Coffee SHOP RECOMMENDER SYSTEM

IBM Data Science Capstone Project

PROBLEM :

“ To develop a recommender system that will help the restaurant manager to find the best suitable place to open a Coffee Shop. “

INTRODUCTION

- Toronto is the provincial capital of Ontario and the most populous city in Canada, with estimated population of 2,956,024 and an estimated population of 6,341,935 in the Toronto region.
- The city has many restaurants, coffee shops, cafe, hotels. The variety of food items are provided by these shops.
- One of the popular item is a Coffee. Thus, there are many Ice Cream Shops in the various areas of the city.
- Therefore, if someone decides to open a Coffee Shop in the city, he would select the best suitable place for the shop.
- To get the information about this suitable place, the recommender system can be used

The questions that should be answered

- Which place is the most suitable and popular for the Coffee Shop ?
- What type of Coffee should be provided ? What type is preferred by people in that area ?
- What type of people live in that area (students, company employees, etc) ?
- How many similar shops are present in that area ?
- What other specialities should be provided to attract customers ?
- What should be the cost of the Coffee provided ?

TARGET AUDIENCE

Target audience for this system are the managers or people who want to open a Coffee Shop in the specific city or area. These people expect the place which is most popular and well known in the city.

DATA

To open a shop, following things are required –

- Geographical coordinates of the area
- The population of the neighbourhood
- The type of people in the neighbourhood
- Average income of the people nearby that area
- The preference of people towards the type of food
- Other service details such as juice, transport, taxi, etc.

- The above information was obtained from the various websites such as Wikipedia, Foursquare API, census report websites, csv data, etc.

METHODOLOGY

The following steps were followed –

- get the data of neighbourhoods in Toronto
- use the pandas HTML table scraping method for web scraping
- get the longitude and latitude coordinates of the areas from csv file
- match the areas and the coordinates
- visualize the map of Toronto using the Folium library package
- get the list of top nearest venues using Foursquare API
- group the venues by their categories
- selected the category as " Coffee Shop"
- use the K-Means clustering method to form the clusters of the data.
- by analysing the results, the final results were obtained

Initial data :

[3]:

	Postal code	Borough	Neighborhood
0	M1A	NaN	NaN
1	M2A	NaN	NaN
2	M3A	North York	Parkwoods
3	M4A	North York	Victoria Village
4	M5A	Downtown Toronto	Regent Park / Harbourfront

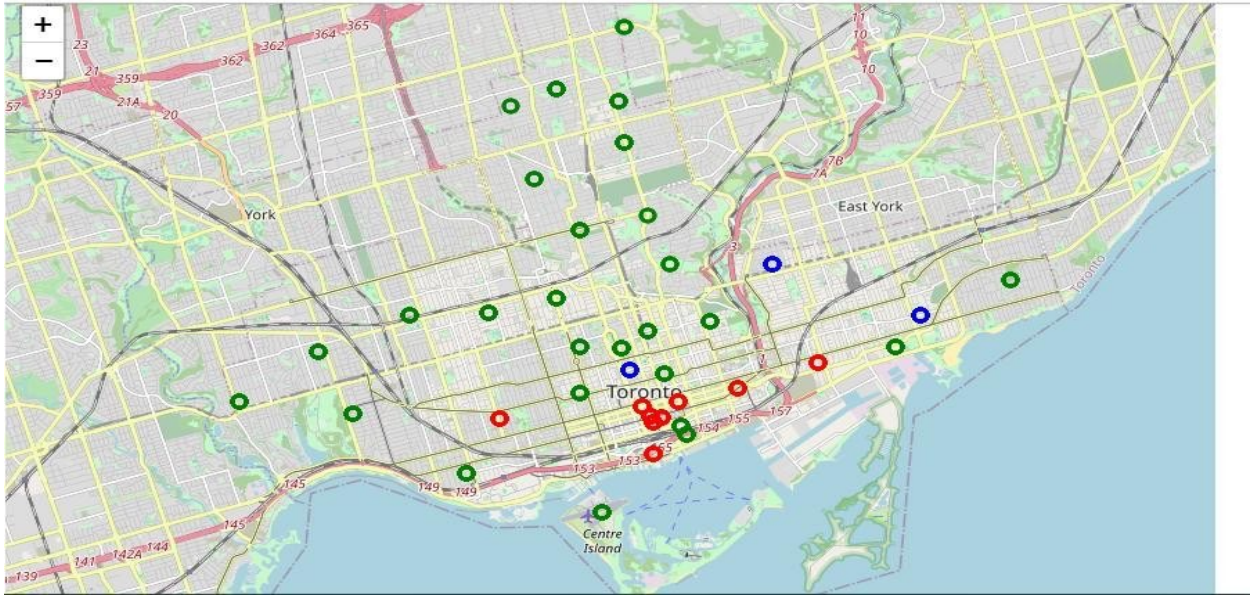
Dataframe after matching venues and the coordinates :

