

# **Project to Find the Optimal Number of the Toronto Financial Security Centers (TFSCs)**

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**Junyup Kim**

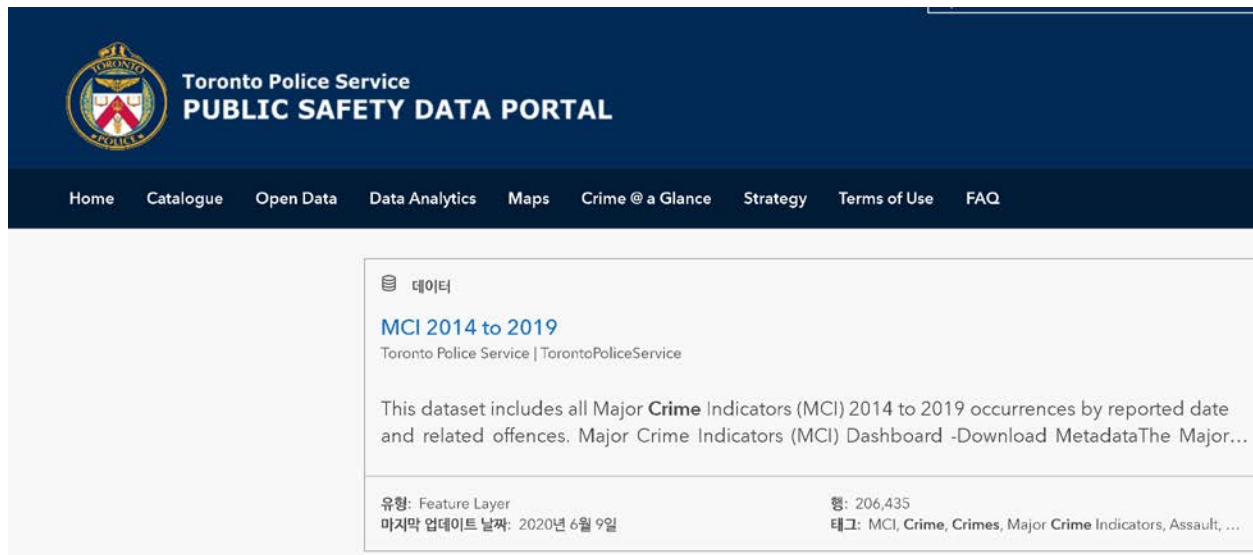
# Introduction

- There are around 107 robberies on average in financial firms in Toronto per year.
- **(Assumption)** The Canadian Bankers Association (CBA) decides to lower the number of bank robberies as 50% of the current average level until 2025.
  - CBA will support to establish a Toronto Financial Security Center (TFSC).
  - Main Goal of this Project:

*Find the Optimal Number of TFSCs  
by the Clustering Analysis*

# Data

- Robbery in Financial Institution
  - Major Crime Indicators (MCI) database

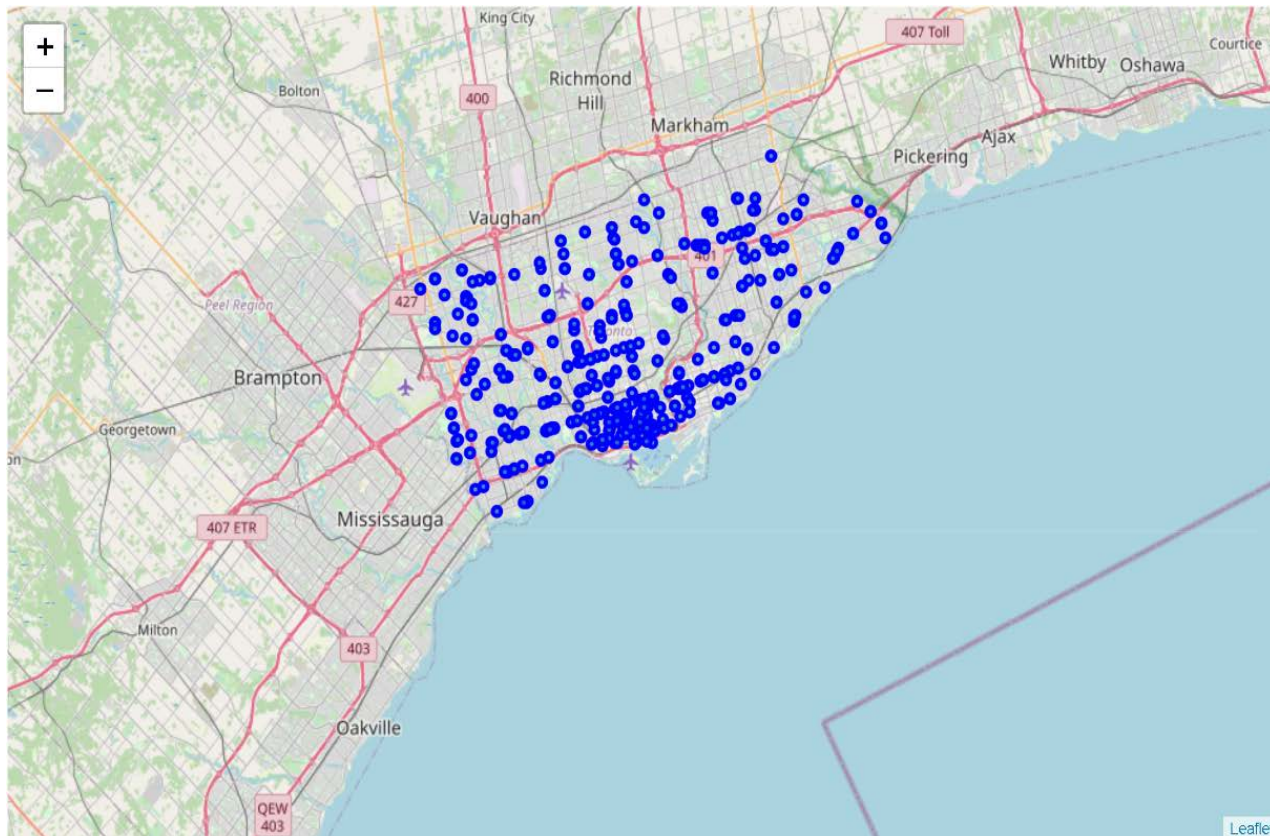


- Bank Location in Toronto
  - Foursquare API

# Methodology

- **Location Clustering of the Robbery in Financial Institutions in Toronto**

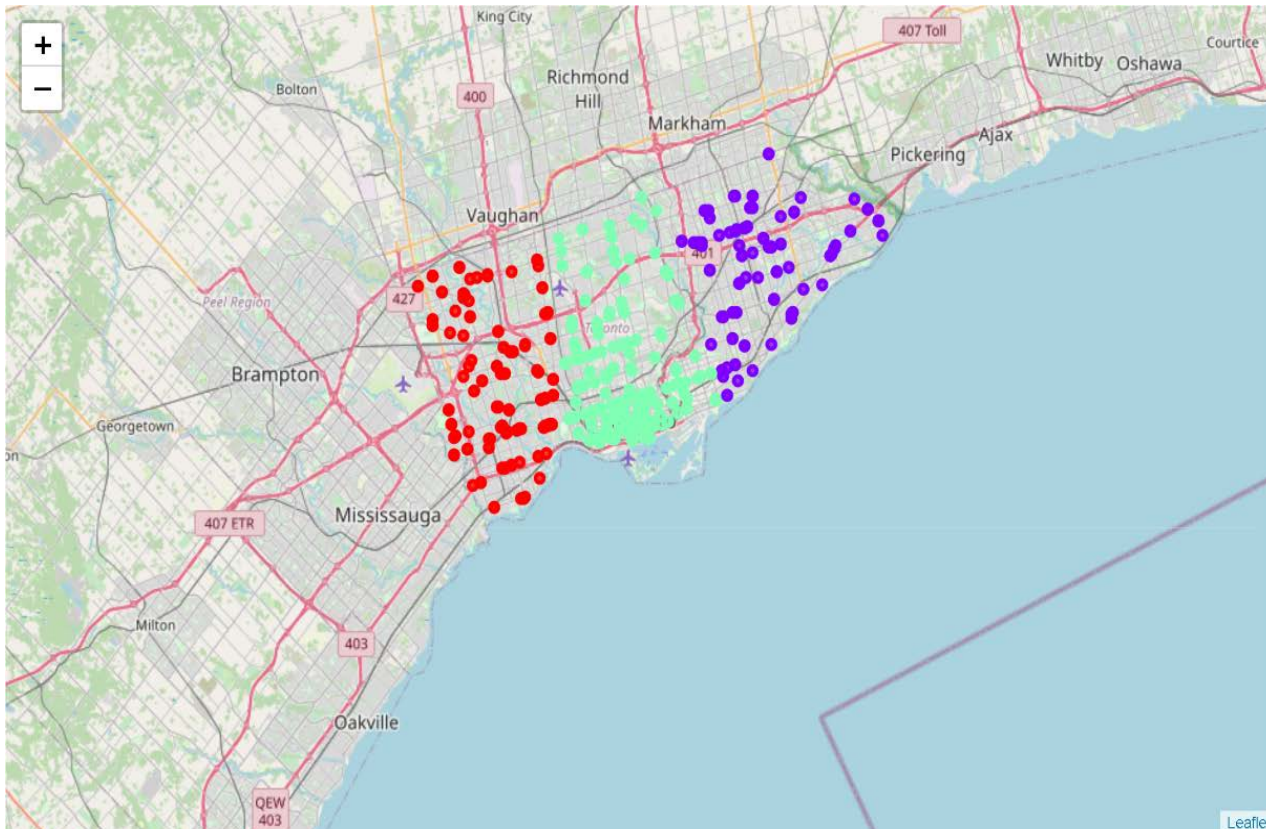
**Robbery in Financial Institutions in Toronto (2014-19)**



