

An advise on where to start a yoga studio: segmenting and clustering of neighborhoods in Calgary, Alberta, Canada

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1. Introduction

1.1 Background

To date, practicing yoga is gaining popularity. Multiple studies looked into the positive effects of yoga and concluded that yoga is advantageous for improving health-related quality of life (QoL) and physical fitness in pediatric cancer out-patients, as well as improving cognitions and behaviors towards pain (1, 2). In daily life, yoga might positively influence academic performance in students, relieve stress, anxiety, depression and chronic pain, enhance muscular strength and body flexibility, improve respiratory and cardiovascular function, promote recovery from addiction, and enhance sleep patterns and well-being (3, 4, 5). Therefore, increasing the amount of facilities where yoga can be practiced and taught is beneficial for public health.

1.2 Problem

When starting-up a yoga studio, it might be a challenge to find the right spot for setting up the studio. Often, most yoga studios might settle in the most crowded areas of a city as to attract the most customers. The aim of this project is to explore the best spot(s) to start a yoga studio in the city of Calgary in Alberta, Canada.

1.1 Interest

This paper might be of interest for a client who wants advise on where to set up a yoga studio in Calgary given current knowledge on yoga studios in Calgary.

2. Methods

2.1 Data acquisition and processing

2.1.1 Data acquisition

A dataset on postal codes, boroughs and neighborhoods as well as corresponding latitudes and longitudes in Alberta was derived from Wikipedia and can be found [here](#). Foursquare was used to gather data on venues in Calgary.

2.1.2 Data processing

Data on Alberta was scraped from Wikipedia and checked on missing values on borough, neighborhood, latitude or longitude. If present, missing values were deleted from the dataset. To visualize this dataset, exploratory data analysis was done in the form of a map to visualize the neighborhoods of Calgary. Using the Foursquare credentials, a connection was made to the Foursquare API to gain access to the nearby venues for all neighborhoods in Calgary. The amount of venues per neighborhoods was explored. Additionally, one hot encoding was used to make dummy variables for the venues per neighborhood.

2.1 Data analyses

K-means clustering analysis on neighborhoods was performed to gain insight into which neighborhoods were similar with respect to their top 10 venues. An elbow plot was made to determine the value of k. A map was then made to visualize the assigned clusters and one table per cluster was created to depict the characteristics of every neighborhood in that particular cluster. Yet, these clusters contain all venues. Hence, additional data exploration was performed to visualize the settlements of yoga studios in Calgary.

3. Results

3.1 Cluster analysis

A total of 33 neighborhoods were analyzed. **Figure 1** shows the elbow plot for the optimal k. Yet, the curve does not show a real bend. However, the optimal number of k had determined to be 5, since the slope gets a little bit less steep after this point.

