



## Capstone Project - The Battle of Neighborhoods (Week 2)

### The Battle of Neighborhoods

A Treatise on Opening Laundromat service in Toronto City  
Presented by Chanchal Cakraborty

Battle of Neighborhoods

# INTRODUCTION

- Toronto review for ABC Company.
- Optimum location for new Laundromat business

## Business Problem

- Choice of first neighborhood to start Laundromat business.
- Easy to replicate.
- Low competition
- High demand
- Choice of Services

## Success Criteria

- Best neighborhood which meets above criteria.





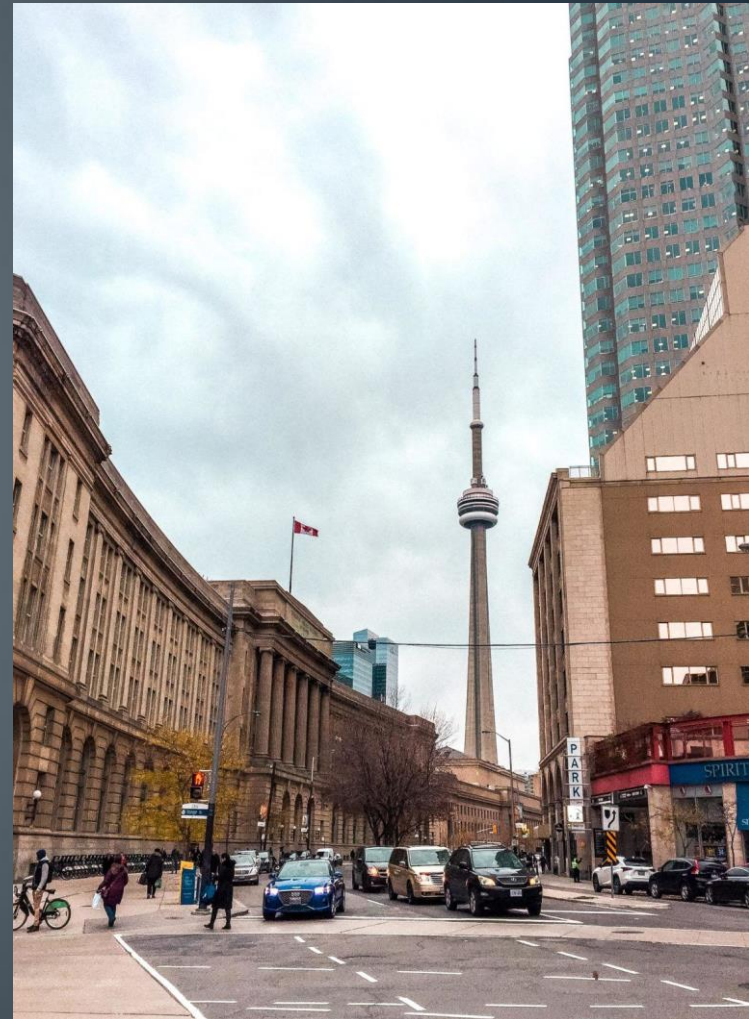
# Toronto City – at a glance

- Toronto is the provincial Capital of Ontario
- Land Area : 630 Sq Km
- Population (July 2018) :2,956,024
- Gross Domestic Product (in 2007 \$ billion, 2017) : \$158.7
- Average (Mean) Household Income (2015 ) : \$98,174
- An International centre of Business, finance, arts and Culture
- Recognised as one of the most multicultural and cosmopolitan cities in the world
- Home to the Toronto Stock Exchange,
- The Headquarters of Canada's five largest Banks of Canada
- Head Quarters of many large Canadian MNCs.



# Toronto City – Business Environment

- Market is highly competitive
- Highly developed city so cost of doing business is also one of the highest
- New business venture or expansion needs to be analysed carefully
- One should strategically targeting the market in order to
  - ❖ This will help in reduction of risk.
  - ❖ The Return on Investment will be reasonable.



