

# **Calgary's Crime Impacted Businesses**

**Coursera Capstone Project**

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# Introduction

- Calgary, Alberta, incorporated as a city in 1894, population 1,239,220 (2016 consensus)
- It is the financial centre of western Canada, based on its key role in the development of the region's oil and gas industry.
- In the recent past, Calgary has seen very polar economic conditions by virtue of Alberta's dependence on Oil and Gas market.



# Target Audience

- Passive and Active investors in businesses
- Looking to avoid communities with high rates of commercial crimes
- Could lead to better decision making and increased profitability.

# Data

Data obtained from City of Calgary’s open data source website

<https://data.calgary.ca/Health-and-Safety/Community-Crime-Statistics/78gh-n26t>

Venue data will be found using Foursquare API.

Sector	Community Name	Category	Crime Count	Resident Count	Date	Year	Month	Day	Lat	Long	ID	Community Center Point
SOUTHEAST	AUBURN BAY	Assault (Non-domestic)	1	17607	04/01/2020 12:00:00 AN	2020	APR		-113.95782	50.892705	2020-APR-AUBURN BAY-Assault (Non-domestic)	POINT (-113.957817281387 50.892705346575)
CENTRE	BANFF TRAIL	Break & Enter - Other Premises	1	4153	04/01/2020 12:00:00 AN	2020	APR		-114.11513	51.074217	2020-APR-BANFF TRAIL-Break & Enter - Other Premises	POINT (-114.115129022303 51.074216599416)
CENTRE	BANFF TRAIL	Street Robbery	1	4153	04/01/2020 12:00:00 AN	2020	APR		-114.11513	51.074217	2020-APR-BANFF TRAIL-Street Robbery	POINT (-114.115129022303 51.074216599416)
CENTRE	BANFF TRAIL	Theft FROM Vehicle	1	4153	04/01/2020 12:00:00 AN	2020	APR		-114.11513	51.074217	2020-APR-BANFF TRAIL-Theft FROM Vehicle	POINT (-114.115129022303 51.074216599416)
CENTRE	BANFF TRAIL	Theft OF Vehicle	2	4153	04/01/2020 12:00:00 AN	2020	APR		-114.11513	51.074217	2020-APR-BANFF TRAIL-Theft OF Vehicle	POINT (-114.115129022303 51.074216599416)
CENTRE	BANKVIEW	Break & Enter - Commercial	2	5256	04/01/2020 12:00:00 AN	2020	APR		-114.10049	51.034131	2020-APR-BANKVIEW-Break & Enter - Commercial	POINT (-114.100489190214 51.034131244481)
CENTRE	BANKVIEW	Break & Enter - Dwelling	1	5256	04/01/2020 12:00:00 AN	2020	APR		-114.10049	51.034131	2020-APR-BANKVIEW-Break & Enter - Dwelling	POINT (-114.100489190214 51.034131244481)
CENTRE	BANKVIEW	Theft FROM Vehicle	15	5256	04/01/2020 12:00:00 AN	2020	APR		-114.10049	51.034131	2020-APR-BANKVIEW-Theft FROM Vehicle	POINT (-114.100489190214 51.034131244481)
CENTRE	BANKVIEW	Theft OF Vehicle	3	5256	04/01/2020 12:00:00 AN	2020	APR		-114.10049	51.034131	2020-APR-BANKVIEW-Theft OF Vehicle	POINT (-114.100489190214 51.034131244481)
SOUTH	BAYVIEW	Break & Enter - Commercial	1	751	04/01/2020 12:00:00 AN	2020	APR		-114.11396	50.974634	2020-APR-BAYVIEW-Break & Enter - Commercial	POINT (-114.113962307868 50.974634397802)
