Capstone Project - The Battle of Neighborhoods

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Introduction

Toronto, the most populous city in Canada is the capital of the province of Ontario. It is a major Canadian city along Lake Ontario's northwestern shore. It is a dynamic metropolis with a core of soaring skyscrapers, all dwarfed by the iconic, free-standing CN Tower. Toronto has, in recent decades, been transformed into one of the most culturally and ethnically diverse cities in the world. More than 80 ethnic communities are represented, and over half of the city's residents were born outside Canada.

Multicultural Toronto is home to a culinary wonderland of many cuisines and dishes unique to the city. Toronto's plethora of ethnic food places is a direct result of its multiculturalism. Indian cuisine has always been one of the most popular cuisines not only among the resident population but also among the tourists visiting this city.

Business Problem

▶ With the amount of popularity that this cuisine has gained over the period of time and especially in the city of Toronto, Indian restaurants are also gaining popularity from a business perspective. If you are someone looking to start your own Indian restaurant, then this information is for you. There are several aspects to be considered when starting a new business, we will be focusing on a few aspects here.

▶ The success of any business, especially a restaurant, is heavily dependent on its location. The area has to be convenient and safe for the public. One of the other important factors is competition from existing peers. Fierce competition can be a great entry barrier and should be avoided as much as possible. So, an area where there is a scarcity of Indian restaurants would be preferred.

▶ This final project is directed towards finding a best neighborhood in Toronto based on its location, rating and most important, in my opinion, considering the safety of that neighborhood

Target Audience

The organizations, individuals and group of people who would be using and be benefited from this project are:

▶ Any organization or individual that wants to setup a new Indian restaurant or want to expand their footprint in Toronto area.

▶ Foodies who are looking for areas with best options for Indian cuisine based on ratings.

▶ People who are looking for neighborhoods with higher number of Indian restaurants.

Data and Data Sources

For this project we will need the following data:

1. List of Postal Codes in Toronto area along with the Boroughs and Neighborhoods they belong to.

This data set contains list of Postal Codes and corresponding Boroughs and Neighborhoods in Toronto area. This dataset will be merged with other dataset that contains geospatial co-ordinates of various postal codes in Toronto to obtain Latitude & Longitude for each Neighborhood.
Link: https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M

2. List of postal codes in Toronto area along with their latitude and longitude.

This data set contains geospatial co-ordinates of various postal codes in Toronto. This dataset will be merged with other dataset that contains list of Postal Codes and corresponding Boroughs and Neighborhoods in Toronto to obtain Latitude & Longitude for each Neighborhood.
Link: http://cocl.us/Geospatial_data

3. Current footprint of Indian restaurants in each neighborhood of Toronto area.

This information will be gathered by marking a call to FourSquare API to fetch venues around each neighborhood within certain radius. We will then filter this dataset to get information about only Indian restaurants.
Link: https://developer.foursquare.com/docs/api-reference/venues/search/

4. **Recent Crime Data in Toronto neighborhoods.**

This dataset contains Toronto Police Data for Years 2014 through 2019. It provides information about what type of offenses were reported along with their location and type of premise where the crimes were committed.
Link: https://www.kaggle.com/kapastor/toronto-police-data-crime-rates-by-neighbourhood

Approach

▶ Build a dataset of boroughs & neighborhoods in Toronto area along with their geospatial coordinates.

▶ Using FourSquare Venue API, get list of all venues within half a mile radius for each neighborhood.

▶ Filter this list to build a dataset of only the Indian Restaurants in each neighborhood.

▶ Analyze above dataset to find boroughs & neighborhoods with the greatest number of Indian Restaurants & least number of Indian Restaurants.

▶ Using FourSquare Venue Details API, get details for each restaurant such as rating, tips and number of likes.

▶ Sort the list of restaurants by ratings and identify the boroughs & neighborhoods that have the best Indian Restaurants.

▶ Create a map of Toronto area to visualize the neighborhoods that have the best Indian Restaurants.

▶ Build a dataset of crimes committed in Toronto area in year 2019 with details such as Borough, Neighborhood, type of offence and type of premise.

▶ Filter this dataset to get information about crimes committed only in Commercial premises.

