

The Battle of Neighborhoods - Finding a Better Place in Scarborough, Toronto

1. Introduction

This Project is to help people in exploring better facilities around their neighborhood. It will help people to make efficient decisions on selecting great neighborhood out of numbers of other neighborhoods in Scarborough, Toronto.

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

This Project will 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 freash and waste water and exrement 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 Description

2.1 Scrapped Data Source

Data Source Link: https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M

Scarborough dataset which I scrapped from wikipedia on Week 3 would be used in the project. Dataset consisting of latitude and longitude, zip codes.

2.2 API Data Source - Foursquare

I also need data about different venues in different neighborhoods of that specific borough.

In order to gain that information I 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.

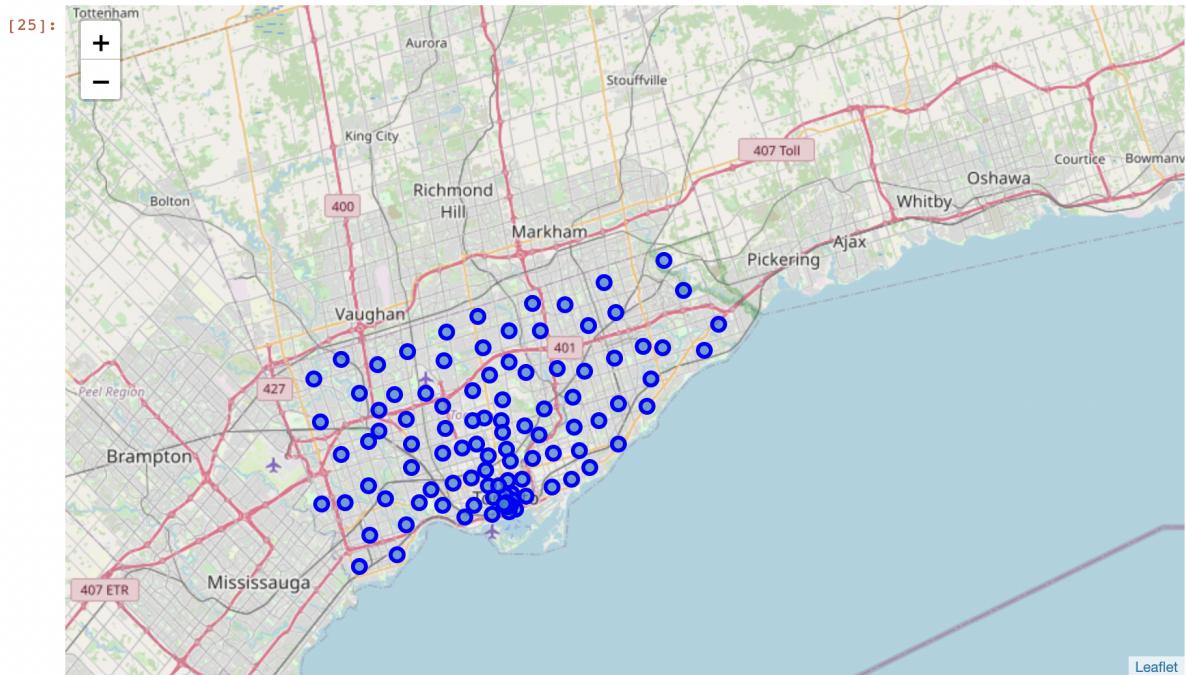
After finding the list of neighborhoods, then connect to the Foursquare API to gather information about venues inside each and every neighborhood. For each neighborhood, I have chosen the radius to be 100 meter.

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

2.3 Map of Scarborough



3. Methodology

3.1 Clustering Approach

To compare the similarities of two cities, I 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, I need to cluster data which is a form of unsupervised machine learning: k-means clustering algorithm

