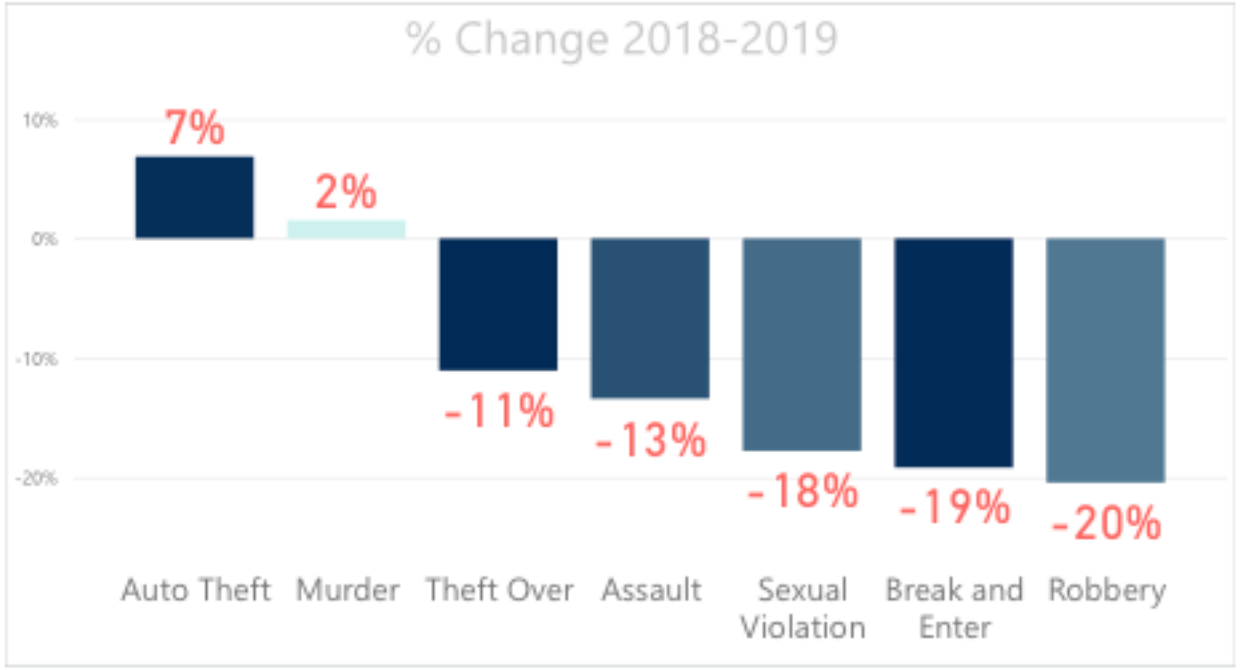
Car Theft in Toronto

Where and how?

Crime in Canada?

- Toronto is not on the list of the most dangerous cities in the world
- But it does not mean Torotonians are exempt from crime occurrence



Source: https://data.torontopolice.on.ca/pages/major-crime-indicators

But who is interested?

- Car Insurance companies wants to know more and more about dangerous places
- Affects pricing

