Nana’s Restaurant Opening in Vancouver Neighborhood

Cknollo

April 14, 2020

1. Introduction

1.1 Background

Vancouver is a coastal seaport city in western Canada, located in the Lower Mainland region of British Columbia. The Greater Vancouver area had a population of 2,463,431 as in 2016, making it the third-largest metropolitan area in Canada. Crime in different forms is a prevalent distress to the people in Metropolitan cities and Vancouver is no exception. Crimes like break into commercial property to for theft are on rise and people thinking to enter into similar business should bear in mind criminal activity of the neighbourhood before finalizing a location. We look to address this issue by analysing the crime data of Vancouver City and finding the safest borough and a neighbourhood within the borough which best suits the requirements of our business problem.

1.2. Business Problem

The family owned restaurant “Nana’s Pizza” wants to expand their business and decided to take a large step and open another Restaurant in Vancouver. They already own two successful restaurants in Montreal and Quebec. The goal is to find a safe and secure location.
“Nana’s Pizza” is a family friendly restaurant. To ensure a safe area, the task would be to select the safest neighborhood by analyzing crime data for opening a restaurant and shortlisting a neighborhood where restaurants are not among the most frequented locations. On the other hand they should be as close as possible to the city center.

1.3. Interest

The example is a real-life situation, with businesses opening in and outside of Canada every day. A thorough analysis of neighborhood to open a business is key, in order to guarantee a successful business operation.

2. Data acquisition and cleaning

2.1 Data sources

As data for this project, a data set provided from Kaggle has been used. The data set contained many information, which was not necessary for our analysis, e.g. type of crime, recorded time etc. Though it had many information included, it was not properly categorized into boroughs. Therefore, additional information from Wikipedia was used to fill in the gaps. The coordinates of the data have been gathered from OpenCage Geocoder API. Fourssuqare was used to create venues for listed neighborhoods.

The information from Wikipedia, did not need any further adaption in form of scraping, as it was already categorized.

2.2 Data cleaning

The data provided from Kaggle data source was a large file. The Vancouver crime report included more than 600.000 rows of input. A reduction to current crimes has been used to reduce the number of rows in the dataset. The data set has been provided in github in form of csv file and then uploaded into pandas.

Furthermore, any information that was not relevant for the analysis of our business problem have been dropped. The resulting information have been used for conclision.

