Coursera Capstone – Ideal location for Aesthetics Recommender

Introduction

Aim of this project is to build a recommender system to discover neighbourhoods and its venues. This recommender system is based on clients' choice of profession and to choose a neighbourhood that may be profitable in the near future.

Our client needs a Recommender system based on the immigrant's professional interest as the first criteria. Here we will explore the profession of Aesthetician.

Business Problem

As one plans to move to a new neighbourhood, we tend to look for websites providing various details. The details are mostly scattered around many websites.

A brief Intro about Aestheticians: Aestheticians are state licensed health and wellness professionals. Aestheticians must complete a course of training and/or education and pass specific state written and practical examinations to earn licensure through their state board of cosmetology or department of health.

To outperform in the battle of websites, our client needs to add a Recommender System in their website. Currently the website allows searches such as apartments for rents in a certain neighbourhood. As the client is experiencing visitors, who are Aestheticians by profession and would like to move to a neighbourhood based on number of similar profession and needs to be close by to nails/barber/hairdresser facilities, so as to draw more customers. This Recommender System would facilitate the visitor's search experience, and choose a Borough based on the criteria of Aestheticians. After choosing the borough, the client will be able to look at the neighbourhoods with its amenities, towards choosing a neighbourhood for moving.

Data Inputs

To provide quality information meeting the client's requirements, we need to access following different data sources:

- Bodysafe Data : An open source dataset provided by City of Toronto.
  https://open.toronto.ca/dataset/bodysafe/

    This dataset provides the most current inspection results for establishments that provide hairdressing/hairstyling, barbering, tattooing, micropigmentation, ear and body piercing, electrolysis, manicure,

pedicure and aesthetics services. Inspection data history is limited to the past two years.

This dataset contains data about:
- Establishment names and location
- Inspection results
- Possible infractions and enforcement info

- FourSquare: An open source API for proving information about venues and current trends.

- Wikipedia : Here we find all the Boroughs and its neighborhood data.

Methodology

1. Firstly, we take data from Wikipedia to find all the boroughs and neighbourhoods in Toronto city, with respective postal codes. Just like the lab, we did.
2. We read data into a dataframe from City of Toronto regarding all licensed establishments offering Aesthetics, Nails, hairstyling and barbering services. The following dataframe and corresponding pie chart shows the profession's distribution.

|	Postal	Borough	Neighborhood	addr	estName	lon	lat	servTypeDesc
0	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	111 ISLAND RD	WILSON'S BARBER SHOP	-79.137419	43.797804	Barbering & Hairdressing
1	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	371 OLD KINGSTON RD	VIENNE'S SPA AND NAIL	-79.169747	43.783247	Nails, Aesthetics
2	M1E	Scarborough	Guildwood, Morningside, West Hill	4218 LAWRENCE AVE E	AWESOME NAILS	-79.184662	43.769355	Nails, Aesthetics
3	M1E	Scarborough	Guildwood, Morningside, West Hill	4234 LAWRENCE AVE E	XCITING CUTS BARBER SHOP	-79.183287	43.769500	Barbering & Hairdressing
4	M1G	Scarborough	Woburn	3770 LAWRENCE AVE E	PINK NAILS & SPA	-79.214237	43.762496	Nails, Aesthetics

