

Capstone Project - The Battle of the Neighborhoods

Exploring the city of Toronto





Introduction: Business Problem

In this project we will try to find an optimal location for a restaurant. Specifically, this report will be targeted to stakeholders interested in opening an restaurant in Toronto, Canada.

Here we will try finding if someone wants to open a new restaurant in the city which location is best suited for it keeping in mind the competitors and which income group of people will be attracted most to it based on the population of the neighbourhood.

Since there are lots of restaurants in Toronto, we will try to detect locations that are not already crowded with restaurants. We would also prefer locations as close to city center as possible, assuming that first two conditions are met.

We will use our data science powers to generate a few most promising neighborhoods based on this criteria. Advantages of each area will then be clearly expressed so that best possible final location can be chosen by stakeholders.



Data acquisition and cleaning

Based on definition of our problem, factors that will influence our decision are:

- All existing restaurants in the neighborhood (any type of restaurant)
- Age group of people with their income
- Distance of neighborhood from city center

We decided to use regularly spaced grid of locations, centered around city center, to define our neighborhoods.

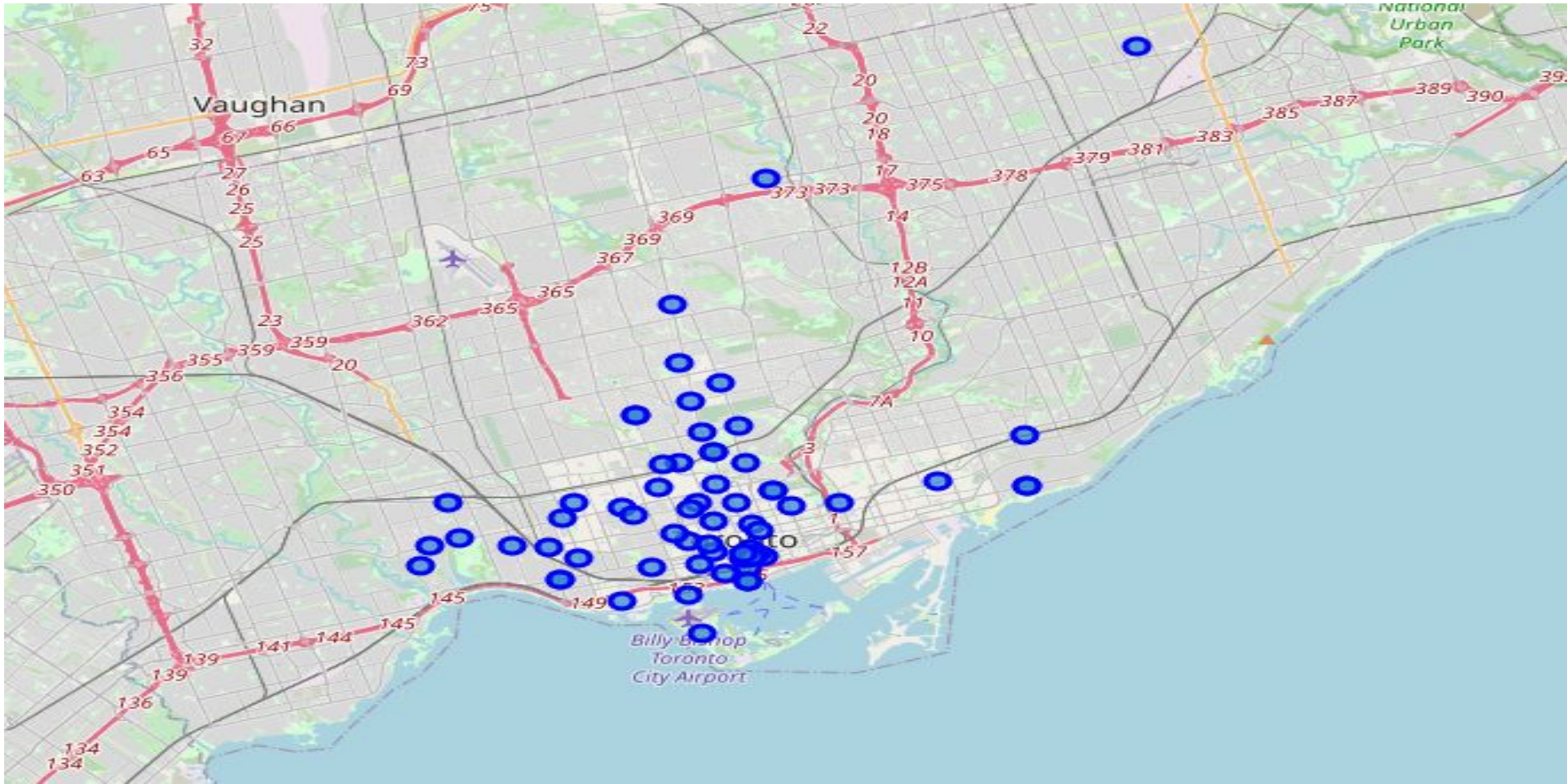
Following data sources will be needed to extract/generate the required information:

- centers of candidate areas will be generated algorithmically and approximate addresses of centers of those areas will be obtained using https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M
- number of restaurants and their type and location in every neighborhood will be obtained using Foursquare API

	Postalcode	Borough	Neighborhood	Latitude	Longitude
0	M5A	Downtown Toronto	Harbourfront	43.6400801	-79.3801495
1	M7A	Downtown Toronto	Queen's Park	43.659659	-79.3903399
2	M5B	Downtown Toronto		43.65846945	-79.37899327
3	M5B	Downtown Toronto		43.6564995	-79.3771141
4	M5C	Downtown Toronto	St. James Town	43.6694032	-79.3727041
5	M4E	East Toronto	The Beaches	43.6710244	-79.296712
6	M5E	Downtown Toronto	Berczy Park	43.64798435	-79.37539591
7	M6G	Downtown Toronto		43.6641106	-79.4184051
8	M5H	Downtown Toronto		43.6504863	-79.37949791
9	M5H	Downtown Toronto		43.6489494	-79.3777538
10	M5H	Downtown Toronto		43.8125891	-79.26337039
11	M6H	West Toronto	Dovercourt Village	43.6653069	-79.4326362
12	M6H	West Toronto		43.6602019	-79.4357191
13	M5J	Downtown Toronto		43.6400801	-79.3801495
14	M5J	Downtown Toronto	Toronto Islands	43.6230544	-79.39431564
15	M5J	Downtown Toronto	Union Station	43.6446934	-79.38013201
16	M6J	West Toronto	Little Portugal	43.64741325	-79.43111633
17	M6J	West Toronto	Trinity	43.66530155	-79.39525215
18	M4K	East Toronto		43.6870172	-79.2975115
19	M4K	East Toronto	Riverdale	43.6654704	-79.3525936
20	M5K	Downtown Toronto	Design Exchange	43.6477412	-79.3801145
21	M5K	Downtown Toronto	Toronto Dominion Centre	43.6473768	-79.38137194
22	M6K	West Toronto		43.6509173	-79.4400216
23	M6K	West Toronto	Exhibition Place	43.63346925	-79.41786519
24	M6K	West Toronto	Parkdale Village	43.6404954	-79.4368965
25	M4L	East Toronto		43.6710244	-79.296712
26	M4L	East Toronto	India Bazaar	43.6722231	-79.3235032
27	M5L	Downtown Toronto	Commerce Court	43.64809515	-79.37902543
28	M4M	East Toronto		43.64958515	-79.39068323
29	M4N	Central Toronto	Lawrence Park	43.729199	-79.4032525
30	M5N	Central Toronto		43.7105408	-79.4011379
31	M4P	Central Toronto		43.7043123	-79.3885169
32	M5P	Central Toronto	Forest Hill North	43.6935586	-79.4139023

