Battle of the Neighbourhoods - Edmonton

Introduction

The purpose of the project is to look at the various neighbourhoods in Edmonton in order to determine several options of different neighbourhoods to acquire a new office for the organization. In understanding this project it is important to understand the background.

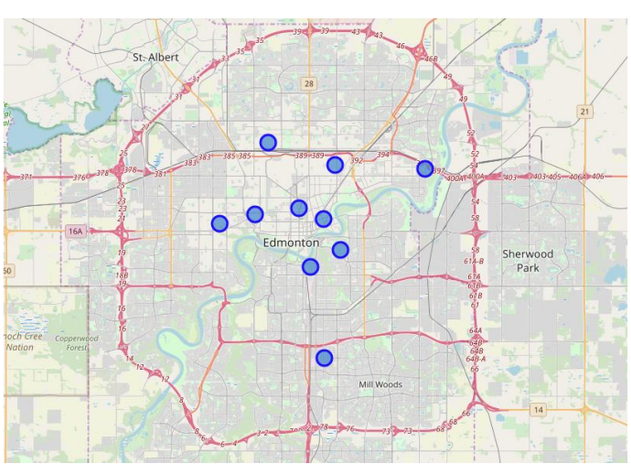
First, for those who may not know, Edmonton is the capital city of the province of Alberta and is the fifth largest city in Canada. It is the most northern capital of all the provinces in Canada and has its beginnings in the fur trade. Today Edmonton is the centre of the oil and gas industry, home to the Oilers hockey team and the largest mall in Canada. Edmonton also has the largest area of urban parkland in North America.

In Edmonton, an organization is looking into acquiring new office space. Over the years this organization has moved around several times and of concern to the staff is that neighbourhood of the new location is safe, has a variety of lunch locations and coffee shops to pick up coffee.

Past and present office locations have been in the following neighbourhoods: Calder, Strathcona, Westmount, Central McDougall, Eastwood, Strathcona Industrial Park, Grovenor, Strathearn, Abbottsfield and Boyle Street. The map below shows the location of these offices and the table shows the Total Crime Incidents (2019), restaurants and coffee shops.

	Neighbourhood	Total_Crime_Incidents	Restaurants	Coffee_Shops
0	CALDER	185	0	0
1	STRATHCONA	386	17	3
2	CENTRAL MCDOUGALL	564	30	4
3	WESTMOUNT	197	12	4
4	EASTWOOD	286	6	1
5	STRATHCONA INDUSTRIAL PARK	78	9	2
6	GROVENOR	45	4	2
7	ABBOTTSFIELD	64	2	2
8	STRATHEARN	63	2	0
9	BOYLE STREET	434	27	5

Below are the locations of the neighbourhoods in Edmonton of current / past offices:



Data

- Data will be accessed on the neighbourhood location in Edmonton. This data will be acquired from the City of Edmonton Open Data Portal. Data regarding the location of neighbourhood centroid will be imported into a Jupyter Notebook in a JSON format.
- Crime data in each neighbourhood location will be accessed also through the City of Edmonton Open Data. However, due to the size of this data it will be downloaded as a CSV file and then imported into the Jupyter Notebook.
- Data on restaurants and coffee shops in each neighbourhood will be accessed using the Four Square Developers API and will be limited to a 1000 meter radius of the centroid point of each neighbourhood.

Essentially the goal is to limit the choices to a few neighbourhoods that have lower crime rates, a higher number of restaurants of which a few of those restaurants need to be coffee shops. This will be done by sorting and limiting the data to the top neighbourhoods as well as visualizing the data using Folium maps and Matplotlib.

Methodology

Data Regarding Neighbourhoods in Edmonton

1. Data was pulled from the City of Edmonton Open Data Portal which can be found here, https://data.edmonton.ca/.
2. This data was acquired as a direct link through the API as a JSON file.

