Capstone Project- Little India in Toronto

Opening an Indian Restaurant in Toronto

1) Business Problem:

The purpose of this project is to help investors establish which neighbourhood in Toronto would be the best to open an Indian restaurant.

The aim will be to explore various neighbourhoods and demographics of those neighbourhoods in order to arrive at an answer to the question "which place/s would be the most ideal to open an **Indian restaurant**?"

Toronto ranks as the 3rd most diverse city in the world, with over half its residents born abroad.

For one thing, the proportion of our population that's foreign born remains higher than just about any major city in the world. In the City of Toronto, 51% of residents were not born in Canada and for the Toronto Region as a whole, that figure is 47%. This is higher than any other metro region in North America, and higher than Greater London, Sydney, Melbourne, Paris, and Amsterdam (see figure below). The only North American cities with higher foreign born rates than Toronto are the Cities of Miami and Miami Beach. Yet unlike the Toronto Region, where just about every corner of the world is represented, more than three quarters of immigrants in Miami hail from Latin America.

Foreign Born Population (%)

City	%
City of Toronto	51.2%
Toronto Region	46.8%
Brussels	45.1%
Vancouver	44.7%
Sydney	42.9%
Zurich	40.6%
Miami	40.5%
Melbourne	40.2%
London	37.6%
Frankfurt	36.3%
San Francisco Bay Area	34.7%
Los Angeles	33.6%
New York	29.3%
Amsterdam	28.8%
Paris	25.7%
Montréal	25.6%
Stockholm	24.9%
San Diego	24.1%
Houston	23.5%
Washington, D.C.	23.0%
Barcelona	20.0%
Berlin	14.6%

Over 250 ethnicities and 170 languages are represented in the Toronto Region, and roughly half the population identifies as a visible minority (defined as either Asian, Black, Latin American, or Arab). There are 16 countries that have over 50,000 people represented in the Toronto Region, including 337,000 from India, 300,000 from China, and 200,000 from the Philippines. To put this in perspective, there are more people in the Toronto Region that were born in Asia than there are living in the Cities of San Francisco or Dallas. There are nearly twice as many people living in the Toronto Region that were born in Greece than there are living in Santorini.

Country of Birth	Number of People in the Toronto Region
India	336,835
China	303,900
Philippines	205,365
Pakistan	125,685
United Kingdom	124,615
Italy	107,575
Jamaica	107,280
Sri Lanka	105,015
Hong Kong	103,220
Iran	76,860
Portugal	73,430
Guyana	72,305
United States	66,250
Poland	62,005
Vietnam	61,435
South Korea	53,230

It is often touted as the most multicultural city on the globe. This means generally the population would be open to diverse food offerings.

2)Data Set:

Our data will originate from three main sources, namely:

- **Open-source dataset of Toronto** The dataset will be downloaded from https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M From this dataset, we would get information of the locations in Toronto relating to:
  - Postal code
  - Borough
  - Neighbourhood

- **Geocoder package**
  This will be used to source geographical coordinates of locations i.e., latitude and longitude.