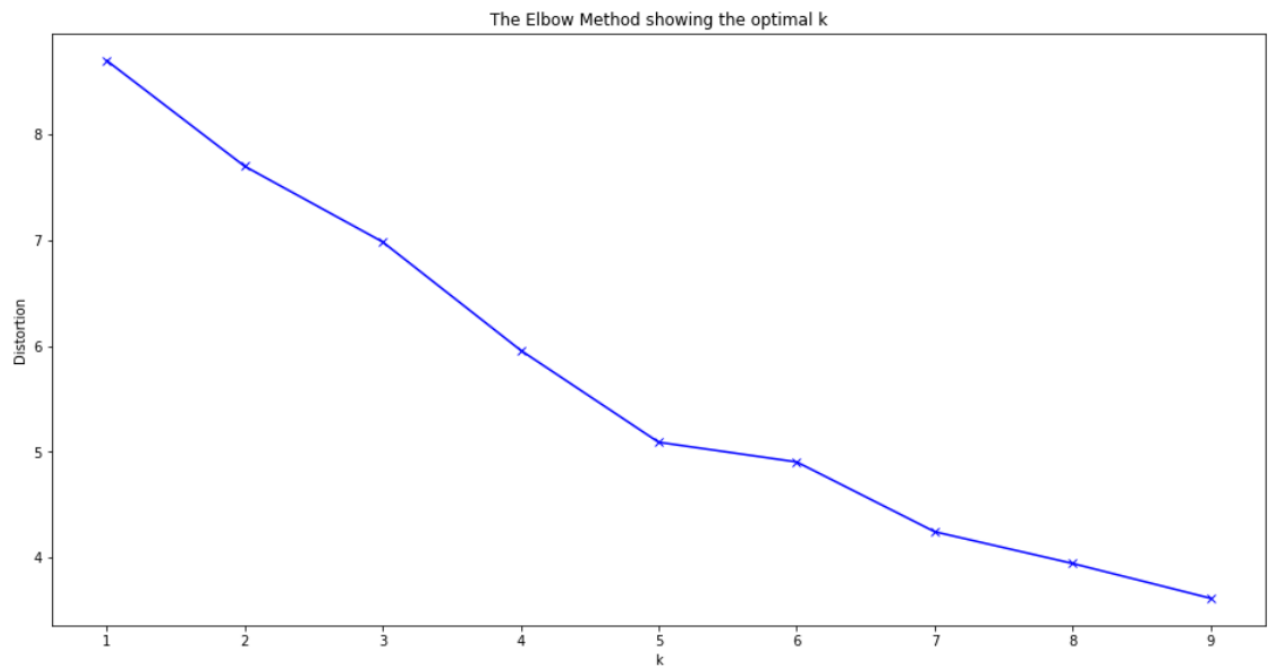


Figure 1. Elbow plot depicting the optimal number of k

Figure 2 depicts the five clusters. As can be seen, most clusters consist of only one or two neighborhoods, whereas one cluster consists of almost all neighborhoods.

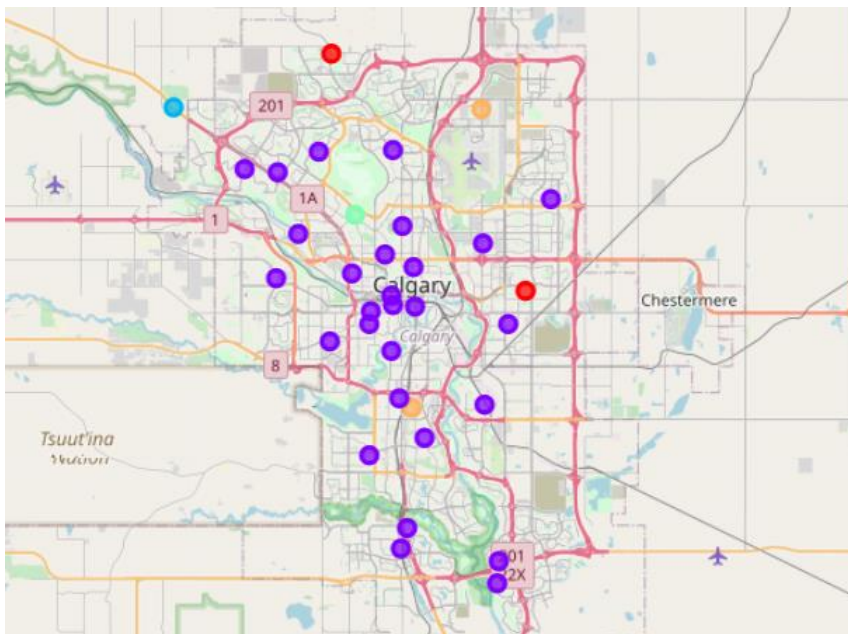


Figure 2. Geographic plot showing the assigned clusters ($k=5$)

Tables 1-5 show the neighborhoods per cluster and their corresponding top 10 venues. As can be seen, cluster 2 consists of the most neighborhoods, as was also clear from **Figure 2**.