# Methodology *(continued)*

- **Location Clustering of the Robbery in Financial Institutions in Toronto**

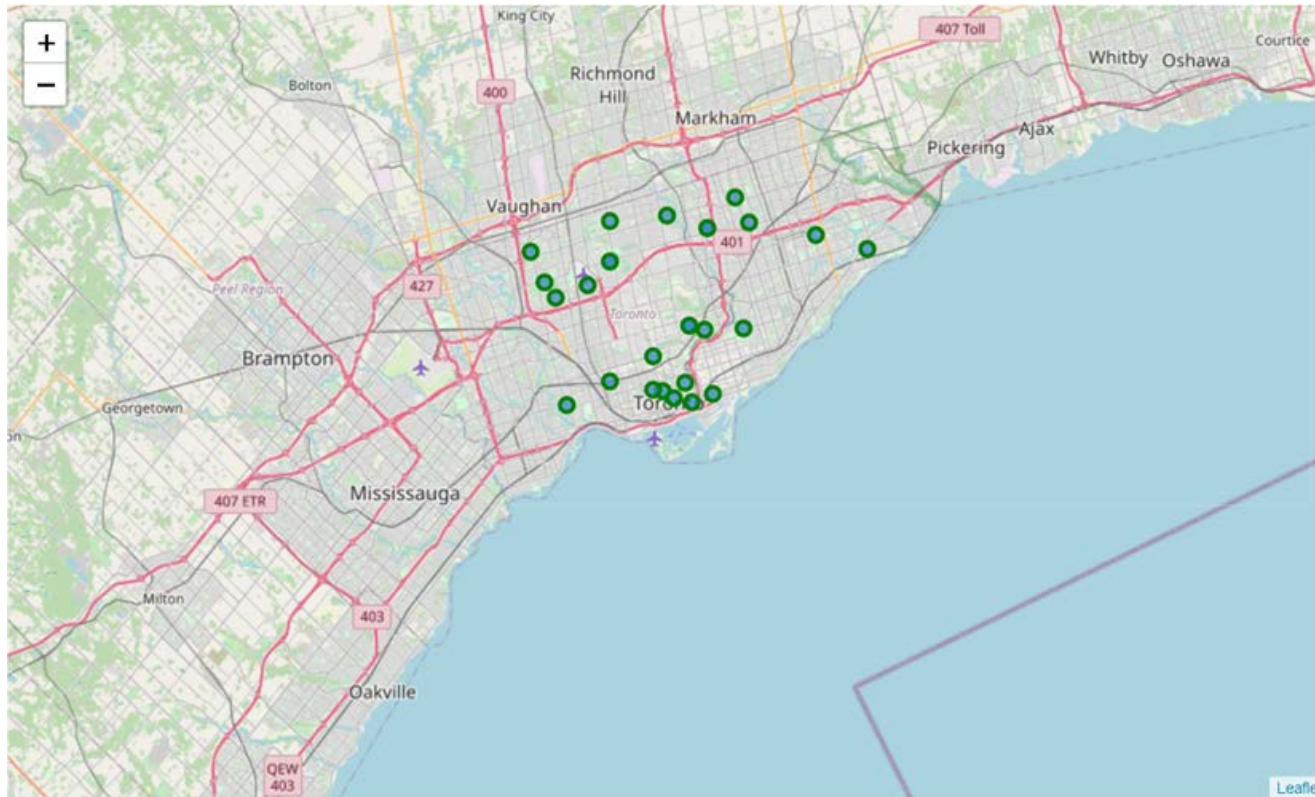
Cluster Map of the Robbery in Financial Institutions in Toronto



