

# CRIME ANALYSIS FOR NEIGHBORHOODS IN VANCOUVER



# WHY VANCOUVER?

Why a lot of people choose to live in Vancouver?

Beside the prices of house, what other characters should you consider?

Well, the *safety*!

- This Presentation will help you to find out how safety Vancouver's Neighborhoods are.

# DATA

## The crime.csv

- includes all crimes(from 2003 to 2019) reported in Vancouver.
- It also shows the detail of each crime such as: crime type, date, and Neighborhood.
- This data is directly download from Kaggle

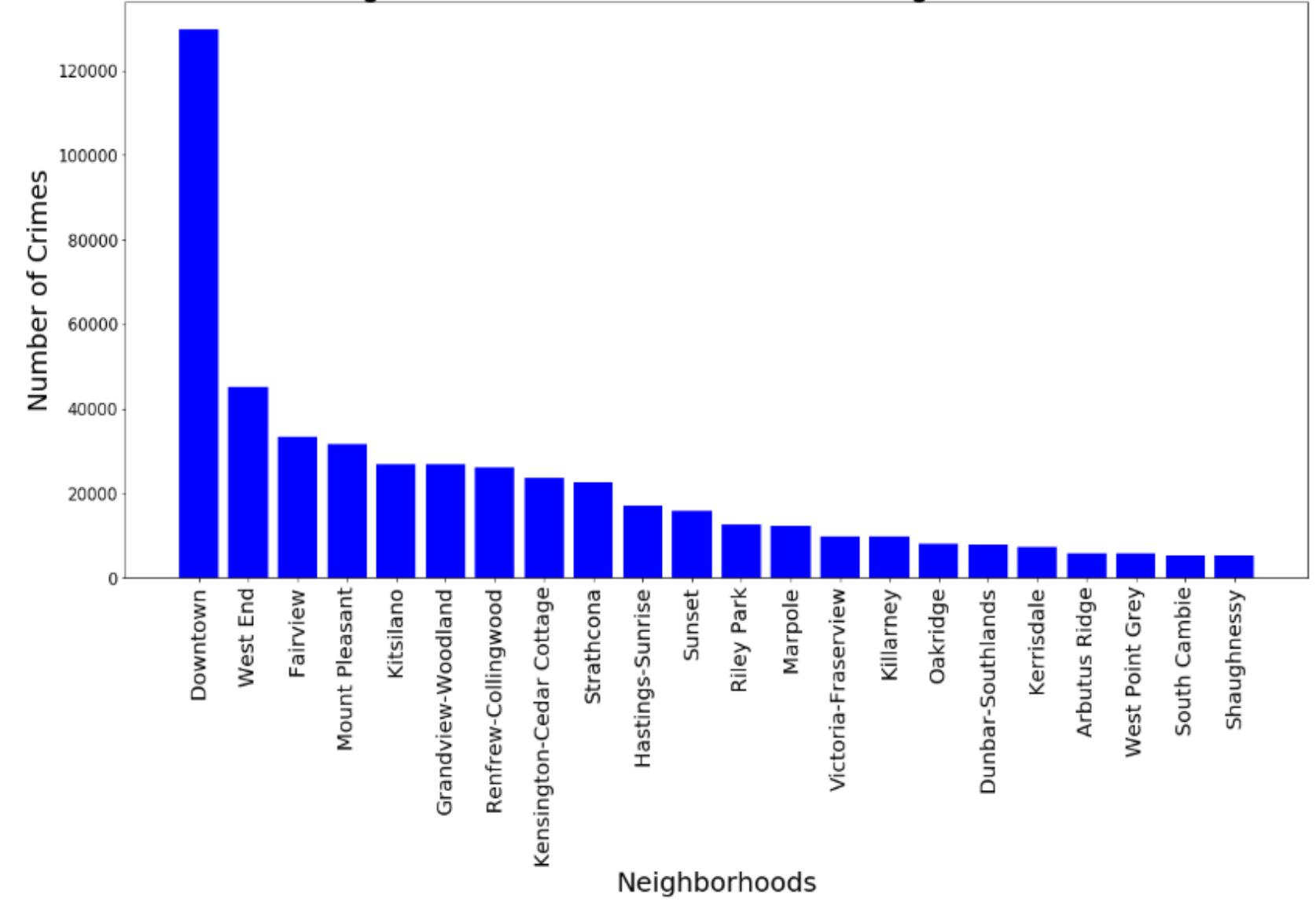
## The Location.xlsx data

- combined with a list of Neighborhoods and their GPS location.
- The table is manually created by gathering data from Wikipedia.
- This data is helpful for combining crime data with the Foursquare location data.