33	M6P	West Toronto	High Park	43.6538668	-79.4668644
34	M6P	West Toronto		43.6654775	-79.470352
35	M5R	Central Toronto	The Annex	43.6703377	-79.407117
36	M5R	Central Toronto	Yorkville	43.6713861	-79.3901677
37	M6R	West Toronto	Parkdale	43.6404954	-79.4368965
38	M6R	West Toronto	Roncesvalles	43.6514426	-79.4510381
39	M4S	Central Toronto		43.697936	-79.3972908
40	M5S	Downtown Toronto		43.66151215	-79.41439134
41	M5S	Downtown Toronto	University of Toronto	43.663462	-79.39775965
42	M6S	West Toronto	Runnymede	43.6517026	-79.4759978
43	M6S	West Toronto	Swansea	43.64494	-79.478313
44	M4T	Central Toronto	Moore Park	43.6903876	-79.3832965
45	M4T	Central Toronto		43.6816776	-79.3905037
46	M5T	Downtown Toronto	Chinatown	43.6529237	-79.3980316
47	M5T	Downtown Toronto	Grange Park	43.6521966	-79.39231922
48	M5T	Downtown Toronto	Kensington Market	43.6552136	-79.4022604
49	M4V	Central Toronto	Deer Park	43.68809	-79.3940935
50	M4V	Central Toronto		43.6935586	-79.4139023
51	M4V	Central Toronto	Rathnelly	43.6783953	-79.4008217
52	M4V	Central Toronto	South Hill	43.6779261	-79.4057671
53	M4V	Central Toronto		43.6816776	-79.3905037
54	M5V	Downtown Toronto	CN Tower	43.6425637	-79.38708718
55	M5V	Downtown Toronto		43.6357905	-79.398329
56	M5V	Downtown Toronto		43.6400801	-79.3801495
57	M5V	Downtown Toronto	King and Spadina	43.6454561	-79.3949942
58	M5V	Downtown Toronto	South Niagara	43.6446702	-79.4091943
59	M4W	Downtown Toronto	Rosedale	43.6783556	-79.3807457
60	M4X	Downtown Toronto	Cabbagetown	43.6644734	-79.3669861
61	M4X	Downtown Toronto	St. James Town	43.6694032	-79.3727041
62	M5X	Downtown Toronto	First Canadian Place	43.6487681	-79.38169179
63	M5X	Downtown Toronto	Underground city	43.7701454	-79.3748625
64	M4Y	Downtown Toronto	Church and Wellesley	43.6655242	-79.3838011

Map of Toronto



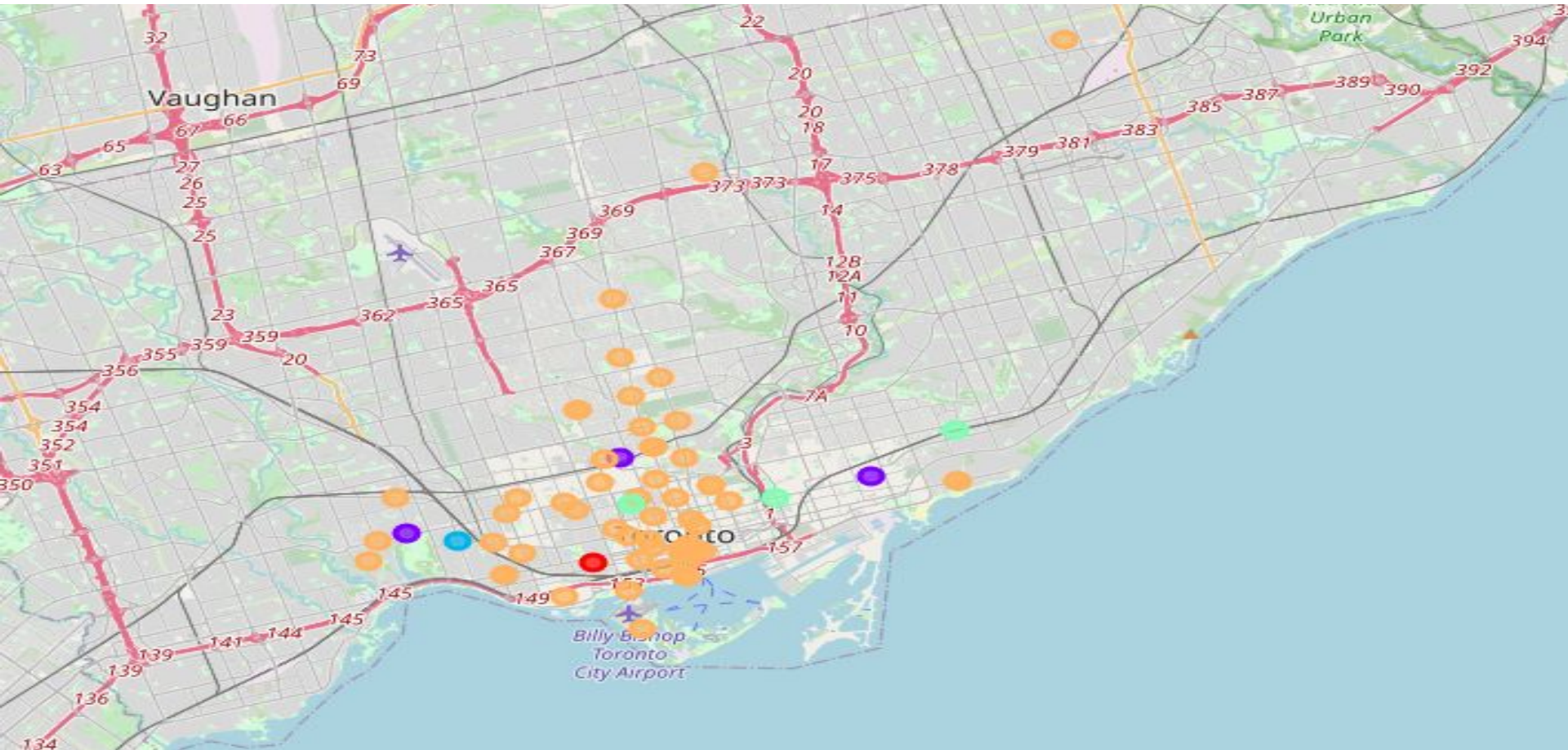
Neighborhoods in Toronto with their nearby 10 most Popular Venues

