ICE CREAM 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 an Ice Cream 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 an Ice Cream. Thus, there are many Ice Cream Shops in the various areas of the city.
- Therefore, if someone decides to open an Ice Cream 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 Ice Cream Shop ?
- What type of Ice Cream 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 ice cream provided ?

TARGET AUDIENCE

Target audience for this system are the managers or people who want to open an Ice Cream 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 " Ice Cream Shop"
- use the K-Means clustering method to form the clusters of the data.
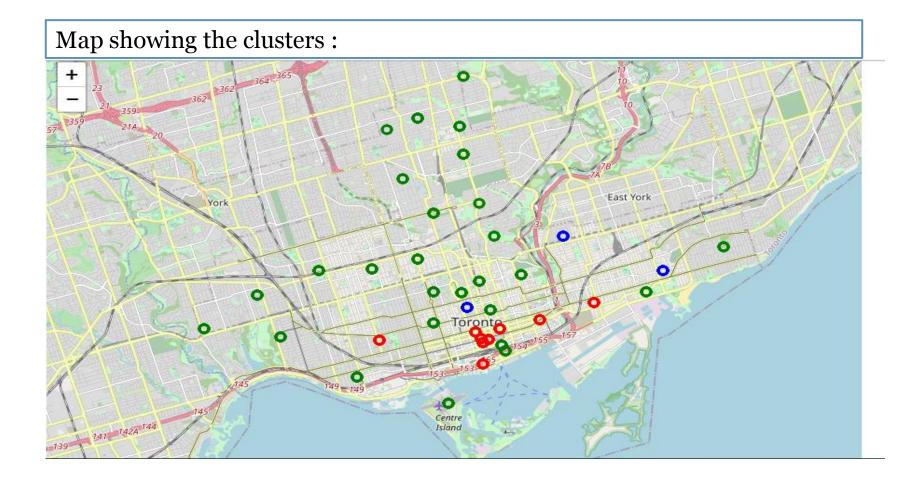- by analysing the results, the final results were obtained

Initial data :

	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

[3]:

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 :

[72]:

	Neighborhood	Ice Cream Shop	Cluster Labels	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
32	Studio District	0.025000	0	43.659526	-79.340923	Ed's Real Scoop	43.660656	-79.342019	Ice Cream Shop
24	Regent Park / Harbourfront	0.020833	0	43.654260	-79.360636	Greg's Ice Cream	43.650102	-79.360440	Ice Cream Shop
11	First Canadian Place / Underground city	0.010000	0	43.648429	-79.382280	deKEFIR	43.650433	-79.379393	Ice Cream Shop
29	St. James Town	0.012500	0	43.651494	-79.375418	deKEFIR	43.650433	-79.379393	Ice Cream Shop
19	Little Portugal / Trinity	0.023810	0	43.647927	-79.419750	Bang Bang Ice Cream & Bakery	43.646246	-79.419553	Ice Cream Shop
14	Harbourfront East / Union Station / Toronto Is...	0.010000	0	43.640816	-79.381752	Lick It Gelato	43.639256	-79.384650	Ice Cream Shop
25	Richmond / Adelaide / King	0.010638	0	43.650571	-79.384568	deKEFIR	43.650433	-79.379393	Ice Cream Shop
37	Toronto Dominion Centre / Design Exchange	0.010000	0	43.647177	-79.381576	deKEFIR	43.650433	-79.379393	Ice Cream Shop
7	Commerce Court / Victoria Hotel	0.010000	0	43.648198	-79.379817	deKEFIR	43.650433	-79.379393	Ice Cream Shop

RESULTS

Table – Cluster 1 :

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[73]: to_merged.loc[(to_merged['Cluster Labels'] ==1) & (to_merged['Venue Category'] == 'Ice Cream Shop') ]
```

[73]:

	Neighborhood	Ice Cream Shop	Cluster Labels	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
16	India Bazaar / The Beaches West	0.050000	1	43.668999	-79.315572	Brett's Ice Cream	43.667222	-79.312831	Ice Cream Shop
36	The Danforth West / Riverdale	0.046512	1	43.679557	-79.352188	Dolce Gelato	43.677773	-79.351187	Ice Cream Shop
36	The Danforth West / Riverdale	0.046512	1	43.679557	-79.352188	La Diperie	43.677530	-79.352295	Ice Cream Shop
4	Central Bay Street	0.033333	1	43.657952	-79.387383	Kekou Gelato House	43.656099	-79.392715	Ice Cream Shop
4	Central Bay Street	0.033333	1	43.657952	-79.387383	Arctic Bites	43.656085	-79.392913	Ice Cream Shop

RECOMMENDATION

- By analyzing nearby venues, we can conclude that the cluster 1 does not have many ice cream 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 an Ice Cream 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.