Grocery store in Vancouver

Canada

Aim of the project

- The aim of the current project is to find a secure and safe location to one a Grocery story in Vancouver, Canada. Safe and Secure in terms of criminality.

- Initially we must pick the safest borough of Vancouver and then shorten the list to the safest neighbourhood. One that has close “busy” venues and is close to the city.

Data sources

- Part 1: Using a real world data set from Kaggle containing the Vancouver Crimes from 2003 to 2019.
- Part 2: Gathering additional information of the list of officially categorised boroughs in Vancouver from Wikipedia.
- Part 3: Creating a new consolidates dataset of the Neighbourhoods, along with their boroughs, Crome data sand the respective Neighbourhood’s co-ordinates.
- Part 4: Creating a new consolidates dataset of the Neighbourhoods, boroughs, and the most common venues and the respective Neighbourhood along with co-ordinates.

Crime types reported

- Break and Enter Commercial
- Break and Enter Residential/Other
- Mischief
- Other Theft
- Theft from Vehicle
- Theft of Bicycle
- Theft of Vehicle
- Vehicle collision or Pedestrian struck (with Fatality)
- Vehicle collision or Pedestrian struck (with Injury)

Methodology

- Exploratory Data Analysis: Visalise the crime reports in different Vancouver boroughs to identify the safest.

- Modelling: Use of K-Means clustering (an unsupervised machine learning algorithm) to address this problem so as to group data based on existing venues.

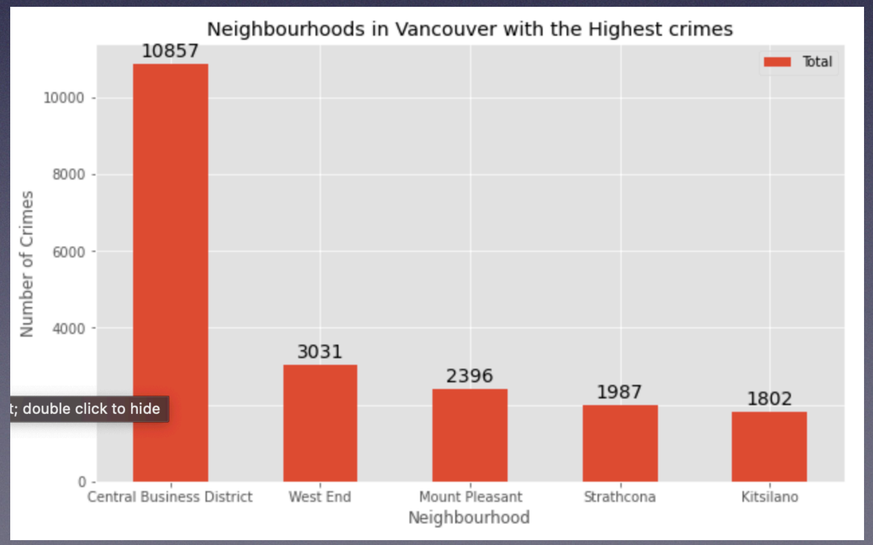
Exploratory Data Analysis

- Visualization of some Neighbourhood's (the first five, by using command .head()) with the number of each crime type per neighbourhood:

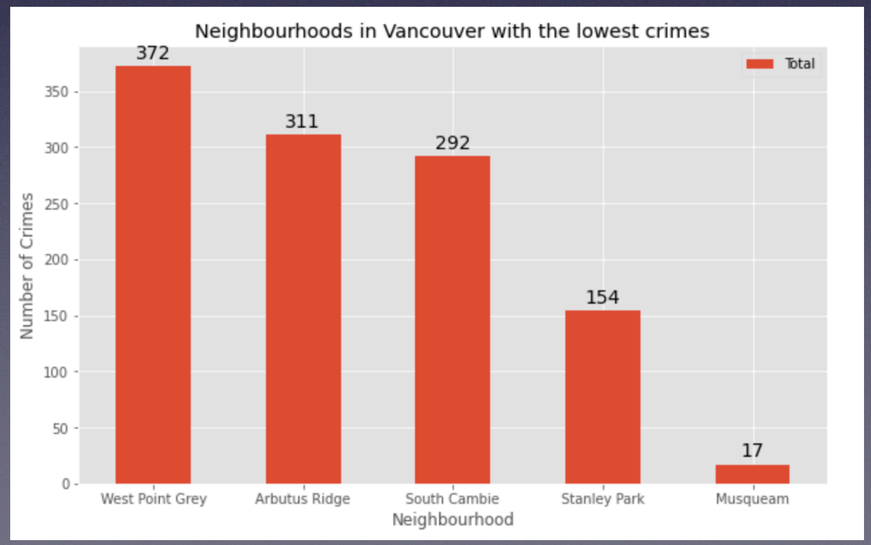
	Neighbourhood	YearBreak and Enter Commercial	YearBreak and Enter Residential/Other	YearMischief	YearOther Theft	YearTheft from Vehicle	YearTheft of Bicycle	YearTheft of Vehicle	YearVehicle Collision or Pedestrian Struck (with Fatality)	YearVehicle Collision or Pedestrian Struck (with Injury)	Total
0	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