This analysis

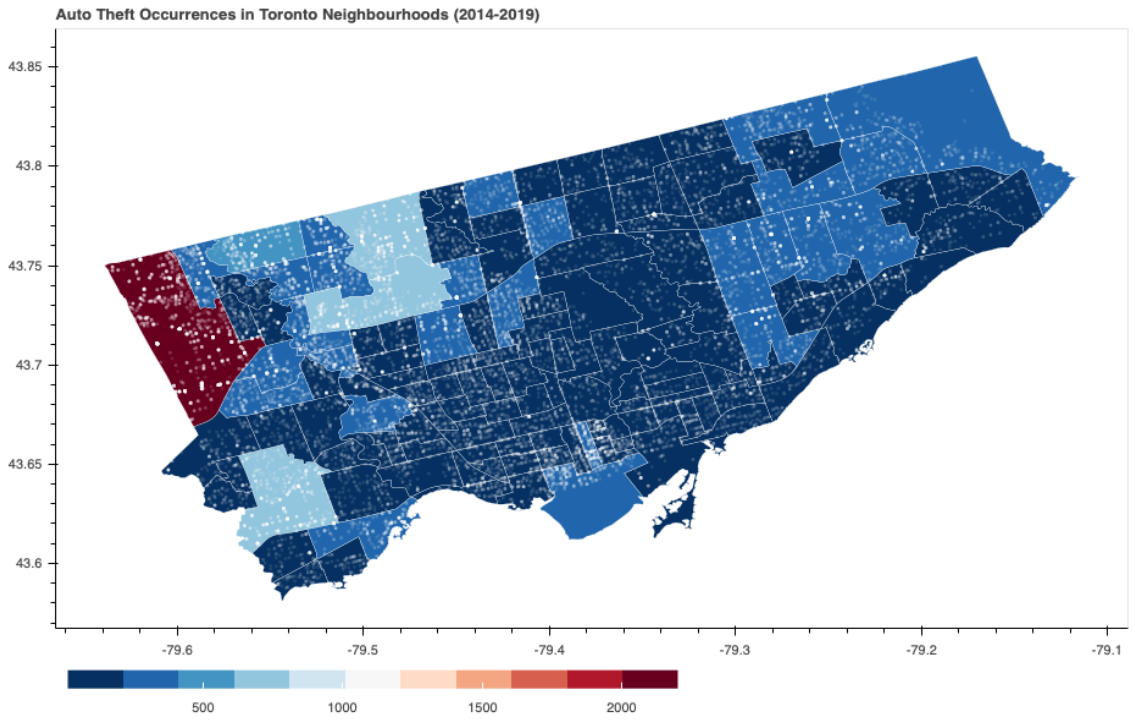
- I will try to describe the characteristics of neighbourhoods in which crime happens

Data

- Toronto Police data containing auto theft cases in Toronto from 2014 to 2019
- Foursquare API data containing venues in each neighbourhood, including its coordinates, categories and sub-categories

