

# Capstone Project

## Identifying Location for Pizza Restaurant

*G Makesh – Oct 2019*

## Background and Problem Statement

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Identifying a right location for opening a Pizza Restaurant for a Businessman. Below questions to be answered:

- List of Neighborhoods in Central Toronto Region?
- Find out how many restaurants in Central Toronto Region?
- Number of Pizza restaurants are located in each of the Neighborhood in Central Toronto?
- Number of Neighborhood that has many restaurants but does not have any Pizza restaurant so far?
- And finally, Right location to open a new Pizza restaurant?

## Data Acquisition

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- ***List of all the Neighborhoods in the Central Toronto Region***

This can be obtained from the below 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)

- ***Latitude and Longitude of each Neighborhood***
  - This data is available in a spreadsheet form.
  - This spreadsheet will be used as reference to get the Latitude and Longitude of each Neighborhood.
- ***List of all the restaurants and their location in each Neighborhood***
  - Obtain from Foursquare API with the Get request on Venue with Explore option.
  - For each neighborhood, API can be called using the Latitude and Longitude.
  - API will return the list of venues in each Neighborhood along with their co-ordinates.

# Data Cleaning

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- Remove 'Not assigned' Boroughs
- Filter the data for only 'Central Toronto'
- Around 17 neighborhoods are returned as below

	Postcode	Borough	Neighborhood
144	M4N	Central Toronto	Lawrence Park
145	M5N	Central Toronto	Roselawn
156	M4P	Central Toronto	Davisville North
157	M5P	Central Toronto	Forest Hill North
158	M5P	Central Toronto	Forest Hill West
168	M4R	Central Toronto	North Toronto West
169	M5R	Central Toronto	The Annex
170	M5R	Central Toronto	North Midtown
171	M5R	Central Toronto	Yorkville
183	M4S	Central Toronto	Davisville
196	M4T	Central Toronto	Moore Park
197	M4T	Central Toronto	Summerhill East
211	M4V	Central Toronto	Deer Park
212	M4V	Central Toronto	Forest Hill SE
213	M4V	Central Toronto	Rathnelly
214	M4V	Central Toronto	South Hill
215	M4V	Central Toronto	Summerhill West

## Data Analysis – Identify Restaurants in each Neighborhood

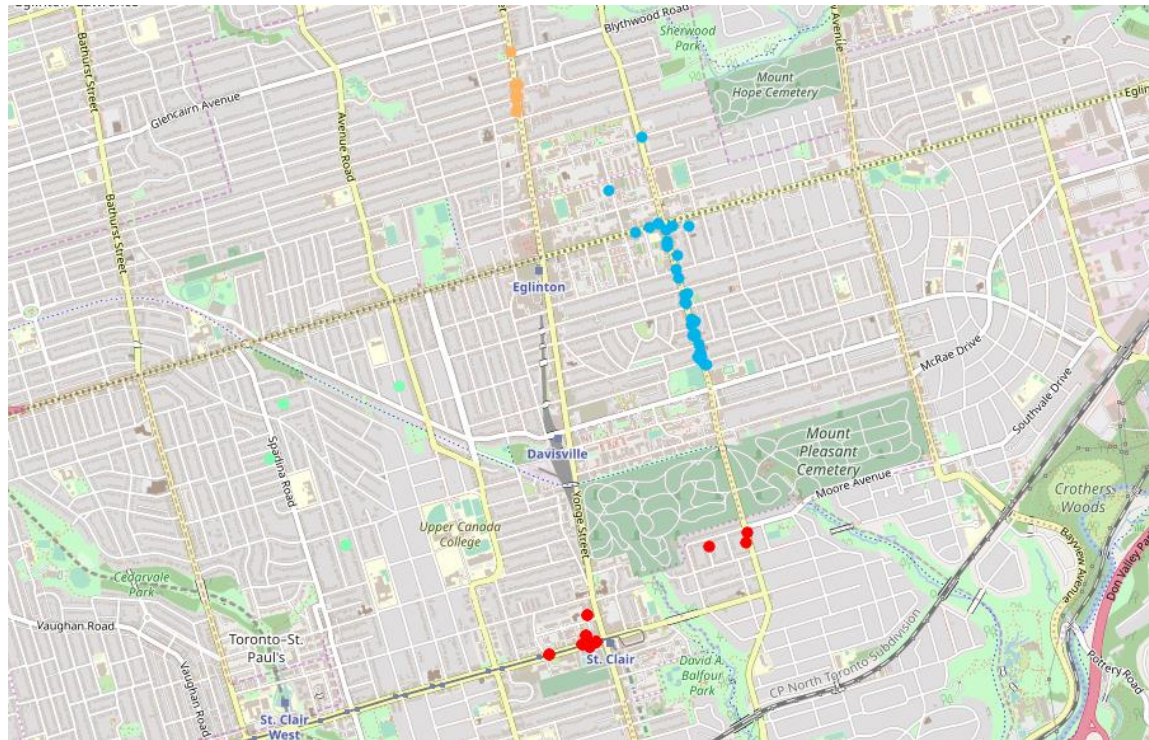
- Use Foursquare API with Explore/Venue option
  - Latitude, Longitude of the Neighborhood
  - ‘Food’ as section
- This will return the details of each restaurant as below

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Lawrence Park	43.728020	-79.388790	Dim Sum Deluxe	43.726953	-79.394260	Dim Sum Restaurant
1	Davisville North	43.712751	-79.390197	Homeway Restaurant & Brunch	43.712641	-79.391557	Breakfast Spot
2	Davisville North	43.712751	-79.390197	Subway	43.708378	-79.390473	Sandwich Place
3	Davisville North	43.712751	-79.390197	Ho Su Korean & Japanese Restaurant	43.710002	-79.393856	Asian Restaurant
4	Davisville North	43.712751	-79.390197	Provocative Pizza Series	43.708293	-79.389546	Pizza Place

- 144 restaurants are retrieved for the Central Toronto area
- Among these, 14 are Pizza restaurants

# Data Analysis – Cluster the Neighborhoods

- Identify Restaurant Clusters in Central Toronto
  - Reflects people movement in those clusters
  - Opportunity to open a new restaurant
- K-Means clustering technique to cluster the neighborhood into 5 clusters
- Folium map to show the clusters



## Data Analysis – Neighborhood Clusters

- 5 Clusters and their neighborhood are provide in the table
- Cluster 0 has many restaurants
- Cluster 2, 3 and 4 has very few restaurants

Cluster Labels	Neighborhood
0	Summerhill West
0	Rathnelly
0	Forest Hill SE
0	Deer Park
0	Summerhill East
0	Moore Park
0	South Hill
1	The Annex
1	Yorkville
1	North Midtown
2	Davisville
2	Davisville North
3	Forest Hill West
3	Forest Hill North
4	North Toronto West
4	Lawrence Park

## Data Analysis – Analyze the Clusters

- Clusters, number of total restaurants and pizza restaurants are show in the chart below
- Cluster 1, 2 and 3 has few Pizza restaurant
- Cluster 4 and 5 does not have any Pizza restaurant





## Result and Conclusion

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- Below Clusters do not have any Pizza restaurants but has other restaurants

Cluster Labels	Neighborhood
3	Forest Hill North
3	Forest Hill West
4	Lawrence Park
4	North Toronto West

- Existence of other restaurants in these clusters determines that there are people movement and business around in these areas
- Good opportunity to open a new Pizza restaurant in these clusters and neighborhood
- Concluding that above locations are suitable for the businessman to open a new Pizza place.