

Crimes in Chicago

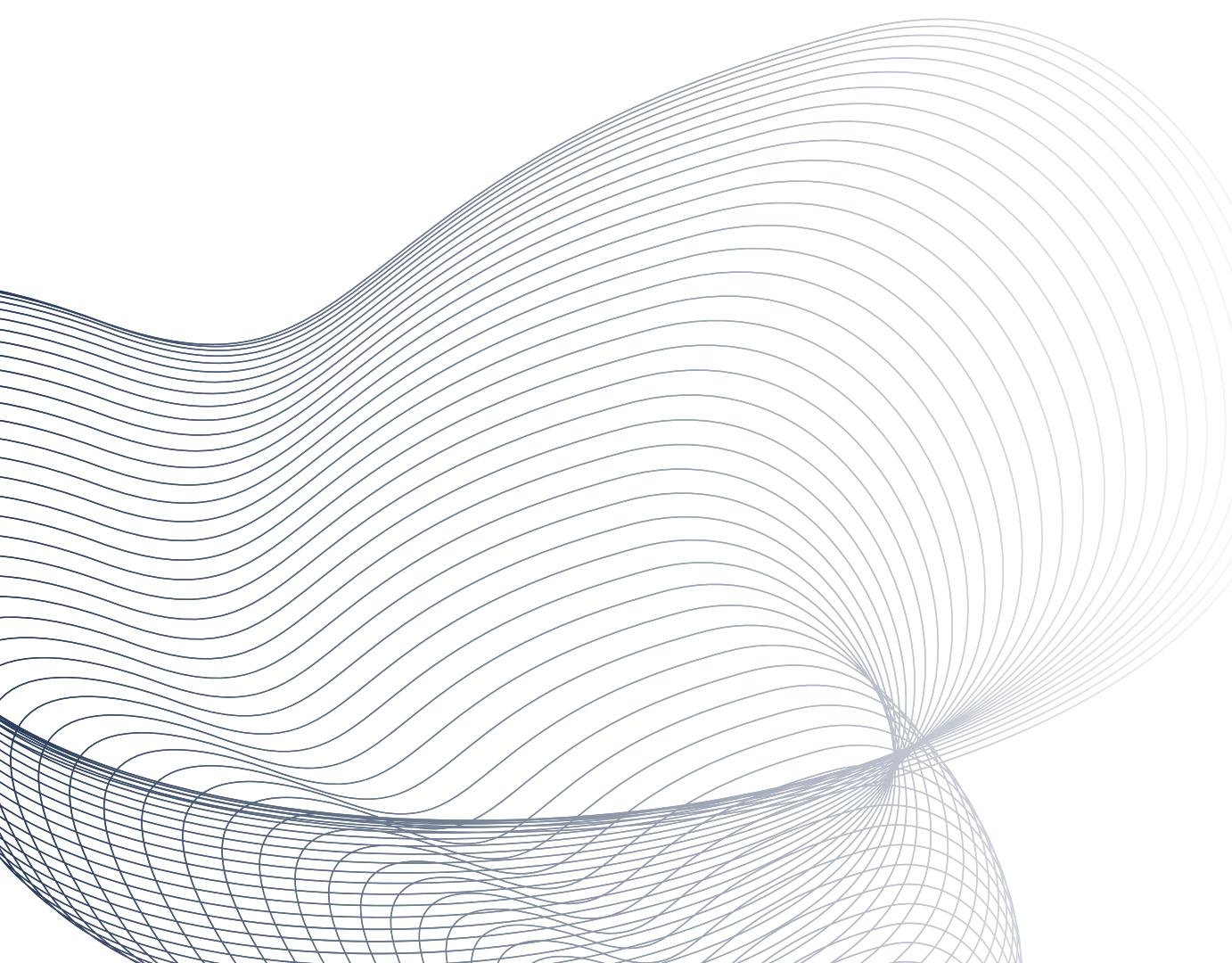
Λιάγγου Δέσποινα - 8190094

Φραγκιαδάκης Χριστόφορος - 8190168



DATASET

Crimes that occurred in
Chicago between the
years 2020-2022



About Crimes

- ID
- Date

About Crime Type

- IUCR
- Primary type

About Location

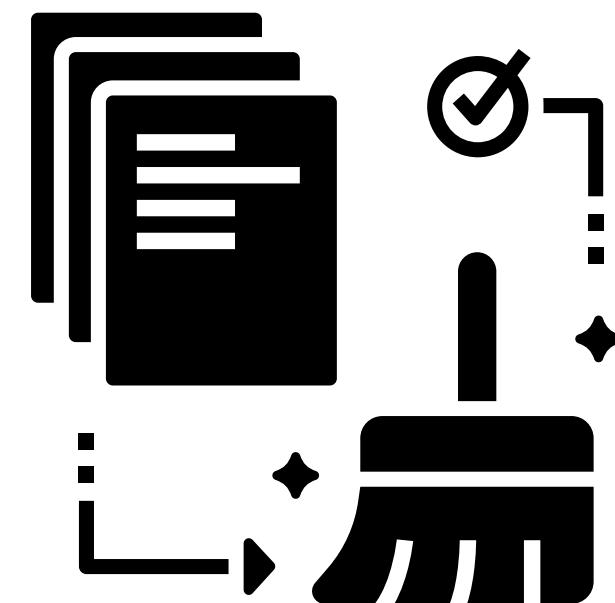
- Block
- Location Description
- Community area
- Latitude
- Longitude