▶ Analyze the above dataset and identify the boroughs & neighborhoods that have least crime rate in commercial premises.

▶ Considering the above data holistically, recommended a location to setup a new Indian Restaurant in Toronto.

Methodology

Using the Toronto neighborhood data and FourSquare Venue details API, built a dataframe of neighborhood that contains Indian restaurants.

	Borough	Neighborhood	ID	Name
0	Downtown Toronto	Queen's Park	4bedf8b5e24d20a17b567214	Kothur Indian Cuisine
1	East Toronto	The Beaches	4dcd7c6352b1f8915b7e7f7e	Delhi Bistro
2	East York	Leaside	504bcf32e4b0ef19b0e2ecf8	Mt Everest Restaurant
3	Downtown Toronto	Christie	4adb969ef964a520332921e3	Banjara Indian Cuisine
4	Downtown Toronto	Christie	4b7369d7f964a52049ad2de3	Madras Masala

Methodology (cont ..)

Using the Toronto neighborhood data and FourSquare Venue API, built a dataframe of neighborhood that contains Indian restaurants.
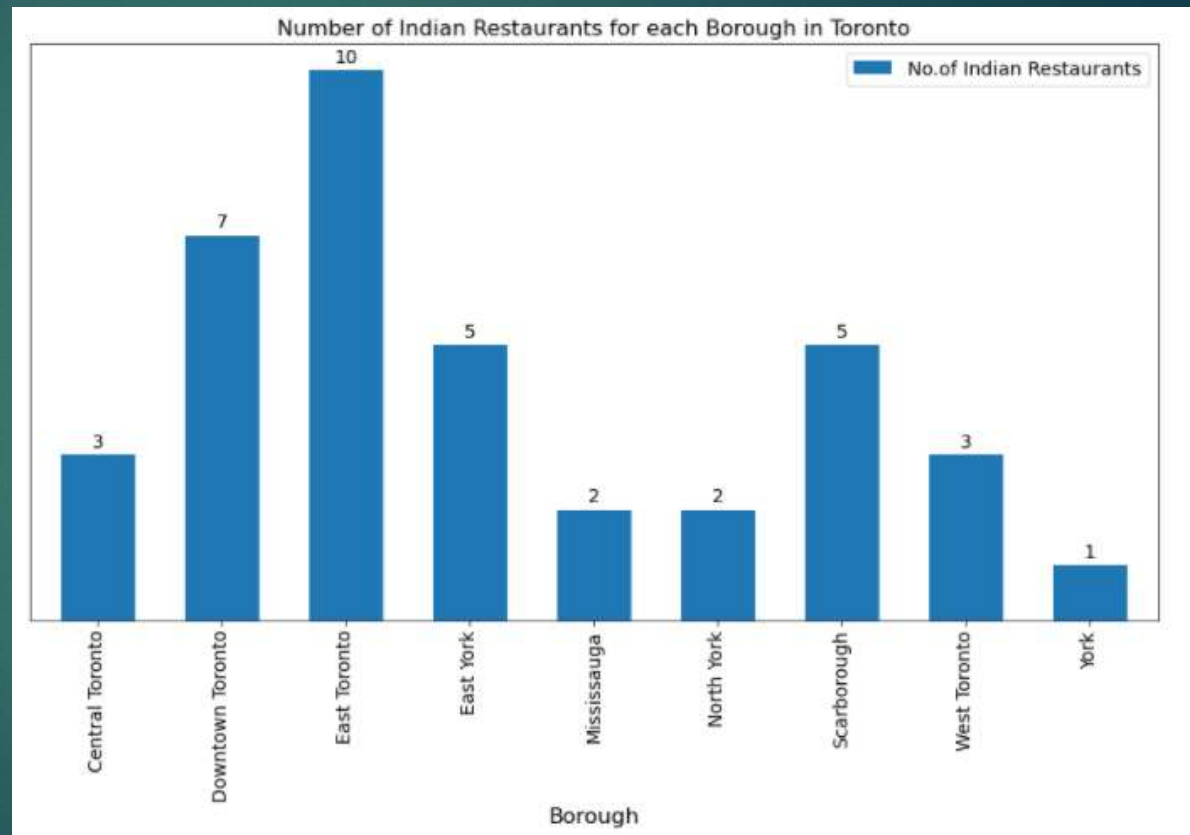
	Borough	Neighborhood	ID	Name
0	Downtown Toronto	Queen's Park	4bedf8b5e24d20a17b567214	Kothur Indian Cuisine
1	East Toronto	The Beaches	4dcd7c6352b1f8915b7e7f7e	Delhi Bistro
2	East York	Leaside	504bcf32e4b0ef19b0e2ecf8	Mt Everest Restaurant
3	Downtown Toronto	Christie	4adb969ef964a520332921e3	Banjara Indian Cuisine
4	Downtown Toronto	Christie	4b7369d7f964a52049ad2de3	Madras Masala

