

Smart Policing in Detroit

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IBM Data Science Capstone Project

Introduction

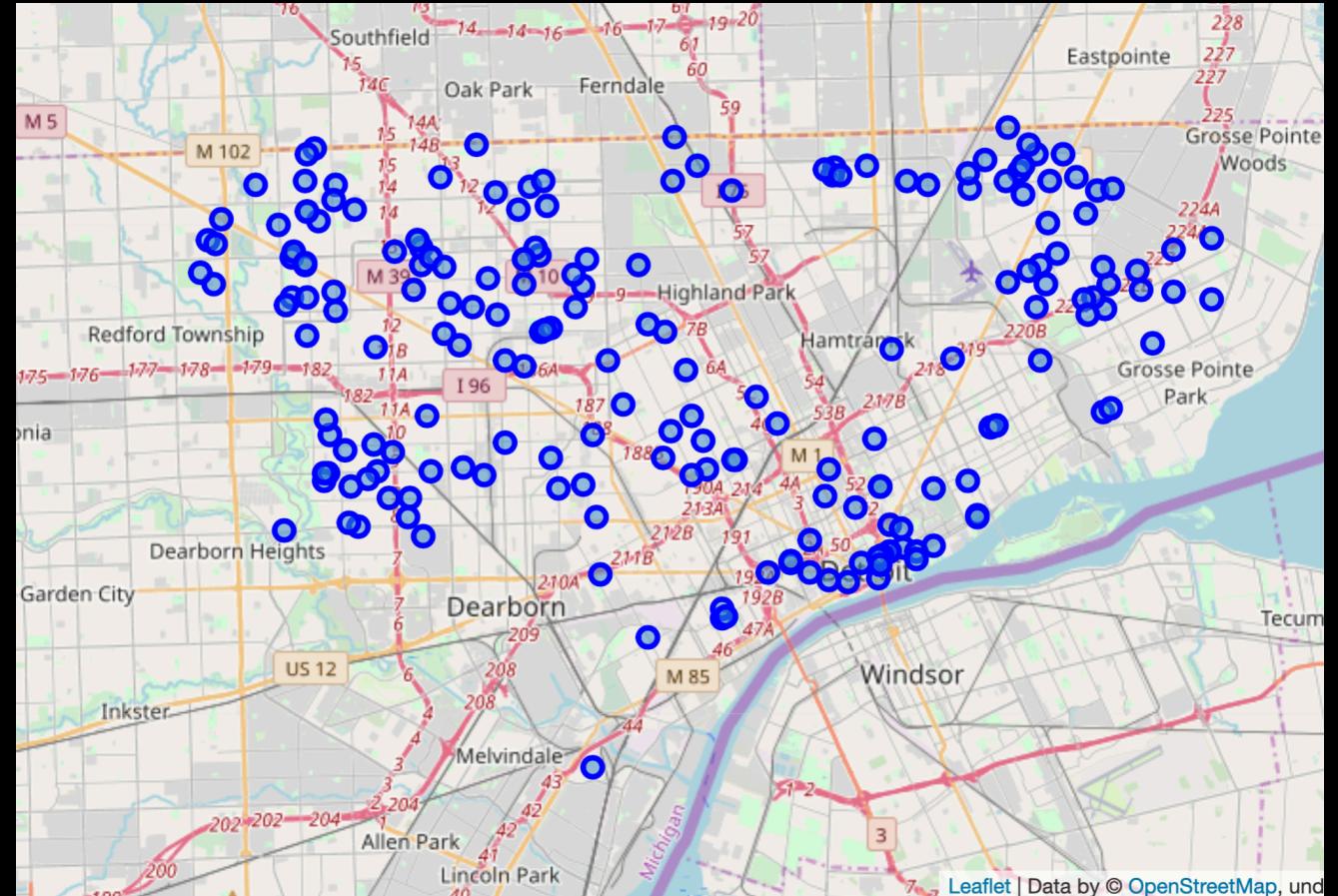
- Detroit is a city with high criminal activity
- Ranked among the top three most dangerous cities to live in the U.S.
 - United States FBI's Uniform Crime Report (2017)
- How can public safety agents ensure the safety of the citizens of Detroit?
- How can public safety agents maximize the efficacy and efficiency of policing and other public safety efforts and activities?

