

## Introduction/Business Problem

Jane was always a West Toronto resident. After accepting a job promotion, she decides to move to either Toronto Downtown or East Toronto. Jane wants to make a choice depending on the amenities of each area, so she contacts a real estate company, named XY in order to make the right decision. XY is a newly established company and needs to make impression to new customers and also to be effective in customer service, so hires a data scientist to help them with the following problem.

Compare Toronto Downtown and East Toronto, in order to find which kind of amenities each neighborhood provides the most. Each area has unique features, for example East Toronto has quick access to beaches and Downtown Toronto has a lot of sports areas.

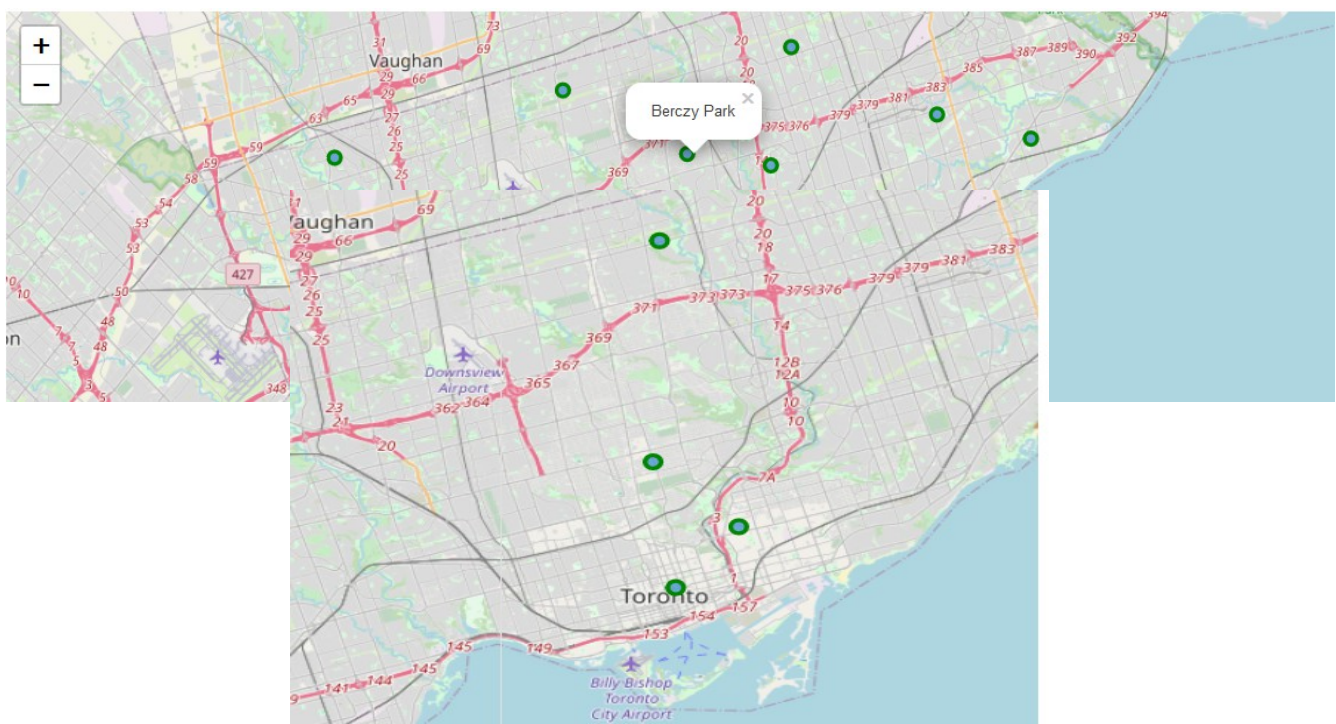
## DATA

For approaching an effective solution to the problem asked from XY real estate company, Jupyter Lab Notebook will be used for the project. Firstly the following Wikipedia page will be used, [https://en.wikipedia.org/wiki/List\\_of\\_postal\\_codes\\_of\\_Canada:\\_M](https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M), in order to obtain the data that is in the table of postal codes and to transform the data into a dataframe. Then location data provider Foursquare API will be used, in order to leverage data for interesting points of each neighborhood. In order to get access to Foursquare Api, coordinates of each neighborhood needed, will be provided by the following csv file [https://cocl.us/Geospatial\\_data](https://cocl.us/Geospatial_data). New dataframes with the types of venues will be created and then with the help of Folium map, the investigation will be visualized with markers.

