The Battle of the Neighborhoods

Introduction

Background:

Calgary is the third-largest municipality in Canada. It is located in an area of foothills and prairie, about 80 km from the Canadian Rockies. According to the 2016 Census, Calagry had a population of 1,392,609, which is the fourth-largest in Canada. Calgary is a leader in the Canadian oil and gas industry so its economy is highly depend on the oil and gas market. Its economy expanded at a high rate from 1999 to 2009. Its high personal and family incomes, low unemployment have benefited from increased sales and prices.

Many Calgarians lived in the city's suburbs, central districts such as 17 Avenue, Kensington, Inglewood and the Mission District, which have become more popular and the density in those areas has increased.

There were more than 5900 restaurants operating in Calgary according to the records from Alberta Health Services. That's up from 5500 in 2015. Compare with the rest of Canada, Albertans spend the second most on dining out. This also means the market is highly competitive. The cost of doing business is also high with highly developed city. The insight derived from this analysis will give a good understanding of the business environment. This study will help in reduction of the risk of investment.

Problem Description :

A restaurant, or an eatery, is a business that serves food and drinks to customers. Food and drinks are generally served and eaten on the premises. Many restaurants also offers take-out and food delivery services. According to the Global News, Calgary's restaurant is seeing an evolution after the economic downturn led to many restaurants and pubs closing. With the increased competition from food delivery services like SkipTheDishes and UberEats, a lot of restaurant owners were forced to think outside the box. According to the 2016 Census, 60% of Calgary's population was European origin, 36% of the population belonged to a visible minority group. It's food culture includes international cuisines influenced by the immigrants. Customers are looking for different things, particularly speed, value and uniqu experiences. So it is very important for new restaurant owners planned their investment startegically. There's still room for traditional restaurants, but the market share is squeezed by new style of dining with modern lifestyles. Various factors would needed to be studied to decide on the location. The factors would includes the following:

1. Community Population
2. Demographics
3. Who are the competitors in the location?

4. Are there any Farmers Markets, Wholesale Markets ect nearby so the ingredients can be purchased in low cost?

Target Audience

The objective is to locate and recommend to the management which neighborhood of Calgary will be best choice to start a restaurant. The Management also expects to understand the rationale of the recommendations made. The success criteria of the project will be a good recommendation of borough/Neighborhood choice to any company who would like to do investment to Calgary, based on Lack of such restaurants in that location and nearest suppliers of ingredients.

Data Section

Description of the Data:

The following data is required to answer the question:

In this project, one city will be analysed: Calgary, AB, Canada

We will using the following dataset for analysis:

Data1.list of neighbourhoods in Calgary

The dataset is on the free wikipedia.

Link is:https://en.wikipedia.org/wiki/List_of_neighbourhoods_in_Calgary

The whole dataset including residential communities, parks and industrial areas.

To do the study we would focus on the residential communities.

	Name	Type	Population
0	Abbeydale	Residential	5,917
1	Acadia	Residential	10,705
2	Albert Park/Radisson Heights	Residential	6,234
3	Altadore	Residential	9,116
4	Alyth/Bonnybrook	Industrial	16

Data2.list of business license database filtered as Market

A farmers' market is often defined as a public site used by two or more local or regional producers for the direct sale of farm products to consumers. In addition to fresh fruits and vegetables, markets may sell dairy products, fish, meat, baked goods, and other minimally processed foods.

The dataset is on the website of city of Calgary.

Link is: https://data.calgary.ca/Business-and-Economic-Activity/Calgary-Business-Licences/vdjc-pybd/data

The dataset has a total of 39 tradename, which is 39 rows. In order to segement the location, the longitude and latitude of the market has been added.The below is the head of the dataframe.

	TRADENAME	ADDRESS	LICENCETYPES	COMDISTNM	JOBSTATUSDESC	JOBCREATED	longitude	latitude	location	Count
0	FESTIVAL MARKET AT EAU CLAIRE	139 BARCLAY PR SW	MARKET	EAU CLAIRE	RENEWAL LICENSED	1995/07/11	-114.069507	51.052453	(51.052453240987, -114.06950715568)	1
1	CHINOOK CENTRE	#B 6455 MACLEOD TR SW	MARKET	MEADOWLARK PARK	RENEWAL LICENSED	2000/06/13	-114.073836	50.997976	(50.9979758797472, -114.0738360896)	1
2	KENSINGTON ARTISAN MARKET	#101 225 10 ST NW	MARKET	HILLHURST	LICENSED	2019/01/23	-114.086241	51.053591	(51.0535912689486, -114.086241242606)	1
3	BROOKFIELD PLACE (CALGARY) GP	225 6 AV SW	MARKET	DOWNTOWN COMMERCIAL CORE	RENEWAL LICENSED	2017/05/16	-114.066183	51.047071	(51.0470708957163, -114.066182739294)	1
4	BANKERS COURT	850 2 ST SW	MARKET	DOWNTOWN COMMERCIAL CORE	RENEWAL LICENSED	2013/10/16	-114.067340	51.044991	(51.0449905772837, -114.067340276426)	1

Data3. Calgary geographical coordinate data will be utilized as input for the Foursquare API.

It will be leveraged to provision venues information for each neighborhood. We will use the Foursquare API to explore neighborhoods in Calgary and the below is the 5 head row of the dat.

	Neighbourhood	Neighbourhood Latitude	Neighbourhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Abbeydale	51.058836	-113.929413	Subway	51.059215	-113.934836	Sandwich Place
1	Abbeydale	51.058836	-113.929413	Mac's	51.059376	-113.934425	Convenience Store
2	Abbeydale	51.058836	-113.929413	roadside pub	51.059277	-113.934529	Wings Joint
3	Acadia	50.968655	-114.055587	Highwest Electric Ltd	50.965847	-114.057257	Construction & Landscaping
4	Acadia	50.968655	-114.055587	Home Diner	50.967631	-114.060319	Diner

Methodology

Exploratory Data Analysis:

1.	We transform the data we scrapped from Wikipedia into a pandas dataframe.
2.	This dataframe contains the name of the neighborhoods, population of neighborhoods, and type of neighborhoods in calgary. To forcus on the residiential area in Calgary, the industrial area and park area has been dropped in the dataframe. The last element has been removed as well.

