

Capstone Project - The Battle of Neighborhoods

Opening an Ethiopian Cuisine Restaurant

1. Introduction

i. Business problem

The purpose of this project is to help investors establish which neighborhood in Toronto would be the best to open an Ethiopian restaurant. We will explore various neighborhoods and demographics of those neighborhoods in order to arrive at an answer to the question “which place/s would be the most ideal to open an Ethiopian restaurant?”

Toronto ranks as the 3rd most diverse city in the world, with over half its residents born abroad. It is often touted as the most multicultural city on the globe. This means generally the population would be open to diverse food offerings.

ii. Target Audience

The target audience for this project is foreign investors, looking to expand their footprint in Toronto. The results of the analysis would give them a better understanding of which places would be most ideal to open up an additional franchise for their Ethiopian cuisine restaurants. This would help the investor to make better informed decisions, especially that they are unfamiliar with the place.

2. Data

Our data will be sourced from three main sources, namely:

i. Open-source dataset of Toronto

The dataset will be downloaded from https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M

From this dataset, we would get information of the locations in Toronto relating to:

- Postal code
- Borough
- Neighborhood

ii. Geocoder package

This will be used to source geographical coordinates of locations i.e., latitude and longitude.

iii. Foursquare API

For sourcing information related to the venues such as:

- Name of the venue
- Latitude of the venue
- Longitude of the venue
- Most rated venues
- Most popular venues
- Most popular venues per cluster grouping

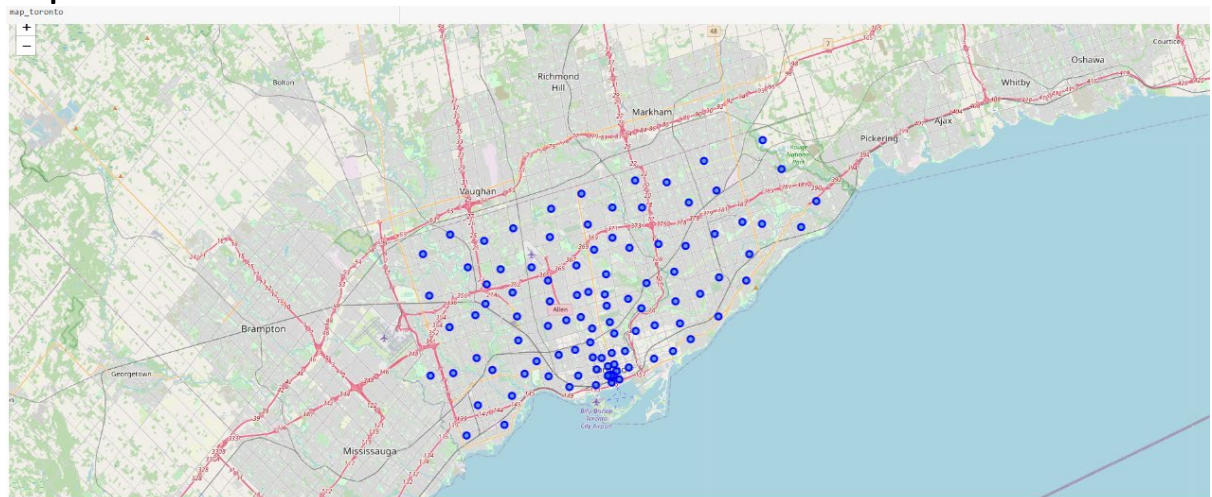
The data would be visualized and presented to the user, in this case, the investor looking to open the restaurant in Toronto. Based on the findings, we would then recommend the best location(s) to open the restaurant.

3. Methodology

We will explore the neighborhoods in Toronto, find out which venues are most popular and which restaurants in particular are most popular. We will segment and group the neighborhoods to explore the venues further. To do this, we will use k-Means clustering. The aim of this is to find out how popular Ethiopian Restaurants are, if at all, and what the trend is of restaurants that are more popular with the general population.

4. Results

Map of Toronto



Restaurant Types

There were 46 different types of restaurants in total that we discovered in Toronto. Below are the number of restaurants per type. The most popular restaurants were the unclassified restaurants, followed by Italian, Japanese, sushi and fast-food restaurants. The figure below shows the list of all the restaurant types according to count.

