

Best Location to Open a Café Shop in Barrhaven Ottawa

*IBM Data Science Professional Certificate Final
Capstone Project*

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1.0 Introduction

1.1 Background

Planning to open a cafe bar that will offer a unique coffee and bubble tea drinking experience featuring specialty coffee beans and variety of handcrafted drinks in Ottawa. The shop will also sell homemade healthy snacks such as low fat, whole grain muffins, red beans and rice, and fresh fruit.

The atmosphere of the cafe will be youth-oriented and casual, with rich, bold colors accenting a primarily wood decor. There will be "work area" set up for people who comes in for a working lunch or to study. These areas will be in one section of the cafe, separated so the patrons can have a quieter work area. Internet connections will be provided at these spots as well.

1.2 About Ottawa

Ottawa is the capital city of Canada and it's the fourth largest city in Canada by population. It is a vibrant, safe and youthful city, containing a diverse and eclectic mix of neighborhoods. Ottawa has a population estimated at 934,243 as of 2016 and has a population density of 317 people per square kilometer (820/sq mi). The city covers a total surface area of 2,796 kilometers squared and is larger than the cities of Toronto, Montreal, Vancouver, Calgary and Edmonton combined.

There are over 80 neighborhoods within city border and Barrhaven has the highest population and it still rapidly growing when compared to other neighborhoods in Ottawa. Barrhaven is bounded by Fallowfield Road to the north, Strandherd Road to the south, Greenbank Road to the east, and Cedarview Road to the west. It has a total surface area of 42.93 km squared.

1.3 Business Problems

Determine if Barrhaven in Ottawa an optimal neighborhood for opening a new cafe with available data.

Question 1: How many similar coffee shops already exist?

The number of similar coffee shops will have affected on the new cafe to generate profit. This question will be answered by using Foursquare API.

Question 2: How many local business and residence?

The number of local businesses and residences within a neighborhood will be a good indicator for the new cafe if the business will be sustainable and aspects of how it operates, such as total sales and how costly it is to run. This question will also be answered by using Foursquare API.

1.4 Interested Audience

This report can be useful for both new investors are looking to open new coffee shop themed and/or for existing owner wanted to expand their businesses within Barrhaven area.

2.0 Data Requirements

In this section we are talking about what and which type of data we are using to answer the questions stated in Section 1.3.

2.1 Data Preparations

All the data collection will be composed with multiples sources:

1. Foursquare API - <https://foursquare.com/>

Foursquare has a database of millions of places acquired through crowdsourcing. We will pass coordinates through the platform and the endpoint will return a list of surrounding venues in a pre-defined radius.

2. Ottawa Neighborhoods with postal code on GeoName and Ottawa Police website:

<https://www.geonames.org/postalcode-search.html?q=Ottawa&country=CA&adminCode1=ON>

<https://www.geonames.org/postalcode-search.html?q=Nepean&country=CA&adminCode1=ON>

<https://www.geonames.org/postalcode-search.html?q=Kanata&country=CA&adminCode1=ON>

<https://www.ottawapolice.ca/en/contact-us/resources/ottawa-postal-codes.pdf>

GeoName give us both postal codes and latitude and longitude coordinates for each neighborhood. Then manually created two comma-separated-values (.csv) files for data manipulation easily in Jupiter notebook.