	Name	Type	Population
0	Abbeydale	Residential	5,917
1	Acadia	Residential	10,705
2	Albert Park/Radisson Heights	Residential	6,234
3	Altadore	Residential	9,116
5	Applewood Park	Residential	6,498

3.	There are total 192 residential neighborhoods left. To get the latitude and longitude of Calgary, the Nominatim from geopy has been imported and used.

4.   To convert the neighborhoods into longitude and latitude, the geopy.geocode has been used. There are several neighborhoods latitude and longitude were missing so all the missing values have been removed. There are 187 neighborhood's latitude and longitude information has been added to the dataframe.

	Name	Type	Population	Longitude	Latitude
0	Abbeydale	Residential	5,917	-113.929413	51.058836
1	Acadia	Residential	10,705	-114.055587	50.968655
2	Albert Park/Radisson Heights	Residential	6,234	-113.990195	51.044845
3	Altadore	Residential	9,116	-114.100756	51.015104
5	Applewood Park	Residential	6,498	-113.928931	51.044658

5.   The data frame has been used to get Venues data from Fouresquare. Geopy and folium libraries has been used to create a map of Calgary with neighborhoods on top.
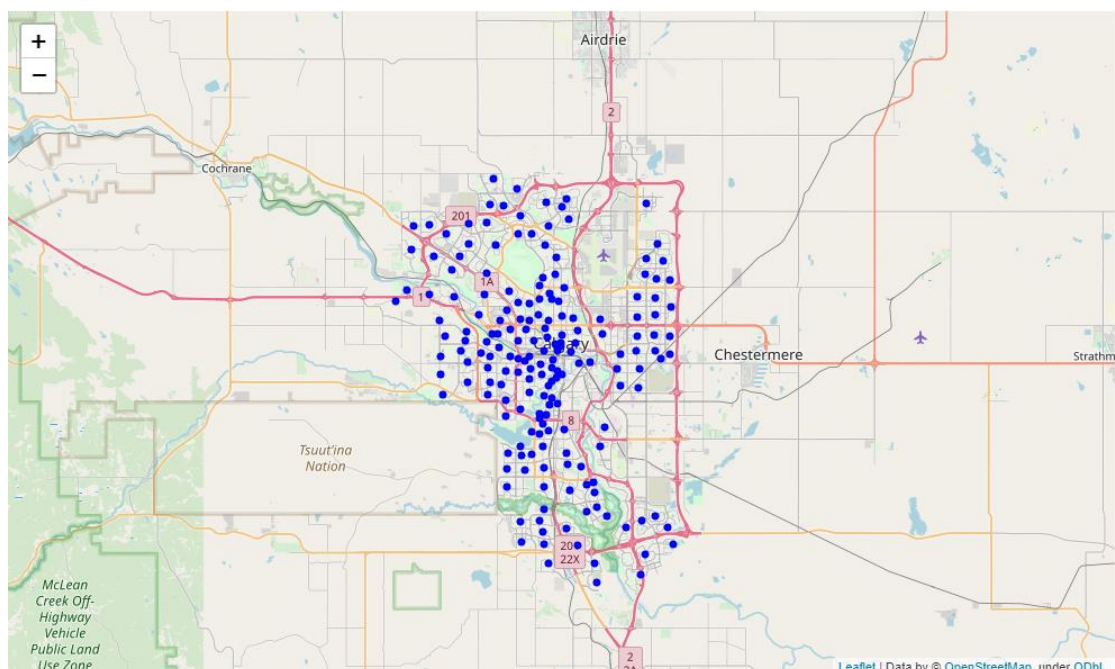

6.   There are total 1178 venues in Calgary. To get a briefly understanding of the data, the top 10 neighborhoods with venues have been plot.

	Neighbourhood	Neighbourhood Latitude	Neighbourhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Abbeydale	51.058836	-113.929413	Subway	51.059215	-113.934836	Sandwich Place
1	Abbeydale	51.058836	-113.929413	Mac's	51.059376	-113.934425	Convenience Store
2	Abbeydale	51.058836	-113.929413	roadside pub	51.059277	-113.934529	Wings Joint
3	Albert Park/Radisson Heights	51.044845	-113.990195	7-Eleven	51.047371	-113.989308	Convenience Store
4	Albert Park/Radisson Heights	51.044845	-113.990195	New Dynasty	51.047540	-113.990004	Asian Restaurant

```
Beltline                    56
Downtown Commercial Core    51
Lower Mount Royal           49
Eau Claire                  45
Mission                     38
Cliff Bungalow              36
Aspen Woods                 27
Meadowlark Park             27
Bridgeland/Riverside        25
Country Hills Village       24
Name: Neighbourhood, dtype: int64
```
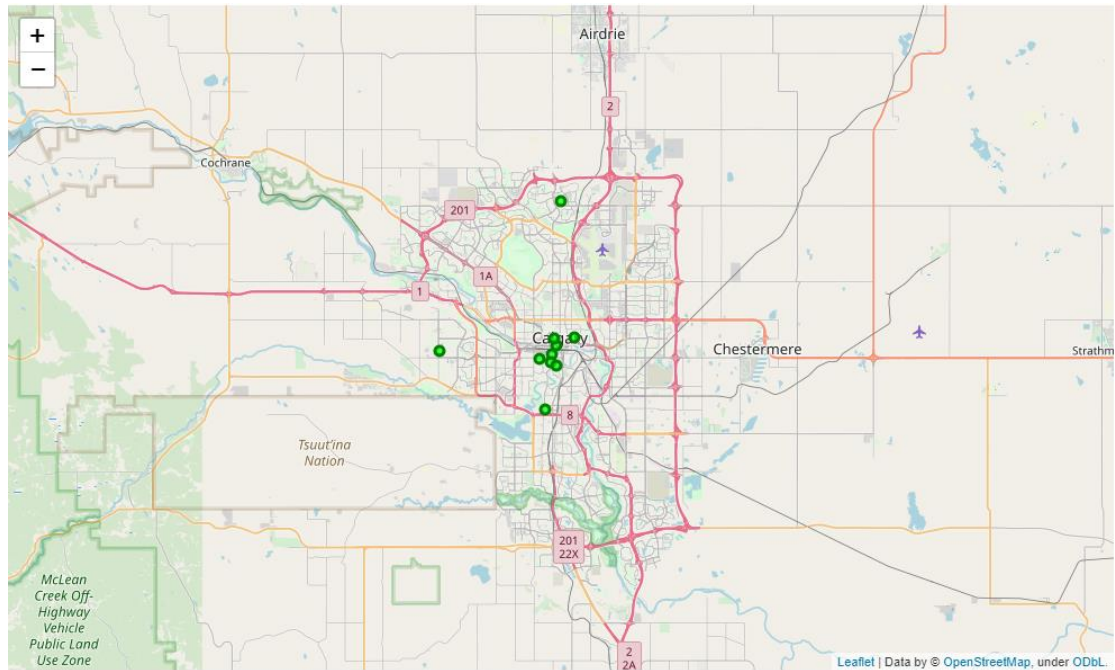

