

Locations To Open Asian Restaurants In Edmonton

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1. Introduction

Edmonton is the capital city of the Alberta province in Canada. Its metro area had a population of 1,491,000[1] at the beginning of 2021, making it Alberta's second-largest city and Canada's fifth-largest municipality [2]. As Edmonton's population continues to grow, the number of immigrants in the area also increases, making Edmonton's visible minority more prominent. According to the source in 2016, 70% of its population is European origins while its 10% are originated from East or Southeast Asia [3]. As many Asians immigrate to Edmonton, many of them pursue their career to support themselves or their families while there are some who start their own business. One of the major business they choose to start is restaurants.

2. Business Problem

While some wants to open coffee shops, bar, or American restaurants to target key customers in the city, there are some people who want to open their own restaurants serving food from their own countries. The goal of this project is to choose optimal locations for Asians to open their Asian restaurants, such as Chinese, Korean, Japanese, or Vietnamese. We will be using Foursquare API to search its locations.

3. Data

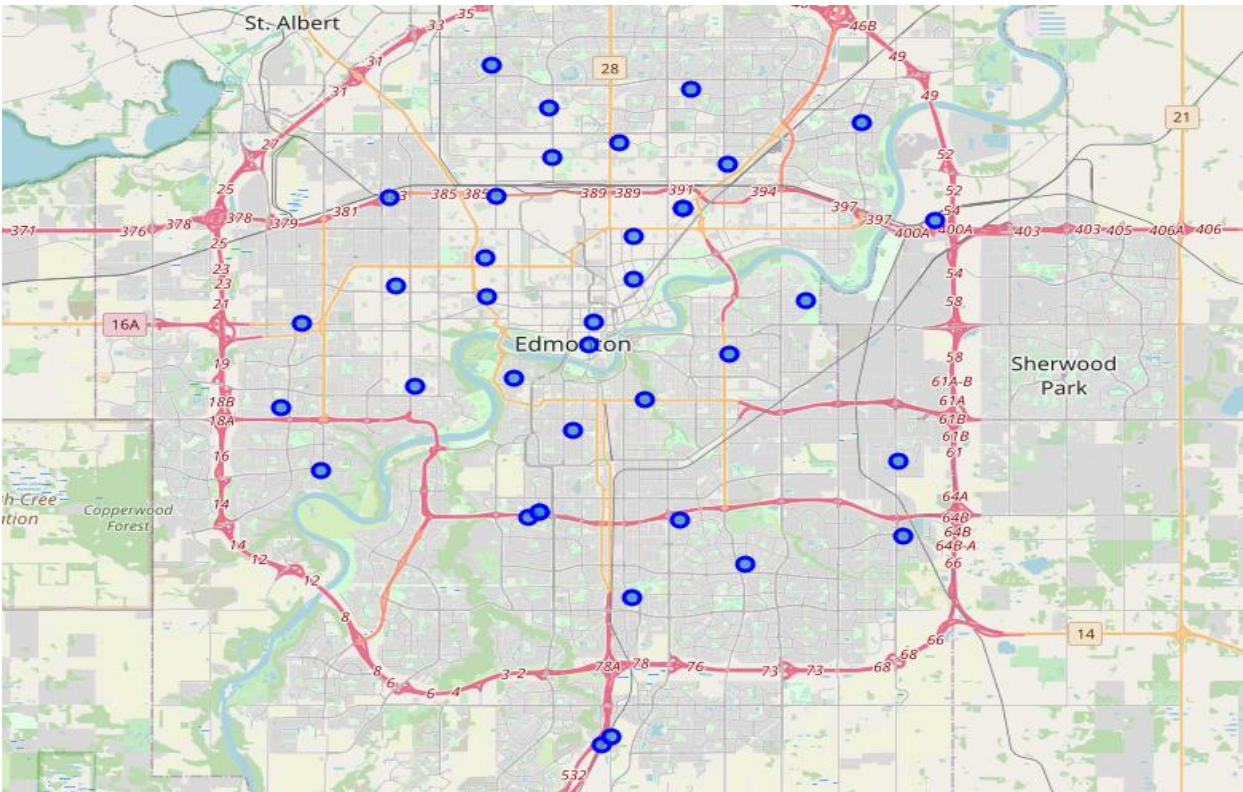
In this project, we will extract the data from Wikipedia [4] which includes postal code, borough, neighborhood, latitude, and longitude in Alberta. The table below represents the data we can scrap from the page.

