Locating a new Chinese restaurant in Canada

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1. Introduction

1.1 Background

My friend, who is a very recent immigrant in Canada and has a great passion for cuisine, wants to start a restaurant business targeting Chinese students in the college town. Right now, she has two options in mind, the University of Toronto or the University of British Columbia (in Vancouver, Canada).

Although she has been well-informed that many Chinese families reside in these two cities, she has her concerns. What if these two college towns are already filled with high densities of a Chinese restaurant and her business would be engaged in fierce competitions from the beginning?

Therefore, she asks me to help her out, trying to evaluate the nearby neighborhoods, and figure out whether she should continue her business plan. If not, why not? Otherwise, where should she land the new business, and, if possible, what kind of Chinese dishes should she be serving?

1.2 Problem

To find the best location for the new restaurant, I am expected to answer four questions: (1) how many Chinese restaurants list around the University of Toronto and the University of British Columbia? (2) Which streets do they locate at? (3) If not many Chinese restaurants lay around, how about the number of Asian-flavor restaurants? (4) What kind of Chinese food are those existing Chinese restaurants serving?

1.3 Target Audience

People like my friend, who have interests in launching a new Chinese restaurant around the University of Toronto or the University of British Columbia college town. Furthermore, my analysis method may be applied to help many other kinds of business starters. It is not only limited to Chinese food or even the catering business.

2. Data description

2.1 Main data source

Foursquare location data

(1) Explore. To find the nearby venues around the universities. The radius would be 5 km.

https://developer.foursquare.com/docs/api-reference/venues/explore/

(2) Categories id. The FourSquare has a very detailed list of Chinese restaurant categories, including many Chinese local cuisine styles, like Hainan restaurant, Hunan restaurant, and more.

https://developer.foursquare.com/docs/build-with-foursquare/categories/

(3) Venue stats. Get the total check-in and sharing numbers of a venue, for determining the popularities.

https://developer.foursquare.com/docs/api-reference/venues/stats/

Geopy.geocoders

To get the longitudes and latitudes of the universities.

2.2 Data acquiring and cleaning

First, we get the latitudes and longitudes coordinates for the two universities. Then, to make the location filter more precisely, we create a grid of cells covering our area of interest. Since we try to find the closest location to the campus, we narrow down the distance to 5 km. Each circle on the map has a radius of 300 meters.

However, for the Universities of British Columbia, as you can see on the map that

the campus is surrounded by sea and recreation park, we have extended its distance to 8 km.

Therefore, we have 228 candidate neighborhood for the University of Toronto and 119 for the University of British Columbia.

After creating the cells, to accurately calculate distances, we need to create our grid of locations in Cartesian 2D coordinate system which allows us to calculate distances in meters, rather than latitudes and longitudes degree. Hence, we need to create the functions to translate between X/Y coordinates and latitudes/longitudes and calculate the attributes for all the location candidates.
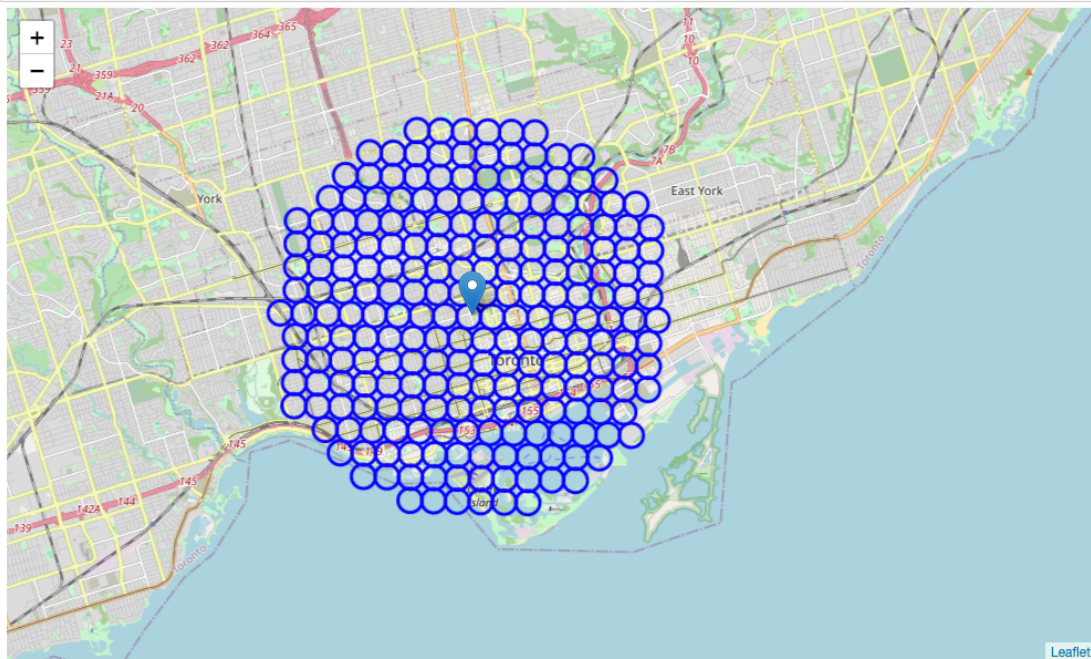