Venues in top 10 neighborhoods in Calgary
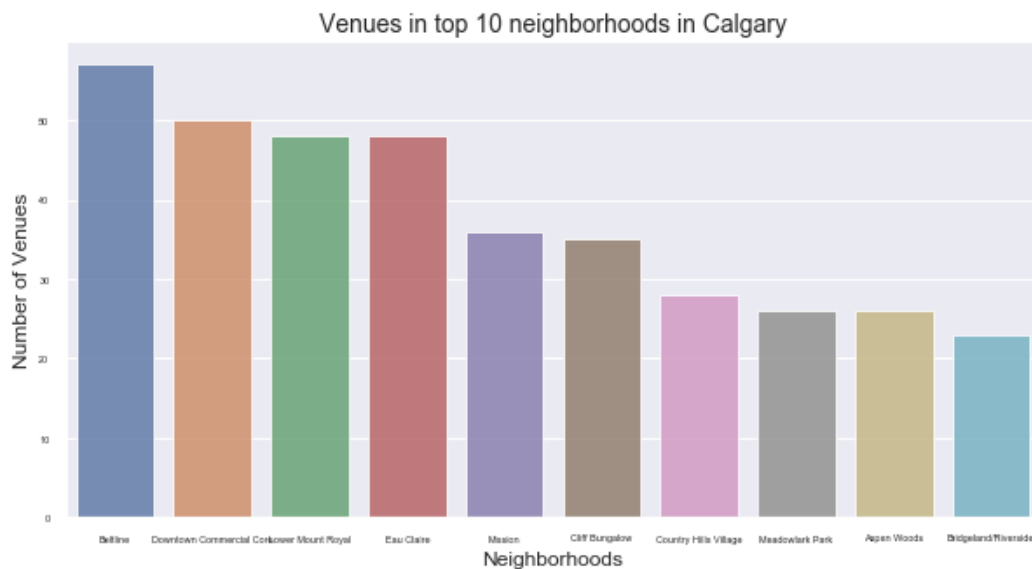
7.   To study the relationship of the location of venues and population, the map of top 10 neighborhoods with population and venues have been created.

8.   To focus on the restaurant, the fuzzy matching has been used. The data have been sorted by venue category. By reading the unique value of the category, the list of words related with restaurant has been created.

```
['Restaurant',
 'Pizza',
 'Place',
 'Coffee',
 'Breakfast',
 'Pub',
 'Bar',
 'Burger',
 'Wings',
 'Noodle',
 'Café']
```

9.   Using the list of related, the size of original venue data have been filtered to 522. To get the briefly understanding of the restaurants data, the map with all the restaurant has been created using folium.

|	Neighbourhood	Neighbourhood Latitude	Neighbourhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	Abbeydale	51.058836	-113.929413	Subway	51.059215	-113.934836	Sandwich Place
2	Abbeydale	51.058836	-113.929413	roadside pub	51.059277	-113.934529	Wings Joint
4	Albert Park/Radisson Heights	51.044845	-113.990195	New Dynasty	51.047540	-113.990004	Asian Restaurant
5	Albert Park/Radisson Heights	51.044845	-113.990195	Vern's Pizza	51.047874	-113.990340	Pizza Place
8	Altadore	51.015104	-114.100756	Monogram Coffee	51.010967	-114.100054	Coffee Shop
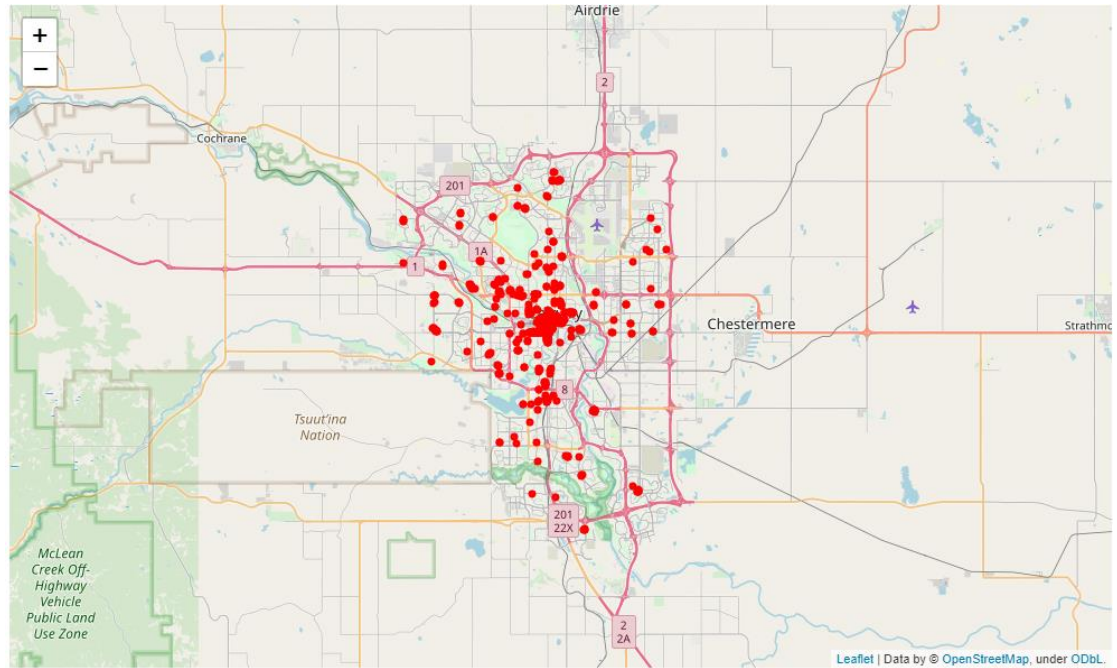
10.　To get a briefly understanding of the data, the top 10 neighborhoods with restaurant have been plot.