Exploratory Data Analysis

- Now we are in the position to search and fine the five neighbourhoods with highest crime numbers:

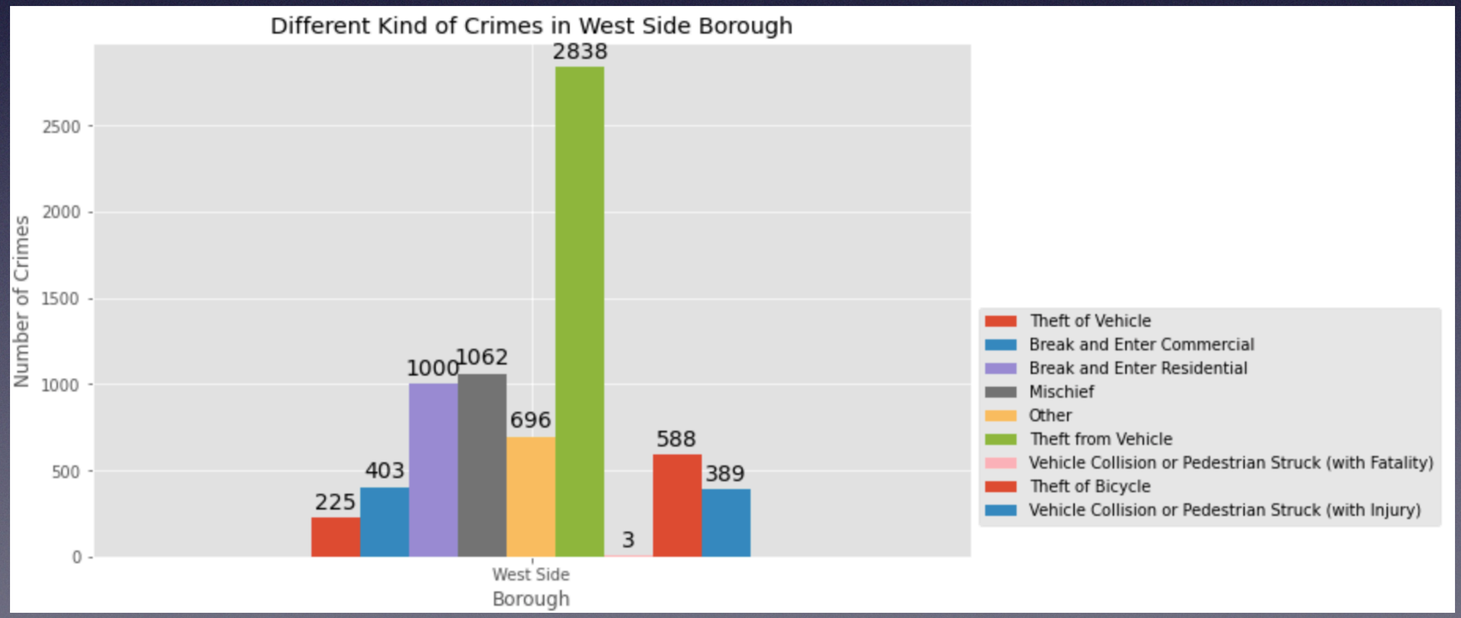


- As well to search and fine the five neighbourhoods with lowest crime numbers:



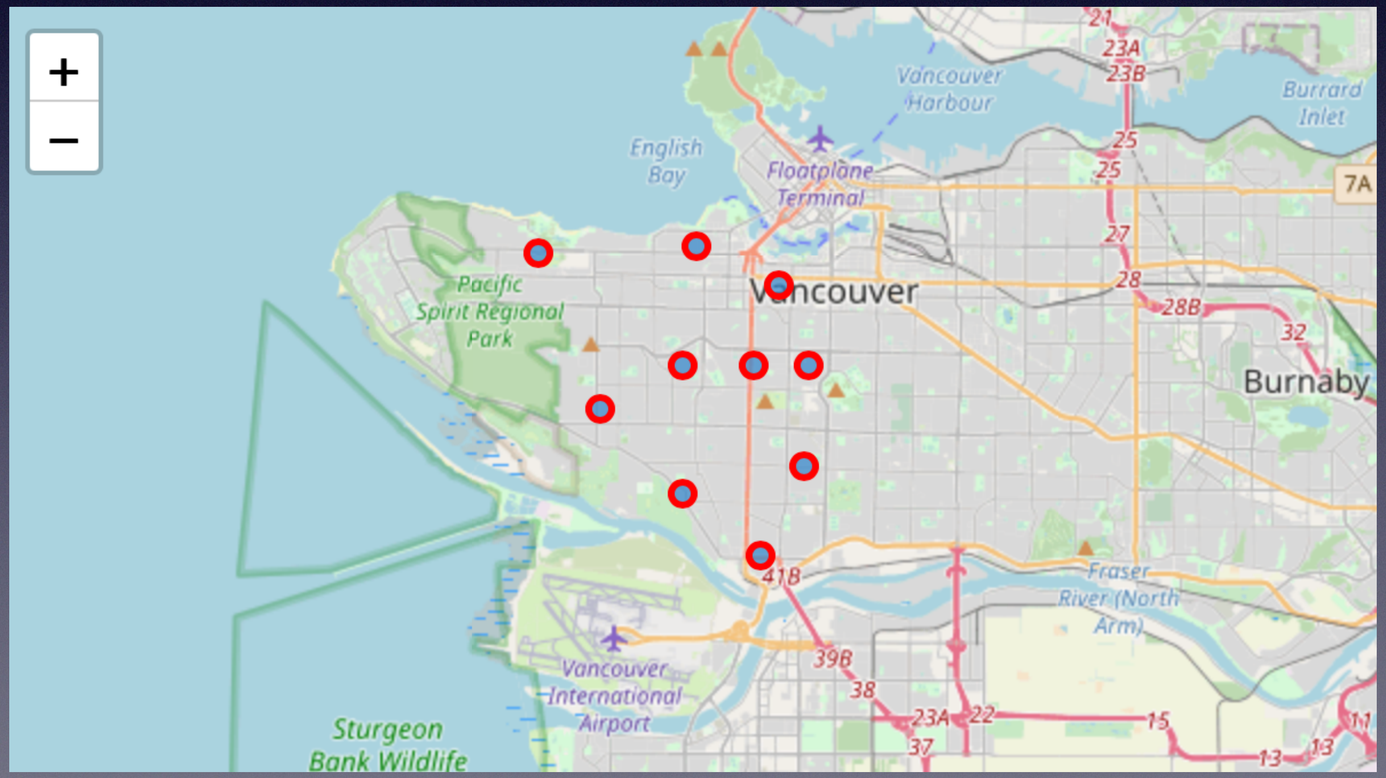
Exploratory Data Analysis

- We have chosen to search deeper the West Side borough of Vancouver. Hence here is an chart showing the number of each crime type in this region:



Exploratoty Data Analysis

- In this place we used Folium to plot Vancouver City's West Side Borough and its Neighbourhoods:



Modelling

- Next we decided to get a deeper knowledge across different neighbourhoods and we searched for the top 5 most common venues in each one of them.

----Arbutus Ridge----

	venue	freq
0	Liquor Store	0.12
1	Seafood Restaurant	0.12
2	Fast Food Restaurant	0.12
3	Dance Studio	0.12
4	Coffee Shop	0.12

----Dunbar-Southlands----

	venue	freq
0	Grocery Store	0.23
1	Liquor Store	0.15
2	Gym / Fitness Center	0.08
3	Ski Area	0.08
4	Japanese Restaurant	0.08

----Fairview----

	venue	freq
0	Asian Restaurant	0.11
1	Japanese Restaurant	0.11
2	Korean Restaurant	0.06
3	Camera Store	0.06
4	Indian Restaurant	0.06

----Kerrisdale----

	venue	freq
0	Park	0.25
1	Golf Course	0.25
2	Café	0.25
3	Pool	0.25
4	Massage Studio	0.00

----Kitsilano----

	venue	freq
0	Bakery	0.07
1	American Restaurant	0.04
2	Coffee Shop	0.04
3	Ice Cream Shop	0.04
4	Thai Restaurant	0.04

----Marpole----

	venue	freq
0	Sushi Restaurant	0.09
1	Pizza Place	0.09
2	Chinese Restaurant	0.06
3	Vietnamese Restaurant	0.06
4	Bubble Tea Shop	0.06

----Oakridge----

	venue	freq
0	Bubble Tea Shop	0.2
1	Sporting Goods Shop	0.1
2	Vietnamese Restaurant	0.1
3	Light Rail Station	0.1
4	Bus Station	0.1

