The Battle of Neighborhoods

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1. Introduction

The purpose of this 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 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.

2. Data Acquisition and Cleaning

DataLink: https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_MWi
ll use Scarborough dataset which we scrapped from wikipedia. Dataset
consisting of latitude and longitude, zip codes.

2.1 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 meters.

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 e.g. the name of a store or restaurant
6. Venue Latitude
7. Venue Longitude
8. Venue Category

3. Methodology Section

Clustering Approach:

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

```
       2, 2, 2, 2, 2, 2, 1, 2, 2, 1], dtype=int32)
```

In [33]:
```
neighborhoods_venues_sorted.insert(0, 'Cluster Labels', kmeans.labels_)

Scarborough_merged =df_2.iloc[:16,:]
```

In [34]:
```
Scarborough_merged = Scarborough_merged.join(neighborhoods_venues_sorted.set_index('Neighborhood'), on='Neighborhood')

Scarborough_merged.head()
```

Out[34]:

	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
0	M1B	Scarborough	Malvern, Rouge	43.81139	-79.19662	0	Zoo Exhibit	Paintball Field	Fast Food Restaurant	Event Space	Dumpling Restaurant	Eastern European Restauran
1	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	43.78574	-79.15875	2	Bar	Construction & Landscaping	Fish & Chips Shop	Falafel Restaurant	Eastern European Restaurant	Electronics Store
2	M1E	Scarborough	Guildwood, Morningside, West Hill	43.76575	-79.17470	1	Park	Gym / Fitness Center	Athletics & Sports	Gymnastics Gym	Yoga Studio	Doner Restauran
3	M1G	Scarborough	Woburn	43.76812	-79.21761	1	Coffee Shop	Chinese Restaurant	Park	Fast Food Restaurant	Event Space	Dumpling Restauran
4	M1H	Scarborough	Cedarbrae	43.76944	-79.23892	2	Thai Restaurant	Bakery	Caribbean Restaurant	Gas Station	Athletics & Sports	Hakka Restauran

Most Common venues near Neighborhood

top 10 Common venues near neighborhood¶

In [31]:
```
import numpy as np
num_top_venues = 10

indicators = ['st', 'nd', 'rd']

columns = ['Neighborhood']
for ind in np.arange(num_top_venues):
    try:
        columns.append('{}{} Most Common Venue'.format(ind+1, indicators[ind]))
    except:
        columns.append('{}th Most Common Venue'.format(ind+1))

neighborhoods_venues_sorted = pd.DataFrame(columns=columns)
neighborhoods_venues_sorted['Neighborhood'] = Scarborough_grouped['Neighborhood']

for ind in np.arange(Scarborough_grouped.shape[0]):
    neighborhoods_venues_sorted.iloc[ind, 1:] = return_most_common_venues(Scarborough_grouped.iloc[ind, :], num_top_venues)

neighborhoods_venues_sorted.head()
```

Out[31]:

	Neighborhood	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
0	Agincourt	Shopping Mall	Pharmacy	Print Shop	Bubble Tea Shop	Skating Rink	Breakfast Spot	Shanghai Restaurant	Sandwich Place	Supermarket	Latin American Restaurant
1	Alderwood, Long Branch	Sandwich Place	Pub	Performing Arts Venue	Gym	Coffee Shop	Pharmacy	Gas Station	Print Shop	Pizza Place	Convenience Store
	Bathurst Manor,	Coffee	Sandwich		Mediterranean	Mobile	Fried	Sushi			Middle

