



# **FINDING BEST PLACE TO OPEN A RESTAURANT**



# PROPER LOCATION IS NEEDED

Restaurants are a heavy investment project where 2-3 people invest to run it.

Such a high value risk should not be taken haphazardly.

Finding a place suitable for restaurant can be done on by finding the number of restaurant that are in the locality

People only visit your restaurant if it is in good locality or if they other visiting your restaurant.

# DATA

Data for this was obtained from Wikipedia for the neighborhood of Toronto.

Also, the latitude and longitude of different districts of Toronto was obtained by calling geospatial library.

The first data had many “na” values that were removed.

After that many areas of same districts were in different rows so, all these areas were merged under one district.



After that, a new dataframe was created that was merged with the location of different districts and postal codes.

Then the map of Toronto was created based on that with folium package.

# FOURSQUARE API

So with the help of foursquare API, different types of venues that are listed by foursquare.

```
toronto_venues['Venue Category'].unique()[:80]
array(['Trail', 'Health Food Store', 'Pub', 'Park', 'Neighborhood',
      'Greek Restaurant', 'Cosmetics Shop', 'Italian Restaurant',
      'Ice Cream Shop', 'Yoga Studio', 'Brewery',
      'Fruit & Vegetable Store', 'Pizza Place', 'Bookstore',
      'Restaurant', 'Dessert Shop', 'Juice Bar', 'Bubble Tea Shop',
      'Spa', 'Diner', 'Grocery Store', 'Furniture / Home Store', 'Café',
      'Coffee Shop', 'Bakery', 'Caribbean Restaurant',
      'Indian Restaurant', 'Frozen Yogurt Shop', 'Lounge',
      'Liquor Store', 'Gym', 'Fish & Chips Shop', 'Fast Food Restaurant',
      'Sushi Restaurant', 'Pet Store', 'Steakhouse', 'Burrito Place',
      'Movie Theater', 'Sandwich Place', 'Board Shop', 'Fish Market',
      'Gay Bar', 'Cheese Shop', 'Middle Eastern Restaurant',
      'Comfort Food Restaurant', 'Thai Restaurant', 'Seafood Restaurant',
      'American Restaurant', 'Stationery Store', 'Coworking Space',
      'Wine Bar', 'Bar', 'Gym / Fitness Center',
      'Latin American Restaurant', 'Gastropub', 'Bank', 'Clothing Store',
      'Convenience Store', 'Thrift / Vintage Store', 'Swim School',
      'Bus Line', 'Food & Drink Shop', 'Breakfast Spot',
      'Department Store', 'Hotel', 'Asian Restaurant',
      'Chinese Restaurant', 'Salon / Barbershop', 'Mexican Restaurant',
      'Sporting Goods Shop', 'Toy / Game Store', 'Gift Shop',
      'Rental Car Location', 'Gas Station', 'Farmers Market',
      'Gourmet Shop', 'Pharmacy', 'Indoor Play Area', 'Deli / Bodega',
      'Tennis Court'], dtype=object)
```

# PROJECT GOAL

Our project goal is to find the best locations to open a restaurant.

Hence, out of these different unique locations, we merged the areas with their co-ordinated with the areas where the Restaurant was present.

