II. Data Description

Based on the business problem and background, factors that will influence our recession are:

- number of any existing restaurants in the neighborhood
- number existing Chinese restaurants in the neighborhood
- distance to Chinese restaurants in the neighborhood
- distance of the neighborhood from downtown center

In this project, we will create regularly spaced grid of locations, centered at Rogers Place at Downtown, Edmonton, to define our neighborhoods. Restaurant information can help us to analyze the situation in each grid so that we can make decisions based on the above criteria. We will need to extract/generate the required information from the following data sources:

- **use Google Maps API Geocoding** to obtain coordinate
- scrap approximate addresses for each center of candidate neighborhood using **Google Maps API Reverse Geocoding**
- scrap neighborhood restaurant information using **Foursquare API**

Neighborhood Candidates

We start with creating a grid of cells covering our area of interest. We want the area to cover 2x2 killometers centered around Rogers Place. The reason behind is that Edmonton has a faily small downtown, a cirucle with a radius of one killometer will cover almost all commercial lands in Downtown. Any larger circle will include more residential lands nearby which will eventually distort our analysis and decision.

We will use self-defined function *get_coordiantes* to obtain coordinates of Rogers Place. You may refer to the .ipynb file for higher level of technical details. After we had the coordiantes, a grid of candidate will be generated algorithmically. Note that we can not use coordinates to calculate the distance between two locations. In order to do so, there is another self-defined function *lonlat_to_utm* to convert long/lat degree to UTM degree which can be used for distance calculation. Each cell has a radius of 500 meters. There is a second marker on the map, despite the Rogers Place one, representing the Green Tea Restaurant current location. Appearently, it is unusually far away from Downtown area. In the map, 15 candidate neighborhood centers are generated for further analysis.

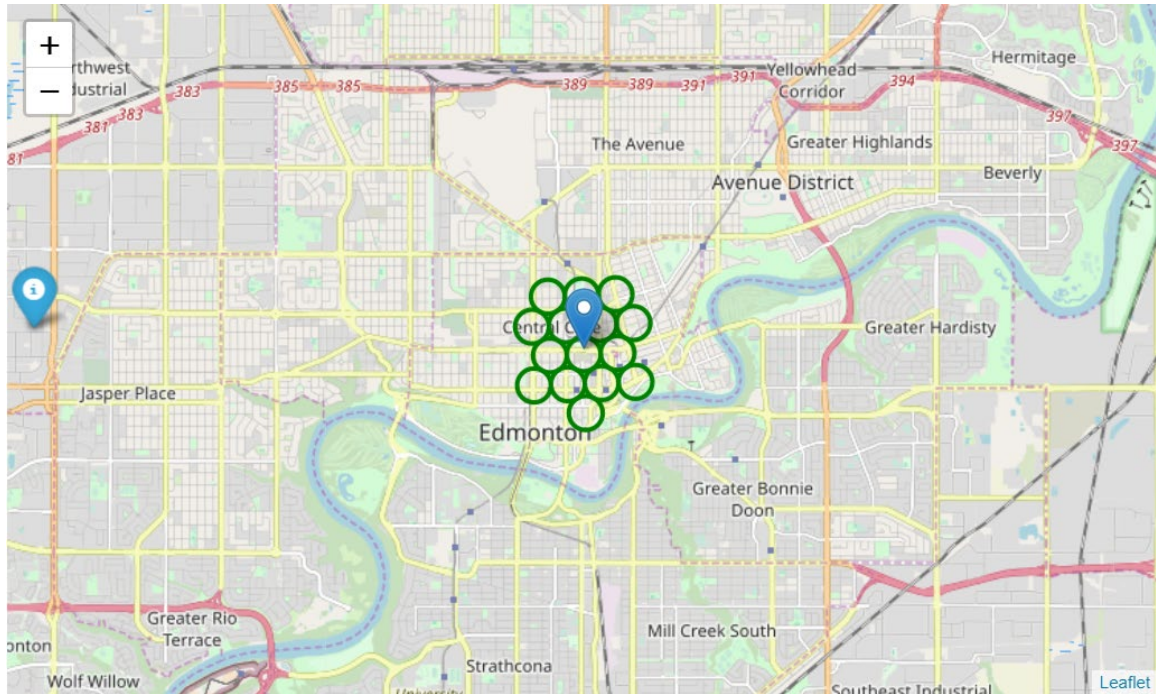[1] Google Maps, url = https://goo.gl/maps/F4J99y1CKcJQU3VM7

Figure 2. Candidate neighborhoods map

Next, we will use Google Maps API Reverse Geocoding to lookup the address for each coordinate. The result will be stored in a pandas DataFrame and pass to the next step.

