

Bakeries

Data Analysis of Toronto

Table of Contents

A. Introduction.....	1
Description & Discussion of the Background.....	1
Data Description.....	1
B. Methodology.....	2
C. Results.....	5
D. Discussion.....	5
E. Conclusion.....	5

A. Introduction

Description & Discussion of the Background

In this project we will try to find an optimal location for a bakery in/around Downtown Toronto, Canada.

Because of the trendiness of bakeries in Toronto we will try to detect locations that are not already crowded with bakeries but yet as close to city centre as possible. Since bakeries have substitutes in the face of bagel shops, cupcake shops, delis and breakfast spots, we will add these to the map so that there might be areas with no bakery but with some of its substitutes.

Based on these criteria, we will use our data science prowess to generate a few promising streets and spots. Advantages of each area will then be clearly expressed for the purposes of finding the best possible final location which can be chosen by stakeholders.

When we consider all these problems, we can create a map and information chart where substitute are placed on the map and each central district is clustered according to the venue density.

Data Description

Based on our problem as defined above, factors that will influence our decision are:

- number of existing bakeries in/around the downtown area;
- number of existing substitute places – bagel shops, delis, etc.;
- distance to bakeries in the downtown area, if any distance from city centre;
- distance to sightseeings/crowded venues.

We decided to use regularly spaced grid of locations, centered around city center, to define the city area. The number of bakeries and their type and location as well as sightseeings in and around Downtown Toronto will be obtained using Foursquare API.

B. Methodology

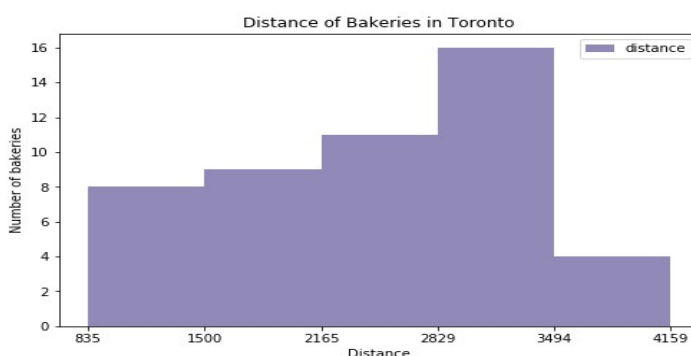
With the help of python **folium** library I visualized geographic details of Toronto and its boroughs



by using latitude and longitude values. Utilizing the Foursquare API, I explored the boroughs. I designed the limit as 200 for bagel shop, bakeries, cup cake shop and breakfast spots and the radius 4 km to the centre. Additionally, I added a query of bakery and bagel in case the category ID is different or wrong. Here is a list of 11 venues from the search - name, category, latitude and longitude, distance, etc. from Forsquare API.

