

# OPENING INDIAN RESTAURANT IN TORONTO

*CAPSTONE FINAL PROJECT*  
*-Lakshmi Lakshmiganapathy*







# TABLE OF CONTENT

- Background
- Business Problem
- Target Audience
- Data & Data extraction
- Methodology
- Results
- Discussion
- Conclusion

# BACKGROUND

- No. of immigrants from India to Canada has been increasing at a faster rate
- National Foundation for American Policy (NFAP) analysis of Immigration, Refugees and Citizenship Canada data – Indians with Canadian PR increased from 39,340 in 2016 to 80,685 in 2019, through the first 11 months of 2019, an increase of more than 105%
- Reason- problem with H1B visas in the USA
- More IT companies in Canada
- GOOD IDEA- to open Indian restaurants in city like Toronto to cater this enormous surge in Indian population.

# BUSINESS PROBLEM & TARGET AUDIENCE

## **OBJECTIVE:**

To find a best location for the entrepreneur to open an authentic Indian Restaurant in Toronto, Canada.

## **BUSINESS QUESTION:**

What would be the best location in Toronto for an entrepreneur to open an Indian restaurant?

## **TARGET AUDIENCE:**

Any person who would want to open an Indian restaurant in Toronto, Canada.



# DATA & METHODOLOGY

## DATA:

1. Neighborhood data of Toronto, Canada
2. Latitude and Longitude of the neighborhoods
3. Venue data related to Indian restaurants.

## METHODOLOGY:

**Step 1.** Scraping wikipedia page [https://en.wikipedia.org/wiki/List\\_of\\_postal\\_codes\\_of\\_Canada:\\_M](https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M) collect information about Toronto boroughs and locations,

**Step 2.** Use the Geopy and Folium library to get the coordinates of every locations and map geospatial data on a Toronto map.

**Step 3.** Using Foursquare API, collect the top 100 restaurants and their categories for each location within a radius 500 meters.

**Step 4.** Group collected restaurants by location and by taking the mean of the frequency of occurrence of each type, preparing them for clustering.

