

Finding Out the Right Place for a Grocery Shop in Vancouver

- Capstone Project of the Battle of Neighborhood –

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Introduction and Background

Vancouver City is one of the most beautiful cities in the world. A man want to open a grocery store in the city, Vancouver, and I am going to help him in finding out safe and secure location in Vancouver for his new grocery store. I will make use of my skills I learned from this course to analyze data. I will focus on the safest borough and explore its neighborhoods. Then, I will list up the 10 most common venues in each neighborhood so that the best neighborhood for a new grocery store could be recommended.

Data and Methodology

I need to choose the safest borough by analyzing crime data as a location of a new grocery store, and shortlist a neighborhood where grocery stores are not amongst the most common venues, and yet as close to the city as possible. The factors to be considered will be:

- finding the safest borough based on crime statistics
- finding the most common venues
- choosing the right neighbourhood within the borough

I will use the geographical coordinates of Vancouver to plot neighborhoods in a borough that is safe and in the city's vicinity, and finally cluster our neighborhoods and present our findings.

Therefore, the datasets I use are:

- **Dataset 1:** A real world data set from Kaggle containing the Vancouver Crimes from 2003 to 2019. This dataset consist of the crime statistics of each Neighbourhoof in Vancouver along with type of crime, recorded year, month and hour.
- **Dataset 2:** The list of officially categorized boroughs in Vancouver from Wikipedia. Borough information will be used to map the existing data where each neighborhood can be assigned with the right borough.
- **Dataset 3:** A new consolidated dataset of the Neighborhoods, along with their boroughs, crime data and the respective Neighborhood's coordinates. This data will

be fetched using OpenCage Geocoder to find the safest borough and explore the neighborhood by plotting it on maps using Folium and perform exploratory data analysis.

- **Dataset 4:** A new consolidated dataset of the Neighborhoods, boroughs, and the most common venues and the respective Neighborhood along with co-ordinates. This data will be fetched using Four Square API to explore the neighborhood venues and to apply machine learning algorithm to cluster the neighborhoods and present the findings by plotting it on maps using Folium.

Data Exploration and Manipulation

1. Looking for a safe and prospective area

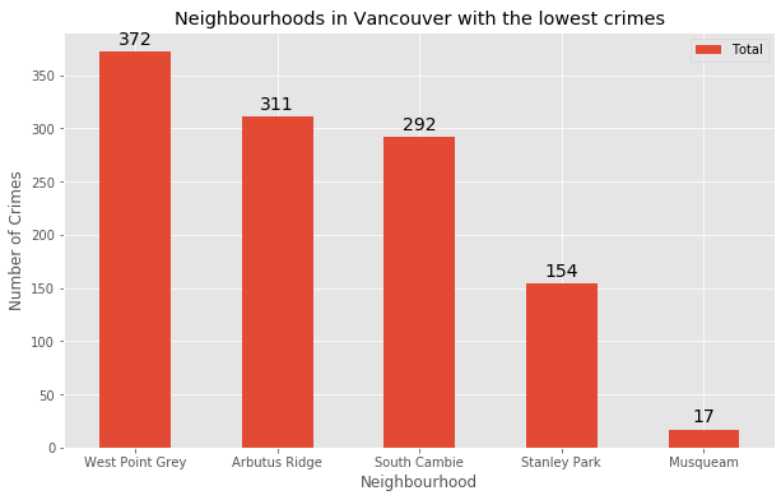
The first thing I considered was the safety. The place for a new grocery shop should be safe with low crime rate. For this, I used Vancouver Crime Report from <https://www.kaggle.com/agilesifaka/vancouver-crime-report/version/2> to extract the number of crimes in respective neighborhood of Vancouver.

Table 1. Crime Category and Frequency for the respective Neighborhood

	Neighbourhood	YearBreak and Enter Commercial	YearBreak and Enter Residential/Other	YearMischief	YearOther Theft	YearTheft from Vehicle	YearTheft of Bicycle	YearTheft of Vehicle	YearVehicle Collision or Pedestrian Struck (with Fatality)	YearVehicle Collision or Pedestrian Struck (with Injury)	Total
0	Arbutus Ridge	12	78	49	18	111	12	12	1	18	311
1	Central Business District	551	124	1812	2034	5301	640	165	0	230	10857
2	Dunbar-Southlands	8	106	81	31	199	16	9	1	23	474
3	Fairview	138	73	233	297	692	245	55	0	62	1795
4	Grandview-Woodland	148	162	304	215	634	110	123	0	65	1761

The top 5 neighborhoods in Vancouver with the lowest crime rates are Musqueam (3), Stanley Park (154), South Cambie (292), Arbutus Ridge (311), and West Point Grey (372), as shown in Fig. 1.

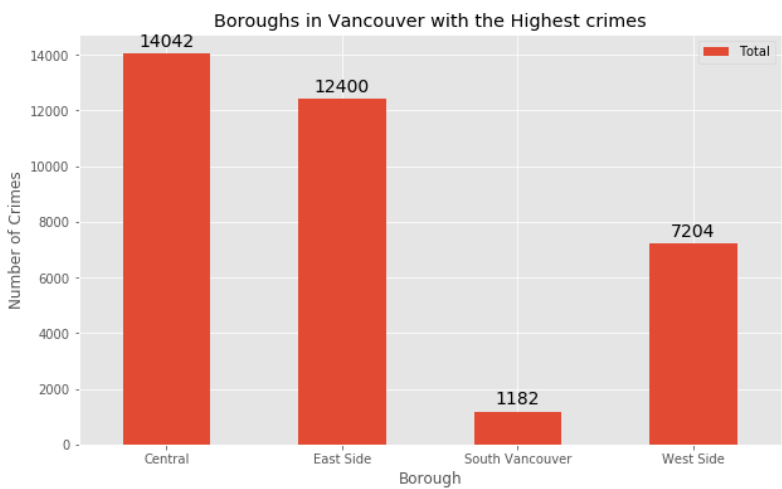
Figure 1. Neighborhoods in Vancouver with the Lowest Crime



There are 24 neighborhoods in Vancouver and the 24 neighborhoods are grouped into 4 boroughs: 3 neighborhoods in Central, 8 in East Side, 10 in West Side, and 3 in South Vancouver. I compared the number of crimes between the 4 boroughs as shown in Fig. 2.