of neighborhoods in Toronto

Methodology (cont ..)

By plotting of Number of Indian Restaurants for each Borough in Toronto, we concluded that **East Toronto & Downtown Toronto** have large number of Indian restaurants and **York & Central Toronto** have least number of Indian restaurants

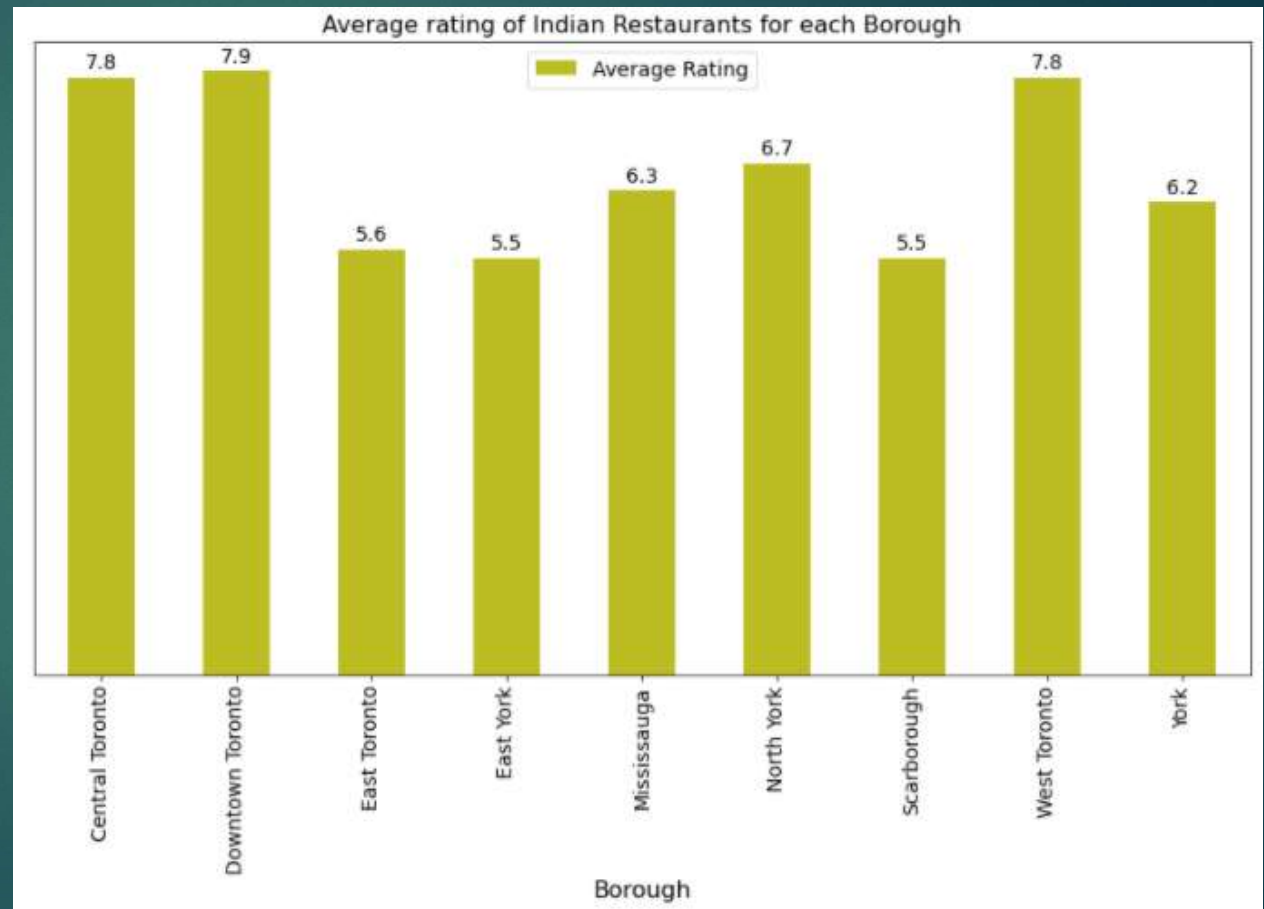Number of Indian Restaurants for each Borough in Toronto