3.0 Methodology

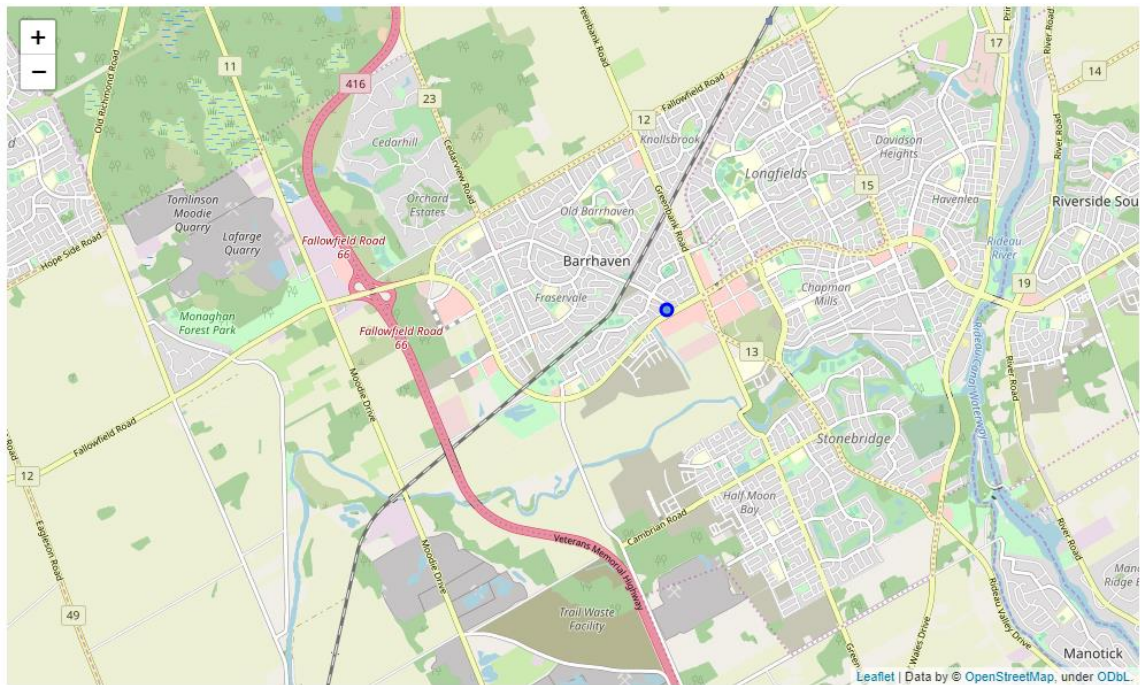
To answer the question in section 1.3 of this report we need to go through a series of data analysis to generate some useful insight.

3.1 Data Exploratory Analysis

First, we have to get a list of all the neighborhoods in the Ottawa area from GeoName and Ottawa Police as mentioned in section 2.1. Then we created two csv files then merged that two files together to generate the following data frame:

	PostalCode	Borough	Neighborhood	Latitude	Longitude
0	K1Y	Ottawa West	Island Park, Hintonburg, Mechanicsville, Champ...	45.402	-75.733
1	K1S	Ottawa	The Glebe, Ottawa South, Ottawa East	45.399	-75.687
2	K1K	Ottawa	Overbrook, Forbes, Manor Park, Viscount Alexan...	45.445	-75.643
3	K1L	Ottawa	Vanier, McKay Lake	45.440	-75.663
4	K1Z	Ottawa	Westboro, Carlington	45.387	-75.740

With the latitude and longitude coordinates information, we can completely plot the neighborhoods to a map using folium, but we only concerned Barrhaven neighborhood only.