The initial data contained the name and locations of 400 neighbourhoods in the City of Edmonton. The data was cleaned up and below is the data and a map of Edmonton neighbourhoods.

	number	neighbourhood	area_sq_km	latitude	longitude
0	4477	Kinglet Gardens	2.637129	53.577379	-113.701417
1	4018	Anthony Henday Big Lake	3.217870	53.592211	-113.647881
2	6492	Mill Creek Ravine South	0.758605	53.507712	-113.464836
3	4023	Anthony Henday Rampart	3.150323	53.627635	-113.576203
4	3220	Hagmann Estate Industrial	0.527770	53.582176	-113.544951
5	5505	Ambleside	3.143942	53.430640	-113.600677
6	4464	The Uplands	3.572662	53.461707	-113.658220
7	6020	Avonmore	0.897090	53.507780	-113.451631
8	4012	Anthony Henday South West	4.547852	53.464532	-113.637545
9	2590	Overlanders	0.841196	53.581011	-113.388176

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(400, 5)
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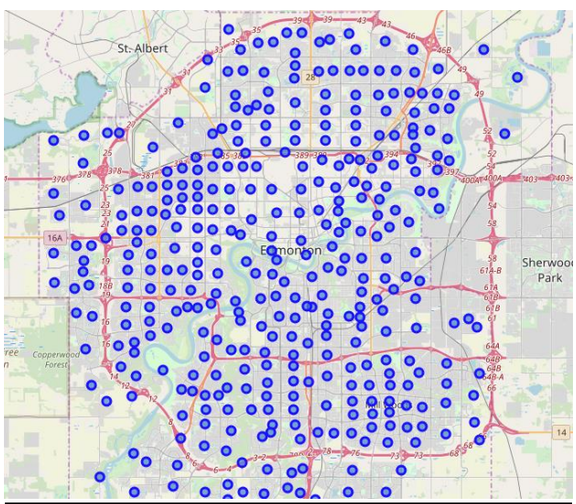
Map of Edmonton Neighbourhoods



Data Regarding Crime in Neighbourhoods in Edmonton

1. This data was also acquired through the City of Edmonton Open Data Portal. However, it was downloaded in a csv file and was cleaned to include only 2019 crime data. This was because the data portal would not allow more than 1000 lines in the JSON file.
2. In this project only the Grand Total of incidents in 2019 was looked at, however, the specifics of the issues were kept in case they were needed for the results.
3. This data was cleaned and this is the result. 27 neighbourhoods had no results in the crime tables and because the reason is not known they were just dropped from being considered.

	number	neighbourhood	Assault	Break and Enter	Homicide	Robbery	Sexual Assaults	Theft From Vehicle	Theft Of Vehicle	Theft Over $5000	Grand Total
0	1090	DOWNTOWN	420.0	147.0	1.0	67.0	28.0	321.0	66.0	13.0	1063
1	1030	CENTRAL MCDOUGALL	278.0	60.0	NaN	21.0	22.0	108.0	63.0	12.0	564
2	1150	OLIVER	94.0	105.0	NaN	25.0	15.0	242.0	58.0	6.0	545
3	1140	MCCAULEY	269.0	63.0	2.0	27.0	13.0	119.0	46.0	3.0	542
4	1020	BOYLE STREET	174.0	65.0	1.0	14.0	28.0	102.0	44.0	6.0	434
5	1010	ALBERTA AVENUE	118.0	99.0	NaN	16.0	13.0	127.0	53.0	4.0	430
6	1180	QUEEN MARY PARK	91.0	77.0	NaN	17.0	10.0	123.0	66.0	6.0	390
7	5480	STRATHCONA	80.0	79.0	NaN	22.0	13.0	153.0	33.0	6.0	386
8	5200	GARNEAU	31.0	82.0	NaN	7.0	4.0	151.0	24.0	5.0	304
9	2080	BELVEDERE	67.0	64.0	NaN	10.0	7.0	93.0	53.0	5.0	299