## Factors to be studied for Laundromat Location

- Toronto Population
- Toronto City Demographics
- Are there any Hotels nearby so that the service can be extended to the Hotel dwellers with quality and cost?
- Are there any venues the locations of travel accommodations such as hostels and motels in the region so that the travellers can avail this service?
- Who are the competitors in that location?
- Types of Services of the competitors
- Segmentation of the Borough - both demographic and psychographic (lifestyle)

# DATA DESCRIPTION - 1

**Data 1** :First data set contains 11 boroughs and 103 neighborhoods along with Postal codes associated to those. This data is loaded from the Wikipedia page.

( [https://en.wikipedia.org/wiki/List\\_of\\_postal\\_codes\\_of\\_Canada:\\_M](https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M) )

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



## DATA DESCRIPTION - 2

Data 2 : Neighborhood has a total of 11 boroughs and 103 neighborhoods. In order to segment the neighborhoods and explore them, we will essentially need a dataset that contains the 11 boroughs and the neighborhoods that exist in each borough as well as the latitude and longitude coordinates of each neighborhood.

Second data is csv file that has the geographical coordinates of each postal code

([http://cocl.us/Geospatial\\_data](http://cocl.us/Geospatial_data))

	Postal Code	Latitude	Longitude
0	M1B	43.806686	-79.194353
1	M1C	43.784535	-79.160497
2	M1E	43.763573	-79.188711
3	M1G	43.770992	-79.216917
4	M1H	43.773136	-79.239476

# DATA DESCRIPTION - 3

- Data 3 :Toronto city geographical coordinates data will be utilized as input for the Foursquare API, that will be leveraged to provision venues information for each neighborhood like existing Laundromat and nearest Hotel, hostel & motel information.

( [www.Foursquare.com](http://www.Foursquare.com))

- Laundromat Information

	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

Information of hotels, hostels and motels in the neighborhood of Toronto

	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



# ANALYTIC APPROACH

Toronto city neighborhood has a total of 11 boroughs and 103 neighborhoods

In order to search for locations of the existing Laundromats and hotels in the city of Toronto, it is necessary to find the coordinates of the neighbourhoods in Toronto for querying the Foursquare API.

# Analysis

The postal codes for each of the neighborhoods were matched to the information from the csv file and the original pandas dataframe was updated to list the corresponding geographical coordinate for each neighborhood.

	PostalCode	Borough	Neighborhood	Latitude	Longitude
0	M3A	North York	Parkwoods	43.753259	-79.329656
1	M4A	North York	Victoria Village	43.725882	-79.315572
2	M5A	Downtown Toronto	Harbourfront	43.654260	-79.360636
3	M6A	North York	Lawrence Heights, Lawrence Manor	43.718518	-79.464763
4	M7A	Queen's Park	Queen's Park	43.662301	-79.389494

# Analysis contd ...

To limit the range of the data, only the Central Toronto borough was investigated as this is the centre of Toronto where the tourists are centered. The neighbourhoods from the borough of Central Toronto were extracted and listed in a dataframe.

- .

	PostalCode	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, Forest Hill West	43.696948	-79.411307
4	M4R	Central Toronto	North Toronto West	43.715383	-79.405678

# Analysis - Foursquare.com

The Foursquare API was then used to query each of the neighbourhood for the keywords {laundromats, laundry} and {hotel, hostel, motel}. The resulting locations for each venue were tabulated and stored in a new dataframe.

## Laundromat information

	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

## Data of hotels, hostels and motels in the neighborhood of Toronto

	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



# Result

## Neighborhood hierarchical clustering

In order to see the aggregation of the Laundromats and hotels, unsupervised machine learning hierarchical clustering algorithm has been used to cluster the Laundromats and hotels separately. Hierarchical clustering was used because there was no need for a cluster number to be selected and can be purely based on the distance between the venues.