	Postal Code	Borough	Neighborhood	Latitude	Longitude
0	T1A	Medicine Hat	Central Medicine Hat	50.036460	-110.679250
1	T2A	Calgary	Penbrooke Meadows, Marlborough	51.049680	-113.964320
2	T3A	Calgary	Dalhousie, Edgemont, Hamptons, Hidden Valley	51.126060	-114.143158
3	T4A	Airdrie	East Airdrie	51.272450	-113.986980
4	T5A	Edmonton	West Clareview, East Londonderry	53.5899	-113.4413

As this project focus on the specific location, Edmonton, we can filter the data that its Borough only matches 'Edmonton' like the table below.

	Postal Code	Borough	Neighborhood	Latitude	Longitude
0	T5A	Edmonton	West Clareview, East Londonderry	53.5899	-113.4413
1	T6A	Edmonton	North Capilano	53.5483	-113.408
2	T5B	Edmonton	East North Central, West Beverly	53.5766	-113.4608
3	T6B	Edmonton	SE Capilano, West Southeast Industrial, East B...	53.5322	-113.4404
4	T5C	Edmonton	Central Londonderry	53.6129	-113.4572

Using Folium, we create the map showing these neighborhoods in Edmonton to get better understanding of these locations.



Using a Foursquare API explore endpoints, we will collect a list of venues near the locations (the blue dots shown in the above map).

4. Methodology

As we got the table that shows Borough information in Alberta in Data section, we drop the cells that shows ‘Not Assigned’ in Neighborhood, Latitude, and Longitude. The table below shows the original section.

	Postal Code	Borough	Neighborhood	Latitude	Longitude
171	T1Z	Rocky View	Not assigned	Not assigned	Not assigned
172	T2Z	Calgary	Douglas Glen, McKenzie Lake, Copperfield, East...	50.9023	-113.9873
173	T3Z	Redwood Meadows	Not assigned	50.9821	-114.5178
175	T5Z	Edmonton	West Lake District	53.5966	-113.4882
177	T7Z	Stony Plain	Not assigned	53.5202	-114.0135

The next table shows the edited version. As we can see below, cell number 171 that had ‘Not Assigned’ value for Neighborhood, Latitude, and Longitude was dropped.

	Postal Code	Borough	Neighborhood	Latitude	Longitude
168	T7Y	Spruce Grove, Parkland County, Lac Ste. Anne C...	Spruce Grove, Parkland County, Lac Ste. Anne C...	53.4495	-113.7135
172	T2Z	Calgary	Douglas Glen, McKenzie Lake, Copperfield, East...	50.9023	-113.9873
173	T3Z	Redwood Meadows	Redwood Meadows	50.9821	-114.5178
175	T5Z	Edmonton	West Lake District	53.5966	-113.4882
177	T7Z	Stony Plain	Stony Plain	53.5202	-114.0135

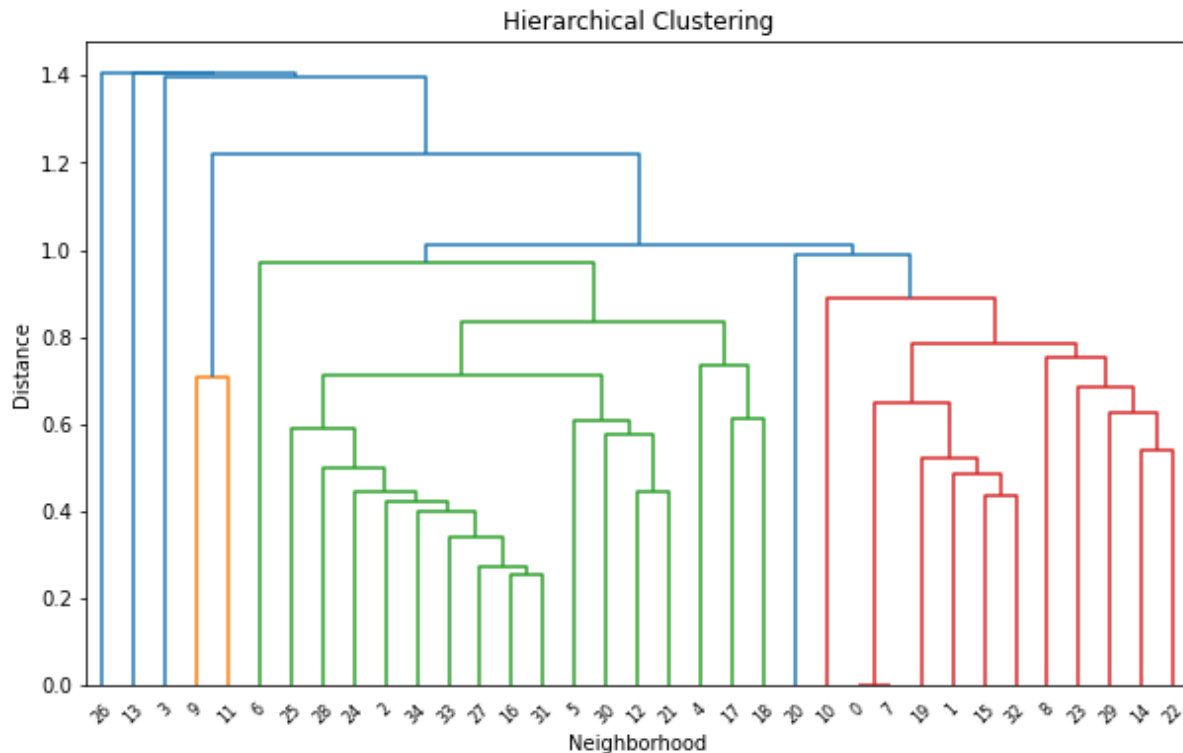
As we use Foursquare API explore endpoints, we can collect a list of venues and its categories. The table below shows that each neighborhood has all kinds of venues such as American Restaurant, Bakery, and park etc.

