Coffee Shop analysis in Toronto and Vancouver

Introduction/Business Problem

This project seeks to compare the amount of coffee shops between Toronto and Vancouver. The goal is to learn which city has the most amount of coffee shops compared to its population and also map out the clusters of neighborhoods with the most amount of coffee venues.

The target question is to determine which city can be regarded as the most caffeinated city in Canada. Additionally, it would be useful to identify what are the top neighborhoods where the coffee shops are located and any other findings that may arise from this analysis. Another goal is to find out what is the most popular coffee chain in Toronto and Vancouver and whether they are the same for both cities.

The target audience could be residents of Toronto and Vancouver who are looking for business opportunities to open a new coffee shop. Additionally those who like to buy coffee, drink coffee or work/study in the coffee shops might also benefit from this project.

Data

This project will use Foursquare API to identify and map all coffee shops in Toronto and Vancouver. Folium library will be used to map the clusters. Wikipedia information about the postal codes was used to collect the data about the neighborhoods of both Vancouver and Toronto. The focus was on both cities only omitting the suburbs (although that would also be interesting).

For the coffee shop data the following data categories were included:
1. Coffee shop
2. Corporate coffee shop
3. Café
4. Pet Café

Other venues such as College Cafeteria, Corporate Cafeteria, coffee house, Gaming Cafe, and Internet Cafe as well as restaurants that serve coffee were omitted from this analysis.

Methodology

Part 1: Download and prepare data
First step was to download and prepare the data to fit the format that is suitable for this analysis. A dataframe of neighborhoods in Vancouver and Toronto with their corresponding latitudes and longitudes was created from the scraped data. The data was collected from Wikipedia using

`beaufifulsoup` package for python. Geographic coordinates were scraped using OpenCage Geocoder API.
Next Foursquare API was used to query all coffee shops in Toronto and Vancouver by neighborhood. Resulting data was put in the dataframe and included information such as venue name, category, latitude and longitude.

Part 2: Initial analysis and visualization

All resulting coffee shops in Vancouver and Toronto were mapped to provide a visualization where these venues are located.

Since Toronto is larger city than Vancouver, it has more coffee shops. To determine which city has more coffee shops comparing to its population, the ratio was calculated by dividing number of residents by number of coffee shops.

To determine the most popular coffee chain in both cities the dataframes were grouped by number of venues with the same name and sorted in ascending order.

Part 3: Use k-means clustering

k-means clustering method was used to categorize neighborhoods with coffee shops. The results were divided into 5 clusters. Resulting clusters were plotted on the map.
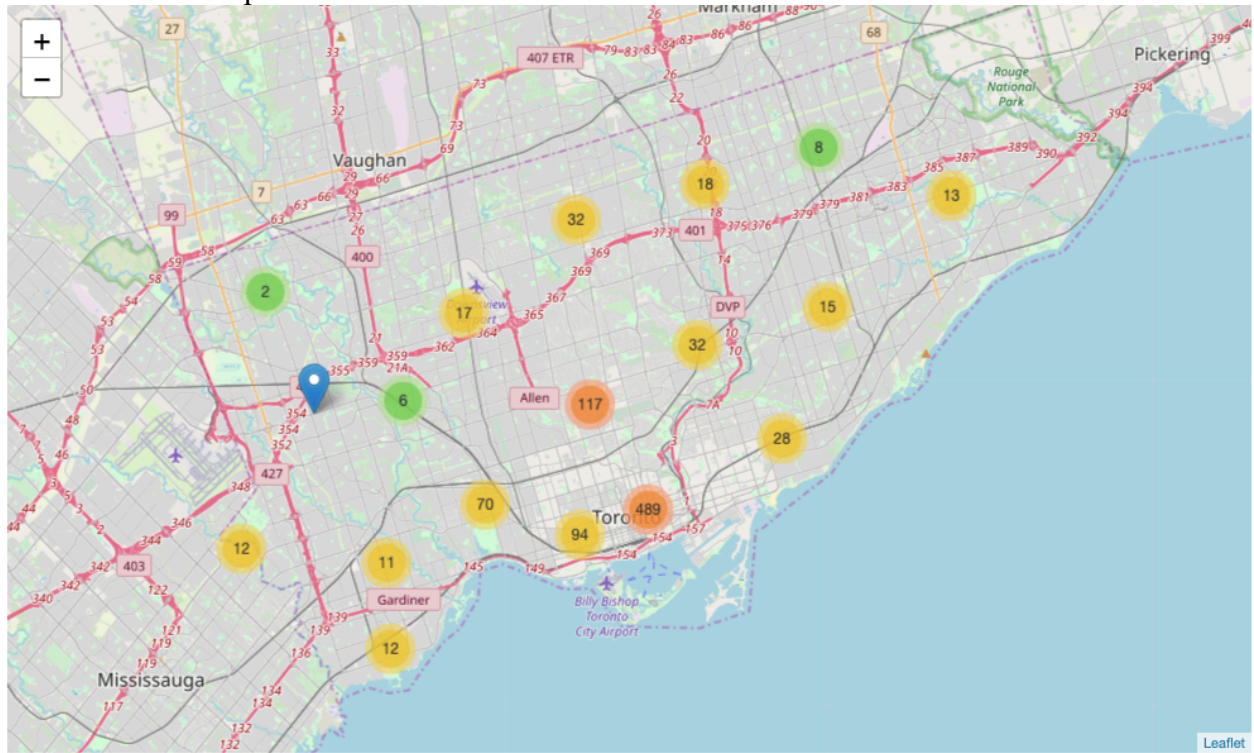
Results

