations were discovered via FourSquare API utilized via the Request library in Python. To be able to use FourSquare, Foursquare credentials and version were obtained and identified. Coffee shops were discovered in each neighborhood and borough. The results were counted and graphed.

Next, data about the top three neighborhoods that have the highest numbers of coffee shops in Toronto was obtained using the function `nlargest()`. The results were plotted using the function `plot()`. Then, data about coffee shops in these three top neighborhoods were obtained.

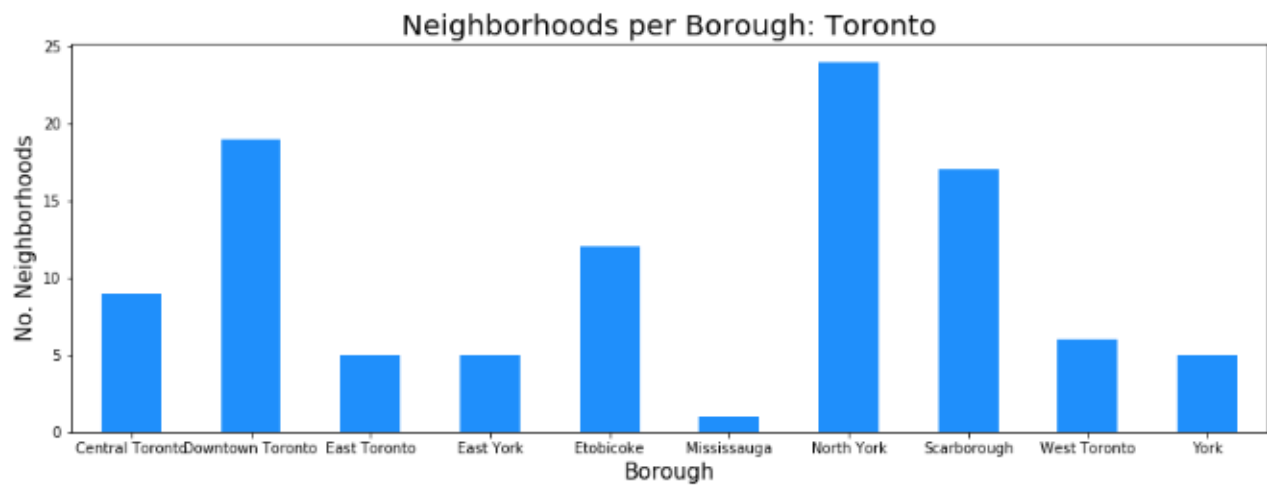
Additionally, likes, ratings, and tips that were given to coffee shops in Toronto were explored using `get_venue_details(ID)`. Coffee shops with maximum likes, ratings, and tips were obtained as well using the function `idmax()`. By calculating the average rating of neighborhoods using the function `mean()` and sorting the results using the function `sort_values()`, the top ten neighborhoods with the highest ratings were identified. Then, the same functions were used for boroughs and the top five boroughs with the highest ratings were identified. The results were visualized on a bar graph using the function `plot.bar()`

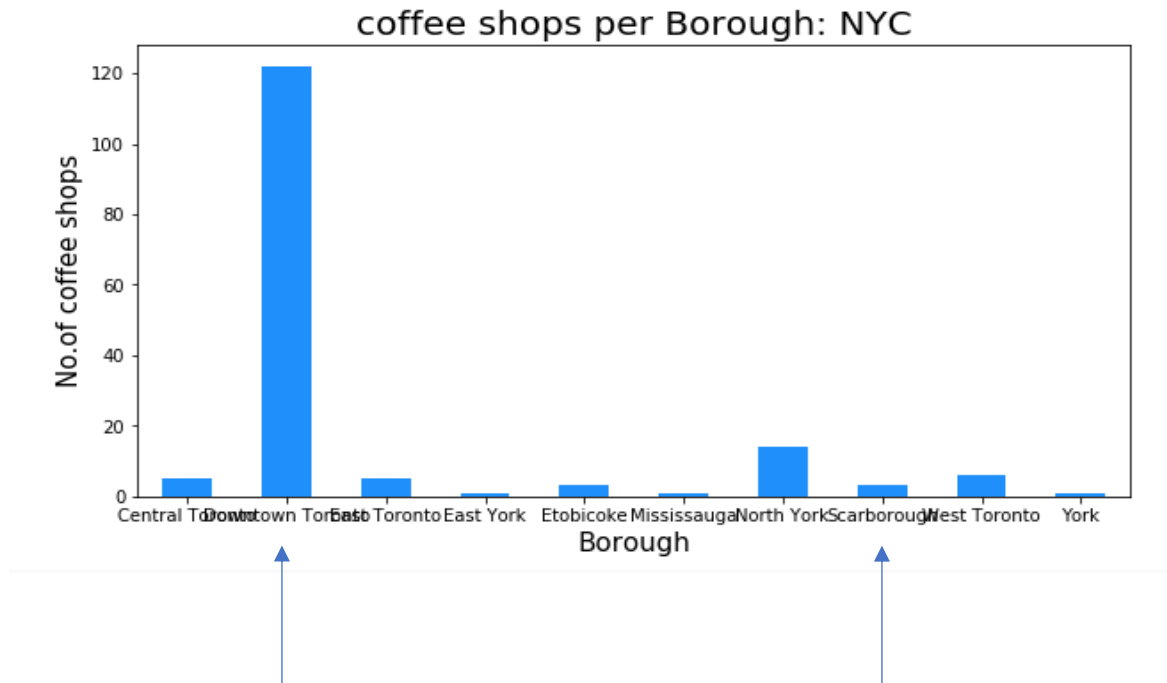
Finally, neighborhoods with an average rating that is greater than or equal to seven using the data with the latitudes and longitudes were found using the function `['Average Rating']>=7.0`. Latitudes and longitudes of these neighborhoods were included in the same data frame with the results and the data of interest using the function `merge()`. The results were visualized on the map.