Table 1. Characteristics of cluster 1

Neighborhood number	Borough	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	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
23	Calgary	0	Convenience Store	Yoga Studio	Falafel Restaurant	Construction & Landscaping	Cosmetics Shop	Deli / Bodega	Department Store	Dim Sum Restaurant	Diner	Discount Store

Table 2. Characteristics of cluster 2

Neighborhood number	Borough	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	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
1	Calgary	1	Convenience Store	Asian Restaurant	Gas Station	Café	Yoga Studio	Falafel Restaurant	Cosmetics Shop	Deli / Bodega	Department Store	Dim Sum Restaurant
2	Calgary	1	Convenience Store	Bar	Smoke Shop	Yoga Studio	Falafel Restaurant	Construction & Landscaping	Cosmetics Shop	Deli / Bodega	Department Store	Dim Sum Restaurant
3	Calgary	1	Coffee Shop	Bank	Food Court	Scenic Lookout	Electronics Store	Construction & Landscaping	Convenience Store	Cosmetics Shop	Deli / Bodega	Department Store

4	Calgary	1	Clothing Store	Convenience Store	Pizza Place	Diner	Yoga Studio	Comedy Club	Construction & Landscaping	Cosmetics Shop	Deli / Bodega	Department Store
5	Calgary	1	Sandwich Place	Fast Food Restaurant	Indian Restaurant	Pub	Mexican Restaurant	Fried Chicken Joint	Spa	Pizza Place	Candy Store	Thai Restaurant
6	Calgary	1	Fast Food Restaurant	Vietnamese Restaurant	Bank	Chinese Restaurant	Convenience Store	Noodle House	Dim Sum Restaurant	Indian Restaurant	Pharmacy	Restaurant
7	Calgary	1	Coffee Shop	Construction & Landscaping	Wine Shop	Vietnamese Restaurant	Asian Restaurant	Convenience Store	Cosmetics Shop	Deli / Bodega	Department Store	Dim Sum Restaurant
8	Calgary	1	Coffee Shop	Hotel	Pub	Performing Arts Venue	Theater	Cocktail Bar	Restaurant	Asian Restaurant	New American Restaurant	Italian Restaurant
9	Calgary	1	Pizza Place	Pub	Yoga Studio	Comedy Club	Construction & Landscaping	Convenience Store	Cosmetics Shop	Deli / Bodega	Department Store	Dim Sum Restaurant
11	Calgary	1	Vietnamese Restaurant	Convenience Store	Gas Station	Bar	Pizza Place	Yoga Studio	Dim Sum Restaurant	Donut Shop	Dog Run	Discount Store
12	Calgary	1	Pizza Place	Chinese Restaurant	Child Care Service	Yoga Studio	Comic Shop	Convenience Store	Cosmetics Shop	Deli / Bodega	Department Store	Dim Sum Restaurant
13	Calgary	1	Shop & Service	Moving Target	Dog Run	Comedy Club	Construction & Landscaping	Convenience Store	Cosmetics Shop	Deli / Bodega	Department Store	Dim Sum Restaurant
14	Calgary	1	Vietnamese Restaurant	Fast Food Restaurant	Convenience Store	Bar	Food Service	Electronics Store	Construction &	Cosmetics Shop	Deli / Bodega	Department Store

