



BATTLE OF THE NEIGHBORHOODS

Determining the next possible location to establish a profitable Laundromat service in Central Toronto



PROBLEM STATEMENT

- The purpose of this project is to identify the best possible location to establish a laundromat in a given city/neighborhood.
- The city consider for this study is Toronto, Canada.Toronto is the capital city of the Canadian province of Ontario and is the most populous city in Canada and the fourth most populous city in North America.Toronto is an international centre of business, finance, arts, and culture, and is recognized as one of the most multicultural and cosmopolitan cities in the world.
- With numerous museums and galleries, festivals and public events, entertainment districts, national historic sites, and sports activities, attract over 43 million tourists each year. With the huge inflex of tourists, the demand of hotels and BnB stays keeps increasing in multifold. This has a direct influenze in the demand for laundromat services as well.
- The Project aims at helping the laundromat business to establish new services in places where the demand is high but not met. There by helping to provide a profitable laundry service with less competition. This would eventually play a key role in influencing the touristst to choose the near by accommodations for their visit

Location where the new Laundromat service needs to be established

- Central Toronto,Canada. The city with numerous museums and galleries, festivals and public events, entertainment districts, national historic sites, and sports activities, attract over 43 million tourists each year is considered by the Laundromat business to expand their service.



DATA ACQUISITION AND CLEANING

➤ Data about neighborhoods

- In order to perform the analysis for the project. we required the locations of existing accomodations(Hotels, Motels) and laundromats. The data gathering starts with capturing all the neighbourhoods in Toronto. This data can be fetched from the following Wiki Link https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M (oldid: 954731857)
- The data will be scrapped and processed to be ready for the analysis.

➤ Geo coordinates

- The geographical coordinates for each of the neighbourhoods can be obtained by downloading the data in csv from the following link https://cf-courses-data.s3.us.cloud-object-storage.appdomain.cloud/IBMDriverSkillsNetwork-DS0701EN-SkillsNetwork/labs_v1/Geospatial%20Coordinates.csv)

➤ Data selection

- Data corresponding to the neighborhood of Toronto alone will be considered for this study. Filtering is done based on Borough that contains 'Toronto' in it.

➤ Foursquare API

- The geo locations for the required neighborhoods will be fed into the Foursquare API along with keywords like hotels, motels, laundry, laundromats to fetch the corresponding data.
- Clustering will be done on the above mentioned data for Laundromats and Hotels separately.
- Folium map will be used to visualize the clusters, using which the conclusion will be arrived.

NEIGHBORHOOD DATA FOR CANADA

- The sample postal code data for Canada after initial cleaning.

	Postal code	Borough	Neighborhood
0	M3A	North York	Parkwoods
1	M4A	North York	Victoria Village
2	M5A	Downtown Toronto	Regent Park , Harbourfront
3	M6A	North York	Lawrence Manor , Lawrence Heights
4	M7A	Downtown Toronto	Queen's Park , Ontario Provincial Government

NEIGHBORHOOD IN CENTRAL TORONTO

- A total of 9 neighborhoods were identified in the central Toronto. Find below the complete detail with Postal code and geo location for each of those.

	Postal code	Borough	Neighborhood	Latitude	Longitude
0	M4N	Central Toronto	Lawrence Park	43.728020	-79.388790
1	M5N	Central Toronto	Roselawn	43.711695	-79.416936
2	M4P	Central Toronto	Davisville North	43.712751	-79.390197
3	M5P	Central Toronto	Forest Hill North & West	43.696948	-79.411307
4	M4R	Central Toronto	North Toronto West	43.715383	-79.405678
5	M5R	Central Toronto	The Annex , North Midtown , Yorkville	43.672710	-79.405678
6	M4S	Central Toronto	Davisville	43.704324	-79.388790
7	M4T	Central Toronto	Moore Park , Summerhill East	43.689574	-79.383160
8	M4V	Central Toronto	Summerhill West , Rathnelly , South Hill , For...	43.686412	-79.400049

