The Battle of the Neighborhoods

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In this project we are going to be analysing the city of Toronto and the neighborhoods within it. We are going to be analysing the Boroughs of Toronto and identifying the popular cuisines when it comes to the available food options within each of the Boroughs. The problem we are trying to solve here is to identify a potential location for a new restaurant and see which particular cuisines would provide a potential opportunity for success within those locations

Dataset

The data set we will be using for this project comprises of the following.

- We will be picking up neighborhood information from Wikipedia - https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M.
- We will be importing location, local business, popularity and other related information from the Foursquare APi.
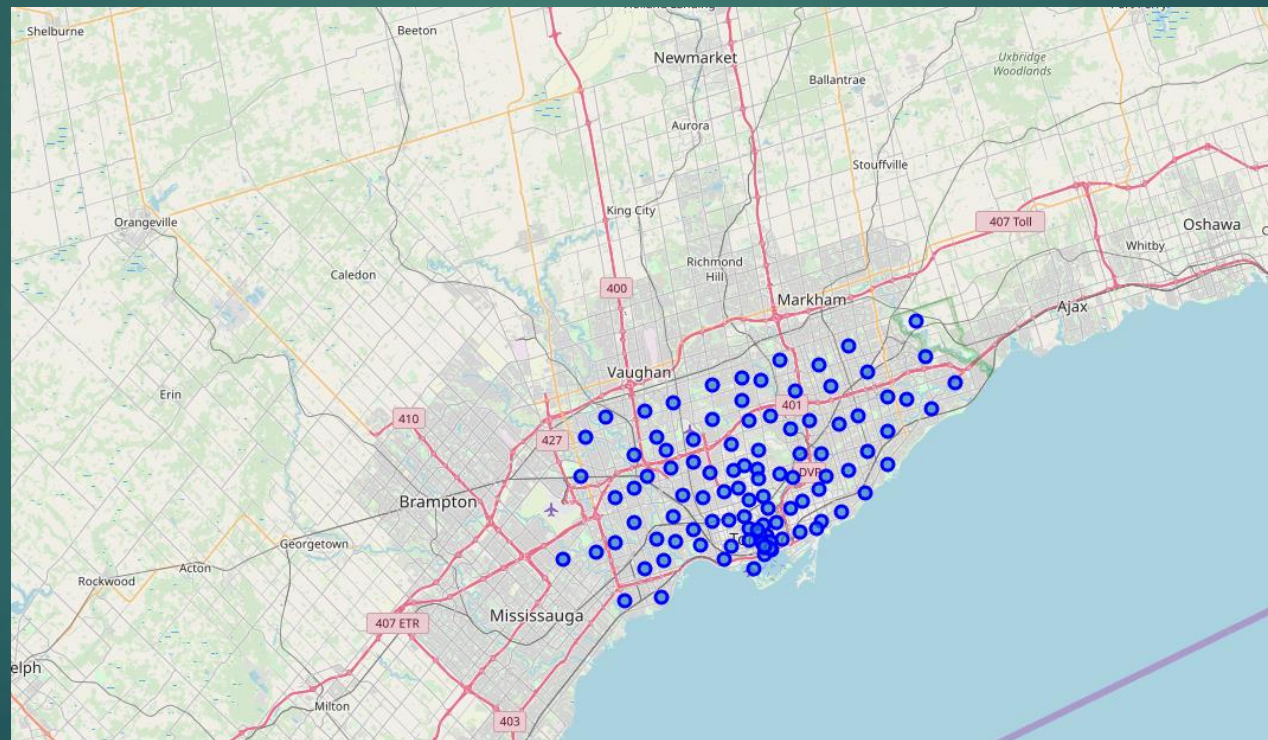- We will also be using a variety of python libraries.

Methodology

We will be targeting a singular borough of Scarborough for this particular study. We will create a DF for the neighbourhood information for Scarborough, add lat. And long. Details to the same. Followed by the same, we would import venue information using the FourSquare APi, group them by neighbourhood and sort the information using popularity metrics available via FS Api. We will further refine the information by classifying the businesses information in categories and then ordering them in order of popularity.