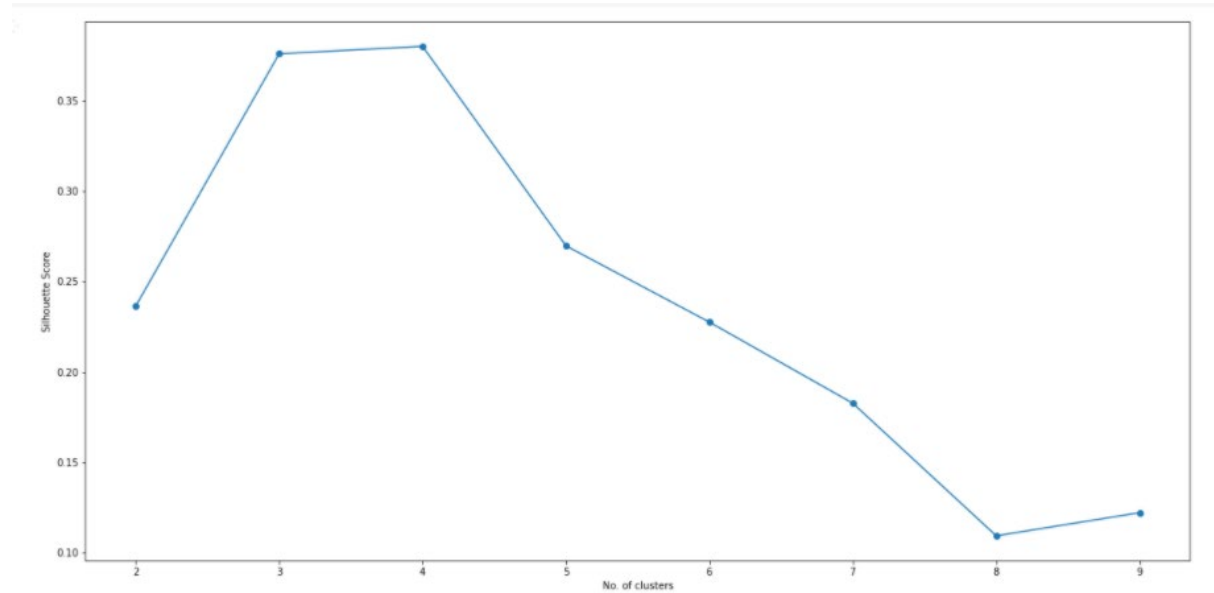
Restaurant	64
Italian Restaurant	51
Japanese Restaurant	47
Sushi Restaurant	39
Fast Food Restaurant	32
Seafood Restaurant	29
Thai Restaurant	27
American Restaurant	27
Asian Restaurant	22
Middle Eastern Restaurant	20
Vegetarian / Vegan Restaurant	19
Greek Restaurant	15
French Restaurant	13
Indian Restaurant	12
Chinese Restaurant	12
Ramen Restaurant	11
Vietnamese Restaurant	11
Mediterranean Restaurant	11
Mexican Restaurant	10
New American Restaurant	8
Falafel Restaurant	7
Korean Restaurant	6
Comfort Food Restaurant	5
Latin American Restaurant	5
Caribbean Restaurant	5
Brazilian Restaurant	5
Eastern European Restaurant	5
Gluten-free Restaurant	4
Modern European Restaurant	3
Ethiopian Restaurant	3
German Restaurant	2
Moroccan Restaurant	2
Turkish Restaurant	2
Cuban Restaurant	2
Molecular Gastronomy Restaurant	2
Portuguese Restaurant	2
Cantonese Restaurant	1
Dumpling Restaurant	1
Theme Restaurant	1
Peruvian Restaurant	1
Colombian Restaurant	1
Belgian Restaurant	1
Taiwanese Restaurant	1
Hawaiian Restaurant	1
Hong Kong Restaurant	1
Halal Restaurant	1
Name: Venue Category, dtype: int64	

We sampled the top 30 most popular restaurants types to visualize the most popular restaurants, relative to the Ethiopian restaurant. The Ethiopian restaurant ranked 30th. The chart below visualizes the results.



k-Means Clustering

We explored various ranges for clustering and found that the optimal number of clusters was 4.