Vancouver vs Toronto number of coffee shops

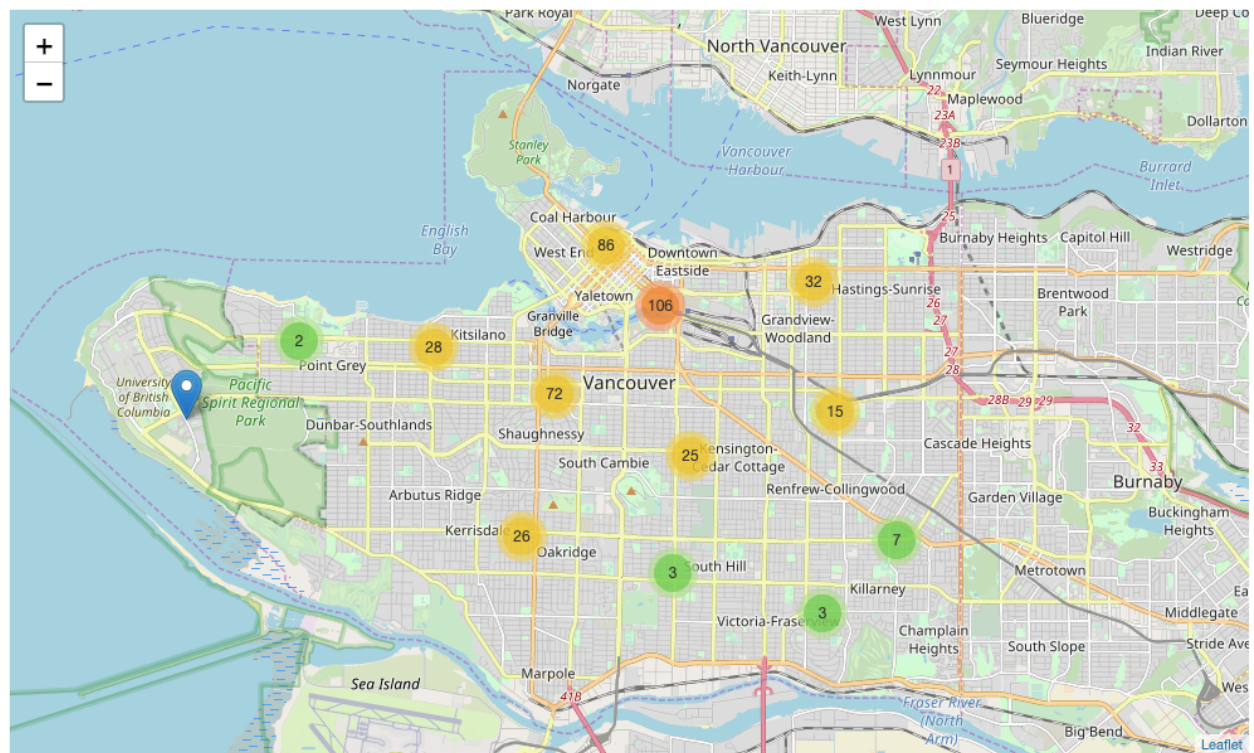From the analysis conducted using Foursquare data, Vancouver has 406 coffee shops and Toronto has 977.

