Coursera IBM Capstone Project — The Battle of the Neighborhoods

This report, and other associated files are for the Final Assignment for the Capstone Project, Week 4 and 5 specifically.

Section 1.0: Introduction & Business Problem

In this section I will present my problem that I came up with that can be solved utilizing the relevant FourSquare location data.

1.1 Background

A major Japanese Ramen restaurant company has made a decision to open up a restaurant in Toronto, Ontario which will be the first one in Canada. The firm hired a local consulting company to for the recommendation of the location. Ramen is a Japanese cuisine. It is a noodle soup which originated in China and made its way over to Japan in 19th century. It evolved in Japan with rich broth or "dashi" made of Kombu (sea weeds), pork and niboshi (dried baby sardines). There are many dedicated Ramen shops in Japan. Recently Ramen became more and more popular in North America. Since the location is crucial to the success of a restaurant and the first shop serve as a sort of a flagship role from the

marketing standpoint, the client is interested in the densely populated downtown Toronto though the rent is high. The questions are: 1) Which neighborhoods would be good candidates for a new restaurant in the downtown Toronto, 2) What would be the restaurant market like in such a location.

1.2 Project Idea

This data scientist in the consulting company is tasked to provide preliminary data before onsite research. He has determined that by utilizing venue and location data from FourSquare, it will be possible to provide the restaurant company with information that they can use to narrow the areas for the upcoming onsite research.

The data scientist will begin running his project with these three areas of focus, which were themes that the business consulting team collected from the executives of the Ramen restaurant company:

1. Determining the area close to the collages as students are one of the target customer segment. One of its competitor use this strategy as described in the article: https://www.fastcompany.com/3042623/how-japanese-marketing-secrets-sparked-the-american-ramen-revolutionFinding access to restaurants, shopping, and entertainment per city. Since the University of Toronto has the

largest student enrollment, the business consultant ask that the data scientist work on the area around it.

2. Finding the area with high concentration of Japanese organization and businesses. Many locals are familiar with variety of Chinese dishes, one of which are noodle soups. In order to differentiate from Chinese dishes and position Ramen as alternative to Sushi, the famous Japanese cuisine, the client wants to open a business within the Japanese business community which is another target customer segment.

3. Providing the up-to-date restaurant market in downtown Toronto which includes the information about existing Ramen noodle shops.

1.3 Who is this solution targeted at?

The solution is targeted at the project team of the Ramen restaurant company, and intended to help them make an informed decision as to which area they should focus on opening a new restaurant and gain better understanding of the local market.

Section 2.0: Data Description, Acquisition & Cleaning

In this section I will describe how the relevant data was sourced, acquired and why it is needed to solve the problem.

2.1 Data Sourcing

2.1.1 Wikipedia web page – Provides a list of Zip codes in Toronto:

We will accomplish this by scraping the web page of the Wikipedia using Beautifulsoup library on our Python Jupyter Notebook.

Data source:

https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_M

2.1.2 Foursquare Locational Data

The next data element required is to source from FourSquare a list of venues and the details of the venues. This information provides the client which areas are good candidate for their new restaurant.

We acquire the data by entering our FourSquare credentials and making an API call to obtain the venues that are located within a 1500 meter radius of the location at downtown Toronto. We then retrieve a JSON file that gives us the venue details with associated categories. We examine what venues are available for the areas of the interests in order to provide the client what the area look like.

The JSON file will need to be converted into a Pandas dataframe, and we'll then need to filter and run a function for the "venue categories" on each row of data to get the actual categories that the venues belong to.

Data Source = [FourSquare](#)

2.1.3 Geocoding with ArcGIS

In order to convert the addresses and place names into geographic coordinates, ArgGIS API was used.

2.2 Data Cleaning

- Import libraries and acquire data from the data sources mentioned above.

- Construct dataframe(s) for nearby venue information per neighborhood, remove unnecessary data, and standardize.

- Visualize the findings via Folium

3.0 Methodology & Results: Exploratory Data Analysis

3.1 Exploring Downtown Toronto areas

The initial analysis of the Toronto shows that several neighborhoods are in close proximity one another not so far away from the beach in North East of the airport, which are in the downtown of Toronto.