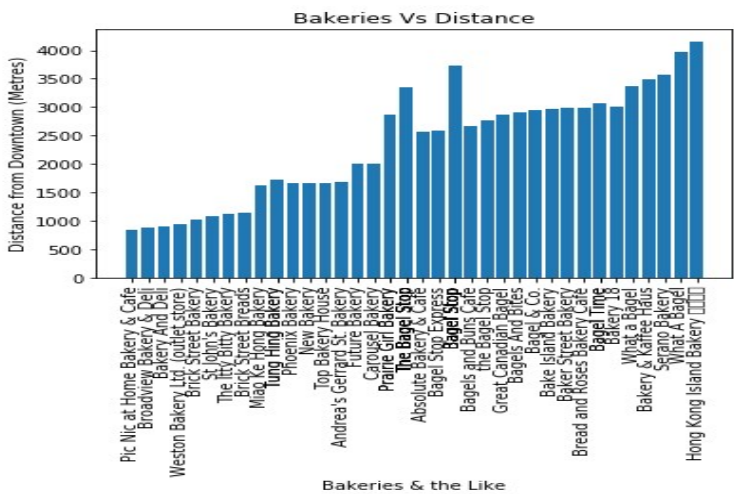
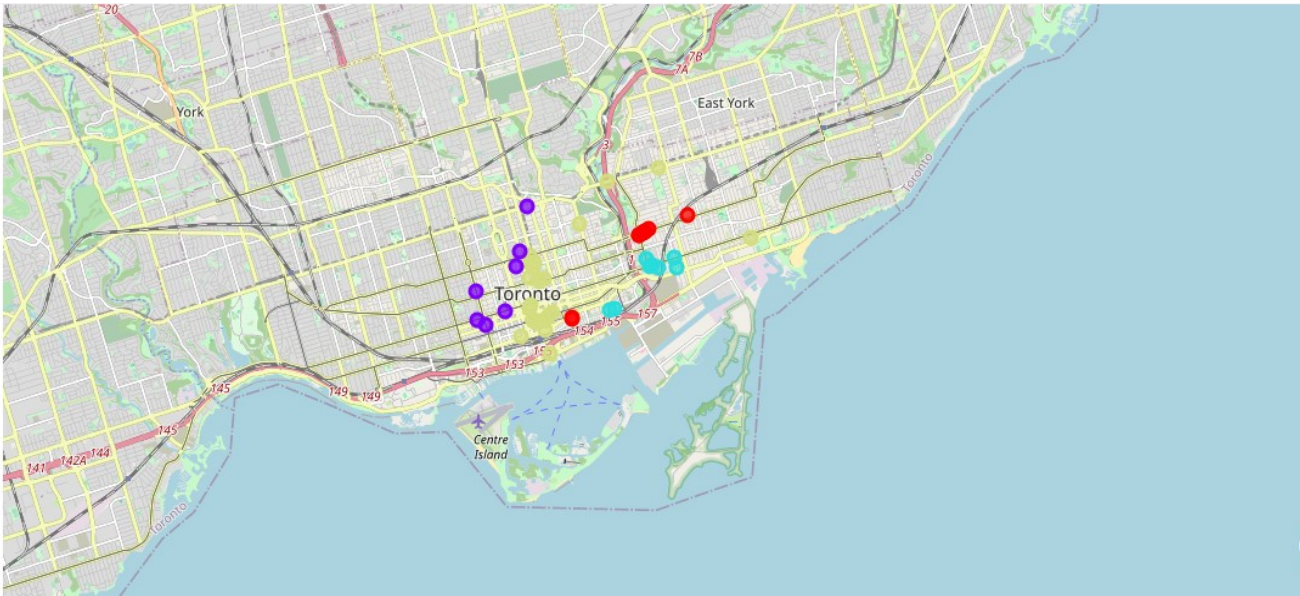
index	name	categories	address	distance	LATITUDE	LONGITUDE	neighborhood	postal code	id
0	Brick Street Bakery	Bakery	27 Trinity St	1010	43.650574	-79.359539	NaN	M5A 3C4	4b156a02f964a5207fac23e3
1	The Bagel Stop	Bagel Shop	161 Bay St.	2639	43.646184	-79.379077	Financial District	NaN	4d3872479784a0931e57e0e8
2	Bagel Stop	Bagel Shop	Ernst & Young Tower	2724	43.647931	-79.380564	NaN	M5L 1L5	4d36edee10248cfa02d889cf
3	Bake Island Bakery	Bakery	372 Yonge Street	2966	43.658720	-79.382300	NaN	M5G 2K9	5b3d6a3aacb00b002cf6234b
4	The Bagel Stop	Bagel Shop	20 Bay St	2670	43.641619	-79.377486	NaN	M5J 2N8	4b910b08f964a5208fa033e3
5	Bagel Stop	Bagel Shop	199 Bay St (Commerce Court)	2603	43.648324	-79.379110	NaN	M5L 1G5	52e11a21498e7356498a1d7d
6	Bakery And Deli	Deli / Bodega	NaN	907	43.659127	-79.348743	NaN	NaN	522f966011d221423d1d71c8
7	What A Bagel	Breakfast Spot	130 Spadina Ave	3960	43.647349	-79.395912	NaN	NaN	4f7dd9a6e4b09d309a4777fe
8	Bagel Stop Express	None	2018 Queen Street East	2589	43.664621	-79.320873	NaN	NaN	4bb664ff2ea19521439aab2f
9	Bagel Time	Breakfast Spot	415 Yonge Street	2987	43.659642	-79.382171	NaN	M5B 2E7	4b7c0070f964a520e3772fe3
10	Bagel Stop	Bagel Shop	121 King Street	2824	43.647820	-79.381788	NaN	NaN	550c4713498e1e886da1d169
11	Broadview Bakery & Deli	Bakery	728 Queen St East	885	43.658847	-79.349336	NaN	NaN	4ada357cf964a520fd1f21e3

In summary of this data **49** venues were returned by Foursquare. The postal code seems to be of little use and there is an office with 'bakery' in the name which is dropped later from the table.



When grouping bakeries and their substitutes by distance, there seems to be fewer bakeries and substitutes in the range of 835 m to 1500 m from Downtown Toronto and above 3494 m from downtown. These are possible areas for opening a new bakery.

Next, I clustered the bakeries found in 4 clusters thanks to K-means algorithm. These are coloured differently in half circles around the downtown area.



To get a better idea of the type and distance of each bakery, I created a bar chart. Average distance between bakeries and Downtown is 2434 metres.

Since the presence of interesting and attractive places in the surroundings lead to more passers-by, I searched for other venues using Foursquare API. The query included hotels and museums because they attract foreigners and visitors to the city. There is a constant flow of people coming to hotels.

