Suggesting suitable location for the setting up of an African Restaurant in the Calgary neighborhoods in Alberta, Canada

By Taiwo Awe

1. INTRODUCTION/BUSINESS PROBLEM

With the increasing number of Africans migrating to the city of Calgary and with need for Africa and Africans to start marketing their cultural heritage especially through their dishes to the rest of the world, there is therefore a need to start setting African restaurants. There exist quiet a number of restaurants such as the American Restaurants, Chinese Restaurants, Japanese Restaurants and the likes in the city of Calgary, but very few African Restaurants. According to tripadvisor (available at https://www.tripadvisor.com/Restaurants-g154913-Calgary_Alberta.html) there are 3346 restaurants in the city of Calgary, out of which only seven (7) are African restaurants.

Also, let's look at the demography of Calgary, the table below shows the population statistics of the various nationalities found in Calgary from 2006 to 2010.

	Population (2016)	% of total population (2016)	Population (2011)	% of total population (2011)	Population (2006)	% of total population (2006)
European	**744,625**	**60.90%**	**727,940**	**67.30%**	**722,595**	**73.80%**
South Asian	115,795	9.50%	81,180	7.50%	56,210	5.70%
Chinese	102,070	8.30%	74,070	6.80%	65,365	6.70%
Black	55,730	4.60%	31,870	2.90%	20,540	2.10%
Filipino	71,780	5.90%	47,350	4.40%	24,915	2.50%
Latin American	33,540	2.70%	19,870	1.80%	13,120	1.30%
Arab	25,190	2.10%	16,745	1.50%	11,245	1.10%
Southeast Asian	21,610	1.80%	20,530	1.90%	15,410	1.60%
West Asian	12,610	1%	8,470	0.80%	5,930	0.60%
Korean	11,235	0.90%	8,160	0.80%	6,710	0.70%
Japanese	7,080	0.60%	5,160	0.50%	4,490	0.50%
Visible minority, n.i.e.	1,445	0.10%	2,860	0.30%	1,920	0.20%
Multiple visible minorities	13,895	1.10%	9,130	0.80%	6,605	0.70%

Source Wikipedia(available at https://en.wikipedia.org/wiki/Demographics_of_Calgary)

The table above shows an increase in the population of blacks which include Africans from 2.1% of the total population in 2006, to 4.6% in 2016. Majority of this increase in black population is due to

increase migration of Africans to the City according to a United Nations document available http://www.un.org/en/development/desa/population/migration/data/empirical2/migrationflows.shtml. Setting up African restaurant in the city of Calgary will therefore be a profitable business decision and also a way to market more of African delicacies to other nationalities who may not even be of Africa descent.

2. DATA DESCRIPTION

The aim for this project therefore is to suggest the best possible location to set up an African Restaurant in the city of Calgary. The data for the purpose of this project would be sourced from:

a. Wikipedia. At https://en.wikipedia.org/wiki/List_of_postal_codes_of_Canada:_T is a list of the neighborhoods in Calgary together with their latitude and longitude coordinates. This dataset would be filtered and cleaned to extract only the borough of Calgary.
b. The Forsquare API would be used to get the most common venues in the city of Calgary.

Using this dataset, we are going to set certain parameters so as to achieve our objectives. These parameters are:

a. Locations not already crowded with the presence of restaurant of any kind.
b. Locations where there is no African restaurant.