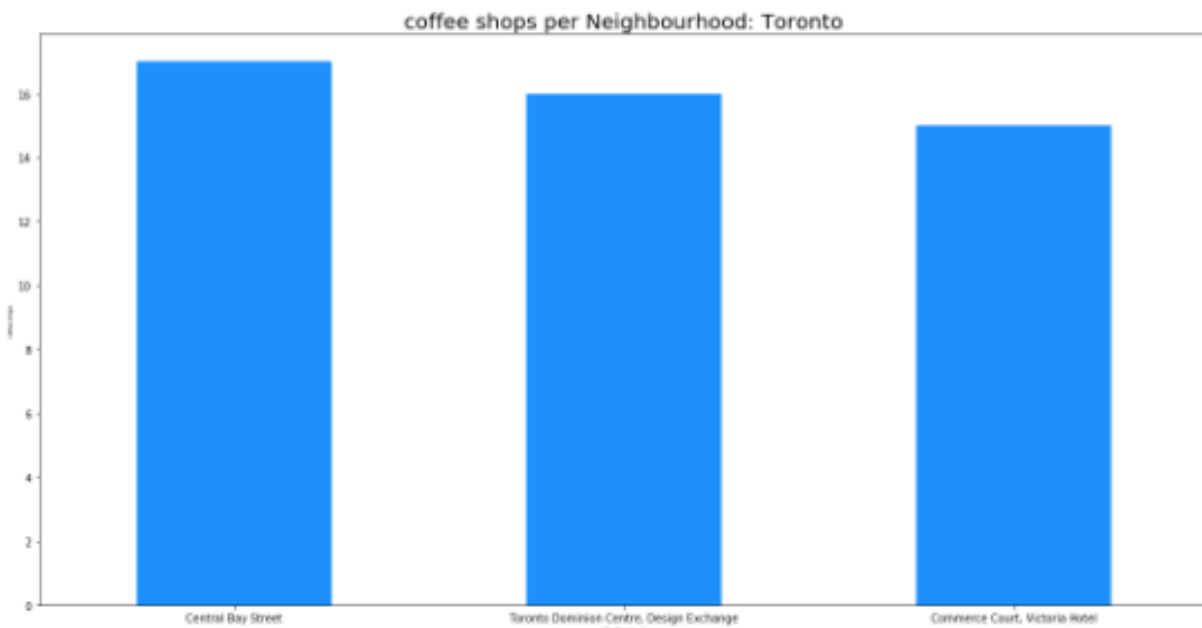
4. Results and Discussion

Our analysis shows that although Downtown Toronto has a similar number of neighborhoods to Scarborough, it has a very large number of coffee shops if compared to the other boroughs including Scarborough, look at the following figures. This result indicates that the success of a business located in Downtown Toronto is a challenge. This first result supports the idea of relocate a coffee shop from Downtown Toronto to Scarborough. However, let's move forward and discuss the other results.





After exploring the top three neighborhoods that have the highest numbers of coffee shops, the results show that they are all located in Downtown Toronto, look at the following figure.

