Location Decision Making for A Chinese Restaurant in Toronto

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27.12.2020

1. Introduction

1.1 Background

There are more and more Chinese people living abroad. Toronto is one of the most popular cities when it comes to choosing a destination for Chinese. Chinese are highly passionate for food. Especially after a long day of work, Chinese people find quite rewarding and comforting when they can have a good meal. Food is a very essential part of Chinses culture. Instead of a bar or a pub, restaurant is a go-to place for Chinese people to seek relaxation. Therefore, business people have been seizing the opportunity created by such culture to meet such needs by opening Asian or even Chinese restaurants all over the world, and Toronto is definitely an outstanding example.

1.2 Problem

For planning on opening a Chinese restaurant in Toronto, the location of the restaurant is definitely one of the most crucial decisions to make. Therefore, in this report, based on the analysis, some important factors such as foot traffic, business function of the area, reputation of venues in a neighborhood will be taken into consideration to help making a reliable decision on choosing the location.

Are you looking for a place in Toronto to open a Chinese restaurant, where people can enjoy authentic Chinese food for a medium price? It will be a place for people who want to actually enjoy food and the atmosphere. Opening a restaurant can be a risky business in these years, therefore you want to be wise putting your investment by first making a smart decision of the location. This location analysis report may be something for you.

2. Data

First, we need a list of neighborhoods in Toronto, which can be found here. From this list, we can get the borough name, neighborhood name, and postal code of every neighborhood in Toronto. Next dataset we need is one with geographic location information of these neighborhoods, which can be found here. Referring to this dataset, we can find the according

longitude and latitude of each neighborhood. As shown in Table 1 below, geographic information about a neighborhood is more detailed after combining these two datasets.

Table 1: Merged data frame from two data source

	Postal Code	Borough	Neighbourhood	Latitude	Longitude
0	M3A	North York	Parkwoods	43.753259	-79.329656
1	M4A	North York	Victoria Village	43.725882	-79.315572
2	M5A	Downtown Toronto	Regent Park, Harbourfront	43.654260	-79.360636
3	M6A	North York	Lawrence Manor, Lawrence Heights	43.718518	-79.464763
4	M7A	Downtown Toronto	Queen's Park, Ontario Provincial Government	43.662301	-79.389494

Another data source is Foursquare. By using information in the above data frame, we can get the venue information, such as nearby venues within a certain radius of a location, rating of a venue, venue ID, venue Categories, etc. (see Table 2). After removing duplicated neighborhoods in the dataset, there are 99 unique neighborhoods with 2,103 venues available for further analysis.

Table 2: Data retrieved from Foursquare

	Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue ID	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Parkwoods	43.753259	-79.329656	4e8d9dcdd5fbbbb6b3003c7b	Brookbanks Park	43.751976	-79.332140	Park
1	Parkwoods	43.753259	-79.329656	4cb11e2075ebb60cd1c4caad	Variety Store	43.751974	-79.333114	Food & Drink Shop
2	Victoria Village	43.725882	-79.315572	4c633acb86b6be9a61268e34	Victoria Village Arena	43.723481	-79.315635	Hockey Arena
3	Victoria Village	43.725882	-79.315572	4f3ecce6e4b0587016b6f30d	Portugril	43.725819	-79.312785	Portuguese Restaurant
4	Victoria Village	43.725882	-79.315572	4bbe904a85fbb713420d7167	Tim Hortons	43.725517	-79.313103	Coffee Shop

3. Exploratory Data Analysis & Result

3.1 Venue Counts

At the very first stage, a basic standard should be set for selecting a restaurant location: higher foot traffic. For a generally idea about the foot traffic, the venue number within a certain radius can imply how popular the area is. Therefore, by setting the radius to 500 and limiting the output of venues to 100, venues in each neighborhood is retrieved from Foursquare. The following picture (Table 3) shows part of the table indicating the number of venues for each neighborhood. To ensure enough foot traffic, neighborhoods with less than 20 venues are eliminated and no longer within our consideration for the location decision making. Thus, 64 out of 99 neighborhoods are disqualified and 31 unique neighborhoods remains in our dataset. After removing the venues of these neighborhoods from the venue dataset as shown in Table.2, there are 1,679 venues left in these 31 neighborhoods.

Table 3: Venue counts

Neighborhood	Venue
Harbourfront East, Union Station, Toronto Islands	100
First Canadian Place, Underground city	100
Toronto Dominion Centre, Design Exchange	100
Commerce Court, Victoria Hotel	100
Garden District, Ryerson	100
Stn A PO Boxes	98
Richmond, Adelaide, King	97
St. James Town	81
Church and Wellesley	79
Fairview, Henry Farm, Oriole	68
Central Bay Street	62

3.2 Neighborhood Clustering

By clustering neighborhoods based on their venues' categories, we want to know what do people do in different neighborhoods, or in other words, what is the focus of the business function for each neighborhood. For example, we do not want to open our restaurant next to an airport where people will only appreciate fast/convenient food. After converting the venue data frame into a dummy code, frequency of each venue category was calculated for each neighborhood, based on which a k-means clustering is conducted with k=3. Please see Table 4 for the output.