Some useless rows and columns in crime.csv are deleted.

Neighborhoods cannot be Null in both tables.

Figure1: Crime numbers in each Neighborhoods

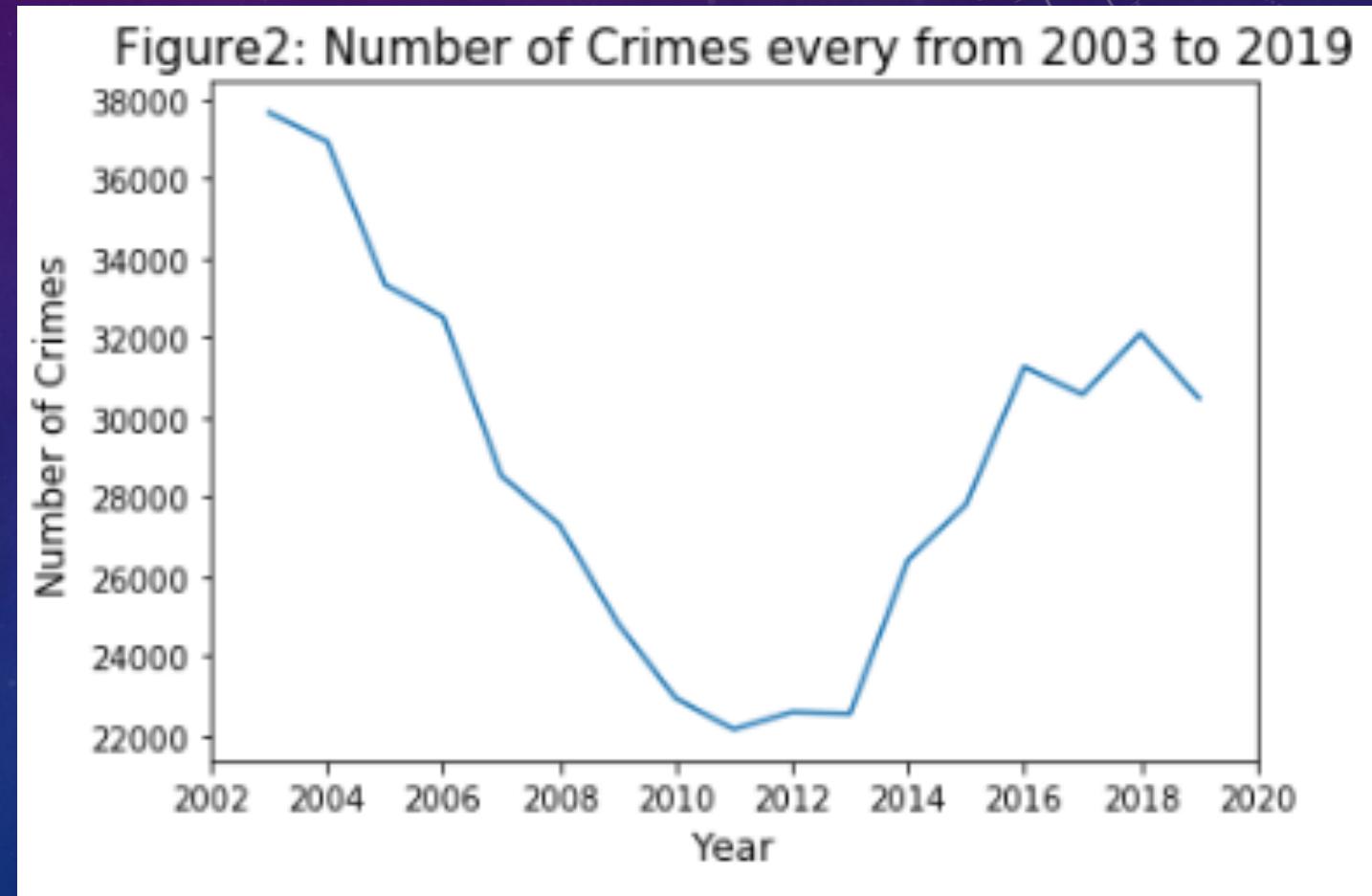


## NEIGHBORHOODS VS. CRIMES

- Most of crimes are in 'Downtown' and 'West End'.
- 'Downtown' has almost 5 times more crimes than other Neighborhoods.