	Neighborhood	1st Popular Venues	2nd Popular Venues	3rd Popular Venues	4th Popular Venues	5th Popular Venues	6th Popular Venues	7th Popular Venues	8th Popular Venues	9th Popular Venues	10th Popular Venues
0	Adelaide\	Café	Coffee Shop	American Restaurant	Japanese Restaurant	Gym	Restaurant	Gastropub	Cosmetics Shop	Seafood Restaurant	Tea Room
1	Bathurst Quay\	Coffee Shop	Café	Park	Harbor / Marina	Bike Rental / Bike Share	Ramen Restaurant	Garden	Grocery Store	Japanese Restaurant	Bank
2	Berczy Park	Coffee Shop	Café	Restaurant	Hotel	Italian Restaurant	Japanese Restaurant	Gym	Seafood Restaurant	Cocktail Bar	Gastropub
3	Brockton\	Bar	Café	Vietnamese Restaurant	Park	Coffee Shop	French Restaurant	Dive Bar	Music Venue	Gastropub	Korean Restaurant
4	CN Tower	Hotel	Coffee Shop	Pizza Place	Scenic Lookout	Ice Cream Shop	Theater	Aquarium	Gym	Baseball Stadium	Sandwich Place
5	Cabbagetown	Coffee Shop	Restaurant	Café	Japanese Restaurant	Pub	Gastropub	Diner	Beer Store	Bakery	Indian Restaurant
6	Chinatown	Café	Dessert Shop	Coffee Shop	Mexican Restaurant	Bakery	Vietnamese Restaurant	Vegetarian / Vegan Restaurant	Clothing Store	Bar	Ramen Restaurant
7	Christie\	Korean Restaurant	Coffee Shop	Mexican Restaurant	Grocery Store	Pub	Cocktail Bar	Japanese Restaurant	Indian Restaurant	Gift Shop	Sandwich Place
8	Church and Wellesley	Sushi Restaurant	Coffee Shop	Japanese Restaurant	Grocery Store	Restaurant	Hotel	Burger Joint	Café	Diner	Gastropub
9	Commerce Court	Coffee Shop	Restaurant	Hotel	Café	Italian Restaurant	Japanese Restaurant	American Restaurant	Gym	Seafood Restaurant	Deli / Bodega
10	Davisville\	Sushi Restaurant	Italian Restaurant	Coffee Shop	Gym	Pub	Convenience Store	Trail	Hotel	Falafel Restaurant	Sandwich Place
11	Davisville North\	Pizza Place	Sandwich Place	Dessert Shop	Sushi Restaurant	Gym	Café	Italian Restaurant	Coffee Shop	Restaurant	Bar
12	Deer Park	Coffee Shop	Sushi Restaurant	Italian Restaurant	Café	Grocery Store	Thai Restaurant	Restaurant	Bank	Sandwich Place	Gym
13	Design Exchange	Coffee Shop	Café	Restaurant	Hotel	American Restaurant	Gym	Seafood Restaurant	Deli / Bodega	Tea Room	Bakery
14	Dovercourt Village	Café	Pizza Place	Park	Brazilian Restaurant	Bar	Restaurant	Coffee Shop	Dessert Shop	Electronics Store	Flower Shop
15	Dufferin\	Bar	Bakery	Café	Coffee Shop	Sandwich Place	Restaurant	Beer Bar	Beer Store	Cocktail Bar	Mexican Restaurant
16	Exhibition Place	Theme Park	Soccer Stadium	Arts & Crafts Store	Poutine Place	Coffee Shop	Athletics & Sports	Theme Park Ride / Attraction	Moving Target	Storage Facility	Nightclub
17	First Canadian Place	Coffee Shop	Hotel	Café	Restaurant	Gym	Japanese Restaurant	American Restaurant	Salad Place	Asian Restaurant	Seafood Restaurant
18	Forest Hill North	Playground	Furniture / Home Store	Bank	Park	Home Service	Flea Market	Fish Market	Fish & Chips Shop	Filipino Restaurant	Fast Food Restaurant
19	Forest Hill SE\	Playground	Furniture / Home Store	Bank	Park	Home Service	Flea Market	Fish Market	Fish & Chips Shop	Filipino Restaurant	Fast Food Restaurant
20	Garden District\	Restaurant	Clothing Store	Hotel	Coffee Shop	Cosmetics Shop	Bookstore	Tea Room	Japanese Restaurant	Sandwich Place	Café

