

# Peer-graded Assignment: Capstone Project - The Battle of Neighborhoods (Week 2) – Report

By Cheekiam Lau

## Introduction where you discuss the business problem and who would be interested in this project.

This project was initiated by an investor wishing to open a Chinese Restaurant in Toronto City. The request came with a provision that Chinatown should not be included in the next possible location for his upcoming restaurant. Therefore the recommendation from this study/analysis can be used by anyone who is interested in opening a restaurant outside of Chinatown in Toronto City.

## Data where you describe the data that will be used to solve the problem and the source of the data.

The source of the data is obtained from Foursquare database. The data was originally in the format where each of the neighbourhood(s) that are grouped by postcode have frequencies of occurrence of each kinds of venues. Here are two samples from the list that was returned with 232 unique venues categories for the neighbourhoods. Only the top 10 venues are displayed. The full list can be seen in the coding section.

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----	Runnymede, Swansea-----	venue	freq
0		Pizza Place	0.08
1		Café	0.08
2		Coffee Shop	0.08
3		Italian Restaurant	0.05
4		Sushi Restaurant	0.05
5		French Restaurant	0.03
6		Bookstore	0.03
7		Boutique	0.03
8		Gastropub	0.03
9		Burrito Place	0.03
----	Ryerson, Garden District----	venue	freq
0		Coffee Shop	0.09
1		Clothing Store	0.06
2		Cosmetics Shop	0.04
3		Café	0.03

----Ryerson, Garden District---- venue freq (cont.)

4 Middle Eastern Restaurant 0.03  
 5 Fast Food Restaurant 0.03  
 6 Diner 0.02  
 7 Bubble Tea Shop 0.02  
 8 Ice Cream Shop 0.02  
 9 Restaurant 0.02

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The above data was then transformed into the table below. This is the cluster that is of interest. The other clusters can be seen in the coding section. There are 5 clusters altogether.

	Neighbourhood	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	Harbourfront, Regent Park	2	Coffee Shop	Café	Park	Pub	Bakery	Restaurant	Breakfast Spot	Mexican Restaurant	Ice Cream Shop	Chocolate Shop
9	Ryerson, Garden District	2	Coffee Shop	Clothing Store	Cosmetics Shop	Fast Food Restaurant	Middle Eastern Restaurant	Café	Japanese Restaurant	Tea Room	Restaurant	Ramen Restaurant
15	St. James Town	2	Coffee Shop	Italian Restaurant	Hotel	Restaurant	Café	Breakfast Spot	Gastropub	Beer Bar	Cosmetics Shop	Cocktail Bar
20	Berczy Park	2	Coffee Shop	Bakery	Cocktail Bar	Farmers Market	Steakhouse	Seafood Restaurant	Café	Cheese Shop	Beer Bar	Park
24	Central Bay Street	2	Coffee Shop	Ice Cream Shop	Italian Restaurant	Café	Burger Joint	Sandwich Place	Salad Place	Indian Restaurant	Bubble Tea Shop	Spa
25	Christie	2	Café	Grocery Store	Park	Restaurant	Convenience Store	Nightclub	Baby Store	Italian Restaurant	Coffee Shop	Athletics & Sports
30	Adelaide, King, Richmond	2	Coffee Shop	Café	Bar	Steakhouse	Thai Restaurant	Gym	Asian Restaurant	Breakfast Spot	Burger Joint	Hotel
31	Dovercourt Village, Dufferin	2	Bakery	Supermarket	Pharmacy	Gym / Fitness Center	Middle Eastern Restaurant	Brewery	Discount Store	Music Venue	Café	Bar

