

The background is a solid blue gradient. Overlaid on the left side are several concentric circles and radial lines, some solid and some dashed, creating a technical or architectural feel. A large circle on the left has radial lines extending from its center towards the right, intersecting with other circular elements. Smaller circles and arcs are scattered across the left and top-left areas, some with arrows indicating a clockwise or counter-clockwise direction.

# CRIME IN THE CITY

## CHICAGO

# Introduction

**Today's life in a big cities with high population consider safety as major concern. The safety of the community creates challenges for authorities and police departments. Crimes in big cities are different with diverse rates and might happen during any time, which in its turn need proper planning and resources to understand its trend and where and when to allocate the required resources in certain areas.**

# Problem Definition

Forecasting used to be a challenge for both the planners and decision makers. Proper planning for critical service such as police operations needs clear inputs to answer critical questions such as:

- What are the major crimes in the city and its future trend?
- How and where such crime types distributed across the city?
- With limited budget, which districts should get more focus?
- What are the main geo characteristics used to be companion with specific crime; can be used in a proactive approach to improve the policy investigation process?

# The Project's Methodology

In this project, we focused on detecting and classifying the load on Police Districts based on the number of cases registered per year. Then, analyzing the major crime types, which happened in the most loaded district.

In order to improve the investigation process as the approach to improve the number of arrested crime cases, we provided and plotting the avenues surround the crime case. We suggested this as a good starting point for an effective investigation.

# The Project's Data Acquisition and Cleaning

- Chicago crime incidents dataset from 2001 to present, which has detailed information on the daily cases, such as where it happened, when, case coordinates (latitude and longitude), crime type, etc. From [Chicago Data Portal](#)
- Foursquare, which is geo information platform Its API used to get nearby venues based on the crime case coordinates. From [Foursquare](#)
- After data cleaning, there were 6,705,122 samples and 18 attributes in the data
- We used KNN classifier to complete the missing details with accuracy 99.9%



**Police Districts Status**

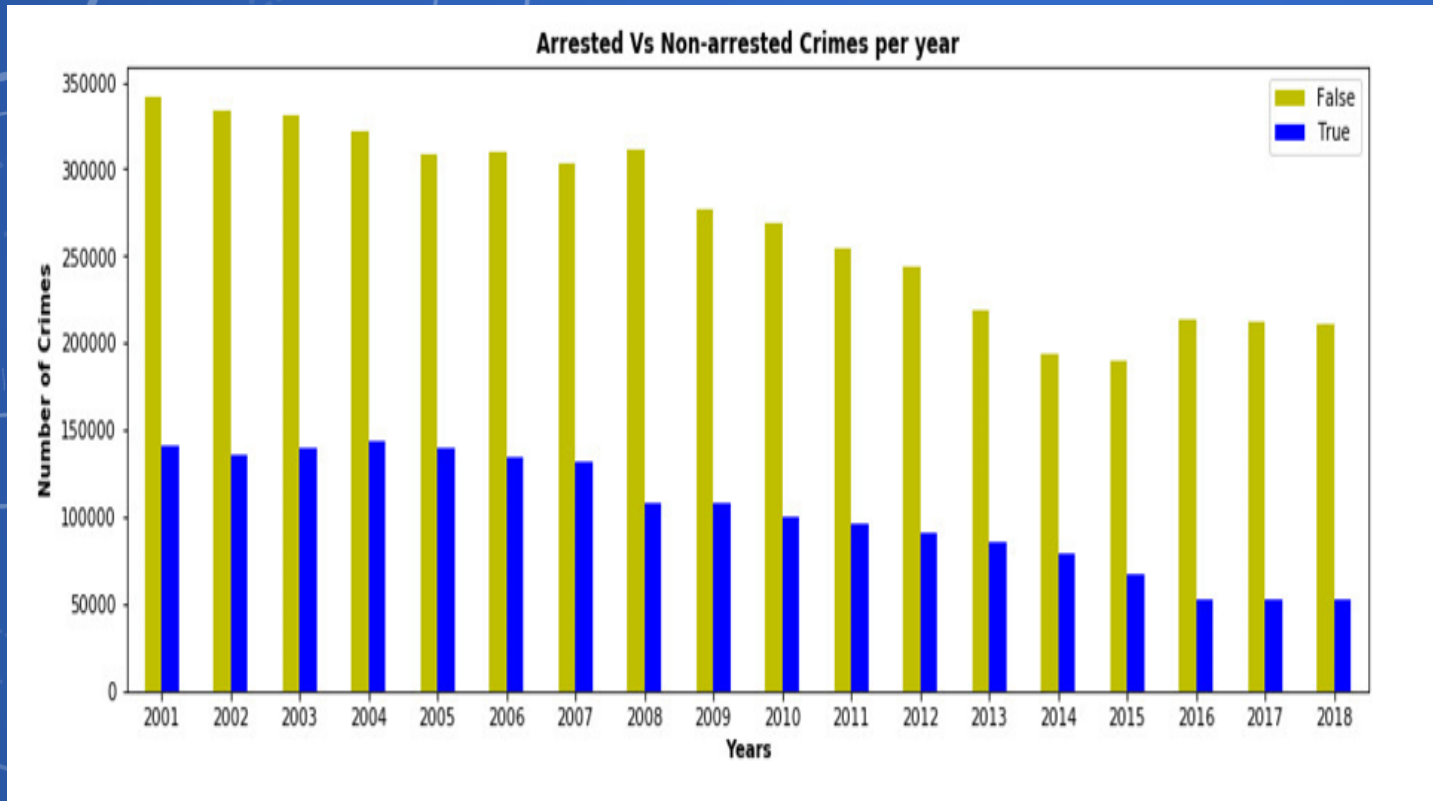
- High Load (Red dot)
- Low Load (Yellow dot)
- Medium Load (Green dot)

