CAPSTONE PROJECT FINAL REPORT

THE BATTLE OF NEIGHBORHOODS

INTRODUCTION

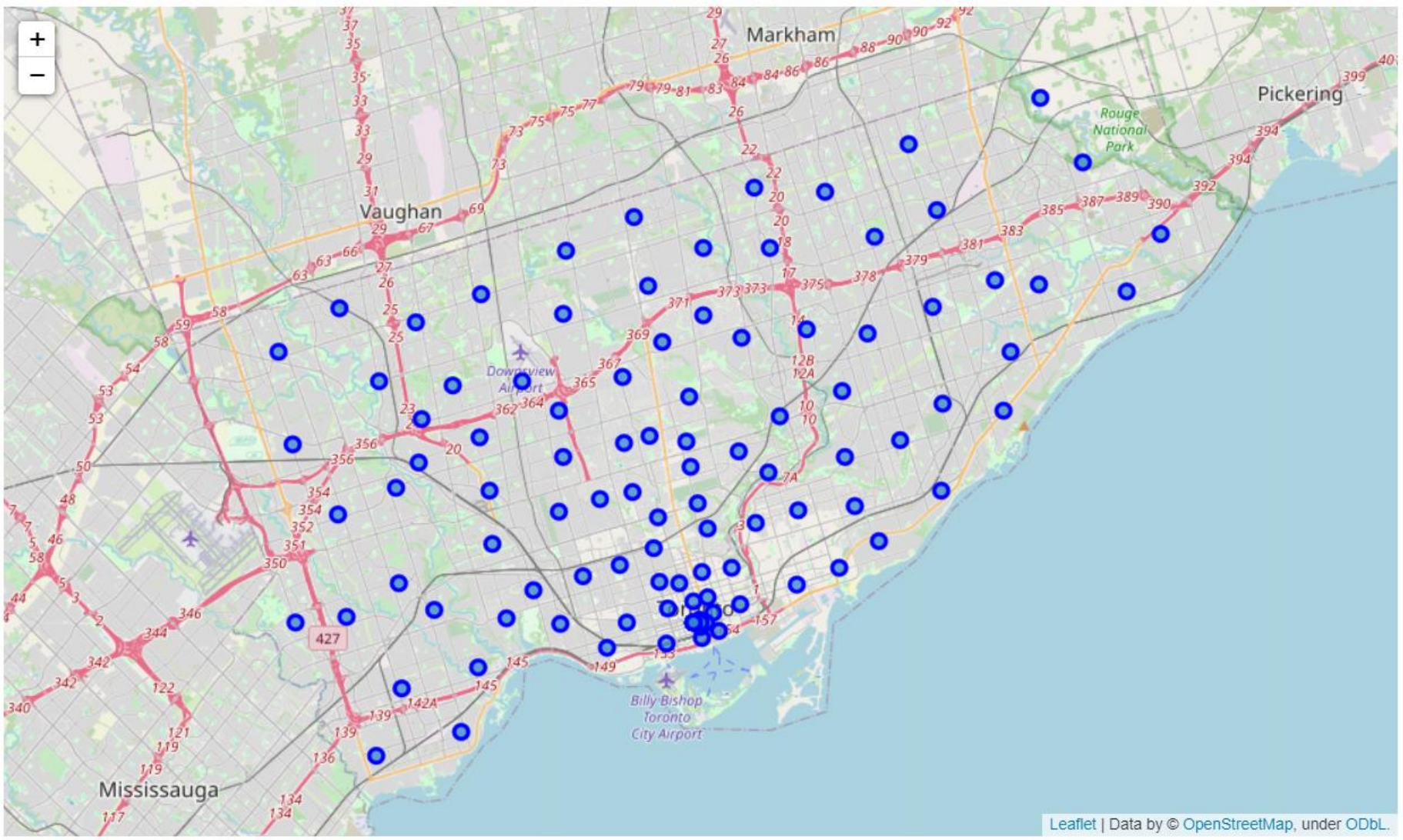
- Help people explore the equipment and facilities better in their neighborhood.
- Assisting people making smart and effective decisions to select excellent neighborhood.
- Scarborough is a popular destination for new immigrants in Canada to reside.
- The reason to choose a better neighborhood is mainly for the kids.
- Appropriate house prices, convenience to shops and ease of accessing hospitals
- Create an analysis among various features influencing people to migrate to Scarborough. (house price, school rating, crime rates, traffic connectivity, weather conditions, emergency management, water supply and waste treatment.)