### Laundromat distance Matrix

```
[[0.          0.47310571 0.3710759  ... 0.8358833  0.75830948 0.37579332]
 [0.47310571 0.          0.29121879 ... 0.7289435  0.40192747 0.49889405]
 [0.3710759  0.29121879 0.          ... 0.96253584 0.69132031 0.60775833]
 ...
 [0.8358833  0.7289435 0.96253584 ... 0.          0.45895701 0.47154443]
 [0.75830948 0.40192747 0.69132031 ... 0.45895701 0.          0.55083028]
 [0.37579332 0.49889405 0.60775833 ... 0.47154443 0.55083028 0.          ]]
```

# Result

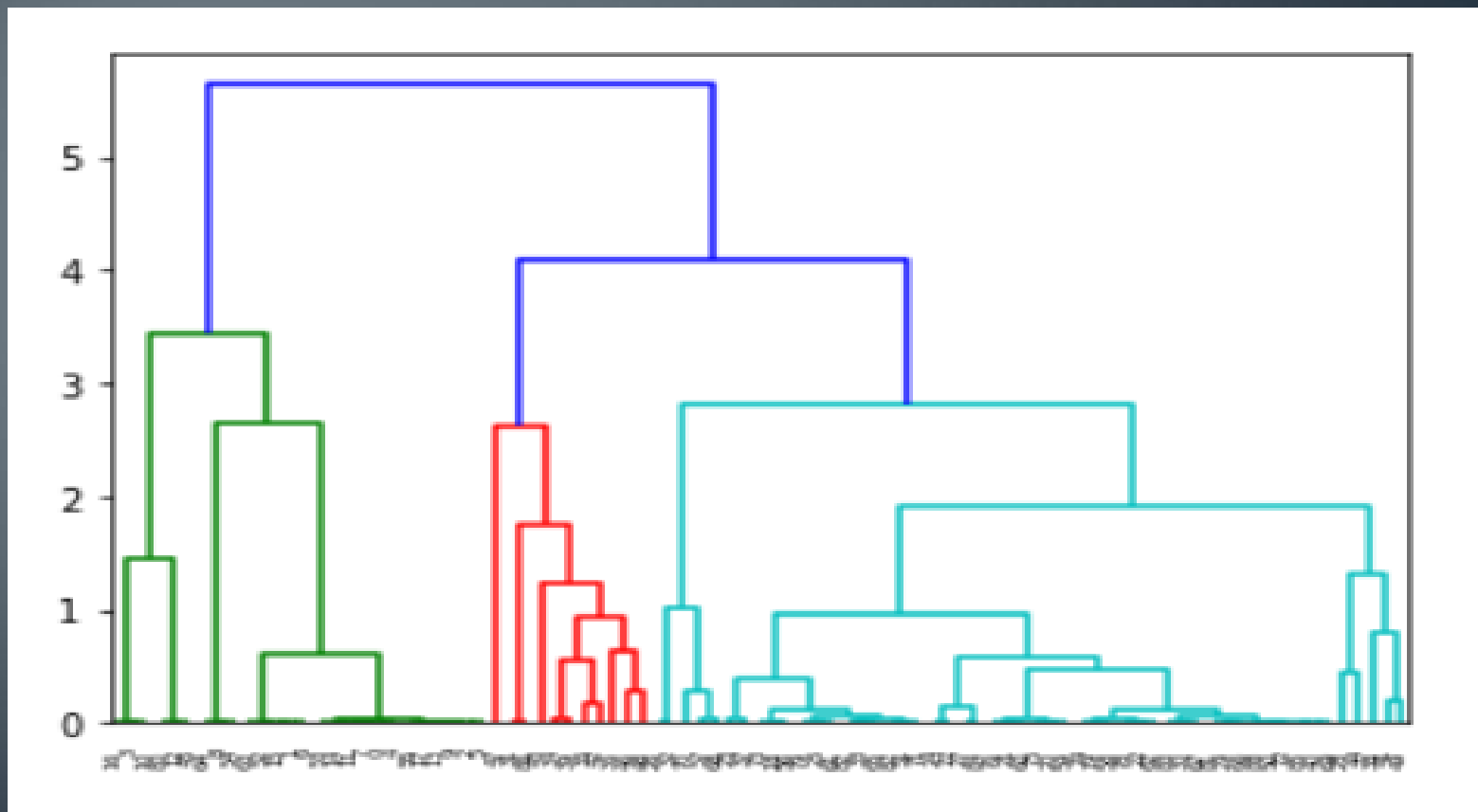
## Neighborhood hierarchical clustering contd...