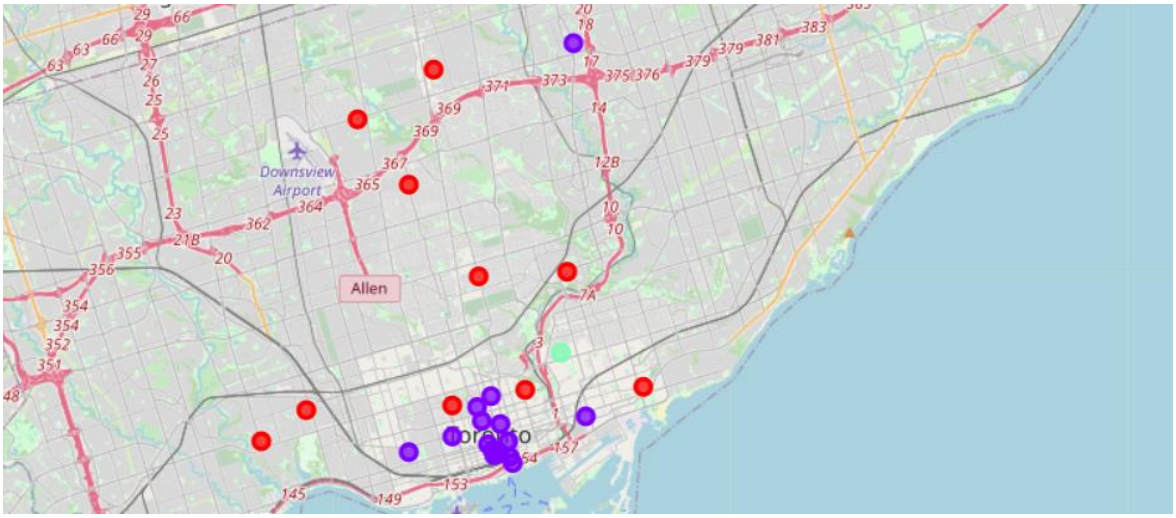
Table 4: Output of k-means clustering

Cluster Labels	Postal Code	Borough	Neighbourhood	Latitude	Longitude
0	10	10	10	10	10
1	15	15	15	15	15
2	1	1	1	1	1

Three clusters now should be further analyzed individually with the venues in each of the cluster. Top five common venues of each neighborhoods are taken into consideration to give a general picture of the business function of the neighborhoods in a cluster. It was very obvious that in cluster 1, most neighborhoods in this cluster have Café/coffee shop as their top one common venue, together with a very different venues in each neighborhood such as hotel, beer bar, gym, etc. This does not seem like the areas that mostly people go for a good meal. While in cluster 0 and cluster 3, we see a great variety of restaurants in the top five common venues in every single neighborhood, such as Sushi restaurant, Thai restaurant, Italian restaurant, Greek restaurant, etc. In comparison, neighborhoods in cluster 0 or cluster 3 are mostly plausible. To give further support for such decision, the locations of the neighborhoods come into play. As shown below,

the k-means clustering is visualized on the map, with red dots indicating the neighborhoods in cluster 0, purple dots in cluster 1, and green dot in cluster 3. As shown on the map (see Pic. 1), the purple dots indicating neighborhoods in cluster 1 mostly locate in the very center of Toronto, where has the highest rent throughout the city. In the contrary, dots of the other two colors indicating neighborhoods in cluster 0 and cluster 2 locate further away from the center Toronto. Therefore, it is even safer to decide that only neighborhoods in cluster 0 and 2 should be further analyzed to draw final conclusion. Thus, at this point, only 11 neighborhoods remain.

Pic. 1: Visualization of K-means clustering



3.3 A Consumer Base for Asian Food

To smoothen the initial operation and marketing of a fine Chinese restaurant, choosing a location with an existing consumer base for high-quality Asian food is definitely is one of the effective strategies, although this can also mean more competition. The very first thing that can be done is going through the top five common venues of the remained 11 neighborhoods and see if even any Asian restaurant is in these areas. These areas do not have the highest foot traffic throughout Toronto, therefore, a venue category appearing in the top-5 list may just have a low number of venues in this category. Understanding this, we do not need to worry too much about too many similar venues existing in the same area that generates fierce competition. Within these 11 neighborhoods, there are 4 do not have any Asian restaurant in their top 5 common venue categories, and are thus removed from our potential list. Now we narrow down our options to these 7 neighborhoods.

3.4 Neighborhood Reputation

What if the Asian restaurants or the restaurants in a certain area have, in general, a bad reputation? We often heard people recommending dining places like “I heard XXX area has the

best Sushi restaurants". Restaurants' joint reputation in an area often forms a general first impression for consumers which may influence the possibility of visiting the place. Since we are doing analysis for opening a restaurant, knowing the ratings of the restaurants instead of all categories of venues in these neighborhoods is more relevant and helpful. Therefore, the next step is to, through making premium requests to Foursquare, by using the venue ID that is already retrieved for each venue, get the ratings of the 51 restaurants in these 7 areas. After removing one missing value, the average rating is calculated for all the restaurants within the 500-meter radius in each of these 7 neighborhoods, combined with other relevant outputs about them from earlier (see Table 5).