Borough wise distribution hair dressing/salon/Nails etc
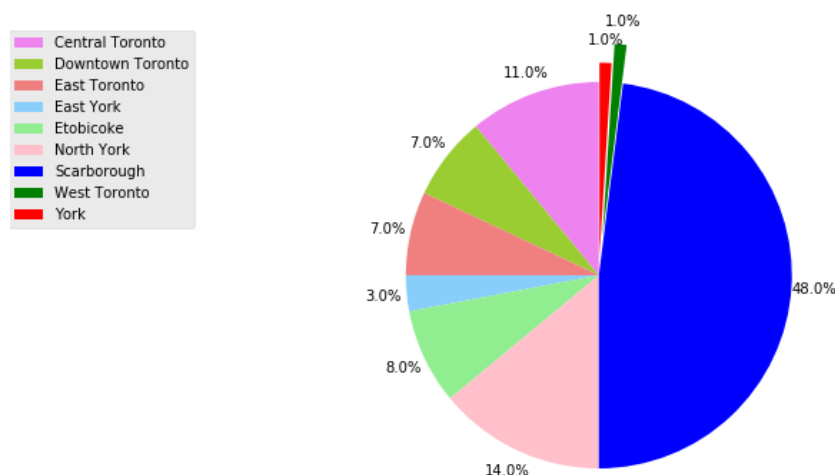
3. As we can see that from the following Toronto map (with the help of Folium maps), that such licensed establishments offering hairstyling or barbering services are pretty scattered.
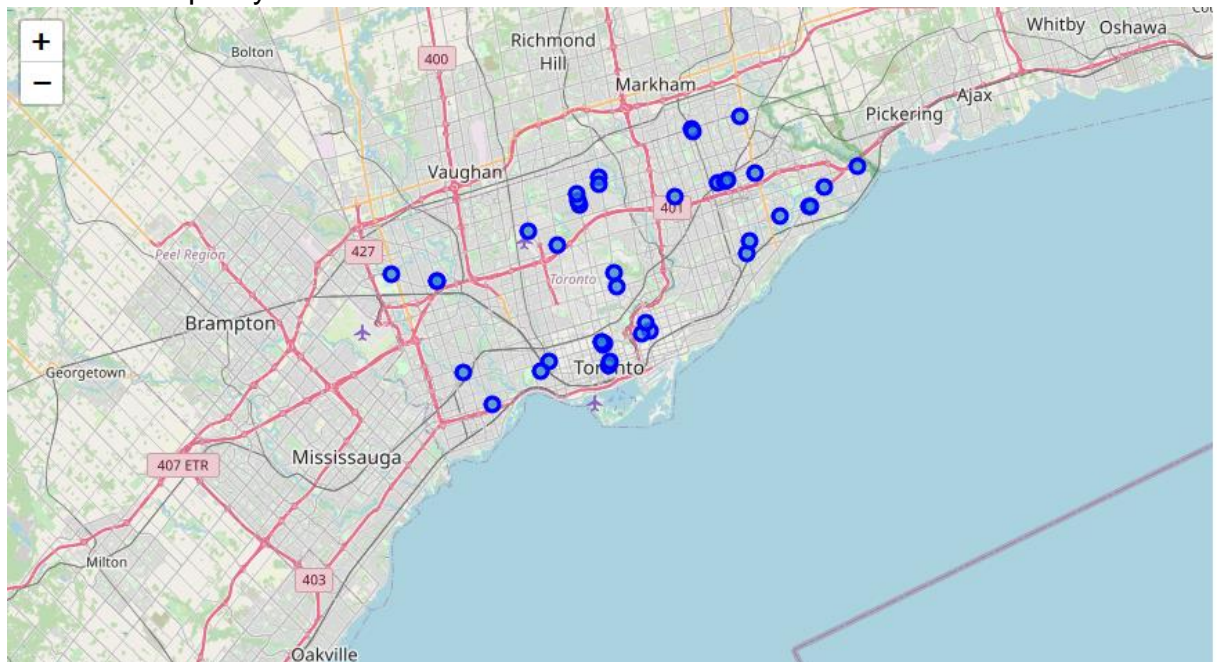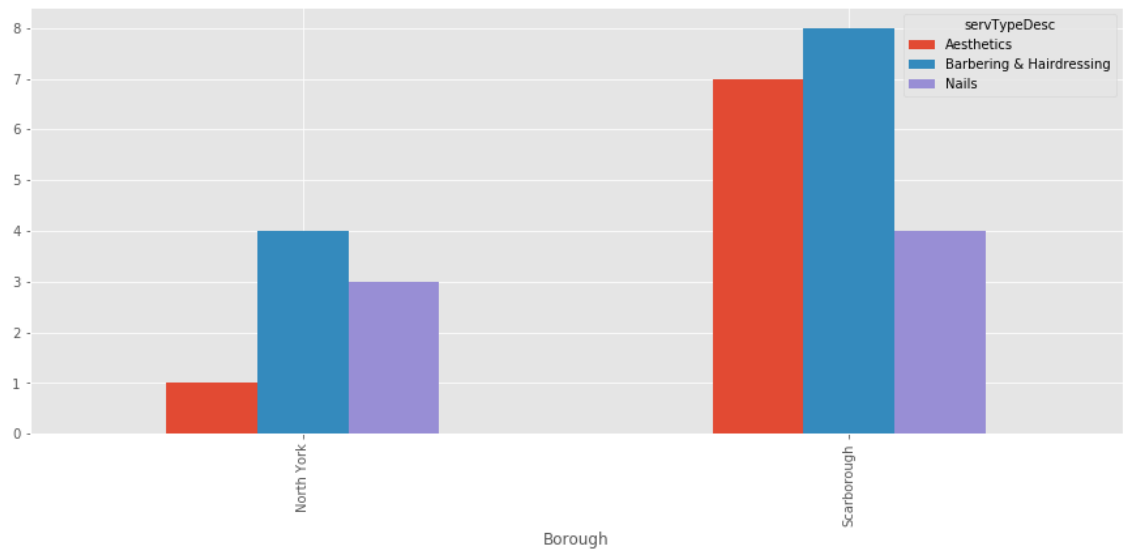