	Neighborhoods	American Restaurant	Arts & Crafts Store	Asian Restaurant	Bakery	Bank	Baseball Field	Baseball Stadium	Big Box Store	Bookstore	...	Thai Restaurant	Theater	Toy / Game Store	Trail
0	Central Beverly	0.000000	0.2	0.0	0.000000	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.000000
1	Central Bonnie Doon	0.166667	0.0	0.0	0.000000	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.166667
2	Central Jasper Place, Buena Vista	0.000000	0.0	0.0	0.111111	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.000000
3	Central Londonderry	0.000000	0.0	0.0	0.000000	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.000000
4	Central Mistatim	0.000000	0.0	0.0	0.000000	0.0	0.0	0.0	0.0	0.0	...	0.0	0.0	0.0	0.000000

Next, we can collect and sort it out to figure which common venues can be noticed in each neighborhood.

	Neighborhoods	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	Central Beverly	Department Store	Smoke Shop	Grocery Store	Park	Arts & Crafts Store	Vietnamese Restaurant	Museum	Pizza Place	Pharmacy	Pet Store
1	Central Bonnie Doon	American Restaurant	Water Park	Cosmetics Shop	Electronics Store	Trail	Grocery Store	Paper / Office Supplies Store	Noodle House	Office	Paintball Field
2	Central Jasper Place, Buena Vista	Café	Pizza Place	Sandwich Place	Sushi Restaurant	Salad Place	Convenience Store	Fast Food Restaurant	Liquor Store	Bakery	Pharmacy
3	Central Londonderry	Construction & Landscaping	American Restaurant	New American Restaurant	Plaza	Playground	Pizza Place	Pharmacy	Pet Store	Park	Paper / Office Supplies Store
4	Central Mistatim	Warehouse Store	Liquor Store	Casino	American Restaurant	New American Restaurant	Plaza	Playground	Pizza Place	Pharmacy	Pet Store

As we see above, it shows that there are some common venues like restaurants in Central Londonderry. 2nd and 3rd most common venues are America Restaurant and New American Restaurant. We can use this method to figure which neighborhood has the most restaurants. Next, we can apply k-means clustering method to group the neighborhood that are similar to one another. To get the optimum k value we can draw the hierarchical clustering diagram.