Results per cluster:

Cluster 1

	PostalCode	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	M3A	North York	Parkwoods	43.75245	-79.32991	0.0	Food & Drink Shop	Park	Convenience Store	Pool	Electronics Store	Dog Run	Donut Shop	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant
1	M4A	North York	Victoria Village	43.73057	-79.31308	0.0	Grocery Store	Park	German Restaurant	Women's Store	Eastern European Restaurant	Doctor's Office	Dog Run	Donut Shop	Dry Cleaner	Dumpling Restaurant
16	M8C	York	Humewood-Cedarvale	43.89211	-79.43038	0.0	Field	Grocery Store	Playground	Hockey Arena	Trail	Park	Falafel Restaurant	Farm	Event Space	Ethiopian Restaurant
18	M1E	Scarborough	Guildwood, Morningside, West Hill	43.70575	-79.17470	0.0	Gym / Fitness Center	Construction & Landscaping	Park	Women's Store	Electronics Store	Dog Run	Donut Shop	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant
22	M1G	Scarborough	Woburn	43.70812	-79.21761	0.0	Construction & Landscaping	Park	Business Service	Coffee Shop	Women's Store	Electronics Store	Donut Shop	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant
32	M1J	Scarborough	Scarborough Village	43.74445	-79.23117	0.0	Restaurant	Grocery Store	Park	Indian Restaurant	Eastern European Restaurant	Doctor's Office	Dog Run	Donut Shop	Dry Cleaner	Dumpling Restaurant
35	M4J	East York/East Toronto	The Danforth East	43.68811	-79.33418	0.0	Music Venue	Intersection	Park	Dumpling Restaurant	Distribution Center	Doctor's Office	Dog Run	Donut Shop	Dry Cleaner	Women's Store
39	M2K	North York	Bayview Village	43.78112	-79.38080	0.0	Trail	Dog Run	Construction & Landscaping	Park	Women's Store	Donut Shop	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store
49	M8L	North York	North Park, Maple Leaf Park, Upwood Park	43.71381	-79.48874	0.0	Bakery	Park	Basketball Court	Women's Store	Escape Room	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant	Electronics Store	Ethiopian Restaurant
57	M9M	North York	Humberlea, Emery	43.73387	-79.53789	0.0	Coffee Shop	Park	Nightclub	Women's Store	Electronics Store	Dog Run	Donut Shop	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant
66	M2P	North York	York Mills West	43.74778	-79.40033	0.0	Speakeasy	Park	Convenience Store	Coffee Shop	Women's Store	Escape Room	Donut Shop	Dry Cleaner	Dumpling Restaurant	Eastern European Restaurant
69	M8P	West Toronto	High Park, The Junction South	43.85673	-79.48281	0.0	Residential Building (Apartment / Condo)	Park	Convenience Store	Sandwich Place	Women's Store	Dumpling Restaurant	Doctor's Office	Dog Run	Donut Shop	Dry Cleaner
72	M2R	North York	Willowdale West	43.77899	-79.44878	0.0	Baby Store	Park	Grocery Store	Pizza Place	Supermarket	Coffee Shop	Dumpling Restaurant	Doctor's Office	Dog Run	Donut Shop

Cluster 2 (sample)