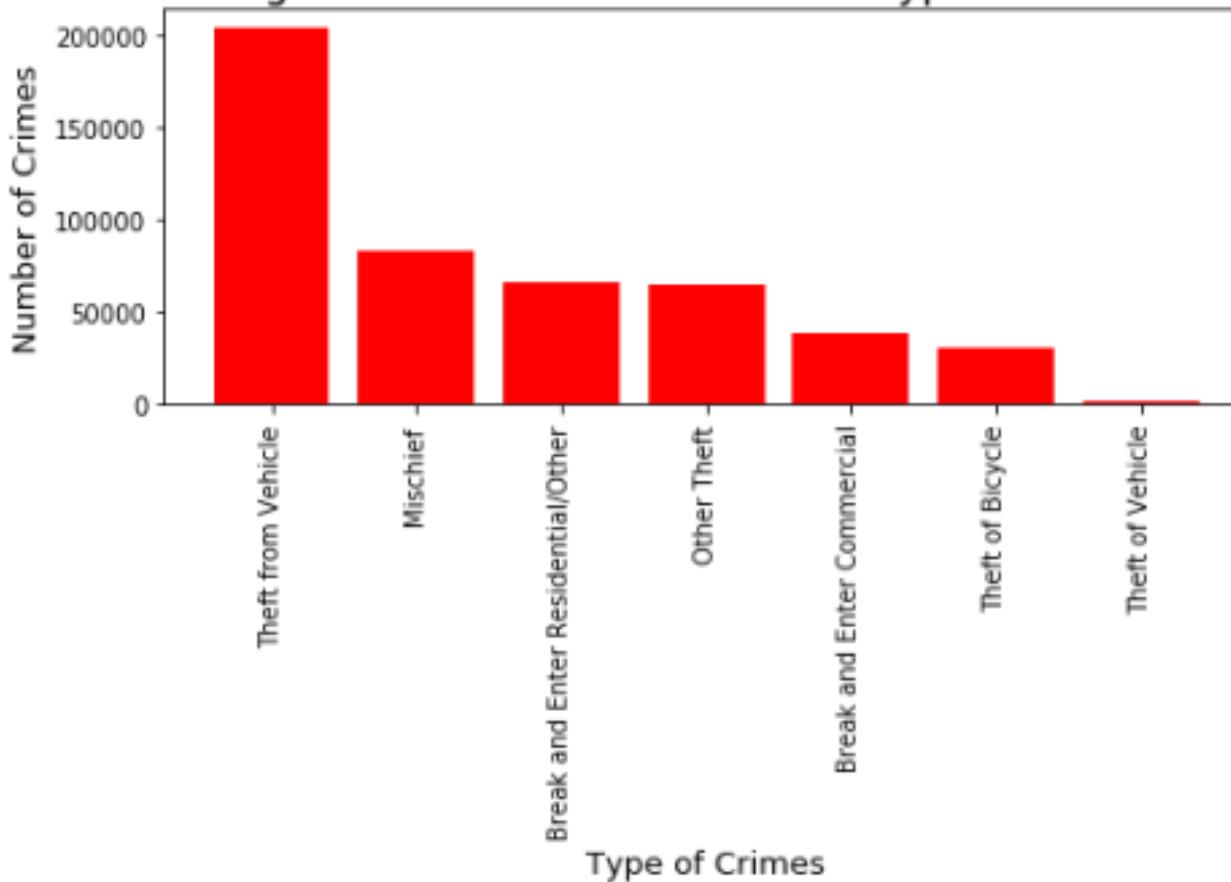
# YEAR VS. CRIMES

the crime rate shows a decrease trend since 2018. So, we can say that Vancouver becomes safer since 2003.