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36	Harbourfront East, Toronto Islands, Union Station	2	Coffee Shop	Hotel	Aquarium	Italian Restaurant	Café	Pizza Place	Scenic Lookout	Bakery	Sporting Goods Shop	Brewery
37	Little Portugal, Trinity	2	Bar	Coffee Shop	Asian Restaurant	Men's Store	Café	Restaurant	Bakery	Pizza Place	Cocktail Bar	French Restaurant
41	The Danforth West, Riverdale	2	Greek Restaurant	Coffee Shop	Ice Cream Shop	Italian Restaurant	Furniture / Home Store	Yoga Studio	Bookstore	Brewery	Bubble Tea Shop	Caribbean Restaurant
42	Design Exchange, Toronto Dominion Centre	2	Coffee Shop	Café	Hotel	Restaurant	Italian Restaurant	Gym	Bar	Gastropub	Bakery	American Restaurant
43	Brockton, Exhibition Place, Parkdale Village	2	Breakfast Spot	Café	Coffee Shop	Performing Arts Venue	Intersection	Burrito Place	Stadium	Caribbean Restaurant	Restaurant	Bar
47	The Beaches West, India Bazaar	2	Pizza Place	Italian Restaurant	Pet Store	Gym	Coffee Shop	Pub	Movie Theater	Sandwich Place	Burrito Place	Burger Joint
48	Commerce Court, Victoria Hotel	2	Coffee Shop	Café	Hotel	Restaurant	American Restaurant	Gastropub	Gym	Deli / Bodega	Seafood Restaurant	Steakhouse
54	Studio District	2	Café	Coffee Shop	Gastropub	Italian Restaurant	American Restaurant	Bakery	Yoga Studio	Convenience Store	Seafood Restaurant	Sandwich Place
67	Davisville North	2	Breakfast Spot	Park	Clothing Store	Hotel	Food & Drink Shop	Gym	Sandwich Place	Falafel Restaurant	Farmer's Market	Event Space
69	High Park, The Junction South	2	Café	Mexican Restaurant	Bar	Bookstore	Gastropub	Diner	Music Venue	Cajun / Creole Restaurant	Fast Food Restaurant	Flea Market
73	North Toronto West	2	Sporting Goods Shop	Coffee Shop	Clothing Store	Yoga Studio	Mexican Restaurant	Diner	Dessert Shop	Park	Chinese Restaurant	Restaurant
74	The Annex, North Midtown, Yorkville	2	Coffee Shop	Sandwich Place	Café	Pizza Place	BBQ Joint	Indian Restaurant	Jewish Restaurant	Flower Shop	Liquor Store	Cosmetics Shop

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75	Parkdale, Roncesvalles	2	Breakfast Spot	Gift Shop	Eastern European Restaurant	Movie Theater	Dog Run	Restaurant	Italian Restaurant	Bar	Dessert Shop	Coffee Shop
79	Davisville	2	Dessert Shop	Sandwich Place	Pizza Place	Pharmacy	Coffee Shop	Restaurant	Café	Sushi Restaurant	Italian Restaurant	Indian Restaurant
80	Harbord, University of Toronto	2	Café	Bakery	Japanese Restaurant	Bookstore	Restaurant	Bar	Poutine Place	Beer Bar	Beer Store	Sandwich Place
81	Runnymede, Swansea	2	Coffee Shop	Café	Pizza Place	Sushi Restaurant	Italian Restaurant	Grocery Store	Smoothie Shop	Boutique	Burrito Place	Sandwich Place
84	Chinatown, Grange Park, Kensington Market	2	Vegetarian / Vegan Restaurant	Café	Chinese Restaurant	Coffee Shop	Mexican Restaurant	Vietnamese Restaurant	Dumpling Restaurant	Bar	Bakery	Comfort Food Restaurant
86	Deer Park, Forest Hill SE, Rathnelly, South Hi...	2	Coffee Shop	Pub	Pizza Place	Bagel Shop	Restaurant	Liquor Store	Sports Bar	Supermarket	Sushi Restaurant	Fried Chicken Joint
87	CN Tower, Bathurst Quay, Island airport, Harbo...	2	Airport Service	Airport Lounge	Airport Terminal	Coffee Shop	Airport	Airport Food Court	Airport Gate	Bar	Harbor / Marina	Sculpture Garden
92	Stn A PO Boxes 25 The Esplanade	2	Coffee Shop	Café	Restaurant	Seafood Restaurant	Bakery	Beer Bar	Hotel	Fast Food Restaurant	Cocktail Bar	Park
96	Cabbageto wn, St. James Town	2	Coffee Shop	Café	Restaurant	Italian Restaurant	Pub	Bakery	Market	Pizza Place	Park	Pet Store
97	First Canadian Place, Underground city	2	Coffee Shop	Café	Restaurant	Hotel	Steakhouse	Gastropub	Seafood Restaurant	Bar	Deli / Bodega	Gym
99	Church and Wellesley	2	Coffee Shop	Japanese Restaurant	Sushi Restaurant	Gay Bar	Restaurant	Men's Store	Hotel	Gastropub	Fast Food Restaurant	Mediterranean Restaurant
100	Business Reply Mail Processing Centre	2	Yoga Studio	Auto Workshop	Pizza Place	Gym / Fitness Center	Recording Studio	Restaurant	Burrito Place	Skate Park	Smoke Shop	Brewer