Restaurant in top 10 neighborhoods in Calgary
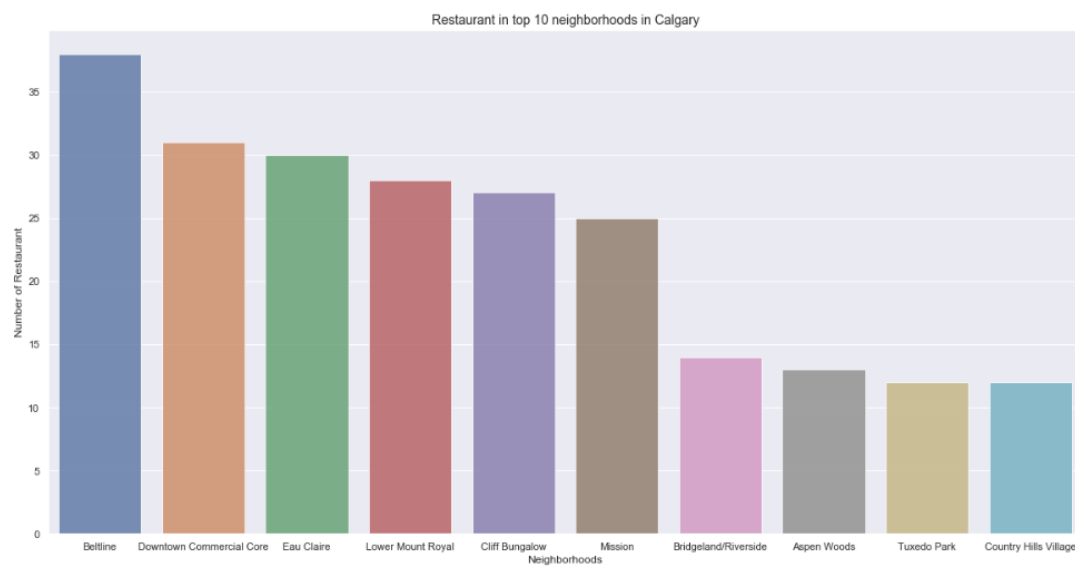
11. To study the relationship of the location of restaurants and population, the map of top 10 neighborhoods with restaurants have been created.
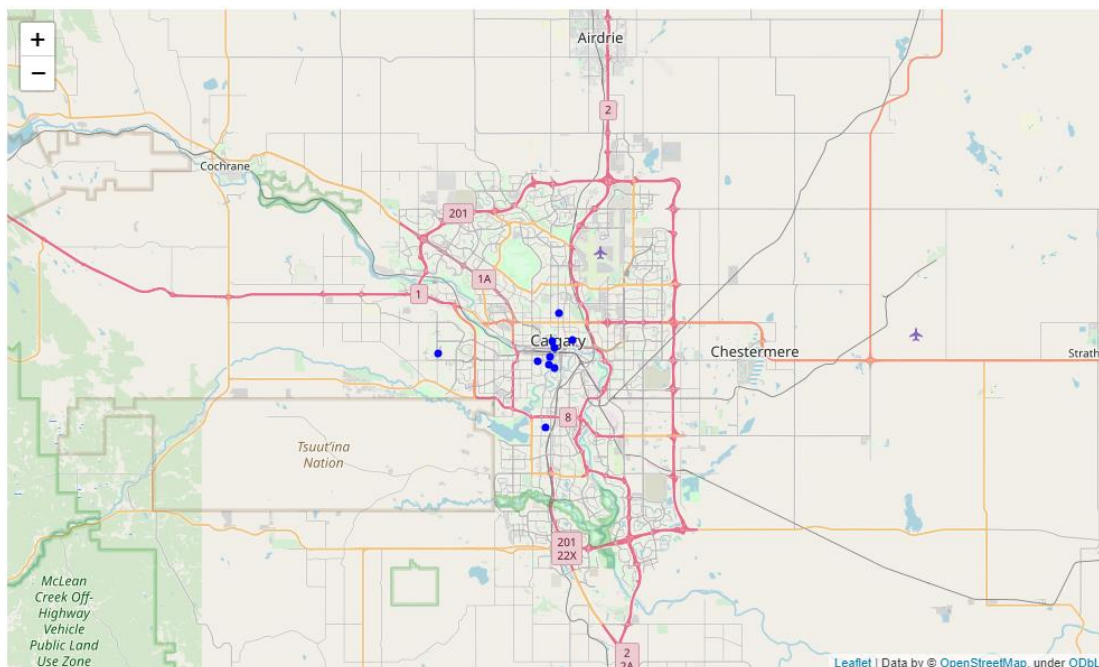
12. Fetching data from the website of City of Calgary using the filter of the license-type of market.

	TRADENAME	ADDRESS	LICENCETYPES	COMDISTNM	JOBSTATUSDESC	JOBCREATED	longitude	latitude	location	Count
0	FESTIVAL MARKET AT EAU CLAIRE	139 BARCLAY PR SW	MARKET	EAU CLAIRE	RENEWAL LICENSED	1995/07/11	-114.069507	51.052453	(51.052453240987, -114.06950715568)	1
1	CHINOOK CENTRE	#B 6455 MACLEOD TR SW	MARKET	MEADOWLARK PARK	RENEWAL LICENSED	2000/06/13	-114.073836	50.997976	(50.9979758797472, -114.0738360896)	1
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4	BANKERS COURT	850 2 ST SW	MARKET	DOWNTOWN COMMERCIAL CORE	RENEWAL LICENSED	2013/10/16	-114.067340	51.044991	(51.0449905772837, -114.067340276426)	1