									Landscapin g			
15	Calgary	1	Coffee Shop	Bank	Italian Restaurant	Liquor Store	Pharmacy	Pizza Place	Grocery Store	Bakery	Convenienc e Store	Deli / Bodega
17	Calgary	1	Video Store	Convenienc e Store	Chinese Restaurant	Pharmacy	Pizza Place	Pub	Liquor Store	Yoga Studio	Dog Run	Construction & Landscapin g
18	Calgary	1	American Restaurant	Coffee Shop	Vietnamese Restaurant	Sushi Restaurant	Pub	Pizza Place	Fast Food Restaurant	Chinese Restaurant	Mediterrane an Restaurant	Comic Shop
19	Calgary	1	Cosmetics Shop	Pizza Place	Liquor Store	Yoga Studio	Comedy Club	Construction & Landscapin g	Convenienc e Store	Deli / Bodega	Department Store	Dim Sum Restaurant
20	Calgary	1	Park	Hobby Shop	Furniture / Home Store	Yoga Studio	Electronics Store	Construction & Landscapin g	Convenienc e Store	Cosmetics Shop	Deli / Bodega	Department Store
22	Calgary	1	Mediterrane an Restaurant	Coffee Shop	Bakery	Sushi Restaurant	Bar	Pub	Restaurant	Sandwich Place	Middle Eastern Restaurant	Moroccan Restaurant
24	Calgary	1	Coffee Shop	Bar	French Restaurant	Restaurant	Brewery	Middle Eastern Restaurant	Mediterrane an Restaurant	Pub	Ice Cream Shop	Indian Restaurant
26	Calgary	1	Japanese Restaurant	Construction & Landscapin g	Coffee Shop	Gay Bar	Gastropub	Gift Shop	Convenienc e Store	Cosmetics Shop	Deli / Bodega	Department Store
27	Calgary	1	Coffee Shop	Convenienc e Store	Pet Store	Pizza Place	Dry Cleaner	Comic Shop	Construction &	Cosmetics Shop	Deli / Bodega	Department Store

									Landscaping			
28	Calgary	1	Burger Joint	Restaurant	Steakhouse	Sushi Restaurant	Coffee Shop	Cosmetics Shop	Climbing Gym	Chocolate Shop	Chinese Restaurant	Department Store
29	Calgary	1	Gym	Hockey Rink	Convenience Store	Pharmacy	Pizza Place	Pub	Ice Cream Shop	Coffee Shop	Gas Station	Food Truck
30	Calgary	1	Hardware Store	Board Shop	Liquor Store	Yoga Studio	Falafel Restaurant	Convenience Store	Cosmetics Shop	Deli / Bodega	Department Store	Dim Sum Restaurant
31	Calgary	1	Hotel	Grocery Store	Coffee Shop	Automotive Shop	BBQ Joint	Gastropub	Motel	Sports Bar	Diner	Donut Shop
32	Calgary	1	Pub	Bank	Sporting Goods Shop	American Restaurant	Bookstore	Coffee Shop	Convenience Store	Pharmacy	Light Rail Station	Multiplex
33	Calgary	1	Bar	Park	Dry Cleaner	Food Truck	Bus Stop	Asian Restaurant	Cosmetics Shop	Deli / Bodega	Department Store	Electronics Store

Table 3. Characteristics of cluster 3

Neighborhood number	Borough	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	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
25	Calgary	2	Flea Market	Yoga Studio	Falafel Restaurant	Construction & Landscaping	Convenience Store	Cosmetics Shop	Deli / Bodega	Department Store	Dim Sum Restaurant	Diner

Table 4. Characteristics of cluster 4

Neighborhood number	Borough	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	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
16	Calgary	3	Electronics Store	Yoga Studio	Falafel Restaurant	Construction & Landscaping	Convenience Store	Cosmetics Shop	Deli / Bodega	Department Store	Dim Sum Restaurant	Diner

Table 5. Characteristics of cluster 5

Neighborhood number	Borough	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	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
10	Calgary	4	American Restaurant	Bowling Alley	Fast Food Restaurant	Convenience Store	Cosmetics Shop	Deli / Bodega	Department Store	Dim Sum Restaurant	Diner	Discount Store
21	Calgary	4	American Restaurant	Hotel	Falafel Restaurant	Construction & Landscaping	Convenience Store	Cosmetics Shop	Deli / Bodega	Department Store	Dim Sum Restaurant	Diner

3.2 Division of yoga studios in Calgary

49 yoga studios are settled in Calgary. **Figure 3** shows the division of these yoga studios in Calgary.