### Hotel distance Matrix

```
[[0.          0.11496622 0.00561036 ... 0.70466877 0.63880283 0.63874749]
 [0.11496622 0.          0.11058236 ... 0.7590232  0.64457599 0.65807007]
 [0.00561036 0.11058236 0.          ... 0.70337434 0.63521127 0.63570043]
 ...
 [0.70466877 0.7590232  0.70337434 ... 0.          0.31381699 0.23710913]
 [0.63880283 0.64457599 0.63521127 ... 0.31381699 0.          0.07677343]
 [0.63874749 0.65807007 0.63570043 ... 0.23710913 0.07677343 0.          ]]
```

# Result

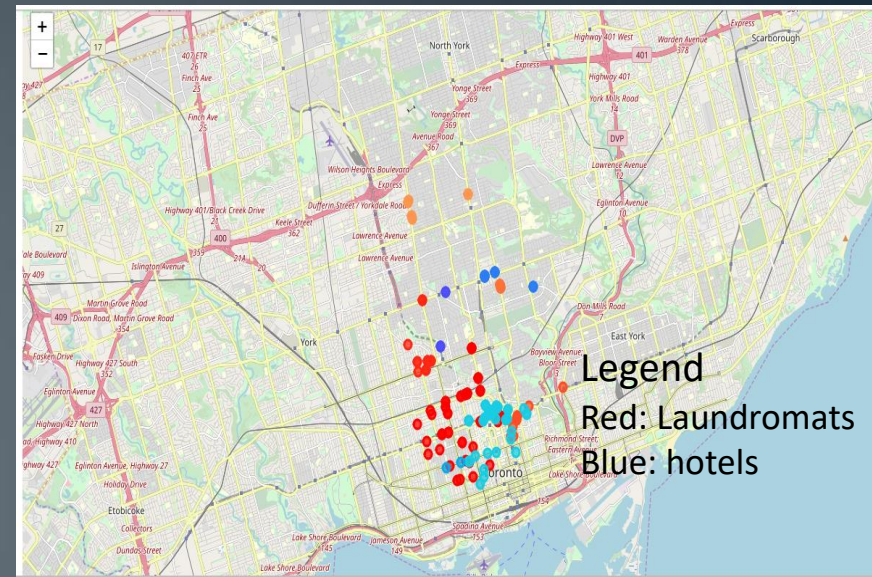
## Hierarchical Clustering



# RESULT

## Analysis on Central Toronto

- The neighborhoods falling under Central Toronto amount to 9 neighborhoods in total. The Laundromats and hotels around these neighborhoods were explored.
- A total of 106 Laundromats and 87 hotels were found after performing the query on Foursquare API around these neighborhoods.
- Hierarchical clustering on the Laundromats and hotels have produced a total of 5 clusters of Laundromats and 4 clusters of hotels



### 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		43.6632		-79.4126	28

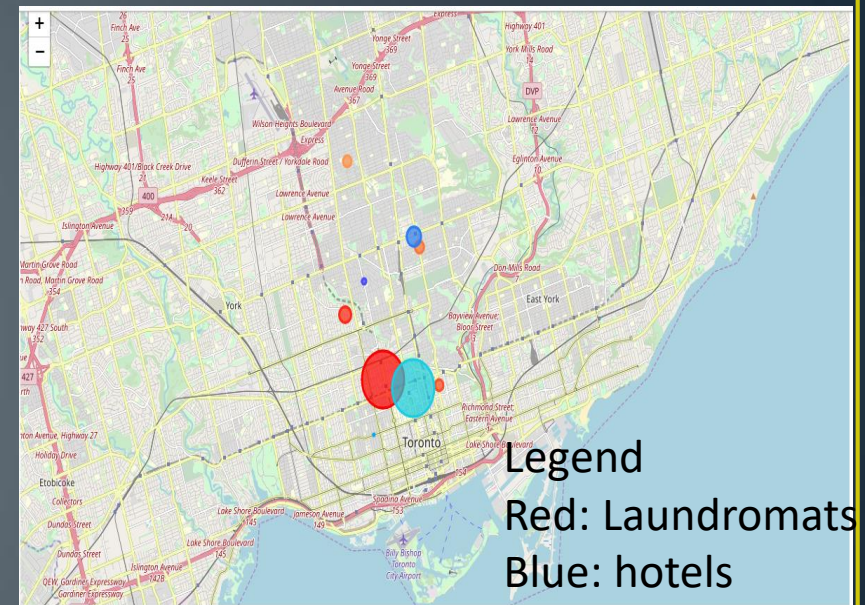
### Hotel clusters:

	Venue	Latitude	Venue	Longitude	Number of Venues
0		43.6959		-79.4155	6
1		43.7075		-79.3911	20
2		43.6578		-79.4022	11
3		43.6696		-79.3909	52



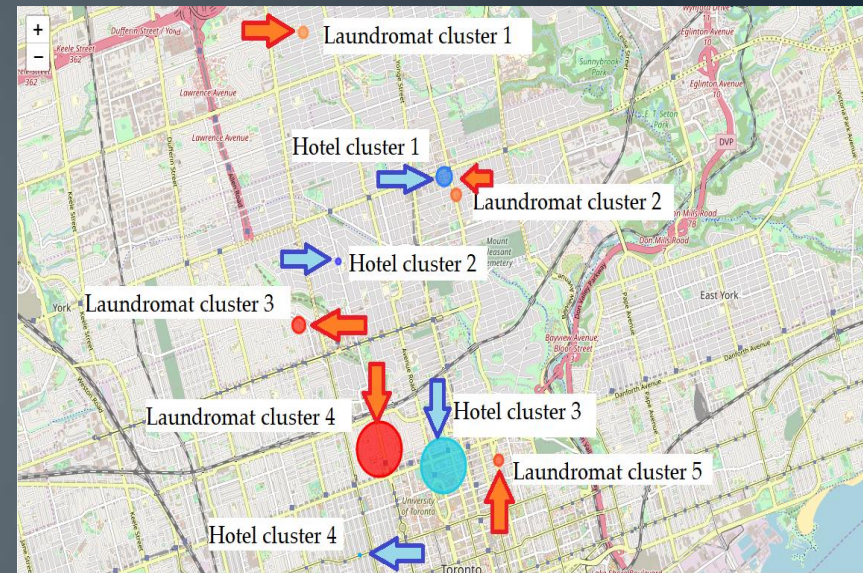
# DISCUSSION

- It can be observed that the Laundromat and hotel clusters are generally overlapping or close to each other. This observation makes sense as the Laundromats depend on the tourist population for supporting its business.
- A large concentration of Laundromats and hotels alike can be found surrounding The Annex neighborhood. This can be seen in the large clusters shown in the Folium map.



# DISCUSSION

- There is a relatively smaller hotel concentration at the Forest Hill neighborhood with only a very sparse number of Laundromats serving it. The closest cluster of Laundromats is located further away in the neighborhood of Humewood.
- There is a small cluster of Laundromats in the neighborhood of Caribou park which does not have any neighboring hotel clusters. Upon closer inspection, this is probably due to the fact that there are boarding schools and hospitals in that region, which serve as the Laundromats' clientele.



# CONCLUSION

- The most suitable place for setting up a new Laundromat is in the neighborhood of Forest Hill in Central Toronto. This is due to the lack of Laundromats in its close proximity while still having a decent number of hotels. This is however applicable for the clients who are in mid cap range.
- If the client can go for high level investment and can take risk, it is advisable to open a Laundromat service in The Annex neighborhood as there is a large concentration of hotels alike can be found surrounding that area and all big competitors are present there.





# CONCLUSION

## Service with Differentiation

- Wide range of washers and dryers including some of the largest front load washers around
- Clean and bright facility
- 2 change machines
- All large washers should accept quarters ,loonies and toonies
- Lot of seating arrangement
- Car parking facility and limited hour free parking reimbursement
- Availability of multiple folding tables
- Washer/Dryer transfer service for busy customers
- Security cameras monitoring location 24 hours a day



**Equipped with residential laundry, wash and fold , commercial laundry and linen service – pricing should be Competitive ,Transparent ,Affordable.**