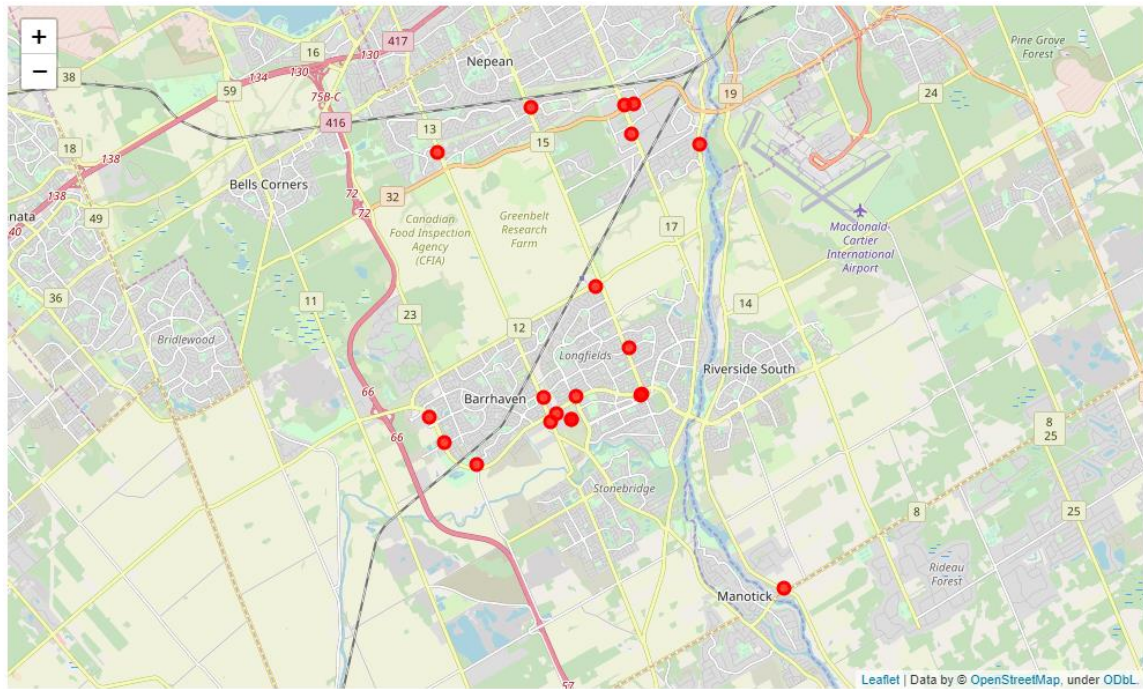


3.2 Coffee Shop Data Exploratory Analysis

To obtain the existing coffee shops we will use Foursquare API to retrieve data. We have queried the first 200 venue within 0.8 km radius of Barrhaven.

From Foursquare API we were able to retrieve that there are 20 coffee shop located in Barrhaven area:

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Barrhaven	45.269	-75.752	Café Cristal	45.264895	-75.777534	Café
1	Barrhaven	45.269	-75.752	Second Cup	45.269219	-75.746093	Coffee Shop
2	Barrhaven	45.269	-75.752	Starbucks	45.274293	-75.748052	Coffee Shop
3	Barrhaven	45.269	-75.752	Starbucks	45.269775	-75.739897	Coffee Shop
4	Barrhaven	45.269	-75.752	Starbucks	45.275007	-75.719048	Coffee Shop
5	Barrhaven	45.269	-75.752	Tim Hortons	45.274739	-75.738416	Coffee Shop
6	Barrhaven	45.269	-75.752	Tim Hortons	45.270406	-75.781876	Coffee Shop
7	Barrhaven	45.269	-75.752	Tim Hortons	45.284821	-75.722564	Coffee Shop
8	Barrhaven	45.269	-75.752	Tim Hortons	45.270906	-75.744291	Coffee Shop
9	Barrhaven	45.269	-75.752	Tim Hortons	45.297531	-75.732450	Coffee Shop
10	Barrhaven	45.269	-75.752	Tim Hortons	45.234567	-75.676451	Coffee Shop
11	Barrhaven	45.269	-75.752	Tim Hortons	45.327369	-75.701527	Coffee Shop
12	Barrhaven	45.269	-75.752	Tim Hortons	45.325499	-75.779515	Coffee Shop
13	Barrhaven	45.269	-75.752	Starbucks	45.269880	-75.739750	Coffee Shop
14	Barrhaven	45.269	-75.752	Two Monkeys Coffee & Tea House	45.260366	-75.768002	Coffee Shop
15	Barrhaven	45.269	-75.752	Tim Hortons	45.329441	-75.721791	Coffee Shop
16	Barrhaven	45.269	-75.752	Starbucks	45.275072	-75.718880	Coffee Shop
17	Barrhaven	45.269	-75.752	Tim Hortons	45.335603	-75.723880	Coffee Shop
18	Barrhaven	45.269	-75.752	Tim Hortons	45.335654	-75.721080	Coffee Shop
19	Barrhaven	45.269	-75.752	Tim Hortons	45.334894	-75.751604	Coffee Shop



We used one hot encoding to order the data frame into venue category columns within Barrhaven and then we can aggregate the results to a frequency-based data frame for each venue category.