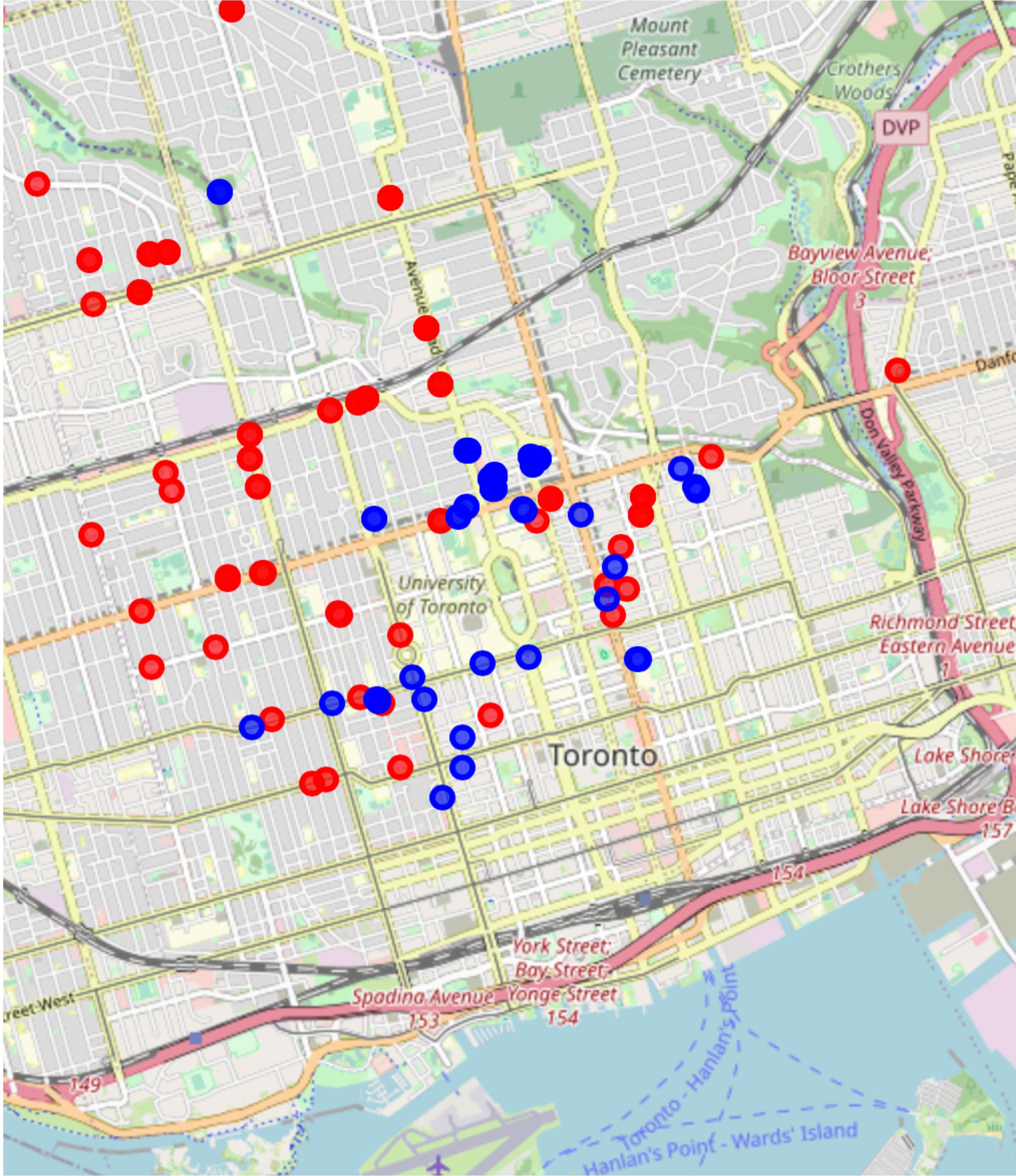
VENUE INFORMATION IN CENTRAL TORONTO - (FOURSQUARE API)

► Sample Laundry venues

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Lawrence Park	43.728020	-79.388790	Maytag Laundry Linens And Gifts	43.730241	-79.403576	Laundry Service
1	Roselawn	43.711695	-79.416936	Royal Forest Coin Laundry	43.701115	-79.425177	Laundry Service
2	Roselawn	43.711695	-79.416936	Bathurst Street Coin Laundry	43.723356	-79.430118	Laundry Service
3	Roselawn	43.711695	-79.416936	Empire Dry Cleaners & Laundry Services - Etob...	43.699698	-79.415735	Dry Cleaner
4	Roselawn	43.711695	-79.416936	Coin Laundry	43.724148	-79.430481	Laundry Service