Figure 1-1: the grid of cells on the map of the University of Toronto
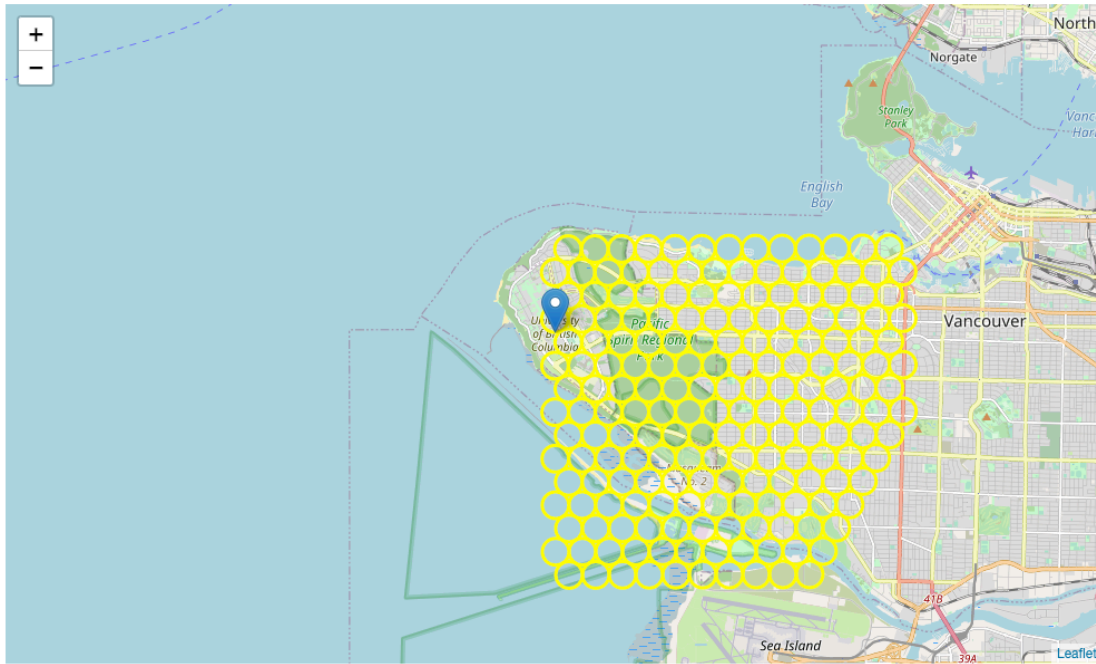
Figure 1-2: the grid of cells on the map of the University of British Columbia

Finally, we run the latitudes and longitudes of all location candidates in Foursquare API to get the Asian-flavor restaurants (including Chinese restaurants) around. The reason why we specifically look for Asian-flavor restaurants is customers who are interested in one type of Asian-flavor food are generally more open to the other types. More will be explained in the data analysis part.

