BUSINESS VENUE RECOMMENDER SYSTEM

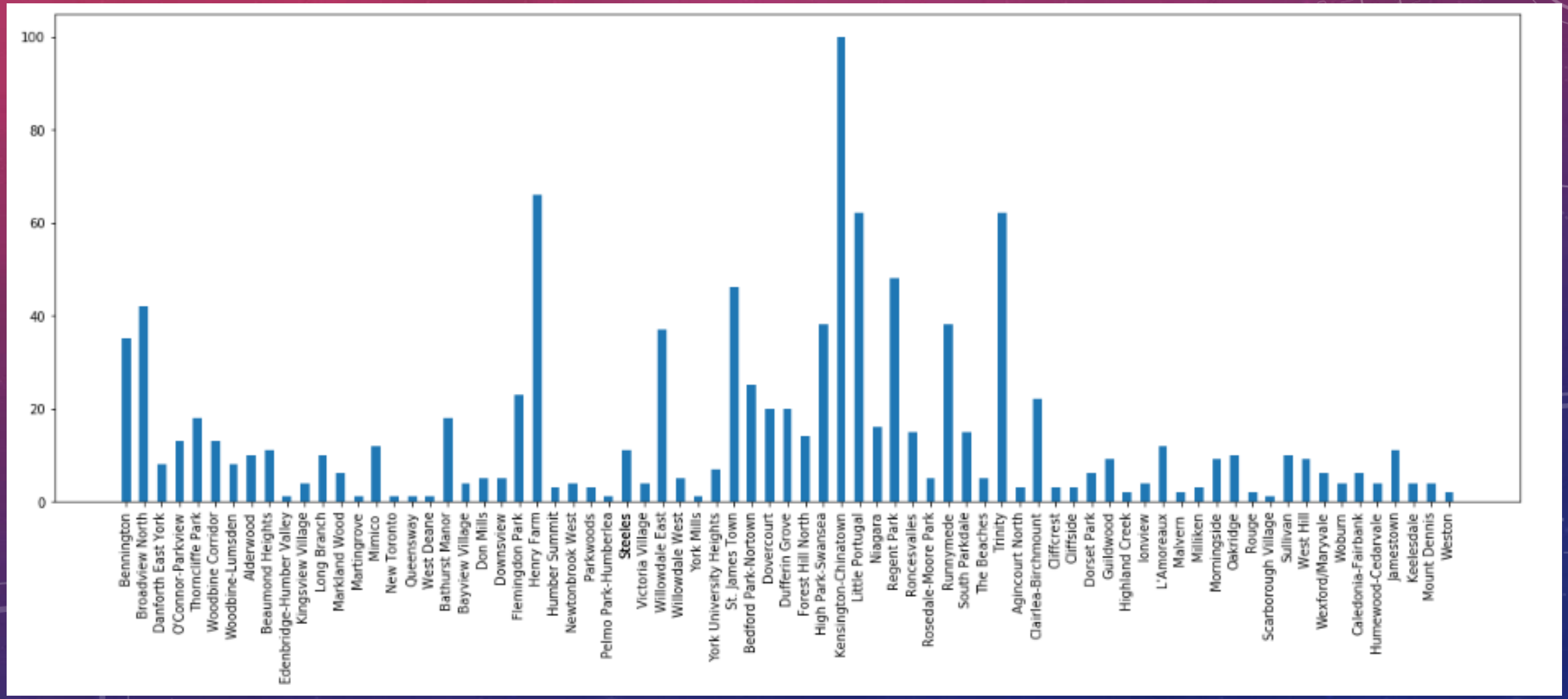
IBM CAPSTONE PROJECT.