DATA DESCRIPTION

- Link: https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M
- Data about different venues in different neighborhoods of that specific borough is required for the project. In order to gain that data we will use Foursquare locational information, including venue names, locations, menus and even photos.

- Neighborhood names
- Neighborhood coordinates(latitude, longitude)
- Venue names
- Venue coordinates(latitude, longitude)
- Venue category

MAP OF SCARBOROUGH, TORONTO



PROBLEMS AND SOLUTIONS

- House prices listed in a sorted way(ascending or descending).
- Location, tuition fees, rating and reviews of schools listed in a sorted way(ascending or descending).
- Foursquare API
- comparing the similarities of two cities
- k-means clustering algorithm to cluster data

RESULTS

- K-Means Approach

```
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()# check the last columns!
```

	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	0	Coffee Shop	Hotel	Café	Restaurant	Japanese Restaurant	Beer Bar	Theater
1	M1B\n	Scarborough\n	Malvern, Rouge	43.81139	-79.19662	0	Zoo Exhibit	Construction & Landscaping	Fast Food Restaurant	Paintball Field	Escape Room	Doner Restaurant	Donut Shop
2	M1C\n	Scarborough\n	Rouge Hill, Port Union, Highland Creek	43.78574	-79.15875	1	Bar	Yoga Studio	Ethiopian Restaurant	Donut Shop	Dumpling Restaurant	Eastern European Restaurant	Electronics Store
3	M1E\n	Scarborough\n	Guildwood, Morningside, West Hill	43.76575	-79.17470	2	Park	Gym / Fitness Center	Athletics & Sports	Gymnastics Gym	Yoga Studio	Dog Run	Doner Restaurant
4	M1G\n	Scarborough\n	Woburn	43.76812	-79.21761	2	Fast Food Restaurant	Chinese Restaurant	Park	Coffee Shop	Yoga Studio	Elementary School	Doner Restaurant

