NEIGHBOURHOOD RECOMMENDATION

Introduction

A friend in Central Toronto, near Forest Hill West, is tired of the hustle and Bustle of the city centre and is looking for a quieter, cheaper and cleaner neighbourhood around to move to. He has identified Etobicoke as the perfect suburb. He is also a foodie and wants somewhere where there are very good Italian restaurants like central Toronto.

Description of the Data

The data to be used is neighbourhood information for Central Toronto and Etobicoke was scrapped from Wikipedia: https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M, transformed and used together with location and venue data from obtained from foursquare API.

The neighbourhoods will be clustered to find neighbourhoods that are in the same cluster in Etobicoke as Forest Hill West in Central Toronto.

The foursquare API will then be used to obtain ratings of Italian restaurants within the vicinity to help decide on the best neighbourhood for my friend.

Methodology

Since the client had identified a Borough they will like to move to (Etobicoke), Central Toronto and Etobicoke neighbourhoods were considered for the purpose of this assignment. There is a total of twenty-one (21) neighbourhoods in central Toronto and Etobicoke, nine (9) in Central Toronto and twelve (12) in Etobicoke.
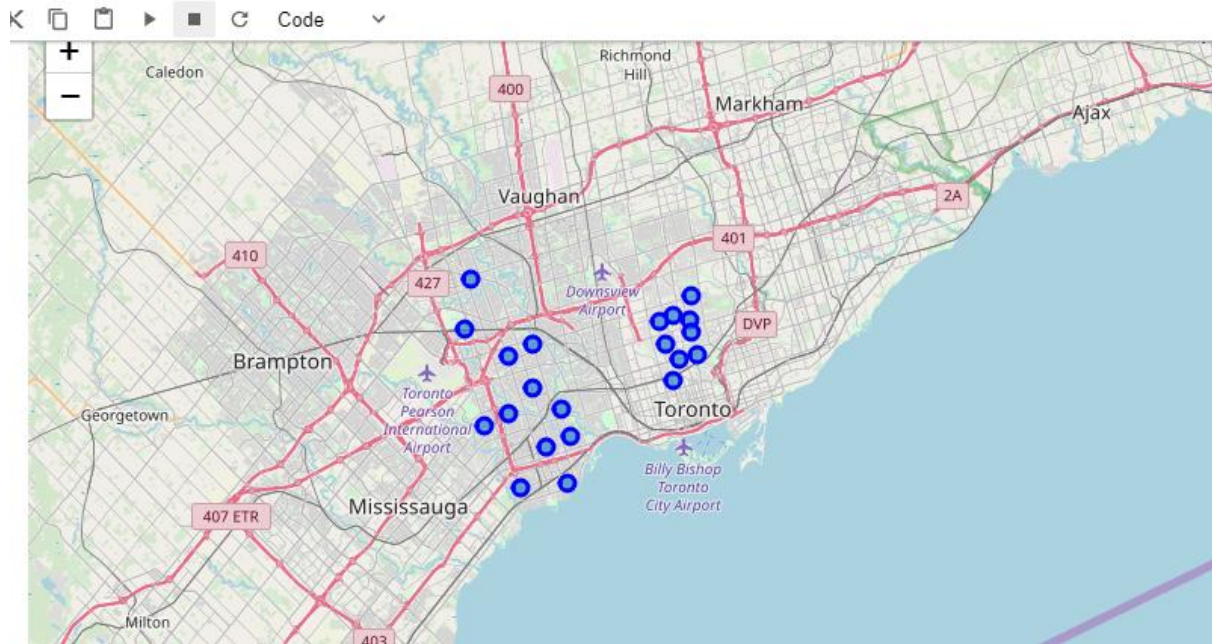
Figure 1: Neighbourhoods in Central Toronto and Etobicoke

Top 50 venues within 500m of Central Toronto were obtained and categorised according to their types.

The neighbourhoods of Central Toronto were explored and grouped into a dataframe by neighbourhood.

Onehot encoding and data from foursquare were then used to obtain the top venues and paces in the two locations.

