



IBM Data Science: Capstone Project – Week 5

The Battle of Neighborhoods

Selecting the right location to open a new Indian Restaurant
in North York, Toronto, Canada

Introduction

- City of Toronto is the financial capital of Canada
- Offers a vibrant multi-cultural society representing population diversity
- Growing population due to government's immigration policy
- Celebrates international cultures and cuisines
- Offers immense opportunity to start a new Restaurant



Business Problem

- Real estate is expensive
- High competition
 - Restaurant at every block in most business districts and residential hubs
- Focus area according to client: North York, Toronto (project constraint assumed)
- Interested in opening Indian Restaurant



Finding the Right Location

- Location, Location, Location
 - most important criteria after quality of food
- Ideal location
 - Away from other Indian Restaurants
 - Affluent neighborhood
 - Maximum ROI



Data



- The Toronto neighbourhood data is available from this web location for free:
URL: https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M_. This is the same data as used in earlier assignment.
- The Geospatial data is available from this web location.
URL: http://cocl.us/Geospatial_data

	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

Methodology

- Foursquare API used to explore venues in North York, Toronto
- Neighborhoods updated with Latitude and Longitude information
- Explore function of Foursquare used to obtain category: Indian Restaurant

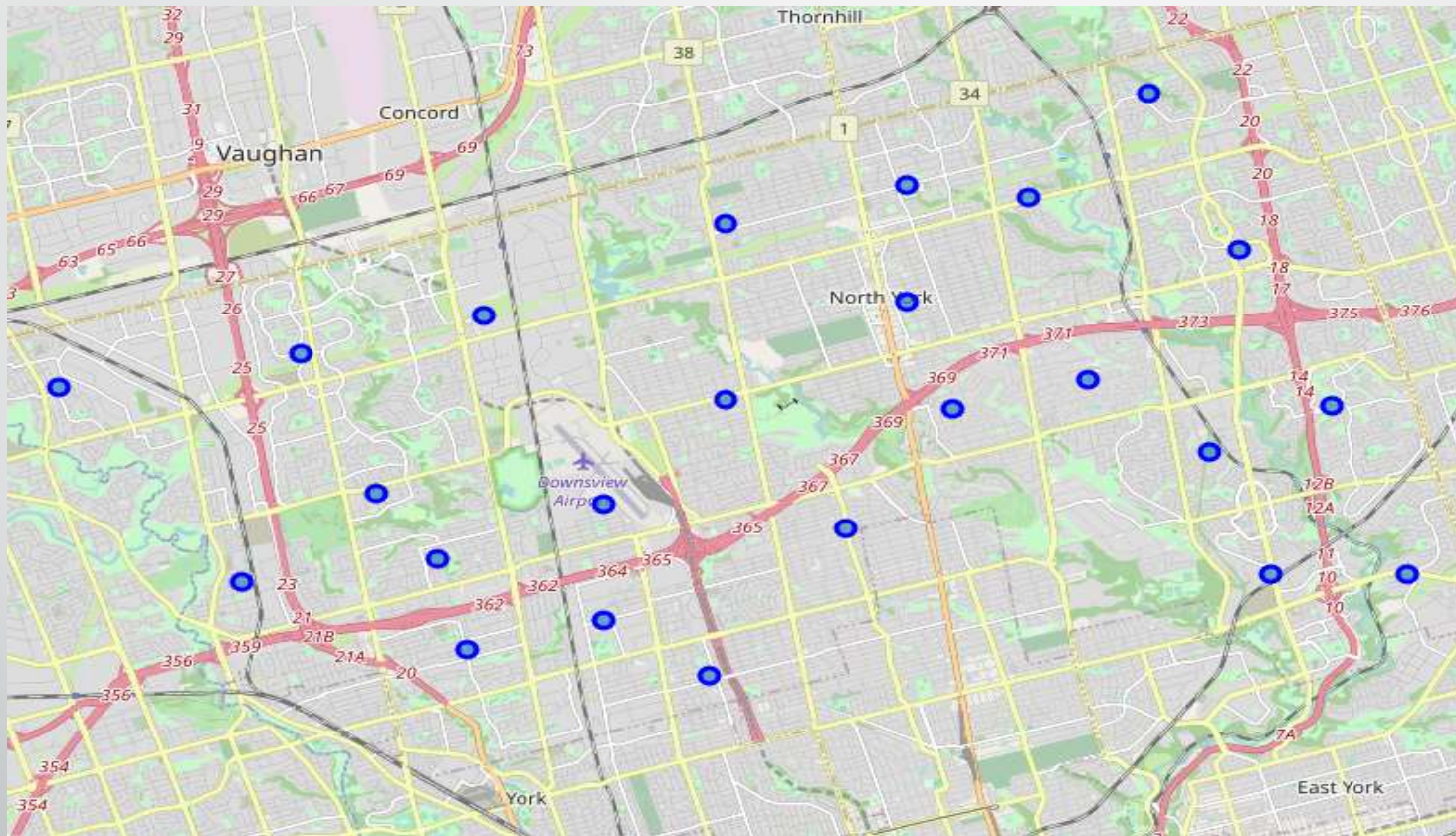


	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Fairview, Henry Farm, Oriole	43.778517	-79.346556	Good Karma	43.778239	-79.343575	Indian Restaurant
1	Fairview, Henry Farm, Oriole	43.778517	-79.346556	Vatica	43.775762	-79.330994	Chaat Place
2	Fairview, Henry Farm, Oriole	43.778517	-79.346556	Iqbal Kebab & Sweets Centre	43.774032	-79.341003	Indian Restaurant
3	Willowdale, Newtonbrook	43.789053	-79.408493	Earth Indian Restaurant	43.787524	-79.417466	Indian Restaurant
4	Willowdale, Newtonbrook	43.789053	-79.408493	Tandori Indian Cuisine	43.780807	-79.416185	Indian Restaurant

Data dimensions

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NorthYork_venues_IndianRestaurant.shape
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(24, 7)
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Zoom-In view of locations (neighborhood) of interest in North York, Toronto

