



Analyze Restaurant Opportunity in Scarborough, Toronto

IBM DATA SCIENCE PROFESSIONAL CERTIFICATE

Business goal:

- Use of data science to find the best possible suitable location for an entrepreneur to open a refined Spanish restaurant in the area of Scarborough, Toronto.



Target audience:

- ▶ Entrepreneur/investor who is looking to open a new business in Scarborough, Toronto.



Data:

► Selection criteria:

1. Find location with possible competitors (restaurants).
2. Compare average housing prices.

► Work flow:

1. List neighborhoods in Toronto and select Scarborough borough.
2. Location of neighborhoods (latitude, longitude).
3. Explore venue data.
4. Explore average housing prices.
5. Locate optimum location.



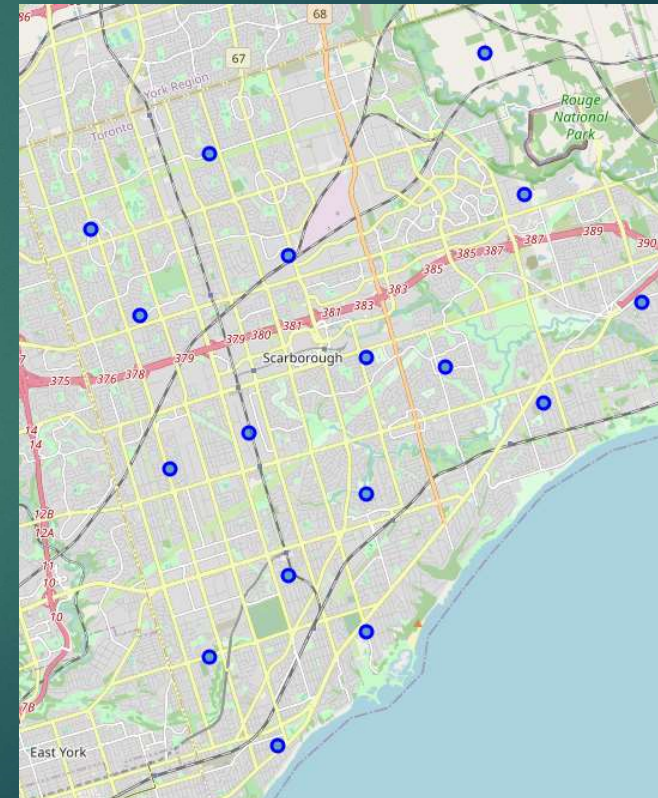
Sources of Data:

- ▶ Data will be obtained using data scraping techniques (Beautiful Soup packages).
- ▶ Longitude and latitude with Geocoder package.
- ▶ Venue search through Foursquare API.
- ▶ Clustering with k-means algorithm. One hot encoding will be necessary.

Dataframe:

- The data frame that we obtain for Scarborough and its map is as follows:

	Postal Code	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



► Ten top venues per neighborhood

	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	Agincourt	Clothing Store	Coffee Shop	Badminton Court	Lounge	Latin American Restaurant	Skating Rink	Pool Hall	Breakfast Spot	Motorcycle Shop	Sandwich Place
1	Birch Cliff, Cliffside West	Park	Thai Restaurant	College Stadium	Diner	Skating Rink	Café	General Entertainment	Gas Station	Fried Chicken Joint	Flower Shop
2	Cedarbrae	Indian Restaurant	Bakery	Coffee Shop	Hakka Restaurant	Athletics & Sports	Bank	Board Shop	Caribbean Restaurant	Chinese Restaurant	Flower Shop
3	Clarks Corners, Tam O'Shanter, Sullivan	Coffee Shop	Intersection	Convenience Store	Pharmacy	Pizza Place	Gas Station	Sandwich Place	Bus Stop	Italian Restaurant	Noodle House
4	Cliffside, Cliffcrest, Scarborough Village West	Wings Joint	Burger Joint	Pharmacy	Chinese Restaurant	Hardware Store	Grocery Store	Greek Restaurant	Coffee Shop	College Stadium	Convenience Store

► Five top venues list per neighborhood

```

----Agincourt----
venue freq
0 Coffee Shop 0.1
1 Breakfast Spot 0.1
2 Clothing Store 0.1
3 Pool Hall 0.1
4 Motorcycle Shop 0.1

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```

----Birch Cliff, Cliffside West----
venue freq
0 Park 0.25
1 General Entertainment 0.12
2 Thai Restaurant 0.12
3 Diner 0.12
4 Café 0.12