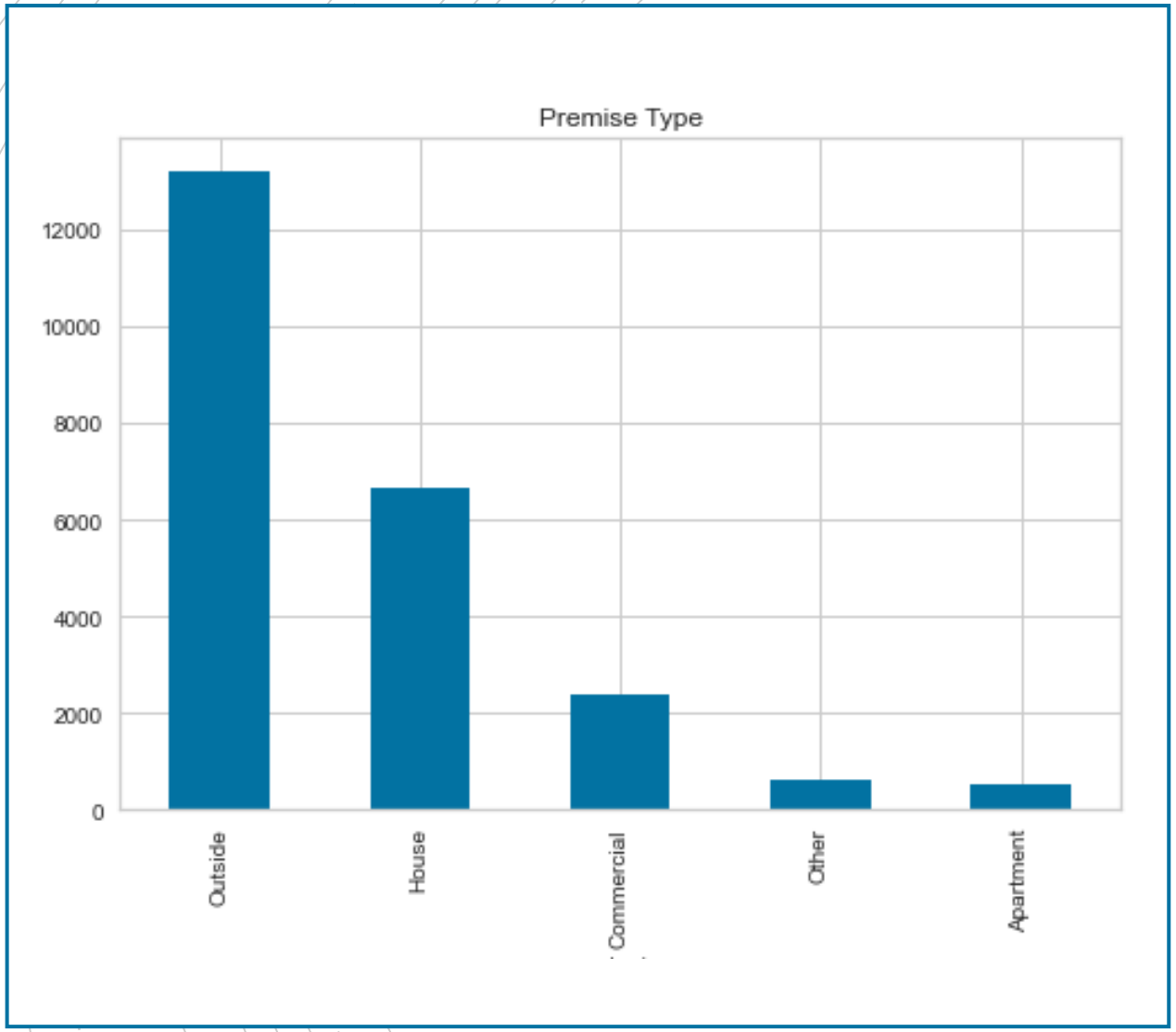
Methodology

- Account the total auto theft occurrences in each neighbourhood
  - Show on the map
  - Identify the sazonality of the occurrences
- Machine Learning
  - Cluster the neighbourhoods
    - Standardize data
    - PCA analysis/feature selection
  - Identify the five most common venues for each type of neighbourhood



Auto theft in Toronto Neighbourhoods

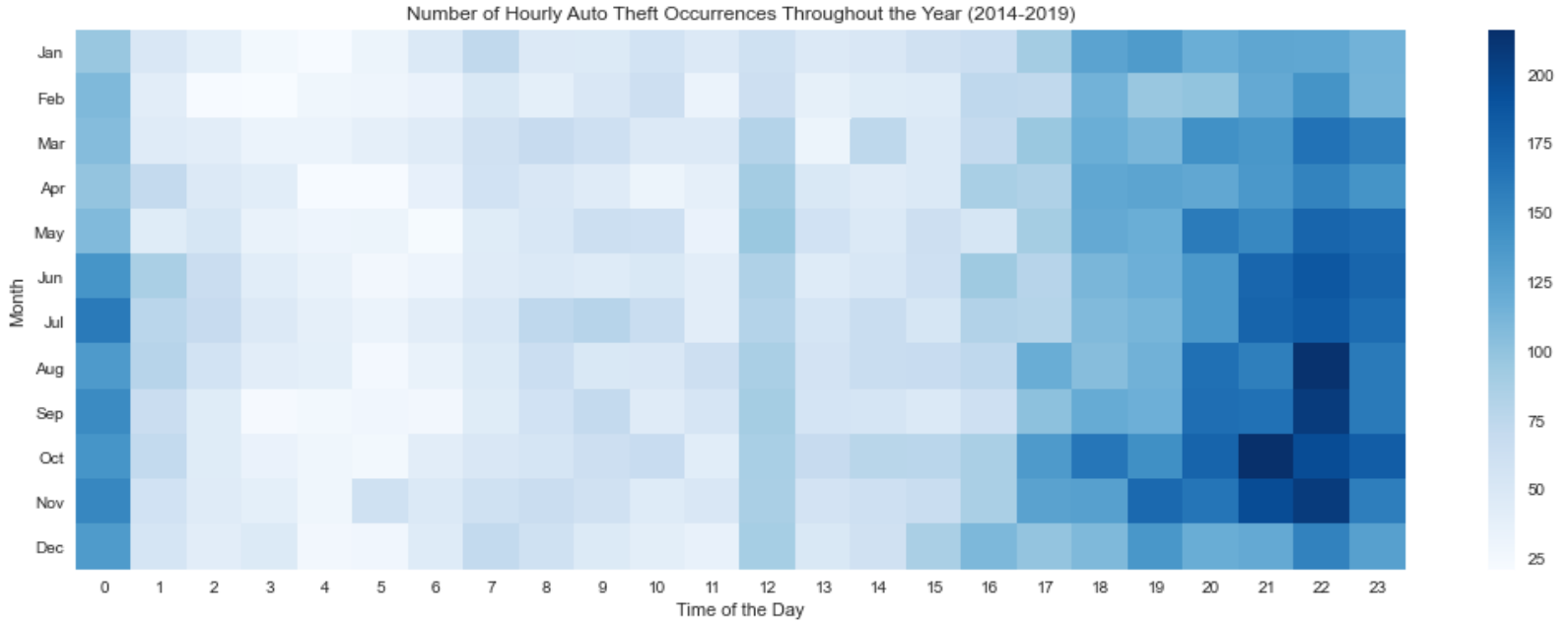
West Humber-Clairville neighbourhood is the most dangerous, with 2200 records of auto theft