**Step 5.** Cluster restaurants by k-means algorithm and analyze the top 10 most common restaurants in each cluster.

**Step 6.** Visualize clusters on the map, thus showing the best locations to open Indian restaurant.

## DATA CLEANING TO GET ONLY TORONTO NEIGHBORHOODS

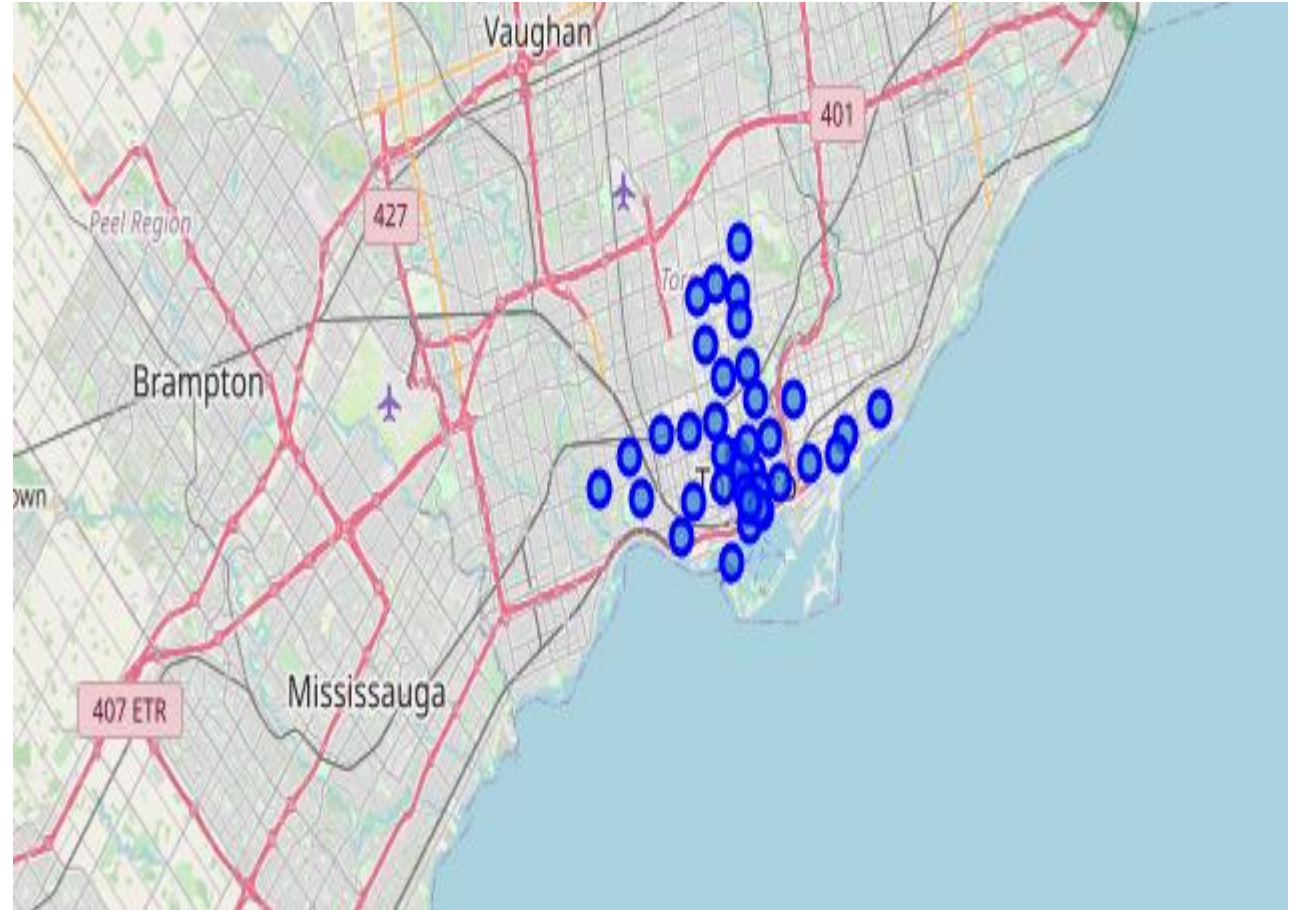
```
In [14]: #getting all rows which has toronto in their borough  
df4=df3[df3['Borough'].str.contains("Toronto")]  
df4.head()
```

Out[14]:

	Postal Code	Borough	Neighborhood	Latitude	Longitude
2	M5A	Downtown Toronto	Regent Park, Harbourfront	43.654260	-79.360636
4	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government	43.662301	-79.389494
9	M5B	Downtown Toronto	Garden District, Ryerson	43.657162	-79.378937
15	M5C	Downtown Toronto	St. James Town	43.651494	-79.375418
19	M4E	East Toronto	The Beaches	43.676357	-79.293031

# EXPLORING TORONTO NEIGHBORHOODS

- Using Geopy library obtained latitude and longitude of Toronto: The geographical coordinate of Toronto are 43.6534817, -79.3839347
- Using folium map created a map of Toronto with neighborhoods superimposed on top





# EXPLORING TORONTO RESTAURANTS

- Using Foursquare API, we got the top 100 restaurants that are in Parkwoods within a radius of 500 meters using GET request
- Created same process to do with all neighborhoods in Toronto

Location	Venue
Berczy Park	52
Brockton, Parkdale Village, Exhibition Place	15
Business reply mail Processing Centre, South Central Letter Processing Plant Toronto	5
CN Tower, King and Spadina, Railway Lands, Harbourfront West, Bathurst Quay, South Niagara, Island airport	2
Central Bay Street	69
Christie	7
Church and Wellesley	64
Commerce Court, Victoria Hotel	100
Davisville	30
Davisville North	4
Dufferin, Dovercourt Village	8
First Canadian Place, Underground city	100
Forest Hill North & West, Forest Hill Road Park	4
Garden District, Ryerson	94
Harbourfront East, Union Station, Toronto Islands	86
High Park, The Junction South	16
India Bazaar, The Beaches West	12
Kensington Market, Chinatown, Grange Park	54
Lawrence Park	1
Little Portugal, Trinity	42