Methodology (cont ..)

Using the Indian restaurant data and FourSquare Venue details API, built a dataframe of statistics of Indian restaurants such as rating, count of tips & no. of likes.

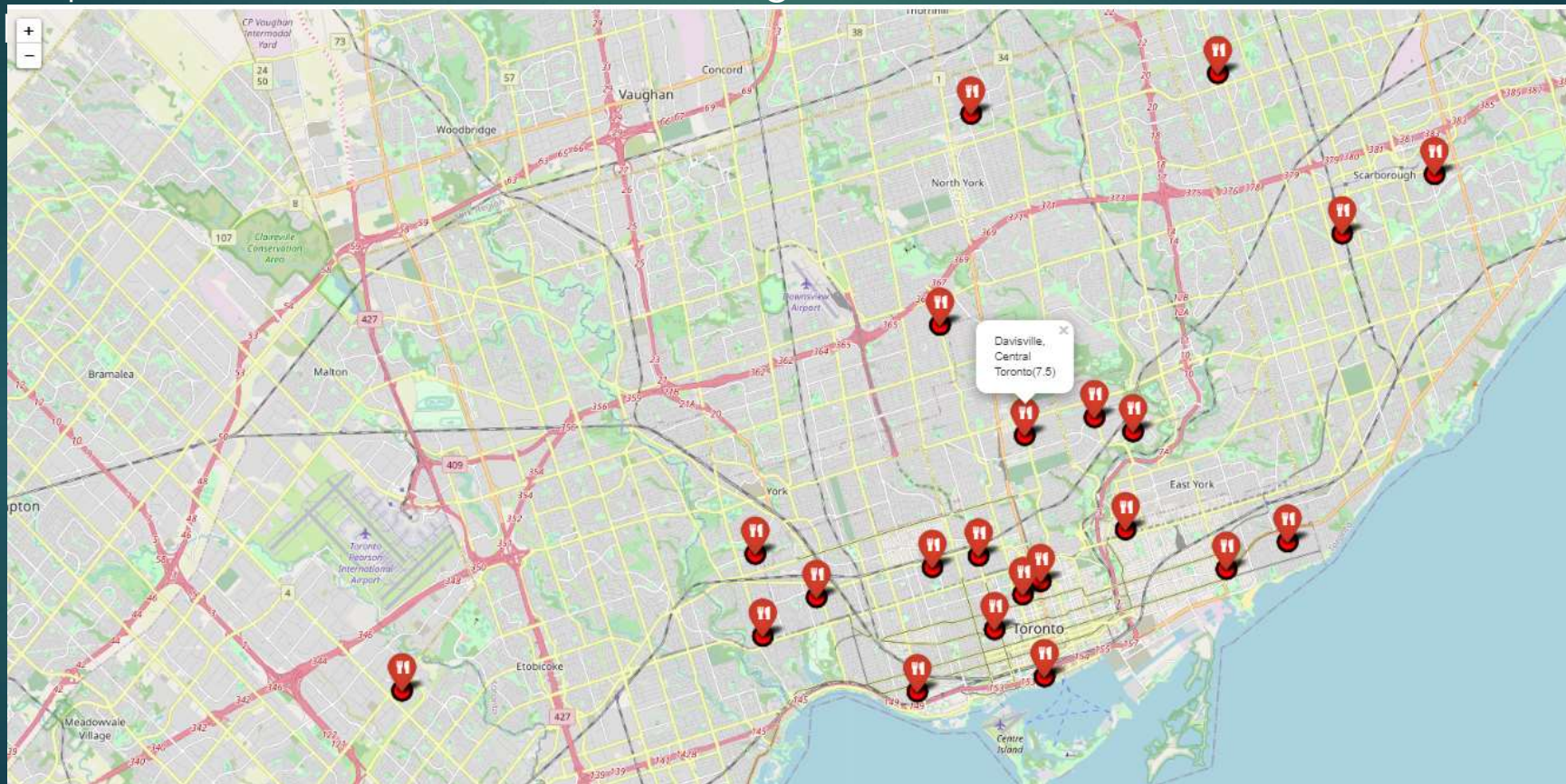|	Borough	Neighborhood	ID	Name	Rating	Tips	Likes
0	Downtown Toronto	Queen's Park	4bedf8b5e24d20a17b567214	Kothur Indian Cuisine	8.0	19	16
1	East Toronto	The Beaches	4dcd7c8352b1f8915b7e7f7e	Delhi Bistro	6.9	3	6
2	East York	Leaside	504bcf32e4b0ef19b0e2ecf8	Mt Everest Restaurant	6.8	6	8
3	Downtown Toronto	Christie	4adb969ef964a520332921e3	Banjara Indian Cuisine	8.6	75	142
4	Downtown Toronto	Christie	4b7369d7f964a52049ad2de3	Madras Masala	7.8	22	35