Premise Type

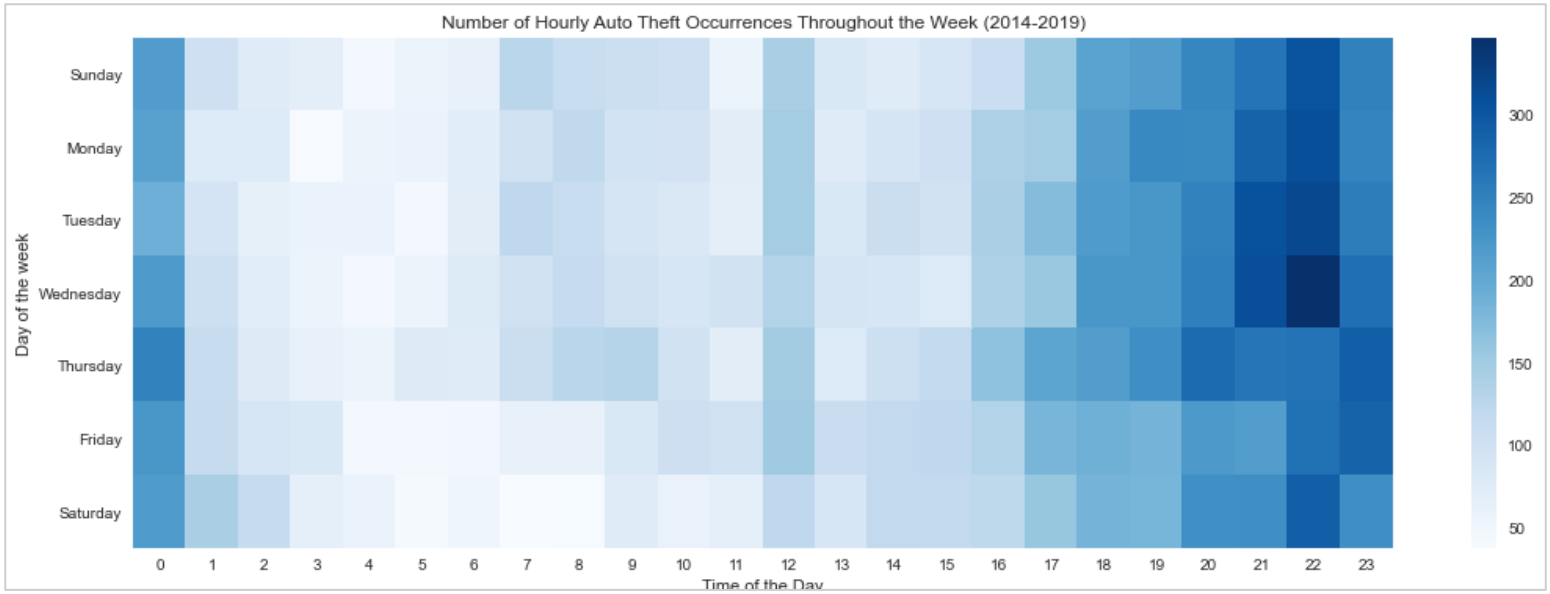
- Majority of the occurrences are outside houses

When?