- Discovered number of restaurants in each neighborhoods in Toronto and also ten most common restaurants in each location

	Location	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
0	Berczy Park	Restaurant	Bakery	Italian Restaurant	Café	Sushi Restaurant	Moroccan Restaurant	Diner	Bistro	Seafood Restaurant	Greek Restaurant
1	Brockton, Parkdale Village, Exhibition Place	Café	Bakery	Restaurant	Breakfast Spot	Italian Restaurant	Burrito Place	Japanese Restaurant	Sandwich Place	Pizza Place	Vietnamese Restaurant
2	Business reply mail Processing Centre, South C...	Fast Food Restaurant	Restaurant	Burrito Place	Pizza Place	Wings Joint	Eastern European Restaurant	Deli / Bodega	Dim Sum Restaurant	Diner	Doner Restaurant
3	CN Tower, King and Spadina, Railway Lands, Har...	American Restaurant	Tapas Restaurant	Wings Joint	Falafel Restaurant	Dim Sum Restaurant	Diner	Doner Restaurant	Donut Shop	Dumpling Restaurant	Eastern European Restaurant
4	Central Bay Street	Café	Sandwich Place	Italian Restaurant	Restaurant	Japanese Restaurant	Chinese Restaurant	Pizza Place	Thai Restaurant	Fried Chicken Joint	Indian Restaurant
5	Christie	Restaurant	Café	Diner	Italian Restaurant	Japanese Restaurant	Wings Joint	Ethiopian Restaurant	Dim Sum Restaurant	Doner Restaurant	Donut Shop
6	Church and Wellesley	Japanese Restaurant	Sushi Restaurant	Pizza Place	Burger Joint	Restaurant	Vietnamese Restaurant	Mexican Restaurant	Mediterranean Restaurant	Burrito Place	Korean Restaurant
7	Commerce Court, Victoria Hotel	Restaurant	Café	Italian Restaurant	Salad Place	American Restaurant	Japanese Restaurant	Breakfast Spot	Deli / Bodega	Seafood Restaurant	Vegetarian / Vegan Restaurant
8	Davisville	Pizza Place	Café	Restaurant	American Restaurant	Italian Restaurant	Sushi Restaurant	Greek Restaurant	Seafood Restaurant	Fried Chicken Joint	Indian Restaurant
9	Davisville North	Breakfast Spot	Asian Restaurant	Restaurant	Pizza Place	Ethiopian Restaurant	Deli / Bodega	Dim Sum Restaurant	Diner	Doner Restaurant	Donut Shop
10	Dufferin, Dovercourt Village	Pizza Place	Bakery	Portuguese Restaurant	Middle Eastern Restaurant	Café	Brazilian Restaurant	Empanada Restaurant	Dim Sum Restaurant	Diner	Doner Restaurant
11	First Canadian Place, Underground city	Café	Restaurant	American Restaurant	Salad Place	Italian Restaurant	Sushi Restaurant	Seafood Restaurant	Deli / Bodega	Japanese Restaurant	Asian Restaurant

# RESULTS

## Cluster 1:

1. First most common restaurant: “Restaurant”
2. 10<sup>th</sup> most common restaurant: “Eastern European Restaurant”

	Neighborhood	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
21	Forest Hill North & West, Forest Hill Road Park	Restaurant	French Restaurant	Sushi Restaurant	Wings Joint	Empanada Restaurant	Deli / Bodega	Dim Sum Restaurant	Diner	Doner Restaurant	Donut Shop
29	Moore Park, Summerhill East	Restaurant	Wings Joint	Ethiopian Restaurant	Deli / Bodega	Dim Sum Restaurant	Diner	Doner Restaurant	Donut Shop	Dumpling Restaurant	Eastern European Restaurant

## Cluster 2:

1. First most common restaurant: “Japanese Restaurant”
2. 10<sup>th</sup> most common restaurant: “Emapanada Restaurant”

	Neighborhood	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
33	Rosedale	Japanese Restaurant	Wings Joint	Falafel Restaurant	Dim Sum Restaurant	Diner	Doner Restaurant	Donut Shop	Dumpling Restaurant	Eastern European Restaurant	Empanada Restaurant