METHODOLOGY

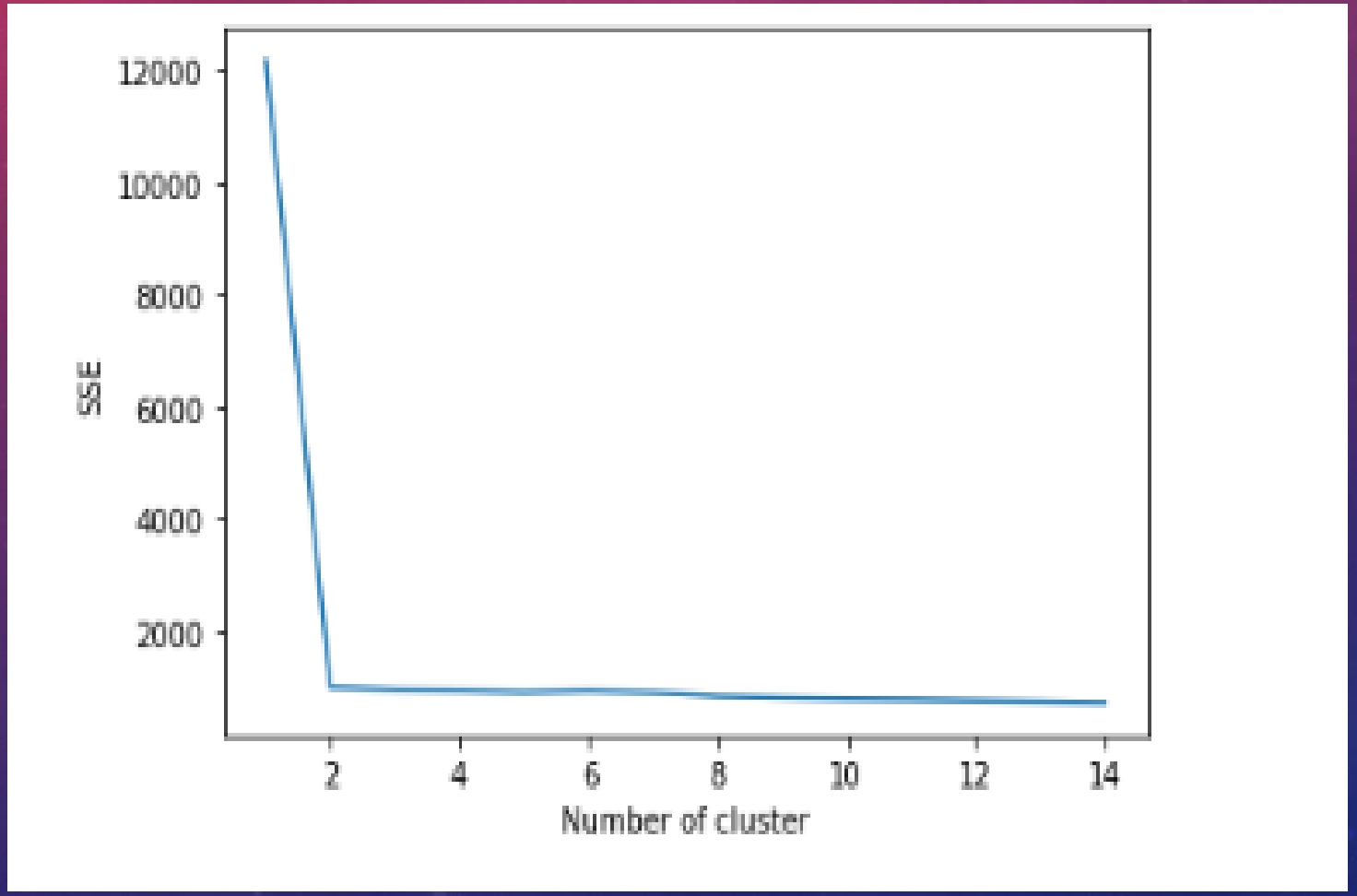
A businessman already has a restaurant being operated successfully in one neighborhood of Ontario. Suppose, he/she wants to increase their revenue by opening another branch of the restaurant in other part of the city. In such situation, the type of neighborhood plays an important in choosing an optimum location for the new branch. Factors like the kinds of venues in the neighborhood, population of the neighborhood, income of the neighborhood and so on have a significant effect on the location chosen for the new branch.