**District 4**

- The police districts load has been classified in 3 main classes (High, Medium, and Low)
- We plotting the status with different colors on Chicago's map to get more insight on the load distribution and where are the city's cortical areas

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# Crime cases: Arrested Vs, Non-arrested

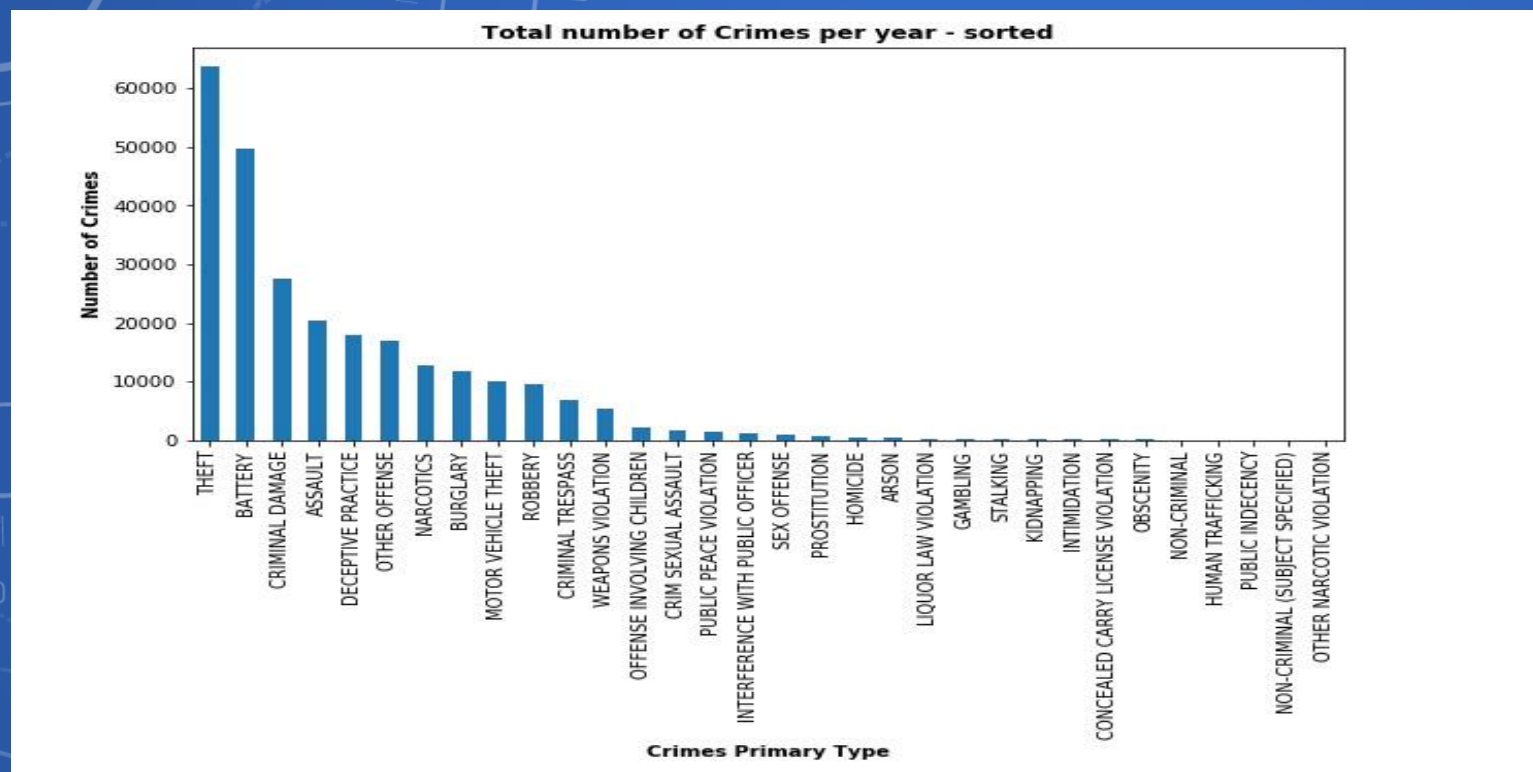


First, we start by analyzing the crimes cases' status to have insight on the effectiveness of the running operations.

It found that the majority of cases not resolve and kept open (non-arrested)

It found that the % of arrested cases keep shrinking, which confirm the need to have effective investigation approach