The neighbourhoods were then segmented into four clusters using k-means clustering algorithm. The cluster to which the current address (Forest Hill West) was determined as cluster 2 and other neighbourhoods in cluster 2 in Etobicoke were identified.
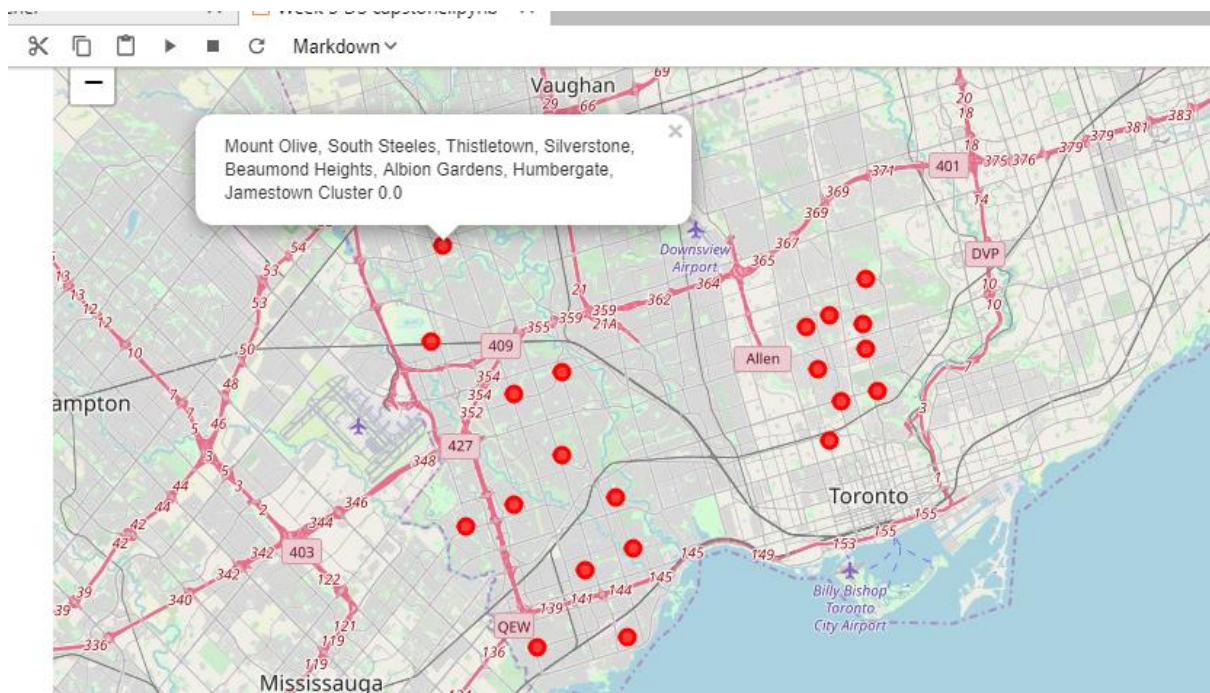
Figure 2: Clusters of Central Toronto and Etobicoke

As shown below, Forest Hill West, with postcode M5P is part of cluster 2, this was then compared with other neighbourhoods in Etobicoke which shares the same cluster. It turn out that there are only two neighbourhoods (post codes M8X and M9R) in the same cluster as Forest Hill West.

	Postcode	Borough	Neighbourhood	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
11	M8X	Etobicoke	The Kingsway, Montgomery Road, Old Mill North	43.653654	-79.506944	2.0	Park	River	Yoga Studio	Food & Drink Shop	Diner	Discount Store
18	M9R	Etobicoke	Richview Gardens, Kingsview Village, St. Phill...	43.688905	-79.554724	2.0	Park	Bus Line	Mobile Phone Shop	Yoga Studio	Dessert Shop	Discount Store