[33]:

	Postal code	Borough	Neighborhood	Latitude	Longitude
0	M1B	Scarborough	Malvern / Rouge	43.806686	-79.194353
1	M1C	Scarborough	Rouge Hill / Port Union / Highland Creek	43.784535	-79.160497
2	M1E	Scarborough	Guildwood / Morningside / West Hill	43.763573	-79.188711
3	M1G	Scarborough	Woburn	43.770992	-79.216917
4	M1H	Scarborough	Cedarbrae	43.773136	-79.239476

RESULTS

Map showing the clusters :



RESULTS

Table – Cluster 0 :

	Neighborhood	Coffee Shop	Cluster Labels	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
28	Runnymede / Swansea	0.055556	0	43.651571	-79.484450	Wibke's Espresso Bar	43.649132	-79.484802	Coffee Shop
28	Runnymede / Swansea	0.055556	0	43.651571	-79.484450	Tim Hortons	43.648526	-79.485066	Coffee Shop
25	Richmond / Adelaide / King	0.095745	0	43.650571	-79.384568	Starbucks	43.646891	-79.381871	Coffee Shop
25	Richmond / Adelaide / King	0.095745	0	43.650571	-79.384568	Dineen @CommerceCourt	43.648251	-79.380127	Coffee Shop
25	Richmond / Adelaide / King	0.095745	0	43.650571	-79.384568	Starbucks	43.649028	-79.381593	Coffee Shop
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13	Garden District, Ryerson	0.090000	0	43.657162	-79.378937	Hailed Coffee	43.658833	-79.383684	Coffee Shop
13	Garden District, Ryerson	0.090000	0	43.657162	-79.378937	Balzac's Coffee	43.657854	-79.379200	Coffee Shop
13	Garden District, Ryerson	0.090000	0	43.657162	-79.378937	Nordstrom Ebar	43.654649	-79.380574	Coffee Shop
1	Brockton / Parkdale Village / Exhibition Place	0.086957	0	43.636847	-79.428191	Starbucks	43.639090	-79.427622	Coffee Shop
1	Brockton / Parkdale Village / Exhibition Place	0.086957	0	43.636847	-79.428191	Louie Craft Coffee	43.639284	-79.425620	Coffee Shop

RESULTS

Table – Cluster 1 :

	Neighborhood	Coffee Shop	Cluster Labels	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
19	Little Portugal / Trinity	0.02381	1	43.647927	-79.41975	Jimmy's Coffee	43.644521	-79.418908	Coffee Shop

RECOMMENDATION

- By analyzing nearby venues, we can conclude that the cluster 1 does not have many Coffee shops in that areas. Thus, it would be suitable to select these locations for opening ice cream shops.
- Therefore, locations like Central Bay Street, Riverdale, The Beaches West, Commerce court will be good to open a new Ice Cream Shop.

CONCLUSION

- The recommender system correctly recommends the most suitable place to open a Coffee Shop. Thus, it can provide good results to the users of the system.
- The system can also be used as recommendation system for opening the restaurants, coffee shops, street food shop, etc.
- Using this method the recommendation system for malls, theatres, shops can also be designed.