4. The following chart shows that, borough 'North York' has the least number of Aestheticians among the boroughs with at least 1 available.
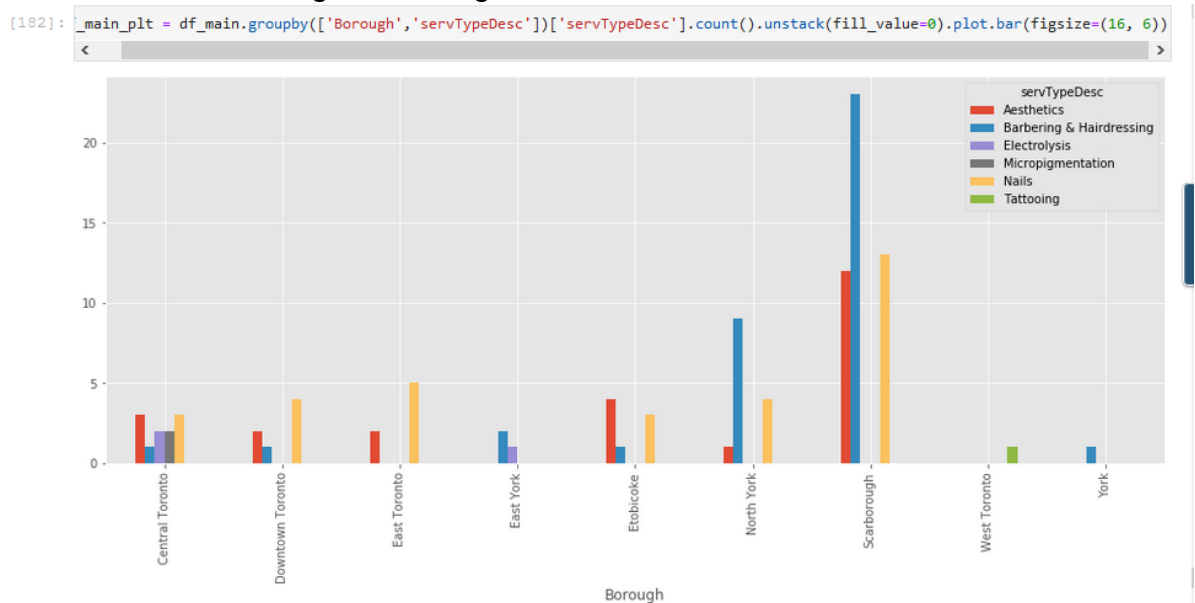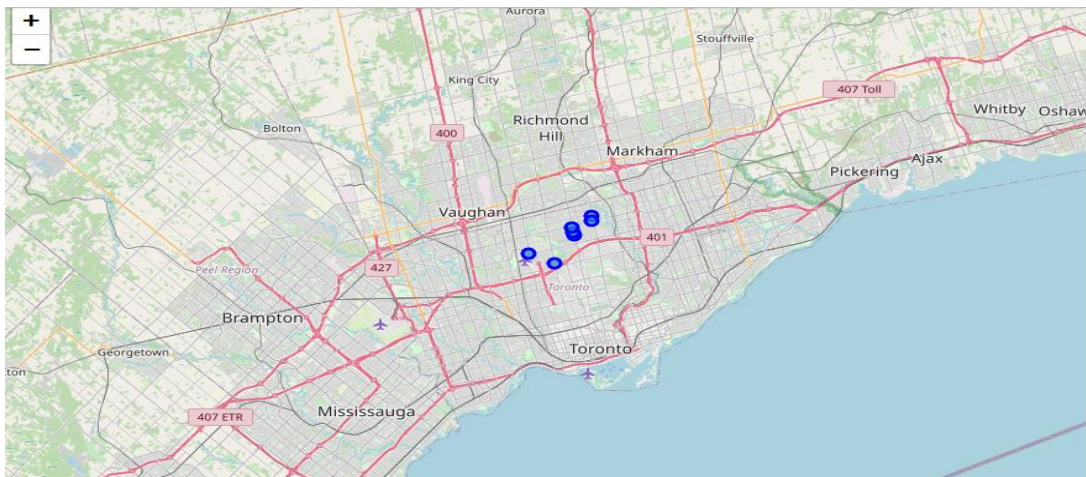