Figure 3: Forest Hill West cluster

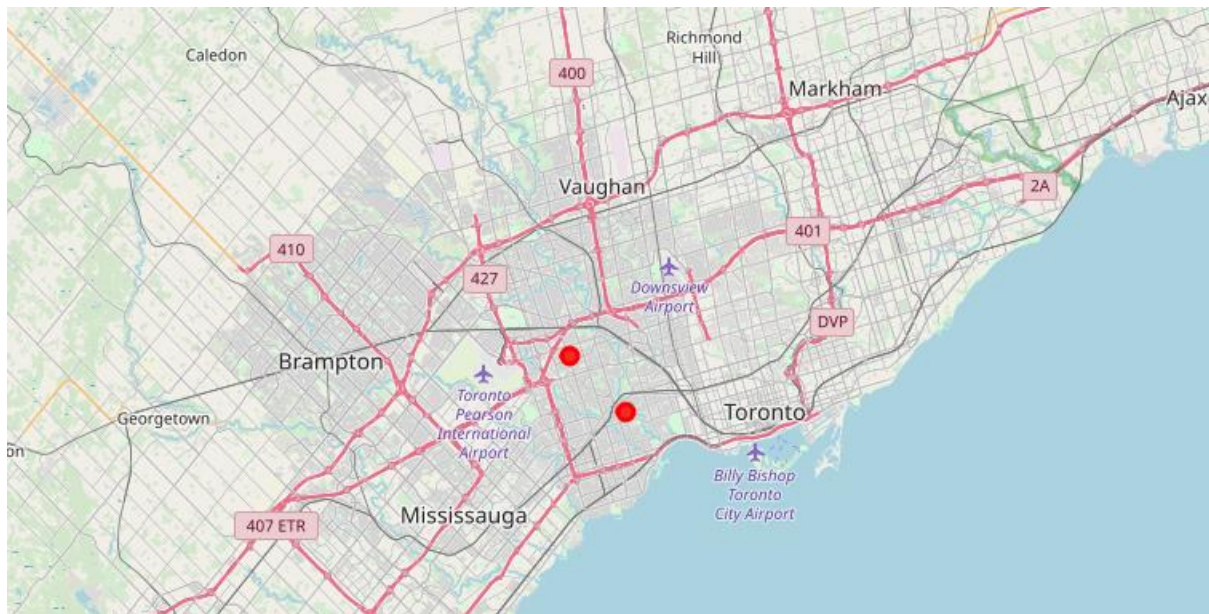There are two (2) neighbourhoods in the same cluster 2 in Etobicoke.

Figure 4: Cluster 2 neighbourhoods in Etobicoke

The cluster has the following neighbourhoods:

M8X - The Kingsway, Montgomery Road, Old Mill North

M9R - Richview Gardens, Kingsview Village, St. Phillips, Martin Grove Gardens.

One of the client requirements was that the new neighbourhood should in proximity of Italian Restaurants therefore a search query was executed using foursquare API to determine those neighbourhoods, searching within 5km radius of each neighbourhood.

The search returned the following neighbourhoods with Italian restaurants within 5km of the neighbourhood:

S/No.	Postcode	Distance(m)	Italian Restaurant
1	M8X	1683	Big Slice Express Italian Food
2	M9R	3173	Jolly II Italian Restaurant

Table 1: Italian restaurants within 5km radius of neighbourhoods

Results

From the results, it is clear that neighbourhoods in M8X postcode and M9R postcode are in the same cluster as Forest Hill and have Italian restaurant with 5km radius. The restaurants are "Big slice express Italian food" and "Jolly II Italian Restaurant". "Jolly II Italian Restaurant" is in Weston and outside Etobicoke borough. Big slice Italian restaurant has no rating on foursquare while Jolly II italian restaurant is rated 6.4 on foursquare.

Conclusion

From the result, the recommended neighbourhood are neighbourhoods within M8X post code. These are: The Kingsway, Montgomery Road and Old Mill North. The Big slice Express Italian restaurant is about 1.6 from the neighbourhood.

The client may also consider M9R neighbourhoods if he does not mind travelling out of the borough since the closest Italian restaurant is outside the borough but about 3.1km away.

From the foregoing, the neighbourhood postcodes in Etobicoke Borough that appear to fit my clients' situation are two out of twelve which have Italian Restaurants within a 5km radius. This analysis does not consider Restaurants beyond this radius. The client may want to explore and see if there are other good restaurants that are within a reasonable distance from the chosen neighbourhood. The client may also wish to consider other boroughs as neighbourhoods in Etobicoke similar to the client's current neighbourhood in central Toronto are limited.

Reference: https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M