# RESULTS

## Cluster 3:

1. First most common restaurant: “Restaurant”

2. 10<sup>th</sup> most common restaurant: “Donut Shop”

	Neighborhood	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
0	Regent Park, Harbourfront	Café	Restaurant	Breakfast Spot	Bakery	Chinese Restaurant	Mexican Restaurant	Seafood Restaurant	Italian Restaurant	Greek Restaurant	Thai Restaurant
1	Queen's Park, Ontario Provincial Government	Sushi Restaurant	Japanese Restaurant	Diner	Restaurant	Mexican Restaurant	Café	Chinese Restaurant	Creperie	Deli / Bodega	Middle Eastern Restaurant
2	Garden District, Ryerson	Restaurant	Café	Pizza Place	Middle Eastern Restaurant	Fast Food Restaurant	Japanese Restaurant	Bakery	Burger Joint	Thai Restaurant	Italian Restaurant
3	St. James Town	Restaurant	Italian Restaurant	Café	Sushi Restaurant	Bakery	American Restaurant	Breakfast Spot	Gastropub	Creperie	Moroccan Restaurant
4	The Beaches	Burger Joint	Asian Restaurant	Pizza Place	Wings Joint	Dim Sum Restaurant	Diner	Doner Restaurant	Donut Shop	Dumpling Restaurant	Eastern European Restaurant
5	Berczy Park	Restaurant	Bakery	Italian Restaurant	Café	Sushi Restaurant	Moroccan Restaurant	Diner	Bistro	Seafood Restaurant	Greek Restaurant
6	Central Bay Street	Café	Sandwich Place	Italian Restaurant	Restaurant	Japanese Restaurant	Chinese Restaurant	Pizza Place	Thai Restaurant	Fried Chicken Joint	Indian Restaurant
7	Christie	Restaurant	Café	Diner	Italian Restaurant	Japanese Restaurant	Wings Joint	Ethiopian Restaurant	Dim Sum Restaurant	Doner Restaurant	Donut Shop
8	Richmond, Adelaide, King	Restaurant	Café	Asian Restaurant	Salad Place	Sandwich Place	American Restaurant	Thai Restaurant	Sushi Restaurant	Deli / Bodega	Bakery
9	Dufferin, Dovercourt Village	Pizza Place	Bakery	Portuguese Restaurant	Middle Eastern Restaurant	Café	Brazilian Restaurant	Empanada Restaurant	Dim Sum Restaurant	Diner	Doner Restaurant
10	Harbourfront East, Union Station, Toronto Islands	Restaurant	Fast Food Restaurant	Café	Pizza Place	Chinese Restaurant	Food Court	Italian Restaurant	Fried Chicken Joint	Hot Dog Joint	Salad Place
11	Little Portugal, Trinity	Asian Restaurant	Restaurant	Vietnamese Restaurant	Pizza Place	New American Restaurant	Bakery	Diner	French Restaurant	Mexican Restaurant	Vegetarian / Vegan Restaurant
12	The Danforth West, Riverdale	Greek Restaurant	Sushi Restaurant	Italian Restaurant	Restaurant	Pizza Place	Caribbean Restaurant	Indian Restaurant	Japanese Restaurant	Thai Restaurant	Bagel Shop
13	Toronto Dominion Centre, Design Exchange	Restaurant	Café	Italian Restaurant	Salad Place	Japanese Restaurant	American Restaurant	Asian Restaurant	Sushi Restaurant	Steakhouse	Burger Joint
14	Brockton, Parkdale Village, Exhibition Place	Café	Bakery	Restaurant	Breakfast Spot	Italian Restaurant	Burrito Place	Japanese Restaurant	Sandwich Place	Pizza Place	Vietnamese Restaurant
15	India Bazaar, The Beaches West	Pizza Place	Fast Food Restaurant	Restaurant	Sandwich Place	Fish & Chips Shop	Italian Restaurant	Sushi Restaurant	Steakhouse	Burrito Place	Wings Joint
16	Commerce Court, Victoria Hotel	Restaurant	Café	Italian Restaurant	Salad Place	American Restaurant	Japanese Restaurant	Breakfast Spot	Deli / Bodega	Seafood Restaurant	Vegetarian / Vegan Restaurant
17	Studio District	Café	Pizza Place	Bakery	Comfort Food Restaurant	Italian Restaurant	Restaurant	Gastropub	American Restaurant	Food	Diner
20	Davisville North	Breakfast Spot	Asian Restaurant	Restaurant	Pizza Place	Ethiopian Restaurant	Deli / Bodega	Dim Sum Restaurant	Diner	Doner Restaurant	Donut Shop
22	High Park, The Junction South	Bakery	Mexican Restaurant	Thai Restaurant	Gastropub	Fried Chicken Joint	Cajun / Creole Restaurant	Café	Restaurant	Italian Restaurant	Fast Food Restaurant
23	North Toronto West, Lawrence Park	Mexican Restaurant	Diner	Chinese Restaurant	Italian Restaurant	Bagel Shop	Restaurant	Fast Food Restaurant	Café	Seafood Restaurant	Wings Joint