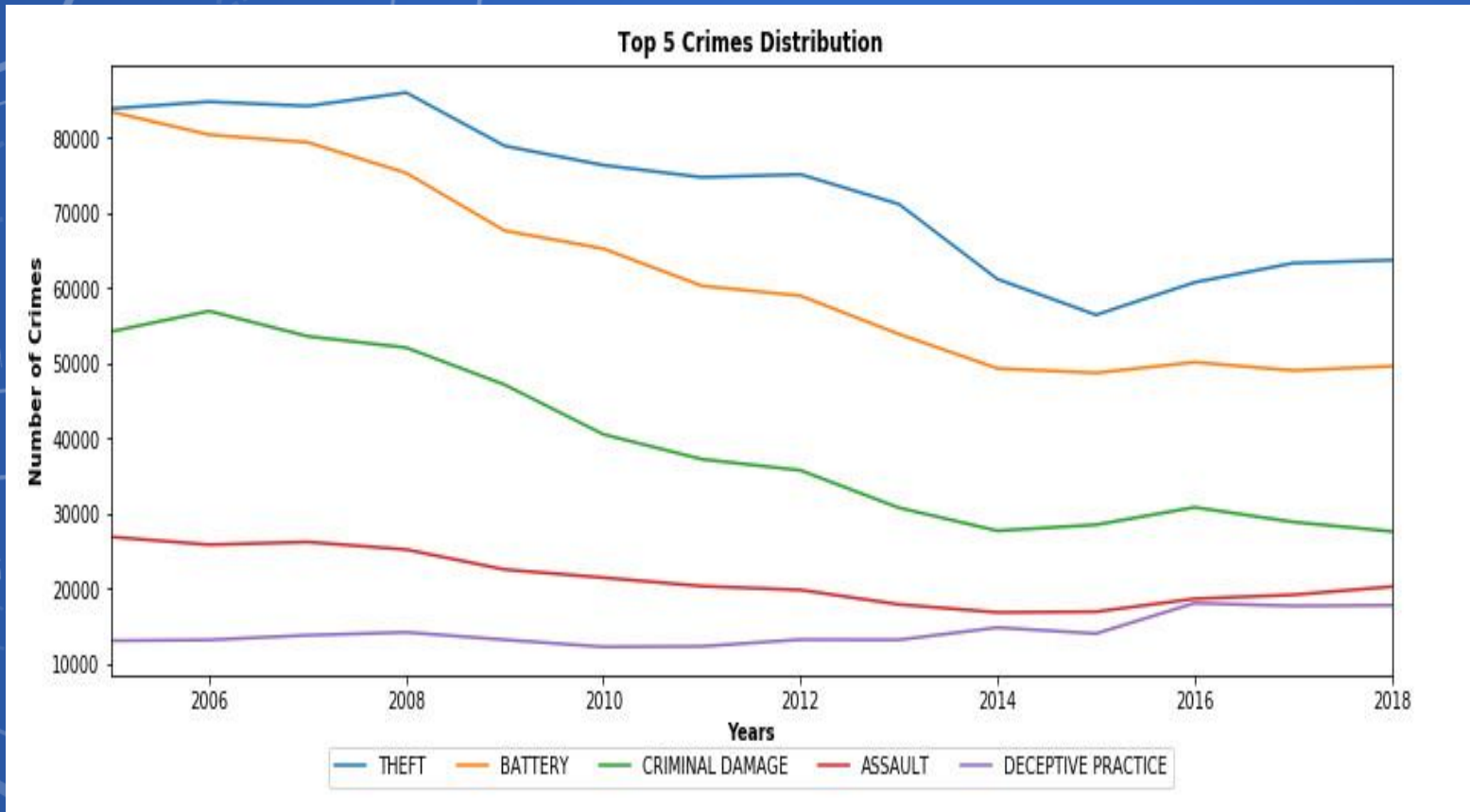
# Crime Types Distribution



Second, we start by analyzing the crimes' types to get insight on the major crimes types