# TYPE OF CRIMES VS. CRIME RATES

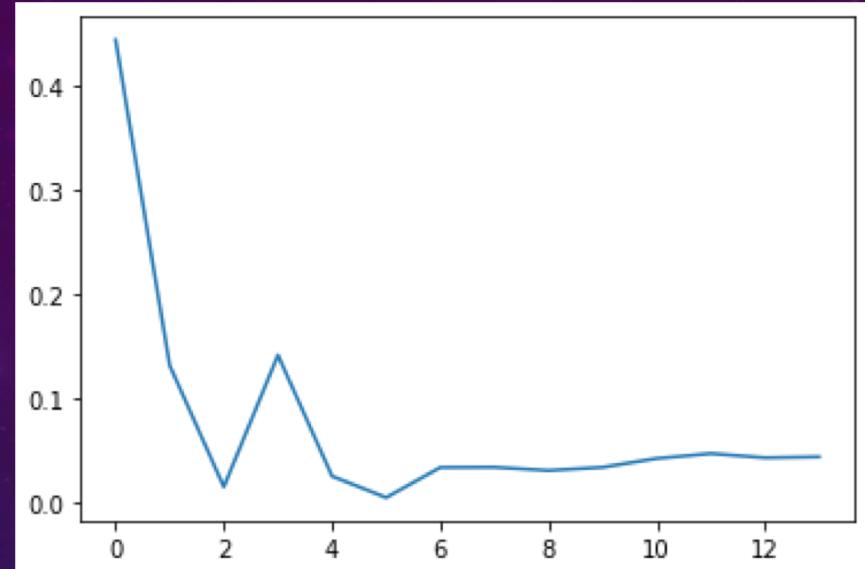
Figure3: Number of Crimes vs. Type of Crimes



- the top five crime types in Vancouver are:
  - 'Theft from Vehicle',
  - 'Mischief',
  - 'Break and Enter Residential/Other',
  - 'Other Theft',
  - 'Break and Enter Commercial'.

→ most crimes in Vancouver are Financial related.

# HOW TO CLUSTER THE NEIGHBORHOODS?



By using 'The Silhouette Method', find the optimal cluster number is 3.

Then, run Kmeans Clustering to Cluster Neighborhoods into 3 groups.

```
In [68]: # set number of clusters
kclusters = 3

van_grouped_clustering = van_grouped.drop('Neighborhood', 1)

# run k-means clustering
kmeans = KMeans(n_clusters=kclusters, random_state=0, n_init = 10).fit(van_grouped_clustering)

# check cluster labels generated for each row in the dataframe
kmeans.labels_[0:10]

Out[68]: array([0, 0, 0, 0, 0, 1, 0, 0, 0], dtype=int32)
```

# USING FOURSQUARE API

Neighborhoods	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
5 Hastings-Sunrise	1	Park	Diner	Coffee Shop	Concert Hall	Convenience Store

One Neighborhood is very different based on it's venues categories.

-There are 85 unique venues categories in Vancouver.