21	Grange Park	Coffee Shop	Café	Ice Cream Shop	Japanese Restaurant	Arts & Crafts Store	Art Gallery	Chinese Restaurant	French Restaurant	Clothing Store	Sandwich Place
22	Harbord\in	Korean Restaurant	Café	Grocery Store	Sandwich Place	Park	Coffee Shop	Japanese Restaurant	Mexican Restaurant	Ice Cream Shop	Fast Food Restaurant
23	Harbourfront	Coffee Shop	Café	Hotel	Restaurant	Italian Restaurant	Sports Bar	Sushi Restaurant	Music Venue	Gym	Bank
24	Harbourfront East\in	Coffee Shop	Café	Hotel	Restaurant	Italian Restaurant	Sports Bar	Sushi Restaurant	Music Venue	Gym	Bank
25	Harbourfront West\in	Coffee Shop	Café	Hotel	Restaurant	Italian Restaurant	Sports Bar	Sushi Restaurant	Music Venue	Gym	Bank
26	High Park	Convenience Store	Pet Store	Park	Sporting Goods Shop	Mattress Store	Gym	Pub	Mexican Restaurant	Pool	Pizza Place
27	India Bazaar	Indian Restaurant	Grocery Store	Café	Women's Store	Platform	Brewery	Burger Joint	Bus Line	Snack Place	Shopping Plaza
28	Kensington Market	Café	Coffee Shop	Bar	Mexican Restaurant	Vegetarian / Vegan Restaurant	Bakery	Vietnamese Restaurant	Nightclub	Dessert Shop	Grocery Store
29	King\in	Coffee Shop	Restaurant	Hotel	Café	Gym	Japanese Restaurant	Gastropub	Seafood Restaurant	Italian Restaurant	American Restaurant
30	King and Spadina	Coffee Shop	Italian Restaurant	Restaurant	Beer Bar	Gym	Hotel	Sandwich Place	Bar	French Restaurant	Indian Restaurant
31	Lawrence Park	Sushi Restaurant	Italian Restaurant	Bakery	Coffee Shop	Pizza Place	Pub	Fast Food Restaurant	Asian Restaurant	Bank	Bubble Tea Shop
32	Little Portugal	Bar	Café	Coffee Shop	Korean Restaurant	Cocktail Bar	Restaurant	Bakery	Grocery Store	Boutique	Jazz Club
33	Moore Park	Park	Gym	Convenience Store	Women's Store	Electronics Store	Ethiopian Restaurant	Event Space	Falafel Restaurant	Farm	Farmers Market
34	Parkdale	Tibetan Restaurant	Indian Restaurant	Diner	Bar	Café	Bakery	Restaurant	Pharmacy	Boutique	Chinese Restaurant
35	Parkdale Village	Tibetan Restaurant	Indian Restaurant	Diner	Bar	Café	Bakery	Restaurant	Pharmacy	Boutique	Chinese Restaurant
36	Queen's Park	Coffee Shop	Café	Italian Restaurant	Sandwich Place	Chinese Restaurant	Bubble Tea Shop	Thai Restaurant	Japanese Restaurant	Ice Cream Shop	French Restaurant
37	Rathnelly	French Restaurant	Park	Mexican Restaurant	Italian Restaurant	Pizza Place	BBQ Joint	Café	Liquor Store	Sandwich Place	Coffee Shop
38	Richmond\in	Ice Cream Shop	Beer Store	Women's Store	Filipino Restaurant	Ethiopian Restaurant	Event Space	Falafel Restaurant	Farm	Farmers Market	Fast Food Restaurant
39	Riverdale	Vietnamese Restaurant	Chinese Restaurant	Bakery	Light Rail Station	Fast Food Restaurant	Coffee Shop	Bridal Shop	Asian Restaurant	Café	Breakfast Spot
40	Roncesvalles	Restaurant	Café	Gourmet Shop	Gift Shop	Bookstore	Gastropub	Gas Station	Pub	Sushi Restaurant	Brewery
41	Rosedale	Park	Bike Trail	Japanese Restaurant	Playground	Flea Market	Fish Market	Fish & Chips Shop	Filipino Restaurant	Flower Shop	Eastern European Restaurant
42	Roselawn\in	Coffee Shop	Fast Food Restaurant	Italian Restaurant	Restaurant	Bookstore	Park	Mexican Restaurant	Yoga Studio	Movie Theater	Pizza Place
43	Runnymede	Café	Coffee Shop	Bakery	Bank	Pizza Place	Tea Room	Italian Restaurant	Gastropub	Pub	Latin American Restaurant
44	Ryerson\in	Coffee Shop	Clothing Store	Café	Burger Joint	Restaurant	Ramen Restaurant	Italian Restaurant	Japanese Restaurant	Diner	Middle Eastern Restaurant
45	South Hill	Sandwich Place	History Museum	Café	Coffee Shop	Park	Castle	Pub	Pizza Place	Pharmacy	Donut Shop