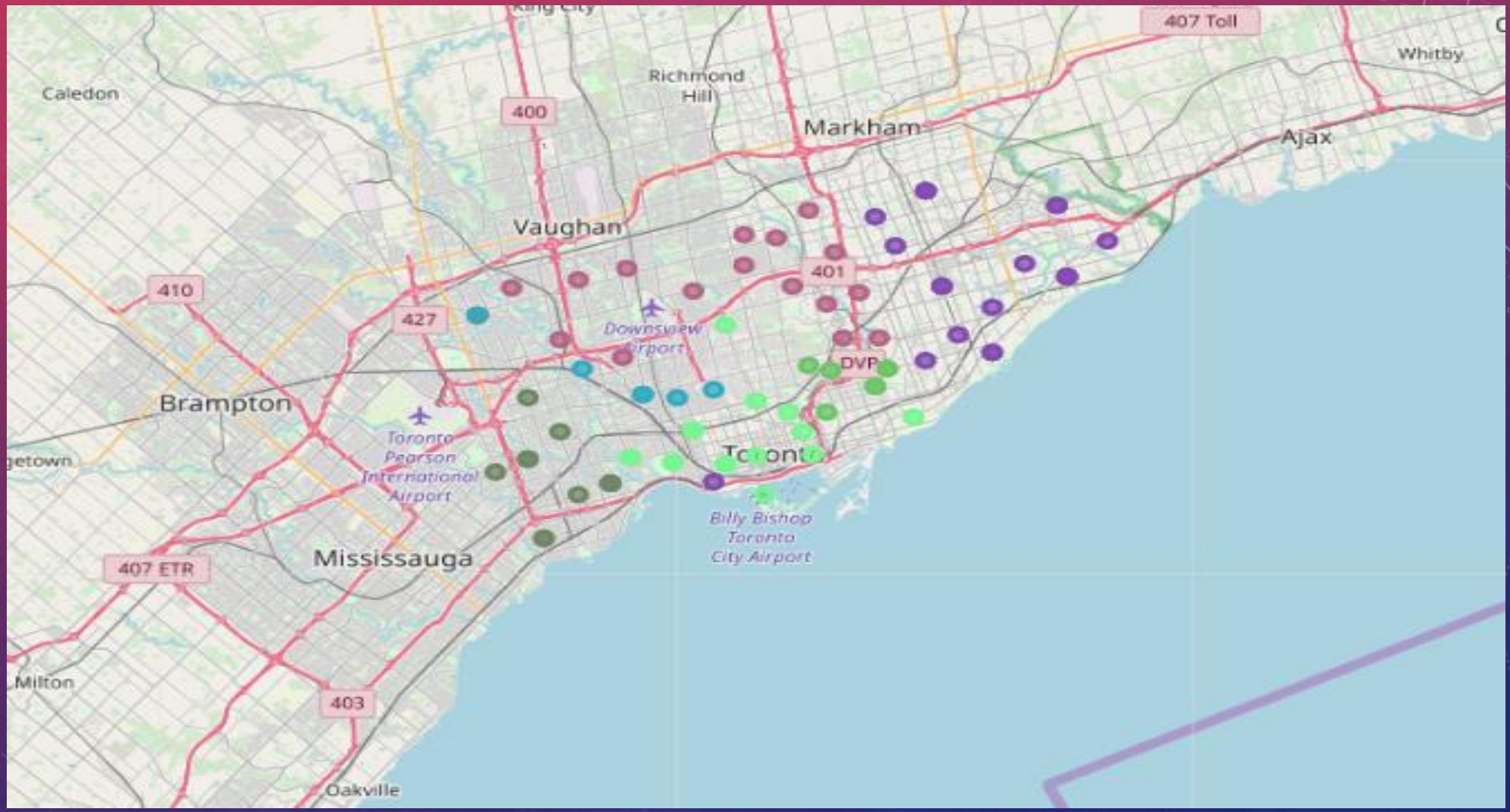
Our aim would be to find a location similar to the location of the original branch to minimize the risks.