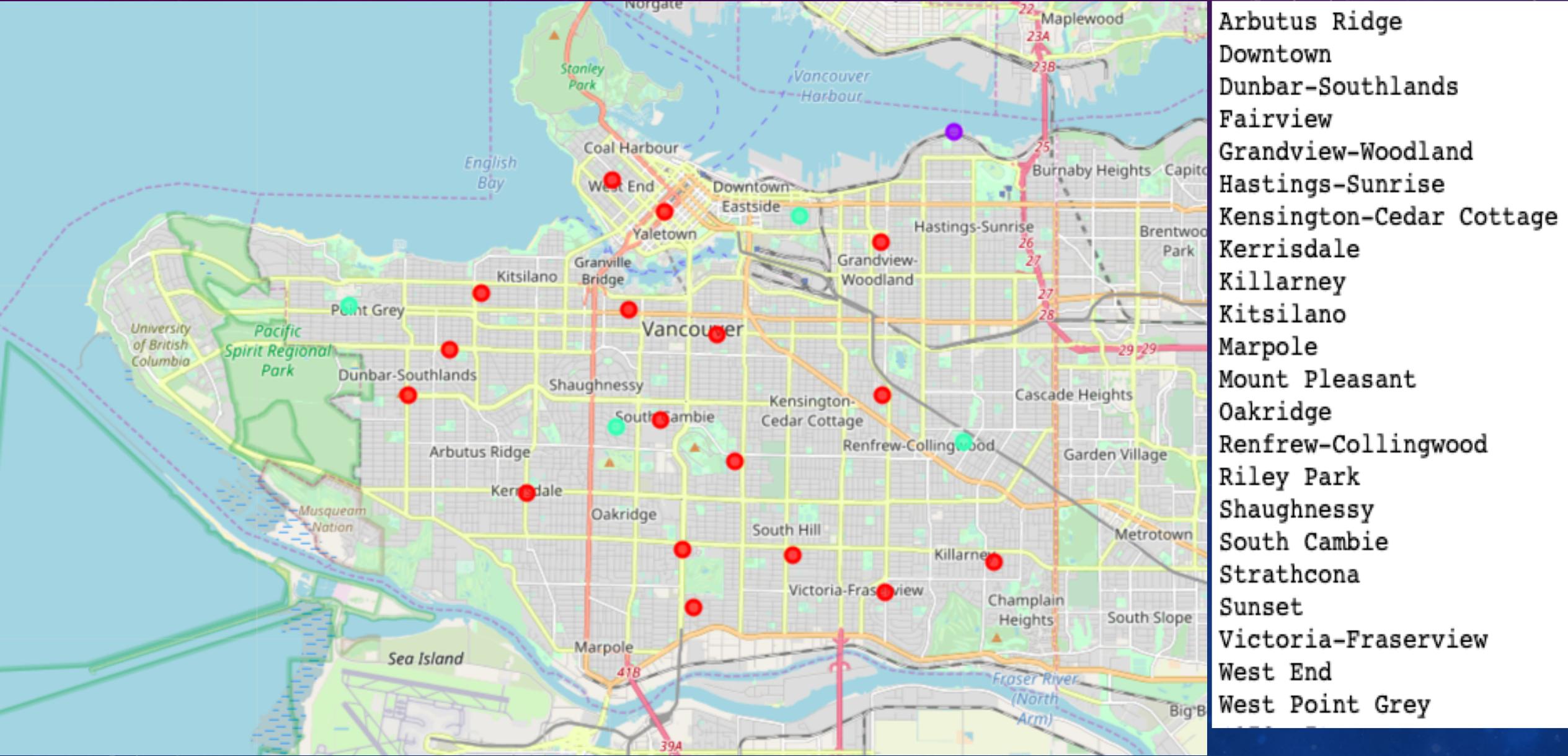
```
In [23]: print('There are {} uniques categories.'.format(len(van_venues['Venue Category'].unique())))
```

```
There are 85 uniques categories.
```

```
In [23]: print('There are {} uniques categories.'.format(len(van_venues['Venue Category'].unique())))
```