NORTH	BEDDINGTON HEIGHTS	Break & Enter - Commercial	4	11514	04/01/2020 12:00:00 AN	2020	APR		-114.08491	51.131644	2020-APR-BEDDINGTON HEIGHTS-Break & Enter - Commercial	POINT (-114.084911140805 51.131643985322)
NORTH	BEDDINGTON HEIGHTS	Break & Enter - Other Premises	1	11514	04/01/2020 12:00:00 AN	2020	APR		-114.08491	51.131644	2020-APR-BEDDINGTON HEIGHTS-Break & Enter - Other Premises	POINT (-114.084911140805 51.131643985322)
NORTH	BEDDINGTON HEIGHTS	Theft FROM Vehicle	3	11514	04/01/2020 12:00:00 AN	2020	APR		-114.08491	51.131644	2020-APR-BEDDINGTON HEIGHTS-Theft FROM Vehicle	POINT (-114.084911140805 51.131643985322)
NORTH	BEDDINGTON HEIGHTS	Theft OF Vehicle	10	11514	04/01/2020 12:00:00 AN	2020	APR		-114.08491	51.131644	2020-APR-BEDDINGTON HEIGHTS-Theft OF Vehicle	POINT (-114.084911140805 51.131643985322)
CENTRE	BELTLINE	Assault (Non-domestic)	13	25129	04/01/2020 12:00:00 AN	2020	APR		-114.05519	51.037438	2020-APR-BELTLINE-Assault (Non-domestic)	POINT (-114.055188797256 51.037437926217)
CENTRE	ALTADORE	Break & Enter - Other Premises	6	6942	04/01/2020 12:00:00 AN	2020	APR		-114.10079	51.015948	2020-APR-ALTADORE-Break & Enter - Other Premises	POINT (-114.100794741538 51.015948466883)
CENTRE	ALTADORE	Theft FROM Vehicle	8	6942	04/01/2020 12:00:00 AN	2020	APR		-114.10079	51.015948	2020-APR-ALTADORE-Theft FROM Vehicle	POINT (-114.100794741538 51.015948466883)
CENTRE	ALTADORE	Theft OF Vehicle	1	6942	04/01/2020 12:00:00 AN	2020	APR		-114.10079	51.015948	2020-APR-ALTADORE-Theft OF Vehicle	POINT (-114.100794741538 51.015948466883)
CENTRE	ALYTH/BONNYBROOK	Break & Enter - Commercial	2	0	04/01/2020 12:00:00 AN	2020	APR		-114.02248	51.022859	2020-APR-ALYTH/BONNYBROOK-Break & Enter - Commercial	POINT (-114.022482205646 51.02285932043)
CENTRE	ALYTH/BONNYBROOK	Theft FROM Vehicle	8	0	04/01/2020 12:00:00 AN	2020	APR		-114.02248	51.022859	2020-APR-ALYTH/BONNYBROOK-Theft FROM Vehicle	POINT (-114.022482205646 51.02285932043)
EAST	APPLEWOOD PARK	Assault (Non-domestic)	1	6981	04/01/2020 12:00:00 AN	2020	APR		-113.92786	51.044982	2020-APR-APPLEWOOD PARK-Assault (Non-domestic)	POINT (-113.927857644202 51.044981778175)
EAST	APPLEWOOD PARK	Theft FROM Vehicle	7	6981	04/01/2020 12:00:00 AN	2020	APR		-113.92786	51.044982	2020-APR-APPLEWOOD PARK-Theft FROM Vehicle	POINT (-113.927857644202 51.044981778175)
EAST	APPLEWOOD PARK	Theft OF Vehicle	1	6981	04/01/2020 12:00:00 AN	2020	APR		-113.92786	51.044982	2020-APR-APPLEWOOD PARK-Theft OF Vehicle	POINT (-113.927857644202 51.044981778175)
NORTHWEST	ARBOUR LAKE	Break & Enter - Commercial	5	10619	04/01/2020 12:00:00 AN	2020	APR		-114.20758	51.132633	2020-APR-ARBOUR LAKE-Break & Enter - Commercial	POINT (-114.207578305896 51.132632565563)