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df_edcrime.shape
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(373, 11)
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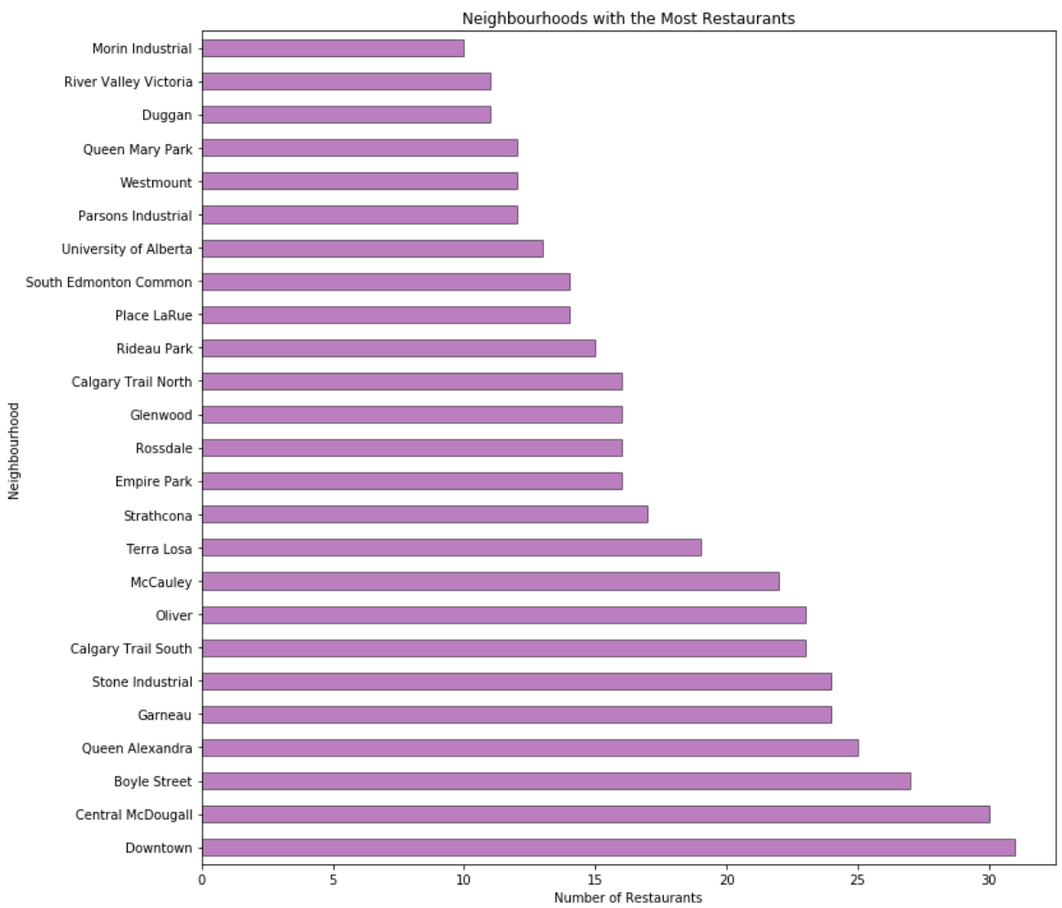
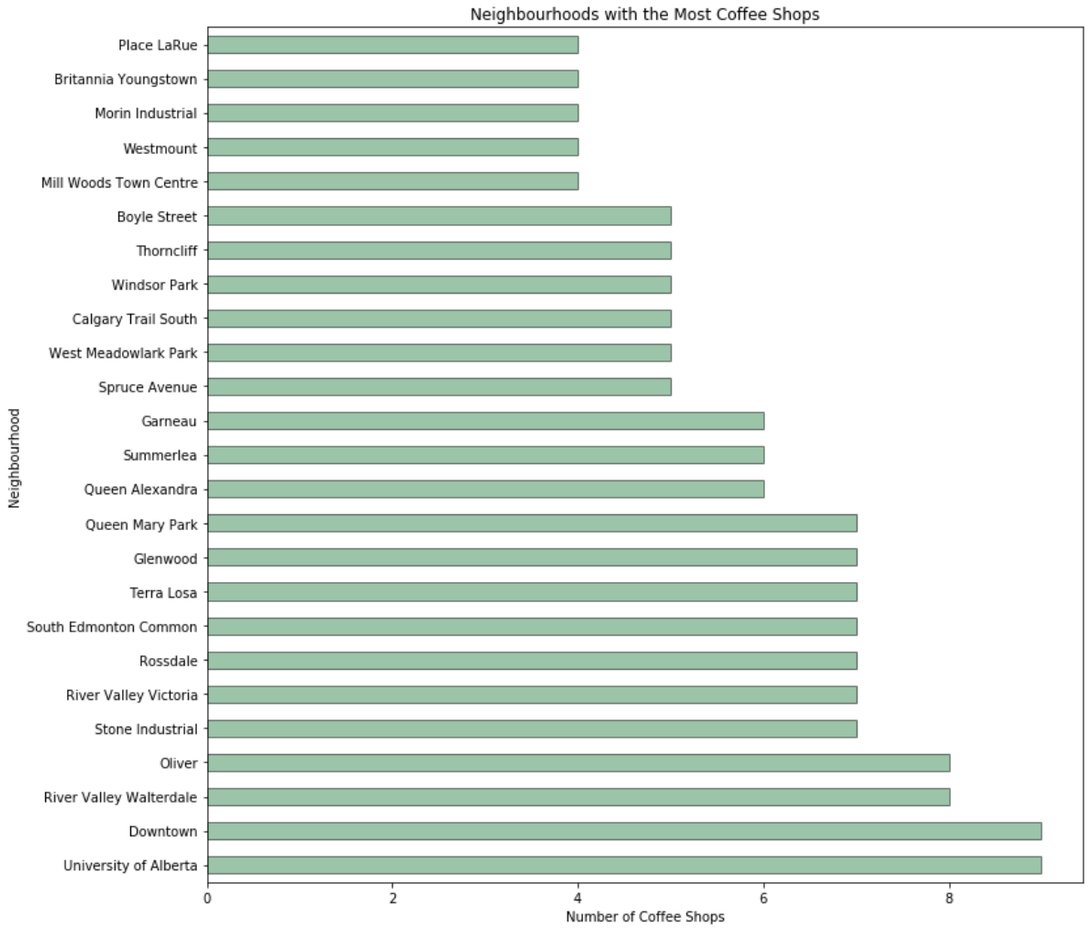
Data Regarding Venues in Edmonton