13. To get a briefly understanding of the location of all the 39 markets in Calgary, the map was created.
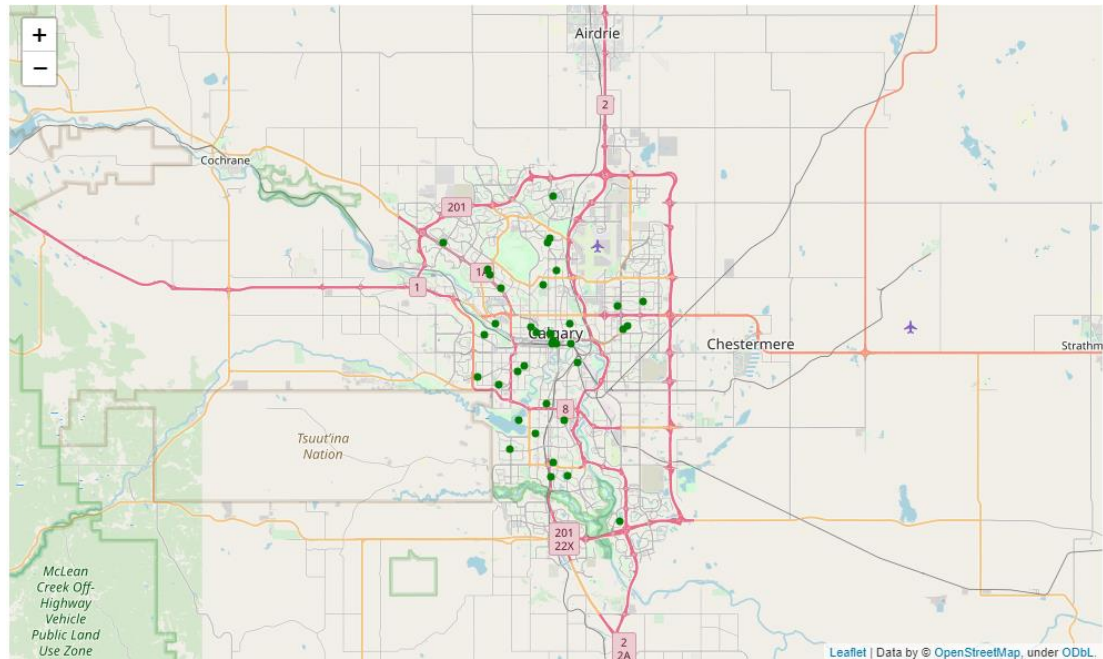
14. To focus on the market related with Farmer Market, the dataset of market has been filtered by key words: Farmers and Market.

15. Clustering Neighborhoods of Calgary without the information of Farmer Market.

16. We pick up 5 as the k to do the k mean clustering. The result was as following.

	Neighbourhood	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
0	Abbeydale	Wings Joint	Cocktail Bar	Sandwich Place	Falafel Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant
1	Albert Park/Radisson Heights	Asian Restaurant	Wings Joint	Falafel Restaurant	Italian Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant
2	Altadore	Greek Restaurant	Coffee Shop	Wings Joint	Falafel Restaurant	Italian Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant
3	Aspen Woods	Coffee Shop	American Restaurant	Sandwich Place	Japanese Restaurant	Mexican Restaurant	Pizza Place	Restaurant	Salon / Barbershop	Juice Bar	Southern / Soul Food Restaurant
4	Banff Trail	Fast Food Restaurant	Seafood Restaurant	Vietnamese Restaurant	Pizza Place	Coffee Shop	Breakfast Spot	Filipino Restaurant	French Restaurant	Gay Bar	Wings Joint

|	Neighbourhood	Type	Population	Longitude	Latitude	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
0	Abbeydale	Residential	5917	-113.929413	51.058836	4	Wings Joint	Cocktail Bar	Sandwich Place	Falafel Restaurant	Indian Restaurant	Hotpot Restaurant
2	Albert Park/Radisson Heights	Residential	6234	-113.990195	51.044845	4	Asian Restaurant	Wings Joint	Falafel Restaurant	Italian Restaurant	Indian Restaurant	Hotpot Restaurant
3	Altadore	Residential	9116	-114.100756	51.015104	3	Greek Restaurant	Coffee Shop	Wings Joint	Falafel Restaurant	Italian Restaurant	Indian Restaurant
7	Aspen Woods	Residential	5271	-114.210185	51.043119	4	Coffee Shop	American Restaurant	Sandwich Place	Japanese Restaurant	Mexican Restaurant	Pizza Place
10	Banff Trail	Residential	3837	-114.111647	51.071462	4	Fast Food Restaurant	Seafood Restaurant	Vietnamese Restaurant	Pizza Place	Coffee Shop	Breakfast Spot

17. To visualize the result of the cluster with k=5, the map with the clustering neighborhoods has been created
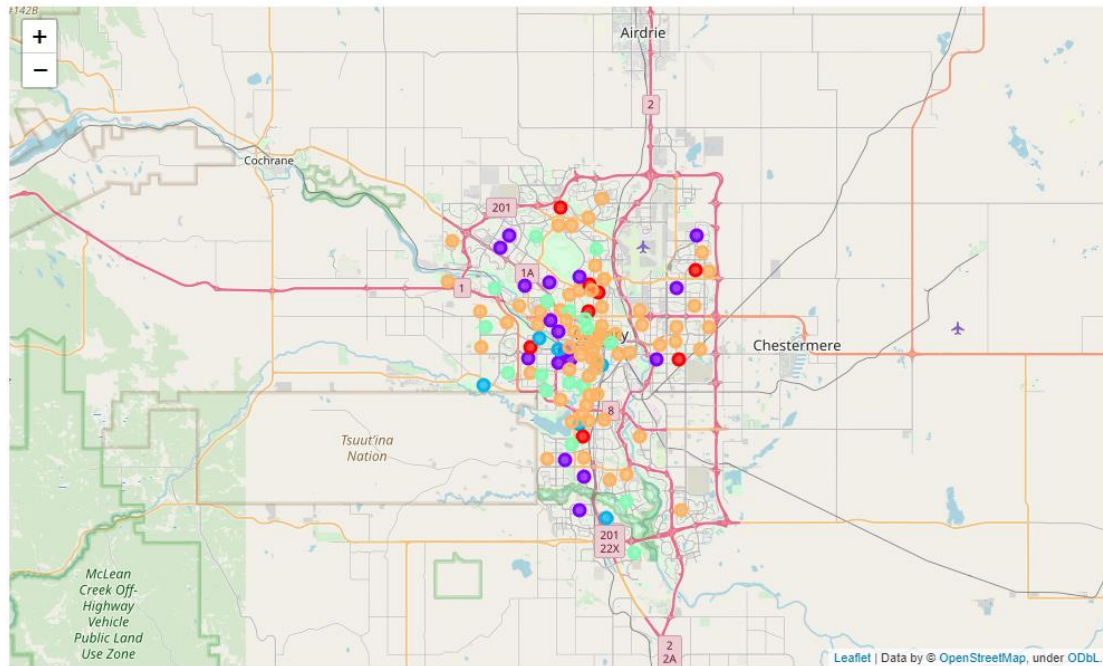
18. To pick up the optimal value for k, we used the elbow method.