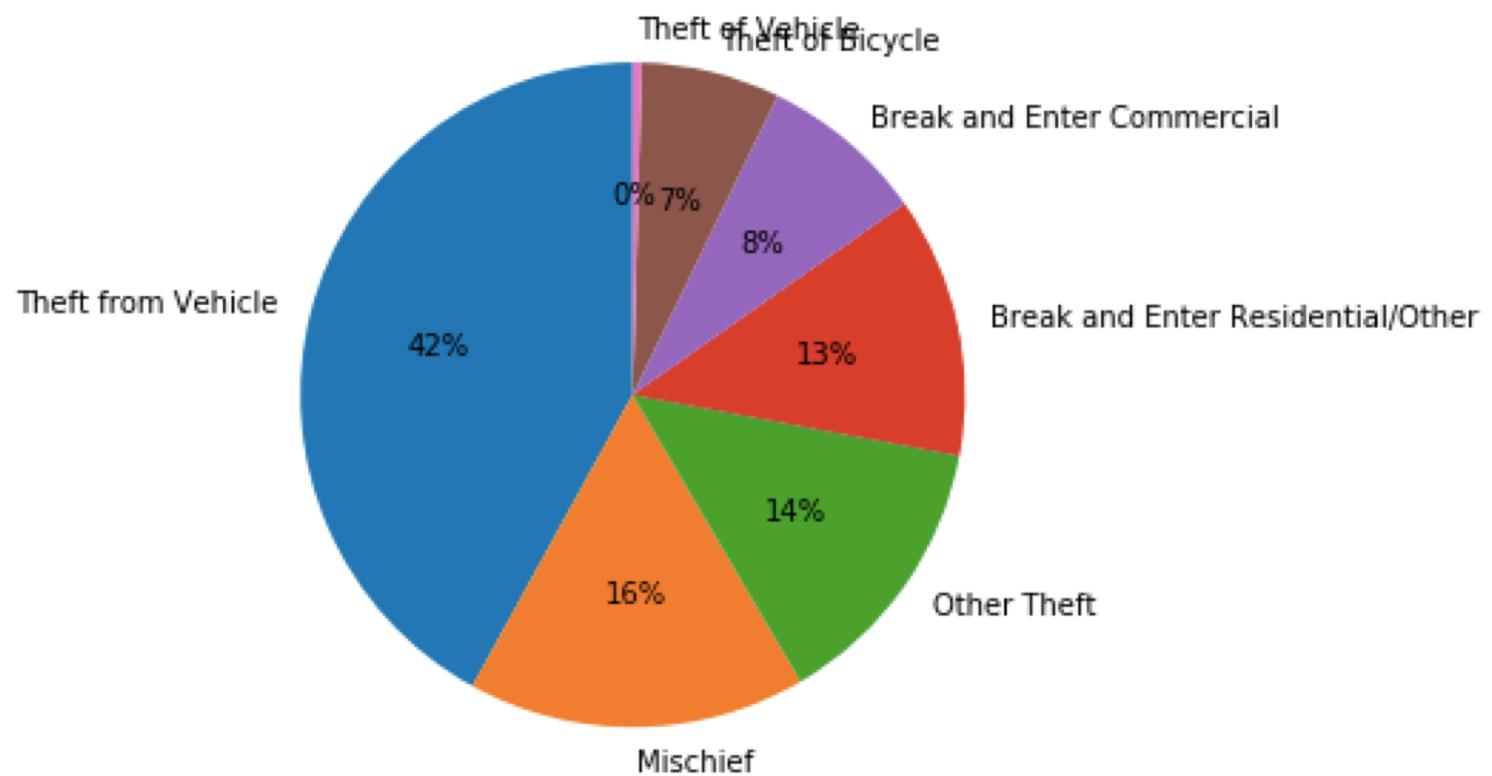
```
There are 85 uniques categories.
```

# MAP OF VANCOUVER'S NEIGHBORHOODS (INTO 3 CLUSTERS)



## THE FIRST GROUP

In cluster one, there are 42 percent 'Theft from Vehicle', 16 percent 'Mischief', and 14 percent 'Other Theft'.