NUMBER OF VENUES PER NEIGHBOHOOD



K-MEANS CLUSTER-ELBOW GRAPH




Caledon
Richmond Hill
400
407 Toll
Whitby
Markham
Ajax
Vaughan
401
410
427
DVP
Brampton
Toronto Pearson International Airport
Billy Bishop Toronto City Airport
407 ETR
Mississauga
Milton
403
Oakville

- We will need information about all the neighborhoods and the boroughs of the city of Toronto. We would also need each neighborhood’s latitude and longitude information. We would also need other information like income, and population of each neighborhood.
- We would also need information of venues, their longitude and location of each venue. This is where FourSquare API comes into play. Use of foursquare is focused to fetch nearest venue locations so that we can use them to form a cluster. Foursquare API leverages the power of finding nearest venues in a radius (in my case : 500mts) and also corresponding coordinates, venue location and names.

DATASETS

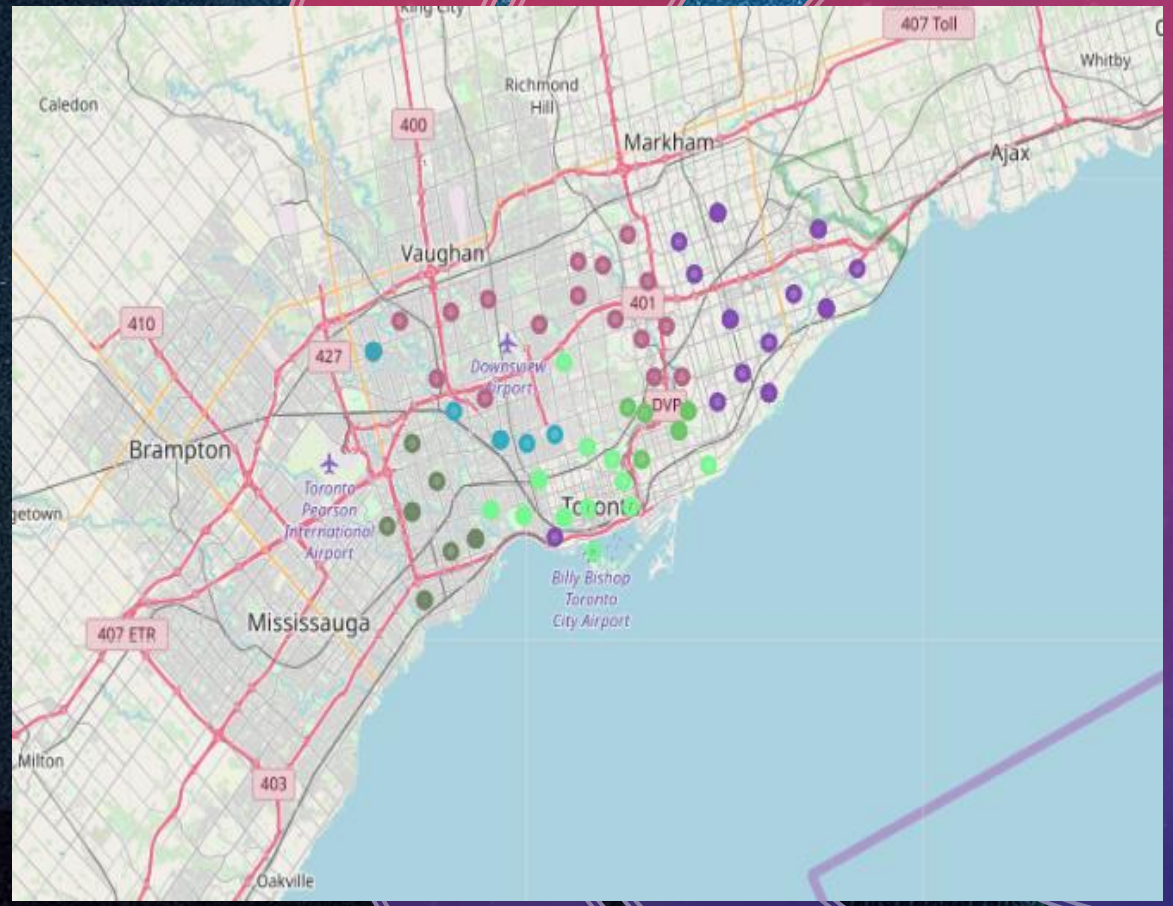
	Post Code	Borough	Neighbourhood	Population	Income
0	M4K	East York	Broadview North	11499	44557
1	M4C	East York	Danforth East York	17180	51846
2	M4G	East York	Bennington	16828	125564
3	M4B	East York	O'Connor-Parkview	18675	43907
4	M4H	East York	Thorncliffe Park	21108	28875