Elbow Method For Optimal k
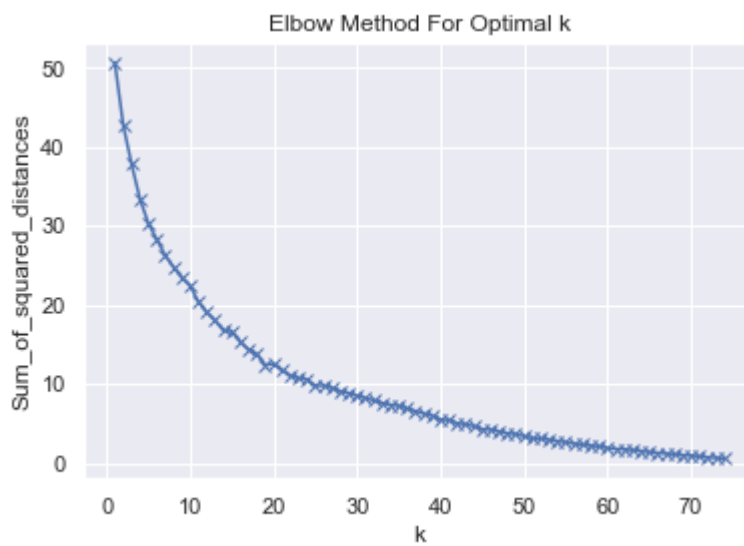
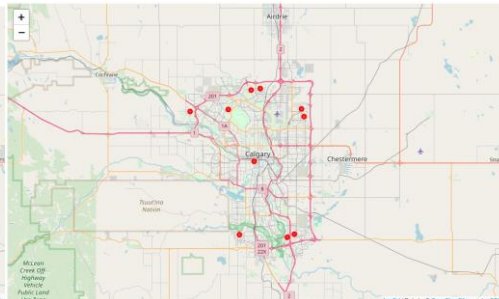19. Clustering with k =20, the clustering result has been plotted on the map.
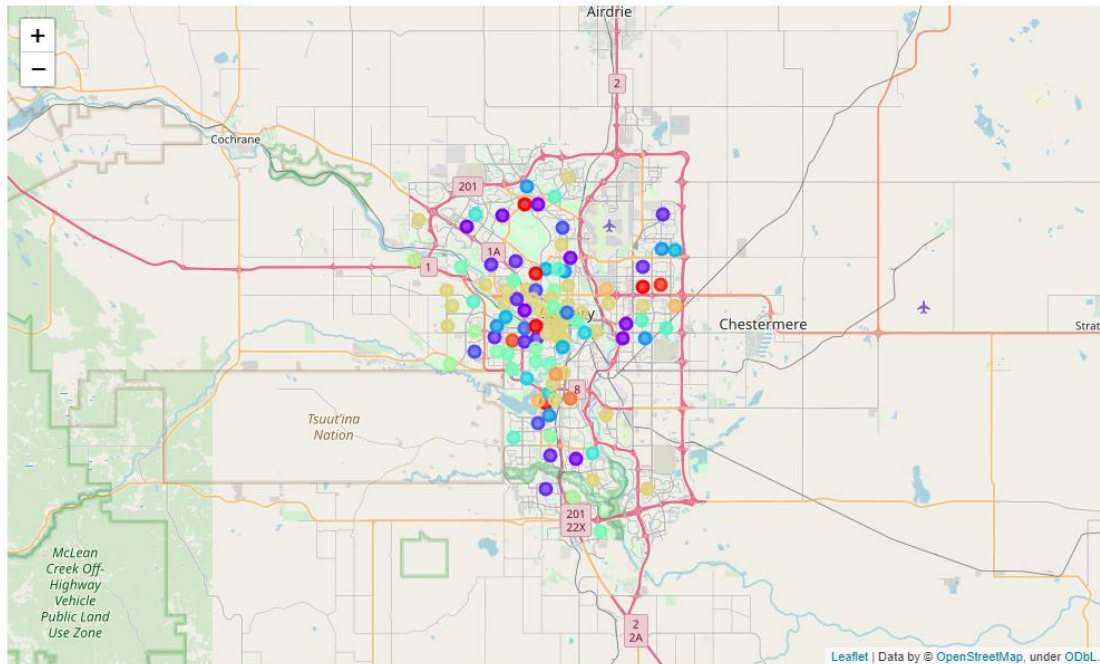
Results

In this study, we have found that the location of venues in Calgary have no significant relationship with the population of neighborhoods. The top 10 neighborhoods with large population are not have more venues.
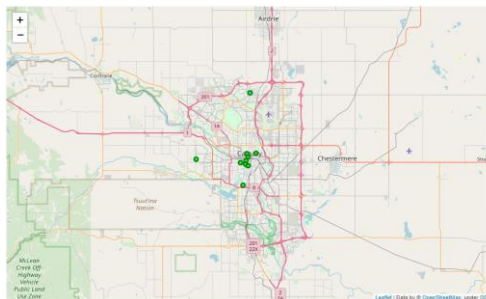
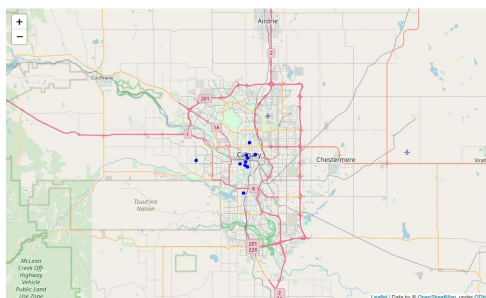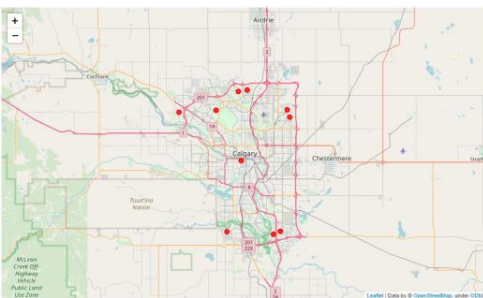Top 10 neighborhoods with Venues   Top 10 neighborhoods with Population

The relationship between the location of restaurant in Calgary and population are not significant as well.