```

```

----Cedarbrae----
venue freq
0 Indian Restaurant 0.11
1 Bakery 0.11
2 Coffee Shop 0.11
3 Asian Restaurant 0.06
4 Hakka Restaurant 0.06

```

```

----Clarks Corners, Tam O'Shanter, Sullivan----
venue freq
0 Pizza Place 0.08
1 Pharmacy 0.08
2 Convenience Store 0.08
3 Intersection 0.08
4 Coffee Shop 0.08

```

```

----Cliffside, Cliffcrest, Scarborough Village West----
venue freq
0 Hardware Store 0.2
1 Burger Joint 0.2
2 Pharmacy 0.2
3 Chinese Restaurant 0.2
4 Wings Joint 0.2

```

```

----Donset Park, Wexford Heights, Scarborough Town Centre----
venue freq
0 Electronics Store 0.13
1 Indian Restaurant 0.13
2 Coffee Shop 0.07
3 Brewery 0.07
4 Fast Food Restaurant 0.07

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...

```

----Wexford, Maryvale----
venue freq
0 Middle Eastern Restaurant 0.11
1 Pizza Place 0.11
2 Asian Restaurant 0.06
3 Burger Joint 0.06
4 Korean Restaurant 0.06

```

```

----Woburn----
venue freq
0 Park 0.4
1 Coffee Shop 0.4
2 Business Service 0.2
3 Asian Restaurant 0.0
4 Medical Center 0.0

```


► Applying K-Means clustering.

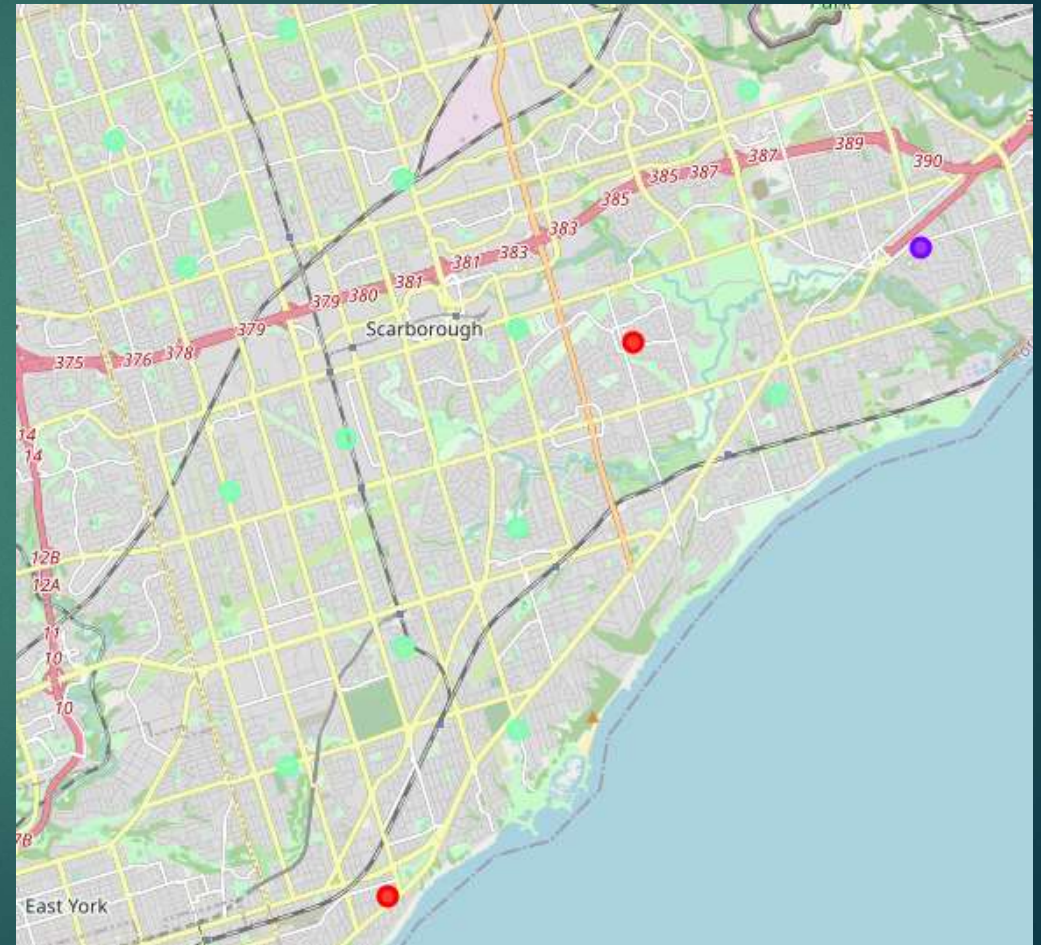
```
# set number of clusters
kclusters = 3

scarborough_grouped_clustering = scarborough_grouped.drop('Neighborhood', 1)