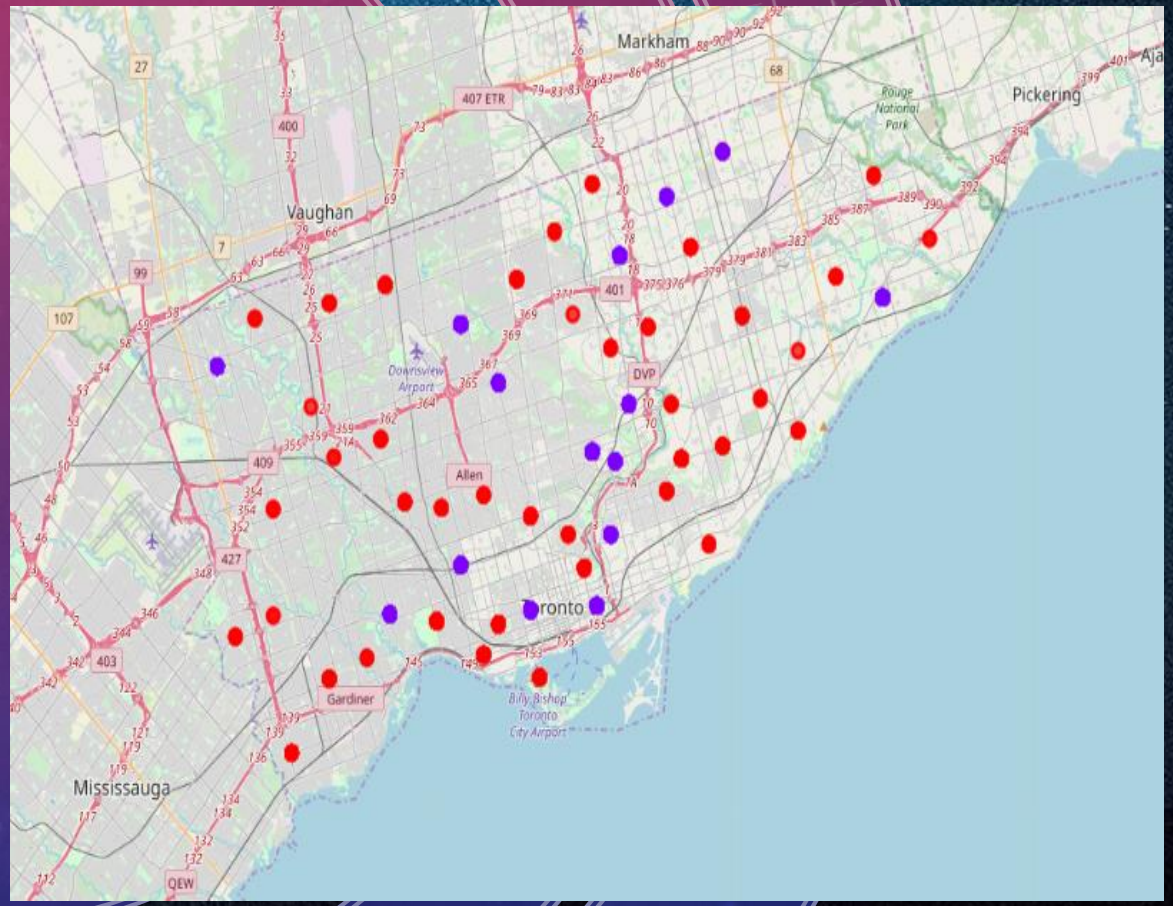
	Post Code	Borough	Neighbourhood	Population	Income	Latitude	Longitude
0	M4K	East York	Broadview North	11499	44557	43.679557	-79.352188
1	M4C	East York	Danforth East York	17180	51846	43.695344	-79.318389
2	M4C	East York	Woodbine-Lumsden	7865	47710	43.695344	-79.318389
3	M4G	East York	Bennington	16828	125564	43.709060	-79.363452
4	M4B	East York	O'Connor-Parkview	18675	43907	43.706397	-79.309937
5	M4B	East York	Woodbine Corridor	12541	55199	43.706397	-79.309937
6	M4H	East York	Thorncliffe Park	21108	28875	43.705369	-79.349372
7	M8W	Etobicoke	Alderwood	12054	47709	43.602414	-79.543484
8	M8W	Etobicoke	Long Branch	10084	47384	43.602414	-79.543484
9	M8Y	Etobicoke	Edenbridge-Humber Valley	15535	101551	43.636258	-79.498509
10	M8Y	Etobicoke	New Toronto	11463	44101	43.636258	-79.498509
11	M8Y	Etobicoke	Queensway	25051	64140	43.636258	-79.498509
12	M9B	Etobicoke	West Deane	18588	47002	43.650943	-79.554724
13	M9B	Etobicoke	Martingrove	22156	44177	43.650943	-79.554724

