Opening a new chain of coffee shops in Toronto

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Introduction

Opening a coffee shop in a large city like Toronto can be challenging as there are many factors to consider, such as location, target consumer etc. This can be made especially if you are not familiar with the area.

We are a large chain of coffee shops looking to break into the Toronto market. We want to start by buying five coffee shops in the downtown area of Toronto. However, in order to decide where these first five shops should be placed we need information. Our strategy will be to find "hotspots" for coffee shops in Toronto. Our hypothesis is basic supply and demand, i.e. that areas with a lot of coffee consumers have a lot of coffee shops. By finding these areas with a cluster of coffee shops, we can determine where to open our first five locations in order to reach the maximum number of customers as quickly as possible.

The target audience for this is myself and anyone else who wants to open a coffee shop in an area known for coffee.

Methods

Using Folium and a list of Toronto neighbourhoods available from Wikipedia, I will create a map of the Toronto neighbourhoods considered to be in the downtown area.

Foursquare provides location information on venues, including coffee shops. I will use the venues found from foursquare and produce a clustering analysis to determine "hotspots" for coffee shops.

Results

First we identify the downtown Toronto Neighbourhoods and their coordinates on a map. See example below in Table 1

	Postal Code	Borough	Neighbourhood	Latitude	Longitude
0	M5A	Downtown Toronto	Regent Park, Harbourfront	43.654260	-79.360636
1	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government	43.662301	-79.389494
2	M5B	Downtown Toronto	Garden District, Ryerson	43.657162	-79.378937
3	M5C	Downtown Toronto	St. James Town	43.651494	-79.375418
4	M5E	Downtown Toronto	Berczy Park	43.644771	-79.373306

Table 1. Toronto downtown neighbourhoods

Using Foursquare, we then find the locations of venues in the downtown. See table 2 for example.

	name	categories	address	crossStreet	lat	lng	labeledLatLngs	distance	postalCode	cc	neighborhood	city	state	country	formattedAddress	id
0	HotBlack Coffee	Coffee Shop	245 Queen Street West	at St Patrick St	43.650364	-79.388669	[{'label': 'display', 'lat': 43.65036434800487...	782	M5V 1Z4	CA	Entertainment District	Toronto	ON	Canada	[245 Queen Street West (at St Patrick St), Tor...	59f784dd28122f14f9d5d63d
1	Timothy's World Coffee	Coffee Shop	401 Bay St.	at Richmond St. W	43.652135	-79.381172	[{'label': 'display', 'lat': 43.65213455850074...	147	M5H 2Y4	CA	NaN	Toronto	ON	Canada	[401 Bay St. (at Richmond St. W), Toronto ON M...	4baa9f6cf964a520817a3ae3
2	Fahrenheit Coffee	Coffee Shop	120 Lombard St	at Jarvis St	43.652384	-79.372719	[{'label': 'display', 'lat': 43.65238358726612...	540	M5C 3H5	CA	NaN	Toronto	ON	Canada	[120 Lombard St (at Jarvis St), Toronto ON M5C...	4fff1f96e4b042ae8acddca5
3	Timothy's World Coffee	Coffee Shop	483 Bay St, Bell Trinity Square	Bell Trinity Square	43.653436	-79.382314	[{'label': 'display', 'lat': 43.653436, 'lng':...	253	M5G 2C9	CA	NaN	Toronto	ON	Canada	[483 Bay St, Bell Trinity Square (Bell Trinity...	4b0aaa8ef964a520272623e3
4	Timothy's World Coffee	Coffee Shop	427 University Avenue	NaN	43.654053	-79.388090	[{'label': 'display', 'lat': 43.65405317976302...	717	NaN	CA	NaN	Toronto	ON	Canada	[427 University Avenue, Toronto ON, Canada]	4b44fc77f964a520cc0026e3

Table 2. Venues pulled used Foursquare's API.

By grouping the venues by neighbourhood we can identify which neighbourhoods have the most coffee shops as shown in table 3.

	Neighborhood	Coffee Shop	Donut Shop	Total
10	Queen's Park, Ontario Provincial Government	0.200000	0.00	0.200000
2	Central Bay Street	0.180000	0.02	0.180000
11	Regent Park, Harbourfront	0.155556	0.00	0.155556
17	Toronto Dominion Centre, Design Exchange	0.100000	0.00	0.100000
6	First Canadian Place, Underground city	0.100000	0.00	0.100000
0	Berczy Park	0.080000	0.00	0.080000
12	Richmond, Adelaide, King	0.080000	0.00	0.080000
1	CN Tower, King and Spadina, Railway Lands, Har...	0.071429	0.00	0.071429
15	St. James Town, Cabbagetown	0.069767	0.00	0.069767
3	Christie	0.062500	0.00	0.062500
14	St. James Town	0.060000	0.00	0.060000
9	Kensington Market, Chinatown, Grange Park	0.060000	0.00	0.060000
8	Harbourfront East, Union Station, Toronto Islands	0.060000	0.00	0.060000
7	Garden District, Ryerson	0.060000	0.00	0.060000
5	Commerce Court, Victoria Hotel	0.060000	0.00	0.060000
4	Church and Wellesley	0.060000	0.00	0.060000
16	Stn A PO Boxes	0.020000	0.00	0.020000
13	Rosedale	0.000000	0.00	0.000000
18	University of Toronto, Harbord	0.000000	0.00	0.000000