Here is the enlarged view which shows the University of Toronto in the center.
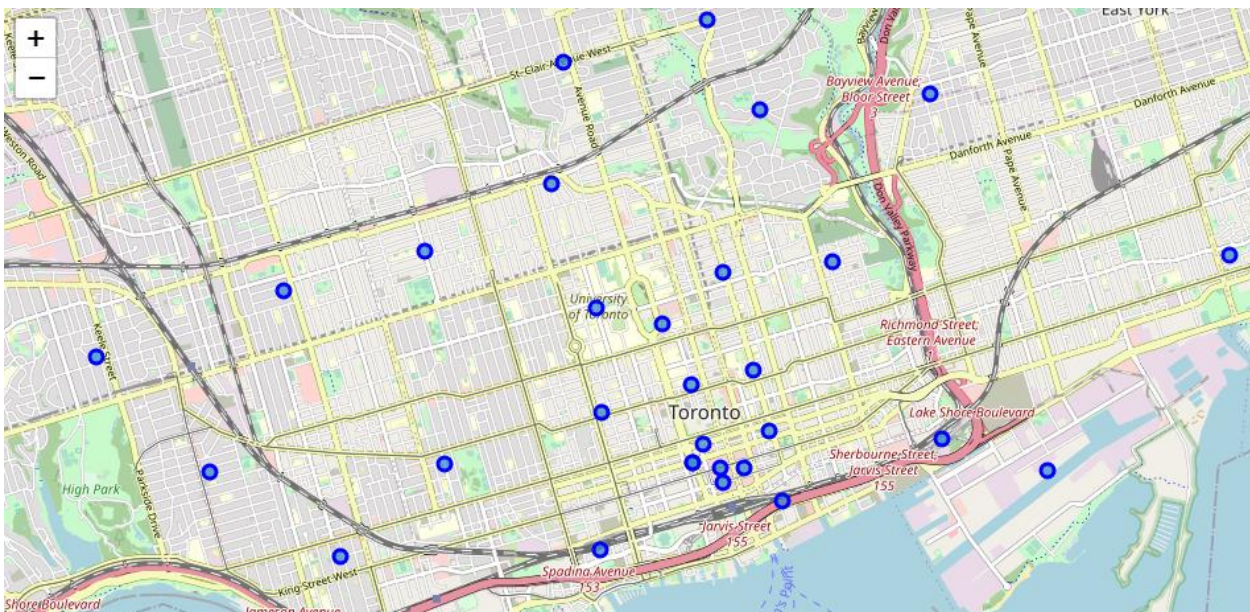
3.2 Universities

In 1.5km radius from the center of Toronto, there are academic facilities belonging to:

- University of Toronto
- University of Dundas
- University of Ryerson
- University of Lakehead
- Ontario College
- University of Liverpool

	name	categories	address	lat	lng	labeledLatLngs	distance	postalCode	cc	city	state	country	formattedAddress
0	Dundas University Health Clinic	Medical Center	104-438 University Avenue	43.654196	-79.388166	[{'label': 'display', 'lat': 43.65419587934101...	349	M4P 2K8	CA	Toronto	ON	Canada	[104-438 University Avenue, Toronto ON M4P 2K8...
1	438 University Ave	Office	438 University Ave	43.654296	-79.388415	[{'label': 'display', 'lat': 43.65429570830456...	372	M5G 2K8	CA	Toronto	ON	Canada	[438 University Ave (at Dundas St W), Toronto ...
2	University Centre	Office	393 University Ave.	43.653907	-79.386764	[{'label': 'display', 'lat': 43.65390719043468...	232	M7A 2K1	CA	Toronto	ON	Canada	[393 University Ave. (at Armoury St.), Toronto...
3	University Centre Gym	Gym / Fitness Center	NaN	43.653571	-79.386979	[{'label': 'display', 'lat': 43.653571, 'lng':...	245	NaN	CA	NaN	NaN	Canada	[Canada]
4	University Avenue Plaza	Plaza	University Avenue	43.652695	-79.387218	[{'label': 'display', 'lat': 43.65269470686765...	278	NaN	CA	Toronto	ON	Canada	[University Avenue (btwn Richmond & College), ...

This indicates that there are plenty of students, a primary target customer segment for the client.