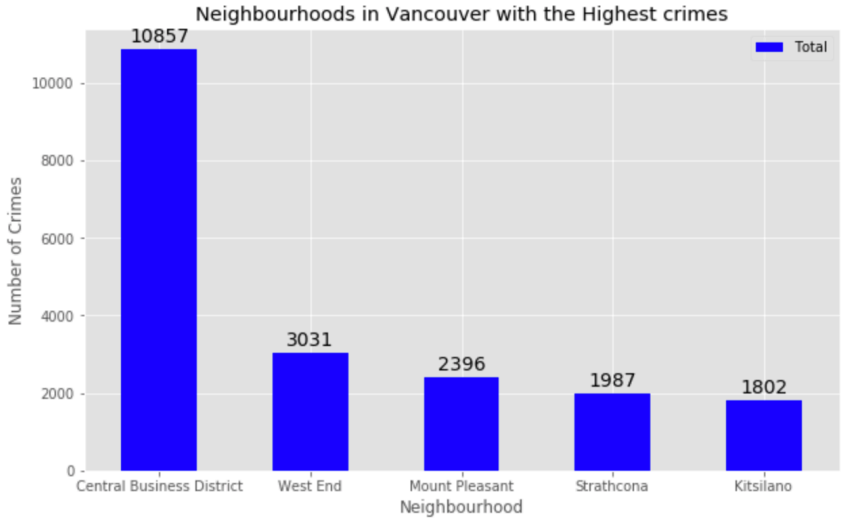
3. Methodology

3.1. Statistical summary of number of Crimes committed

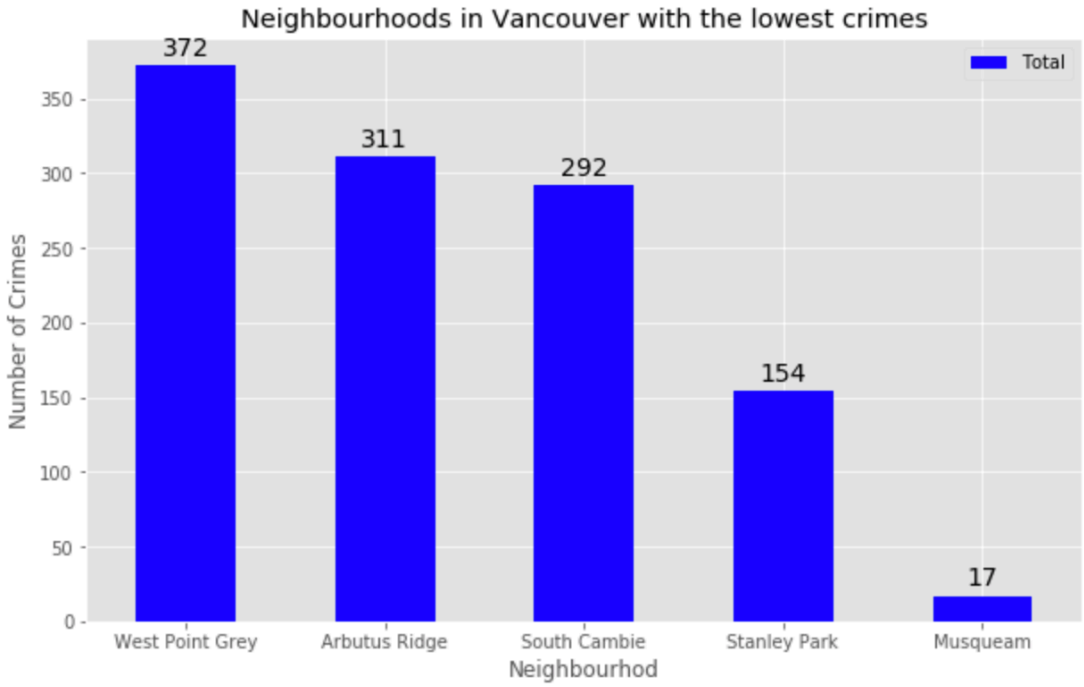
	YearBreak and Enter Commercial	YearBreak and Enter Residential/Other	YearMischief	YearOther Theft	YearTheft from Vehicle	YearTheft of Bicycle	YearTheft of Vehicle	YearVehicle Collision or Pedestrian Struck (with Fatality)	YearVehicle Collision or Pedestrian Struck (with Injury)	Total
count	4.000000	4.000000	4.00000	4.000000	4.000000	4.000000	4.000000	4.000000	4.000000	4.000000
mean	506.250000	599.250000	1430.25000	1236.750000	3736.500000	539.750000	286.500000	3.250000	368.500000	8707.000000
std	354.409721	488.189427	997.26572	1060.087221	2723.536977	353.955153	226.117226	3.304038	227.060198	5801.870618
min	49.000000	156.000000	187.00000	88.000000	483.000000	36.000000	71.000000	1.000000	111.000000	1182.000000
25%	314.500000	187.500000	843.25000	544.000000	2249.250000	450.000000	186.500000	1.000000	263.250000	5698.500000
50%	594.500000	599.000000	1627.00000	1185.000000	3796.000000	633.000000	235.000000	2.000000	351.500000	9802.000000
75%	786.250000	1010.750000	2214.00000	1877.750000	5283.250000	722.750000	335.000000	4.250000	456.750000	12810.500000
max	787.000000	1043.000000	2280.00000	2489.000000	6871.000000	857.000000	605.000000	8.000000	660.000000	14042.000000