NORTHWEST	ARBOUR LAKE	Theft FROM Vehicle	4	10619	04/01/2020 12:00:00 AN	2020	APR		-114.20758	51.132633	2020-APR-ARBOUR LAKE-Theft FROM Vehicle	POINT (-114.207578305896 51.132632565563)
NORTHWEST	ARBOUR LAKE	Theft OF Vehicle	2	10619	04/01/2020 12:00:00 AN	2020	APR		-114.20758	51.132633	2020-APR-ARBOUR LAKE-Theft OF Vehicle	POINT (-114.207578305896 51.132632565563)
WEST	ASPEN WOODS	Assault (Non-domestic)	1	9446	04/01/2020 12:00:00 AN	2020	APR		-114.20788	51.045131	2020-APR-ASPEN WOODS-Assault (Non-domestic)	POINT (-114.207876270297 51.045130968851)
WEST	ASPEN WOODS	Break & Enter - Dwelling	1	9446	04/01/2020 12:00:00 AN	2020	APR		-114.20788	51.045131	2020-APR-ASPEN WOODS-Break & Enter - Dwelling	POINT (-114.207876270297 51.045130968851)
WEST	ASPEN WOODS	Theft FROM Vehicle	6	9446	04/01/2020 12:00:00 AN	2020	APR		-114.20788	51.045131	2020-APR-ASPEN WOODS-Theft FROM Vehicle	POINT (-114.207876270297 51.045130968851)
WEST	ASPEN WOODS	Theft OF Vehicle	1	9446	04/01/2020 12:00:00 AN	2020	APR		-114.20788	51.045131	2020-APR-ASPEN WOODS-Theft OF Vehicle	POINT (-114.207876270297 51.045130968851)
CENTRE	BELTLINE	Break & Enter - Commercial	26	25129	04/01/2020 12:00:00 AN	2020	APR		-114.05519	51.037438	2020-APR-BELTLINE-Break & Enter - Commercial	POINT (-114.055188797256 51.037437926217)
CENTRE	BELTLINE	Break & Enter - Dwelling	1	25129	04/01/2020 12:00:00 AN	2020	APR		-114.05519	51.037438	2020-APR-BELTLINE-Break & Enter - Dwelling	POINT (-114.055188797256 51.037437926217)
CENTRE	BELTLINE	Break & Enter - Other Premises	1	25129	04/01/2020 12:00:00 AN	2020	APR		-114.05519	51.037438	2020-APR-BELTLINE-Break & Enter - Other Premises	POINT (-114.055188797256 51.037437926217)
CENTRE	BELTLINE	Commercial Robbery	1	25129	04/01/2020 12:00:00 AN	2020	APR		-114.05519	51.037438	2020-APR-BELTLINE-Commercial Robbery	POINT (-114.055188797256 51.037437926217)
CENTRE	BELTLINE	Street Robbery	2	25129	04/01/2020 12:00:00 AN	2020	APR		-114.05519	51.037438	2020-APR-BELTLINE-Street Robbery	POINT (-114.055188797256 51.037437926217)
CENTRE	BELTLINE	Theft FROM Vehicle	59	25129	04/01/2020 12:00:00 AN	2020	APR		-114.05519	51.037438	2020-APR-BELTLINE-Theft FROM Vehicle	POINT (-114.055188797256 51.037437926217)
CENTRE	BELTLINE	Theft OF Vehicle	14	25129	04/01/2020 12:00:00 AN	2020	APR		-114.05519	51.037438	2020-APR-BELTLINE-Theft OF Vehicle	POINT (-114.055188797256 51.037437926217)
CENTRE	BELTLINE	Violence Other (Non-domestic)	1	25129	04/01/2020 12:00:00 AN	2020	APR		-114.05519	51.037438	2020-APR-BELTLINE-Violence Other (Non-domestic)	POINT (-114.055188797256 51.037437926217)
SOUTH	BONAVISTA DOWNS	Break & Enter - Other Premises	1	928	04/01/2020 12:00:00 AN	2020	APR		-114.0314	50.943698	2020-APR-BONAVISTA DOWNS-Break & Enter - Other Premises	POINT (-114.031399990506 50.943697683039)