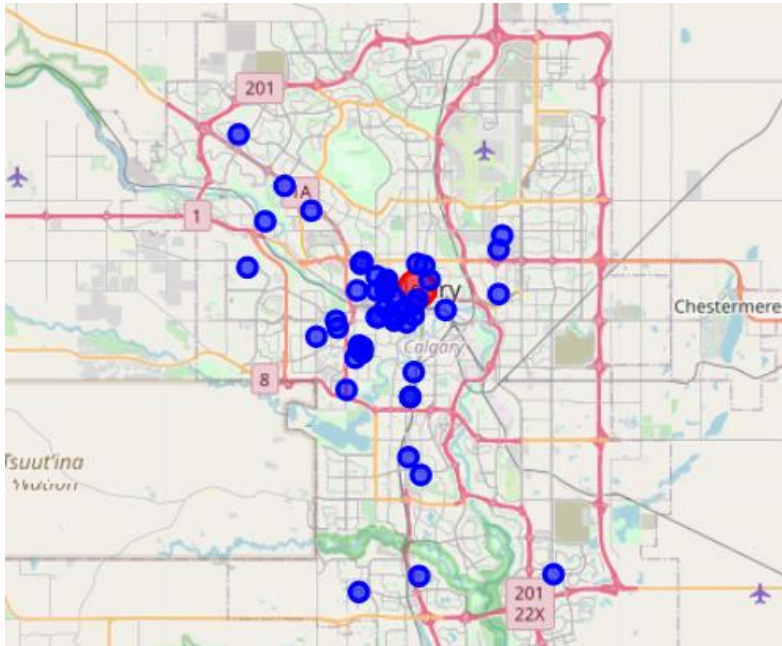


Figure 3. Geographic plot showing all yoga studios ($n=49$) in Calgary

4. Discussion

The aim of this project was to explore the best spot(s) to start a yoga studio in the city of Calgary in Alberta, Canada. From the results, it can be deferred that cluster 1, 3 and 4 already have the yoga studio as the second most common venue. Hence, better neighborhoods to start a yoga studio are located in cluster 2 and 5. We would recommend to start a yoga studio in one of the two neighborhoods in cluster 5 (Northeast Calgary or Highfield), given that in the second cluster 10 out of 33 neighborhoods have yoga studios as well as that an additional two have a gym in the top 10 venues. Also, when looking at the division of yoga studios in Calgary (**Figure 3**), it can be seen that most yoga studios are centered in the mid of Calgary and that no yoga studios are located in Northeast Calgary. These result perfectly matches our previous conclusion that Northeast Calgary would be the best spot to start a yoga studio.

K-means clustering shows that most clusters consist of only one or two neighborhoods, whereas cluster 2 consists of almost all neighborhoods. This might indicate that the other neighborhoods that are assigned to a separate cluster distinguish themselves from the remaining neighborhoods in cluster 2. This indicates that these neighborhoods might be outliers. K-means clustering might therefore not have been the ideal analysis method for this project. Density-based spatial clustering of applications with noise (DBSCAN) is a density-based clustering method that groups points that are closely together. However, since this project is

not about where which neighborhoods are located, but about the best place to start a yoga studio, this method might also be questionable for this project.

Moreover, this project has only looked into the best geographical spot to start up a yoga studio. It has not studied the preferences and needs for a yoga studio of the inhabitants of Northeast Calgary. Hence, further research should dive deeper into the neighborhood itself: which kind of neighborhood is it? What type of inhabitants live there? What are their preferences and needs? This can be done by qualitative research to gauge if it is useful to start up a yoga studio in Northeast Calgary.

5. Conclusion

Based on our geographic analyses we advise start-ups to set up a yoga studio in Northeast Calgary. However, more research on inhabitants' opinions and preferences needs to be performed into this neighborhood to map the usefulness of setting up a yoga studio at this location and the chance on being successful.

6. References

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