PostalCode	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
2	M5A	Downtown Toronto	Regent Park, Harbourfront	43.65912	-79.38284	1.0	Coffee Shop	Breakfast Spot	Health Food Store	Tail Restaurant	Bakery	Distribution Center	Electronics Store	Event Space	Food Truck
3	M5A	North York	Lawrence Manor, Lawrence Heights	43.73271	-79.49542	1.0	Clothing Store	Women's Store	Toy / Game Store	Coffee Shop	Men's Store	Bookstore	Food Court	Furniture / Home Store	Cosmetics Shop
4	M7A	Queen's Park	Ontario Provincial Government	43.65283	-79.39195	1.0	Coffee Shop	Fast Food Restaurant	Cafe	Mediterranean Restaurant	Park	Italian Restaurant	Sushi Place	Falafel Restaurant	Sandwich Place
5	M5A	Eatocoke	Islington Avenue	43.65283	-79.52231	1.0	Pharmacy	Bank	Grocery Store	Park	Cafe	Home Service	Shaving Parl	Shopping Mall	Dumping Restaurant
6	M1B	Scarborough	Malvern, Rouge	43.61130	-79.19852	1.0	Fast Food Restaurant	Construction & Landscaping	Women's Store	Doctor's Office	Farmers Market	Farm	Falafel Restaurant	Event Space	Ethiopian Restaurant
7	M2B	North York	Don Mills North	43.74223	-79.39189	1.0	Booker Field	Sea	Park	Coffee Shop	Gas Station	Burger Joint	Eastern European Restaurant	Dog Run	Donut Shop
8	M4G	East York	Parkview Hill, Woodbine Gardens	43.73712	-79.21162	1.0	Pizza Place	Gym / Fitness Center	Athletics & Sports	Pet Store	Pharmacy	Rock Climbing Spot	Cafe	Breakfast Spot	Free Market
9	M5G	Downtown Toronto	Garden District, Ryerson	43.65739	-79.37694	1.0	Coffee Shop	Clothing Store	Cafe	Middle Eastern Restaurant	Hotel	Cosmetics Shop	Japanese Restaurant	Chinese Restaurant	Sandwich Place
10	M8B	North York	Doncourt	43.79687	-79.44812	1.0	Grocery Store	Fast Food Restaurant	Sandwich Place	Japanese Restaurant	Sushi Restaurant	Gas Station	Bank	Latin American Restaurant	Pizza Place
11	M5B	Eatocoke	West Beaver Park, Riverside Gardens, Martin Shaw	43.65034	-79.55582	1.0	Pizza Place	Tea Room	Chinese Restaurant	Sandwich Place	Dry Cleaner	Distribution Center	Doctor's Office	Dog Run	Donut Shop
12	M1C	Scarborough	Rouge Hill, Port Union, Highland Creek	43.78974	-79.18679	1.0	Bar	Women's Store	Doctor's Office	Farmers Market	Farm	Falafel Restaurant	Event Space	Ethiopian Restaurant	Escape Room
13	M3C	North York	Don Mills South	43.72185	-79.34352	1.0	Gym	Grocery Store	Bottle Tea Shop	Intersection	Coffee Shop	Supermarket	Women's Store	Eastern European Restaurant	Donut Shop
14	M4C	East York	Woodbine Heights	43.69570	-79.39582	1.0	Grocery Store	Bus Line	Coffee Shop	Pet Store	Pharmacy	Cafe	Wine Station	Breakfast Spot	Playground
15	M8C	Downtown Toronto	St. James Town	43.65215	-79.37887	1.0	Coffee Shop	Hotel	Cosmetics Shop	Clothing Store	Italian Restaurant	Cafe	Cocktail Bar	Restaurant	Park
16	M5C	Eatocoke	Singate, Goodwin Gardens, Old Sunnyside Park	43.64887	-79.67529	1.0	Fast & Cheap Shop	College Bar	Park	Grocery Store	Carpet Store	Shopping Mall	Electronics Store	Women's Store	Dumping Restaurant
17	M4E	East Toronto	The Beaches	43.67739	-79.26547	1.0	Health Food Store	Pub	Trail	Discount Store	Doctor's Office	Dog Run	Donut Shop	Dry Cleaner	Dumping Restaurant
18	M5E	Downtown Toronto	Berry Park	43.64539	-79.37589	1.0	Coffee Shop	Cocktail Bar	Seafood Restaurant	Bakery	Pharmacy	Farmers Market	Beer Bar	Breakfast Spot	Cheese Shop
19	M5E	York	Castleton-Parsons	43.65784	-79.45049	1.0	Mexican Restaurant	Sporting Goods Shop	Cafe	Beer Store	Bakery	Park	Gym	Falafel Restaurant	Event Space
20	M4D	East York	Leslie	43.78952	-79.38549	1.0	Coffee Shop	Sporting Goods Shop	Bank	Burger Joint	Furniture / Home Store	Pet Store	Breakfast Spot	Beer Store	Sports Bar
21	M8D	Downtown Toronto	Central Bay Street	43.65659	-79.38483	1.0	Coffee Shop	Clothing Store	Sandwich Place	Pizza Place	Restaurant	Bubble Tea Shop	Cosmetics Shop	Park	Middle Eastern Restaurant
22	M8D	Downtown Toronto	Chinatown	43.65659	-79.42071	1.0	Cafe	Grocery Store	Coffee Shop	Athletics & Sports	Italian Restaurant	Baby Store	Candy Store	Playground	Donut Shop
23	M1H	Scarborough	Cedarbrae	43.78044	-79.23852	1.0	Trail	Women's Store	Eastern European Restaurant	Doctor's Office	Dog Run	Donut Shop	Dry Cleaner	Dumping Restaurant	Electronics Store
24	M2H	North York	Bayview Manor, Willow Heights, Downsview North	43.75788	-79.44647	1.0	Men's Store	Business Service	Women's Store	Doctor's Office	Farmers Market	Farm	Falafel Restaurant	Event Space	Ethiopian Restaurant
25	M6H	East York	Thorncliffe Park	43.71143	-79.34685	1.0	Yoga Studio	Hoisting Development	Pizza Place	Coffee Shop	Sandwich Place	Burger Joint	Bridge	Supermarket	Intersection
26	M5H	Downtown Toronto	Robinson, Adelaide, King	43.64570	-79.38259	1.0	Coffee Shop	Hotel	Cafe	Restaurant	Japanese Restaurant	Gym	American Restaurant	Solid Place	Steakhouse
27	M5H	West Toronto	Dufferin, Downsview Village	43.65585	-79.43581	1.0	Park	Furniture / Home Store	Grocery Store	Pizza Place	Middle Eastern Restaurant	Cafe	Bus Line	Smoke Shop	Bar
28	M2J	North York	Fairview, West Park, Orlé	43.78267	-79.34781	1.0	Clothing Store	Fast Food Restaurant	Restaurant	Coffee Shop	Japanese Restaurant	Julia Bar	Toy / Game Store	Food Court	Bank
29	M2J	North York	Northwood Park, York University	43.78478	-79.48788	1.0	Furniture / Home Store	Bar	Japanese Restaurant	Restaurant	Fast Food Restaurant	Caribbean Restaurant	Automotive Shop	Massage Shop	Coffee Shop
30	M2J	Downtown Toronto	Harbourfront East, Union Station, Toronto Islands	43.64285	-79.38079	1.0	Coffee Shop	Japanese Restaurant	Hotel	Aquarium	Cat / Dog Shop	Place	Scale of Ferry	Park	Vegetarian / Vegan Restaurant
31	M2J	West Toronto	Little Portugal, Trinity	43.64045	-79.41774	1.0	Bar	Cocktail Bar	Asian Restaurant	Vietnamese Restaurant	Restaurant	Yoga Studio	Bookstore	Shaving Parl	Brewery
32	M1K	Scarborough	Kennedy Park, Leslie, East Scarborough Park	43.72982	-79.29481	1.0	Discount Store	Hobby Shop	Convenience Store	Coffee Shop	Department Store	Women's Store	Electronics Store	Donut Shop	Dry Cleaner
33	M5K	North York	Downsview East	43.73384	-79.48525	1.0	Turkish Restaurant	Latin American Restaurant	Pizza Place	Italian Restaurant	Chinese Restaurant	Middle Eastern Restaurant	Sandwich Place	Bakery	Vietnamese Restaurant

