Introduction

Toronto is the considered the financial capital of Canada and the most populated city in the country. Toronto is multiethnic with a large immigrant population. Toronto is also one of the safest cities in North America with a comparatively low crime rate.

Yoga has gained popularity as a fitness and wellness practice over the years. People practicing yoga is on the rise and yoga studios are an attractive business opportunity. I am trying to find a good location for a yoga studio in Toronto. The target audience for this analysis would be an entrepreneur to find the right location to open a yoga studio.

Data

For this analysis the following data is required.

1. List of neighborhoods in Toronto.
   This was obtained from the Wikipedia page
   https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M
2. Latitude and longitude data of the neighborhoods.
   This data was obtained using the Geocoder package.
3. Venue data of yoga studios.
   Foursquare API was used to obtain this data.

Methodology

The first step to the analysis is to obtain the list of neighborhoods and the corresponding postal codes from Wikipedia (https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M). The Wikipedia page was scraped using beautiful soup and the data was converted to a data frame.

	PostalCode	Borough	Neighborhood
0	M1B	Scarborough	Malvern, Rouge
1	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek
2	M1E	Scarborough	Guildwood, Morningside, West Hill
3	M1G	Scarborough	Woburn
4	M1H	Scarborough	Cedarbrae
5	M1J	Scarborough	Scarborough Village
6	M1K	Scarborough	Kennedy Park, Ionview, East Birchmount Park
7	M1L	Scarborough	Golden Mile, Clairlea, Oakridge
8	M1M	Scarborough	Cliffside, Cliffcrest, Scarborough Village West
9	M1N	Scarborough	Birch Cliff, Cliffside West

Then the latitude and longitude coordinates of the locations were obtained.

|	PostalCode	Borough	Neighborhood	Latitude	Longitude
0	M1B	Scarborough	Malvern, Rouge	43.806686	-79.194353
1	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	43.784535	-79.160497
2	M1E	Scarborough	Guildwood, Morningside, West Hill	43.763573	-79.188711
3	M1G	Scarborough	Woburn	43.770992	-79.216917
4	M1H	Scarborough	Cedarbrae	43.773136	-79.239476
5	M1J	Scarborough	Scarborough Village	43.744734	-79.239476
6	M1K	Scarborough	Kennedy Park, Ionview, East Birchmount Park	43.727929	-79.262029
7	M1L	Scarborough	Golden Mile, Clairlea, Oakridge	43.711112	-79.284577
8	M1M	Scarborough	Cliffside, Cliffcrest, Scarborough Village West	43.716316	-79.239476
9	M1N	Scarborough	Birch Cliff, Cliffside West	43.692657	-79.264848

Further using the coordinates the venues data was obtained from Foursquare.

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Malvern, Rouge	43.806686	-79.194353	Wendy's	43.807448	-79.199056	Fast Food Restaurant
1	Rouge Hill, Port Union, Highland Creek	43.784535	-79.160497	Royal Canadian Legion	43.782533	-79.163085	Bar
2	Guildwood, Morningside, West Hill	43.763573	-79.188711	RBC Royal Bank	43.766790	-79.191151	Bank
3	Guildwood, Morningside, West Hill	43.763573	-79.188711	G & G Electronics	43.765309	-79.191537	Electronics Store
4	Guildwood, Morningside, West Hill	43.763573	-79.188711	Sail Sushi	43.765951	-79.191275	Restaurant

Then, k-means clustering is used to cluster the neighborhoods based on the yoga studio locations. The map was plotted using Folium.

Results

The clustered map of Toronto.
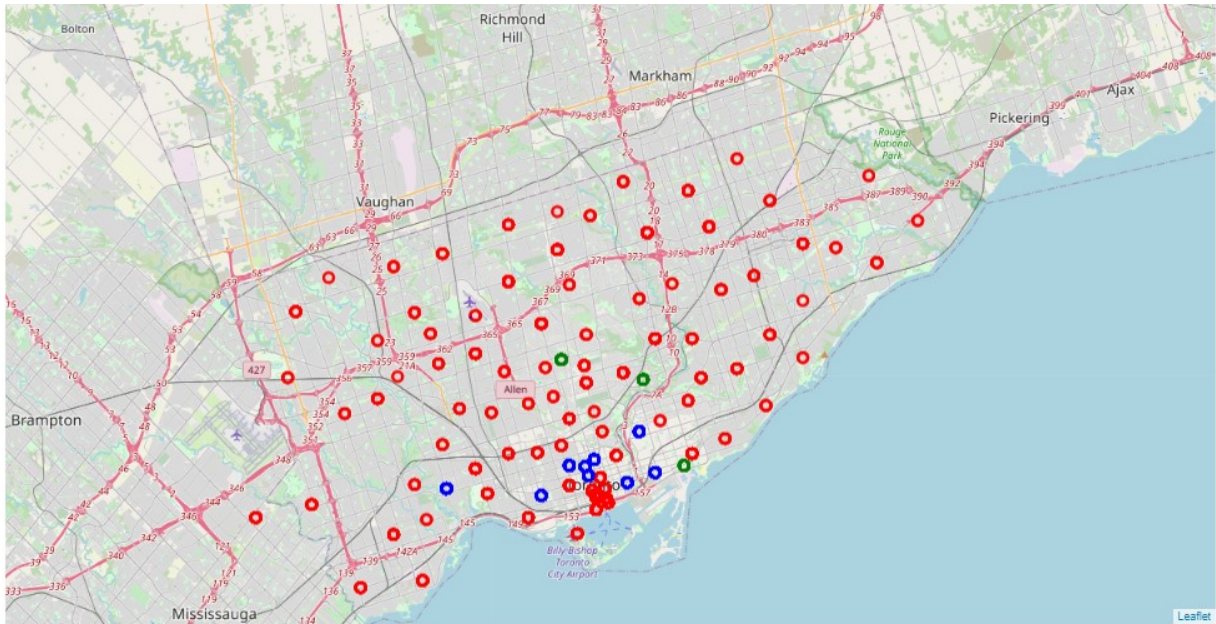
Neighborhoods and clusters sample:

```
dyogacopy.rename(columns={"Neighborhoods": "Neighborhood"}, inplace=True)
dyogacopy.head(5)
```