	Address	Latitude	Longitude	X	Y	Distance from Downtown
0	9923 103 St NW, Edmonton, AB T5K 2J3	53.537857	-113.496728	334548.703964	5.935005e+06	933.012702
1	The Executive, 10105 109 St NW, Edmonton, AB T...	53.541509	-113.508264	333798.703964	5.935438e+06	901.387819
2	105 Street & Jasper Avenue, Edmonton, AB T5J 3N1	53.541667	-113.500726	334298.703964	5.935438e+06	559.016994
3	10043 Jasper Ave, Edmonton, AB T5J 1S6	53.541825	-113.493188	334798.703964	5.935438e+06	559.016994
4	9751 Jasper Ave, Edmonton, AB T5J 0C5	53.541982	-113.485649	335298.703964	5.935438e+06	901.387819
5	107 Street & 103 Avenue, Edmonton, AB T5J 1K3	53.545477	-113.504724	334048.703964	5.935871e+06	504.467341
6	10340 103 St NW, Edmonton, AB T5J 0Y9	53.545634	-113.497186	334548.703964	5.935871e+06	66.987298
7	10248 99 St NW, Edmonton, AB T5J	53.545792	-113.489647	335048.703964	5.935871e+06	504.467341
8	10568 109 St NW, Edmonton, AB T5H 3B2	53.549286	-113.508724	333798.703964	5.936304e+06	834.550535
9	10572 105 St NW, Edmonton, AB T5H 2W7	53.549444	-113.501184	334298.703964	5.936304e+06	443.254550
10	10574 101 St NW, Edmonton, AB T5H 2R8	53.549602	-113.493645	334798.703964	5.936304e+06	443.254550
11	9618 105A Ave, Edmonton, AB T5H 0M4	53.549759	-113.486105	335298.703964	5.936304e+06	834.550535
12	10808 107 St NW, Edmonton, AB T5H 2Z3	53.553254	-113.505184	334048.703964	5.936738e+06	942.582566
13	10750 103 St NW, Edmonton, AB T5H 2V8	53.553411	-113.497644	334548.703964	5.936738e+06	799.038106
14	97 Street & 108 Avenue, Edmonton, AB T5H	53.553569	-113.490104	335048.703964	5.936738e+06	942.582566

Table 1. Google Maps API Reverse Geocoding result

[1] Google Maps, url = https://goo.gl/maps/F4J99y1CKcJQU3VM7

Foursquare Request

Now that we have our location candidates. For each candidate neighborhood, we will use Foursquare API to search for information on restaurants and categorize them into Restaurant category and Chinese Restaurant category.

First, we will need a Venue Categories list from the Foursquare Developers page. We include every category under Chinese Restaurant regardless of the supported countries and cultural factors. And then, after Foursquare API responded, we categorize the result into Restaurants and Chinese Restaurants, and calculate their distances to Rogers Center. The result shows a low portion (around 13.68%) of Chinese restaurants in a total of 95 restaurants. As of now, we have enough information to plot a map. Each blue dot represents a restaurant, and Chinese restaurants are in red.
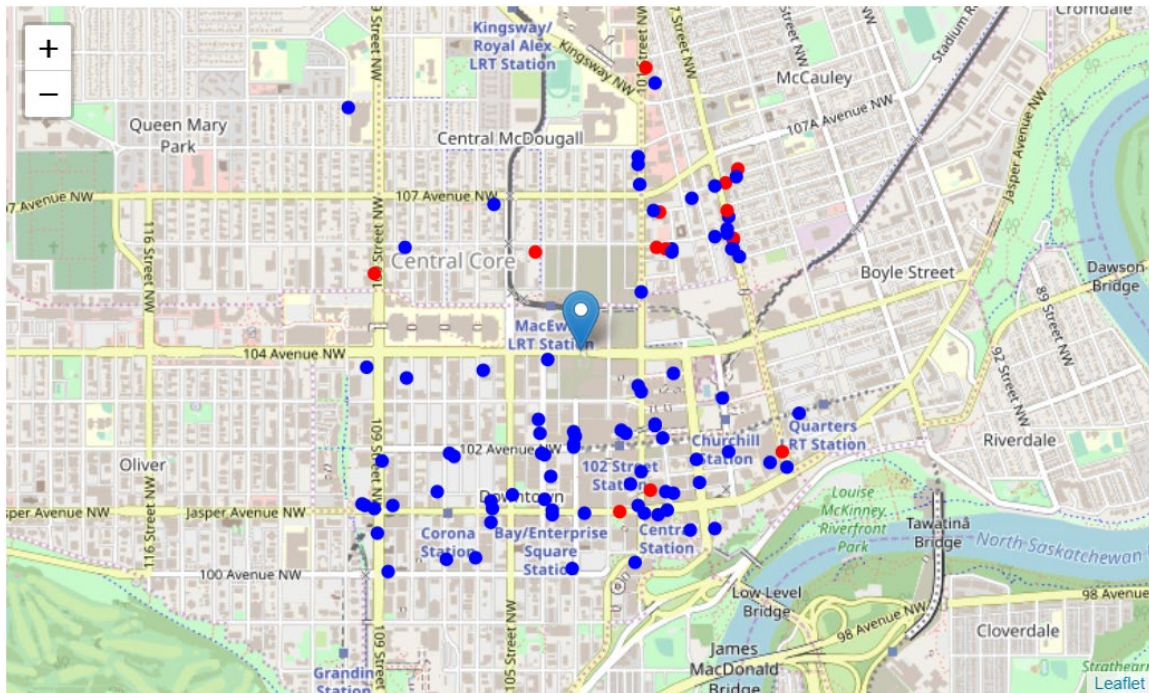

Figure 3. Restaurants distribution

[1] Google Maps, url = https://goo.gl/maps/F4J99y1CKcJQU3VM7