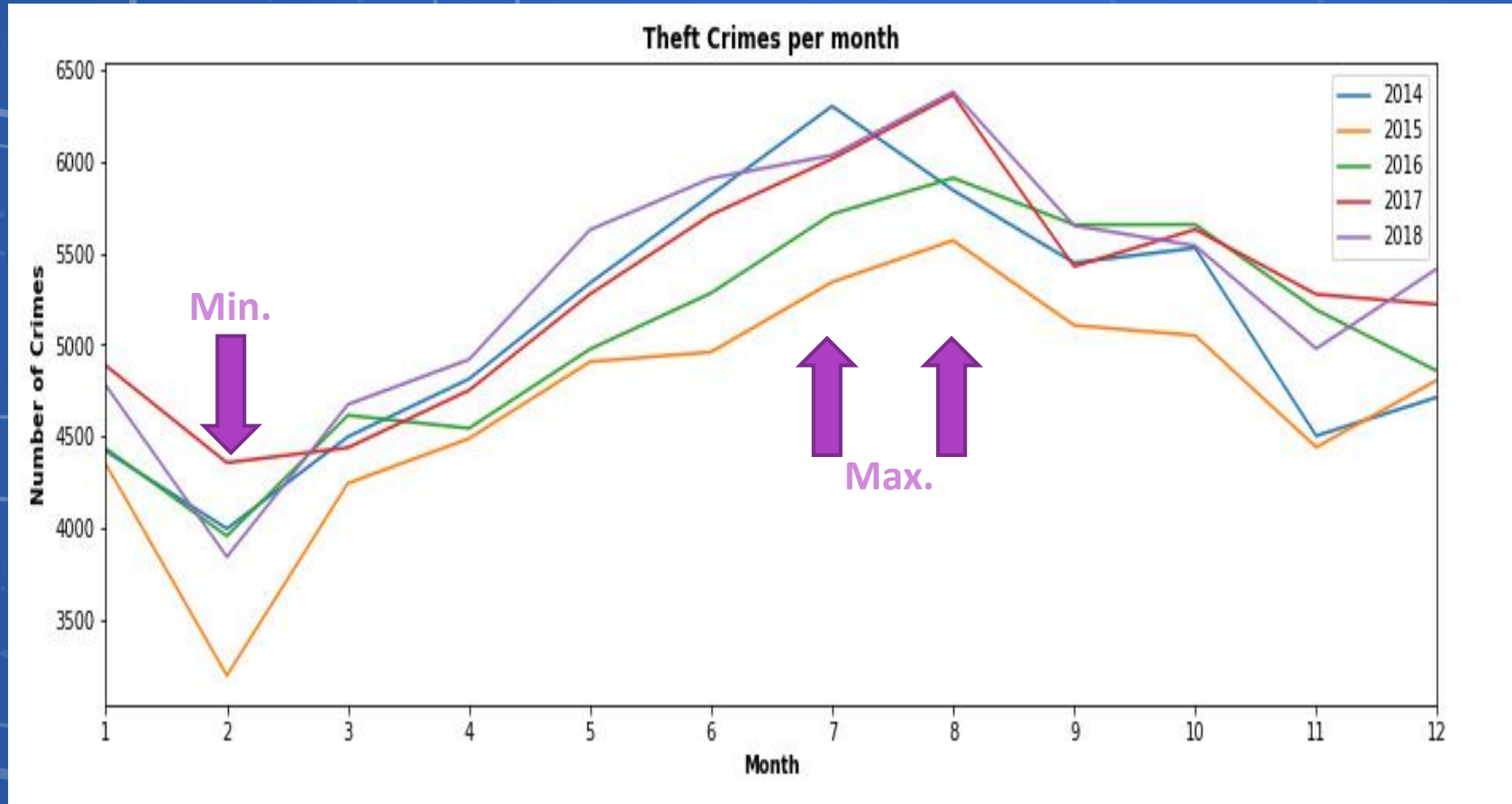
# Crime cases: Top 5 Distribution per Year



The top 5 crime types have been identified and plotted across the provisos years.