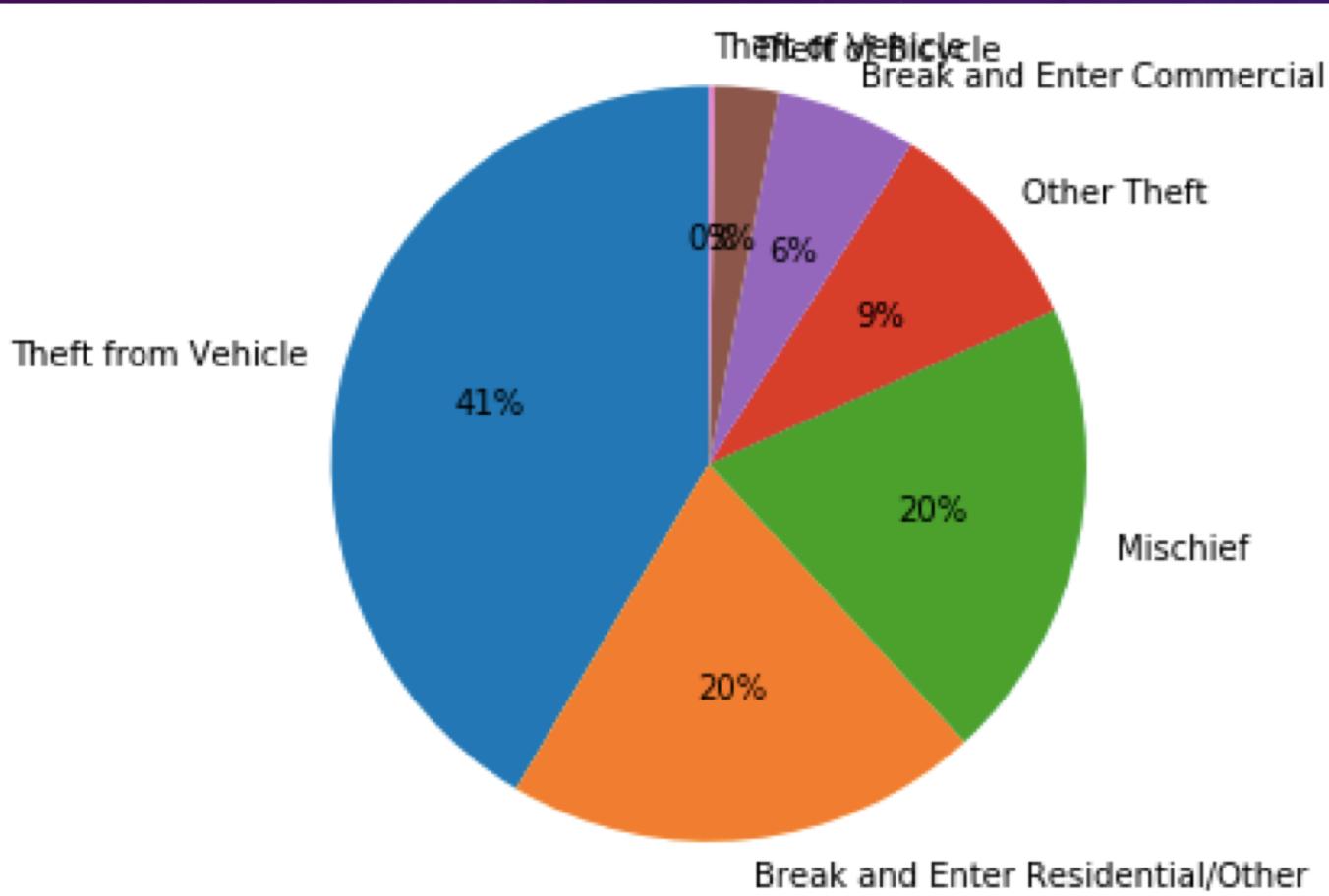


TYPE	Crimes
Theft from Vehicle	173281
Mischief	67834
Other Theft	56261
Break and Enter Residential/Other	52281
Break and Enter Commercial	33296
Theft of Bicycle	27825
Theft of Vehicle	1828

Figure4. crimes in group1

Mischief      Other Theft  
Break and Enter Commercial  
Theft of Bicycle  
Theft from Vehicle  
Break and Enter Residential/Other

## THE SECOND GROUP



In cluster two, there are 41 percent 'Theft from Vehicle', 20 percent 'Break and Enter Residential' and 20 percent 'Mischief'.