Methodology

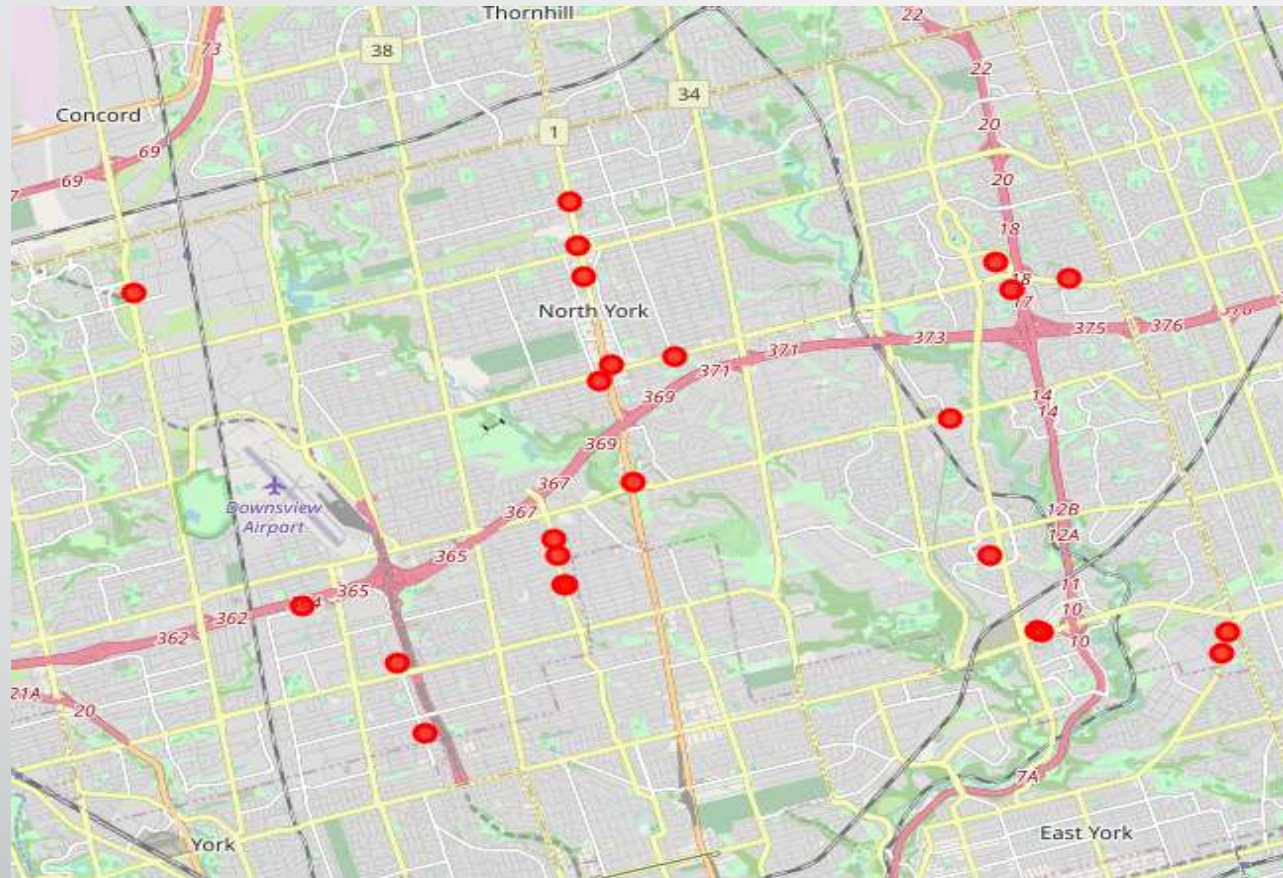


	Neighborhood	Chaat Place	Indian Chinese Restaurant	Indian Restaurant
0	Fairview, Henry Farm, Oriole	0	0	1
1	Fairview, Henry Farm, Oriole	1	0	0
2	Fairview, Henry Farm, Oriole	0	0	1
3	Willowdale, Newtonbrook	0	0	1
4	Willowdale, Newtonbrook	0	0	1

Methodology



	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue
0	Bedford Park, Lawrence Manor East	Indian Restaurant	Indian Chinese Restaurant	Chaat Place
1	Don Mills	Indian Restaurant	Indian Chinese Restaurant	Chaat Place
2	Fairview, Henry Farm, Oriole	Indian Restaurant	Chaat Place	Indian Chinese Restaurant
3	Glencairn	Indian Restaurant	Indian Chinese Restaurant	Chaat Place
4	Lawrence Manor, Lawrence Heights	Indian Restaurant	Indian Chinese Restaurant	Chaat Place



Zoom-in view of Locations of existing Indian Restaurants in North York, Toronto

Results: Using K-Means algorithm

Cluster 0

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue
4	North York	0.0	Indian Restaurant	Indian Chinese Restaurant	Chaat Place
6	North York	0.0	Indian Restaurant	Indian Chinese Restaurant	Chaat Place
9	North York	0.0	Indian Restaurant	Indian Chinese Restaurant	Chaat Place
10	North York	0.0	Indian Restaurant	Indian Chinese Restaurant	Chaat Place
12	North York	0.0	Indian Restaurant	Indian Chinese Restaurant	Chaat Place
17	North York	0.0	Indian Restaurant	Indian Chinese Restaurant	Chaat Place
18	North York	0.0	Indian Restaurant	Indian Chinese Restaurant	Chaat Place
19	North York	0.0	Indian Restaurant	Indian Chinese Restaurant	Chaat Place
20	North York	0.0	Indian Restaurant	Indian Chinese Restaurant	Chaat Place



Results: Using K-Means algorithm

Cluster 1

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue
5	North York	1.0	Indian Restaurant	Indian Chinese Restaurant	Chaat Place



Results: Using K-Means algorithm

Cluster 2

	Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue
1	North York	2.0	Indian Restaurant	Chaat Place	Indian Chinese Restaurant



Results: Using K-Means algorithm

Cluster 3

Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue
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Cluster 4

Borough	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue
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Results: Using K-Means algorithm



Based on above cluster analysis, Downsview and Don Valley North, Don Valley West are the best locations to open a new Indian Restaurant.

Discussion

- Analysis based on data available in the public domain. The results depend on the accuracy of the data available.
- Results are based on Indian restaurants. People may also prefer to experience other international cuisines. This competitive analysis has not been made in this project.
- Anecdotaly, Downsview area is not a very affluent area. This area could be dropped from further consideration. No specific household income information has been objectively analyzed for different North York neighborhoods as part of this project.



Conclusion



- The analysis and recommendation made in this report are based on the quality of data available through the public sources referred in this analysis.
- Based on the recommendation of the clusters identified, a venue with lowest competition can be identified for investment in the Don Valley North / Don Valley West neighborhoods. It is expected that a new Indian Restaurant in this area may prove to be a sound investment.
- The methodology used in this Capstone project could be leveraged to determine appropriate location for other kind of businesses.

Thank you

Bon Appetite