As it shows on the following map, there are 216 Asian-flavor restaurants around the University of Toronto while 25 of them are Chinese restaurants. The University of British Columbia, however, is surrounded by less restaurants, only 68 Asian-flavor restaurants are around while 10 of them serve Chinese food.
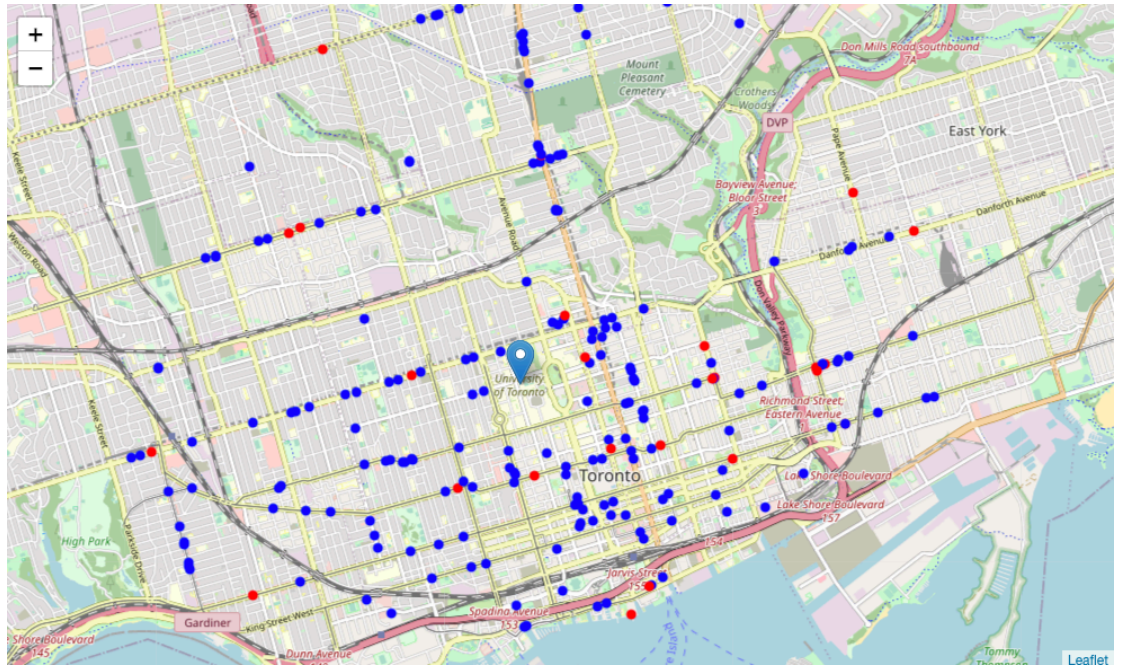
Figure 2-1: Asian-flavor restaurants (blue circles) and Chinese restaurants (red circles) around the University of Toronto
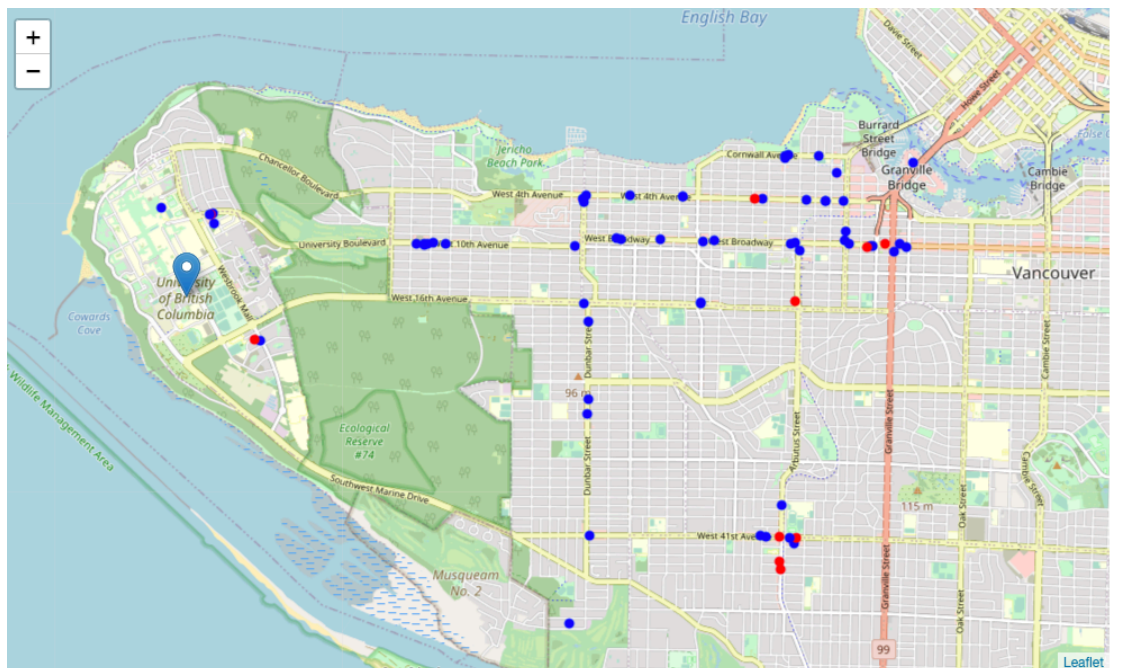