► Sample Hotel venues

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Lawrence Park	43.728020	-79.388790	Hotel Wibke	43.707730	-79.395858	Speakeasy
1	Lawrence Park	43.728020	-79.388790	Best Western Roehampton Hotel & Suites	43.708878	-79.390880	Hotel
2	Lawrence Park	43.728020	-79.388790	Skyline Hotels & Resorts	43.707578	-79.395640	Office
3	Roselawn	43.711695	-79.416936	Hotel Gelato	43.703478	-79.414311	Café
4	Roselawn	43.711695	-79.416936	Hotel Wibke	43.707730	-79.395858	Speakeasy



PLOT THE VENUES IN MAP

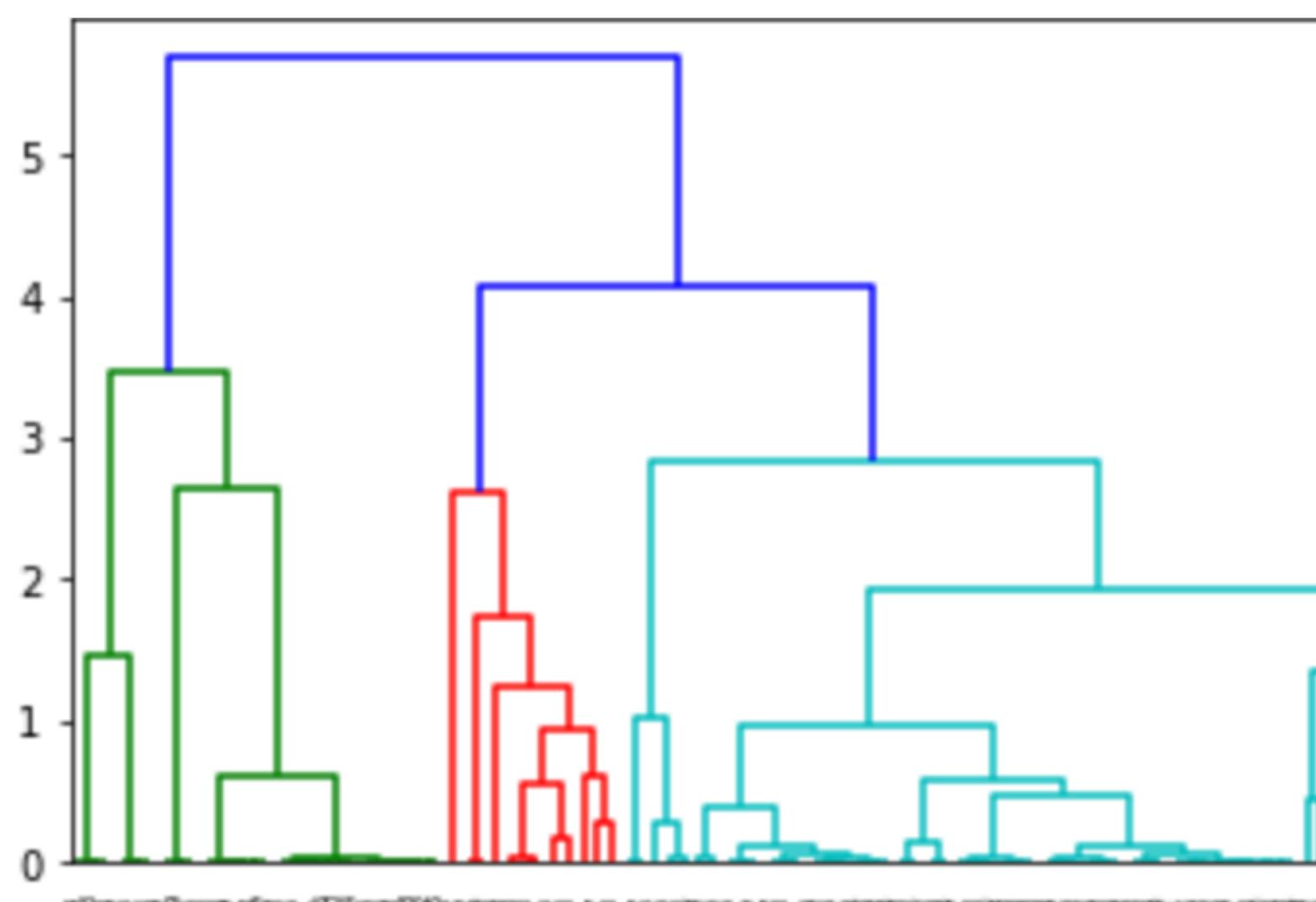
- The coordinates for the Hotels and Laudromats are plotted against the map to understand the distribution of services visually.
- As expected, the number of Laundromats were more in number than the hotels.
- We can also see that the concentration of the venues were more on certain regions than the other.
- The concentration corresponds to the presence of museums and University.