Our last step would be to cluster the businesses based on their geographic location into 3 specific clusters allowing us to develop further insight.
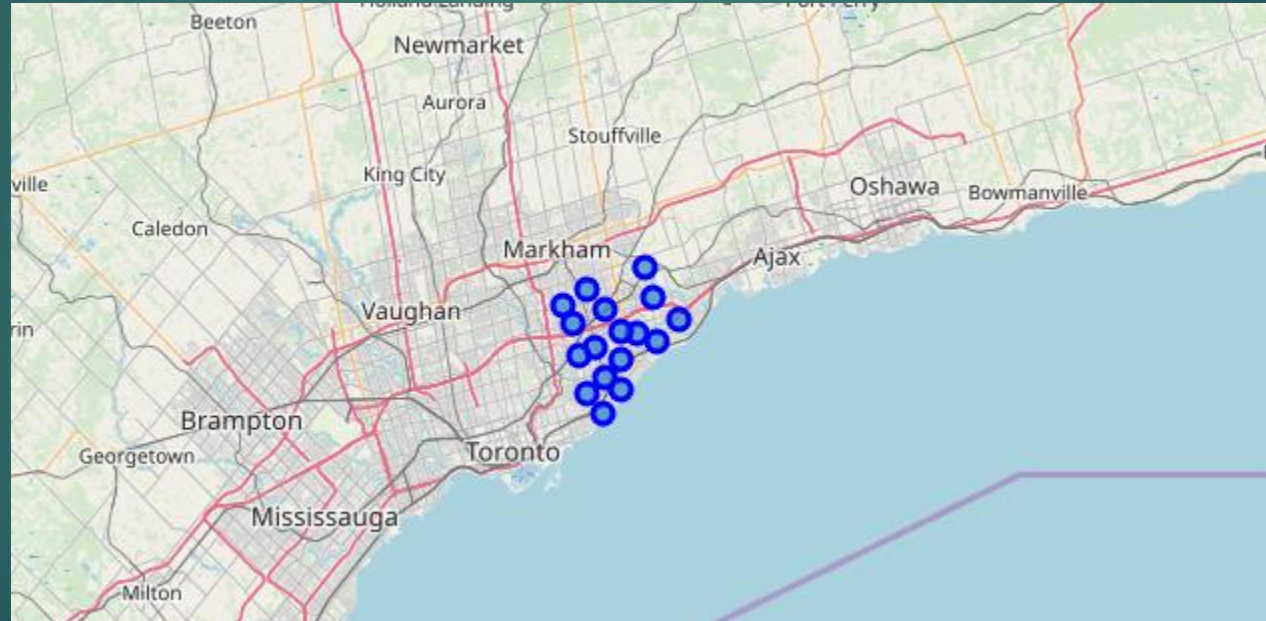
Step by step description of steps followed is provided in our report

Link: https://github.com/nktsthi/Coursera_Capstone/blob/master/The%20Battle%20of%20Neighbourhoods%20-%20A.%20Sethi.pdf