# run k-means clustering
kmeans = KMeans(n_clusters=kclusters, random_state=6).fit(scarborough_grouped_clustering)

# check cluster labels generated for each row in the dataframe
kmeans.labels_

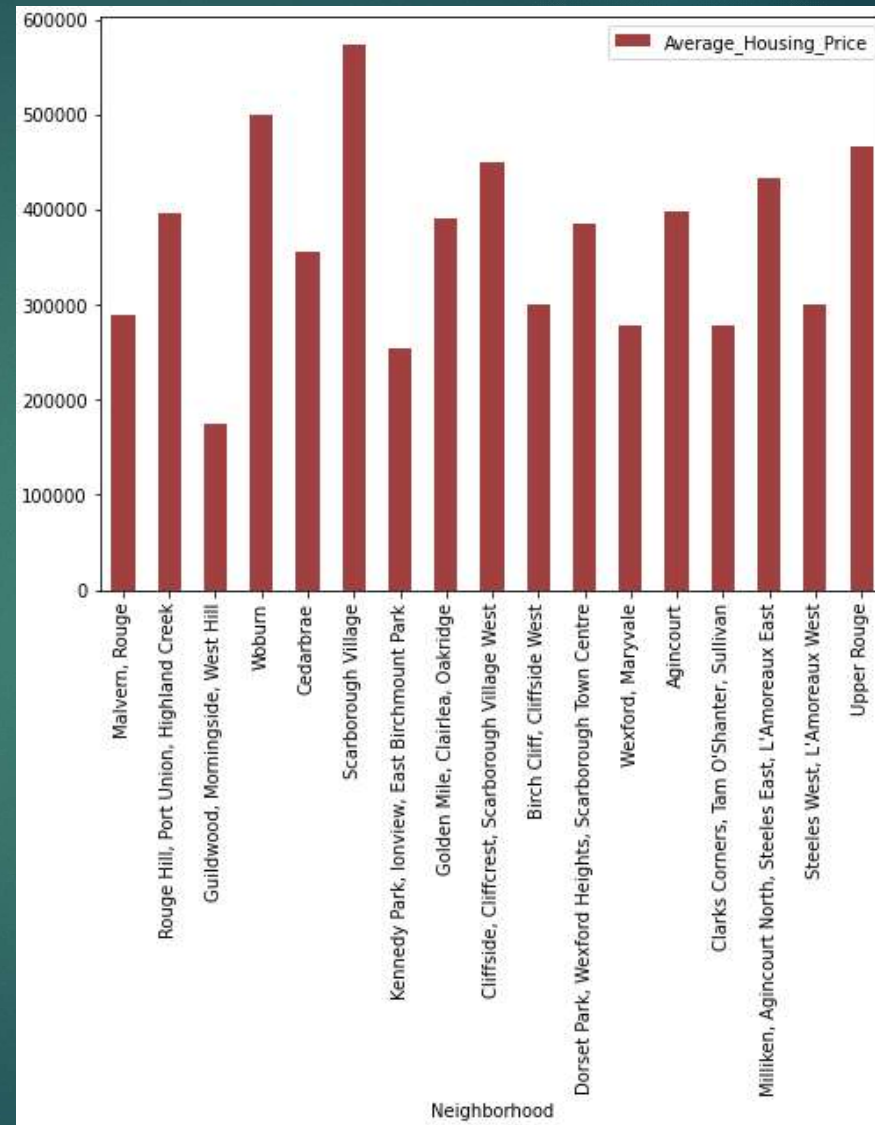
array([2, 0, 2, 2, 2, 2, 2, 2, 2, 2, 2, 1, 2, 2, 2, 0], dtype=int32)
```



► Data frame resulting of most common venues and clustering for each neighborhood.

	Postal Code	Borough	Neighborhood	Latitude	Longitude	Cluster Labels	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	M1B	Scarborough	Malvern, Rouge	43.806686	-79.194353	2.0	Fast Food Restaurant	Coffee Shop	Hobby Shop	Spa	Wings Joint	College Stadium	Convenience Store	Department Store	Diner	Discount Store
1	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	43.784535	-79.160497	1.0	Breakfast Spot	Bar	Burger Joint	Flower Shop	Convenience Store	Department Store	Diner	Discount Store	Electronics Store	Fast Food Restaurant
2	M1E	Scarborough	Guildwood, Morningside, West Hill	43.763573	-79.188711	2.0	Fast Food Restaurant	Park	Moving Target	Restaurant	Grocery Store	Fried Chicken Joint	Electronics Store	Intersection	Medical Center	Mexican Restaurant
3	M1G	Scarborough	Woburn	43.770992	-79.216917	0.0	Park	Coffee Shop	Business Service	Chinese Restaurant	College Stadium	Convenience Store	Department Store	Diner	Discount Store	Electronics Store
4	M1H	Scarborough	Cedarbrae	43.773136	-79.239476	2.0	Indian Restaurant	Bakery	Coffee Shop	Hakka Restaurant	Athletics & Sports	Bank	Board Shop	Caribbean Restaurant	Chinese Restaurant	Flower Shop
5	M1J	Scarborough	Scarborough Village	43.744734	-79.239476	2.0	Ice Cream Shop	Fast Food Restaurant	Coffee Shop	Pizza Place	Convenience Store	Wings Joint	College Stadium	Department Store	Diner	Discount Store
6	M1K	Scarborough	Kennedy Park, Ionview, East Birchmount Park	43.727929	-79.262029	2.0	Coffee Shop	Discount Store	Intersection	Convenience Store	Department Store	Bus Line	Light Rail Station	Sandwich Place	Grocery Store	Hobby Shop