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**Methodology section which represents the main component of the report where you discuss and describe any exploratory data analysis that you did, any inferential statistical testing that you performed, if any, and what machine learnings were used and why.**

Steps involved:

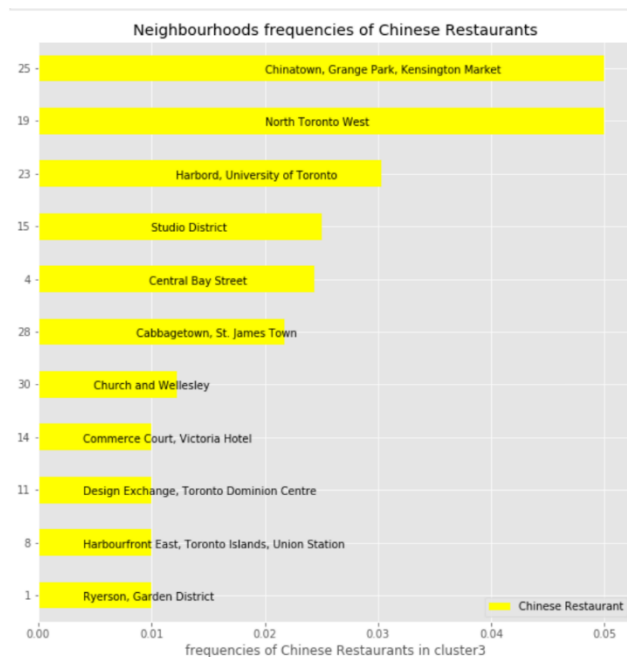
Scraping and wrangling information from

"[https://en.wikipedia.org/wiki/List\\_of\\_postal\\_codes\\_of\\_Canada:\\_M](https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M)"