Other informations

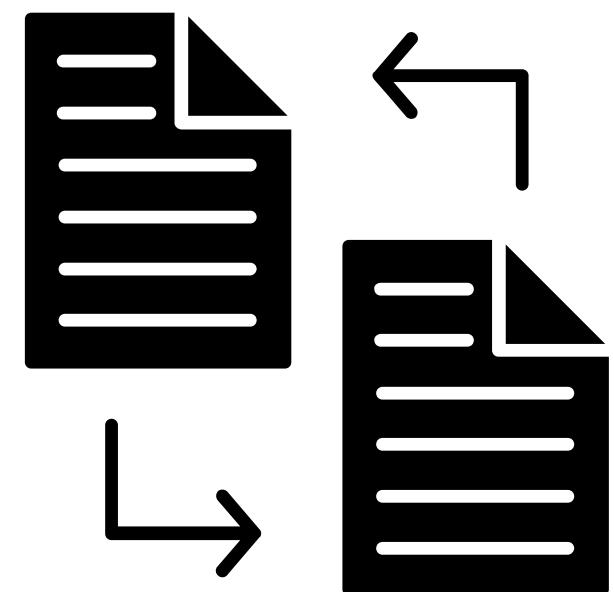
- Arrest
- Domestic

ETL PROCESS

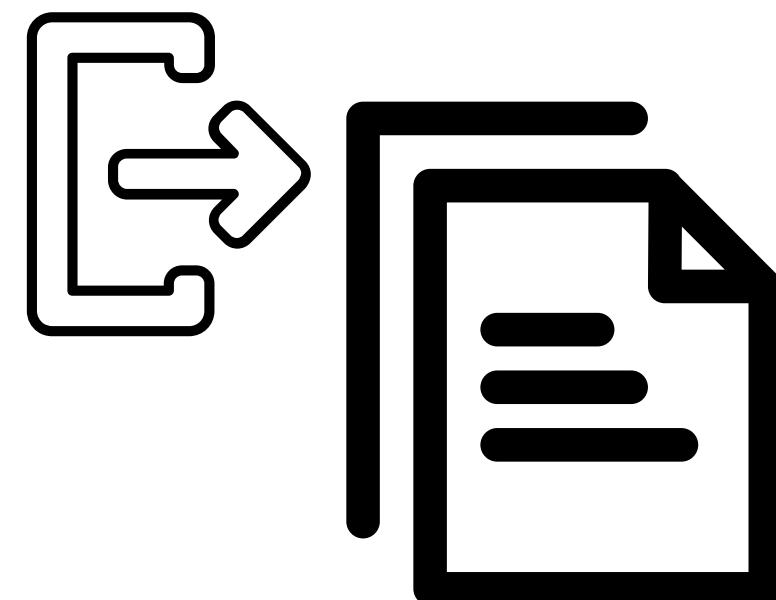
Data cleaning

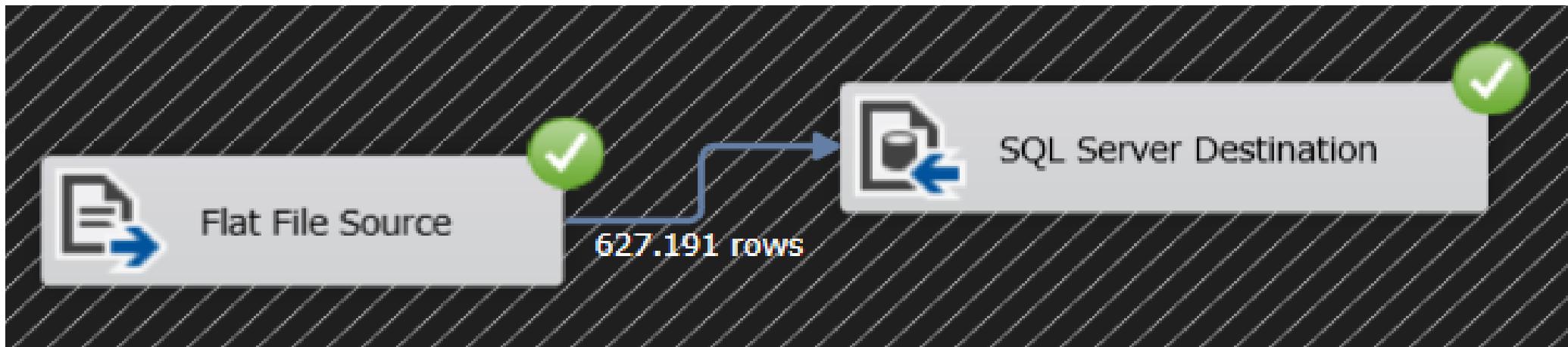


Data transformation



Extract to a file



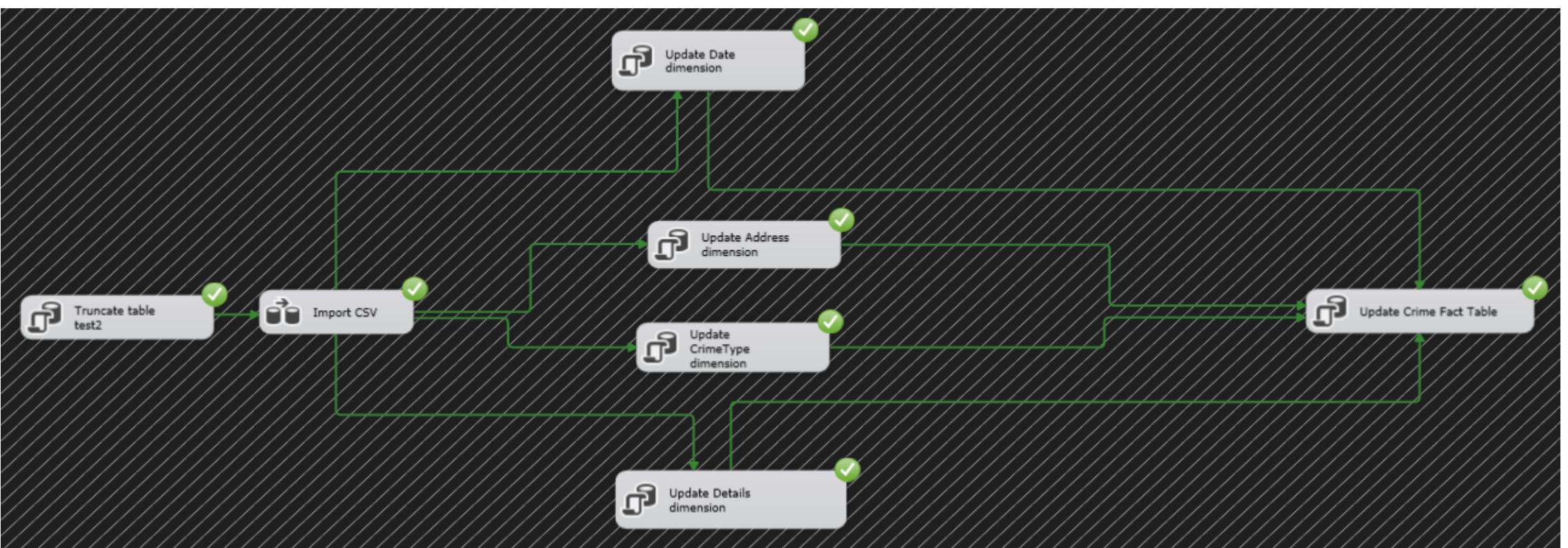


DATA FLOW

- Create dimension tables and fact table in Datawarehouse
- Execute SQL queries
- Create a flow (Truncate - Update tasks)