## METHODOLOGY

As a database Wikipedia was used, in order to bring data in a form easy to examine. Then folium was used, in order to visualize Toronto and its venues with boroughs. Latitude and longitude for each area was imported to the dataframe in order to use Foursquare API for getting all the venues within 500m of Toronto Downtown and East Toronto.

*Downtown Toronto*



## East Toronto

Machine learning algorithm k-mean clustering was deployed to each of the two selected neighborhoods.

Borough	Neighbourhood	Latitude	Longitude	Cluster Labels	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
East Toronto	The Beaches	43.786947	-79.385975	1	Café	Japanese Restaurant	Bank	Chinese Restaurant	Yoga Studio	Ethiopian Restaurant	Farmers Market	Fast Food Restaurant	Frozen Yogurt Shop	Fruit & Vegetable Store
East Toronto	The Danforth West, Riverdale	43.679557	-79.352188	0	Greek Restaurant	Coffee Shop	Italian Restaurant	Restaurant	Ice Cream Shop	Furniture / Home Store	Fruit & Vegetable Store	Liquor Store	Juice Bar	Indian Restaurant
East Toronto	India Bazaar, The Beaches West	43.704324	-79.388790	3	Dessert Shop	Sandwich Place	Italian Restaurant	Sushi Restaurant	Coffee Shop	Café	Pizza Place	Gym	Restaurant	Greek Restaurant
East Toronto	Studio District	43.657162	-79.378937	4	Clothing Store	Coffee Shop	Cosmetics Shop	Bubble Tea Shop	Café	Japanese Restaurant	Italian Restaurant	Hotel	Ramen Restaurant	Pizza Place
East Toronto	Business reply mail Processing Centre, South C	43.688905	-79.554724	2	Bus Line	Park	Sandwich Place	Mobile Phone Shop	Yoga Studio	Electronics Store	Ethiopian Restaurant	Farmers Market	Fast Food Restaurant	Frozen Yogurt Shop

## East Toronto Clusters

The results of the algorithm were further analyzed separately in order to make distinction between the characteristics of Toronto Downtown and East Toronto and propose the right area depending costumer's profile.

## RESULTS

After using algorithms and personal observation for each area,the conclusion is that both areas have a plethora of amenities. Downtown Toronto is ideal for active individuals, as it consists of areas such as parks and sport centers, proper for those who are more athletic. It is also ideal for those looking to combine their activities with entertainment such as coffee shops and restaurants. East Toronto is ideal for those who like to discover gastronomy of different cuisines and also it has close access to Toronto's wonderful beaches. Detailed results for both areas are shown below:

As seen from the above dataframes corresponding to each cluster label, the following conclusions can be made for Downtown Toronto:

1. Cluster 1: the most common venue type are Sports&Athletics,General Entertainment,Fast Food and Skating Rink
2. Cluster 2: the most common venue type is Martial Arts School,Cafe,Pizza Place and Shops
3. Cluster 3: the most common venue type are Coffee Shop
4. Cluster 4: the most common venue type is Baseball Field
5. Cluster 5: the most common venue type are Park and airport

As seen from the above dataframes corresponding to each cluster label, the following conclusions can be made for East Toronto:

1. Cluster 1: the most common venue type is Greek Restaurant
2. Cluster 2: the most common venue type is Cafe
3. Cluster 3: the most common venue type is Bus Line
4. Cluster 4: the most common venue type is Dessert Shop
5. Cluster 5: the most common venue type is Clothing Store

## DISCUSSION

Toronto has 103 boroughs that can be further analyzed depending the services and amenities they provide such as type of cuisine for restaurants, sports amenities, type of sports etc. In that way a complete profile of each area could be provided whenever a costumer will be addressed to the real estate company. Furthermore, we could make assumptions for customers' choices depending their age and family status.

## **CONCLUSION**

After a thorough research about amenities that Downtown Toronto and East Toronto provide, it is clear that Downtown Toronto can be the right person for a vivid, outgoing and active person. East Toronto is ideal for those who value entertainment over activities.