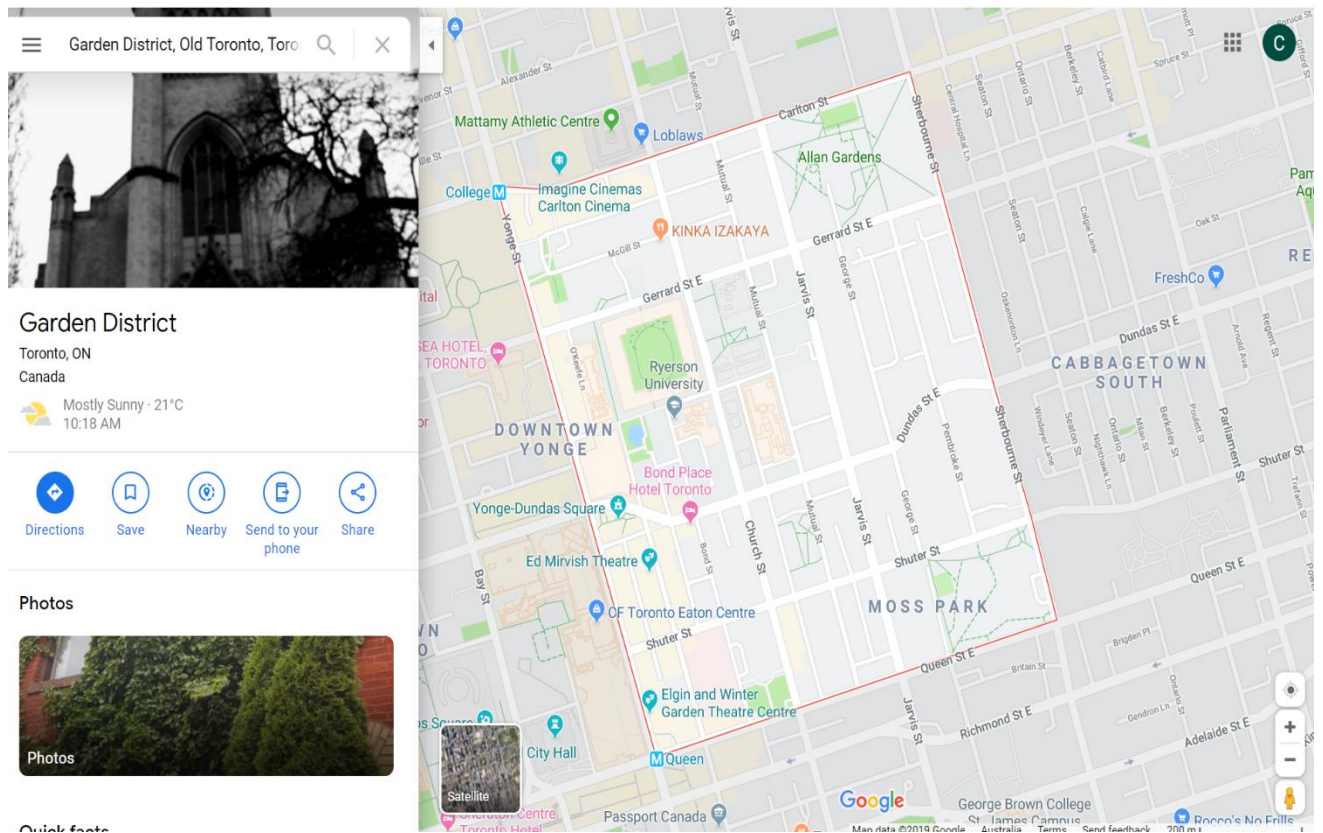
Combine data from "[http://cocl.us/Geospatial\\_data](http://cocl.us/Geospatial_data)" to form a data-frame that consists of all postcodes in Toronto. Next step is to select only boroughs in Toronto we are interested.

Use Foursquare to return information on venues for each of the neighbourhood and then select only venues that are unique to each of the borough. Then use unsupervised machine learning process "K-mean" to cluster the neighbourhoods into distinct types.

Study the cluster that is of interest and then plot the frequencies of occurrence of Chinese restaurants for the neighbourhood(s). All those without any Chinese restaurants were not selected. In our case it is Cluster 3 (labelled 2) that was used to build the graph below.



Work through each neighbourhood(s) from the lowest frequency of occurrence and determine the area which is suitable for the next Chinese restaurant in the city using Google map for exploration.



## Results section where you discuss the results.

Working from the graph with the lowest frequency of Chinese restaurant first that is the Ryerson/Garden District, I stumbled on an area that can be busy due to the number of venues nearby such as Cinema Complex, Shopping Centres, eateries, and hotels. Further investigation also shows that it had held concerts and shows. I decide to explore further around this area.

## Discussion section where you discuss any observations you noted and any recommendations you can make based on the results.

From there I use geolocator to return the latitude and longitude coordinates of the Yonge-Dundas Square as the centre and do further exploration for Chinese restaurants within a 500 meters radius.

I found two Chinese restaurants and then got their ratings from Foursquare. One was 6, and the other 7.6. Both of them not very high rating which suggest that any **Chinese** restaurant with better quality food would do well around here given the busy-ness of this area.

### **Conclusion section where you conclude the report.**

Within the radius of 500m of the Yonge-Dundas square is a good area to look for a new site. My proposition should be a site that is not that far from the Cineplex and Yonge-Dundas Square. Preferably direction south of the Yonge-Dundas intersection seemed right as there is no other Chinese restaurant within the 500 meters radius from the square. It is also closer to the financial district (Queen St. to Front St. W).