3.3 Discovering Japanese organization and businesses

Next, we run a keyword search on the Foursquare API in 1.5km radius, which returned 50 Japanese venues. Then we filtered out the restaurants, which resulted in 7 Japanese business and organizations. Remember that our business consultant recommend that the new store location should be in the area where Japanese business are located, which is the secondary target customer segment.

	name	categories	address	crossStreet	lat	lng	labeledLatLngs	distance	postalCode	cc	neighborhood	city
0	Japan Foundation	Art Gallery	131 Bloor St. West, 2nd Floor	btwn Avenue & Bay	43.670609	-79.386011	[{'label': 'display', 'lat': 43.670609, 'lng': -79.386011}]	1236	M4W 1A8	CA	Rosedale	Toronto
1	Japan camera centre	Electronics Store	777 Bay Street	NaN	43.661566	-79.382300	[{'label': 'display', 'lat': 43.661566, 'lng': -79.3823}]	1262	NaN	CA	NaN	Toronto
2	Japan National Tourist Organization - JNTO	Tourist Information Center	481 University Ave.	NaN	43.650894	-79.386563	[{'label': 'display', 'lat': 43.650894, 'lng': -79.386563}]	1664	M5G 2E9	CA	NaN	Toronto
3	Japan Communications Ltd	Business Service	401-460 Richmond St W	NaN	43.647678	-79.397668	[{'label': 'display', 'lat': 43.647678, 'lng': -79.397668}]	1757	M5V 1Y1	CA	NaN	Toronto
4	Aitas Japanese language school	School	180 Bloor st west	NaN	43.668922	-79.395110	[{'label': 'display', 'lat': 43.668922033361426, 'lng': -79.3951098136092}]	644	NaN	CA	NaN	Toronto
5	Things Japanese	Gift Shop	128 Harbord St.	NaN	43.662507	-79.404819	[{'label': 'display', 'lat': 43.662507, 'lng': -79.404819}]	578	NaN	CA	NaN	Toronto

3.3 Locating Ramen restaurants

There are 27 Ramen Restaurants labeled as "Ramen Restaurant" on Foursquare, which would be direct competitors of our client.

|	name	categories	address	crossStreet	lat	lng	labeledLatLngs	distance	postalCode	cc	city
0	Ramen Raijin 雷神	Ramen Restaurant	24 Wellesley St W	at Yonge St	43.665191	-79.385974	[{'label': 'display', 'lat': 43.6651907105415, 'lng': -79.38597392728876}]	968	M4Y 1W5	CA	Toronto
1	Kinton Ramen	Ramen Restaurant	51 Baldwin St.	Beverley St.	43.655794	-79.394047	[{'label': 'display', 'lat': 43.65579361535061, 'lng': -79.39404723909021}]	904	M5T 1L1	CA	Toronto
2	Ajisen Ramen 味千拉麵	Ramen Restaurant	332 Spadina Ave.	at D'arcy St.	43.653913	-79.398593	[{'label': 'display', 'lat': 43.65391272417607, 'lng': -79.39859327119643}]	1065	M5T 2G2	CA	Toronto
3	Sansotei Ramen 三草亭	Ramen Restaurant	179 Dundas St. W	btwn Centre Ave. & Chestnut St.	43.655157	-79.386501	[{'label': 'display', 'lat': 43.655157467561246, 'lng': -79.38650067479335}]	1294	M5G 1Z8	CA	Toronto

3.4 Locating Chinese restaurants and businesses

The differentiation is one of the most important strategies that marketers take. We locate Chinese restaurants and businesses running a keyword search on Foursquare API.

	name	categories	address	crossStreet	lat	lng	labeledLatLngs	distance	postalCode	cc	neighborhood	city
0	Chinese Traditional Buns	Chinese Restaurant	536 Dundas St. W	at Spadina Ave	43.652714	-79.399006	[{'label': 'display', 'lat': 43.652714116168525, 'lng': -79.39900618361557}]	1200	M5T 1H3	CA	Kensington Market	Toronto
1	Chinese Food Truck	Food Truck	140 St. George	Harbord st.	43.663659	-79.398331	[{'label': 'display', 'lat': 43.663658573630634, 'lng': -79.3983313743529}]	50	NaN	CA	NaN	Toronto
2	Chinese Dumpling House 中华饺子楼	Chinese Restaurant	623 Bloor St W	NaN	43.664518	-79.414128	[{'label': 'display', 'lat': 43.66451790083401, 'lng': -79.41412828715735}]	1323	M6G 1K8	CA	NaN	Toronto
3	Sky Dragon Chinese Restaurant 龍翔酒樓	Dim Sum Restaurant	280 Spadina Ave.	at Dundas St. W.	43.652783	-79.398174	[{'label': 'display', 'lat': 43.65278331265585, 'lng': -79.39817372355205}]	1189	NaN	CA	NaN	Toronto