# RESULTS

## **Cluster 4:**

1. First most common restaurant: “Dim Sum Restaurant”
2. 10<sup>th</sup> most common restaurant: “Empanda Restaurant”

	Neighborhood	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
18	Lawrence Park	Dim Sum Restaurant	Wings Joint	Gluten-free Restaurant	Deli / Bodega	Diner	Doner Restaurant	Donut Shop	Dumpling Restaurant	Eastern European Restaurant	Empanada Restaurant

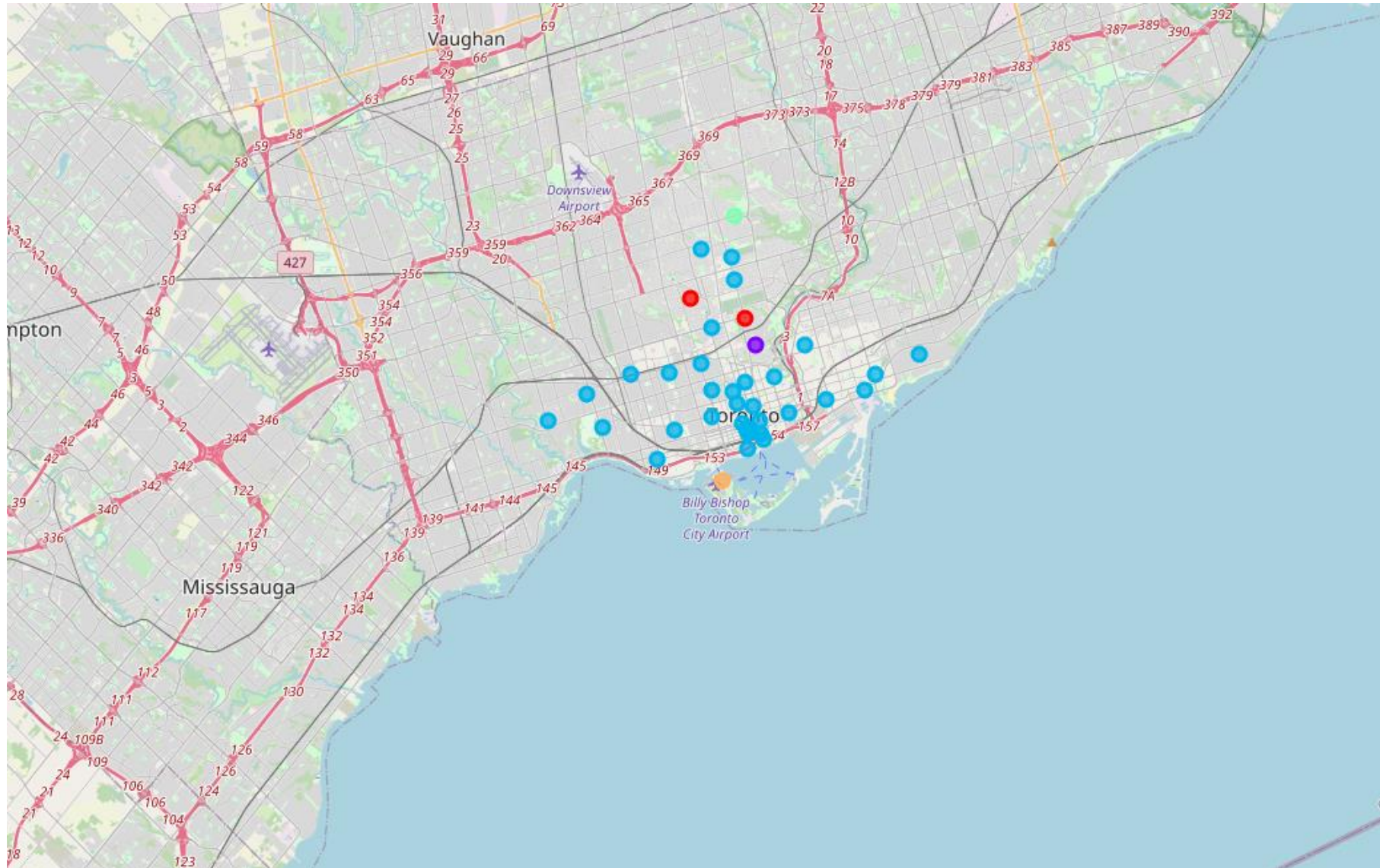
## **Cluster 5:**

1. First most common restaurant: “American Restaurant”
2. 10<sup>th</sup> most common restaurant: “Eastern European Restaurant”

	Neighborhood	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
32	CN Tower, King and Spadina, Railway Lands, Har...	American Restaurant	Tapas Restaurant	Wings Joint	Falafel Restaurant	Dim Sum Restaurant	Diner	Doner Restaurant	Donut Shop	Dumpling Restaurant	Eastern European Restaurant



# VISUALIZING RESTAURANT CLUSTERS



## MAP LEGEND

- Cluster 1 - red dots*
- Cluster 2 - purple dots*
- Cluster 3 - blue dots*
- Cluster 4 - green dots*
- Cluster 5 - orange dots*

# DISCUSSION

- Surprising find!!! – can't find many Indian Restaurants within the top 10 most common restaurants in Toronto neighborhoods
- Clusters 1, 2, 4 and 5 – no Indian Restaurants among 10 most common restaurant venues.
- Cluster 3- 3 neighborhoods have Indian Restaurants in their common venue list(Central Bay street- 10th place, the danforth west, rivedale-7th place, Davisville-10th place).

