

- **Introduction: -**

The aim of the project is to identify venues in Toronto, Canada based on their latitude and Longitude. In this notebook, we will identify various venues in the city of Toronto, Canada using Foursquare API to help property developers to select the location that suit them the best. So, to decide which location is suitable for the shopping mall we required to identify factors such as location cost, it will be profitable or not and so many.

- **Business Problem: -**

The objective of this IBM data science capstone project is to analyze and select the best location for opening a shopping mall in city of Toronto, Canada. So, for that we are using the data science methodology and machine learning technique such as clustering, this project provide solution to the business question.

Business question: -In the city of Toronto, Canada if a property developer is lolling to open a new shopping mall, where would you recommend that they open it?

- **Integrated Audience: -**

This project is particularly useful to property developers and investors to open or invest in new shopping mall in the city of Toronto, Canada.

- **Data Discussion:**

- **Required Data:**

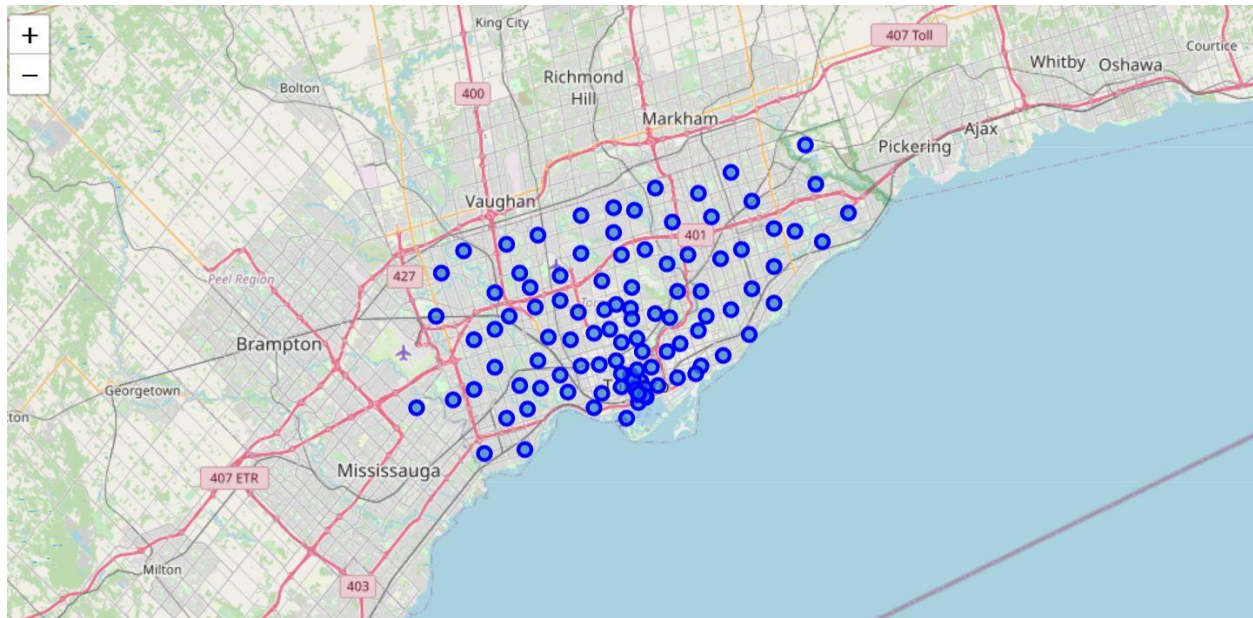
- We will collect the list of neighborhoods in city of Toronto using the Wikipedia page(https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M)
- Longitude and latitude coordinates of the neighborhood. This is required in order to plot the map and to get venue data.
- Venue data related to shopping malls. We will use this data to perform clustering on the neighborhoods.

- **Data collection:**

- To collect the geographical coordinates of the respective postal code or neighborhood I used the csv file that has the geographical coordinates of each postal code (Neighborhood): (http://cocl.us/Geospatial_data)
- Using this CSV file to create the following data Frame:

	Borough	Neighborhood	PostalCode
0	North York	Parkwoods	M3A
1	North York	Victoria Village	M4A
2	Downtown Toronto	Regent Park / Harbourfront	M5A
3	North York	Lawrence Manor / Lawrence Heights	M6A
4	Downtown Toronto	Queen's Park / Ontario Provincial Government	M7A
5	Etobicoke	Islington Avenue	M9A
6	Scarborough	Malvern / Rouge	M1B
7	North York	Don Mills	M3B
8	East York	Parkview Hill / Woodbine Gardens	M4B
9	Downtown Toronto	Garden District, Ryerson	M5B

- Creating a map of Toronto by latitude and longitude values using map folium function.



- Foursquare API: using foursquare API to fetch the nearest venue locations so that we can use them for the cluster. Foursquare API returns the nearest venue in radius and get corresponding 'Venue Name', 'Venue Latitude', 'Venue Longitude', 'Venue Category' respectively. Results will show as follows:

	Neighborhood	Latitude	Longitude	VenueName	VenueLatitude	VenueLongitude	VenueCategory
0	Parkwoods	43.753259	-79.329656	Allwyn's Bakery	43.759840	-79.324719	Caribbean Restaurant
1	Parkwoods	43.753259	-79.329656	Donalda Golf & Country Club	43.752816	-79.342741	Golf Course
2	Parkwoods	43.753259	-79.329656	Brookbanks Park	43.751976	-79.332140	Park
3	Parkwoods	43.753259	-79.329656	Island Foods	43.745866	-79.346035	Caribbean Restaurant
4	Parkwoods	43.753259	-79.329656	Galleria Supermarket	43.753520	-79.349518	Supermarket
5	Parkwoods	43.753259	-79.329656	LCBO	43.757774	-79.314257	Liquor Store
6	Parkwoods	43.753259	-79.329656	Graydon Hall Manor	43.763923	-79.342961	Event Space
7	Parkwoods	43.753259	-79.329656	The Captain's Boil	43.754986	-79.349524	Seafood Restaurant
8	Parkwoods	43.753259	-79.329656	Me Va Me Kitchen Express	43.754957	-79.351894	Mediterranean Restaurant
9	Parkwoods	43.753259	-79.329656	Menchie's	43.754764	-79.350013	Frozen Yogurt Shop