Cluster 3

PostalCode	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
62	M5N	Central Toronto	Rosedale	43.71208	-79.41848	2.0	Home Service	Women's Store	Escape Room	Dog Run	Donut Shop	Dry Cleaner	Dumping Restaurant	Eastern European Restaurant	Electronics Store

Cluster 4

PostalCode	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
27	M2H	North York	Hillcrest Village	43.80225	-79.35558	3.0	Residential Building (Apartment / Condo)	Park	Women's Store	Electronics Store	Dog Run	Donut Shop	Dry Cleaner	Dumping Restaurant	Eastern European Restaurant
45	M2L	North York	York Mills, Silver Hills	43.75998	-79.30050	3.0	Park	Women's Store	Distribution Center	Farmers Market	Farm	Falafel Restaurant	Event Space	Ethiopian Restaurant	Escape Room
68	M5P	Central Toronto	Forest Hill North & West	43.69479	-79.41440	3.0	Park	Women's Store	Distribution Center	Farmers Market	Farm	Falafel Restaurant	Event Space	Ethiopian Restaurant	Escape Room
91	M4W	Downtown Toronto	Rosedale	43.68160	-79.37829	3.0	Park	Playground	Bike Trail	Women's Store	Electronics Store	Dog Run	Donut Shop	Dry Cleaner	Dumping Restaurant
98	M5X	Eatocoke	The Kingsway, Montgomery Road, Old Mill North	43.65319	-79.51113	3.0	Lounge	Park	Women's Store	Electronics Store	Dog Run	Donut Shop	Dry Cleaner	Dumping Restaurant	Ethiopian Restaurant

5. Discussion

The Ethiopian Restaurants are not very popular in Toronto. When grouped into four k-clusters, Ethiopian restaurants appeared in the 10 most popular venues list in the following boroughs:

- York
- North York
- Scarborough
- Central Toronto
- Etobicoke

The frequently appearing neighborhoods where from North York and Central Toronto.

There is an opportunity for the investor open the restaurant anywhere and leverage on having no competition in a neighborhood. It may also be safer to open the restaurant where people are already familiar with the Ethiopian cuisine. Because the investors have little experience with the market, I would recommend that they open the restaurant in either Central Toronto or North York.

6. Conclusion

The purpose of this project was to find out the most ideal place to open an Ethiopian restaurant. We processed the data and analysed it for further insights. We identified the most popular restaurants per cluster in search of an ideal location and to ultimately answer the question “which place/s would be the most ideal to open an Ethiopian restaurant?”. The ultimate decision lies with the investor, after considering all factors.