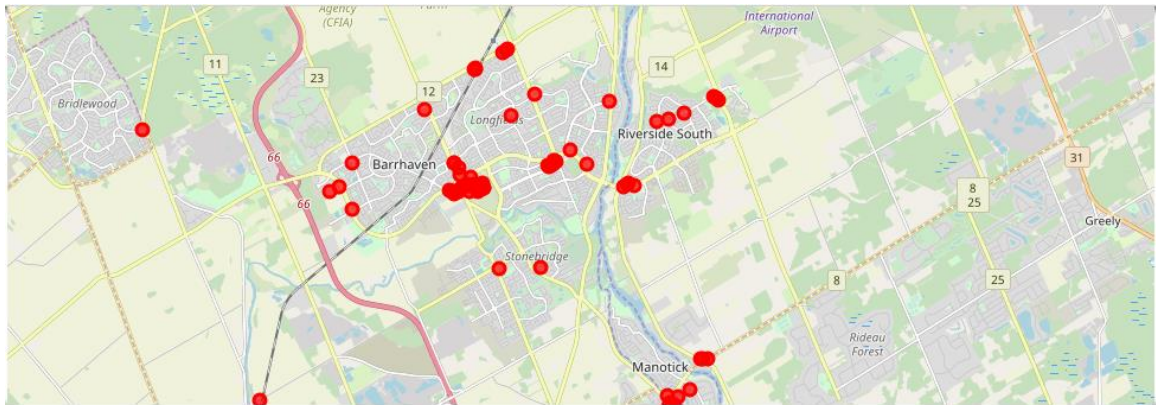
	Neighborhood	Café	Coffee Shop
0	Barrhaven	0.05	0.95

3.3 Local Business and Residence Data Exploratory Analysis

To obtain the number local business we will use Foursquare API to retrieve data. We have queried the first 200 venue within 0.8 km radius of Barrhaven.

From Foursquare API we were able to retrieve that there are 100 local businesses located in Barrhaven area:

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Barrhaven	45.269	-75.752	Toys on Fire	45.268575	-75.741105	Toy / Game Store
1	Barrhaven	45.269	-75.752	Shawarma Heaven	45.269279	-75.739239	Middle Eastern Restaurant
2	Barrhaven	45.269	-75.752	Indigo	45.269857	-75.740122	Bookstore
3	Barrhaven	45.269	-75.752	Café Cristal	45.264895	-75.777534	Café
4	Barrhaven	45.269	-75.752	Costco Wholesale	45.268538	-75.784130	Warehouse Store



We used one hot encoding to order the data frame into venue category columns within Barrhaven and then we can aggregate the results to a frequency-based data frame for each venue category.

	Neighborhood	American Restaurant	Athletics & Sports	BBQ Joint	Bank	Bar	Beer Store	Bookstore	Bowling Alley	Brewery	...	Sandwich Place	Smoothie Shop	Supermarket	Thai Restaurant	Toy / Game Store	Tr
0	Barrhaven	0.02	0.01	0.01	0.03	0.01	0.02	0.02	0.01	0.01	...	0.04	0.01	0.01	0.03	0.01	0.0

Using this data frame, we built a new one with top 10 venues:

	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	Barrhaven	Coffee Shop	Pizza Place	Fast Food Restaurant	Sandwich Place	Grocery Store	Restaurant	Gym	Liquor Store	Thai Restaurant	Bank

4.0 Results

There are total of 20 coffee shops exist within Barrhaven area and about 100 local businesses. Barrhaven also have about 22637 of household with 61528 population.

5.0 Discussion

The real challenge is constructing the dataset:

- Usually the needed data isn't publicly available
- Inconsistent data when combined with multiple sources
- Lots of research and analysis is required to decide if the data are useful or not

6.0 Conclusion

It's unfortunately that the analysis couldn't produce a precise answer whether or not opening a coffee shop in Barrhaven is optimal location. So far, we only have been focused on the number existing coffee shops and numbers of local businesses within Barrhaven. We also lack of understanding of how popular some existing coffee shop to retain their customer. Definitely would recommend to continue to do more in-depth analysis on customer spending behavior and the demographic of the customer.