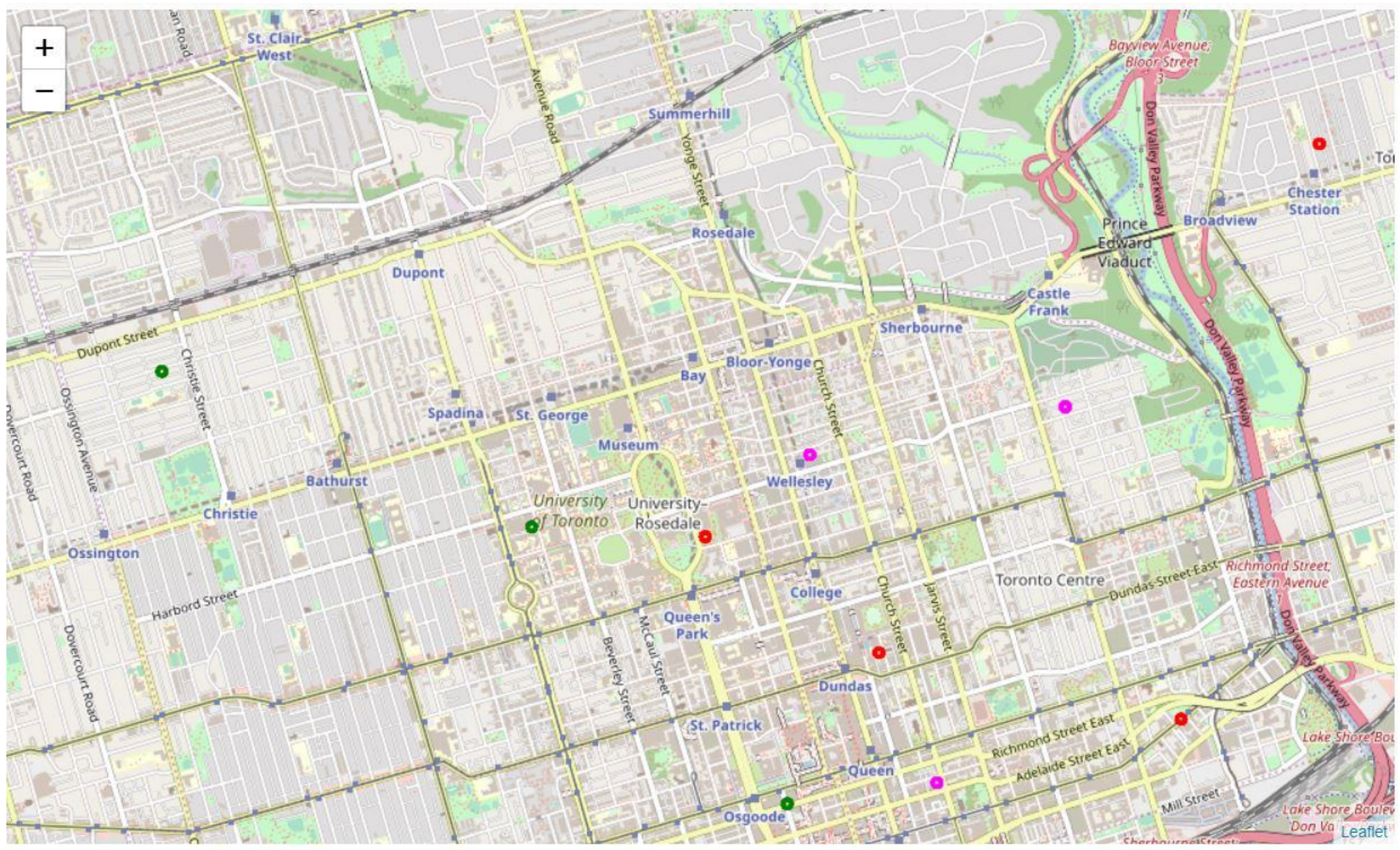
# CLUSTERING

Now, with the help of K-means Clustering, we divided the restaurants in to 5 clusters. Why 5 ? I took k as 3 and 7 where the list became too dense in the former and too sparse in the later.

With k means clustering we found the there are maximum restaurants in cluster 2.

Cluster 0 and 4 had appropriate number of restaurants and hence they were selected to be the best one for new restaurants.







```
#k = 0
```

```
to_merged.loc[(to_merged['Cluster Labels'] == 0) & (to_merged['Venue Category'] == 'Restaurant') ]
```

	Neighborhood	Restaurant	Cluster Labels	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
14	Harbourfront East / Union Station / Toronto Is...	0.030000	0	43.640816	-79.381752	Steam Whistle's Biergarten	43.640666	-79.385859	Restaurant
14	Harbourfront East / Union Station / Toronto Is...	0.030000	0	43.640816	-79.381752	Sushi Shop	43.643485	-79.380960	Restaurant
14	Harbourfront East / Union Station / Toronto Is...	0.030000	0	43.640816	-79.381752	Kellys Landing	43.645082	-79.383050	Restaurant
13	Garden District, Ryerson	0.020000	0	43.657162	-79.378937	Jack Astor's Bar & Grill	43.656019	-79.380326	Restaurant
13	Garden District, Ryerson	0.020000	0	43.657162	-79.378937	JOEY Eaton Centre	43.655404	-79.381929	Restaurant
8	Davisville	0.028571	0	43.704324	-79.388790	Starving Artist	43.701538	-79.387240	Restaurant
28	Runnymede / Swansea	0.022222	0	43.651571	-79.484450	Supper Solved	43.648781	-79.485233	Restaurant
36	The Danforth West / Riverdale	0.023810	0	43.679557	-79.352188	Rikkochez	43.677267	-79.353274	Restaurant
23	Queen's Park / Ontario Provincial Government	0.029412	0	43.662301	-79.389494	Gallery Grill	43.663841	-79.394309	Restaurant
24	Regent Park / Harbourfront	0.022222	0	43.654260	-79.360636	Impact Kitchen	43.656369	-79.356980	Restaurant