Data and Data Cleaning

- Crime record data obtained from City of Detroit's Open Data Portal.
<https://data.detroitmi.gov/datasets/all-crime-incidents-december-6-2016-present>
- In total, 21725 rows and 25 columns in the total raw data set. All are from 2019.
- ~1% (200 rows) of the total raw data was selected randomly to have a smaller and cleaner dataset to work with to identify patterns.
- Rows with NaN values for location and columns with non-relevant information were dropped.
- Venue data were retrieved from Foursquare API.

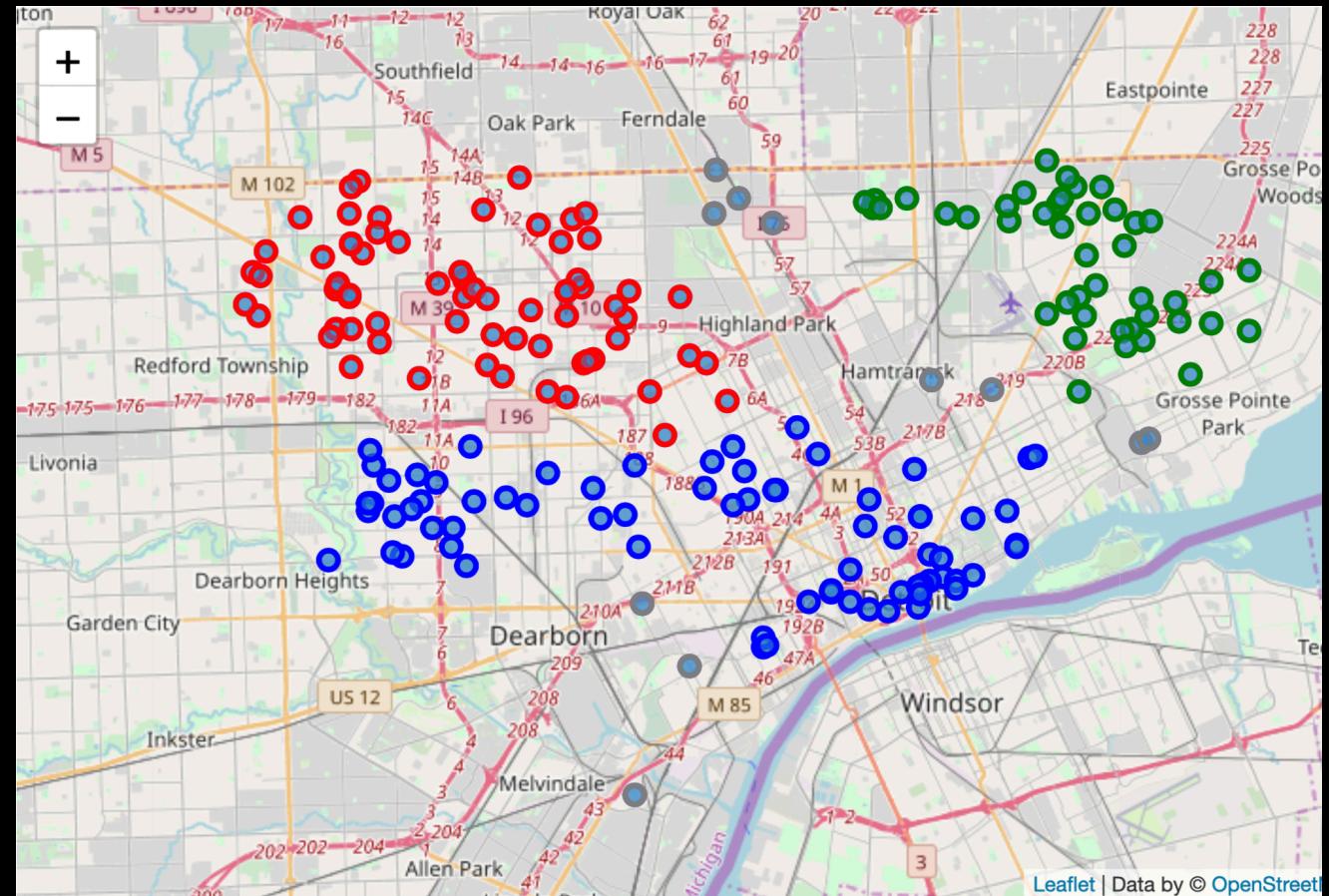
Geographic Distribution of Crimes in Detroit

- Rough observation by the naked eye reveals three geographic regions of high criminal activity density.