The highest crime type identified as “Theft”

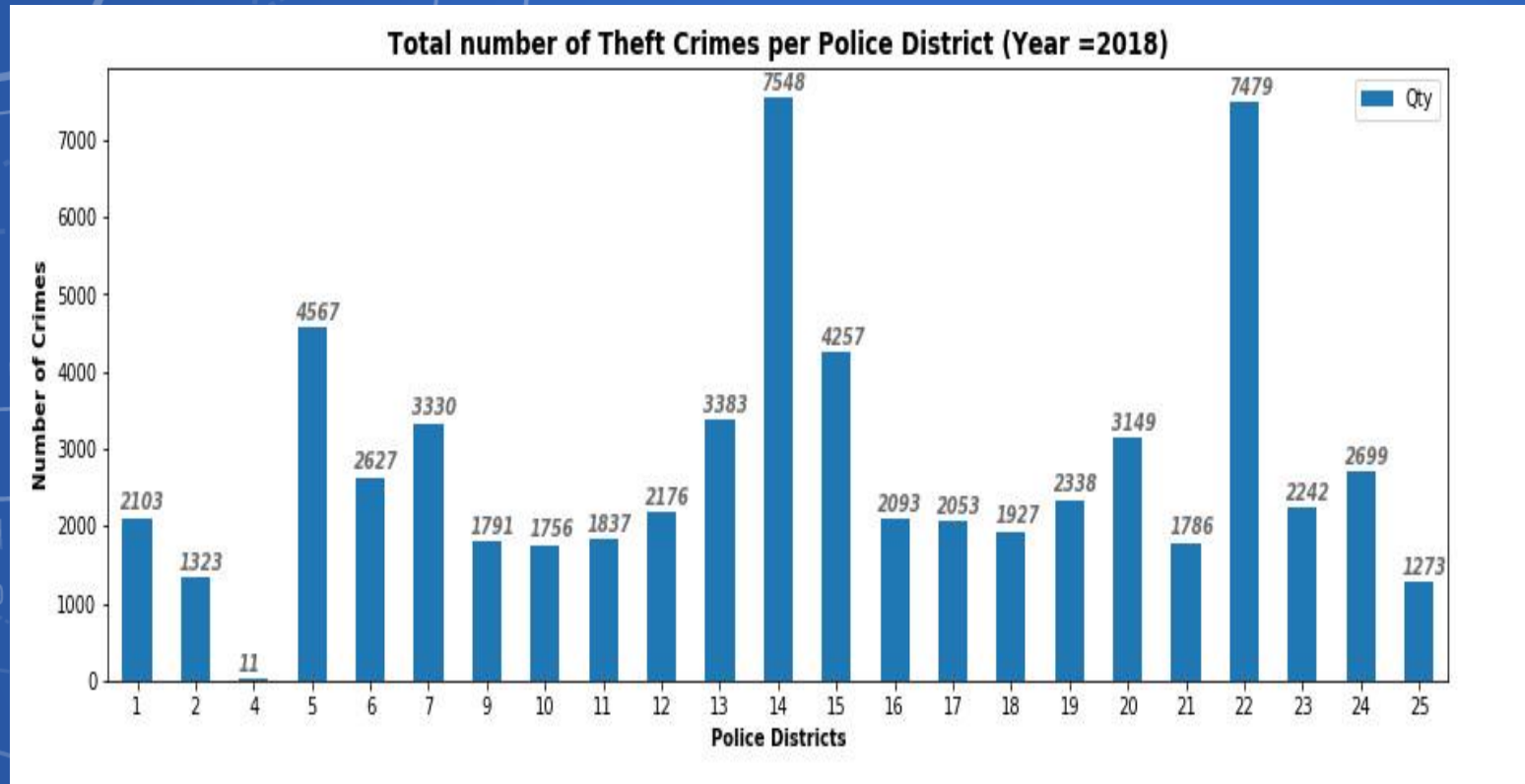
# Crime cases: Theft Distribution per Month