Map of Toronto with Markers

Map of Scarborough with markers

Neighbourhood Grouping of Venues

	Neighborhood	American Restaurant	Athletics & Sports	Auto Garage	Bakery	Bank	Bar	Breakfast Spot	Brewery	Bubble Tea Shop	Bus Line	Café	Caribbean Restaurant	Chinese Restaurant	Coffee Shop	College Stadium	Convenience Store	Department Store	Discount Store	Electronics Store	Fast Food Restaurant	Fried Chicken Joint	Furniture / Home Store	Gas Station	Ente
0	Agincourt	0.000000	0.000	0.000000	0.000000	0.000000	0.0	0.250000	0.000	0.000000	0.000000	0.00	0.000	0.000000	0.000000	0.00	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.000	0.000
1	Agincourt North,L'Amoreaux East,Milliken,Steel...	0.000000	0.000	0.000000	0.000000	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.00	0.000	0.000000	0.000000	0.00	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.000	0.000
2	Birch Cliff,Cliffside West	0.000000	0.000	0.000000	0.000000	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.25	0.000	0.000000	0.000000	0.25	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.000	0.000
3	Cedarbrae	0.000000	0.125	0.000000	0.125000	0.125000	0.0	0.000000	0.000	0.000000	0.000000	0.00	0.125	0.000000	0.000000	0.00	0.000000	0.0	0.000000	0.000	0.000000	0.125000	0.000	0.125
4	Clairlea,Golden Mile,Oakridge	0.000000	0.000	0.000000	0.222222	0.000000	0.0	0.000000	0.000	0.000000	0.222222	0.00	0.000	0.000000	0.000000	0.00	0.000000	0.0	0.000000	0.000	0.111111	0.000000	0.000	0.000
5	Clarks Corners,Sullivan,Tam O'Shanter	0.000000	0.000	0.000000	0.000000	0.083333	0.0	0.000000	0.000	0.000000	0.000000	0.00	0.000	0.083333	0.000000	0.00	0.083333	0.0	0.000000	0.000	0.083333	0.083333	0.000	0.000
6	Cliffcrest,Cliffside,Scarborough Village West	0.333333	0.000	0.000000	0.000000	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.00	0.000	0.000000	0.000000	0.00	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.000	0.000
7	Dorset Park,Scarborough Town Centre,Wexford He...	0.000000	0.000	0.000000	0.000000	0.000000	0.0	0.000000	0.125	0.000000	0.000000	0.00	0.000	0.125000	0.000000	0.00	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.125	0.000
8	East Birchmount Park,Ionview,Kennedy Park	0.000000	0.000	0.000000	0.000000	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.00	0.000	0.000000	0.200000	0.00	0.200000	0.2	0.400000	0.000	0.000000	0.000000	0.000	0.000
9	Guildwood,Morningside,West Hill	0.000000	0.000	0.000000	0.000000	0.000000	0.0	0.125000	0.000	0.000000	0.000000	0.00	0.000	0.000000	0.000000	0.00	0.000000	0.0	0.000000	0.125	0.000000	0.000000	0.000	0.000
10	Highland Creek,Rouge Hill,Port Union	0.000000	0.000	0.000000	0.000000	0.000000	1.0	0.000000	0.000	0.000000	0.000000	0.00	0.000	0.000000	0.000000	0.00	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.000	0.000
11	L'Amoreaux West	0.000000	0.000	0.000000	0.000000	0.000000	0.0	0.083333	0.000	0.083333	0.000000	0.00	0.000	0.166667	0.083333	0.00	0.000000	0.0	0.083333	0.000	0.166667	0.000000	0.000	0.000
12	Maryvale,Wexford	0.000000	0.000	0.142857	0.142857	0.000000	0.0	0.142857	0.000	0.000000	0.000000	0.00	0.000	0.000000	0.000000	0.00	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.000	0.000
13	Rouge,Malvern	0.000000	0.000	0.000000	0.000000	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.00	0.000	0.000000	0.000000	0.00	0.000000	0.0	0.000000	0.000	1.000000	0.000000	0.000	0.000
14	Scarborough Village	0.000000	0.000	0.000000	0.000000	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.00	0.000	0.000000	0.000000	0.00	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.000	0.000
15	Woburn	0.000000	0.000	0.000000	0.000000	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.00	0.000	0.000000	0.666667	0.00	0.000000	0.0	0.000000	0.000	0.000000	0.000000	0.000	0.000