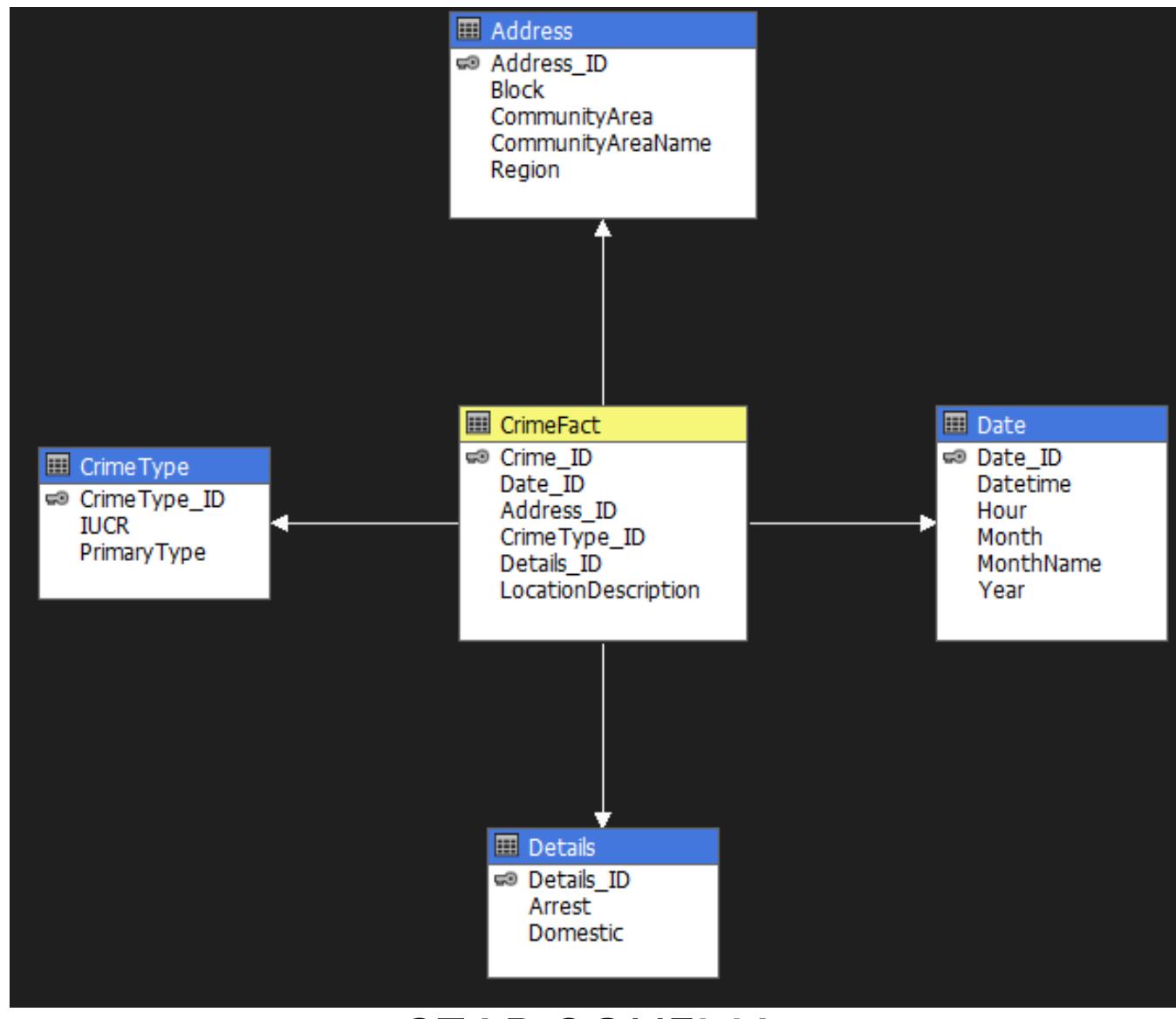
- Read csv file
- Transfer data to database
- Create a staging table