Methodology (cont ..)

By plotting Average rating of Indian Restaurants for each Borough, we concluded that **Downtown Toronto** has the best Indian restaurants with highest average rating.

Average rating of Indian Restaurants for each Borough

Methodology (cont ..)

Map of Toronto area to visualize the neighborhoods that have the best Indian
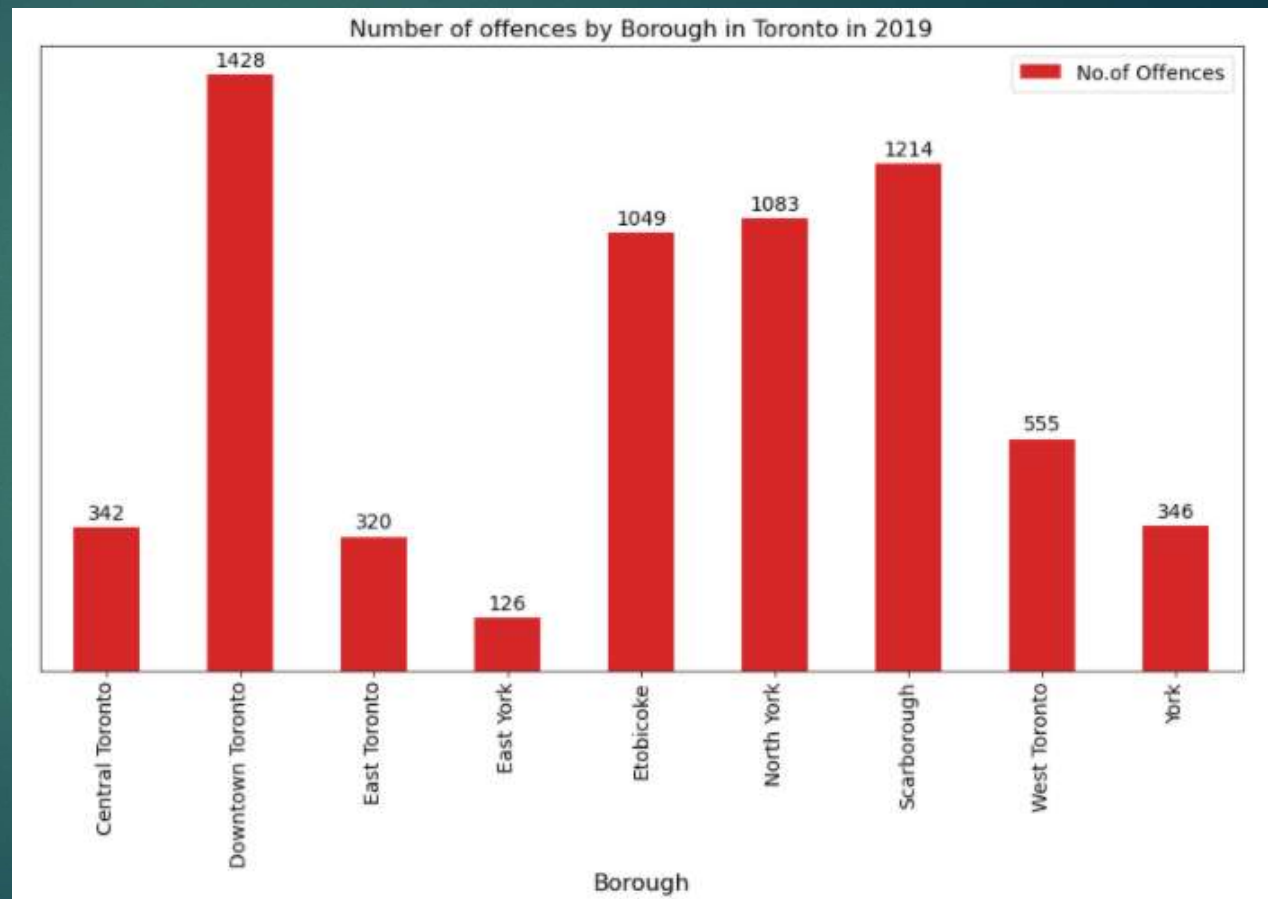
Methodology (cont ..)