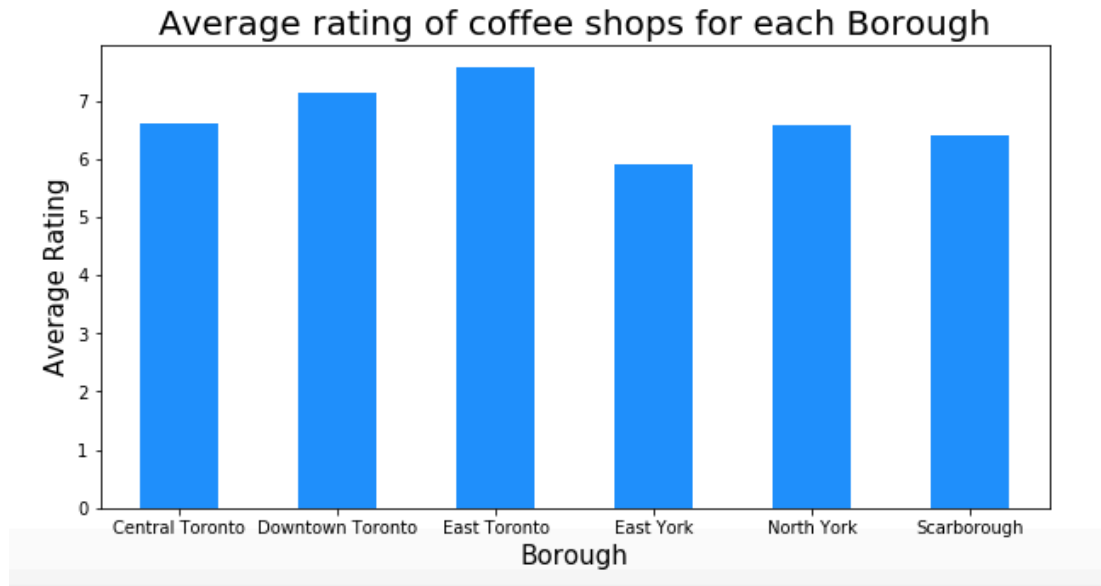


The results of exploring coffee shops with maximum rating, likes, and tips were found to belong to coffee shops in Downtown Toronto, look at the following picture. This could mean that most coffee shops clients tend to buy their coffee from Downtown Toronto.

Borough	Downtown Toronto
Neighbourhood	St. James Town
ID	4ffff1f96e4b042ae8acddca5
Name	Fahrenheit Coffee
Likes	231
Rating	9
Tips	102
Name: 46, dtype: object	

Looking at the results of the average rating of coffee shops for each borough, Downtown Toronto got the second rank with an average rating of 7.13 , but Scarborough got the fifth rank with an average rating of 6.40. Additionally, the top three coffee shops with the top rating were found to be in Downtown Toronto.

	Borough	Average Rating
2	East Toronto	7.580000
1	Downtown Toronto	7.126923
0	Central Toronto	6.625000
4	North York	6.590909
5	Scarborough	6.400000



	Borough	Neighbourhood	Latitude	Longitude	Average Rating
0	Downtown Toronto	Berczy Park	43.644771	-79.373306	8.000000
1	Downtown Toronto	Regent Park, Harbourfront	43.654260	-79.360636	7.633333
2	Downtown Toronto	St. James Town	43.651494	-79.375418	8.033333
3	East Toronto	Studio District	43.659526	-79.340923	7.733333

4.1 recommendations

After looking at the whole picture, the recommendation would be that if the coffee shop was already successful and clients were happy in Downtown Toronto, keep it where it is located. On the other hand, if the business was struggling because of the existence of many other coffee shops in the area, then relocating the business to Scarborough would be better since there are no many coffee shops in this new area.

5. Conclusions

The purpose of this project was to identify coffee shops in Scarborough in Toronto in order to determine if starting a coffee shop or relocate an old one to this area would be a successful idea. To achieve this purpose we have used data that contains information on neighborhoods in Toronto and other data that contains information on Toronto neighborhood boundaries. FourSquare API utilized was used for obtaining information about coffee shop locations.

By calculating coffee shop density distribution from Foursquare data, it was noticed that Downtown Toronto has the most number of coffee shops. Additionally, by looking at the number of ratings, it was suggested that most coffee clients tend to buy their coffee from Downtown Toronto. The average rating of coffee shops in Downtown Toronto was higher than Scarborough by three ranks.

The final recommendation was to keep the business where it is located in Downtown Toronto unless if it was affected by the existence of many other coffee shops in the area.,