By analyzing the Theft crimes, we found:

- Feb. has the minimum rate for the registered case
- July and Aug have the highest rates

# Crime cases: Theft Crimes per Police District

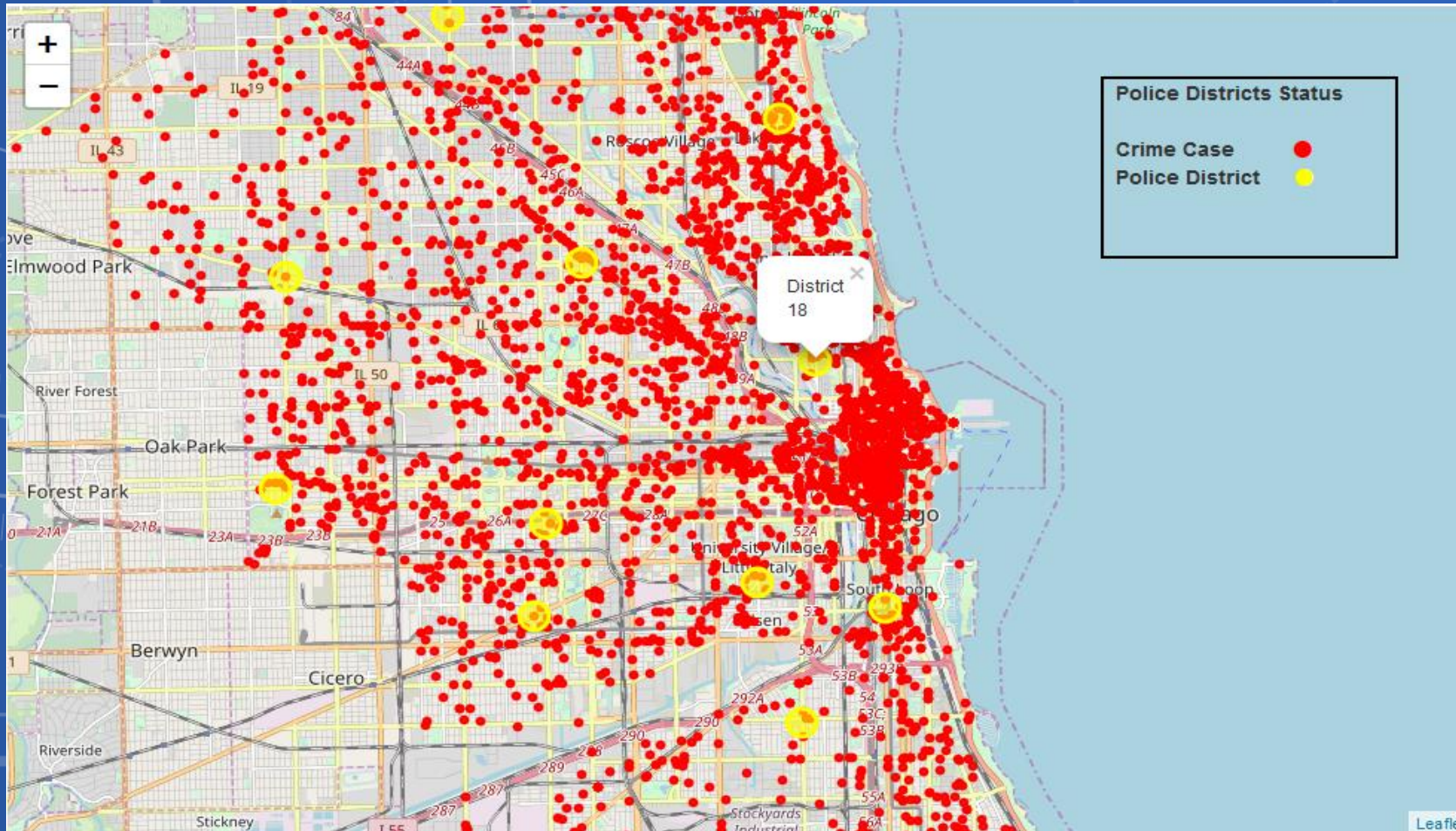


Comparing the same against the police district, we found:

- The District 14 & 22 have the highest rate
- District 4 has rare number of cases