### TYPE

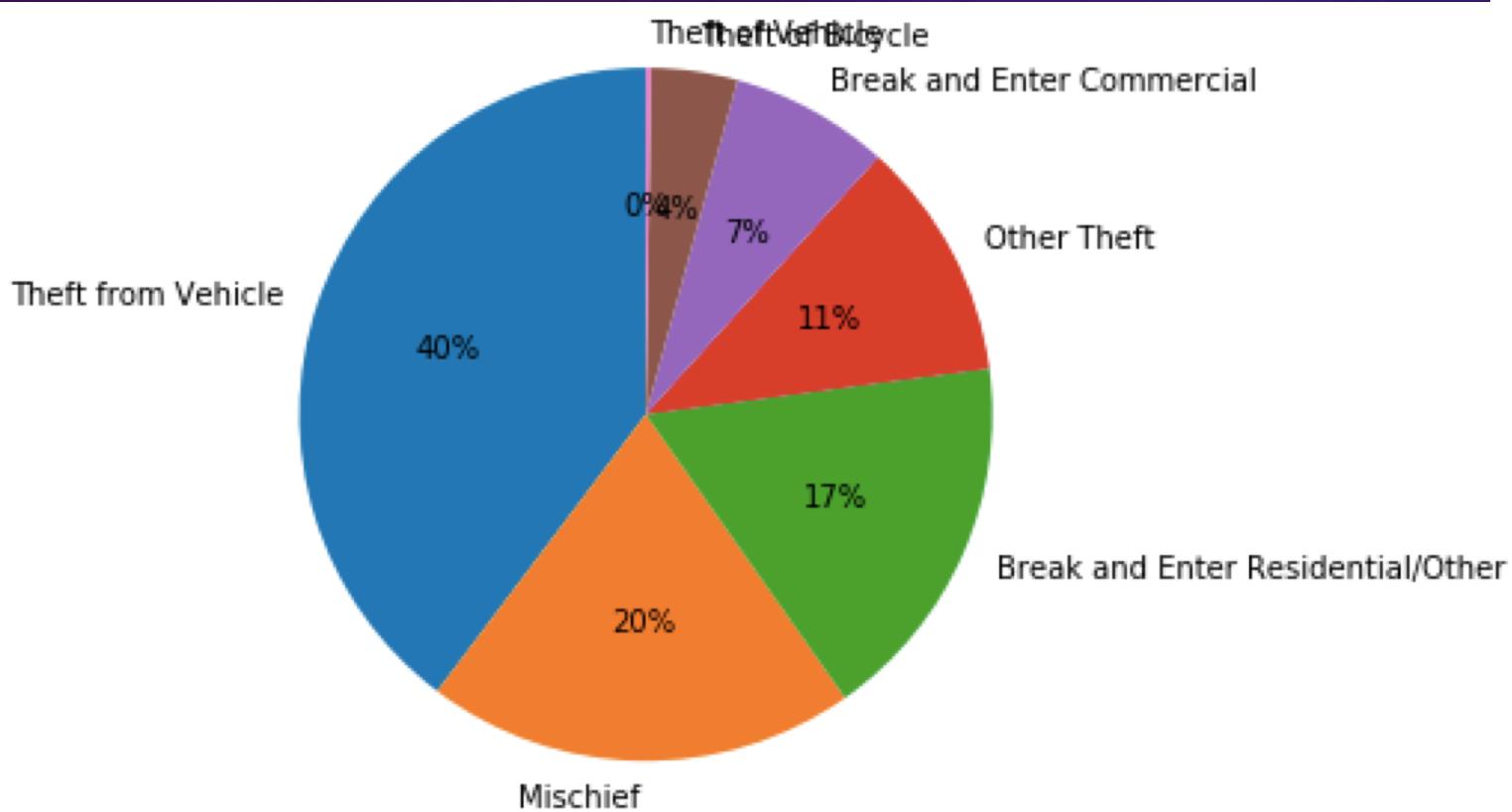
TYPE	Crimes
Theft from Vehicle	7126
Break and Enter Residential/Other	3500
Mischief	3404
Other Theft	1608
Break and Enter Commercial	1036
Theft of Bicycle	471
Theft of Vehicle	38

Figure4. crimes in group2

Theft from Vehicle  
Other Theft  
Break and Enter Residential/Other  
Mischief  
Break and Enter Commercial  
Theft of Bicycle

## THE THIRD GROUP

In cluster three, there are 40 percent 'Theft from Vehicle', 20 percent 'Mischief', and 17 percent 'Break and Enter Residential'.



TYPE	Crimes
Theft from Vehicle	23870
Mischief	12041
Break and Enter Residential/Other	10432
Other Theft	6718
Break and Enter Commercial	4471
Theft of Bicycle	2419
Theft of Vehicle	142

Figure4. crimes in group3

Break and Enter Residential/Other

Break and Enter Commercial

Theft from Vehicle  
Mischief  
Other Theft  
Theft of Bicycle

# RESOURCES

<https://www.kaggle.com/agilesifaka/vancouver-crime-report>