Figure 2-2: Asian-flavor restaurants (blue circles) and Chinese restaurants (red circles) around the University of British Columbia

3. Data analysis and methodology

Since we are trying to decide the best location for a Chinese restaurant that is close to the college campus, we need to figure out the following two questions:

(1) Which street has a high density of Asian-flavor restaurants while, ideally, not many Chinese restaurants are there?

   The more Asian-flavor restaurants located in the neighborhood, the more residents around there are interested in Asian-flavor food. And a low density of Chinese restaurants means the new Chinese restaurants can avoid facing fierce competition from similar tastes of food.

(2) Which street is closest to the campus?

   After narrowing the street lists, we need to find the street which is closest to the campus.

To find out the answer, I calculate the density of Asian-flavor restaurants locate in each location, and filter out locations with more than one Asian-flavor restaurants and cannot access Chinese restaurants within 500 meters, which meet the answers to the above two questions. The result has shortened the candidate list to around twenty locations. After all, we start with over a hundred grid of cells).

But still, twenty is a big number for picking out the best. This is when the KMeans kicks in. Among the nearly twenty locations, we create clusters of locations that meet our requirements and calculate the distance between the center of the cluster and the campus. This will give us a straightforward idea about the location of the new Chinese restaurant.

Finally, we get eight clusters for the University of Toronto and five clusters for the University of British Columbia. The numbers of the clusters are decided after my several tries.
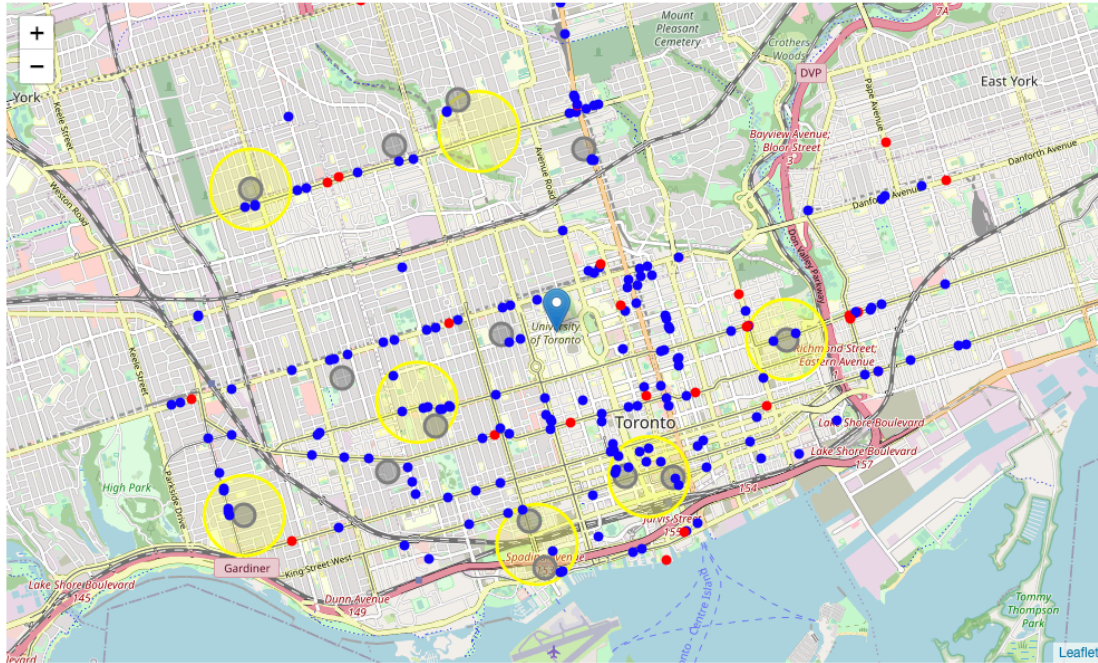
Figure 3-1: The centers of clusters (yellow circle), the best location candidates (gray circles), Asian-flavor restaurants (blue circles) and Chinese restaurants (red circles) around the University of Toronto
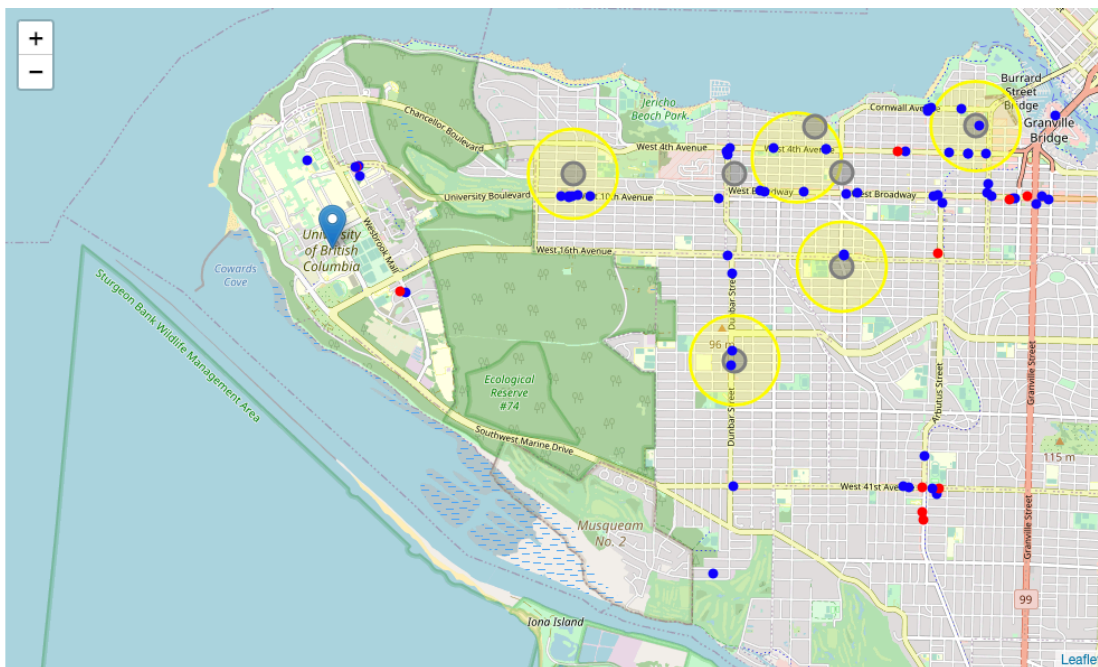

Figure 3-2. The centers of clusters (yellow circle), the best location candidates (gray circles), Asian-flavor restaurants (blue circles) and Chinese restaurants (red circles) around the University of British Columbia

4. Discussion

Surprisingly enough, although I have heard about a giant number of Chinese people are living in Toronto and Vancouver, my data shows that not many Chinese restaurants

are located around the two campuses.