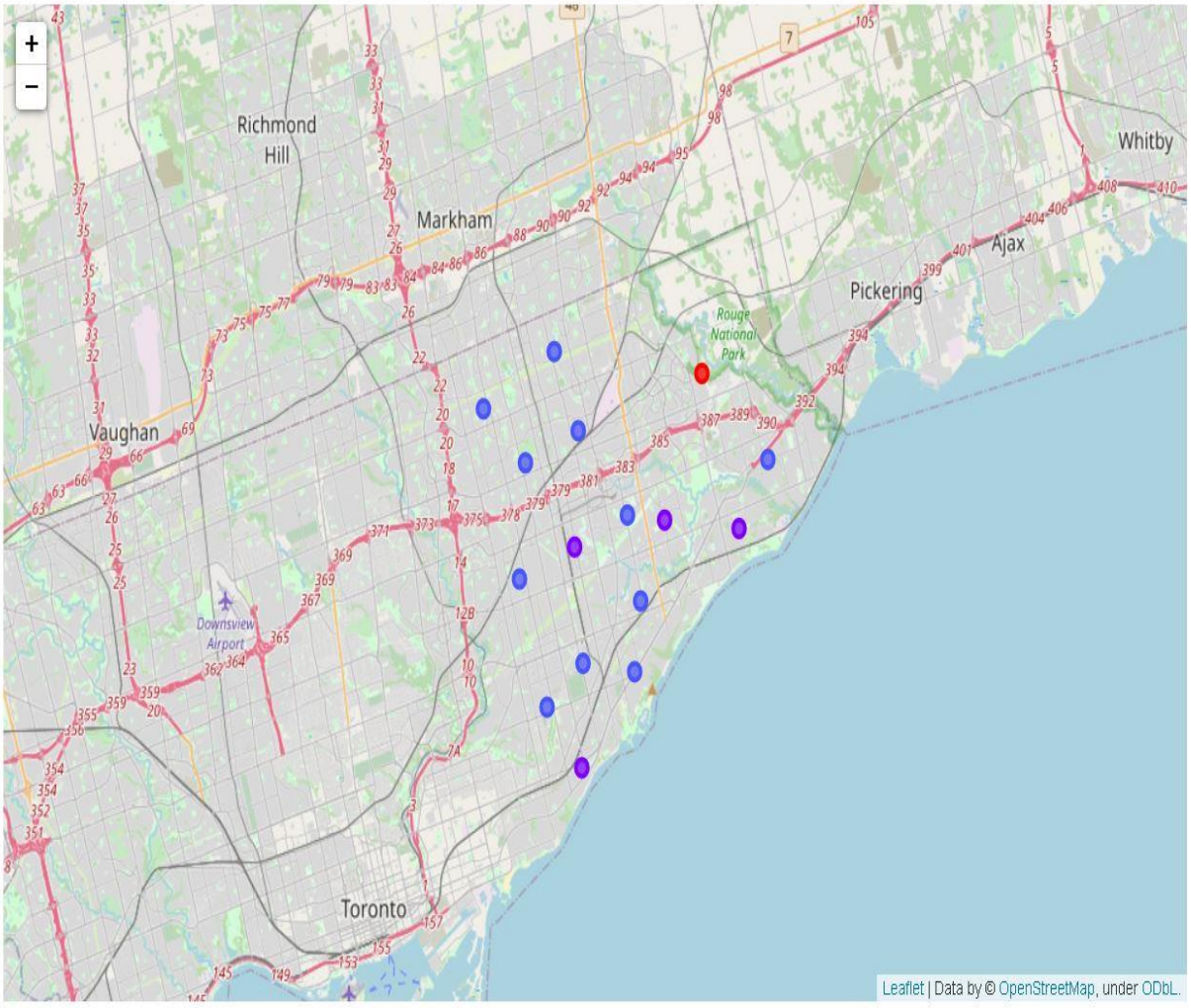
Work Flow:

Using credentials of Foursquare API features of near-by places of the neighborhoods would be mined. Due to http request limitations the number of places per neighborhood parameter would reasonably be set to 100 and the radius parameter would be set to 500.