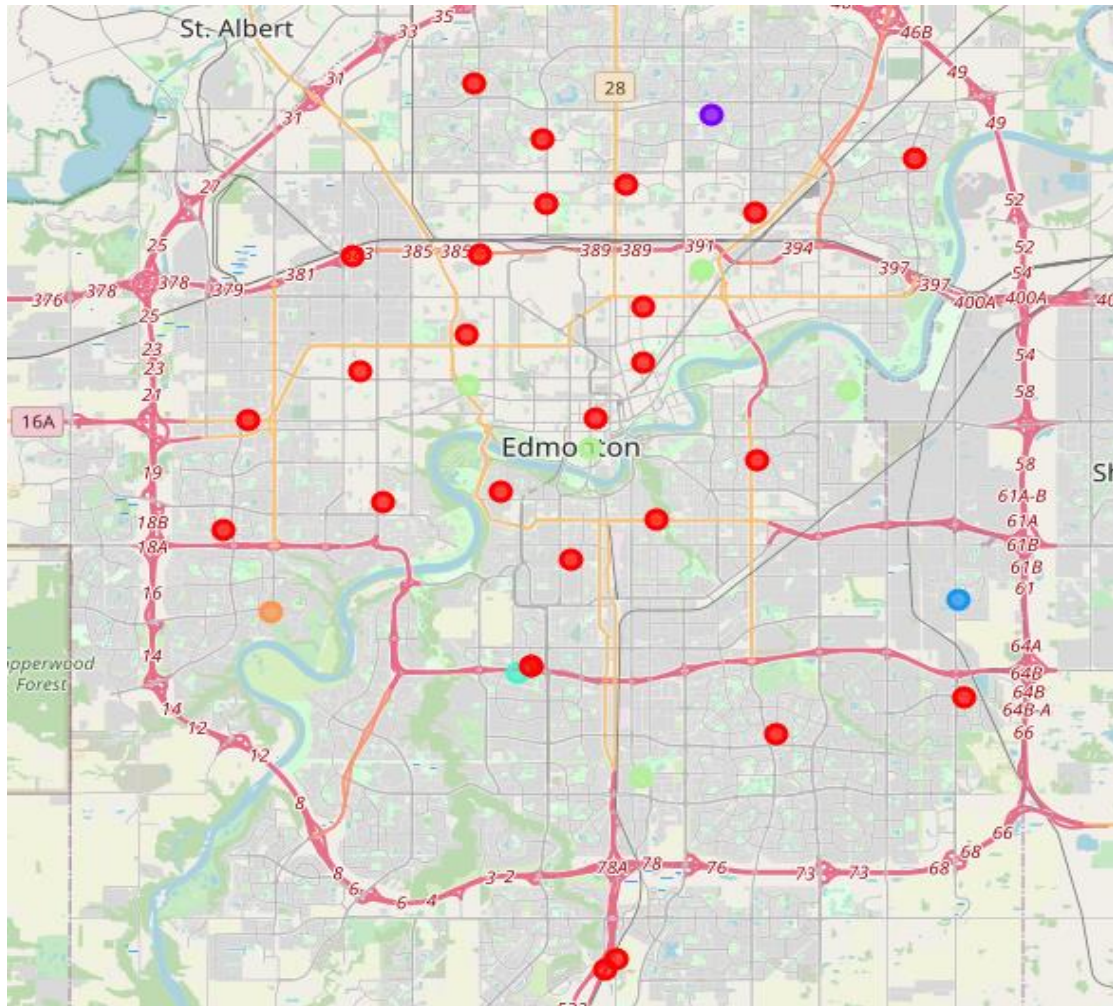
We can cut off at distance 1.0 and figure that we can use 6 clusters as a optimum value for k.

5. Results and Discussion

To grasp the better understanding of the whole scenario, we can merge the entire cells we collected before. The table below shows neighborhood info, cluster labels and common venues.

Postal Code	Borough	Neighborhood	Latitude	Longitude	clusterlabels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	
0	T5A	Edmonton	West Clareview, East Londonderry	53.5899	-113.4413	0.0	Record Shop	Mexican Restaurant	Bus Station	Buffet	Toy / Game Store
1	T6A	Edmonton	North Capilano	53.5483	-113.408	4.0	Playground	Park	Ski Trail	Bus Station	American Restaurant
2	T5B	Edmonton	East North Central, West Beverly	53.5766	-113.4608	4.0	Department Store	Smoke Shop	Grocery Store	Park	Arts & Crafts Store
3	T6B	Edmonton	SE Capilano, West Southeast Industrial, East B...	53.5322	-113.4404	0.0	Business Service	Playground	Music Venue	Plaza	Pizza Place
4	T5C	Edmonton	Central Londonderry	53.6129	-113.4572	1.0	Construction & Landscaping	American Restaurant	New American Restaurant	Plaza	Playground

We can use Folium package to create map based on the table above.



Each neighborhood is separated by six different colors based on their clusters. Each dot represents different cluster labels.

Dot Color	Cluster
Red	1
Purple	2
Blue	3
Cyan	4
Green	5
Orange	6

The tables below represent neighborhoods and its top five most common venues for each cluster.