7	M1L	Scarborough	Golden Mile, Clairlea, Oakridge	43.711112	-79.284577	2.0	Intersection	Bakery	Diner	Bus Line	Coffee Shop	Convenience Store	Park	Ice Cream Shop	Soccer Field	Pharmacy
8	M1M	Scarborough	Cliffside, Cliffcrest, Scarborough Village West	43.716316	-79.239476	2.0	Wings Joint	Burger Joint	Pharmacy	Chinese Restaurant	Hardware Store	Grocery Store	Greek Restaurant	Coffee Shop	College Stadium	Convenience Store
9	M1N	Scarborough	Birch Cliff, Cliffside West	43.692657	-79.264848	0.0	Park	Thai Restaurant	College Stadium	Diner	Skating Rink	Café	General Entertainment	Gas Station	Fried Chicken Joint	Flower Shop
10	M1P	Scarborough	Dorset Park, Wexford Heights, Scarborough Town...	43.757410	-79.273304	2.0	Indian Restaurant	Electronics Store	Brewery	Light Rail Station	Vietnamese Restaurant	Chinese Restaurant	Wine Shop	Bakery	Gym	Pet Store
11	M1R	Scarborough	Wexford, Maryvale	43.750072	-79.295849	2.0	Middle Eastern Restaurant	Pizza Place	Asian Restaurant	Breakfast Spot	Grocery Store	Korean Restaurant	Burger Joint	Pharmacy	Rental Car Location	Restaurant
12	M1S	Scarborough	Agincourt	43.794200	-79.262029	2.0	Clothing Store	Coffee Shop	Badminton Court	Lounge	Latin American Restaurant	Skating Rink	Pool Hall	Breakfast Spot	Motorcycle Shop	Sandwich Place
13	M1T	Scarborough	Clarks Corners, Tam O'Shanter, Sullivan	43.781638	-79.304302	2.0	Coffee Shop	Intersection	Convenience Store	Pharmacy	Pizza Place	Gas Station	Sandwich Place	Bus Stop	Italian Restaurant	Noodle House

► Average housing prices for Scarborough, Toronto.



Conclusion:

- ▶ The best location for a refined Spanish restaurant in Scarborough, Toronto will be in the neighborhood of Woburn where we can see the second highest average house prices and out of the top ten venues only one is a restaurant (chinese) and a dinner. The rest venues are stores or parks.



▶ **Thank you for your
attention**