## **RECOMMENDATIONS:**

- Open Indian restaurant that can cater to Asian population as well
- Also, Indian Restaurant to include Bar to cater general population

Cluster 1 locations- Indian Restaurants/Indian Restaurants with Asian food options

Cluster 2 locations- Indian Restaurants/Indian Restaurants with Asian food options

Cluster 3 locations- Indian Restaurants

Cluster 4 locations- Indian Restaurants/Indian Restaurants with Asian food options

Cluster 5 locations- Indian Restaurants/Indian Restaurants with Asian food options



# CONCLUSION

In this project, we looked at neighborhoods that has Indian restaurants and also discovered locations to open an Indian Restaurant with added options to make business profitable.

- ❑ scrapped Wikipedia page that has information about Toronto neighborhoods and boroughs.
- ❑ cleansed data and by using geospatial libraries we mapped them.
- ❑ used Foursquare API, we collected the top 100 restaurants and their types for each location within a radius 500 meters from its central point.
- ❑ grouped collected restaurants by location and by taking the mean of the frequency of occurrence of each type, preparing them for clustering.
- ❑ clustered restaurants by the k-means algorithm and analyze the top 10 most common restaurants in each cluster, making useful observations.
- ❑ visualized clusters on the map, thus showing the best locations for opening the chosen type of restaurant.

