# Capstone Project

## The Battle of Neighbourhoods

# Introduction:

The purpose of this Capstone Project is to help people in exploring better facilities around their neighborhood. It will help people making smart and efficient decision on selecting great neighborhood out of numbers of other neighborhoods in Scarborough, Toranto.

Lots of people are migrating to various states of Canada and needed lots of research for good housing prices and reputed schools for their children. This project is for those people who are looking for better neighborhoods. For ease of accessing to Cafe, School, Super market, medical shops, grocery shops, mall, theatre, hospital, like minded people, etc.

This Capstone Project aim to create an analysis of features for a people migrating to Scarborough to search a best neighborhood as a comparative analysis between neighborhoods. The features include median housing price and better school according to ratings, crime rates of that particular area, road connectivity, weather conditions, good management for emergency, water resources both fresh and waste water and excrement conveyed in sewers and recreational facilities.

It will help people to get awareness of the area and neighborhood before moving to a new city, state, country or place for their work or to start a new fresh life.

# Data Section:

Data Link: https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M
Will use Scarborough dataset which we scrapped from wikipedia on Week 3. Dataset consisting of latitude and longitude, zip codes.
Foursquare API Data:
We will need data about different venues in different neighborhoods of that specific borough.
In order to gain that information we will use “Foursquare” locational information. Foursquare is a location data provider with information about all manner of venues and events within an area of interest. Such information includes venue names, locations, menus and even photos. As such, the foursquare location platform will be used as the sole data source since all the stated required information can be obtained through the API.
After finding the list of neighborhoods, we then connect to the Foursquare API to gather information about venues inside each and every neighborhood. For each neighborhood, we have chosen the radius to be 100 meter.

The data retrieved from Foursquare contained information of venues within a specified distance of the longitude and latitude of the postcodes. The information obtained per venue as follows:

1. Neighborhood
2. Neighborhood Latitude
3. Neighborhood Longitude
4. Venue
5. Name of the Venue
6. Venue Latitude
7. Venue Longitude
8. Venue Category

# Methodology Section:

To compare the similarities of two cities, we decided to explore neighborhoods, segment them, and group them into clusters to find similar neighborhoods in a big city like New York and Toronto. To be able to do that, we need to cluster data which is a form of unsupervised machine learning: k-means clustering algorithm.

# Using K-Means Clustering Approach

## K-Means Clustering Approach

In [34]:
```
# Using K-Means to cluster neighborhood into 3 clusters
Scarborough_grouped_clustering = Scarborough_grouped.drop('Neighborhood', 1)
kmeans = KMeans(n_clusters=3, random_state=0).fit(Scarborough_grouped_clustering)
kmeans.labels_
```

Out[34]:
```
array([1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 0, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 0, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1,
       1, 0, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       0, 1, 1, 1, 1, 1, 1, 0, 1, 1, 2])
```