CONTROL FLOW



SSIS PROJECT

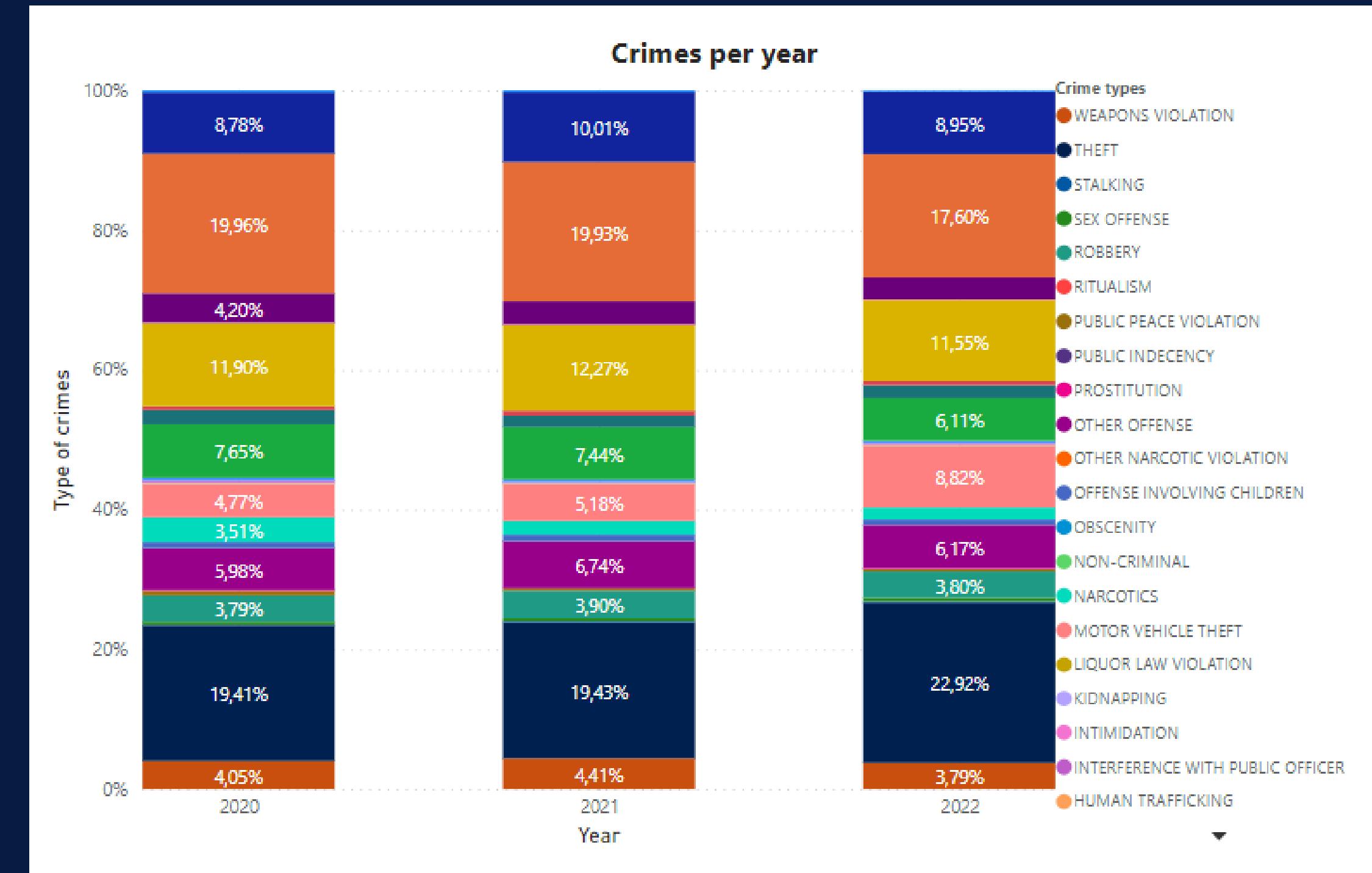
SSAS PROJECT



- Construct a multi-dimensional model on OLAP Server
- Create the Cube

The most usual crimes
that occur every year are:

- Theft
- Criminal damage
- Battery
- Assault
- Deceptive practice
- Motor vehicle theft

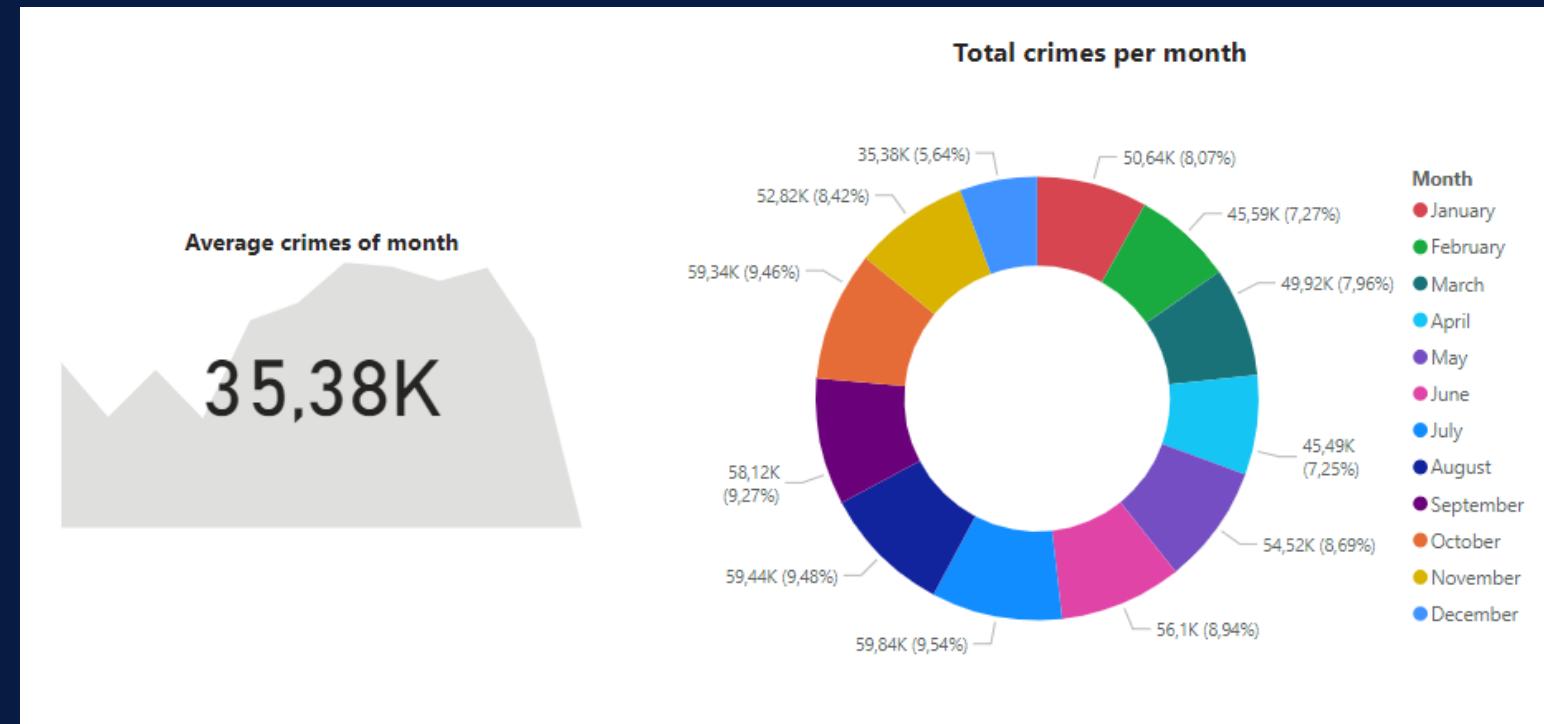
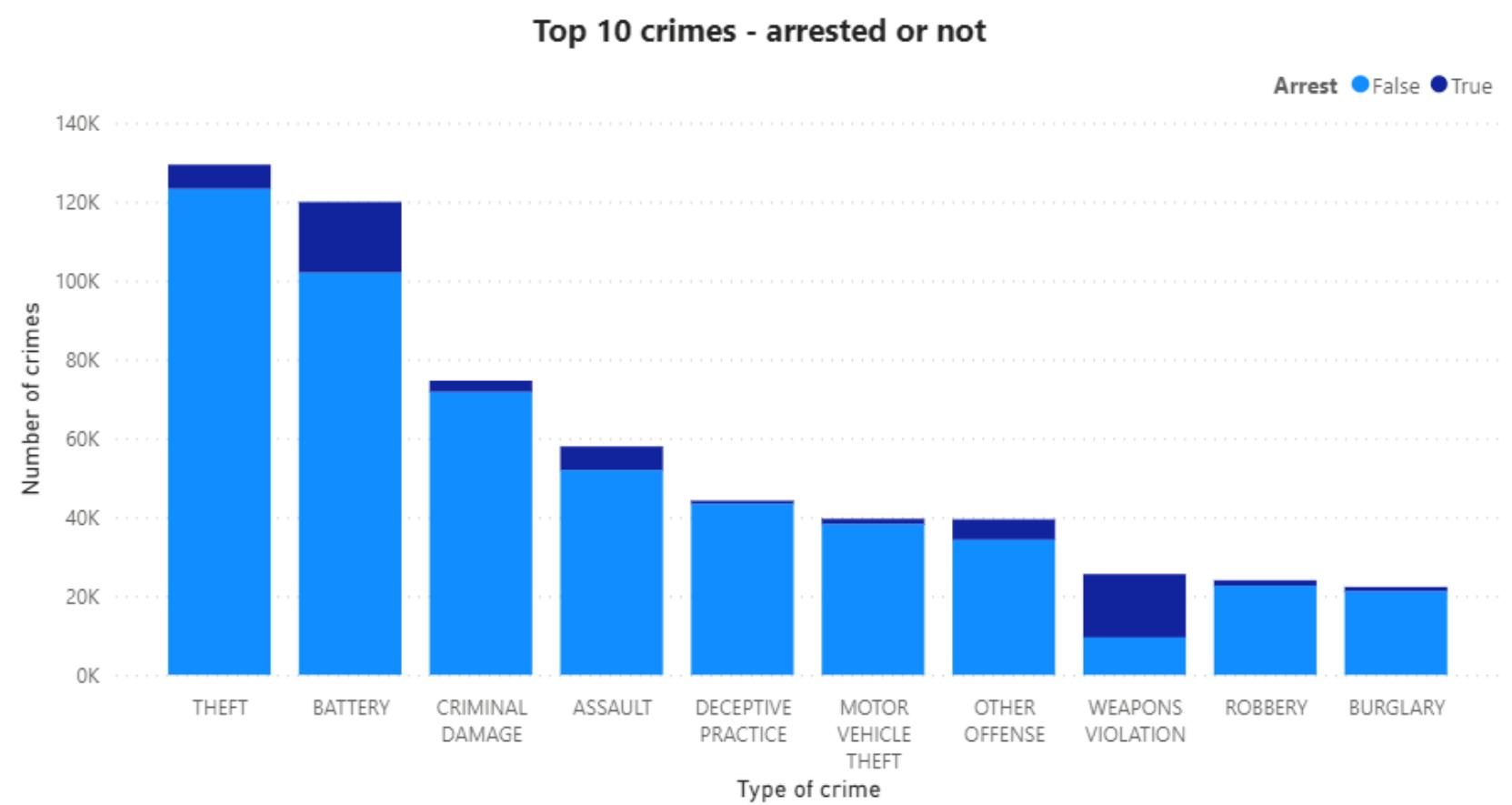