1. Using the Four Square Developers API, data about venues that were in each neighbourhood was pulled.
2. This data was then limited to include restaurants and coffee shops.

Below are the top 25 neighbourhoods in Edmonton with the most restaurant data on Foursquare.



Below are the top 25 Neighbourhoods in Edmonton with the most coffee shops on Foursquare.



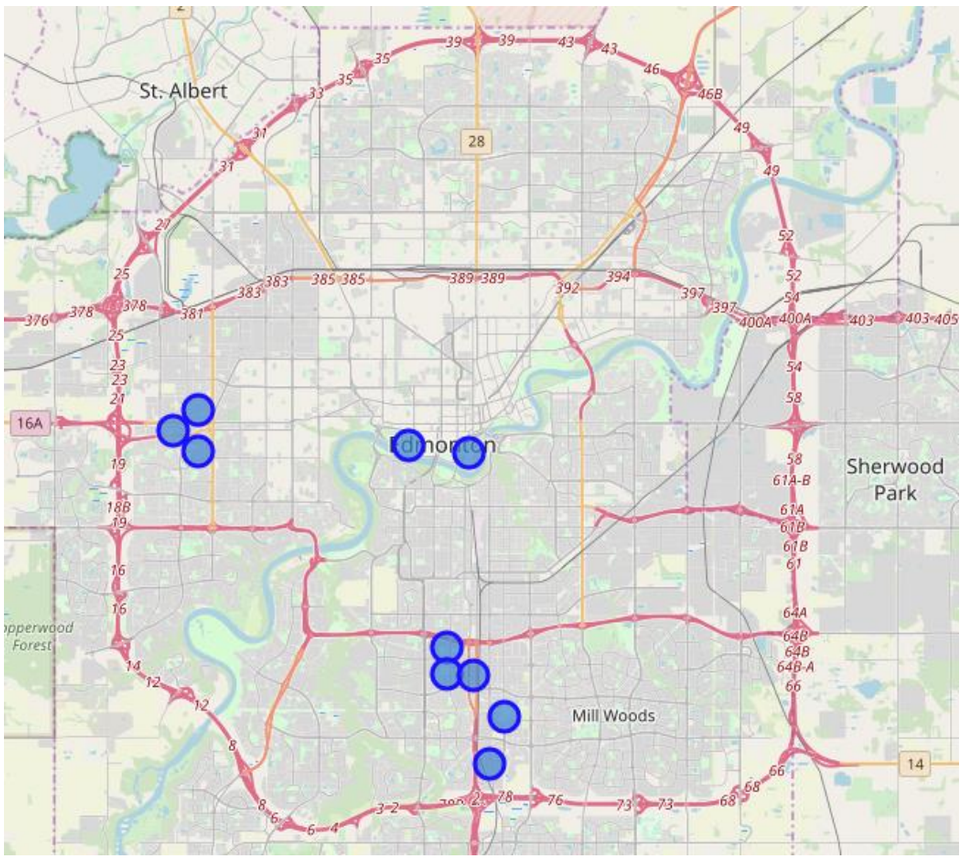
The data was then combined together into one data frame that showed crime incidents in 2019, restaurants and coffee shops. In looking at the data it was apparent that organizing and visualizing the data in regards to the highest number of restaurants was the easiest way to start limiting the data. Generally, if a neighbourhood had restaurants it also had coffee shops. Data was then organized to show neighbourhoods with more than 11 restaurants. This was a natural cut off point that resulted in 24 neighbourhoods in the data set. The data was then further limited to neighbourhoods that had less than 100 crime incidents in 2019.

Results

In the end, a small number of neighbourhoods that fit all three criteria were revealed. Here are these ten neighbours along with the crime incidents in 2019, as well as the number of restaurants and coffee shops.

	Neighbourhood	Total_Crime_Incidents	Restaurants	Coffee_Shops
37	Rideau Park	51	15	3
43	River Valley Victoria	11	11	7
47	Place LaRue	85	14	4
50	Terra Losa	49	19	7
81	Parsons Industrial	56	12	2
94	Stone Industrial	32	24	7
124	Duggan	59	11	2
170	Calgary Trail South	52	23	5
183	South Edmonton Common	61	14	7
191	Rossdale	18	16	7

Below are the locations of the ten purposed office locations.



Discussion

In the process of examining the data about the current and past office locations, it became apparent that the crime incidents are limited in what they sometimes reveal. At least one of the office locations, Abbottsfield, has fairly low crime incidents but, in fact, is surrounded by neighbourhoods with fairly high crime rates. I very much doubt that the staff felt safe in this neighbourhood but yet it if it had more restaurants it would have made the list of neighbourhoods to consider. Feeling unsafe coming to working, leaving work and at work has been a big issue for the staff when we have had office locations in high crime neighbourhoods. In fact, two of the office locations in the past have been in neighbourhoods with a high amount of sex trade.

While this report focuses on three factors, crime, restaurants and coffee shops, many other issues in the office location are important to staff like public transportation, parking and traffic patterns. Also, of concern would be access to the office(s) for the clients as well as the ability to acquire a large space at a reasonable cost.

It would have been appropriate to also look at the average cost of office space and availability of office space in the Edmonton neighbourhoods. However, I was unable to locate any such data that was easily acquired.

Conclusion

The data reported in this project is true however, the staff concerns are somewhat made up. I have worked for this company for many years and I have been at all of the past and present offices. This project idea came out of my experiences at a couple of the offices where I could easily stop and grab a coffee on the way to work and could easily go out for lunch without moving my car. Feeling safe in the neighbourhood at work would also be an added bonus as many staff do not keep strict 9 to 5 hours. Leaving the office late in the evening in a high crime neighbourhood feels unsafe and I know I have felt that as have many other staff.

Links

Jupyter Notebook

- Link to Github final notebook using nviewer – This provides a better experience and the maps can be viewed.

- Github link to final notebook

Blog Post