3. METHODOLOGY

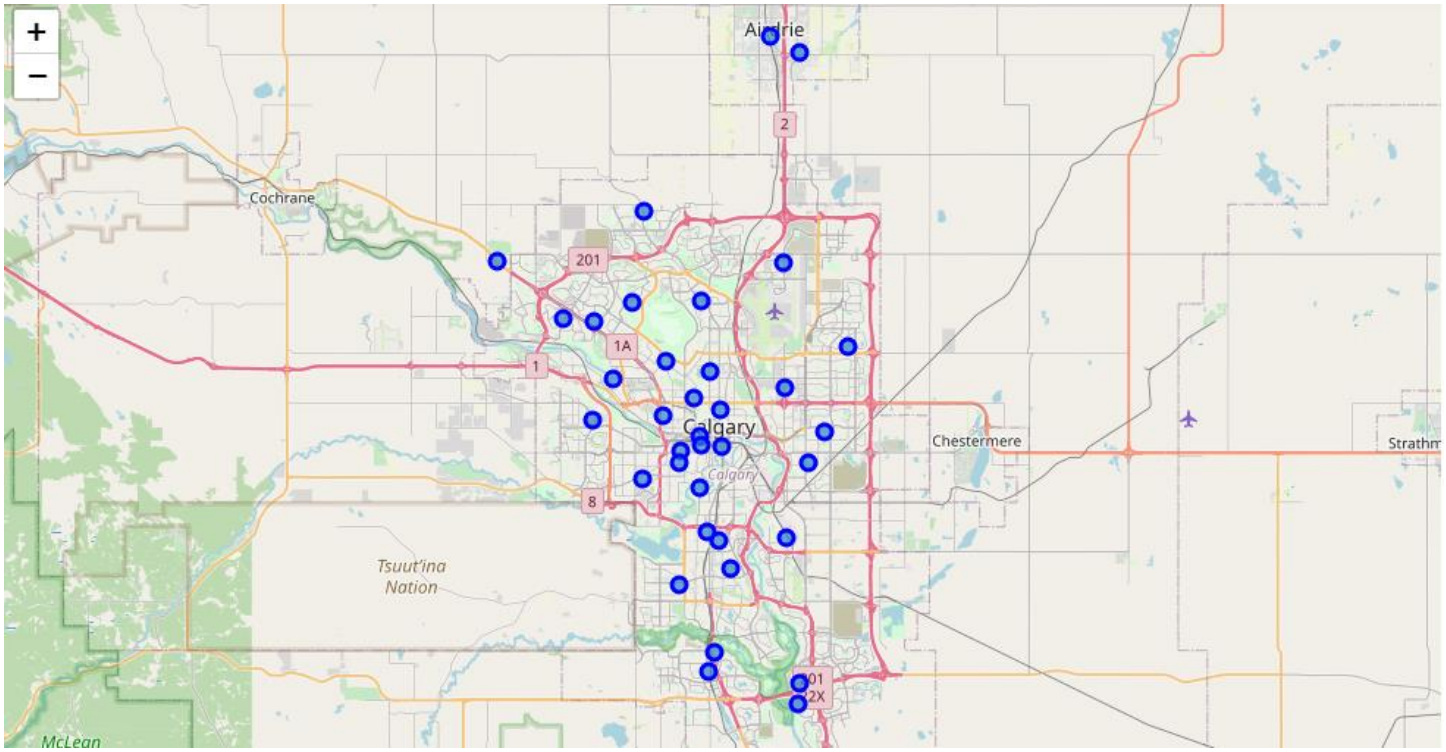
The main data used in this project was the latitude and longitude coordinates of Calgary gotten from Wikipedia as explained in the Data section of this report. The data was passed into DataFrame and cleaned to remove every null value or any duplicate from the dataset. The table below shows the format the data appeared after cleaning.

	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

This data was then filter to narrow down our analysis to only Calgary borough. The result is presented in the table below:

	Postal Code	Borough	Neighborhood	Latitude	Longitude
0	T2A	Calgary	Penbrooke Meadows, Marlborough	51.04968	-113.964320
1	T3A	Calgary	Dalhousie, Edgemont, Hamptons, Hidden Valley	51.12606	-114.143158
2	T2B	Calgary	Forest Lawn, Dover, Erin Woods	51.03180	-113.978600
3	T3B	Calgary	Montgomery, Bowness, Silver Springs, Greenwood	51.08090	-114.161600
4	T2C	Calgary	Lynnwood Ridge, Ogden, Foothills Industrial, G...	50.98780	-114.000100

To visualize the map of Calgary neighborhoods, the folium library in python was used to create the map using the latitude and longitude coordinates given in the Calgary DataFrame above. Below is the map that was produced:

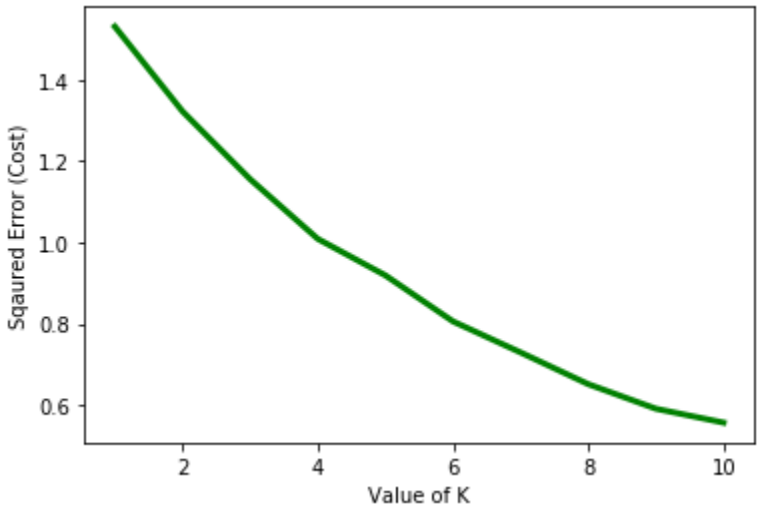


Using the cleaned dataset, we filter it to obtain the neighborhoods of the Calgary borough. The result is passed into the Foursquare API to obtain the venues in each neighborhood within the radius of 1500 meters and the limit of 100. The result obtained using the Foursquare API was converted into a DataFrame and grouped by the number of neighborhoods. The result of this shows there are 187 unique categories of venues in the Calgary neighborhood.

Then the ten most common venues in each of the neighborhood were analyzed and the result was the table below:

	Neighborhood	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	Braeside, Cedarbrae, Woodbine	Coffee Shop	Gas Station	Convenience Store	Pub	Liquor Store	Sandwich Place	Fast Food Restaurant	Shopping Mall	Smoothie Shop	Lake
1	Brentwood, Collingwood, Nose Hill	Pub	Convenience Store	Furniture / Home Store	Liquor Store	Gym	Park	Smoothie Shop	Burger Joint	Bubble Tea Shop	Coffee Shop
2	Bridgeland, Greenview, Zoo, YYC	Chinese Restaurant	Coffee Shop	Vietnamese Restaurant	Pub	Italian Restaurant	Café	Sandwich Place	Park	Convenience Store	Asian Restaurant
3	City Centre, Calgary Tower	Restaurant	Hotel	Pub	Café	Steakhouse	Coffee Shop	Pizza Place	Bakery	Diner	Brewery
4	Connaught, West Victoria Park	Restaurant	Coffee Shop	Pizza Place	Pub	Italian Restaurant	Bakery	Brewery	Bar	Cocktail Bar	Steakhouse

The kmeans cluster algorithm was used to cluster the boroughs in Calgary into 4 clusters. Four clusters were used because the elbow method of calculating the optimal value of k, shows 4 as the best fit value for our kmeans cluster algorithm.



4. RESULTS

The result of our clustering shows majority of the neighborhood belong to the second cluster (cluster '1') while the remaining neighborhoods were sparsely distributed among the other three clusters.

	Postal Code	Borough	Neighborhood	Latitude	Longitude	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	7th Most Common Venue
0	T2A	Calgary	Penbrooke Meadows, Marlborough	51.04968	-113.964320	1	Fast Food Restaurant	Vietnamese Restaurant	Grocery Store	Ice Cream Shop	Pharmacy	Italian Restaurant	Restaurant
1	T3A	Calgary	Dalhousie, Edgemont, Hamptons, Hidden Valley	51.12606	-114.143158	0	Convenience Store	Asian Restaurant	Gas Station	Chinese Restaurant	Gym / Fitness Center	Trail	General Entertainment
2	T2B	Calgary	Forest Lawn, Dover, Erin Woods	51.03180	-113.978600	1	Grocery Store	Vietnamese Restaurant	Fast Food Restaurant	Convenience Store	Bar	Sandwich Place	Pizza Place
3	T3B	Calgary	Montgomery, Bowness, Silver Springs, Greenwood	51.08090	-114.161600	1	Coffee Shop	Pizza Place	Convenience Store	Grocery Store	Clothing Store	Restaurant	Sporting Goods Shop
4	T2C	Calgary	Lynnwood Ridge, Ogden, Foothills Industrial, G...	50.98780	-114.000100	1	Pizza Place	Coffee Shop	Pharmacy	Supermarket	Convenience Store	Spa	Comic Shop

We can classify the clusters thus:

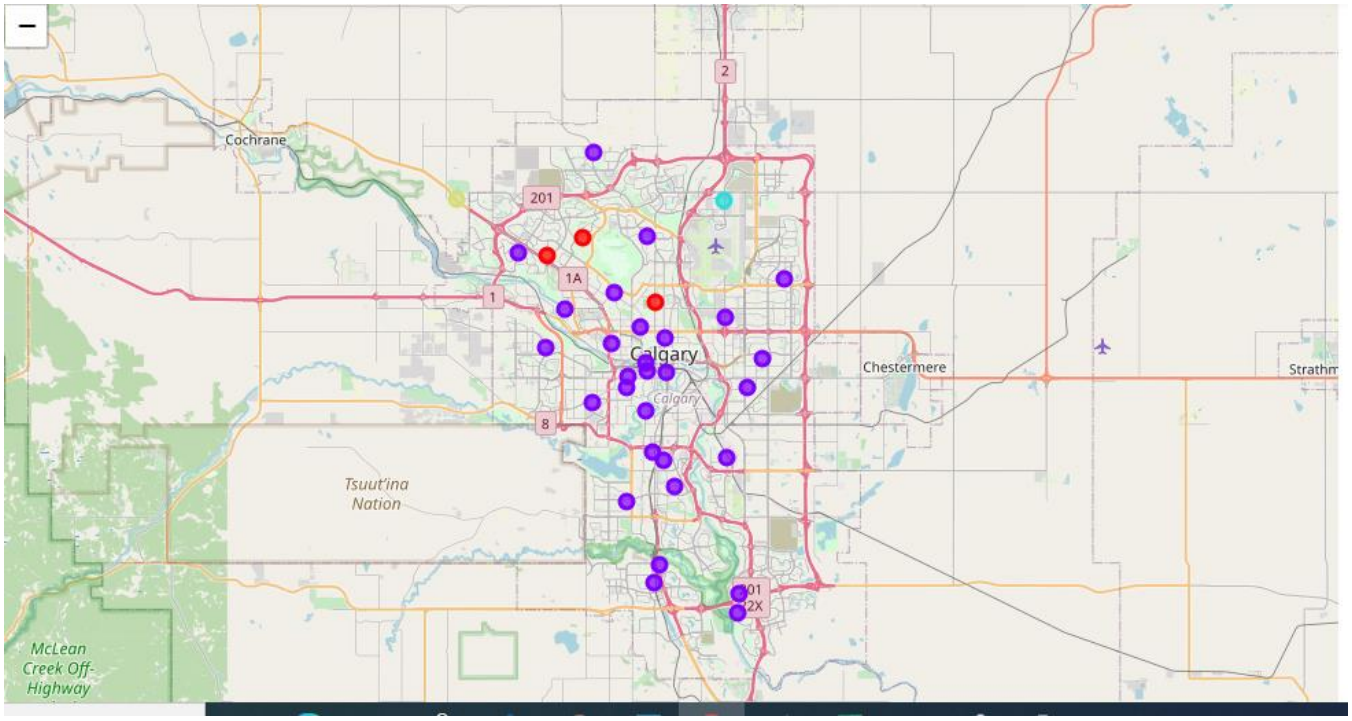
The first cluster (cluster ‘0’) – basically a relaxation center

The second cluster (cluster ‘1’) – for restaurants and café

The third cluster (cluster ‘2’) - a socially mixed neighborhood

The fourth cluster (cluster ‘3’) – more of a sports center

The result was produced on the map using folium.



5. DISCUSSION

Analysing the result of the clustering shows an oversaturation of restaurants in the second cluster. Most of the neighborhood in this particular cluster already possess at least one restaurant with neighborhoods such as Highfield and Burns Industrial having six restaurants among their top ten venues. Since the parameter we sent for this project is not to locate our African restaurant in a place with crowded restaurant of any type, we may want to look at the other clusters in setting up the restaurant.

The first cluster in our analysis projected three neighborhoods also with modest number of restaurants. The third cluster in our analysis reveals that the neighborhood possesses just one restaurant in the first ten venues within the neighborhood. This cluster may be considered for the location. However, the fourth

cluster in our algorithm is the Northwest Calgary neighborhood. A critical look at the top ten venues of this neighborhood shows that there is no restaurant of any type. The Northwest Calgary will be the most suitable place to set up our African restaurant.

6. CONCLUSION

Comparing the parameters we set at the beginning of this project which are:

(a) locations not already crowded with the presence of restaurant of any kind.

(b) Locations where there is no African restaurant,

with the result we obtained from our clustering analysis, the best neighborhood to have our African restaurant set up is the Northwest Calgary. According to the result of our analysis, the Northwest Calgary seems to be the center of sporting activities since there are both a golf course and a football stadium within the vicinity of the neighborhood. Along with this are a number of stores but never a restaurant at least in the first ten places. Considering the fact the sporting events pull a lot crowd and therefore generate a lot of traffic, couple with the fact that there is no restaurant of any kind in the top ten places in the Northwest Calgary neighborhood; I will suggest that this neighborhood is the best place to site an African restaurant.