**FOURSQUARE**

# Methodology

K-means clustering was used to compartmentalize category of venues found for each community.

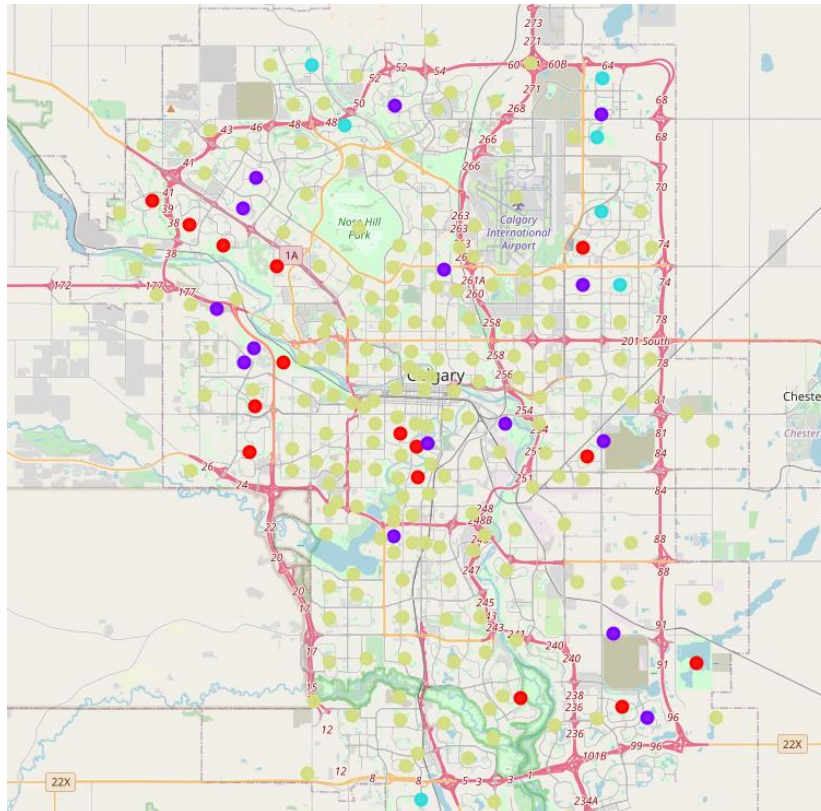
Data Type = categorical

Number of clusters = 4

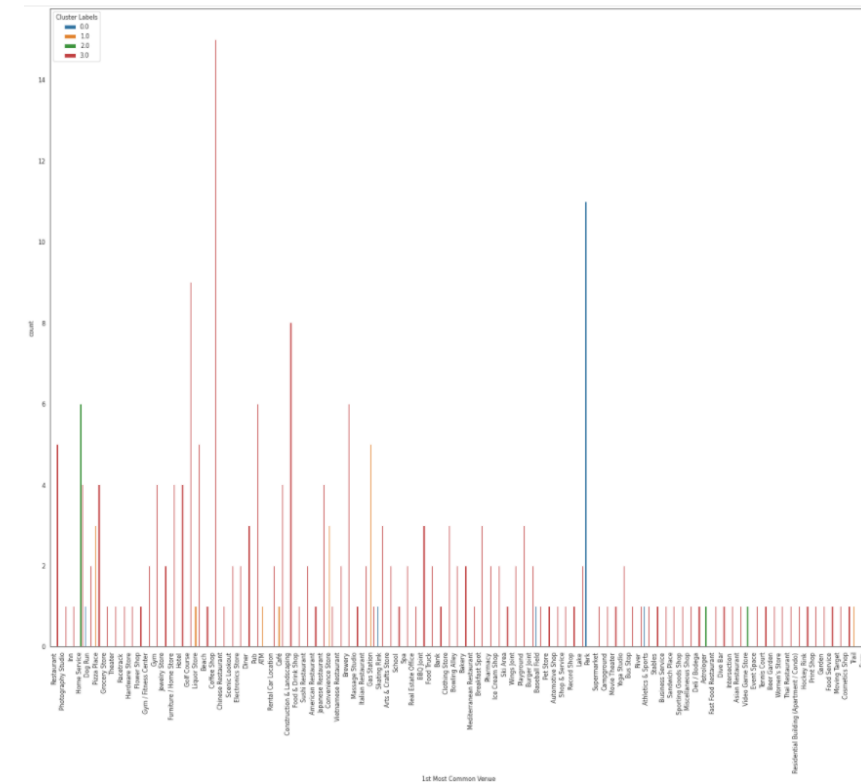
	Category	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue	6th Most Common Venue	7th Most Common Venue	8th Most Common Venue	9th Most Common Venue	10th Most Common Venue
0	Break & Enter - Commercial	3.0	Restaurant	Clothing Store	Women's Store	Food Truck	Gift Shop	German Restaurant	General Entertainment	Gastropub	Gas Station	Garden Center
1	Break & Enter - Commercial	3.0	Photography Studio	Grocery Store	Bus Station	Residential Building (Apartment / Condo)	Lake	Women's Store	Garden	Frozen Yogurt Shop	Furniture / Home Store	Gaming Cafe
2	Break & Enter - Commercial	3.0	Inn	BBQ Joint	Pizza Place	Park	Coffee Shop	Seafood Restaurant	Steakhouse	Baseball Stadium	High School	Liquor Store
3	Break & Enter - Commercial	3.0	Home Service	Light Rail Station	Rock Club	Train Station	Food Service	Food Truck	French Restaurant	Fried Chicken Joint	Frozen Yogurt Shop	Women's Store
4	Break & Enter - Commercial	3.0	Dog Run	Massage Studio	Women's Store	French Restaurant	Gluten-free Restaurant	Gift Shop	German Restaurant	General Entertainment	Gastropub	Gas Station
...	...	...	...	...	...	...	...	...	...	...	...	...
273	Break & Enter - Commercial	3.0	Construction & Landscaping	Baseball Field	Furniture / Home Store	Chinese Restaurant	Women's Store	French Restaurant	Gift Shop	German Restaurant	General Entertainment	Gastropub
274	Break & Enter - Commercial	1.0	Trail	Women's Store	Food Truck	Gluten-free Restaurant	Gift Shop	German Restaurant	General Entertainment	Gastropub	Gas Station	Garden Center