However, given the population data provided by StatCan, there is approximately 1 coffee shop for 1555 people in Vancouver and 1 coffee shop for 5557 people in Toronto. This data may suggest that coffee shops are more popular among Vancouver residents.

The images of coffee maps of both cities are located on the next page.

Toronto coffee map

Vancouver coffee map

Neighborhoods with the greatest number of coffee shops

Toronto top 5 coffee shop neighborhoods

Neighborhood	Borough	Number of coffee shops
Berczy Park	Downtown Toronto	30
Harbourfront East,Toronto Islands,Union Station	Downtown Toronto	30
Stn A PO Boxes 25 The Esplanade	Downtown Toronto	29
Brockton,Exhibition Place,Parkdale Village	West Toronto	28
Design Exchange,Toronto Dominion Centre	Downtown Toronto	28

From the table above and the visualization map it seems that most coffee shops in Toronto are located in Downtown Toronto area.

Vancouver top 5 coffee shop neighborhoods

Neighborhood	Part of the city	Number of coffee shops
East Mount Pleasant	East Side	27
Central Kitsilano , Greektown	West Side	26
NW Shaughnessy , East Kitsilano , Quilchena	West Side	26
NE Downtown , Gastown , Harbour Centre , International Village , Victory Square , Yaletown	Central	25
Waterfront , Coal Harbour , Canada Place	Central	25

From the table above and visualization on the map it seems that coffee shops in Vancouver are spread more uniformly in East Side, West Side and Central parts of the city.

Most popular chains

Starbucks and Tim Hortons are the most popular coffee chains in both Toronto and Vancouver. Starbucks is more ubiquitous than Tim Hortons. Below are tables of most popular coffee chains.