----Shaughnessy----

	venue	freq
0	Bus Stop	0.4
1	Video Game Store	0.2
2	Chocolate Shop	0.2
3	Park	0.2
4	Noodle House	0.0

----South Cambie----

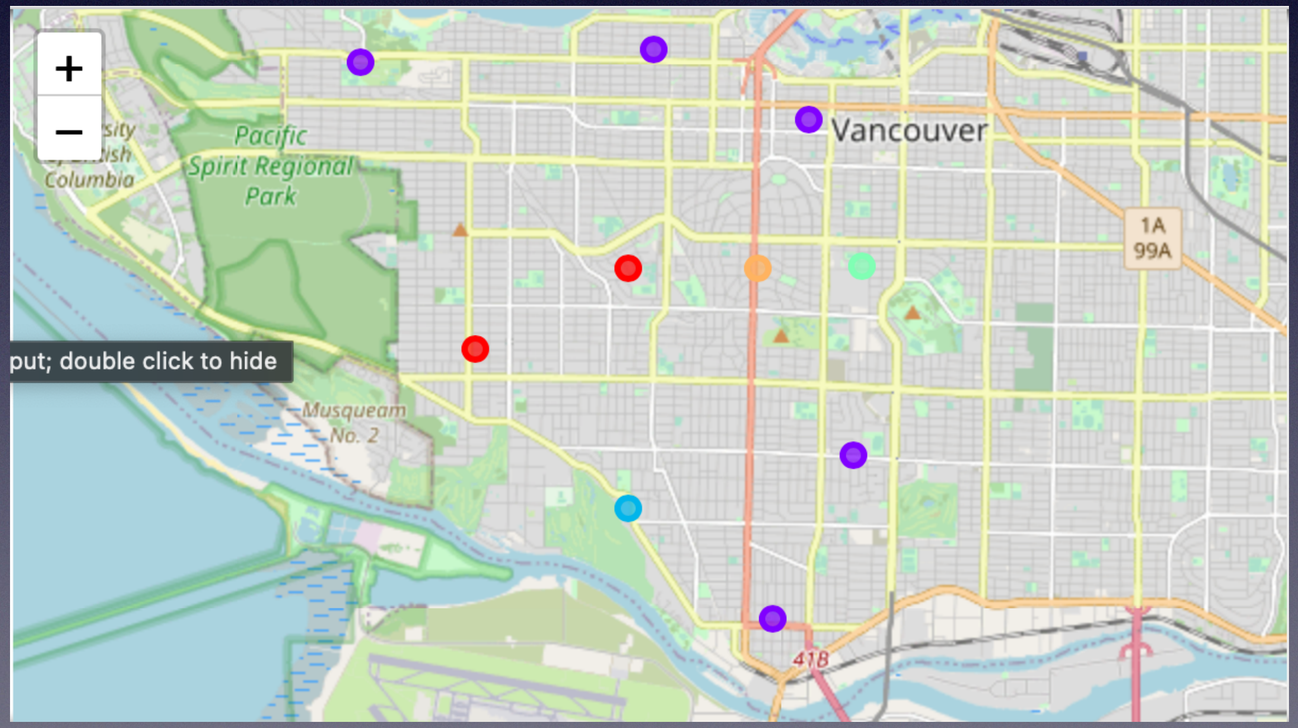
	venue	freq
0	Coffee Shop	0.33
1	Malay Restaurant	0.08
2	Bus Stop	0.08
3	Grocery Store	0.08
4	Sushi Restaurant	0.08

----West Point Grey----

	venue	freq
0	Disc Golf	0.11
1	Harbor / Marina	0.11
2	Sandwich Place	0.11
3	Performing Arts Venue	0.11
4	Park	0.11

Modelling

- As we see the same map but the neighbourhoods are now clustered into 5 different clusters.



Analysis and results.

- We examined each different cluster and we searched for and found the most common value in all of them as to see the location to choose in each one of them.
- By first making use of Vancouver data to identify a safe borough with considerable number of neighbourhood for any business to be viable we achieved our main objective to help stakeholders identify one of the safest borough in Vancouver, Canada.

Conclusion

- We have explored the crime data to understand different types of crimes in all neighbourhoods of Vancouver and later categorised them into different boroughs, this helped us group the neighbourhoods into boroughs and choose the safest borough first.

- Once we confirmed the borough the number of neighbourhoods for consideration also comes down, we further shortlisted the neighbourhoods based on the common venues, to choose a neighbourhood which best suits the business problem.