Neighbourhood venues sorted by popularity

	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	Skating Rink	Latin American Restaurant	Breakfast Spot	Lounge	Vietnamese Restaurant	Coffee Shop	Gas Station	Furniture / Home Store	Fried Chicken Joint	Fast Food Restaurant
1	Agincourt North,L'Amoreaux East,Milliken,Steel...	Park	Playground	Caribbean Restaurant	Gas Station	Furniture / Home Store	Fried Chicken Joint	Fast Food Restaurant	Electronics Store	Discount Store	Department Store
2	Birch Cliff,Cliffside West	General Entertainment	Skating Rink	Café	College Stadium	Vietnamese Restaurant	Coffee Shop	Gas Station	Furniture / Home Store	Fried Chicken Joint	Fast Food Restaurant
3	Cedarbrae	Caribbean Restaurant	Thai Restaurant	Athletics & Sports	Bakery	Bank	Gas Station	Fried Chicken Joint	Hakka Restaurant	College Stadium	General Entertainment
4	Clairlea,Golden Mile,Oakridge	Bakery	Bus Line	Intersection	Soccer Field	Fast Food Restaurant	Metro Station	Park	Vietnamese Restaurant	Coffee Shop	Furniture / Home Store
5	Clarks Corners,Sullivan,Tam O'Shanter	Pizza Place	Noodle House	Bank	Convenience Store	Pharmacy	Italian Restaurant	Rental Car Location	Fast Food Restaurant	Fried Chicken Joint	Thai Restaurant
6	Cliffcrest,Cliffside,Scarborough Village West	American Restaurant	Motel	Movie Theater	Coffee Shop	Gas Station	Furniture / Home Store	Fried Chicken Joint	Fast Food Restaurant	Electronics Store	Discount Store
7	Dorset Park,Scarborough Town Centre,Wexford He...	Indian Restaurant	Pet Store	Brewery	Chinese Restaurant	Furniture / Home Store	Thrift / Vintage Store	Vietnamese Restaurant	Sandwich Place	Caribbean Restaurant	Fried Chicken Joint
8	East Birchmount Park,Ionview,Kennedy Park	Discount Store	Department Store	Convenience Store	Coffee Shop	Vietnamese Restaurant	Hakka Restaurant	General Entertainment	Gas Station	Furniture / Home Store	Fried Chicken Joint
9	Guildwood,Morningside,West Hill	Spa	Intersection	Electronics Store	Rental Car Location	Breakfast Spot	Pizza Place	Medical Center	Mexican Restaurant	Vietnamese Restaurant	Coffee Shop
10	Highland Creek,Rouge Hill,Port Union	Bar	Vietnamese Restaurant	Coffee Shop	General Entertainment	Gas Station	Furniture / Home Store	Fried Chicken Joint	Fast Food Restaurant	Electronics Store	Discount Store
11	L'Amoreaux West	Chinese Restaurant	Fast Food Restaurant	Discount Store	Breakfast Spot	Grocery Store	Bubble Tea Shop	Pharmacy	Pizza Place	Coffee Shop	Sandwich Place
12	Maryvale,Wexford	Middle Eastern Restaurant	Auto Garage	Bakery	Shopping Mall	Sandwich Place	Breakfast Spot	Vietnamese Restaurant	Gas Station	Furniture / Home Store	Fried Chicken Joint
13	Rouge,Malvern	Fast Food Restaurant	Vietnamese Restaurant	Hakka Restaurant	General Entertainment	Gas Station	Furniture / Home Store	Fried Chicken Joint	Electronics Store	Discount Store	Department Store
14	Scarborough Village	Playground	Vietnamese Restaurant	Chinese Restaurant	General Entertainment	Gas Station	Furniture / Home Store	Fried Chicken Joint	Fast Food Restaurant	Electronics Store	Discount Store
15	Woburn	Coffee Shop	Korean Restaurant	Vietnamese Restaurant	General Entertainment	Gas Station	Furniture / Home Store	Fried Chicken Joint	Fast Food Restaurant	Electronics Store	Discount Store

New DF with clustering information

	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	M1B	Scarborough	Rouge,Malvern	43.806686	-79.194353	1	Fast Food Restaurant	Vietnamese Restaurant	Hakka Restaurant	General Entertainment	Gas Station	Furniture / Home Store	Fried Chicken Joint	Electronics Store	Discount Store	Department Store
1	M1C	Scarborough	Highland Creek,Rouge Hill,Port Union	43.784535	-79.160497	0	Bar	Vietnamese Restaurant	Coffee Shop	General Entertainment	Gas Station	Furniture / Home Store	Fried Chicken Joint	Fast Food Restaurant	Electronics Store	Discount Store
2	M1E	Scarborough	Guildwood,Morningside,West Hill	43.763573	-79.188711	1	Spa	Intersection	Electronics Store	Rental Car Location	Breakfast Spot	Pizza Place	Medical Center	Mexican Restaurant	Vietnamese Restaurant	Coffee Shop
3	M1G	Scarborough	Woburn	43.770992	-79.216917	1	Coffee Shop	Korean Restaurant	Vietnamese Restaurant	General Entertainment	Gas Station	Furniture / Home Store	Fried Chicken Joint	Fast Food Restaurant	Electronics Store	Discount Store
4	M1H	Scarborough	Cedarbrae	43.773136	-79.239476	1	Caribbean Restaurant	Thai Restaurant	Athletics & Sports	Bakery	Bank	Gas Station	Fried Chicken Joint	Hakka Restaurant	College Stadium	General Entertainment

Results

Based on the above information, we have identified the above conclusions

▶ Cluster 2 in Scarborough is clearly the largest with the largest audience size and hence, opportunity.

▶ There is not neccessarily a singular cuisine or theme that can be identified to have an extremely strong or dominating presence.

▶ A fairly significant presence in top 10 popular venues for Chinese Restaurants, Indian Restaurants and Vietnamese Restaurants

Conclusions

Based on the above results, we simply do not have enough conclusive data to identify an extremely dominant market space when it comes to the food industry. There are clearly strong players with a somewhat larger presence i.e. Chinese, Indian and Vietnamese restaurants. This can be concluded to provide one of two paths of decision making. Either the market can be considered saturated with these opportunities or it can be considered to be a safe option to invest in considering the large demand.

Overall though, our study has been somewhat inconclusive from a business opportunity research point of view.