Top 10 neighborhoods with Restaurant   Top 10 neighborhoods with Population

There are more restaurants in area which has more venues in Calgary.

There are 522 restaurants located in Calgary. A large amount of restaurant was located in

downtown area of Calgary.
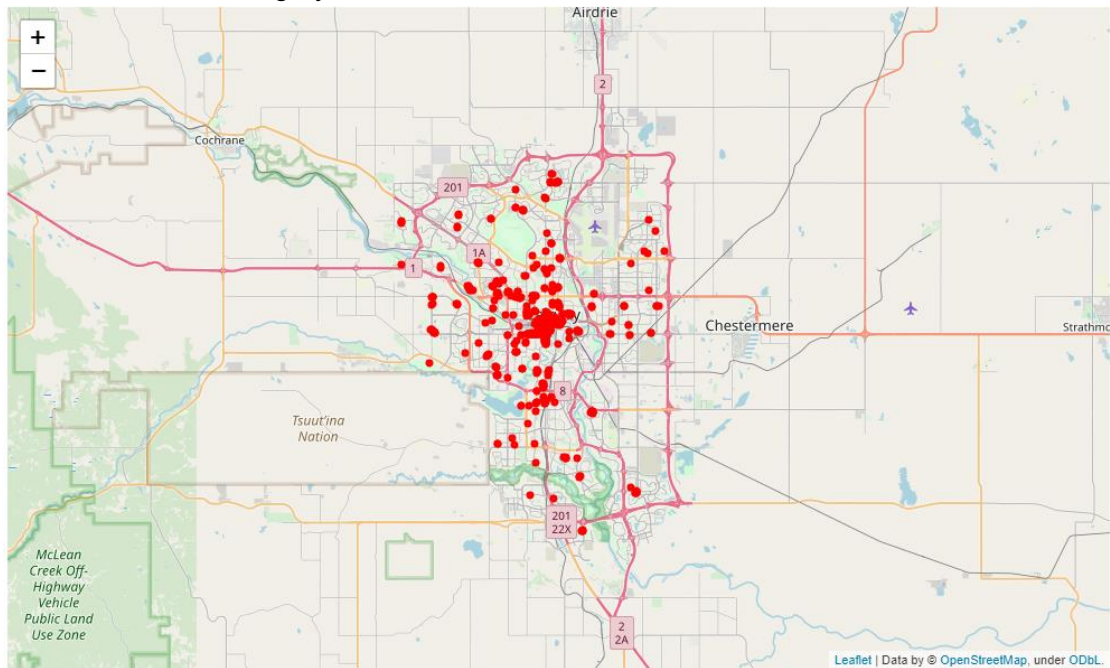
Restaurant map of Calgary

There are only 8 farmer markets located in Calgary. No farmer market located in the north part of Calgary
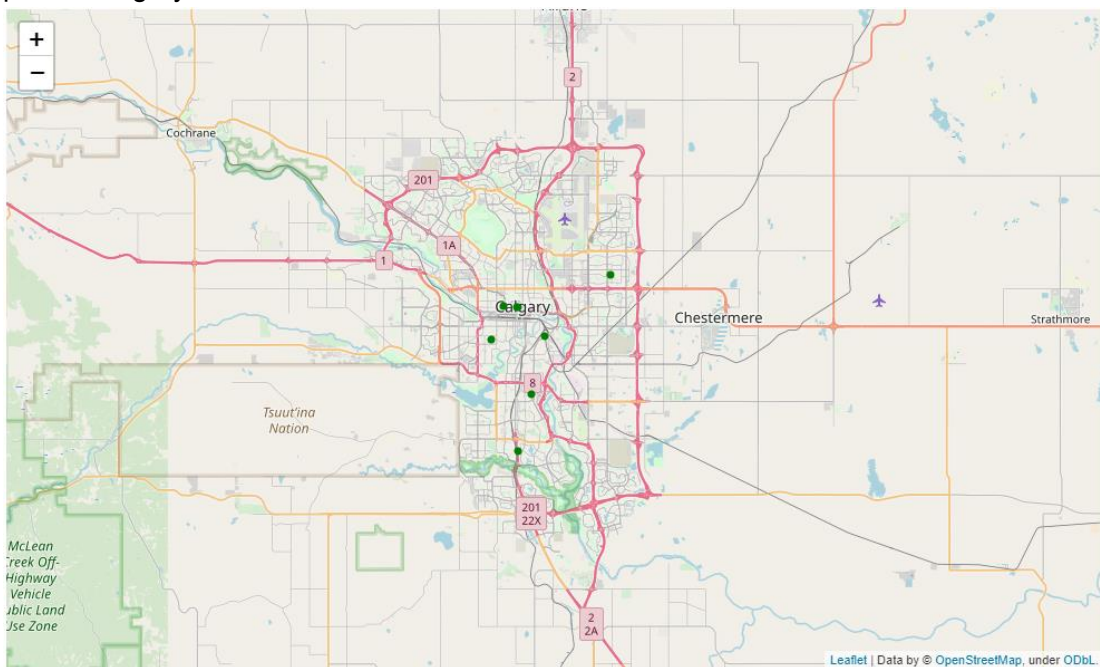
Farmer Markets map Calgary

With the clustering of neighborhoods, there are one cluster all around the city. In other words, the results of the cluster with k =5 is not optimal. The results with k= 20 are much better.

There are 10 neighborhoods in cluster2 which include Bankview, Brentwood, Canyon Meadows, Glendale, and so on. Neighborhoods in this cluster would be a potential competition place for pizza place.

	Name	Cluster_Labels3	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
11	Bankview	2	Pizza Place	Coffee Shop	Wings Joint	Falafel Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant
19	Brentwood	2	Pizza Place	Wings Joint	Falafel Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant	Gluten-free Restaurant
27	Canyon Meadows	2	Pizza Place	Wings Joint	Falafel Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant	Gluten-free Restaurant
86	Glendale	2	Pizza Place	Wings Joint	Falafel Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant	Gluten-free Restaurant
134	Millrise	2	Pizza Place	Wings Joint	Falafel Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant	Gluten-free Restaurant
181	Richmond	2	Pizza Place	Wings Joint	Falafel Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant	Gluten-free Restaurant

<u>Cluster2</u>

There are 5 neighborhoods in cluster5 which include Falconridge, Forest Lawn, Haysboro, and so on. Those neighborhoods would have a strong competition for fast food and wings joint.