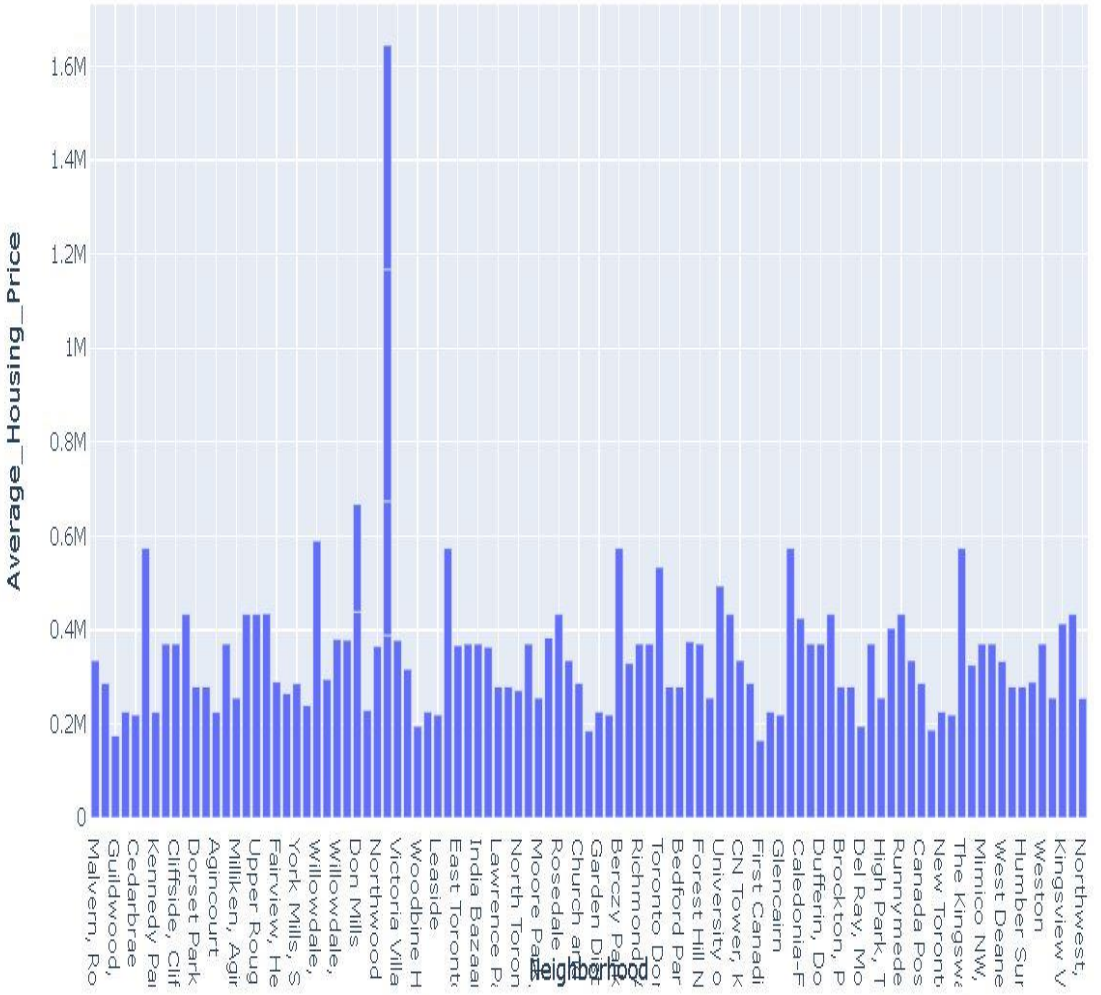
4. Result Section

Map of Clusters

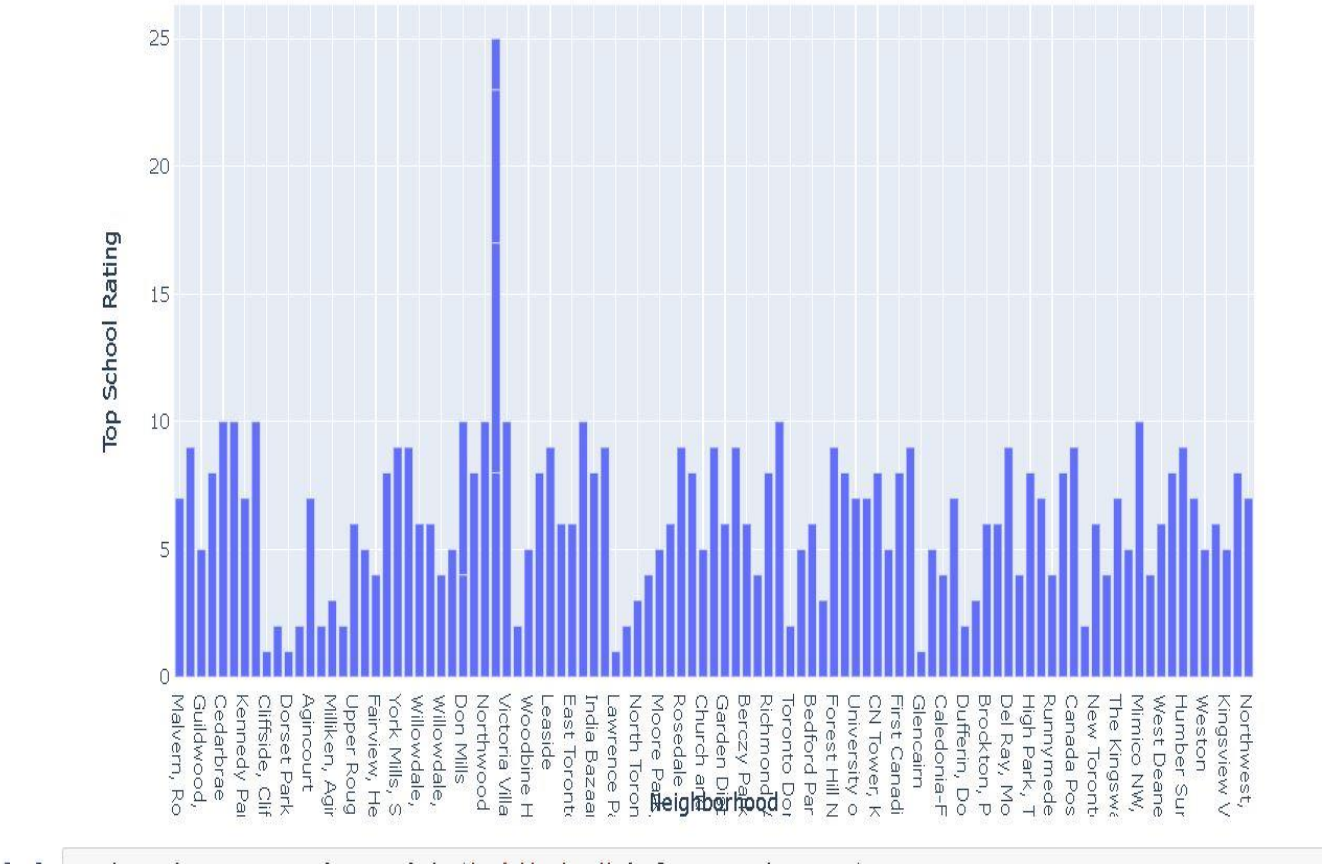
Out[37]:



Average Housing Price by Clusters



School Ratings by Clusters



Location

Scarborough is a popular destination for new immigrants in Canada to reside. As a result, it is one of the most diverse and multicultural areas in the Greater Toronto Area, being home to various religious groups and places of worship. Although immigration has become a hot topic over the past few years with more governments seeking more restrictions on immigrants and refugees, the general trend of immigration into Canada has been one of on the rise.

Foursquare API:

This project has used Four-square API as its prime data gathering source as it has a database of millions of places, especially their places API which provides the ability to perform location search, location sharing and details about a business.

5. Discussion Section

5.1 Problem which Tried to Solve

The major purpose of this project, is to suggest a better neighborhood in a new city for the person who are shifting there.

Social presence in society in terms of like-minded people. Connectivity to the airport, bus stand, city centre, markets and other daily needs things nearby.

1. Sorted list of houses in terms of housing prices in a ascending or descending order.
2. Sorted list of schools in terms of location, fees, rating and reviews.

6. Conclusion Section

In this project, using k-means cluster algorithm I separated the neighborhood into 3 different clusters and for 103 different latitude and longitude 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.