Cluster 1

	Borough	Neighborhood	clusterlabels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Edmonton	West Clareview, East Londonderry	0	Record Shop	Mexican Restaurant	Bus Station	Buffet	Toy / Game Store
3	Edmonton	SE Capilano, West Southeast Industrial, East B...	0	Business Service	Playground	Music Venue	Plaza	Pizza Place
5	Edmonton	Central Bonnie Doon	0	American Restaurant	Water Park	Cosmetics Shop	Electronics Store	Trail
6	Edmonton	West Londonderry, East Calder	0	Dog Run	Bakery	Baseball Field	Arts & Crafts Store	Recreation Center
7	Edmonton	South Bonnie Doon, East University	0	American Restaurant	Pharmacy	Mediterranean Restaurant	Flower Shop	Coffee Shop
8	Edmonton	North Central, Queen Mary Park, Blatchford	0	Music Venue	Café	Bakery	Bank	Pharmacy
9	Edmonton	West University, Strathcona Place	0	College Gym	Theater	Pub	Fast Food Restaurant	Diner
10	Edmonton	NorthDowntown Fringe, East Downtown Fringe	0	Soccer Stadium	Gym	Gift Shop	Grocery Store	Café
11	Edmonton	Southgate, North Riverbend	0	Furniture / Home Store	Restaurant	Coffee Shop	Sandwich Place	American Restaurant
12	Edmonton	North Downtown	0	Coffee Shop	Sandwich Place	Pub	Restaurant	Hotel
16	Edmonton	North Westmount, West Calder, East Mistatim	0	Pub	Breakfast Spot	Middle Eastern Restaurant	Furniture / Home Store	New American Restaurant

Cluster 2

	Borough	Neighborhood	clusterlabels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
4	Edmonton	Central Londonderry	1	Construction & Landscaping	American Restaurant	New American Restaurant	Plaza	Playground

Cluster 3

	Borough	Neighborhood	clusterlabels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
23	Edmonton	East Southeast Industrial, South Clover Bar	2	Café	Housing Development	Bus Station	American Restaurant	Plaza

Cluster 4

	Borough	Neighborhood	clusterlabels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
13	Edmonton	Kaskitayo, Aspen Gardens	3	Lake	American Restaurant	Music Venue	Plaza	Playground

Cluster 5

	Borough	Neighborhood	clusterlabels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
1	Edmonton	North Capilano	4	Playground	Park	Ski Trail	Bus Station	American Restaurant
2	Edmonton	East North Central, West Beverly	4	Department Store	Smoke Shop	Grocery Store	Park	Arts & Crafts Store
14	Edmonton	South Downtown, South Downtown Fringe (Alberta...	4	Park	French Restaurant	Sandwich Place	Hotel	Baseball Stadium
20	Edmonton	Glenora, SW Downtown Fringe	4	Portuguese Restaurant	Park	Music Venue	Plaza	Playground
21	Edmonton	South Industrial	4	Park	Gym	Golf Driving Range	American Restaurant	Music Venue
32	Edmonton	Central Beverly	4	Department Store	Smoke Shop	Grocery Store	Park	Arts & Crafts Store

Cluster 6

	Borough	Neighborhood	clusterlabels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
19	Edmonton	Southwest Edmonton	5	Paintball Field	American Restaurant	Music Venue	Plaza	Playground

In cluster 1, Central Bonnie Doon and South Bonnie Doon has most American restaurants. Cluster 2 shows there are a lot of America restaurants in Central Londonderry. Cluster 4 and 6 shows that 2nd most common venues American restaurants in Kaskitayo and Southwest Edmonton, respectively. Depending on where they live, recommended locations can be different. If they prefer to live in north, Central Londonderry would be the proper location to open. If it is the south side they want to reside, Southwest Edmonton and Kaskitayo location would be recommended. In central Edmonton, Bonnie Doon area would be the most preferable location to start their business.

6. Conclusion

As individuals or families immigrate to new country, opening a business can be extremely challenge. In order to succeed, selecting a perfect location would be critical. Based on the exploratory data analysis above, there are multiple locations we can choose. If it is north or south side they choose to live in, Central Londonderry and Southwest Edmonton, respectively, would be the perfect location they could open their Asian restaurant. If they choose to live in Central or live somewhere else but don't mind going to work in Central Edmonton, Bonnie Doon would be the best location as there are lots of restaurants around in the area, which mean there would be a lot of people passing through to grab a meal. If I recommend the best place out of all places, it would be Bonnie Doon since it has most restaurants in the city.

Reference

- [1] <https://www.macrorends.net/cities/20373/edmonton/population>
- [2] <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/hlt-fst/pd/pl/Table.cfm?Lang=Eng&T=302&SR=1&S=86&O=A&RPP=9999&PR=48>
- [3] <https://www12.statcan.gc.ca/nhs-enm/2011/dp-pd/prof/details/page.cfm?Lang=E&Geo1=PR&Code1=48&Data=Count&SearchText=alberta&SearchType=Begins&SearchPR=01&A1=All&B1=All&Custom=&TABID=1>
- [4] https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_T