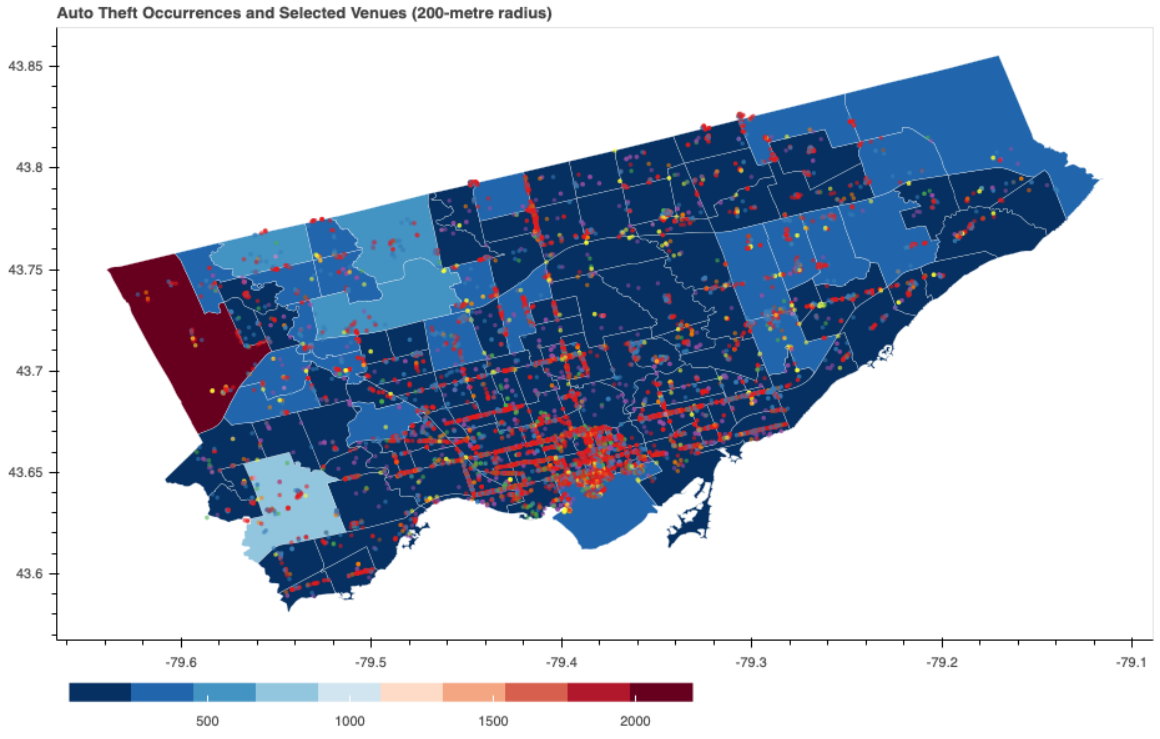


- The autumn months are more subjected to auto theft, with felonies happening predominantly at night between 8pm and midnight

When?



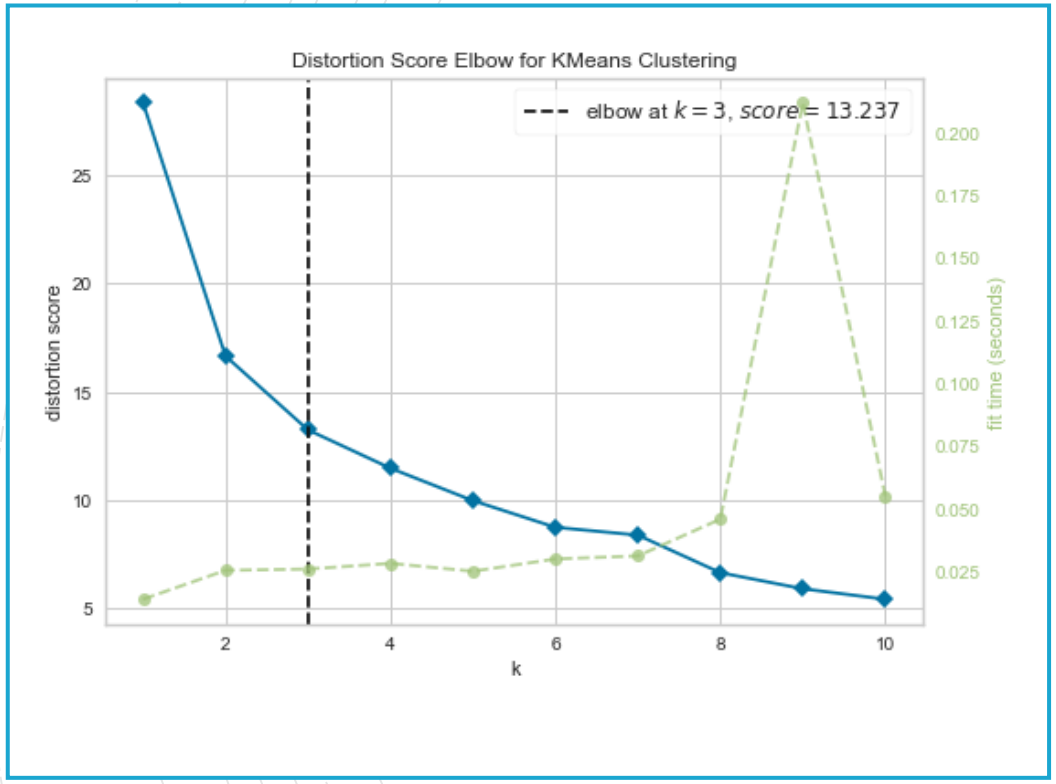
- Occurrences are most common on Wednesday nights