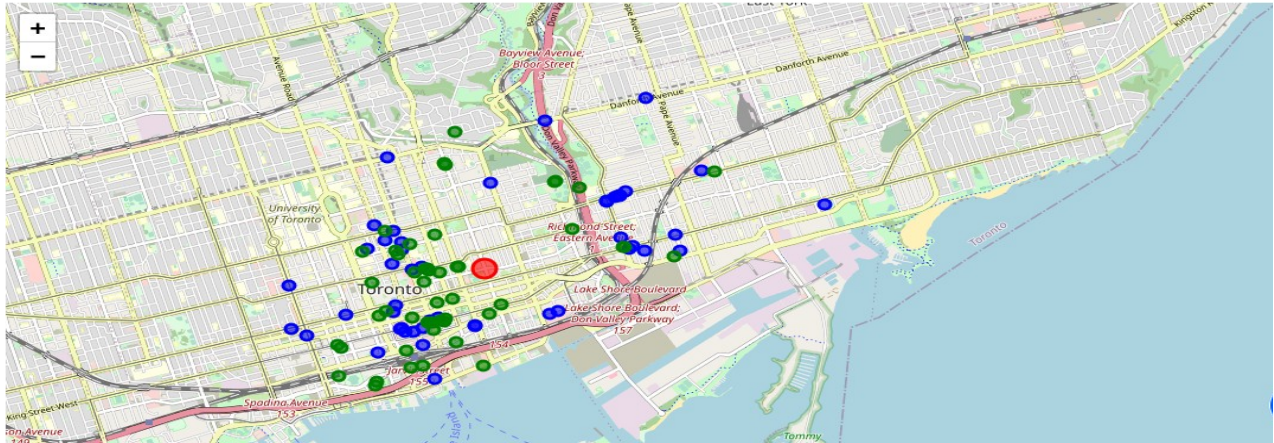
index	name	categories	address	distance	lat	lng	id
0	Hotel Pickles	None	100 booth ave	823	43.657784	-79.342712	4bd10ef0462cb71351bed907
1	Hotel Novotel Toronto Centre	Hotel	45 The Esplanade	2251	43.646530	-79.374250	4ad4c05bf964a520a0f520e3
2	Hotel Deillah	Bar	1036 Gerrard St E	2152	43.668949	-79.336825	5d2386a57dc742002349c5d1
3	Hotel Victoria	Hotel	56 Yonge St	2484	43.648084	-79.377582	4ad4c05cf964a520b4f520e3
4	Hotel Ocho	Hotel Bar	195 Spadina Ave.	3996	43.650000	-79.396609	4d6bf5ced47bb60cdb47a5aa
5	Hotel 22 Division	Hotel	78 Lombard	2243	43.652210	-79.374829	4e3b8d70ae604542364bf092
6	Hotel Le Germain Fitness Room	Gym / Fitness Center	75 Bremner	2719	43.643467	-79.379099	4f55877be4b072b51d61d81c
7	Rooftop At Broadview Hotel	Hotel Bar	106 Broadview Avenue	928	43.659109	-79.350074	59d40c3da9e40234d27cdc28
8	The Broadview Hotel	Hotel	106 Broadview Ave	921	43.659060	-79.350030	596186fd772fbc1671dff18b
9	One King West Hotel & Residence	Hotel	1 King St W	2495	43.649139	-79.377876	4af96fbfb964a520c01122e3
10	Textile Museum of Canada	Art Museum	55 Centre Avenue	3201	43.654396	-79.386500	4ad4c05ef964a520e2f620e3
11	Hotel X	Hotel	NaN	5595	43.632886	-79.411770	567415cc38fa3606432c2e5d
12	Sheraton Centre Toronto Hotel	Hotel	123 Queen Street West	3022	43.650594	-79.384530	4ab2d511f964a5209b6c20e3
13	Le Germain Hotel	Hotel	75 Bremner Boulevard	2870	43.643125	-79.380918	4cb87a334c60a093c04a39ca
14	Chelsea Hotel	Hotel	33 Gerrard Street West	3021	43.658498	-79.383097	51d212c3498ebf27dc469bc9
15	The Omni King Edward Hotel	Hotel	37 King Street East	2344	43.649191	-79.376006	4adf7d0bf964a520127b21e3

The query returned 49 results which I merged with the bakeries and visualized with folium as shown below.

C. Results

To find the best location for a bakery, I took the midpoint of top ten closest among the venues and bakeries. The resulting latitude and longitude are at 43.65619737477344, -79.37023189446444, respectively. This is located at exact junction of Shuter St and Sherbourne St which is quite a central location, close to famous venues, such as the Old City Hall, CF Eaton Centre, Ryerson University and Grand Hotel.

My predicted location is in the downtown area as expected due to the sightseeings and hotels where people tend to gravitate/gather. The coordinates are shown with a red circle. The blue dots are the other popular venues, such as hotels, museums, etc. The green ones are the bakeries.



D. Discussion

The maps and tables above give an idea why the predicted one is pointed/clustered on the given spot.

KMeans shows the most common place for crowded and tourist venues, such as hotels and museums. At the same time this place is close to the downtown but not in the proximity of other bakeries or substitutes. Nevertheless some data is missing. There are venues which are not registered by Foursquare.

E. Conclusion

Kmeans as well as logic is in favour of places near the centre because they generate more interest and attract more passers-by and potential clients in their lunch breaks, on their way to home, on their way to attractions or on their holiday. Moreover, the place is not bustling with other bakeries so that competition is thought to be a little less of an issue.

Future Expectation:

More data to analyze would add more confidence to the results we obtained in this project.

Research on bakery reviews, their price range and specialties would be helpful in the future.