# Crime cases: Plotting Theft Crimes per Police District

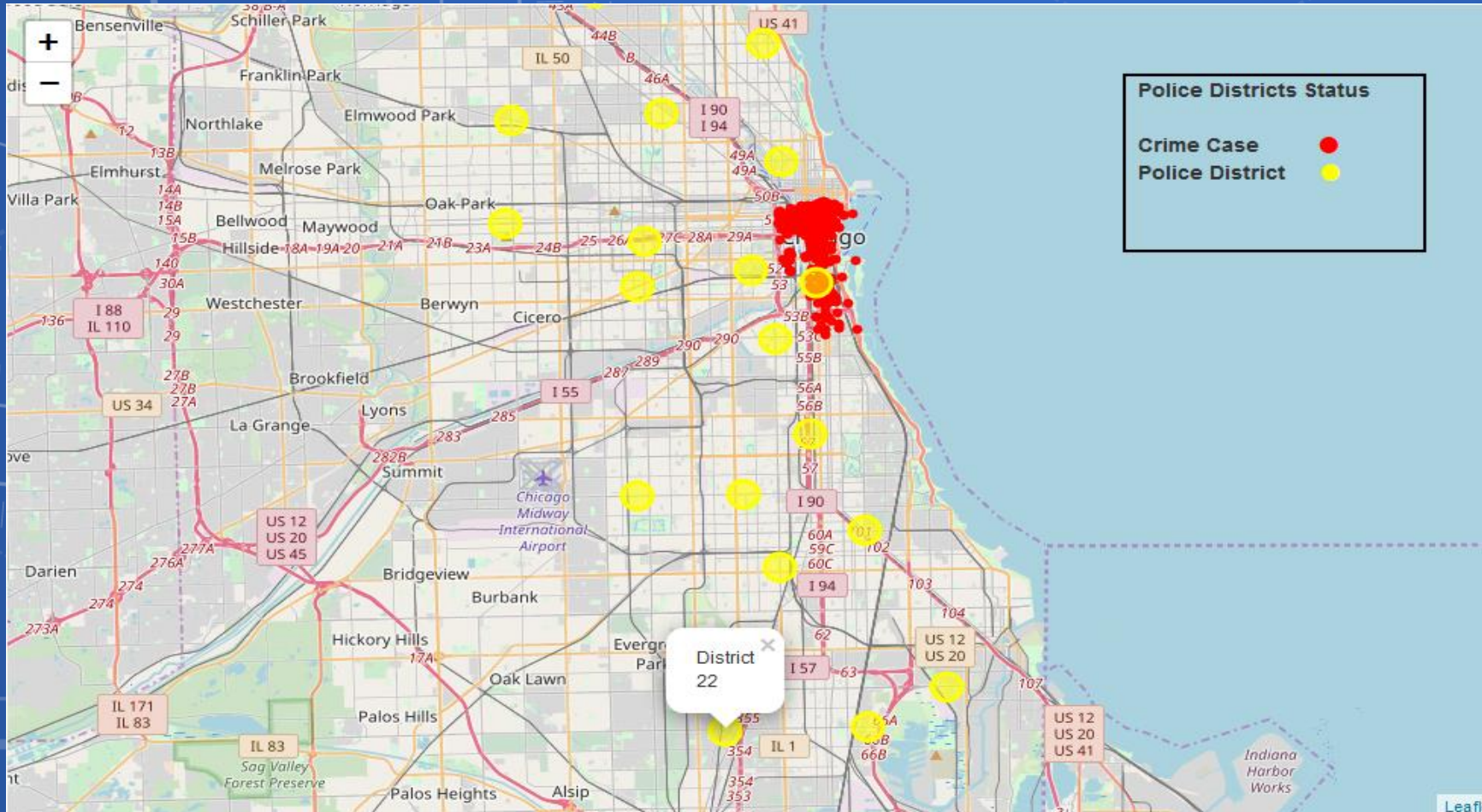


By plotting the required crime cases against its police district location, we found:

- There is a contradiction with the district location
- e.g. District 18 shown as the nearest one for the major number of cases, while it does not have load similar to District 22.