2020:
32,9 %

2021:
32,2 %

2022:
34,9 %

(percentage of all data)

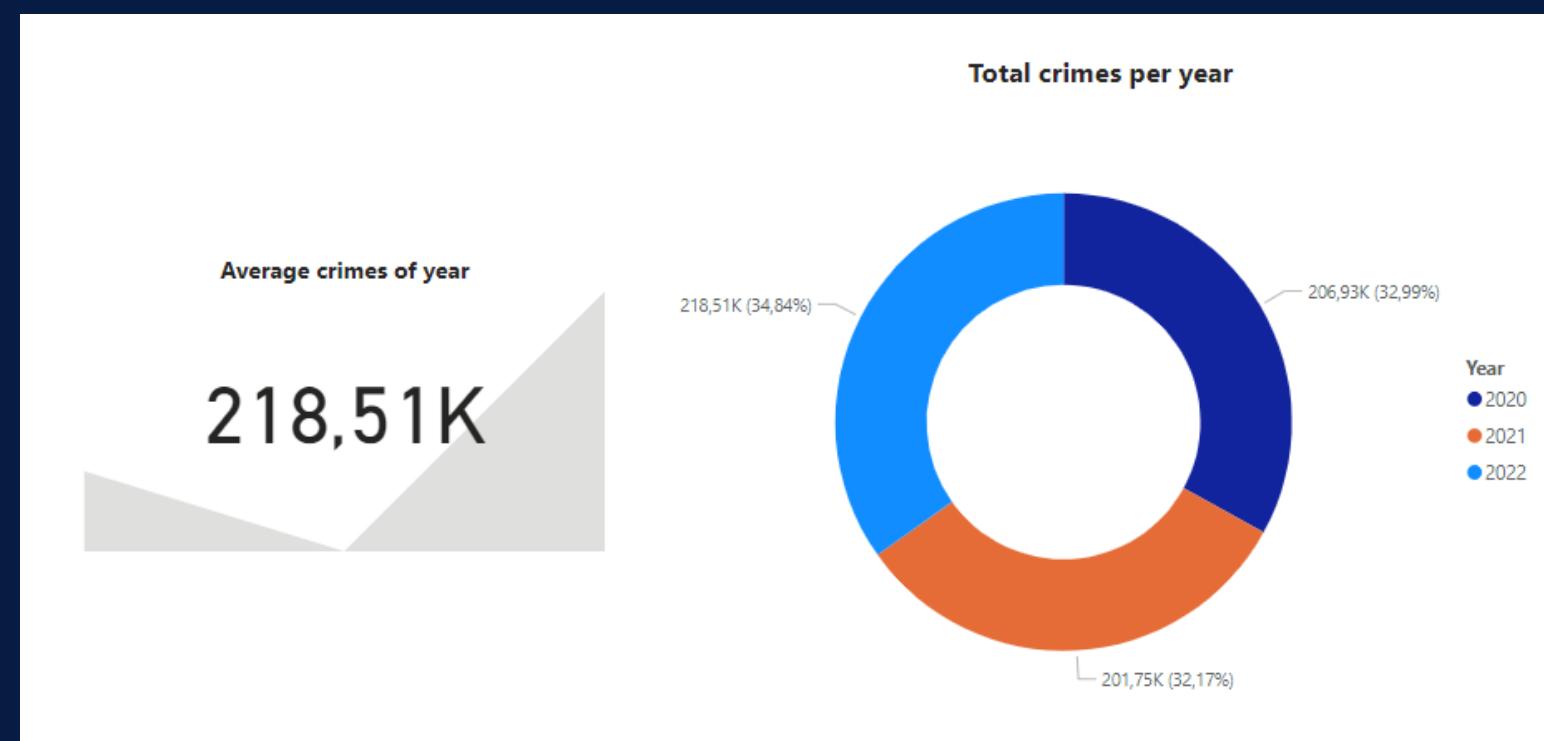


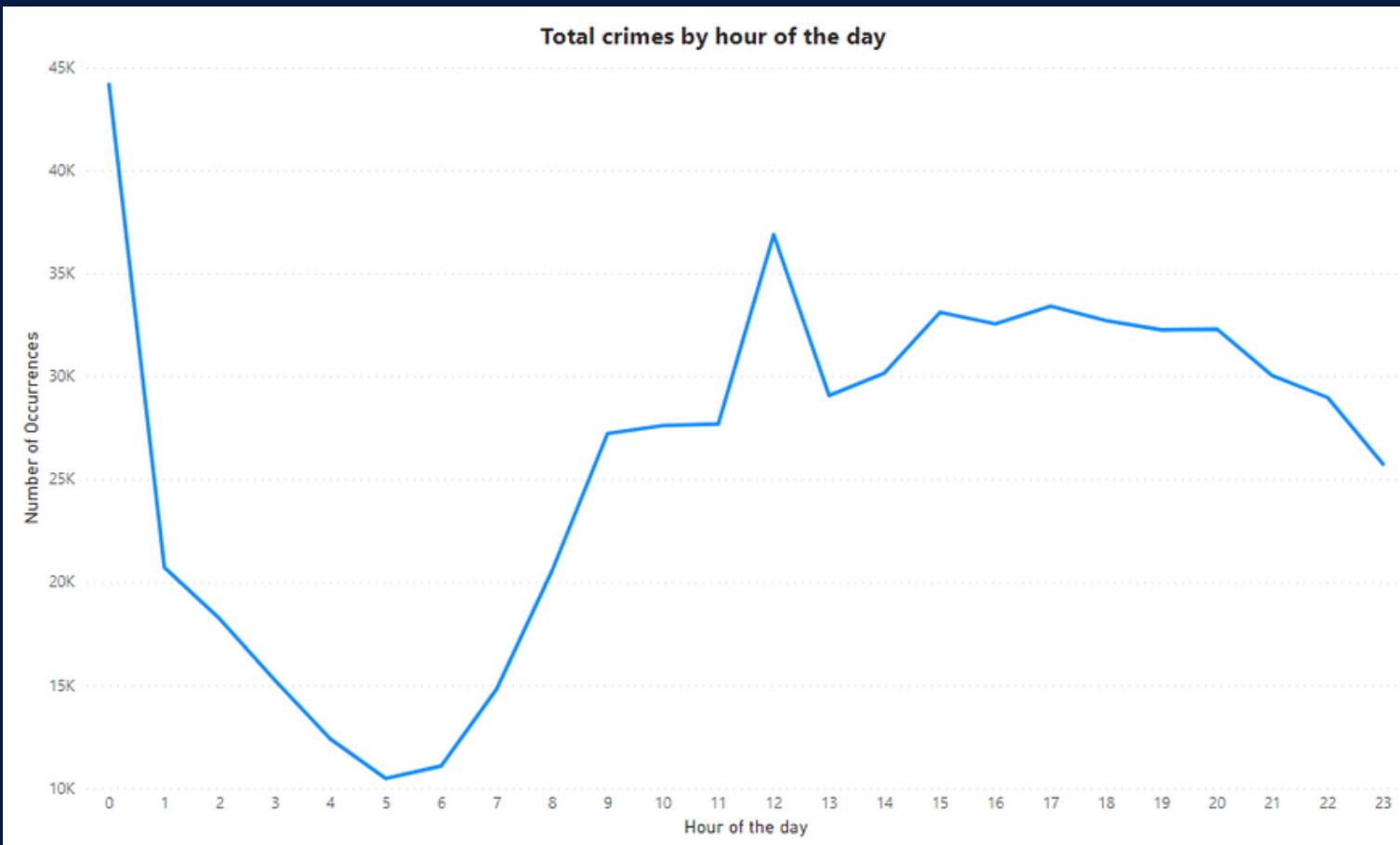
**Most crimes on period July–October
and in 2022**

Few arrests compared to the number of crimes