HEIRARCHIAL CLUSTERING AND DENDROGRAM - HOTEL VENUES

- Cluster data for Hotel venues (Sample 5 records)

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category	cluster_
0	Lawrence Park	43.728020	-79.388790	Hotel Wibke	43.707730	-79.395858	Speakeasy	2
1	Lawrence Park	43.728020	-79.388790	Best Western Roehampton Hotel & Suites	43.708878	-79.390880	Hotel	2
2	Lawrence Park	43.728020	-79.388790	Skyline Hotels & Resorts	43.707578	-79.395640	Office	2
3	Roselawn	43.711695	-79.416936	Hotel Gelato	43.703478	-79.414311	Café	1
4	Roselawn	43.711695	-79.416936	Hotel Wibke	43.707730	-79.395858	Speakeasy	2
5	Roselawn	43.711695	-79.416936	Skyline Hotels & Resorts	43.707578	-79.395640	Office	2

- Dendrogram

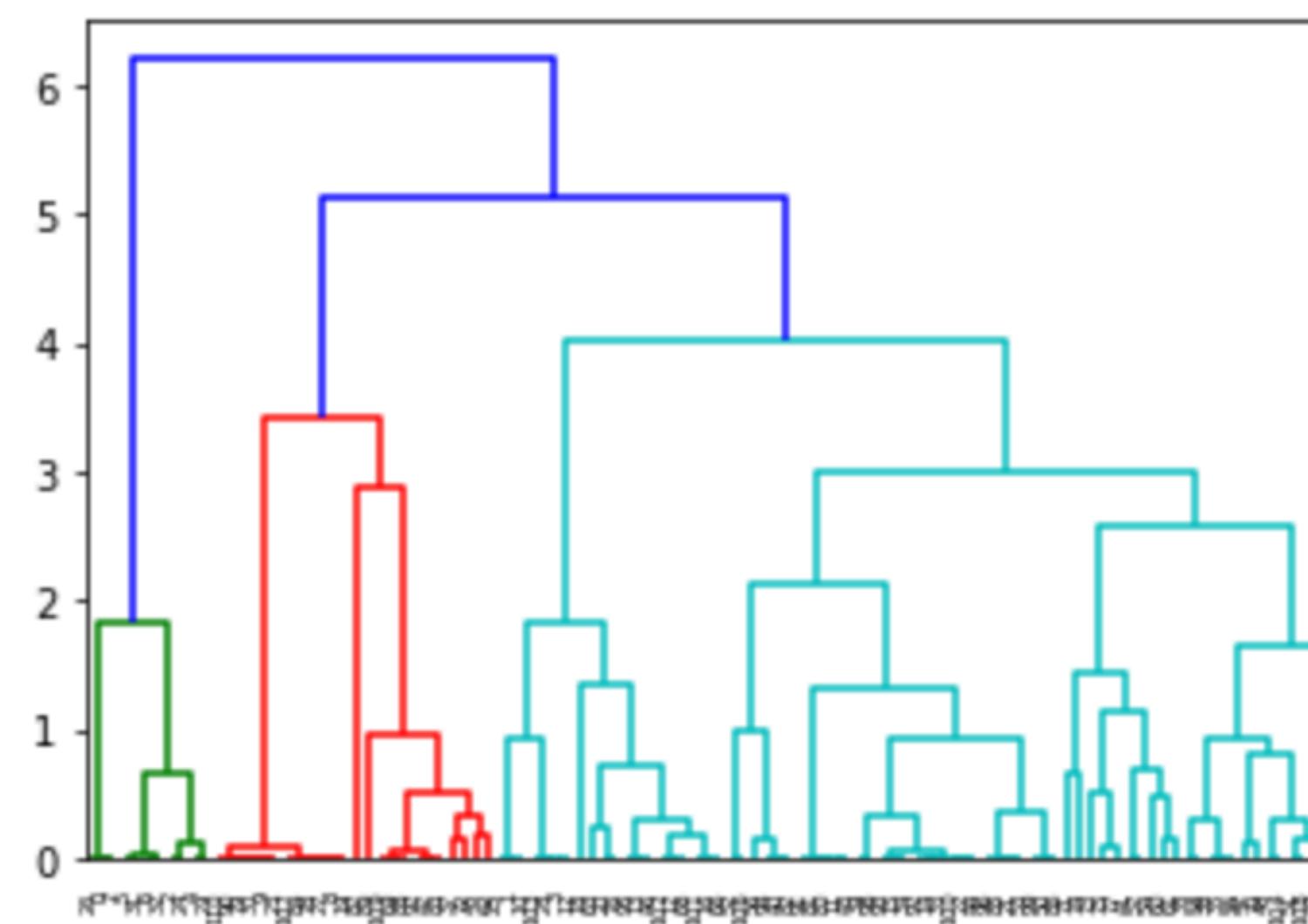


HEIRARCHIAL CLUSTERING AND DENDROGRAM - LAUNDROMATS VENUES

- Cluster data for Laundromats venues (Sample 5 records)

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category	cluster_
0	Lawrence Park	43.728020	-79.388790	Maytag Laundry Linens And Gifts	43.730241	-79.403576	Laundry Service	1
1	Roselawn	43.711695	-79.416936	Royal Forest Coin Laundry	43.701115	-79.425177	Laundry Service	4
2	Roselawn	43.711695	-79.416936	Bathurst Street Coin Laundry	43.723356	-79.430118	Laundry Service	1
3	Roselawn	43.711695	-79.416936	Empire Dry Cleaners & Laundry Services - Etob...	43.699698	-79.415735	Dry Cleaner	4
4	Roselawn	43.711695	-79.416936	Coin Laundry	43.724148	-79.430481	Laundry Service	1
5	Roselawn	43.711695	-79.416936	Magic Touch Coin Laundry	43.728324	-79.431799	Laundry Service	1

- Dendrogram



LIST OF CLUSTERS CREATED FROM THE RESULTED VENUES

- Laundromat
 - Total number of Clusters - 6
 - Total number of Venues - 111
- Hotels
 - Total number of Clusters - 4
 - Total number of Venues - 90
- The Latitude and Logitudes are the centroid of each clusters