45	South Hill	Sandwich Place	History Museum	Café	Coffee Shop	Park	Castle	Pub	Pizza Place	Pharmacy	Donut Shop
46	South Niagara	Pizza Place	Dessert Shop	Bakery	Yoga Studio	Spa	Coffee Shop	Café	Furniture / Home Store	American Restaurant	Pet Store
47	St. James Town	Coffee Shop	Pizza Place	Grocery Store	Café	Pharmacy	Breakfast Spot	Caribbean Restaurant	Sandwich Place	Restaurant	Playground
48	Studio District\	Coffee Shop	Café	Vegetarian / Vegan Restaurant	Clothing Store	Cosmetics Shop	Japanese Restaurant	Hotel	Indian Restaurant	Shoe Store	Restaurant
49	Summerhill East\	Italian Restaurant	Café	Sushi Restaurant	Spa	Coffee Shop	Kids Store	French Restaurant	Juice Bar	Liquor Store	Bakery
50	Summerhill West\	Italian Restaurant	Café	Sushi Restaurant	Spa	Coffee Shop	Kids Store	French Restaurant	Juice Bar	Liquor Store	Bakery
51	Swansea	Park	Bus Line	Social Club	Construction & Landscaping	Restaurant	Skating Rink	Women's Store	Falafel Restaurant	Egyptian Restaurant	Electronics Store
52	The Annex	Pizza Place	Coffee Shop	Bistro	Park	Indian Restaurant	Ice Cream Shop	Thai Restaurant	Grocery Store	Donut Shop	Middle Eastern Restaurant
53	The Beaches	Beach	Pub	Japanese Restaurant	Tea Room	Bar	Bakery	Breakfast Spot	Pizza Place	Park	Liquor Store
54	The Beaches West\	Beach	Pub	Japanese Restaurant	Tea Room	Bar	Bakery	Breakfast Spot	Pizza Place	Park	Liquor Store
55	The Danforth West\	Coffee Shop	Skating Rink	Bus Line	Ice Cream Shop	Fried Chicken Joint	Intersection	Metro Station	Sushi Restaurant	Furniture / Home Store	French Restaurant
56	The Junction South\	Coffee Shop	Italian Restaurant	Thai Restaurant	Café	Bar	Nail Salon	Antique Shop	Arts & Crafts Store	Mexican Restaurant	Bus Stop
57	Toronto Dominion Centre	Coffee Shop	Hotel	Café	Restaurant	Japanese Restaurant	American Restaurant	Deli / Bodega	Seafood Restaurant	Asian Restaurant	Steakhouse
58	Toronto Islands	Park	Café	Harbor / Marina	Music Venue	Farmers Market	Electronics Store	Ethiopian Restaurant	Event Space	Falafel Restaurant	Farm
59	Trinity	Coffee Shop	Café	Clothing Store	Restaurant	Boutique	Park	Museum	Music Store	Japanese Restaurant	Jewelry Store
60	Underground city	Bubble Tea Shop	Bank	Fish Market	Sporting Goods Shop	Breakfast Spot	Fast Food Restaurant	Chinese Restaurant	Gas Station	Sandwich Place	Clothing Store
61	Union Station	Coffee Shop	Café	Hotel	Japanese Restaurant	Sporting Goods Shop	Deli / Bodega	Restaurant	Breakfast Spot	Salad Place	Supermarket
62	University of Toronto	Café	Park	Bookstore	Japanese Restaurant	Italian Restaurant	Hotel	Comfort Food Restaurant	Noodle House	Museum	French Restaurant
63	Yorkville	Boutique	Italian Restaurant	Café	Clothing Store	Coffee Shop	Restaurant	Spa	Women's Store	Sushi Restaurant	French Restaurant