3.2 Data Visualization of Crimes committed per neighborhood

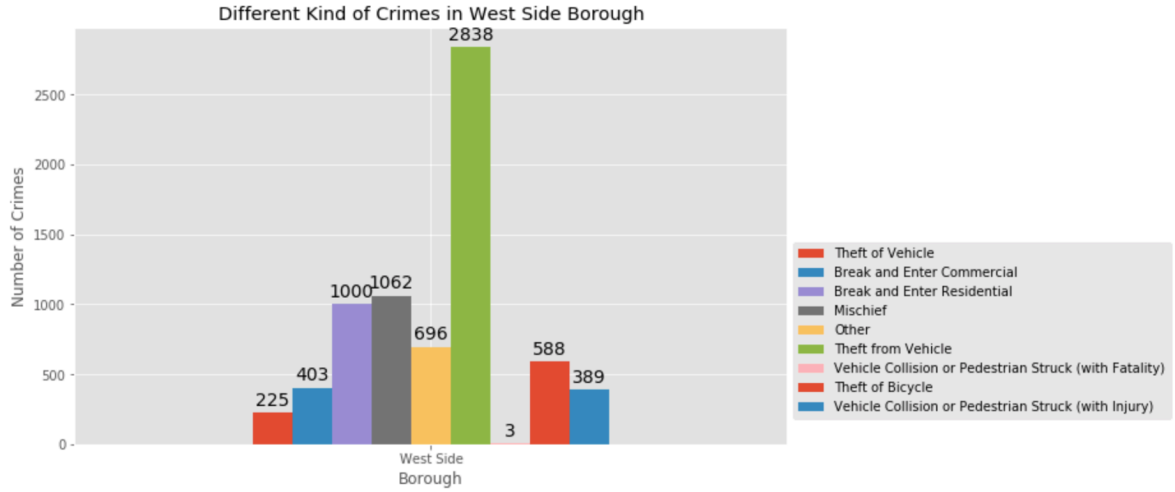
Neighborhoods with highest crime rates



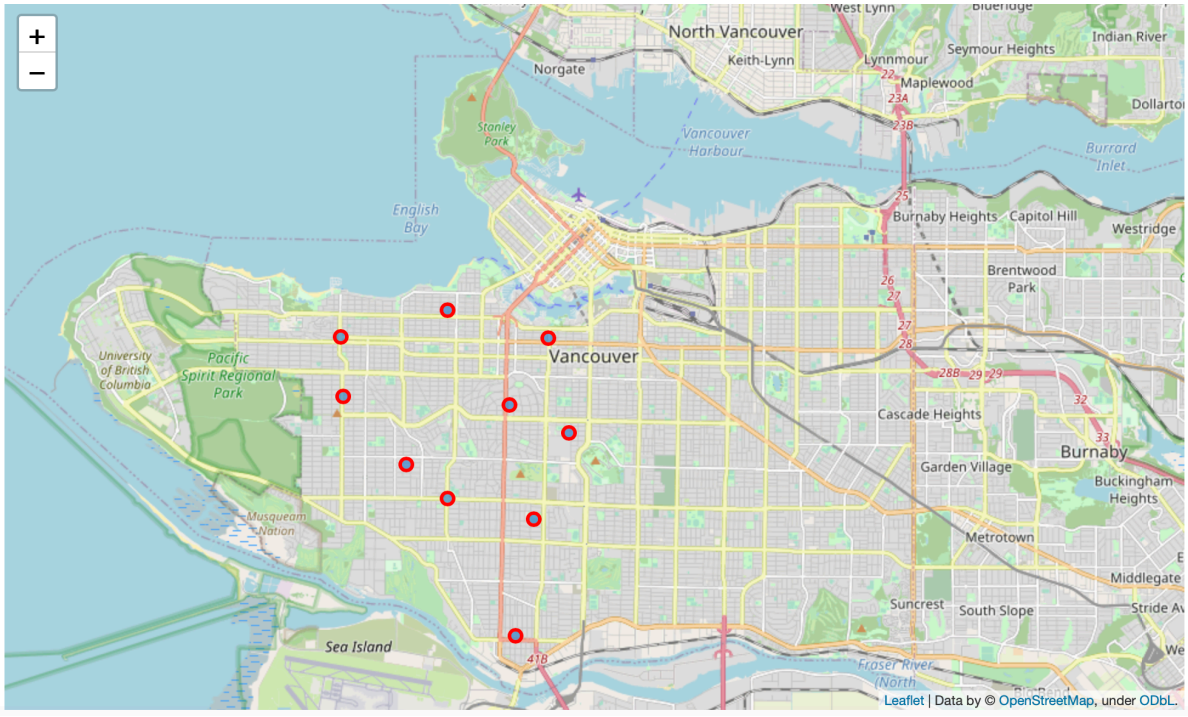
Neighborhoods with lowest crime rates



Different kind of crimes in West Side Borough for detailed analysis



Neighborhoods in West side Borough



4. Modelling

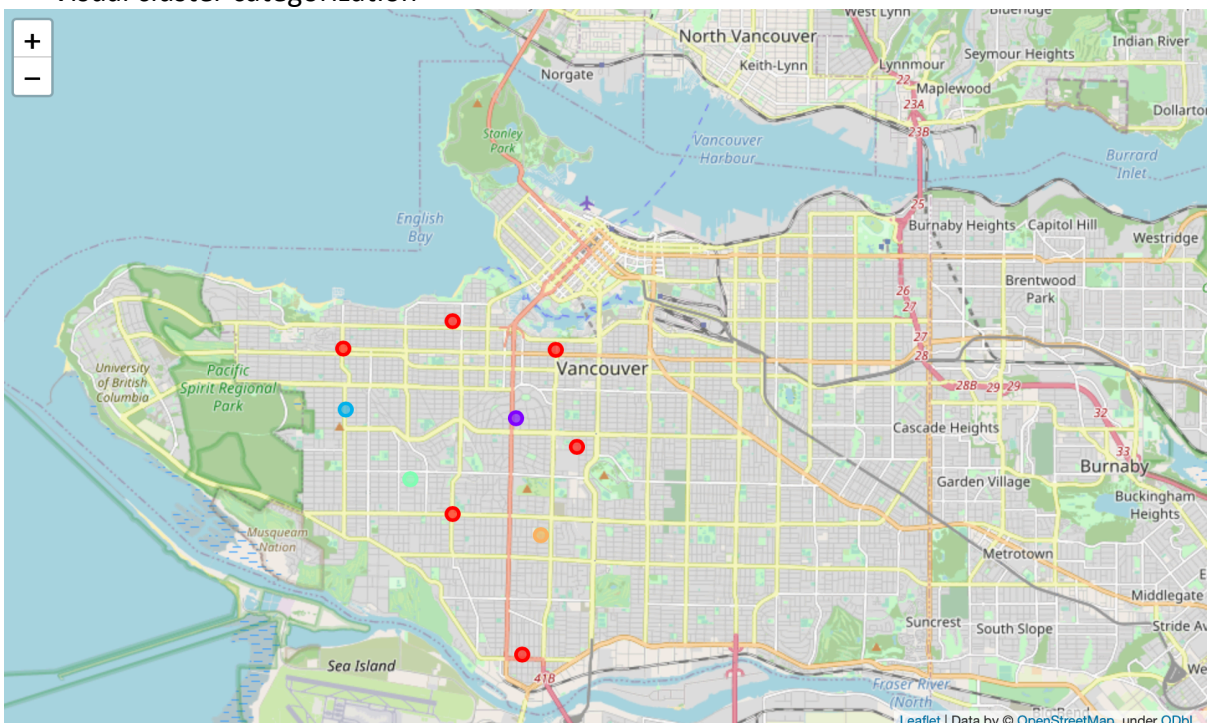
We generated a consolidated dataset combined with the selected borough West Side. With use of longitude and latitude of West Side neighborhood, all venues within 500 meter radius of each neighborhood by connecting FourSquare API can be done. The result is a json containing all venues in each neighborhood wich we convert to pandas data frame.

	Neighbourhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Category
0	Shaughnessy	49.251863	-123.138023	Angus Park	Park
1	Shaughnessy	49.251863	-123.138023	Crepe & Cafe	French Restaurant
2	Fairview	49.264113	-123.126835	Gyu-Kaku Japanese BBQ	BBQ Joint
3	Fairview	49.264113	-123.126835	CRESCENT nail and spa	Nail Salon
4	Fairview	49.264113	-123.126835	Charleson Park	Park

5. Results

After k-means clustering we create each cluster to evaluate which neighborhood was assigned to each of five clusters.

Visual cluster categorization



Cluster data frame

	Borough	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	West Side	Coffee Shop	Asian Restaurant	Park	Pharmacy	Korean Restaurant	Sandwich Place	Indian Restaurant	Japanese Restaurant	Malay Restaurant	Falafel Restaurant
3	West Side	Pizza Place	Chinese Restaurant	Sushi Restaurant	Japanese Restaurant	Café	Noodle House	Coffee Shop	Dim Sum Restaurant	Plaza	Grocery Store