3.1.1 K-Means Clustering Approach

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

Scarborough_merged = df_clean_final_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()
```

	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	8th C
0	M1B	Scarborough	Malvern, Rouge	43.81139	-79.19662	1	Zoo Exhibit	Fast Food Restaurant	Construction & Landscaping	Creperie	Cosmetics Shop	Escape Room	Ethiopian Restaurant	
1	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	43.78574	-79.15875	1	Bar	Construction & Landscaping	Fish & Chips Shop	Farmers Market	Electronics Store	Escape Room	Ethiopian Restaurant	
2	M1E	Scarborough	Guildwood, Morningside, West Hill	43.76575	-79.17470	2	Park	Gymnastics Gym	Gym / Fitness Center	Athletics & Sports	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Elec
3	M1G	Scarborough	Woburn	43.76812	-79.21761	0	Coffee Shop	Park	Chinese Restaurant	Fast Food Restaurant	Falafel Restaurant	Eastern European Restaurant	Electronics Store	
4	M1H	Scarborough	Cedarbrae	43.76944	-79.23892	0	Bakery	Hakka Restaurant	Caribbean Restaurant	Gas Station	Athletics & Sports	Bank	Thai Restaurant	Play

3.1.2 Most Common venues near Neighborhood

```
[40]: 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()
```

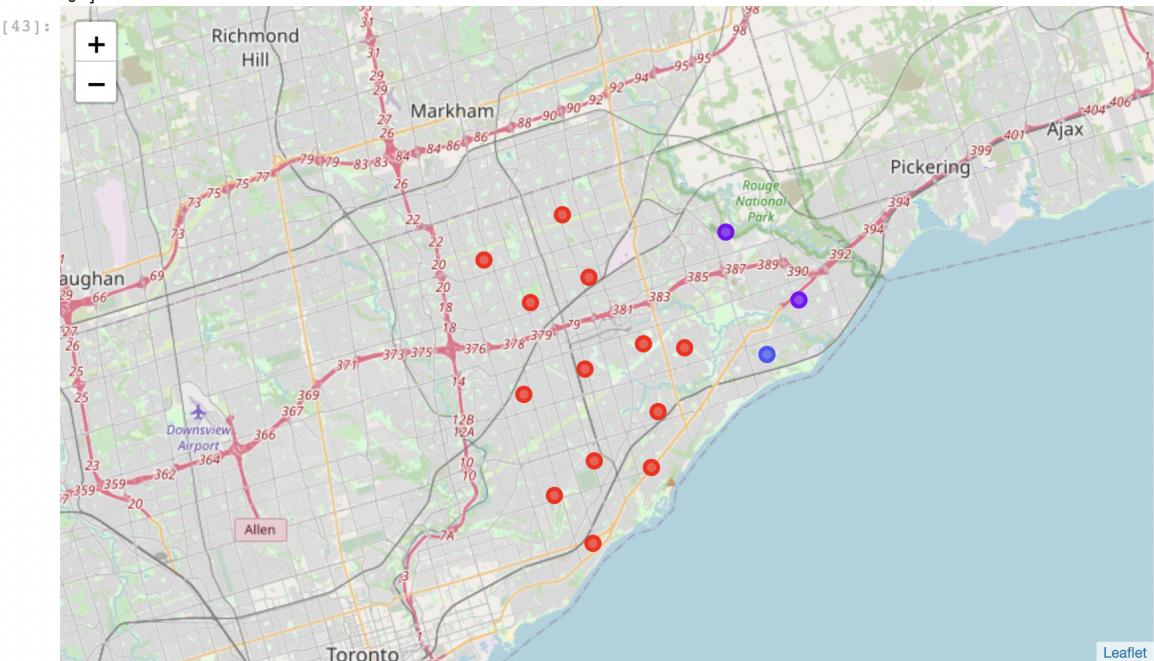
	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Agincourt	Shopping Mall	Hong Kong Restaurant	Badminton Court	Bank	Sushi Restaurant	Supermarket	Latin American Restaurant	Breakfast Spot	Bubble Tea Shop	Sandwich Place
1	Alderwood, Long Branch	Coffee Shop	Gym	Gas Station	Pub	Playground	Pizza Place	Sandwich Place	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant
2	Bathurst Manor, Wilson Heights, Downsview North	Coffee Shop	Park	Sandwich Place	Convenience Store	Pizza Place	Middle Eastern Restaurant	Mediterranean Restaurant	Deli / Bodega	Mobile Phone Shop	Restaurant

3.2 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

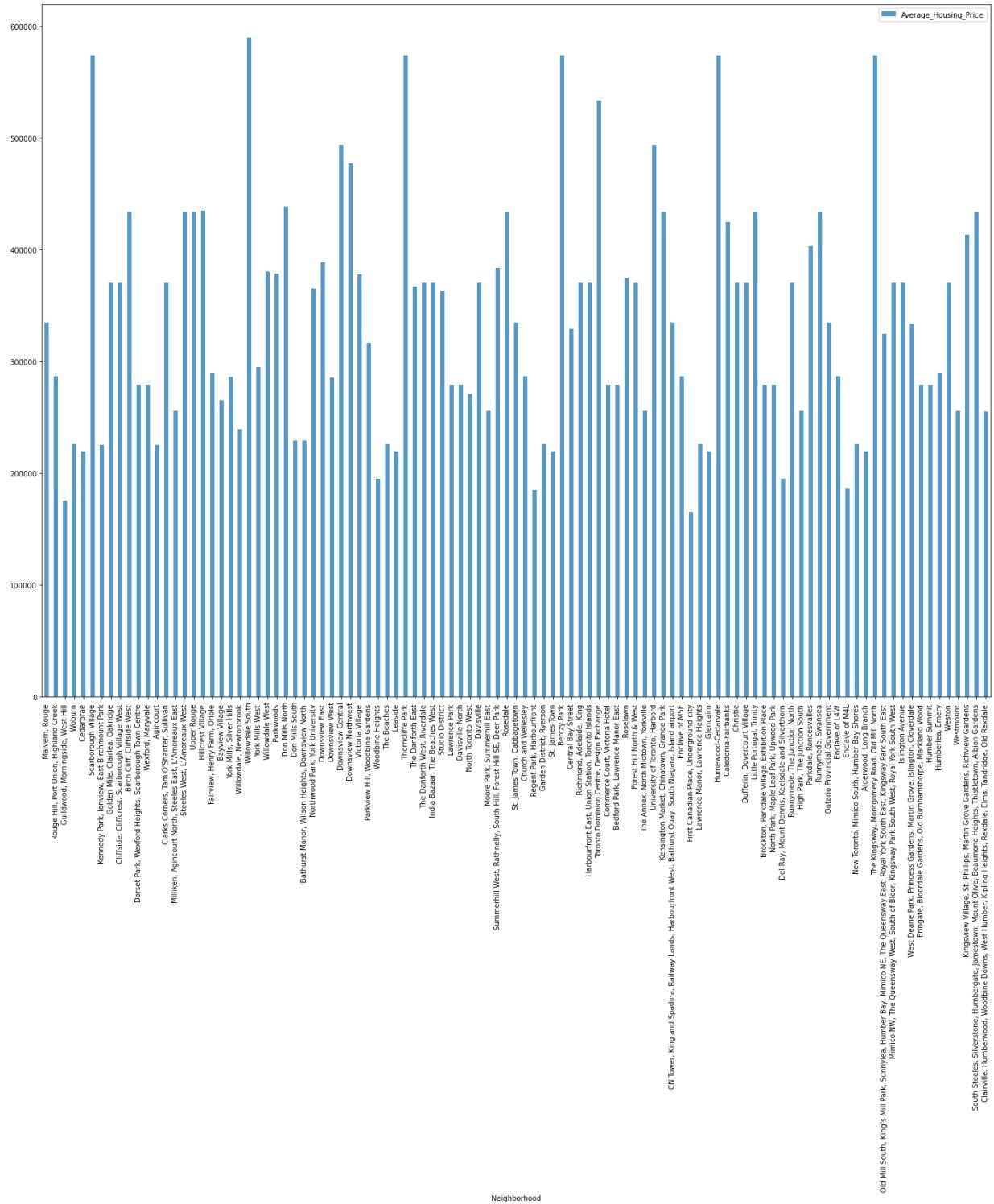
4.1 Map of Clusters in Scarborough



4.2 Average Housing Price by Clusters in Scarborough

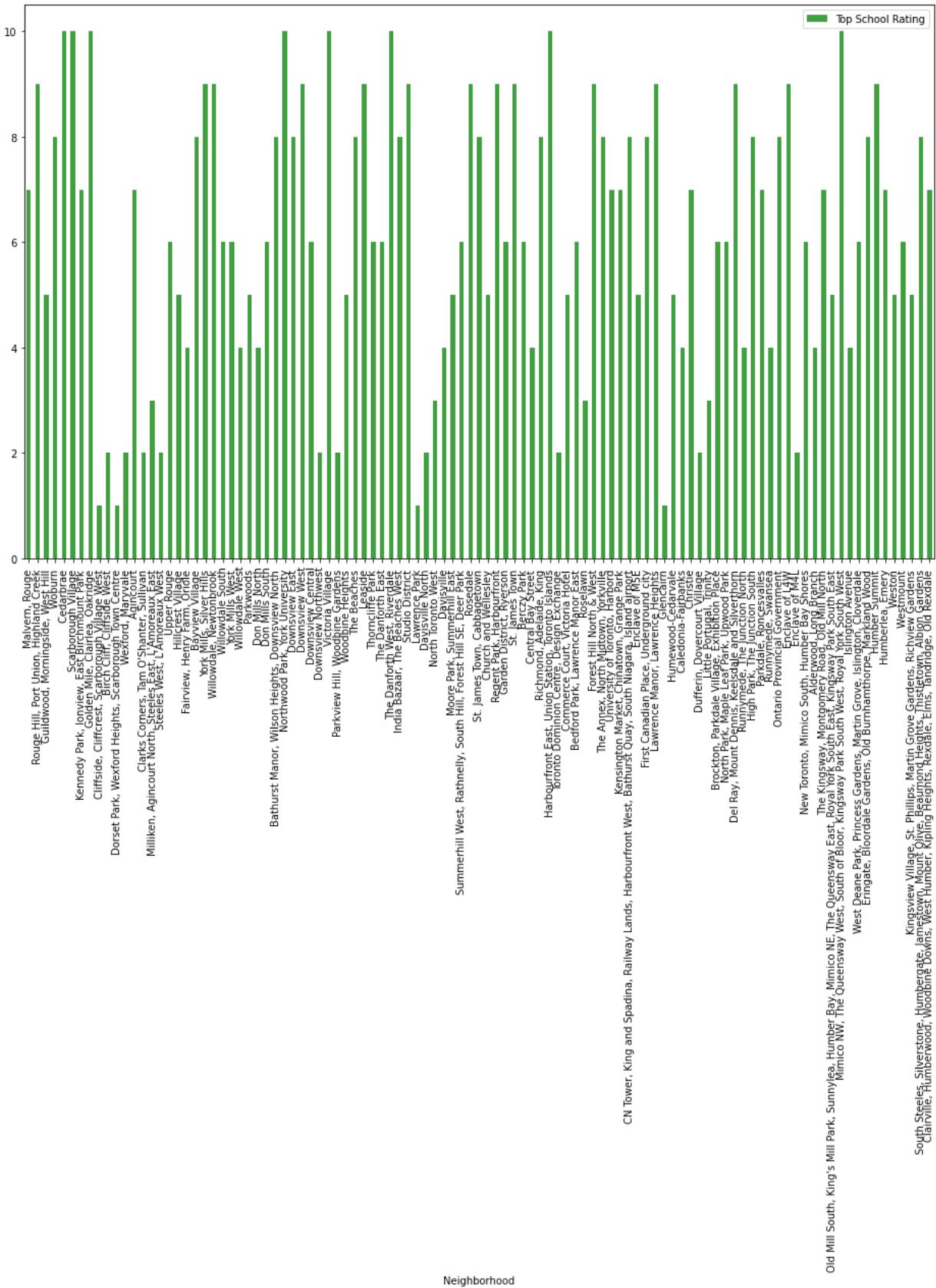
```
In [49]: Scarborough_Avg_HousingPrice.plot(kind='bar', figsize=(24,18), alpha=0.75)
```

```
Out[49]: <AxesSubplot:xlabel='Neighborhood'>
```



4.3 School Ratings by Clusters in Scarborough

```
In [54]: Scarborough_school_ratings.plot(kind='bar', figsize=(16,10), color='green', alpha=0.8)
```



Location Description

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.

API

This project will use 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. Problem Solved

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 center, markets and other daily needs things nearby.

1. Sorted list of house 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

In this project, using k-means cluster algorithm I separated the neighborhood into 10(Ten) 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.

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.

Next step:

This project can be continued for making it more precise in terms to find best house in Scarborough. Best means on the basis of all required things(daily needs or things we need to live a better life) around and also in terms of cost effective.