Table 3. Coffee and donut shops in downtown Toronto Neighbourhoods

We then plotted the top five neighbourhoods on a map and found their centre position, as shown in figure 1A. We then used foursquare to find venues centred around that area. The plot of those venues is shown in figure 1B and made a heat map of those venues (figure 1C)
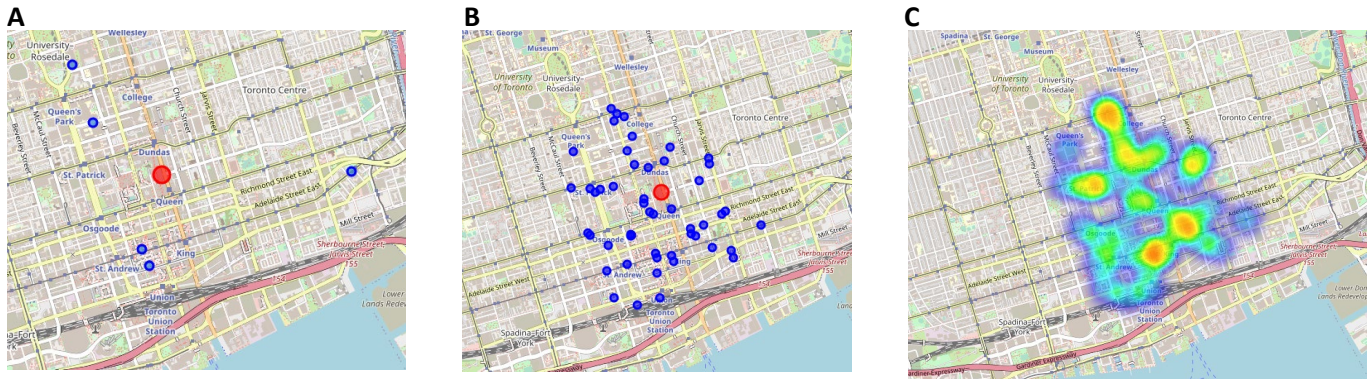
A

B

C

Figure 1. Maps of Toronto. A) showing the five neighbourhoods with the most coffee shops in blue and their centre point in red. B) showing the center point and all the coffee venues in the area. C) showing the information in B as a heatmap.

Finally we used k means clustering to cluster the venues to determine the best locations for the coffee shops. The results of the clustering are shown in figure 2.
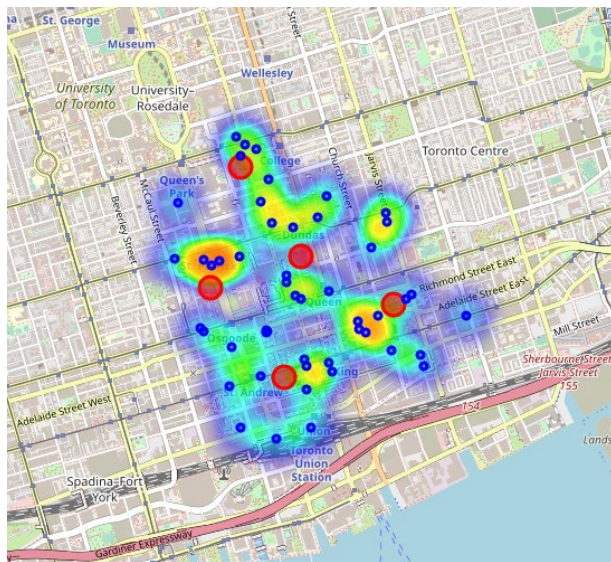

Figure 2. Heat map and venues overlayed on a map of Toronto. K means cluster centers are shown in red.

Discussion and conclusion

We first determined that the five neighbourhoods with the most coffee shops were Queen's Park, Central Bay Street, Regent Park, TD centre and First Canadian Place. We then found the centre point of those areas and used the foursquare API to pull venues from that area. By plotting the venues on a heat map, we were able to see some potential locations. To go about this a bit more analytically, we used K means clustering to find five cluster centres to narrow down where to open our coffee shops. We found that they should be located around 110 Lombard St, the Eaton Centre, King St and Bay St, 380 University Ave and 760 Bay St. Unsurprisingly, the cluster centres were close to the heat map hotspots.

Our goal was to find five potential locations for our new coffee shops. In order to identify these locations, we found areas that already had a large number of coffee shops as these should also be the most popular areas for coffee consumers. By mapping out locations and using clustering analysis we have identified our five potential locations.