Table 5: The 7 Potential Neighborhoods

	Neighbourhood	Restaurant Counts	Restaurant Avg. Rating	Postal Code	Borough	Latitude	Longitude	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Bedford Park, Lawrence Manor East	9	6.855556	M5M	North York	43.733283	-79.419750	Sandwich Place	Italian Restaurant	Coffee Shop	Greek Restaurant	Thai Restaurant
1	High Park, The Junction South	7	7.071429	M6P	West Toronto	43.661608	-79.464763	Thai Restaurant	Café	Mexican Restaurant	Bakery	Fried Chicken Joint
2	India Bazaar, The Beaches West	5	6.780000	M4L	East Toronto	43.668999	-79.315572	Sandwich Place	Fast Food Restaurant	Park	Sushi Restaurant	Pet Store
3	Runnymede, Swansea	8	7.337500	M6S	West Toronto	43.651571	-79.484450	Café	Coffee Shop	Pizza Place	Diner	Sushi Restaurant
4	Thorncliffe Park	4	6.525000	M4H	East York	43.705369	-79.349372	Indian Restaurant	Sandwich Place	Yoga Studio	Supermarket	Gym
5	University of Toronto, Harbord	8	7.912500	M5S	Downtown Toronto	43.662696	-79.400049	Café	Italian Restaurant	Japanese Restaurant	Bar	Bookstore
6	Willowdale, Willowdale East	9	6.755556	M2N	North York	43.770120	-79.408493	Ramen Restaurant	Sandwich Place	Café	Shopping Mall	Restaurant

As shown in the table, neighborhood Bedford Park, India Bazaar, Thorncliffe Park, and Willlowdale all have an average rating of lower than 7, which is not very appealing for consumer to visit. Therefore, we first remove these 4 neighborhoods, which leaves us 3 neighborhoods, High Park, University of Toronto, and Runnymede for our final decision (see Table 6). Each of them has its own pros and cons regarding a location for opening a Chinese restaurant, which we will discuss in the next session.

Table 6: The 3 Neighborhoods for Final Decision

Neighbourhood	Restaurant Counts	Restaurant Avg. Rating	Postal Code	Borough	Latitude	Longitude	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
High Park, The Junction South	7	7.071429	M6P	West Toronto	43.661608	-79.464763	Thai Restaurant	Café	Mexican Restaurant	Bakery	Fried Chicken Joint
Runnymede, Swansea	8	7.337500	M6S	West Toronto	43.651571	-79.484450	Café	Coffee Shop	Pizza Place	Diner	Sushi Restaurant
University of Toronto, Harbord	8	7.912500	M5S	Downtown Toronto	43.662696	-79.400049	Café	Italian Restaurant	Japanese Restaurant	Bar	Bookstore

4. Discussion

As mentioned before, the final 3 neighborhoods have their own different pros and cons. For neighborhood High Park, The Junction South, it has the lowest average rating for the restaurants, which is only slightly higher than 7. Compared with neighborhood University of Toronto,

Harbord which almost reaches 8 for its average rating, High Park is significantly worse in this aspect. However, in this area, Thai restaurant is the top 1 common venue, implying a better consumer base for Asian food. With such foundation, we can concern less about not enough people coming to this area for Asian food. In other words, some Asian food fans may already come to the area without us doing much marketing for our new Chinese restaurant. For neighborhood University Toronto, according to the average rating, it has the best reputation for restaurants in the area. This does not specifically mean Asian restaurants, but restaurants in general. Unfortunately, this neighborhood locates in downtown Toronto, which is more central than the other two neighborhoods. This can lead to a higher rent, but more data should be obtained to further support this assumption. Being closer to the center can also generate higher foot traffic. This is proven by the venue counts we did earlier in Pic. 3. High Park has 24 venues while University Toronto has 33. If the rent in University Toronto is actually higher than High Park, the problem remains as choosing between cheaper rent and higher foot traffic. More analysis can definitely be conducted with more detailed data about rent and foot traffic in these 2 areas and a more specific business plan. Lastly, we have neighborhood Runnymede, Swansea. The average rating for restaurants is between the previous two discussed neighborhoods. In addition, it has 39 different venues within the set radius, ranking highest among these 3 neighborhoods. However, a higher number of venues does not necessarily mean higher foot traffic to this area. Therefore, likewise, further data about foot traffic can be retrieved for better statistical support.

5. Conclusion

In our analysis, or in most analysis, no absolute solution is given. We can always improve the reliability of the analysis by getting more data and conducting more relevant analysis. In our case, High Park, University Toronto, and Runnymede are all potentially great locations for opening a Chinese restaurant. For people who want to invest less in rent, maybe you want to avoid highly central area like University Toronto. For people who are very confident with their future Chinese restaurants and not afraid of fiercer competition, neighborhood University of Toronto already formed a good reputation regarding its restaurants, which will even help you more with bring the traffic. But if you want to avoid too much competition from restaurants in the area, High Park may be a better option for you.