	Neighborhood	Borough	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Broadview North	East York	43.679557	-79.352188	Pantheon	43.677621	-79.351434	Greek Restaurant
1	Broadview North	East York	43.679557	-79.352188	Dolce Gelato	43.677773	-79.351187	Ice Cream Shop
2	Broadview North	East York	43.679557	-79.352188	MenEssentials	43.677820	-79.351265	Cosmetics Shop
3	Broadview North	East York	43.679557	-79.352188	Cafe Fiorentina	43.677743	-79.350115	Italian Restaurant
4	Broadview North	East York	43.679557	-79.352188	La Diperie	43.677530	-79.352295	Ice Cream Shop

To recommend neighborhoods, we need to factor in the income and population of the neighborhoods as well. So we merge the population and income datasets to our main dataset and create a ranking (Normalized Population*0.5+Normalized Income*0.35+Number of Non Coffee Shops*0.1). We create a range of ranking close to the ranking of our sample neighborhood. All the neighborhoods within that range are our recommended neighborhoods.

MAPPING AND CLUSTERING





RESULTS AND CONCLUSION

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	Rank
0	St. James Town	Coffee Shop	Restaurant	Italian Restaurant	0.230689
1	Bathurst Manor	Coffee Shop	Pizza Place	Middle Eastern Restaurant	0.275586
3	Beaumond Heights	Grocery Store	Pharmacy	Fast Food Restaurant	0.221638

The result of the recommender system is that it produces a list of neighborhoods with their most common type of venues. During the runtime of model, a simulation was done by taking ‘Regent Park’ as the neighborhood and then processed through our model so that it would recommend neighborhoods with similar characters that of ‘Regent Park’.

THANK YOU!