Most arrests for Weapons violation offences (62,8%), for Battery (14,9%) and for Assault (10,3%)

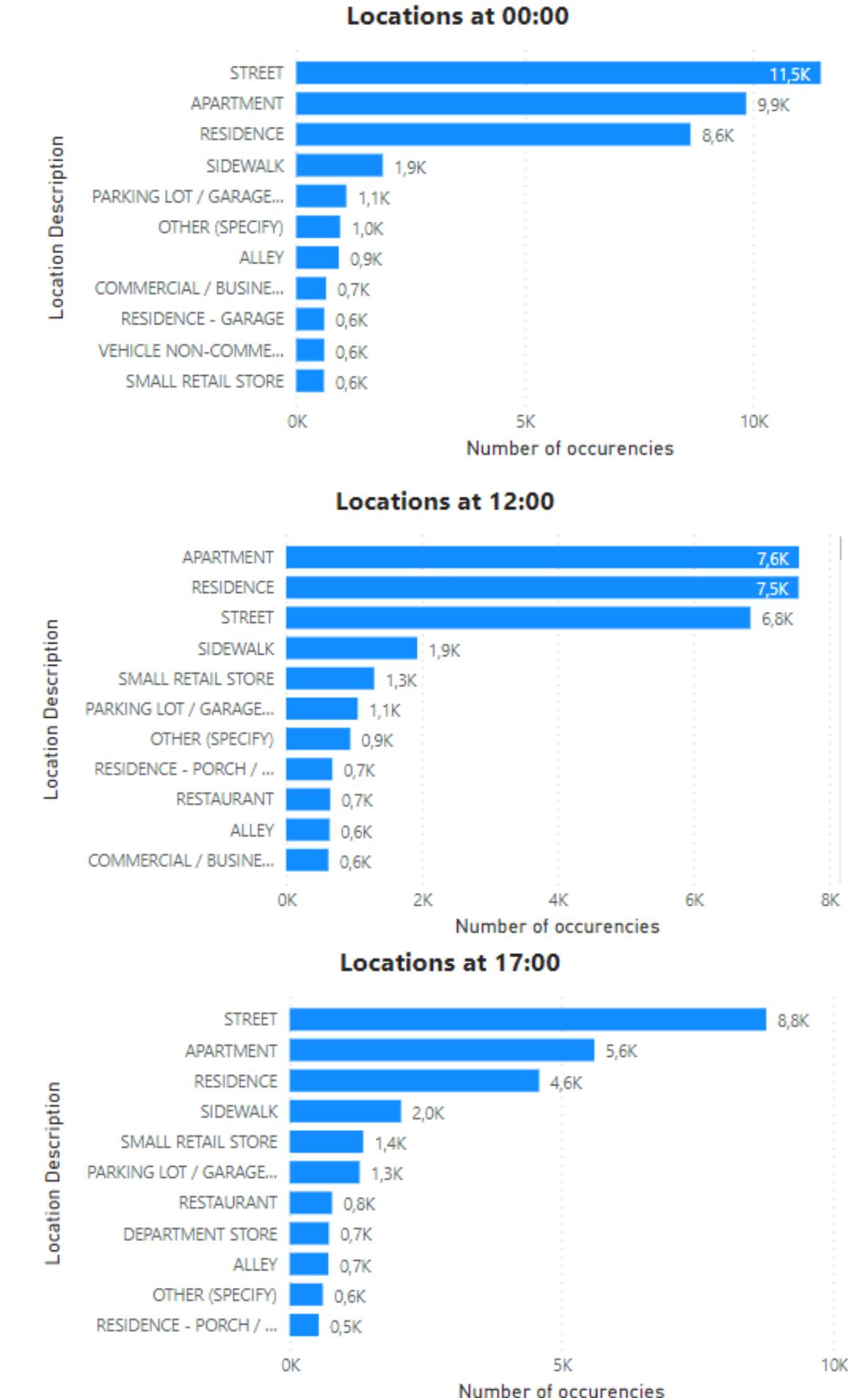
Fewest arrests for Deceptive Practice (1,7%) and for Motor vehicle theft (3,3%)