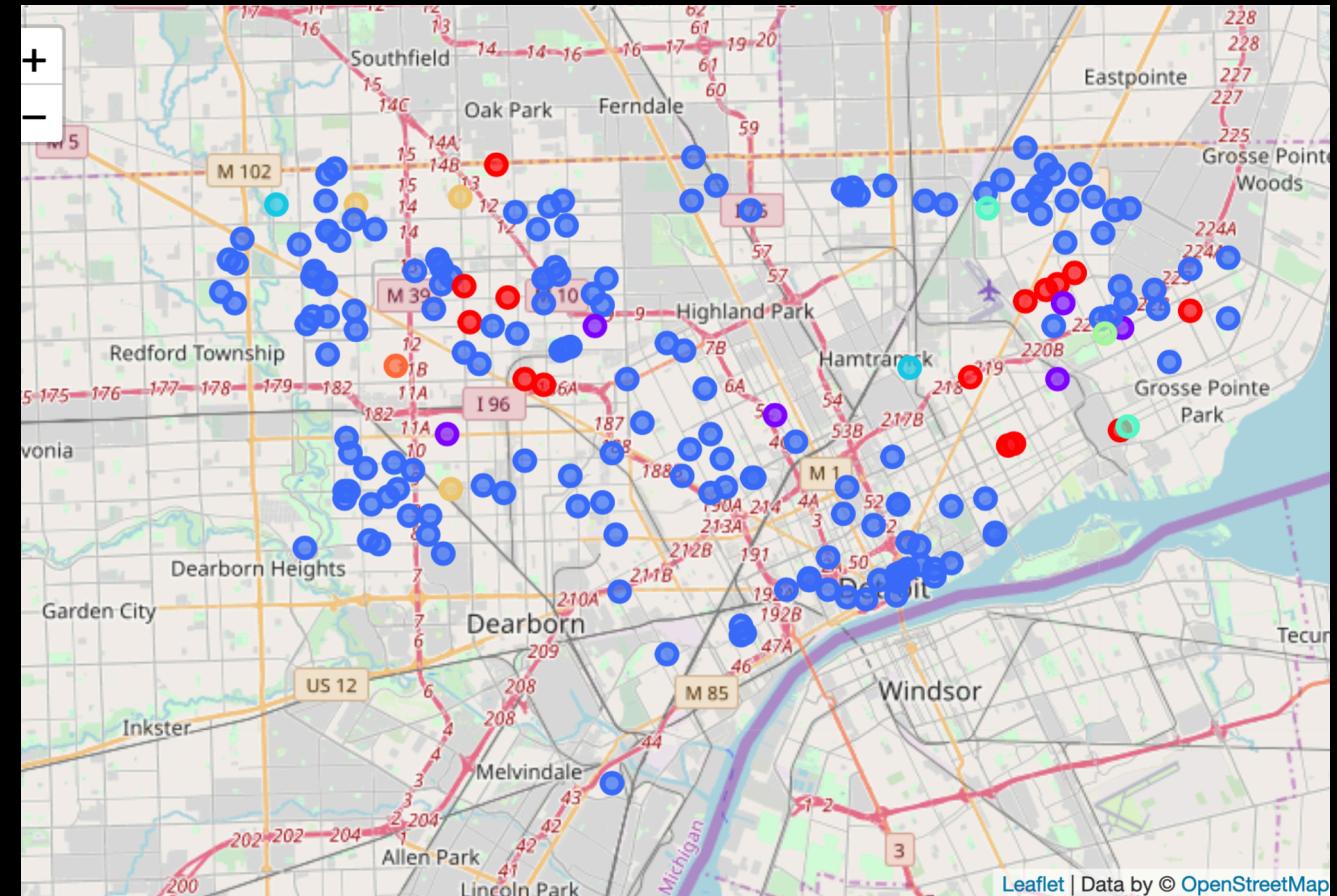
DBSCAN Clustering of Crimes in Detroit

- DBSCAN clustering identified three clusters of criminal hotspots, zones where a high number of criminal activities are recorded.
- The three criminal hotspots are:
 - Red: Northwestern portion of the city
 - Blue: downtown and West side
 - Green: Northeast, close to the municipal airport



