

Distribution of Indian Restaurants in Toronto

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1. Introduction

The number of Indian immigrants to Canada has increased substantially over the past few years.

A lot of these immigrants have moved out of their country for the first time. Indian food would be a very important criteria for them while looking for a residential area.

Through this project I'm attempting to find areas in Toronto that have a good concentration of Indian restaurants. I would also try to consider other aspects and recommend areas that can provide suitable accommodations to the Indian diaspora there.

2. Data

2.1 Data Sources

1. Toronto city data with a list of Boroughs/Neighbourhoods - https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M
2. Indian restaurants in the Neighbourhoods - using Foursquare API
3. Geospace data for visualising in Toronto map

2.2 Data Cleaning

After scraping the data from the mentioned wikipedia link, I have performed the following cleaning:

1. Only processing the cells that have an assigned borough and ignoring the other cells
2. More than one neighborhood can exist in one postal code area. In such cases, these rows will be combined into one row with the neighborhoods separated with a comma.
3. If a cell has a borough but a Not assigned neighborhood, then the neighborhood will be the same as the borough

After cleaning the final data looks like the table below:

	Postal Code	Borough	Neighbourhood	Latitude	Longitude
0	M4E	East Toronto	The Beaches	43.676357	-79.293031
1	M4K	East Toronto	The Danforth West, Riverdale	43.679557	-79.352188
2	M4L	East Toronto	India Bazaar, The Beaches West	43.668999	-79.315572
3	M4M	East Toronto	Studio District	43.659526	-79.340923
4	M4N	Central Toronto	Lawrence Park	43.728020	-79.388790

3. Methodology

Using Foursquare API, a list of all venue in the neighbourhoods of Toronto were extracted

	Neighbourhood	Neighbourhood Latitude	Neighbourhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	The Beaches	43.676357	-79.293031	Glen Manor Ravine	43.676821	-79.293942	Trail
1	The Beaches	43.676357	-79.293031	The Big Carrot Natural Food Market	43.678879	-79.297734	Health Food Store
2	The Beaches	43.676357	-79.293031	Grover Pub and Grub	43.679181	-79.297215	Pub
3	The Beaches	43.676357	-79.293031	Upper Beaches	43.680563	-79.292869	Neighborhood
4	The Danforth West, Riverdale	43.679557	-79.352188	Pantheon	43.677621	-79.351434	Greek Restaurant

Since I was getting only 6 restaurants, I also verified it using one-hot encoding.

Once the list of restaurants was ready, I used Folium to visualise it on the map of Toronto.

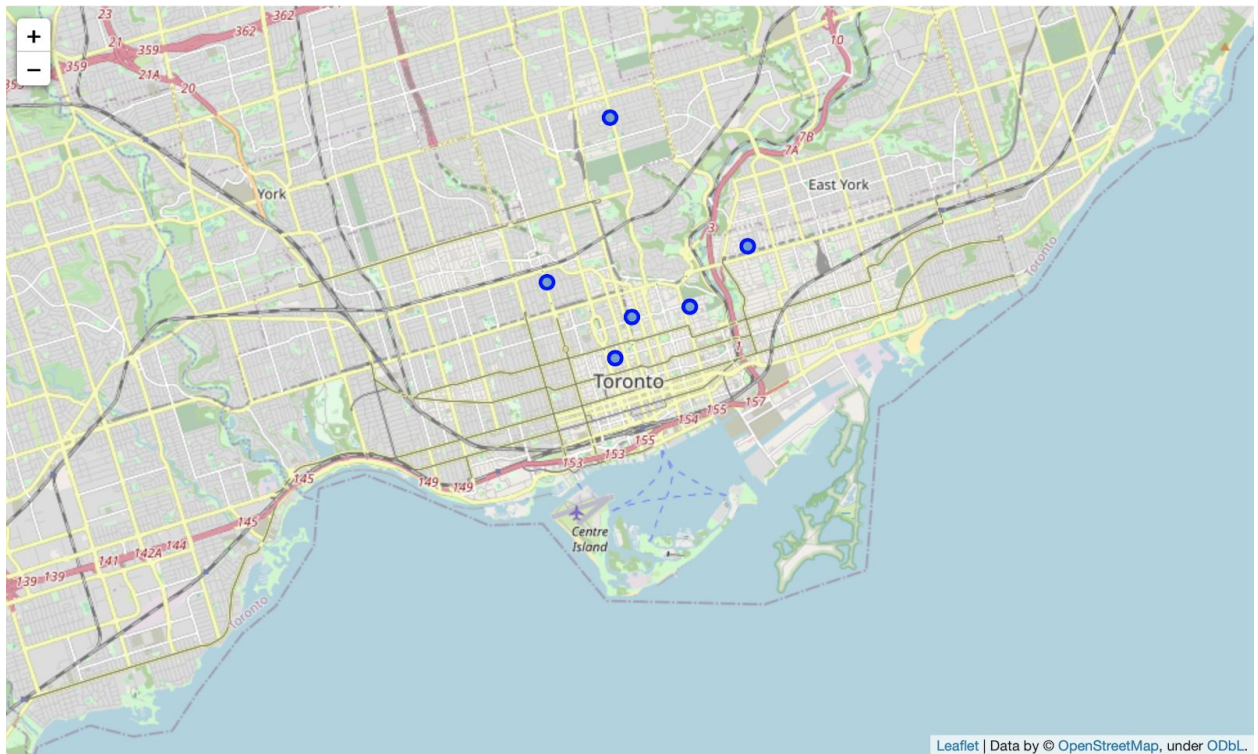
It wouldn't make sense to perform a clustering analysis since the number of restaurants is very low.

4. Results

Table of Indian Restaurants in Toronto:

	Neighbourhood	Neighbourhood Latitude	Neighbourhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	The Danforth West, Riverdale	43.679557	-79.352188	Sher-E-Punjab	43.677308	-79.353066	Indian Restaurant
1	Davisville	43.704324	-79.388790	Marigold Indian Bistro	43.702881	-79.388008	Indian Restaurant
2	St. James Town, Cabbagetown	43.667967	-79.367675	Butter Chicken Factory	43.667072	-79.369184	Indian Restaurant
3	Church and Wellesley	43.665860	-79.383160	Kothur Indian Cuisine	43.667872	-79.385659	Indian Restaurant
4	Central Bay Street	43.657952	-79.387383	Colaba Junction	43.660940	-79.385635	Indian Restaurant
5	The Annex, North Midtown, Yorkville	43.672710	-79.405678	Roti Cuisine of India	43.674618	-79.408249	Indian Restaurant

As we can see, there are only 6 Indian Restaurants in Toronto. Lets visualise their locations on the map of Toronto



5. Discussion

Despite having a high concentration and substantial inflow of Indians, there are few Indian restaurants in Toronto. This could be because of two reasons:

1. Indian diaspora in Toronto doesn't prefer to eat out. They cook their own meals. This could be because of high costs of outside eating.
2. All restaurants serving Indian food might not be classified as 'Indian Restaurants'. There could be other general or fusion restaurants serving Indian food.
3. The Foursquare data might not be updated (unlikely)

6. Conclusion

Indian restaurants in Toronto were marked in the map of Toronto. They are fairly well-spaced and there's no particular area with a high concentration on Indian Restaurants.

Considering the high Indian diaspora there, this could be an opportunity.