	Neighborhood	Yoga Studio	Cluster Labels
0	Agincourt	0.0	0
1	Alderwood, Long Branch	0.0	0
2	Bathurst Manor, Wilson Heights, Downsview North	0.0	0
3	Bayview Village	0.0	0
4	Bedford Park, Lawrence Manor East	0.0	0

The yoga studios in the clusters.

```
#Cluster 0
dyogacopy.loc[(dyogacopy['Cluster Labels'] ==0) & (dyogacopy['Venue Category'] == 'Yoga Studio') ]
```

	Neighborhood	Yoga Studio	Cluster Labels	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
75	Stn A PO Boxes	0.010309	0	43.646435	-79.374846	Bikram Yoga Centre	43.649214	-79.375229	Yoga Studio

```
#Cluster 1
dyogacopy.loc[(dyogacopy['Cluster Labels'] ==1) & (dyogacopy['Venue Category'] == 'Yoga Studio') ]
```

	Neighborhood	Yoga Studio	Cluster Labels	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
76	Studio District	0.025000	1	43.659526	-79.340923	Spirit Loft Yoga	43.663548	-79.341333	Yoga Studio
84	University of Toronto, Harbord	0.029412	1	43.662696	-79.400049	Sivananda Yoga Centre	43.662754	-79.402951	Yoga Studio
80	The Danforth West, Riverdale	0.023256	1	43.679557	-79.352188	Moksha Yoga Danforth	43.677622	-79.352116	Yoga Studio
68	Runnymede, Swansea	0.027027	1	43.651571	-79.484450	(The New) Moksha Yoga Bloor West	43.648658	-79.485242	Yoga Studio
48	Little Portugal, Trinity	0.022727	1	43.647927	-79.419750	YogaSpace	43.647607	-79.420133	Yoga Studio
63	Regent Park, Harbourfront	0.021739	1	43.654260	-79.360636	The Yoga Lounge	43.655515	-79.364955	Yoga Studio
62	Queen's Park, Ontario Provincial Government	0.031250	1	43.662301	-79.389494	The Yoga Sanctuary	43.661499	-79.383636	Yoga Studio
15	Church and Wellesley	0.027027	1	43.665860	-79.383160	Bikram Yoga Yonge	43.668205	-79.385780	Yoga Studio
15	Church and Wellesley	0.027027	1	43.665860	-79.383160	The Yoga Sanctuary	43.661499	-79.383636	Yoga Studio
13	Central Bay Street	0.015385	1	43.657952	-79.387383	The Yoga Sanctuary	43.661499	-79.383636	Yoga Studio

```
#Cluster 2
dyogacopy.loc[(dyogacopy['Cluster Labels'] ==2) & (dyogacopy['Venue Category'] == 'Yoga Studio') ]
```

	Neighborhood	Yoga Studio	Cluster Labels	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
8	Business reply mail Processing Centre, South C...	0.050000	2	43.662744	-79.321558	Toronto Yoga Mamas	43.664824	-79.324335	Yoga Studio
55	North Toronto West, Lawrence Park	0.052632	2	43.715383	-79.405678	Barreworks	43.714070	-79.400109	Yoga Studio
82	Thorncliffe Park	0.050000	2	43.705369	-79.349372	Bikram Yoga East York	43.705450	-79.351448	Yoga Studio

Discussion

Toronto is a densely populated city with a lot of potential. I used k-means clustering to classify the neighborhoods. The results showed that there are not many yoga studios in cluster0 and cluster2. So they would be better locations for a new one.

Conclusion

In comparison locations in Cluster0 or Cluster2 seems like a better place to open a Yoga studio due to the lower number of existing yoga studios. So, locations like Agincourt, Alderwood, Long Branch, Bathurst Manor, Wilson Heights, Downsview North, Bayview Village, Bedford Park, Lawrence Manor East etc. are good locations for opening a Yoga studio.