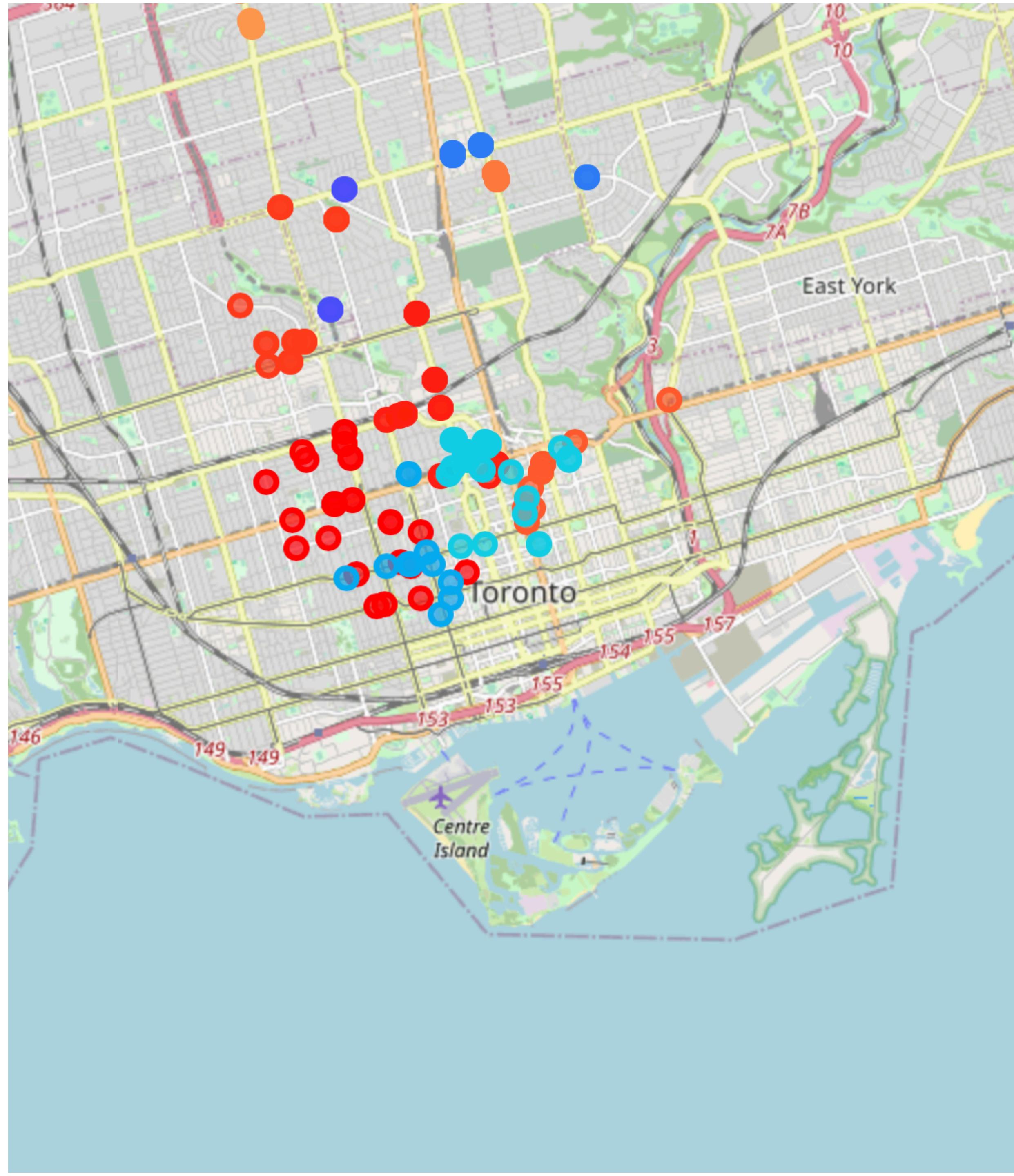
Laundromat clusters:

Venue	Latitude	Venue	Longitude	Number of Venues
0	43.7271		-79.4236	11
1	43.705		-79.3884	12
2	43.6683		-79.379	12
3	43.6897		-79.4228	20
4	43.6769		-79.4002	29
5	43.6633		-79.4124	27