Map Showing the 5 k-mean clusters



Cluster 1

```
[45]: toronto_merged.loc[toronto_merged['Cluster Labels'] == 0, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

	Borough	Cluster Labels	1st Popular Venues	2nd Popular Venues	3rd Popular Venues	4th Popular Venues	5th Popular Venues	6th Popular Venues	7th Popular Venues	8th Popular Venues	9th Popular Venues	10th Popular Venues
58	Downtown Toronto	0	Pizza Place	Dessert Shop	Bakery	Yoga Studio	Spa	Coffee Shop	Café	Furniture / Home Store	American Restaurant	Pet Store

Cluster 2

```
[46]: toronto_merged.loc[toronto_merged['Cluster Labels'] == 1, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

	Borough	Cluster Labels	1st Popular Venues	2nd Popular Venues	3rd Popular Venues	4th Popular Venues	5th Popular Venues	6th Popular Venues	7th Popular Venues	8th Popular Venues	9th Popular Venues	10th Popular Venues
26	East Toronto	1	Indian Restaurant	Grocery Store	Café	Women's Store	Platform	Brewery	Burger Joint	Bus Line	Snack Place	Shopping Plaza
33	West Toronto	1	Convenience Store	Pet Store	Park	Sporting Goods Shop	Mattress Store	Gym	Pub	Mexican Restaurant	Pool	Pizza Place
51	Central Toronto	1	French Restaurant	Park	Mexican Restaurant	Italian Restaurant	Pizza Place	BBQ Joint	Café	Liquor Store	Sandwich Place	Coffee Shop

Cluster 3

```
[47]: toronto_merged.loc[toronto_merged['Cluster Labels'] == 2, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

	Borough	Cluster Labels	1st Popular Venues	2nd Popular Venues	3rd Popular Venues	4th Popular Venues	5th Popular Venues	6th Popular Venues	7th Popular Venues	8th Popular Venues	9th Popular Venues	10th Popular Venues
38	West Toronto	2	Restaurant	Café	Gourmet Shop	Gift Shop	Bookstore	Gastropub	Gas Station	Pub	Sushi Restaurant	Brewery

Cluster 4

```
[48]: toronto_merged.loc[toronto_merged['Cluster Labels'] == 3, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

	Borough	Cluster Labels	1st Popular Venues	2nd Popular Venues	3rd Popular Venues	4th Popular Venues	5th Popular Venues	6th Popular Venues	7th Popular Venues	8th Popular Venues	9th Popular Venues	10th Popular Venues
18	East Toronto	3	Coffee Shop	Skating Rink	Bus Line	Ice Cream Shop	Fried Chicken Joint	Intersection	Metro Station	Sushi Restaurant	Furniture / Home Store	French Restaurant
19	East Toronto	3	Vietnamese Restaurant	Chinese Restaurant	Bakery	Light Rail Station	Fast Food Restaurant	Coffee Shop	Bridal Shop	Asian Restaurant	Café	Breakfast Spot
41	Downtown Toronto	3	Café	Park	Bookstore	Japanese Restaurant	Italian Restaurant	Hotel	Comfort Food Restaurant	Noodle House	Museum	French Restaurant

Cluster 5

```
toronto_merged.loc[toronto_merged['Cluster Labels'] == 4, toronto_merged.columns[[1] + list(range(5, toronto_merged.shape[1]))]]
```