	Name	Cluster_Labels3	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
77	Falconridge	5	Fast Food Restaurant	Wings Joint	Falafel Restaurant	Italian Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant
81	Forest Lawn	5	Fast Food Restaurant	Vietnamese Restaurant	Wings Joint	Eastern European Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant
97	Haysboro	5	Fast Food Restaurant	Wings Joint	Falafel Restaurant	Italian Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant
98	Hidden Valley	5	Fast Food Restaurant	Wings Joint	Falafel Restaurant	Italian Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant
100	Highland Park	5	Fast Food Restaurant	Wings Joint	Falafel Restaurant	Italian Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant
187	Rosscarrock	5	Fast Food Restaurant	Wings Joint	Falafel Restaurant	Italian Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant

<u>Cluster5</u>

There are 4 neighborhoods in cluster 6 which include Cambrian, Coral Springs, Roxboro and Spruce Cliff. Those four neighborhoods got many Indian Restaurant which would not be the best place to open a new Indian Restaurant.

	Name	Cluster_Labels3	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
25	Cambrian Heights	6	Indian Restaurant	Wings Joint	Falafel Restaurant	Italian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant	Gluten-free Restaurant
44	Coral Springs	6	Indian Restaurant	Wings Joint	Falafel Restaurant	Italian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant	Gluten-free Restaurant
188	Roxboro	6	Indian Restaurant	Bar	Café	Wings Joint	Fast Food Restaurant	Italian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant
220	Spruce Cliff	6	Indian Restaurant	Café	Wings Joint	Falafel Restaurant	Italian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant

<u>Cluster6</u>

There are 6 neighborhoods in cluster 9 which include Cedarbrae, Country Hills, and so on. Those neighborhoods had many Vietnamese restaurant which made those area a lot of competition for new starter with idea of Vietnamese cuisine.

	Name	Cluster_Labels3	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
30	Cedarbrae	9	Vietnamese Restaurant	Bar	Wings Joint	Falafel Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant
46	Country Hills	9	Vietnamese Restaurant	Hong Kong Restaurant	Wings Joint	Eastern European Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Greek Restaurant	Gluten-free Restaurant
80	Forest Heights	9	Vietnamese Restaurant	Noodle House	Wings Joint	Falafel Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant
154	Patterson	9	Vietnamese Restaurant	Bar	Pizza Place	Wings Joint	Falafel Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant
160	Queens Park Village	9	Vietnamese Restaurant	Bar	Fast Food Restaurant	Wings Joint	Falafel Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant
164	Red Carpet	9	Vietnamese Restaurant	Bar	Wings Joint	Falafel Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant

<center>Cluster9</center>

There are 4 neighborhoods clustering in cluster 11, which include Glenbrook, Mount Pleasant and so on. Those community have a lot of competition between Japanese cuisine investor.

	Name	Cluster_Labels3	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
85	Glenbrook	11	Sushi Restaurant	Sports Bar	Wings Joint	Eastern European Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant
138	Mount Pleasant	11	Sushi Restaurant	Fast Food Restaurant	Restaurant	Wings Joint	Eastern European Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant
215	South Calgary	11	Sushi Restaurant	Breakfast Spot	Sandwich Place	Wings Joint	Falafel Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant
218	Southwood	11	Sushi Restaurant	Wings Joint	Eastern European Restaurant	Indian Restaurant	Hotpot Restaurant	Hotel Bar	Hookah Bar	Hong Kong Restaurant	Greek Restaurant	Gluten-free Restaurant

<center>Cluster11</center>

Discussion

In this study we have focused on the restaurant location choosing problem for City of Calgary. At first the relationship between population and venue have been study. The top 10 neighborhoods with high population have been choose for plot. It is easy to understand that if there is a correlation coefficient between population and venue then the community with high population will have large number of venues. By reading the map top 10 neighborhoods of population and venues, it is clearly no significant correlation between these two parameters. The 10 largest neighborhoods are mostly located far from downtown of Calgary but the 10 neighborhoods with highest number of venues are located near the core of City of Calgary. The relationship between the restaurant and the population also had been done. 522 of 1187 venues are restaurant we can not conclude more venues means more restaurants.

By using the k-mean clustering we simply found high density area for several special kind of restaurant. For example, Vietnamese restaurants located in Country Hills and Forest Heights. Those two neighborhoods are known as Asian immigrant community. Although not all the clustering done properly, the cluster 14 which is the largest cluster in the results might done incorrectly. By reading the results in cluster 14 we could saw there are neighborhoods all around the city but no special feature. It is worth to mentioned in this report, cluster 14 include almost all the neighborhoods I personally familiar with. I think the reason was not clear but further study could be done. Besides this one, the farmer market information has been used to help us understand the choose of the location for restaurants.

Since there are only 8 farmer markets in Calgary, there would be an option for investors to open their new business near those farmer markets. There were a lot of new pubs open in southern Calgary which means more competition in southern Calgary. Since there are farmers market in southern Calgary I think this would be a reason why some investors want to open their restaurant in southern Calgary. In my opinion, more competition sometimes means good services and food quality for costumers. It all depends on which kind of restaurant the investor wants to open, if someone would like to open an India Restaurant or Vietnamese Restaurants I would suggest they open their business in Country Hills which is the community of immigrants from Asian.

Conclusion

This analysis was done on limited data. Since Calgary had 1 million population, this might be right or wrong compared to some analysis by the government of City of Calgary. But if there is good amount of data is available, better results could be come up with. Every thing has two sides, if there are lot of restaurants probably there is lot of demands as well. The northern Calgary neighborhoods such as Country Hills, Panaroma Hills were optimal location for open Vietnamese Restaurant although there are no farmer market nearby. The downtown of Calgary has high concentration of restaurant business. There are very competitive market near the core of Calgary.

As per the neighborhood or restaurant type mentioned like Chinese restaurant analysis can be done further. A venue with lowest risk and competition can be identified.