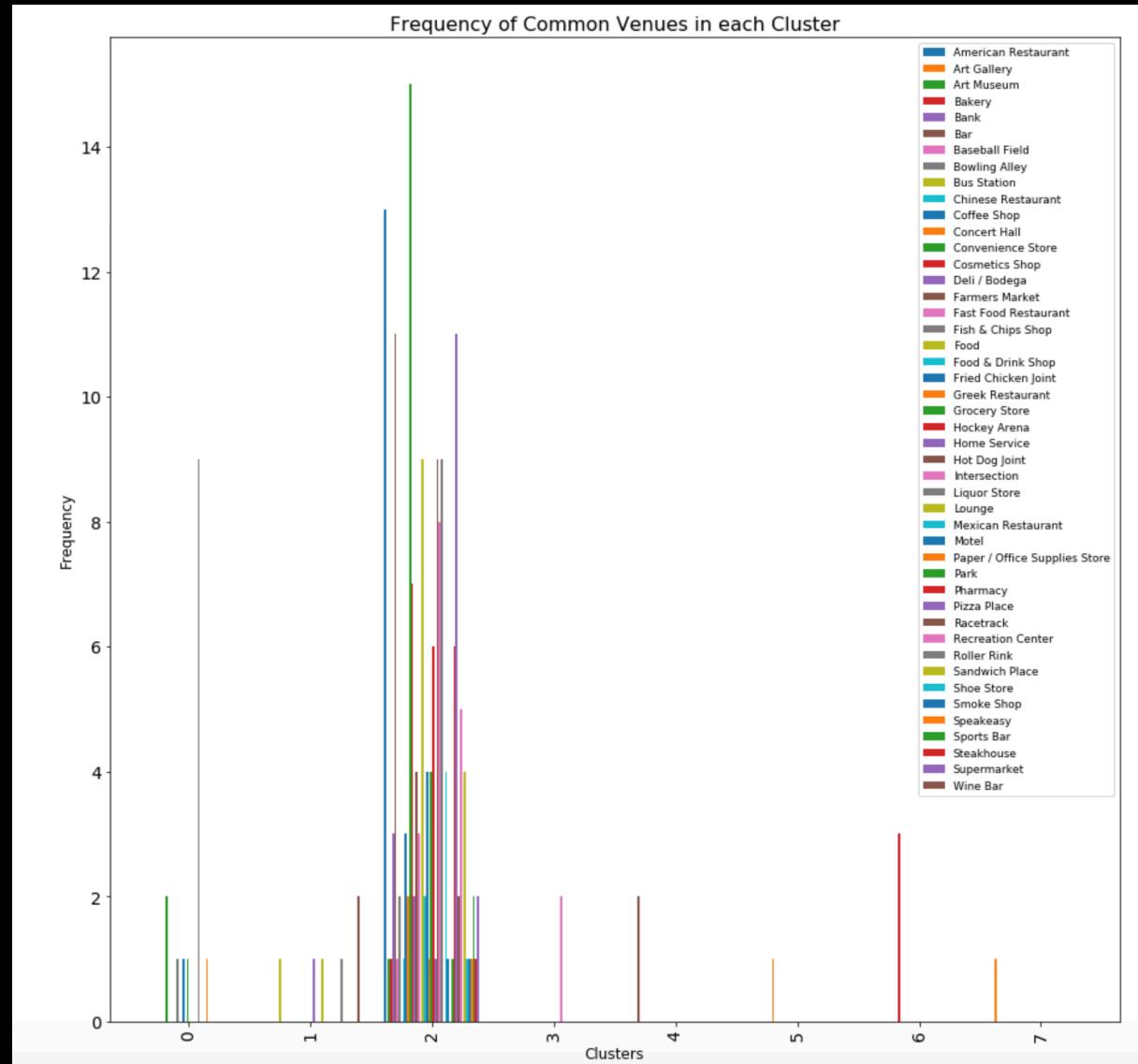
K-means Clustering with Foursquare API Data

- The elbow method identified 8 as the optimal number of clusters to reduce distortion.
- The 8 clusters are identified based on their similarities in recommended venues in their vicinity
- The majority of criminal locations belong to one K-means cluster (blue)
- A cluster of criminal locations (red) appear across criminal hotspots



Food and liquor means trouble...

- What were the cluster representing?
 - Analysis shows that the majority of the criminal activities occurred near American restaurants, convenience stores, pizza places, and bars (Cluster 2).
 - A large portion of the criminal activities occurred near liquor stores (Cluster 0).



Conclusion and Recommendations

- Crime hotspots—zones where a high frequency of crimes occur, exist in Detroit in three locations: Northwest, downtown and inner city, and Northeast.
- The majority of crimes reported occurred near restaurants, convenience stores, pizza places, and bars. Some occurred near liquor stores.
- Recommendations:
 1. Increase public safety services and resources in the criminal hotspots identified.
 2. Allocate more public safety services and resources to the vicinity of the venues identified (food and drinks) co-occurring with most criminal activities.
 3. Perform similar data analysis on larger data sets to yield additional insights.