#k = 4

```
to_merged.loc[(to_merged['Cluster Labels'] ==4) & (to_merged['Venue Category'] == 'Restaurant') ]
```

	Neighborhood	Restaurant	Cluster Labels	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
6	Church and Wellesley	0.037037	4	43.665860	-79.383160	Wish	43.668759	-79.385694	Restaurant
6	Church and Wellesley	0.037037	4	43.665860	-79.383160	O. Noir	43.669145	-79.382505	Restaurant
0	Berczy Park	0.036364	4	43.644771	-79.373306	The Works Gourmet Burger Bistro	43.648742	-79.374142	Restaurant
0	Berczy Park	0.036364	4	43.644771	-79.373306	The Keg Steakhouse + Bar - Esplanade	43.646712	-79.374768	Restaurant
6	Church and Wellesley	0.037037	4	43.665860	-79.383160	Fabarnak	43.666377	-79.380964	Restaurant
1	Brockton / Parkdale Village / Exhibition Place	0.043478	4	43.636847	-79.428191	Vogue Supper Club	43.636951	-79.425446	Restaurant
29	St. James Town	0.040000	4	43.651494	-79.375418	The Carbon Bar	43.653367	-79.374965	Restaurant
29	St. James Town	0.040000	4	43.651494	-79.375418	GEORGE Restaurant	43.653346	-79.374445	Restaurant
29	St. James Town	0.040000	4	43.651494	-79.375418	The Works Gourmet Burger Bistro	43.648742	-79.374142	Restaurant
19	Little Portugal / Trinity	0.040000	4	43.647927	-79.419750	Founder Restaurant & Bar	43.649478	-79.425352	Restaurant
19	Little Portugal / Trinity	0.040000	4	43.647927	-79.419750	Montgomery's	43.644273	-79.418521	Restaurant
21	North Toronto West	0.047619	4	43.715383	-79.405678	Sushi Shop	43.713861	-79.400093	Restaurant
31	Stn A PO Boxes	0.042105	4	43.646435	-79.374846	Marché Mövenpick	43.647262	-79.378600	Restaurant
31	Stn A PO Boxes	0.042105	4	43.646435	-79.374846	The Works Gourmet Burger Bistro	43.648742	-79.374142	Restaurant
31	Stn A PO Boxes	0.042105	4	43.646435	-79.374846	Victoria's Restaurant	43.649298	-79.376431	Restaurant
31	Stn A PO Boxes	0.042105	4	43.646435	-79.374846	The Keg Steakhouse + Bar - Esplanade	43.646712	-79.374768	Restaurant
30	St. James Town / Cabbagetown	0.046512	4	43.667967	-79.367675	Murgatroid	43.667381	-79.369311	Restaurant
29	St. James Town	0.040000	4	43.651494	-79.375418	Bannock	43.652101	-79.381178	Restaurant
30	St. James Town / Cabbagetown	0.046512	4	43.667967	-79.367675	The Pear Tree	43.664904	-79.368246	Restaurant

## Conclusion

From the above analysis we can see that in **cluster 2** has **maximum** number of restaurants.

Out of the total 5 Clusters, **Cluster 0** and **Cluster 4** have **proportionate** amount of restaurants.

In **Cluster 2**, we see a lot of restaurants and **Cluster 1** has only 1 restaurant which is very few. Opening in these areas would result in **strong competition** in one and low attraction due to other restaurants in another.

Hence, we can say that by opening restaurants in

- Cluster 0: Garden District, Ryerson Harbourfront East, Union Station, The Danforth West , Riverdale, Runnymede , Swansea
- Cluster 4: Stn A PO Boxes, St. James Town, Cabbagetown, St. James Town

these areas, one can have enough attraction due to their new restaurants due to already present restaurants and also moderate competition with average number of restaurants in these areas.