4	West Side	Bakery	American Restaurant	French Restaurant	Japanese Restaurant	Thai Restaurant	Tea Room	Ice Cream Shop	Sushi Restaurant	Coffee Shop	Food Truck
5	West Side	Coffee Shop	Chinese Restaurant	Tea Room	Pharmacy	Sandwich Place	Sushi Restaurant	Fast Food Restaurant	Japanese Restaurant	Café	Liquor Store
6	West Side	Coffee Shop	Café	Japanese Restaurant	Sushi Restaurant	Bookstore	Pub	Vegetarian / Vegan Restaurant	Liquor Store	Fast Food Restaurant	Falafel Restaurant
8	West Side	Coffee Shop	Bus Stop	Park	Vietnamese Restaurant	Grocery Store	Bank	Malay Restaurant	Sushi Restaurant	Café	Cafeteria

6. Discussion

The family owned restaurant “Nana’s Pizza” wants to expand their business and decided to take a large step and open another Restaurant in Vancouver. The objective was to identify one of the safest borough in Vancouver, and an appropriate neighborhood within the borough to set up a Restaurant.

With Vancouver crime data to identify a safe borough with considerable number of neighborhood was identified. With selecting the borough it was time to choose the right neighborhood where restaurants were not among venues in a close proximity to each other. We achieved this by grouping the neighborhoods into clusters to assist the family to identify the best location to open their business.

7. Conclusion

During the analysis an exploration of Vancouvers crime data has been done. After categorization into boroughs, a grouping was done and we could select the safest. Moreover an evaluation of neighbourhoods to be considered, made possible to further shortlist the neighborhoods based on the common venues, to choose a neighborhood which best suits the business problem.