- **Foursquare API**
  For sourcing information related to the venues such as:
  • Name of the venue
  • Latitude of the venue
  • Longitude of the venue
  • Most rated venues
  • Most popular venues
  • Most popular venues per cluster grouping
  The data would be visualized and presented to the user, in this case, the investor looking to open the restaurant in Toronto. Based on the findings, we would then recommend the best location(s) to open the restaurant.
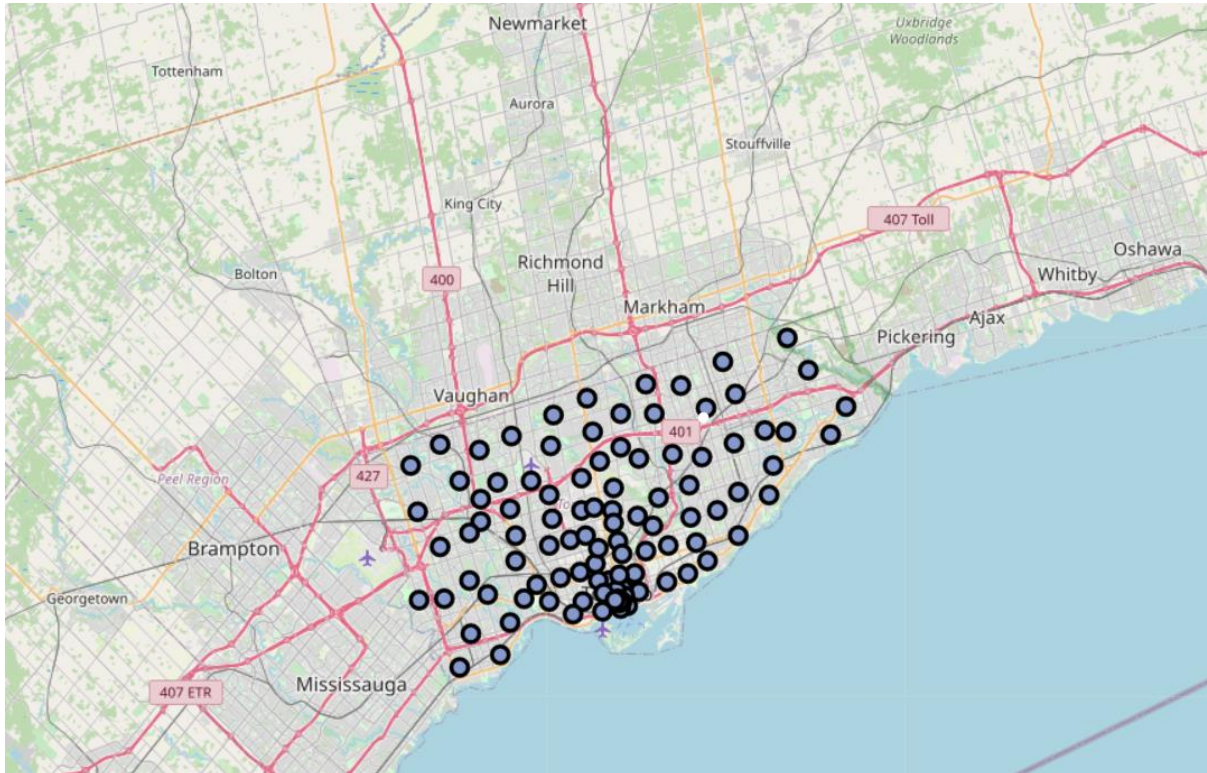
3)Approach/Methodology:

We will explore the neighbourhoods in Toronto, find out which venues are most popular and which restaurants in particular are most popular. We will segment and group the neighbourhoods to explore the venues further. To do this, we will use **K-Means clustering**.

The aim of this is to find out how popular Indian Restaurants are, if at all, and what the trend is of restaurants that are more popular with the general population.

4)Findings/Results:
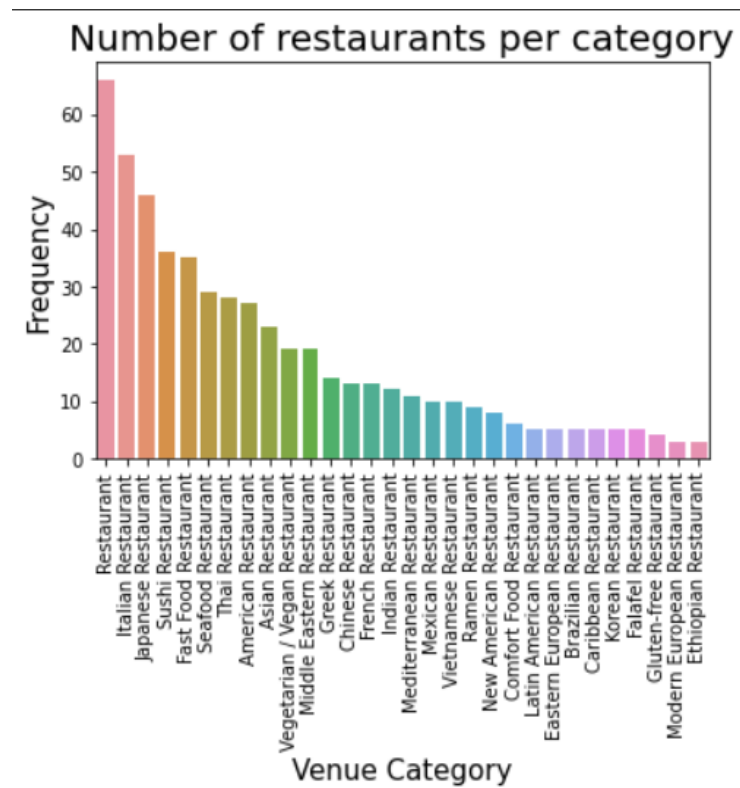
Looking at Toronto

Variety of restaurants:

There were 48 different types of restaurants in total that we discovered in Toronto. Below are the number of restaurants per type. The most popular restaurants were the unclassified restaurants, followed by Italian, Japanese, sushi and fast-food restaurants. The figure below shows the list of all the restaurant types according to count.

```
print (toronto_venues_only_restaurant['Venue Category'].value_counts())

Restaurant                       66
Italian Restaurant               53
Japanese Restaurant              46
Sushi Restaurant                 36
Fast Food Restaurant             35
Seafood Restaurant               29
Thai Restaurant                  28
American Restaurant              27
Asian Restaurant                 23
Vegetarian / Vegan Restaurant    19
Middle Eastern Restaurant        19
Greek Restaurant                 14
Chinese Restaurant               13
French Restaurant                13
Indian Restaurant                12
Mediterranean Restaurant         11
Mexican Restaurant               10
Vietnamese Restaurant            10
Ramen Restaurant                  9
New American Restaurant           8
Comfort Food Restaurant           6
Latin American Restaurant         5
Eastern European Restaurant       5
Brazilian Restaurant              5
Caribbean Restaurant              5
Korean Restaurant                 5
Falafel Restaurant                5
Gluten-free Restaurant            4
Modern European Restaurant        3
Ethiopian Restaurant              3
Moroccan Restaurant               2
Portuguese Restaurant             2
German Restaurant                 2
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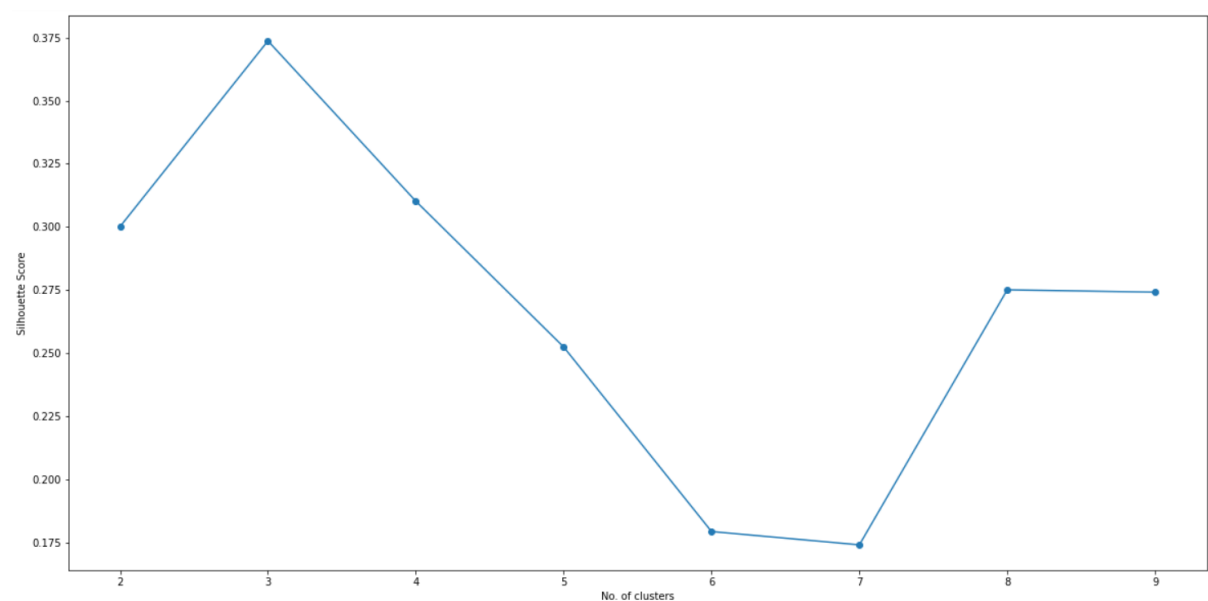
We sampled the top 30 most popular restaurants types to visualize the most popular restaurants, relative to the Indian restaurant. The Indian restaurant ranked 14th. The chart below visualizes the results.

K-Means Clustering:

We explored various ranges for clustering and found that the optimal number of clusters was 3.

Results as per Each Cluster:

Cluster 1:

(Sample)

PostalCode	Borough	Neighborhood	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	7th Most Common Venue	8th Most Common Venue	9th M Com Ve
M3A	North York	Parkwoods	43.75245	-79.32991	0.0	Food & Drink Shop	Park	Bus Stop	Women's Store	Event Space	Electronics Store	Elementary School	Escape Room	Ethio Restau
M4A	North York	Victoria Village	43.73057	-79.31306	0.0	Nail Salon	German Restaurant	Grocery Store	Park	Dog Run	Donut Shop	Dumpling Restaurant	Eastern European Restaurant	Electro S
M5A	Downtown Toronto	Regent Park, Harbourfront	43.65512	-79.36264	0.0	Coffee Shop	Breakfast Spot	Restaurant	Theater	Spa	Event Space	Electronics Store	Food Truck	Ita Restau
M6A	North York	Lawrence Manor, Lawrence Heights	43.72327	-79.45042	0.0	Clothing Store	Women's Store	Toy / Game Store	Restaurant	Men's Store	Bookstore	Food Court	Furniture / Home Store	Cosme S
M7A	Queen's Park	Ontario Provincial Government	43.66253	-79.39188	0.0	Coffee Shop	Park	Gastropub	Mediterranean Restaurant	Burrito Place	Falafel Restaurant	Café	Sandwich Place	F Chic J
M9A	Etobicoke	Islington Avenue	43.66263	-79.52831	0.0	Pharmacy	Park	Café	Shopping Mall	Skating Rink	Grocery Store	Bank	Falafel Restaurant	Ev S
M1B	Scarborough	Malvern, Rouge	43.81139	-79.19662	0.0	Fast Food Restaurant	Women's Store	Donut Shop	Fish Market	Fish & Chips Shop	Field	Farmers Market	Farm	Fa Restau
M3B	North York	Don Mills North	43.74923	-79.36186	0.0	Gas Station	Park	Soccer Field	Burger Joint	Coffee Shop	Women's Store	Ethiopian Restaurant	Eastern European Restaurant	Electro S

Cluster 2:

	PostalCode	Borough	Neighborhood	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	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
27	M2H	North York	Hillcrest Village	43.80225	-79.35558	1.0	Park	Residential Building (Apartment / Condo)	Women's Store	Ethiopian Restaurant	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Elementary School	Escape Room	Event Space
35	M4J	East York East Toronto	The Danforth East	43.68811	-79.33418	1.0	Intersection	Park	Women's Store	Ethiopian Restaurant	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Elementary School	Escape Room	Event Space
45	M2L	North York	York Mills, Silver Hills	43.75698	-79.38060	1.0	Park	Women's Store	Event Space	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Elementary School	Escape Room	Ethiopian Restaurant	Falafel Restaurant
68	M5P	Central Toronto	Forest Hill North & West	43.69479	-79.41440	1.0	Home Service	Park	Women's Store	Event Space	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Elementary School	Escape Room	Ethiopian Restaurant
91	M4W	Downtown Toronto	Rosedale	43.68190	-79.37829	1.0	Park	Playground	Bike Trail	Women's Store	Ethiopian Restaurant	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Elementary School	Escape Room
98	M8X	Etobicoke	The Kingsway, Montgomery Road, Old Mill North	43.65319	-79.51113	1.0	Park	Women's Store	Event Space	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Elementary School	Escape Room	Ethiopian Restaurant	Falafel Restaurant

Cluster 3:

	PostalCode	Borough	Neighborhood	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	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
28	M3H	North York	Bathurst Manor, Wilson Heights, Downsview North	43.75788	-79.44847	2.0	Men's Store	Home Service	Women's Store	Event Space	Eastern European Restaurant	Electronics Store	Elementary School	Escape Room	Ethiopian Restaurant	Farm
53	M3M	North York	Downsview Central	43.73224	-79.50178	2.0	Construction & Landscaping	Home Service	Falafel Restaurant	Eastern European Restaurant	Electronics Store	Elementary School	Escape Room	Ethiopian Restaurant	Event Space	Farm
62	M5N	Central Toronto	Roselawn	43.71208	-79.41848	2.0	Home Service	Women's Store	Falafel Restaurant	Eastern European Restaurant	Electronics Store	Elementary School	Escape Room	Ethiopian Restaurant	Event Space	Farm

5)Discussions:

 The Indian Restaurants are not very popular in Toronto as can be seen by a count of mere 12 I number.
When grouped into 3 k-clusters, Indian restaurants appeared in the 10 most popular venues list in the following boroughs:

• East York
• Scarborough
• Central Toronto

The frequently appearing neighbourhood was Scarborough. There is an opportunity for the investor open the restaurant anywhere and leverage on having no competition in a neighbourhood. It may also be safer to open the restaurant where people are already familiar with the Indian cuisine. Because the investors have little experience with the market, I would recommend that they open the restaurant in either Central Toronto or East York due to the fact that even though there are some Indian Restaurants in these neighbourhoods, the competition would be less than that of as in Scarborough.

6)Conclusion:

The purpose of this project was to find out the most ideal place to open an Indian restaurant. We processed the data and analysed it for further insights. We identified the most popular restaurants per cluster in search of an ideal location and to ultimately answer the question "which place/s would be the most ideal to open an Indian restaurant?". The ultimate decision lies with the investor, after considering all factors