3.5 Determining candidates for a new restaurant location

We now create a map using the data collected so far. As you can see, Chinese restaurants are concentrated in Chinatown area while Japanese business and Ramen Restaurants in the east of Chinatown.
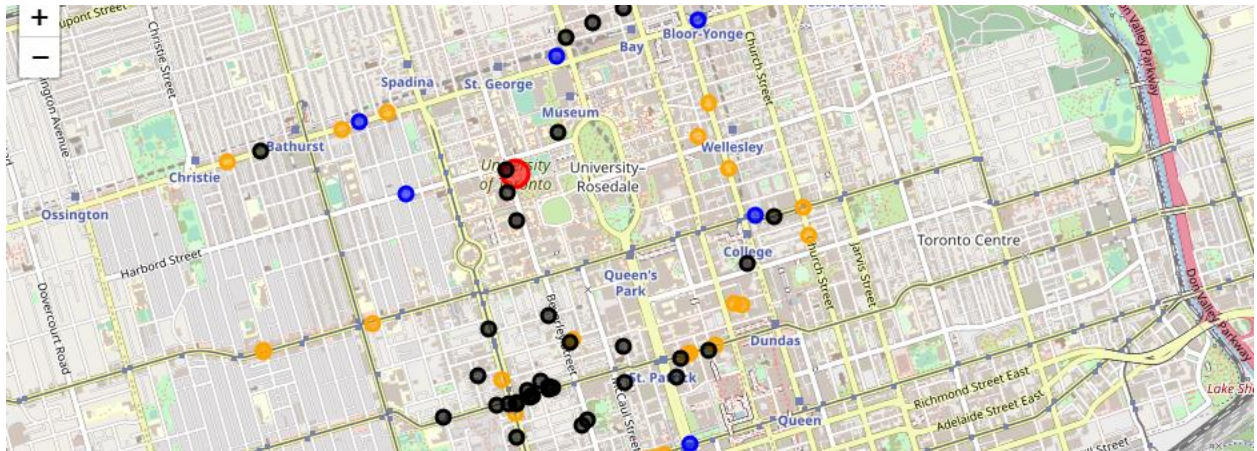
Orange: Existing Ramen restaurants

Blue: Japanese business/organization

Black: Chinese restaurants

Red: University of Toronto

3.5 Narrowing to three neighborhoods

From the previous map, there are three neighborhoods that meet the business requirements for the location (1. Within Japanese business community, 2. Away from Chinese restaurants, 3. Close to the University of Toronto).
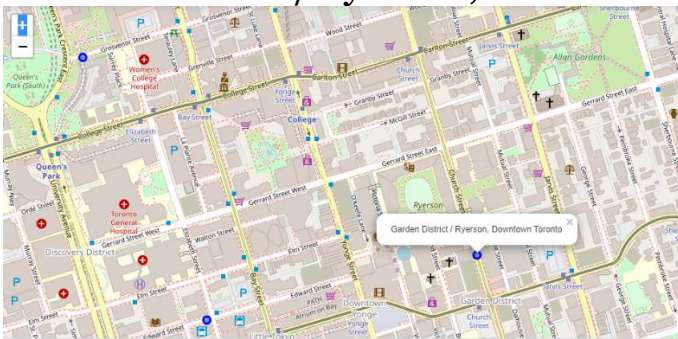
1. Central Bay Street, Downtown Toronto
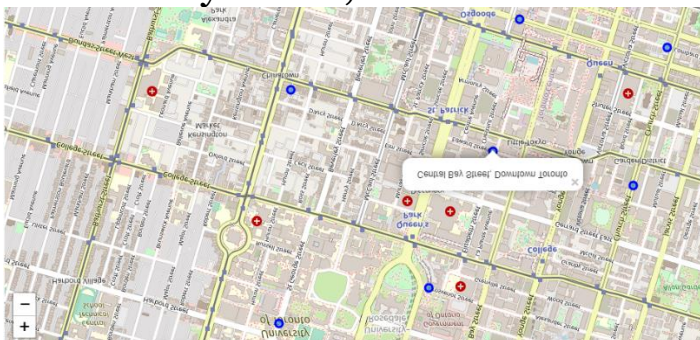
2. Church and Wellesley, Downtown Toronto
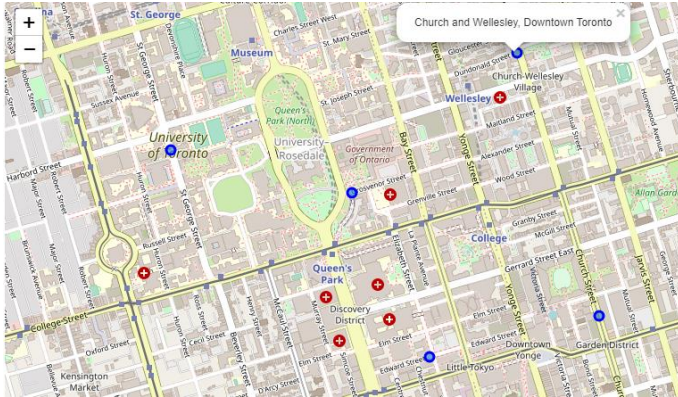
3. Garden District/Ryerson, Downtown Toronto