275	Break & Enter - Commercial	2.0	Home Service	Women's Store	Golf Course	Gift Shop	German Restaurant	General Entertainment	Gastropub	Gas Station	Garden Center	Garden
276	Break & Enter - Commercial	3.0	Pub	Bus Station	Ice Cream Shop	History Museum	Women's Store	French Restaurant	German Restaurant	General Entertainment	Gastropub	Gas Station
277	Break & Enter - Commercial	3.0	Farm	Business Service	Women's Store	French Restaurant	Gift Shop	German Restaurant	General Entertainment	Gastropub	Gas Station	Garden Center

# Results

- The resulting clusters were plotted on a Folium Map



- 1<sup>st</sup> most common venues were mapped on a countplot using seaborn



# Results and Recommendations

## **Results – Most common venues**

- Cluster 0: Parks, Skating Rinks, Dog Runs, Baseball Field
- Cluster 1: Home Service, Gas station, Pizza Place, Convenience Store
- Cluster 2: Home Service, video game store, astrologer
- Cluster 3: Diner, Construction and Landscaping, Restaurant, Hotel.

## **Recommendations**

- In cluster 0, businesses such as skating rinks and sporting complexes are most effected by commercial crimes.
- In cluster 1, small size commercial shops such as gas stations, pizza shops, convenience stores are more effected by commercial crimes
- In Cluster 2, businesses run out of home space are most effected by commercial crimes.
- In Cluster 3, commercial lounging services are most effected by commercial crimes.



# Conclusion

- We can conclude from our study that there is a pattern in the data provided by foursquare API
- Recommendations to our targeted audience based on the patterns found in each clusters was made.
- Further improvements such as using elbow method to predict number of clusters can be done next time.