	Borough	Cluster Labels	1st Popular Venues	2nd Popular Venues	3rd Popular Venues	4th Popular Venues	5th Popular Venues	6th Popular Venues	7th Popular Venues	8th Popular Venues	9th Popular Venues	10th Popular Venues
0	Downtown Toronto	4	Coffee Shop	Café	Hotel	Restaurant	Italian Restaurant	Sports Bar	Sushi Restaurant	Music Venue	Gym	Bank
1	Downtown Toronto	4	Coffee Shop	Café	Italian Restaurant	Sandwich Place	Chinese Restaurant	Bubble Tea Shop	Thai Restaurant	Japanese Restaurant	Ice Cream Shop	French Restaurant
2	Downtown Toronto	4	Coffee Shop	Clothing Store	Café	Burger Joint	Restaurant	Ramen Restaurant	Italian Restaurant	Japanese Restaurant	Diner	Middle Eastern Restaurant
3	Downtown Toronto	4	Restaurant	Clothing Store	Hotel	Coffee Shop	Cosmetics Shop	Bookstore	Tea Room	Japanese Restaurant	Sandwich Place	Café
4	Downtown Toronto	4	Coffee Shop	Pizza Place	Grocery Store	Café	Pharmacy	Breakfast Spot	Caribbean Restaurant	Sandwich Place	Restaurant	Playground
5	East Toronto	4	Beach	Pub	Japanese Restaurant	Tea Room	Bar	Bakery	Breakfast Spot	Pizza Place	Park	Liquor Store
6	Downtown Toronto	4	Coffee Shop	Café	Restaurant	Hotel	Italian Restaurant	Japanese Restaurant	Gym	Seafood Restaurant	Cocktail Bar	Gastropub
7	Downtown Toronto	4	Korean Restaurant	Coffee Shop	Mexican Restaurant	Grocery Store	Pub	Cocktail Bar	Japanese Restaurant	Indian Restaurant	Gift Shop	Sandwich Place
8	Downtown Toronto	4	Café	Coffee Shop	American Restaurant	Japanese Restaurant	Gym	Restaurant	Gastropub	Cosmetics Shop	Seafood Restaurant	Tea Room
9	Downtown Toronto	4	Coffee Shop	Restaurant	Hotel	Café	Gym	Japanese Restaurant	Gastropub	Seafood Restaurant	Italian Restaurant	American Restaurant
10	Downtown Toronto	4	Ice Cream Shop	Beer Store	Women's Store	Filipino Restaurant	Ethiopian Restaurant	Event Space	Falafel Restaurant	Farm	Farmers Market	Fast Food Restaurant
11	West Toronto	4	Café	Pizza Place	Park	Brazilian Restaurant	Bar	Restaurant	Coffee Shop	Dessert Shop	Electronics Store	Flower Shop
12	West Toronto	4	Bar	Bakery	Café	Coffee Shop	Sandwich Place	Restaurant	Beer Bar	Beer Store	Cocktail Bar	Mexican Restaurant
13	Downtown Toronto	4	Coffee Shop	Café	Hotel	Restaurant	Italian Restaurant	Sports Bar	Sushi Restaurant	Music Venue	Gym	Bank
14	Downtown Toronto	4	Park	Café	Harbor / Marina	Music Venue	Farmers Market	Electronics Store	Ethiopian Restaurant	Event Space	Falafel Restaurant	Farm
15	Downtown Toronto	4	Coffee Shop	Café	Hotel	Japanese Restaurant	Sporting Goods Shop	Deli / Bodega	Restaurant	Breakfast Spot	Salad Place	Supermarket
16	West Toronto	4	Bar	Café	Coffee Shop	Korean Restaurant	Cocktail Bar	Restaurant	Bakery	Grocery Store	Boutique	Jazz Club
17	West Toronto	4	Coffee Shop	Café	Clothing Store	Restaurant	Boutique	Park	Museum	Music Store	Japanese Restaurant	Jewelry Store
20	Downtown Toronto	4	Coffee Shop	Café	Restaurant	Hotel	American Restaurant	Gym	Seafood Restaurant	Deli / Bodega	Tea Room	Bakery
21	Downtown Toronto	4	Coffee Shop	Hotel	Café	Restaurant	Japanese Restaurant	American Restaurant	Deli / Bodega	Seafood Restaurant	Asian Restaurant	Steakhouse
22	West Toronto	4	Bar	Café	Vietnamese Restaurant	Park	Coffee Shop	French Restaurant	Dive Bar	Music Venue	Gastropub	Korean Restaurant
23	West Toronto	4	Theme Park	Soccer Stadium	Arts & Crafts Store	Poutine Place	Coffee Shop	Athletics & Sports	Theme Park Ride / Attraction	Moving Target	Storage Facility	Nightclub
24	West Toronto	4	Tibetan Restaurant	Indian Restaurant	Diner	Bar	Café	Bakery	Restaurant	Pharmacy	Boutique	Chinese Restaurant



Conclusion

Purpose of this project was to identify areas in Toronto with low number of restaurants in order to aid stakeholders in narrowing down the search for optimal location for a new restaurant. By calculating restaurant density distribution from Foursquare data we have first identified general boroughs that justify further analysis, and then generated extensive collection of locations which satisfy some basic requirements regarding existing nearby restaurants. Clustering of those locations was then performed in order to create major zones of interest (containing greatest number of potential locations) and addresses of those zone centers were created to be used as starting points for final exploration by stakeholders.

Final decision on optimal restaurant location will be made by stakeholders based on specific characteristics of neighborhoods and locations in every recommended zone, taking into consideration additional factors like attractiveness of each location (proximity to park or water), levels of noise / proximity to major roads, real estate availability, prices, social and economic dynamics of every neighborhood etc.