Top coffee chains in Toronto

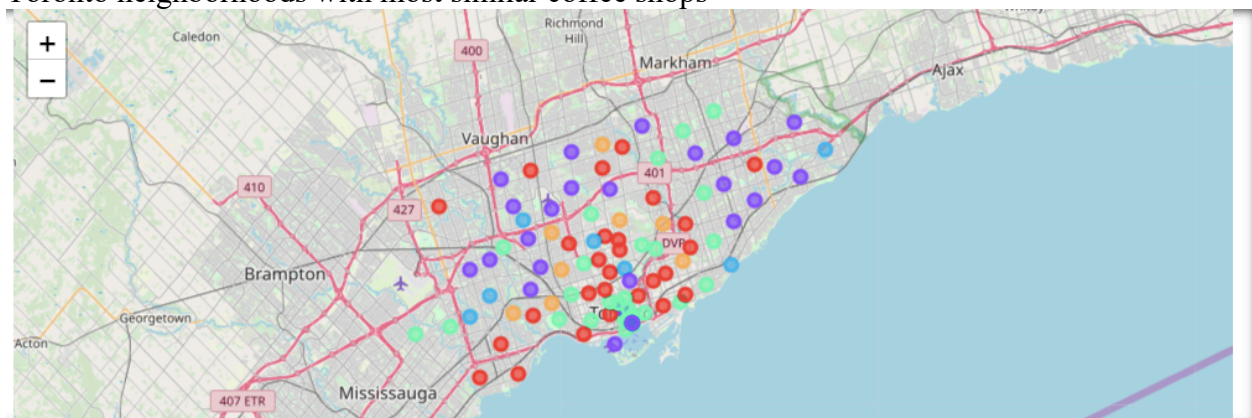|	
Starbucks	200
Tim Hortons	165

Second Cup	32
Aroma Espresso Bar	20
Pilot Coffee Roasters	14

Top coffee chains in Vancouver

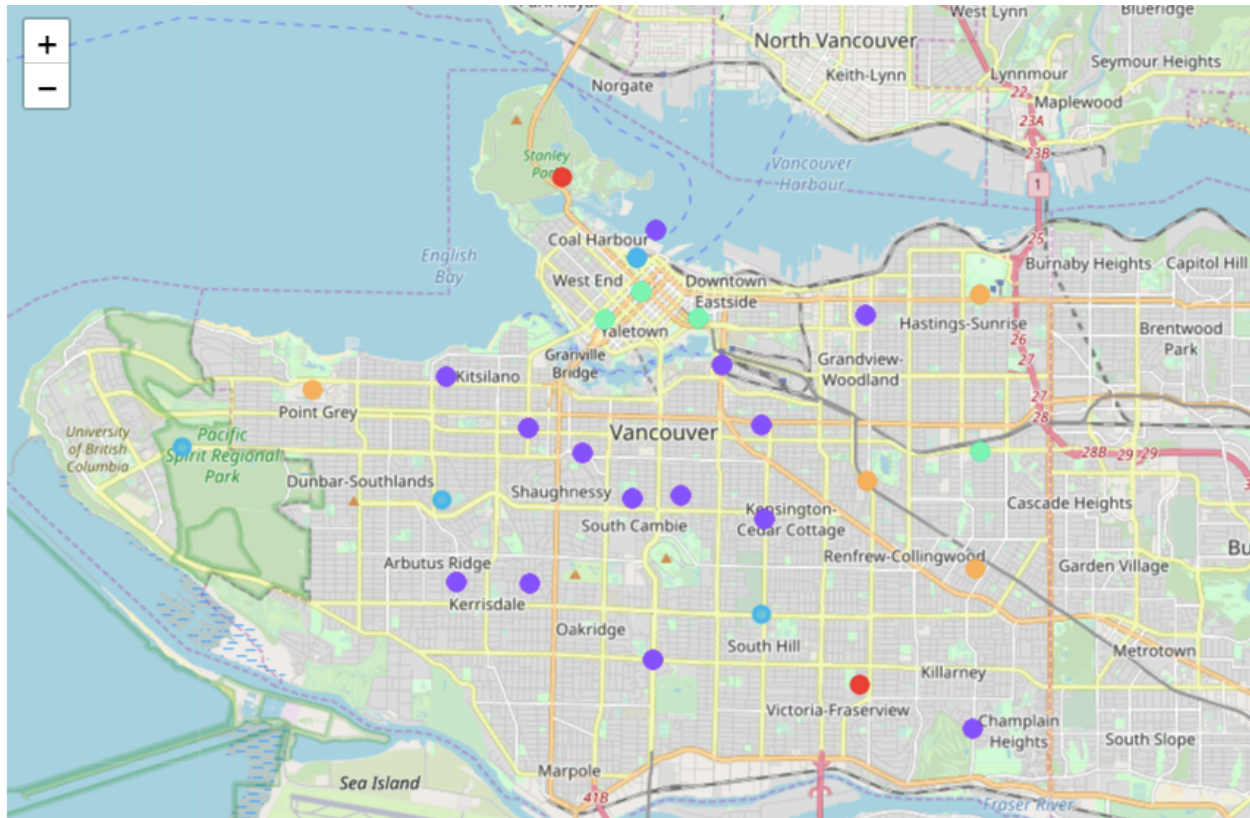|	
Starbucks	88
Tim Hortons	42
JJ Bean	16
Blenz Coffee	10
Pallet Coffee Roasters	5

k-means clustering results

Toronto neighborhoods with most similar coffee shops

Vancouver neighborhoods with most similar coffee shops

Discussion

Based on this analysis it is apparent that coffee shops are most popular in Vancouver given the number of residents. While most coffee venues are located in the downtown part of Toronto, in Vancouver they are more spread out in different neighborhoods of the city. The most popular coffee chain in both cities is Starbucks with Tim Hortons being the second.

Future work would consider expanding this analysis to include more information, for example:
 - Include data from the suburban areas
 - Map independent vs chain coffee shops
 - Can also look at proximity to coworking spaces and tech startups
 - Find most similar city to Vancouver in the U.S.A. with a similar number of coffee shops (perhaps Seattle?)

Conclusion

This project analyzes coffee shops in Vancouver and Toronto. Using information pulled from Foursquare API we were able to visualize the neighborhoods that are saturated with coffee shops. Using this information helped determine which city has most number of coffee shops, what chain is the most popular etc. This analysis may help future entrepreneurs who plan on opening a coffee shop in any of both cities.