Analyzing the data of the most common venues on those neighborhoods, all three seems to be good candidates with plenty of café, restaurants, pubs and so on. Notably, Church and Wellesley has more Japanese restaurants as common venues than the others.

	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
4	Central Bay Street	Coffee Shop	Café	Middle Eastern Restaurant	Restaurant	Bubble Tea Shop	Plaza	Sandwich Place	Clothing Store	Sushi Restaurant	Modern European Restaurant
6	Church and Wellesley	Coffee Shop	Japanese Restaurant	Restaurant	Sushi Restaurant	Pub	Grocery Store	Dance Studio	Gastropub	Gay Bar	Café
13	Garden District / Ryerson	Coffee Shop	Clothing Store	Sandwich Place	Middle Eastern Restaurant	Hotel	Cosmetics Shop	Restaurant	Italian Restaurant	Bar	Café

3.6 Existing Ramen restaurant

The client is eager to learn more about the local market. We pick one exiting Ramen business named Kenzo Ramen as an example.

From FourSquare API, we retrieved one user review about the Kenzo Ramen. The reviewer seems to like Kenzo Ramen a lot.

	text	agreeCount	disagreeCount	id	user.firstName	user.lastName	user.gender	user.id
0	Tasty ramen in many different varieties. I've tried the tonkotsu and the tantanmen and they were both quite delicious and authentic. Also, they have TAKOYAKI BALLS!!! Osaka style :)	0	0	560824ab498e8712c89289e3	Celio	B	NaN	4749894

In order to determine if this review is credible, we checked how many this reviewer posted about the businesses online in the past and if others agreed or disagreed on his previous reviews. He had 13 agreed counts with zero disagreed. Therefore, his review is assumed to be credible and not a fake. With only one review, we can not draw any conclusion here. But Kenzo Ramen is worth noted as a potential competitor.

	text	agreeCount	disagreeCount	id
0	Tasty ramen in many different varieties. I've tried the tonkotsu and the tantanmen and they were both quite delicious and authentic. Also, they have TAKOYAKI BALLS!!! Osaka style :)	0	0	560824ab498e8712c89289e3
1	The quesillos are best in the morning.	1	0	557115de498e0eedc25a5dec
2	Good service, quiet and quaint.	1	0	557115bb498e8182a6b8195e
3	Gorgeous, quiet, spacious, lovely trails.	1	0	55711552498eac6e55d5b897
4	The line moves surprisingly fast.	1	0	4e2c07281f6ebe54425967a8
5	Contemporary art center for the prefecture of Osaka. weekly or bi-monthly exhibitions by top tier local, regional, national and international artists. Pretty cool space. right above passport center.	1	0	4dbdc39bced7ea5898d972d1
6	My favorite is the #6, ginger pork set. Delicious!!!	1	0	4dbdc2d6ced7ea5898d96f62
7	May 3rd to 8th: Chisato Hori solo exhibition of watercolor and Nihonga paintings. Tue-Sat 12PM to 7PM, Sun 12PM to 5PM sharp.	2	0	4dbdc1ffced7ea5898d96c50
8	Different art exhibits every week by Japanese and foreign artists.	2	0	4d0f43cb7177b1f79a664a22
9	The spicy sauce is a real treat. The owners are friendly and warm. This place is nice and comfortable. Oh yeah, the burritos are great!	3	0	4cf63517e308236adebae4ac

4.0 Discussion

The objective of this study was to provide preliminary data analysis to the executive of the company that would help them to decide on a suitable location to open a new restaurant in downtown Toronto. As a free account allows limited access to the data on FourSquare, this report could not go as details as it should.

5.0 Conclusion

In conclusion, the scope of analysis here needs to be limited to the identifications of neighborhoods which could be suitable for the new restaurant. Based on the analysis, below are the suggested neighborhoods:

1. Central Bay Street, Downtown Toronto
2. Church and Wellesley, Downtown Toronto
3. Garden District/Ryerson, Downtown Toronto

The final selection of the location largely depends on the availability and the rental cost of commercial properties which changes daily.