5. Among 2 boroughs, North York and Scarborough, the choice would be North York, it has lesser number of Aestheticians. The following graph shows a close comparison.

6. Folium maps helps to display North York neighbourhoods in the following map.

7. With the help of Foursquare API, we explored various venues in the North York Borough.

8. With the help of k-means cluster, we create dataframes and clusters based on already present barbershop, Nails or any such facilities with their addresses. The map shows the clusters, which narrows down the choice of neighbourhood, as per the visitor's criteria.
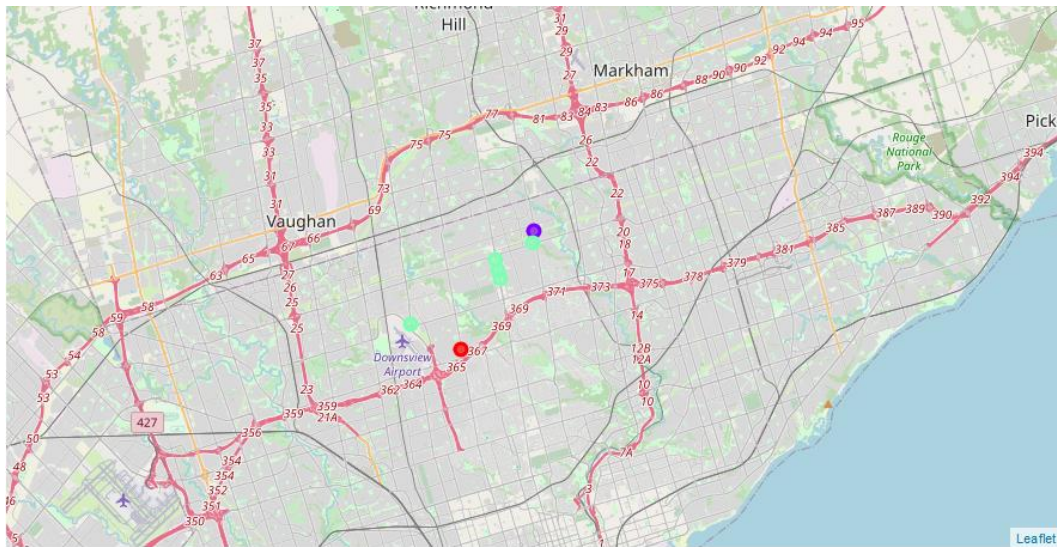
Results