As you can see in the map above, the University of Toronto is surrounded by 216 Asian-flavor restaurants. The percentage of Chinese restaurants is only 12%. The number of Asian-flavor restaurants is even lower, only 68 restaurants, but the percentage of Chinese restaurants is higher, 15%.

Because the UofT locates in the downtown area, students are more accessible to restaurants and shops around, businessmen would have more options to choose from for their business, unlike UBC, which is surrounded by the environment reservoir. Even the most promising candidate near UBC is 2.8 km away from the center of the campus, while the promising candidate near UofT can locate as far as 1.9 km.

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================================================================
Recommended locations for a new chinese restaurant in the University of Toronto
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36, Maclennan Avenue, Moore Park, University—Rosedale, Old Toronto, Toronto, Golden Horseshoe, Ontario, M4T 1C7, Cana
da => 2.7km from The University of Toronto

78, Bond Street, Garden District, Toronto Centre, Old Toronto, Toronto, Golden Horseshoe, Ontario, M5B 1X2, Canada =>
1.9km from The University of Toronto

None => 2.9km from The University of Toronto

1, Harbour Square, Harbourfront, Spadina—Fort York, Old Toronto, Toronto, Golden Horseshoe, Ontario, M5J 2H2, Canada
=> 2.6km from The University of Toronto

12, Lamport Avenue, Rosedale, University—Rosedale, Old Toronto, Toronto, Golden Horseshoe, Ontario, M4W 1R1, Canada =
> 4.2km from The University of Toronto

Pinnacle Centre, Gardiner Expressway, South Core, Spadina—Fort York, Old Toronto, Toronto, Golden Horseshoe, Ontario,
M5E, Canada => 4.5km from The University of Toronto

Brookfield Place, Wellington Street West, Toronto Centre, Old Toronto, Toronto, Golden Horseshoe, Ontario, M5L 1A0, C
anada => 2.1km from The University of Toronto

364, Belsize Drive, Don Valley West, Old Toronto, Toronto, Golden Horseshoe, Ontario, M4S 1N2, Canada => 4.7km from T
he University of Toronto
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Figure 4-1:   Recommended locations around the University of Toronto

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==============================================================
Recommended locations for a new chinese restaurant in the University of British Columbia
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Continental Repairs, 1706, West 4th Avenue, South Granville, Fairview, Vancouver, District of North Vancouver, Metro
Vancouver Regional District, British Columbia, V6J, Canada => 5.3km from the University of British Columbia

2201, Pine Street, South Granville, Fairview, Vancouver, District of North Vancouver, Metro Vancouver Regional Distri
ct, British Columbia, V6J, Canada => 2.8km from the University of British Columbia

Nanton Avenue, Shaughnessy, Vancouver, District of North Vancouver, Metro Vancouver Regional District, British Columb
ia, V6J, Canada => 4.7km from the University of British Columbia

1706, West 1st Avenue, Fairview, Vancouver, District of North Vancouver, Metro Vancouver Regional District, British C
olumbia, V6J, Canada => 7.3km from the University of British Columbia

Pine Street, Shaughnessy, Vancouver, District of North Vancouver, Metro Vancouver Regional District, British Columbi
a, V6J, Canada => 5.7km from the University of British Columbia
```

Figure 4-2:   Recommended locations around the University of British Columbia

But this doesn't necessarily mean UofT is the best choice. After all, the more Asian-restaurants might lead to fiercer competition. Plus, the fact of the high percentage of Chinese restaurants and the low density of Asian-flavor restaurants near UBC might mean it has a better community for Chinese business owner.

6. Result and further direction

Therefore, I would recommend this location for my friend: 2201, Pine Street, South Granville, Fairview, Vancouver. It locates only 2.8 km away from the center of the UBC campus. Furthermore, there are many Asian-flavor restaurants while not even one Chinese restaurant locates there.

But further research is in need, such as rental price, marketing research, and more. One more thing catches my eye during the data cleaning: almost all Chinese restaurants locate more than 6 miles away from the center of campus. Why is it? Does it have to do something with the local community? These are the questions that need to be answered in the future.