Based on the exploratory data analysis, it is clear that South Vancouver has the lowest crime rate. Nevertheless, I do not recommend South Vancouver as a location for a new grocery shop because it has the lowest number of neighborhoods (3) among the 4 boroughs. On the other hand, the West Side has the second lowest crime rate even though there are 10 neighbors. Therefore, I recommend West Side as a borough for a new grocery shop.

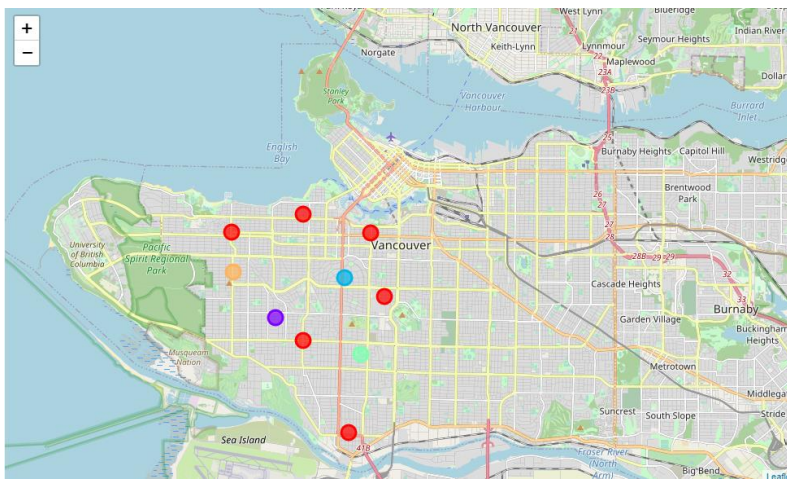
Figure 2. The Number of Crimes in Each Borough in Vancouver



2. Map the area

Then, I made a new consolidated dataset of the Neighborhoods, along with their boroughs, crime data and the respective Neighborhood's co-ordinates. This data were fetched using OpenCage Geocoder to find the safest borough and explore the neighborhood by plotting it on maps using Folium and perform exploratory data analysis.

Figure 3. 10 Neighborhoods in West Side



3. Common Venues of the respective Neighborhood in West Side

Now, I know which area is safe and where it is located. It is early for me to make a final recommendation yet. If there are already many grocery stores, there is low possibility for a new grocery shop to be successful. Therefore. I find out 10 most common venues in the respective neighborhood as shown in Table 2.

Table 2. A Part of '10 Most Common Venues in the respective Neighborhood in West Side

	Neighbourhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	Arbutus Ridge	Bakery	Grocery Store	Nightlife Spot	Spa	Pet Store
1	Dunbar-Southlands	Sushi Restaurant	Liquor Store	Indian Restaurant	Salon / Barbershop	Ice Cream Shop
2	Fairview	Coffee Shop	Asian Restaurant	Park	Chinese Restaurant	Sandwich Place
3	Kerrisdale	Coffee Shop	Chinese Restaurant	Sandwich Place	Sushi Restaurant	Tea Room
4	Kitsilano	Bakery	American Restaurant	Coffee Shop	Restaurant	Japanese Restaurant
5	Marpole	Pizza Place	Sushi Restaurant	Dessert Shop	Chinese Restaurant	Sandwich Place
6	Oakridge	Bubble Tea Shop	Sporting Goods Shop	Vietnamese Restaurant	Sandwich Place	Pharmacy
7	Shaughnessy	French Restaurant	Park	Yoga Studio	Gastropub	Dessert Shop
8	South Cambie	Coffee Shop	Shopping Mall	Sushi Restaurant	Bus Stop	Vietnamese Restaurant
9	West Point Grey	Coffee Shop	Japanese Restaurant	Café	Bookstore	Bakery

In Arbutus Ridge, there is a popular (2nd most popular venue) grocery shop already. Then, 9 neighborhoods are left. Considering the safety of the area mentioned in Fig. 1, I recommend either South Cambie (1st choice) or West Point Grey (2nd choice) as a place for a new grocery shop.

Conclusion

The goal of this project is to provide stakeholders, who would like open a grocery shop in Vancouver, advice and suggestions for a location of the shop. To fulfill the goal, I analyzed crime data in Vancouver and information of popular shops in Vancouver. The Vancouver is consisted of 4 Boroughs and 24 Neighborhoods. Among the 4 boroughs, I recommend 'West Side' considering its comparatively low crime rate and size of the area. The West Side is consisted of 10 neighborhoods. I looked up 10 most common venues for the respective neighborhood in West Side, and found out that there is a popular grocery shop in 'Arbutus Ridge' (purple make in the map above). Among the rest 9 neighborhoods, I recommend either South Cambie (1st choice) or West Point Grey (2nd choice) as a place for a new grocery shop after counting into account of the area's safety.