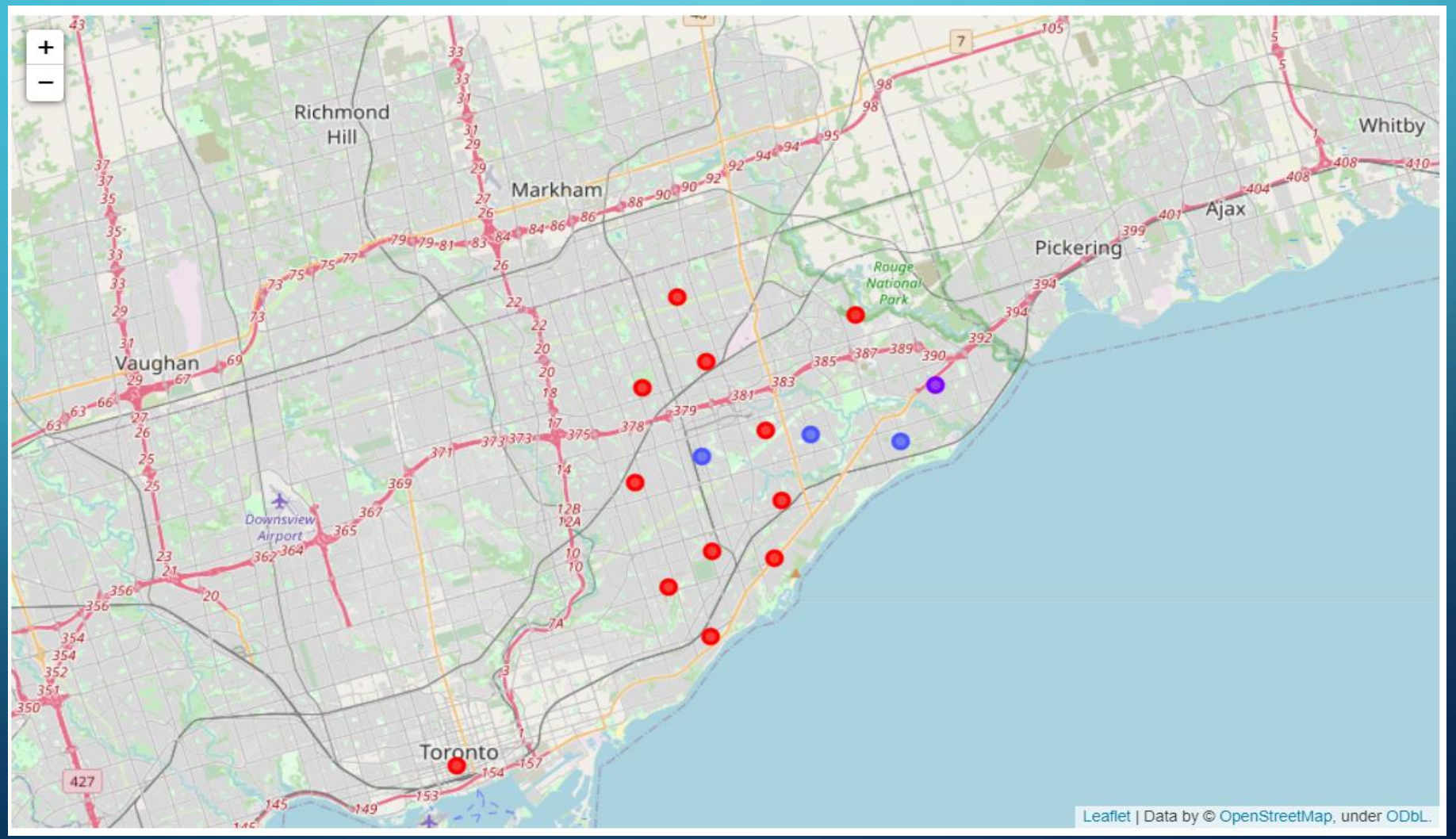
RESULTS

- the most common venues near the neighborhood using clustering method

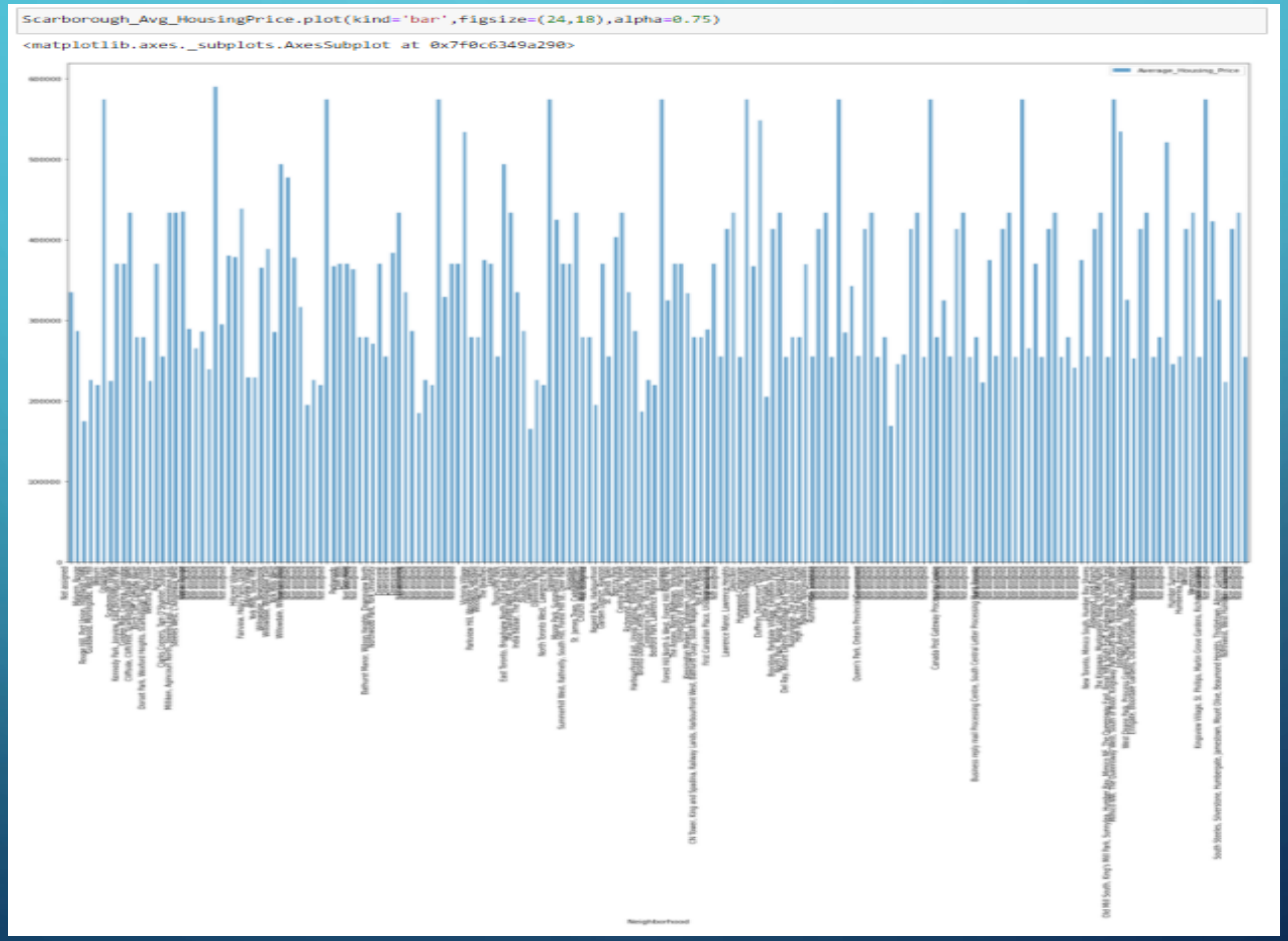
```
num_top_venues = 10

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	Chinese Restaurant	Shopping Mall	Hong Kong Restaurant	Sandwich Place	Sushi Restaurant	Supermarket	Latin American Restaurant	Pharmacy	Bubble Tea Shop	Newsagent
1	Alderwood, Long Branch	Gas Station	Sandwich Place	Pizza Place	Pub	Pharmacy	Coffee Shop	Gym	Eastern European Restaurant	Distribution Center	Dive Bar