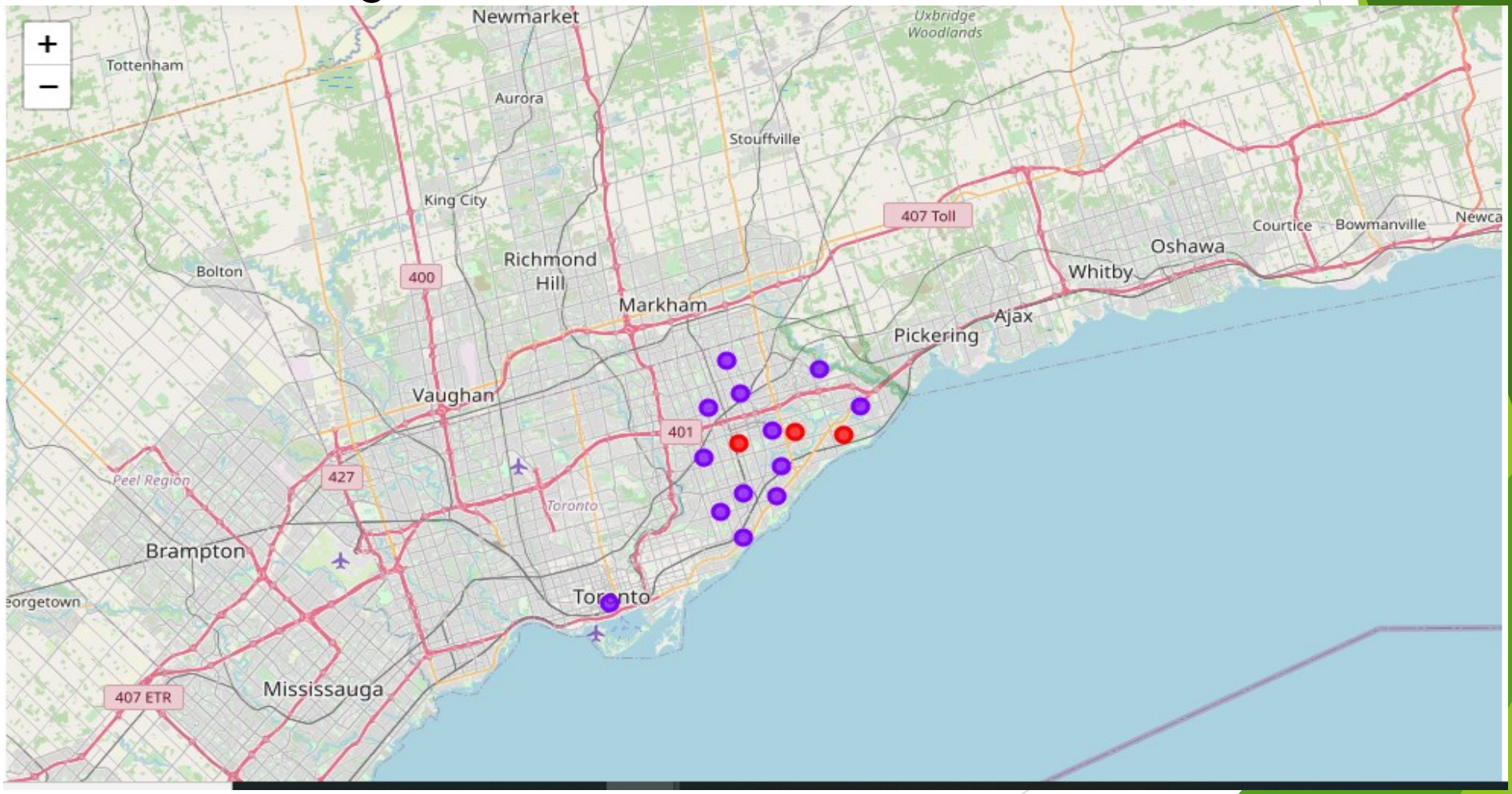
In [35]:
```
neighborhoods_venues_sorted.insert(0, 'Cluster Labels', kmeans.labels_)

Scarborough_merged =df_2.iloc[:16,:]

# merge toronto_grouped with toronto_data to add latitude/longitude for each neighborhood
Scarborough_merged = Scarborough_merged.join(neighborhoods_venues_sorted.set_index('Neighborhood'), on='Neighborhood')

Scarborough_merged.head()
```

Out[35]:

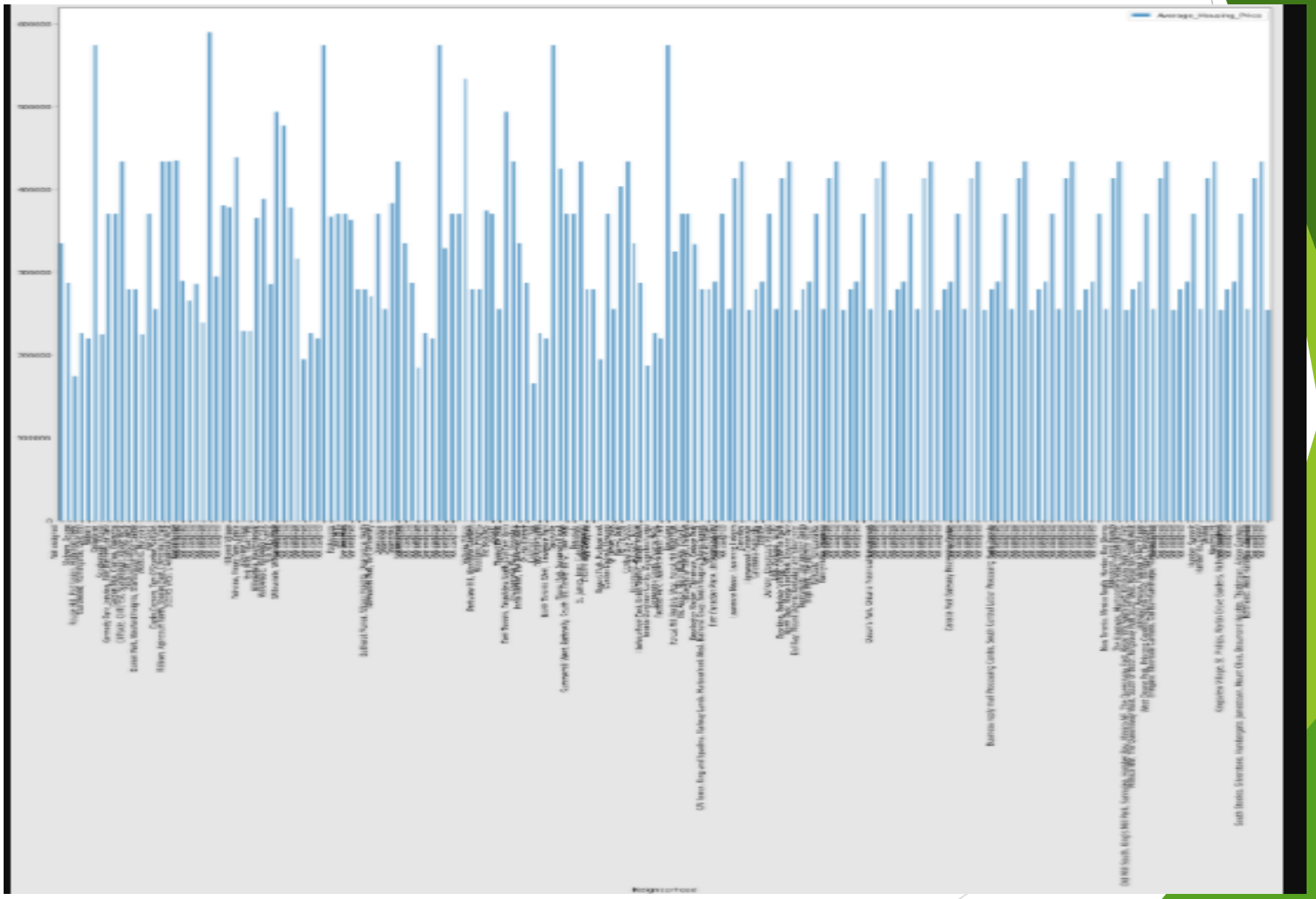
| | Postalcode | Borough | Neighborhood | Latitude | Longitude | Cluster Labels | 1st Most Common Venue | 2nd Most Common Venue | 3rd Most Common Venue | 4th Most Common Venue | 5th Most Common Venue | 6th Most Common Venue | 7th Most Common Venue |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | M1A\n | Not assigned\n | Not assigned\n | 43.64869 | -79.38544 | 1 | Coffee Shop | Hotel | Café | Restaurant | Beer Bar | Pizza Place | Arts & Crafts Store |
| 1 | M1B\n | Scarborough\n | Malvern, | 43.81139 | -79.19662 | 1 | Construction & | Zoo Exhibit | Fast Food | Electronics | Dive Bar | Dog Run | Doner |

# Result:

## Map of Clusters in Scarborough



# Average Housing Price by Clusters in Scarborough



# Conclusion:

In this project, using k-means cluster algorithm I separated the neighborhood into 10(Ten) different clusters and for 180 different latitude and logitude from dataset, which have very-similar neighborhoods around them. Using the charts above results presented to a particular neighborhood based on average house prices and school rating have been made.

I feel rewarded with the efforts and believe this course with all the topics covered is well worthy of appreciation. This project has shown me a practical application to resolve a real situation that has impacting personal and financial impact using Data Science tools. The mapping with Folium is a very powerful technique to consolidate information and make the analysis and decision better with confidence.