# Crime cases: Plotting Theft Crimes per Police District

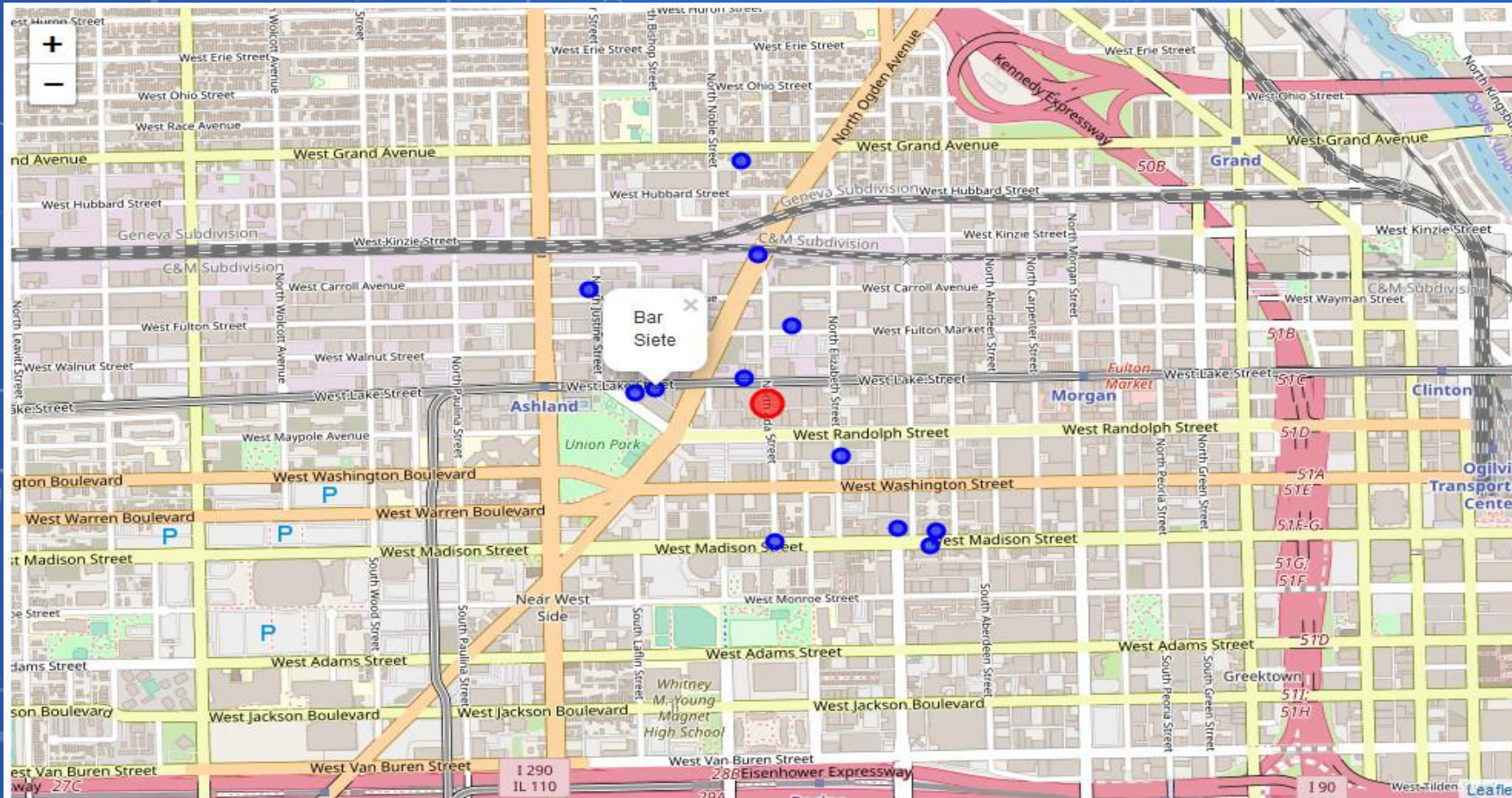


The previous finding has been confirmed as we found the registered cases on District 22, actually concentrated far from its location and mainly located around Districts 1 ,12, and 18

This considered as open issue , as it needs some clarifications from Police dep. side. Also, this can be consider as an area for operations enhancement.



# Crime cases: Venues nearby to Crime Case



As step for empowering the investigation process, here the Venues that are nearby to Case No. JB410653 has been plotted

We assumed that the criminal used to be at some bars around the crime location, which can be used as good start during the investigation process.

# Conclusion and future directions

- In this study, the main objective was helping the government authorities and police departments in improving the planning and the quality of the provided service. The primary objective was to understand the crimes and the police load trends and where and when it is necessary to allocate resources in certain area.
- The other direction was analyzing the crimes with focus on how to provide means to improve the number of arrested cases.
- We think the models can be enhanced by capturing other attributes and extend the use of Foursquare tips. e.g., cluster the crimes based on specific symptoms such as the social life surrounding the crime location that can provide better investigation process