The dataframe resulted in 3 clusters

Cluster 0:

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NYorkToronto_merged.loc[NYorkToronto_merged['Cluster Labels'] == 0]
```

	Postal	Borough	Neighborhood	addr	estName	lon	lat	servTypeDesc	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue
5	M3H	North York	Bathurst Manor, Wilson Heights, Downsview North	3864 BATHURST ST	ORTENSIA NAILS SALON	-79.435476	43.740954	Nails, Aesthetics	0	Convenience Store	Asian Restaurant	Coffee Shop	Sandwich Place

This cluster has venues such has convenient store, restaurants, coffee shops etc. It also has neighbourhoods at the same postal code area. It only has 1 similar professional establishment.

Cluster 1

```
NYorkToronto_merged.loc[NYorkToronto_merged['Cluster Labels'] == 1]
```

	Postal	Borough	Neighborhood	addr	estName	lon	lat	servTypeDesc	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Com
0	M2M	North York	Willowdale, Newtonbrook	3292 BAYVIEW AVE	SIAMAK HAIR DESIGN	-79.393463	43.789791	Nails	1	Gas Station	Japanese Restaurant	Grocery Store	Bank	Resta

This cluster has venues such has gas station, restaurants, bank etc. and only has 1 similar professional establishment.

Cluster 2


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NYorkToronto_merged.loc[NYorkToronto_merged['Cluster Labels'] == 2]
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	Postal	Borough	Neighborhood	addr	estName	lon	lat	servTypeDesc	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th M Com Ve
1	M2N	North York	Willowdale	306 FINCH AVE E	BEAUTY SALON	-79.394036	43.785022	Barbering & Hairdressing	2	Korean Restaurant	Bubble Tea Shop	Coffee Shop	Pizza Place	Ra Restau
2	M2N	North York	Willowdale	5169 YONGE ST	DUZZ	-79.412761	43.769870	Barbering & Hairdressing	2	Korean Restaurant	Bubble Tea Shop	Coffee Shop	Pizza Place	Ra Restau
3	M2N	North York	Willowdale	5332 YONGE ST	N. HAIR SALON	-79.414328	43.773493	Barbering & Hairdressing	2	Korean Restaurant	Bubble Tea Shop	Coffee Shop	Pizza Place	Ra Restau
4	M2N	North York	Willowdale	5492 YONGE ST	NC HAIR SALON	-79.415576	43.778077	Barbering & Hairdressing	2	Korean Restaurant	Bubble Tea Shop	Coffee Shop	Pizza Place	Ra Restau
6	M3J	North York	Northwood Park, York University	1 DE BOERS DR	AKA NAILS AND SPA	-79.464113	43.751228	Nails	2	Coffee Shop	Athletics & Sports	Sandwich Place	Pizza Place	Sta

This cluster has most neighbourhoods with common venues such has restaurants, Bubble tea shop, coffee shop etc.

Discussion

- The aim of the project is to help Aestheticians who want to relocate to Toronto. As Toronto is a very diverse and big city, one needs to research a neighborhood, before moving, specially taking account of their professional growth.
- Here we looked into the neighborhood of 'North York' borough. There is quite a good venue choice. Such as cluster 2, has more venues and neighborhoods comparison to others. It also has similar professional establishments, where a new Aesthetician can draw more clients and grow professionally.
- The preference of venues vary from person to person as every professional need is different.

Conclusion

- This project helps an aesthetician to get a better understanding of neighbourhoods, considering professional growth and common venues. It is always helpful to get an insight, before making a decision.
- The future of the project includes, other factors as filters, such as, cost of living, transportation and other necessary amenities.