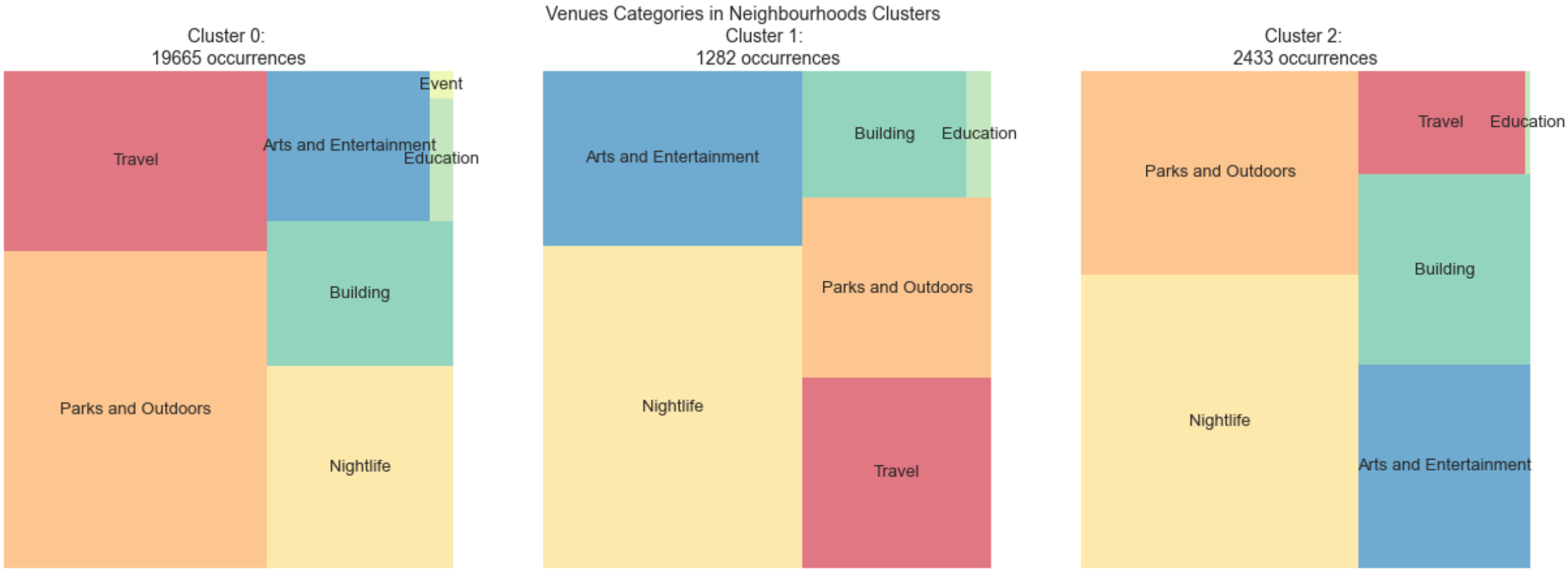
Clustering process

- Data was scaled between zero and one
- Principal Component Analysis were used to reduce the dimensionality of the data to a lower dimensional space respecting 95% of explained variance

Clustering Process



- The number of clusters to be used in the KMeans algorithm was defined using the elbow technique, which found an optimal value of 3 clusters



Clusters

- Cluster 0 → most dangerous (19665 occurrences)
- Cluster 1 → less dangerous (1282 occurrences)
- Cluster 2 → less dangerous (2433 occurrences)

In conclusion

- The most dangerous areas for car owners are those with open spaces such as parks, parking lots and hotels
- Areas with active nightlife and arts/entertainment venues tend to have lower number of occurrences