## Methodology *(continued)*

- **Location Clustering of the Banks in Toronto**

## Banks in Toronto

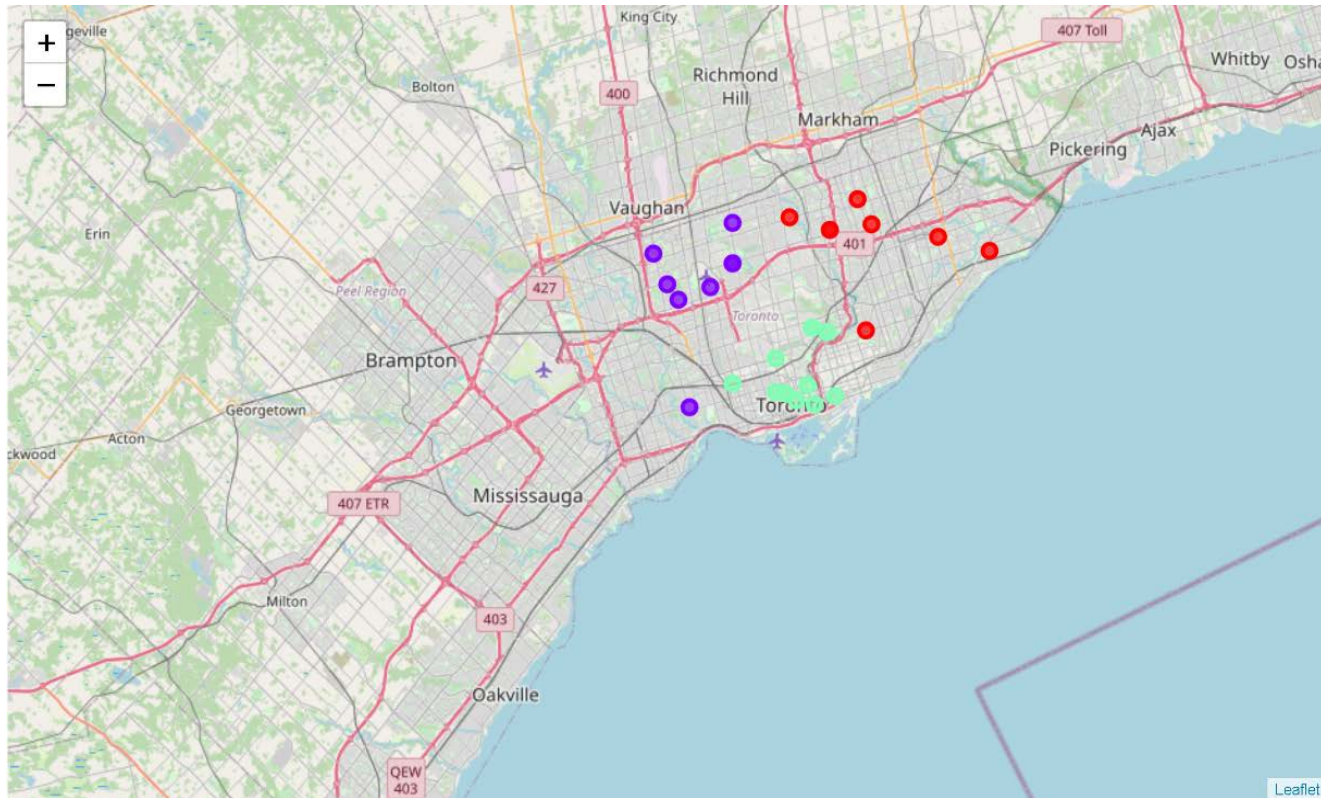




## Methodology *(continued)*

- **Location Clustering of the Banks in Toronto**

## Cluster Map of the Banks in Toronto



# Result and Discussion

- There are three clusters in bank robberies and bank locations in Toronto.
- This implies that at least three TFSCs in Toronto need to be established if there let be one TFSC in each cluster.
- The detailed location of each TFSC can simply be the centroid of each cluster. However, it is necessary to regard more factors:
  - Transportation, Population,
  - Existing Public Security Enforcement (e.g., Police Stations)
  - Incompleteness of Foursquare Database for Bank Locations



# Conclusion

- It can be necessary to have three TFSC in Toronto, given that there are three clusters both in bank locations and robbery cases in financial institutions.