Using the crime data from Kaggle, built a dataframe of crimes committed in commercial premises in Toronto area.

	Borough	Neighbourhood	premisetype	offence
1	Etobicoke	Princess-Rosethorn	Commercial	Robbery - Business
4	Etobicoke	Long Branch	Commercial	B&E
6	North York	Downsview-Roding-CFB	Commercial	B&E
8	East Toronto	South Riverdale	Commercial	B&E
16	Downtown Toronto	Waterfront Communities-The Island	Commercial	Assault With Weapon

Methodology (cont ..)

By plotting number of offences committed in commercial premises by Borough in Toronto in 2019, we concluded that **Downtown Toronto** is the most vulnerable area and areas like **East York, York, East & Central Toronto** are safer compared to other boroughs

Number of offences by Borough in Toronto in 2019

Results

Based on the above analysis & visualization of the data, here is what we have found:

- East Toronto & Downtown Toronto have large number of Indian restaurants and York & Central Toronto have least number of Indian restaurants.
  When setting up a new business, it is best to avoid competition with existing established businesses. So, one should consider areas like Central Toronto and York which has a scarcity of Indian restaurants.

- Downtown Toronto & Central Toronto have the best Indian restaurants with higher average rating compared to Indian restaurants in other boroughs.
  When an area is famous for a cuisine, people tend to be attracted to that area more. This can give an edge when starting a new restaurant with same cuisine.

- Downtown Toronto is the most vulnerable area and areas like East York, York, East & Central Toronto are safer compared to other boroughs.
  Safety is one of the most important aspects to consider while starting a new business. It is best to avoid areas where crime rates are high in commercial establishments.

Discussion

Even though Downtown Toronto has best Indian restaurants, the competition from existing Indian restaurants will be very high in that area. Moreover, it has highest crime rate in commercial establishments. Hence, this area wouldn't be recommended.

Areas like York and East York, despite of being safer and having relatively less competition from existing Indian restaurants, are not known for having good Indian restaurants. Hence, this area wouldn't be recommended either.

Central Toronto seems to be having least competition from existing Indian restaurants and has best Indian restaurants with higher average ratings. It is also one of the safer areas with lower crime rates in commercial establishments.

Hence, this area is highly recommended for setting up a new Indian Restaurant in Toronto.

Conclusion

We analyzed and did a visual representation of the Indian restaurant data and crimes data within the commercial premise type in the city of Toronto using data analysis and data visualization techniques. This helped us understand the best and the safest place to start a new or establish existing Indian restaurant business. If you are just a customer looking for Indian restaurants around Toronto, this data will help you find places with the best Indian cuisine.