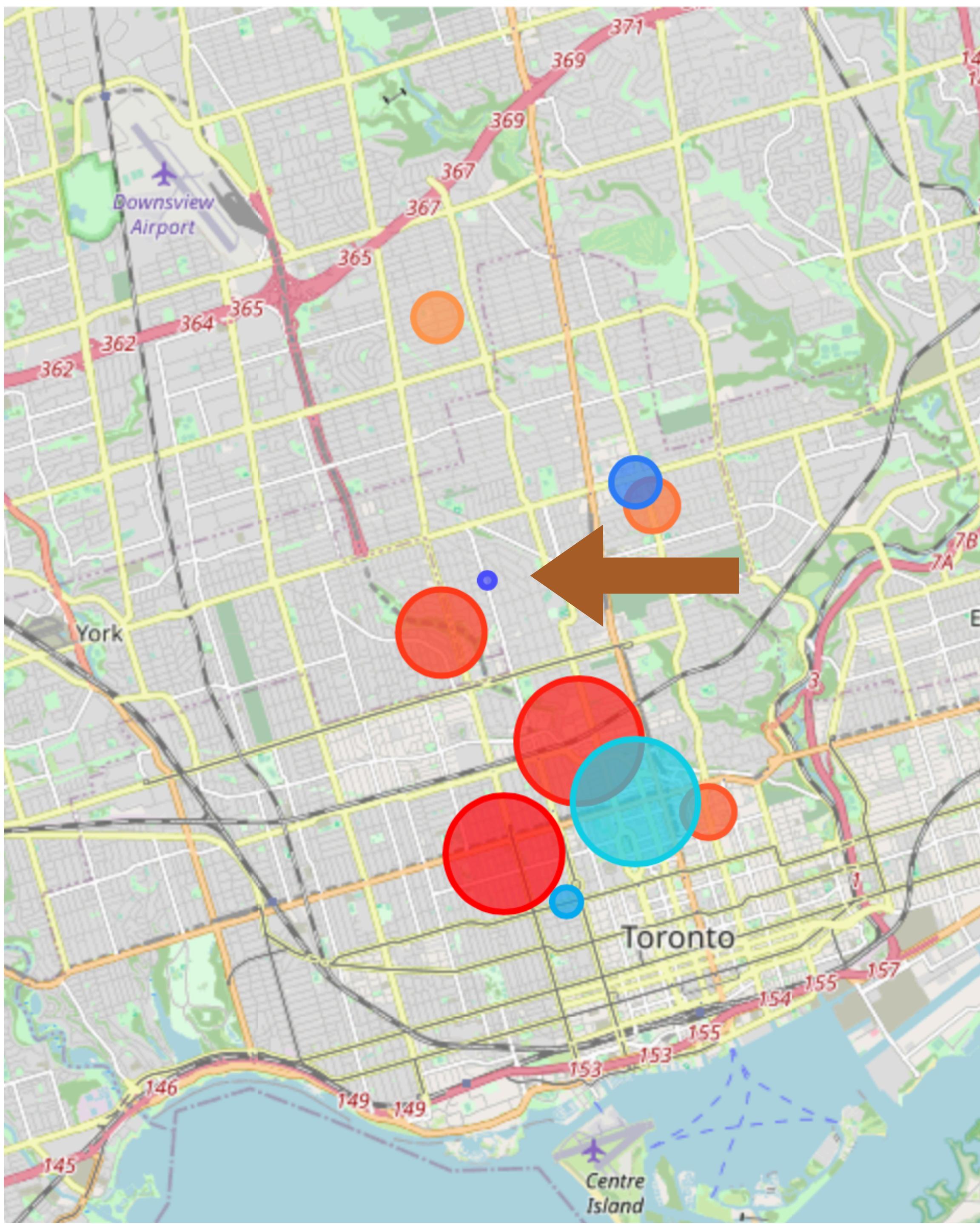
Hotel clusters:

Venue	Latitude	Venue	Longitude	Number of Venues
0	43.6959		-79.4155	6
1	43.7075		-79.3911	20
2	43.6577		-79.4022	12
3	43.6696		-79.3909	52

MAPPING THE CLUSTERS



- The Red family represents the Laudromat clusters.
- The Blue family represents the hotel clusters.
- Though a clear study can be performed based on the location of each clusters in the above map, it would be much easier to visually come to an conclusion about the concentration of hotels and laundry services when the near by clusters are grouped together. This way, visually we can determine the areas where the services overlap and isolated. For an end user(laundromat business), this visual representation helps to immediately come to an conclusion about choosing the location to establish they next business and be confident enough to expect a profitable turnaround.



SUGGESTION TO THE LAUNDROMAT BUSINESS

1. As assumed earlier, in most of the neighborhoods, the hotel clusters and the laundromat clusters overlap each other.
2. Majority of the hotels are found in and around the Yorkville neighborhood. The main reason could be the presence of the museum and university around this neighborhood. We could also see a complimenting numbers of laundromats around this neighborhood.
3. The annex neighborhood got the ratio of laundromat to hotel very high as it turns out to be more of a residential area along with schools, which raises a demand for laundry services inspite of having lesser hotels.
4. The Forest Hill neighborhood got a small cluster of hotels but does not have any laundry establishments to meet the need.
5. The laundromat to Hotels ratio is very less in the ForestHill neighborhood. It has got 6 hotels with no associated laundry services.

Based on the above results, we shall come to a conclusion that the **ForestHill** neighborhood is the most suitable candidate for launching a new laundromat services, which might satisfy the demand and stands for a profitable business establishment.