2	Bathurst Manor, Wilson Heights, Downsview North	Coffee Shop	Park	Mediterranean Restaurant	Fried Chicken Joint	Convenience Store	Restaurant	Deli / Bodega	Sandwich Place	Middle Eastern Restaurant	Men's Store
3	Bayview Village	Dog Run	Flower Shop	Gas Station	Trail	Park	Asian Restaurant	Electronics Store	Doner Restaurant	Donut Shop	Dumpling Restaurant
4	Bedford Park, Lawrence Manor East	Coffee Shop	Sandwich Place	Italian Restaurant	Pet Store	Juice Bar	Restaurant	Sports Club	Thai Restaurant	Intersection	Pub

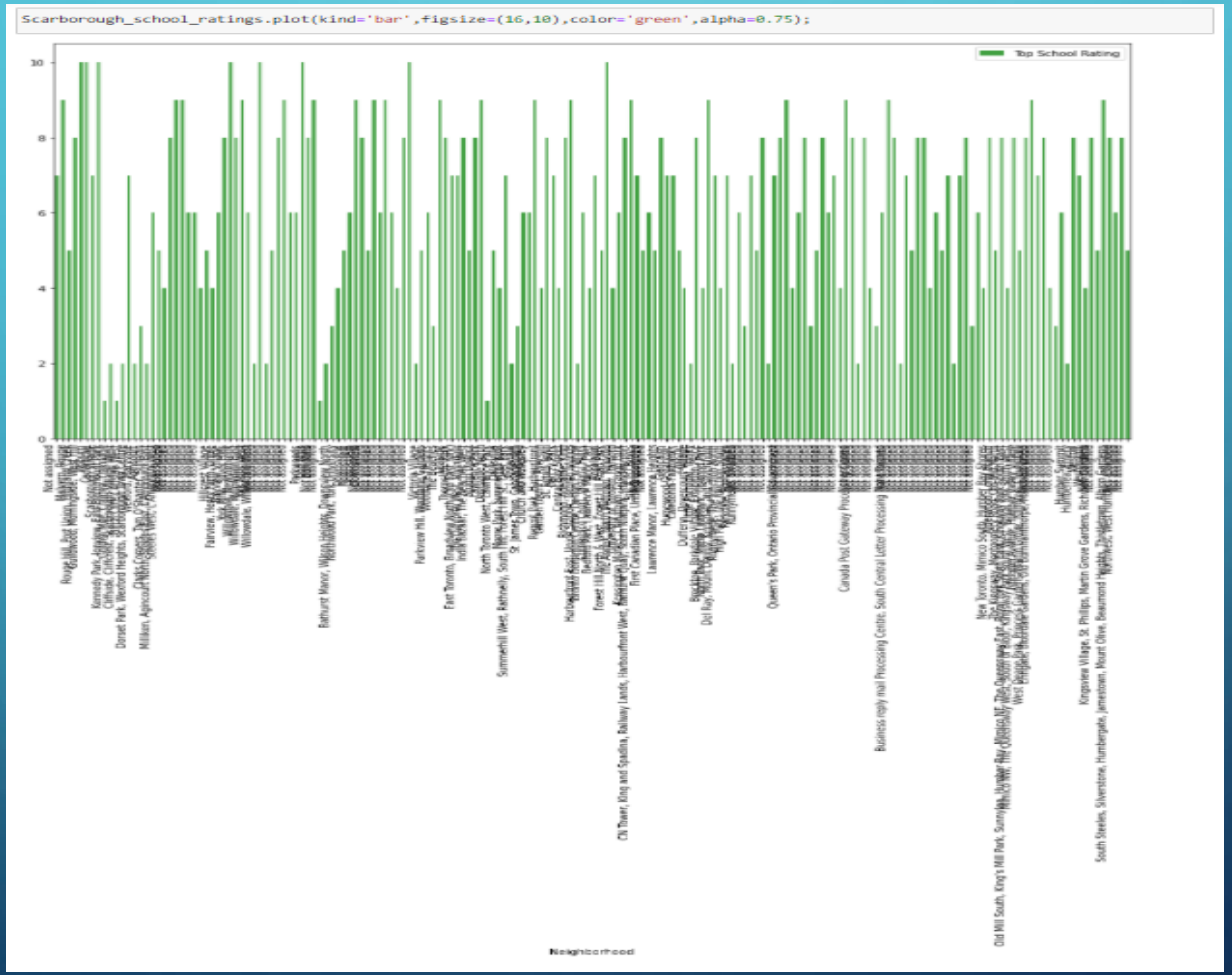
MAP OF CLUSTERS IN THE NEIGHBORHOOD OF SCARBOROUGH, TORONTO



AVERAGE HOUSING PRICE BY CLUSTERS IN SCARBOROUGH



SCHOOL RATINGS BY CLUSTERS IN SCARBOROUGH



CONCLUSION

- Using k-means cluster algorithm, I separated the neighborhood into 10 different clusters and for 180 different lattitude and logitude from dataset, which have very-similar neighborhoods around them. As the charts above, the results show 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.

FUTURE WORKS

- This Capstone 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.

THANK YOU!