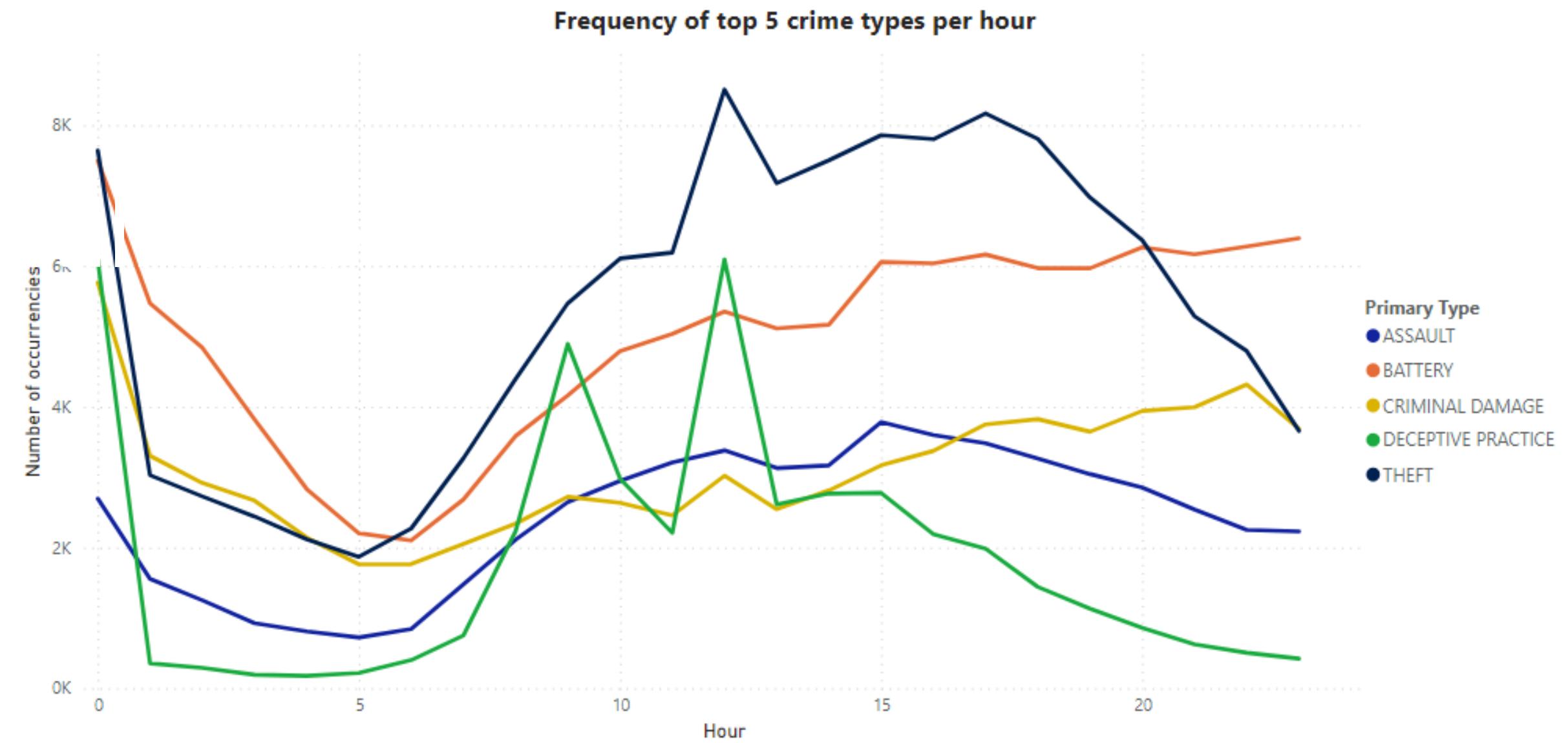
**The most dangerous hours are at
00:00 (7% of crimes) , 12:00 (5,8%)
and 17:00 (5,3%)**

The most safe hour is at 05:00 (1,6%)



At these dangerous hours crimes mostly occur:

- At street
- In apartment
- In residence
- On sidewalk
- In small retail stores

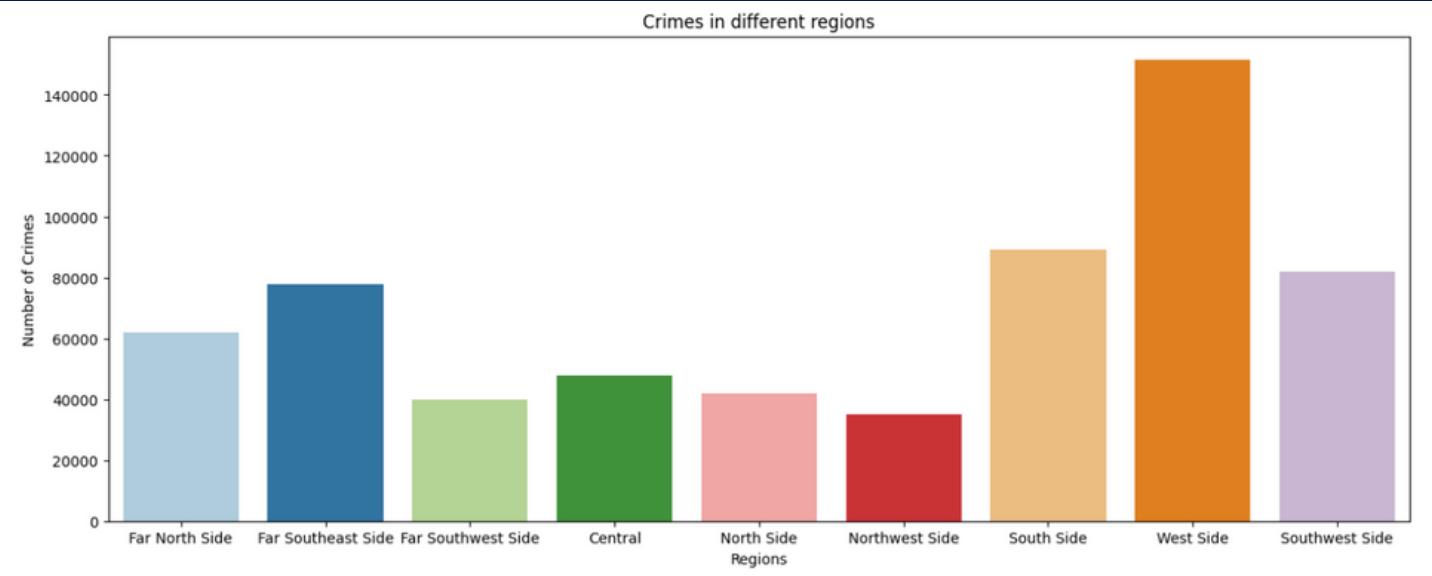


Theft: most often between late morning and late afternoon

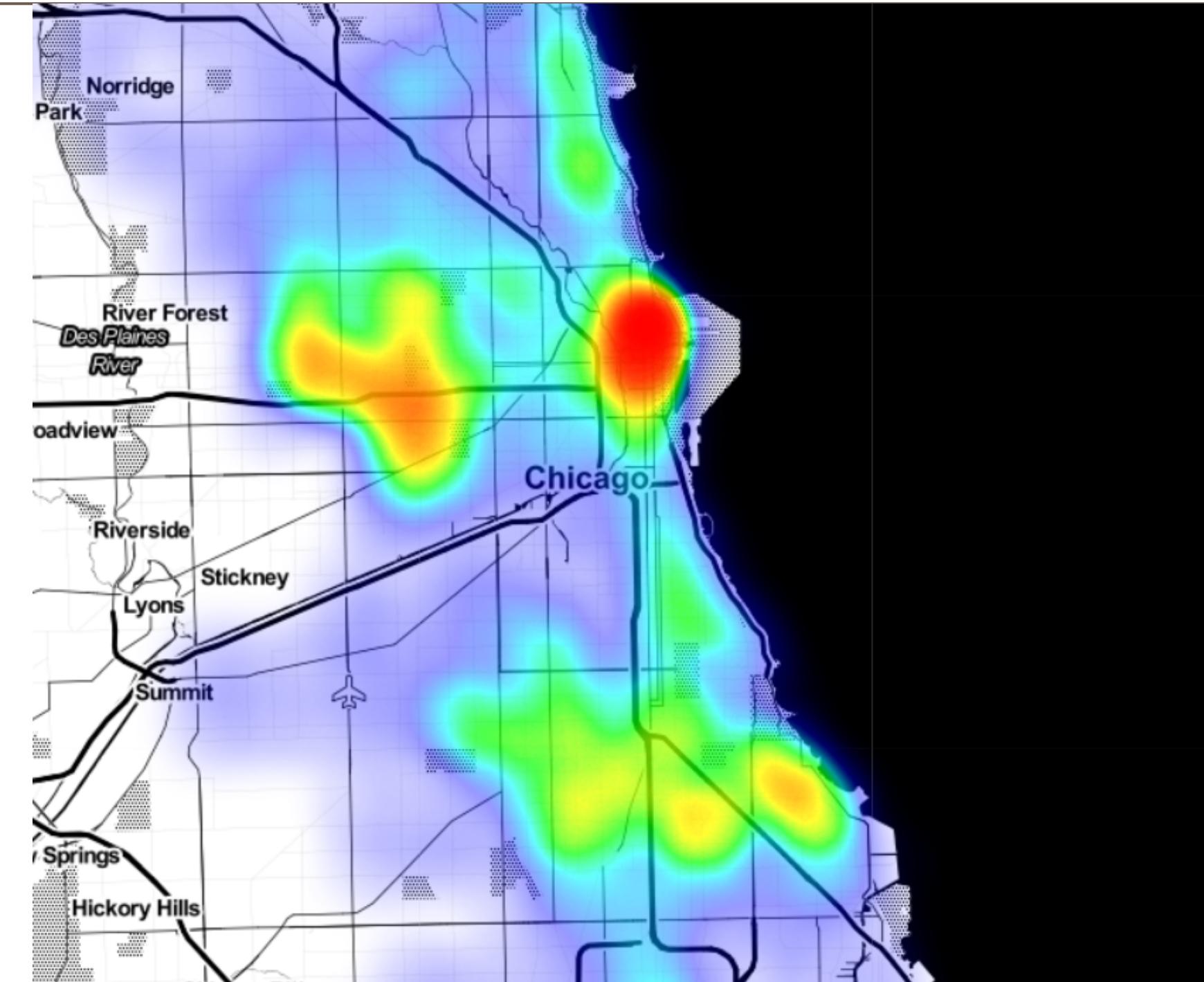
Battery and Criminal damage: most often from the afternoon until late night

Deceptive practice: most often in the morning hours and early afternoon

Assault: most often on lunch time



Most crimes take place on the West side and on the South side of Chicago



North State street in the center of Chicago (red point) The most visited street where thefts up to 70% happen

Number of Crime Records	
Community Area Name	
Austin	11435
Near North Side	9628
Near West Side	8624

Austin seems to be the most dangerous neighbourhood in Chicago

But according to crime rate
Austin is in the 22nd position

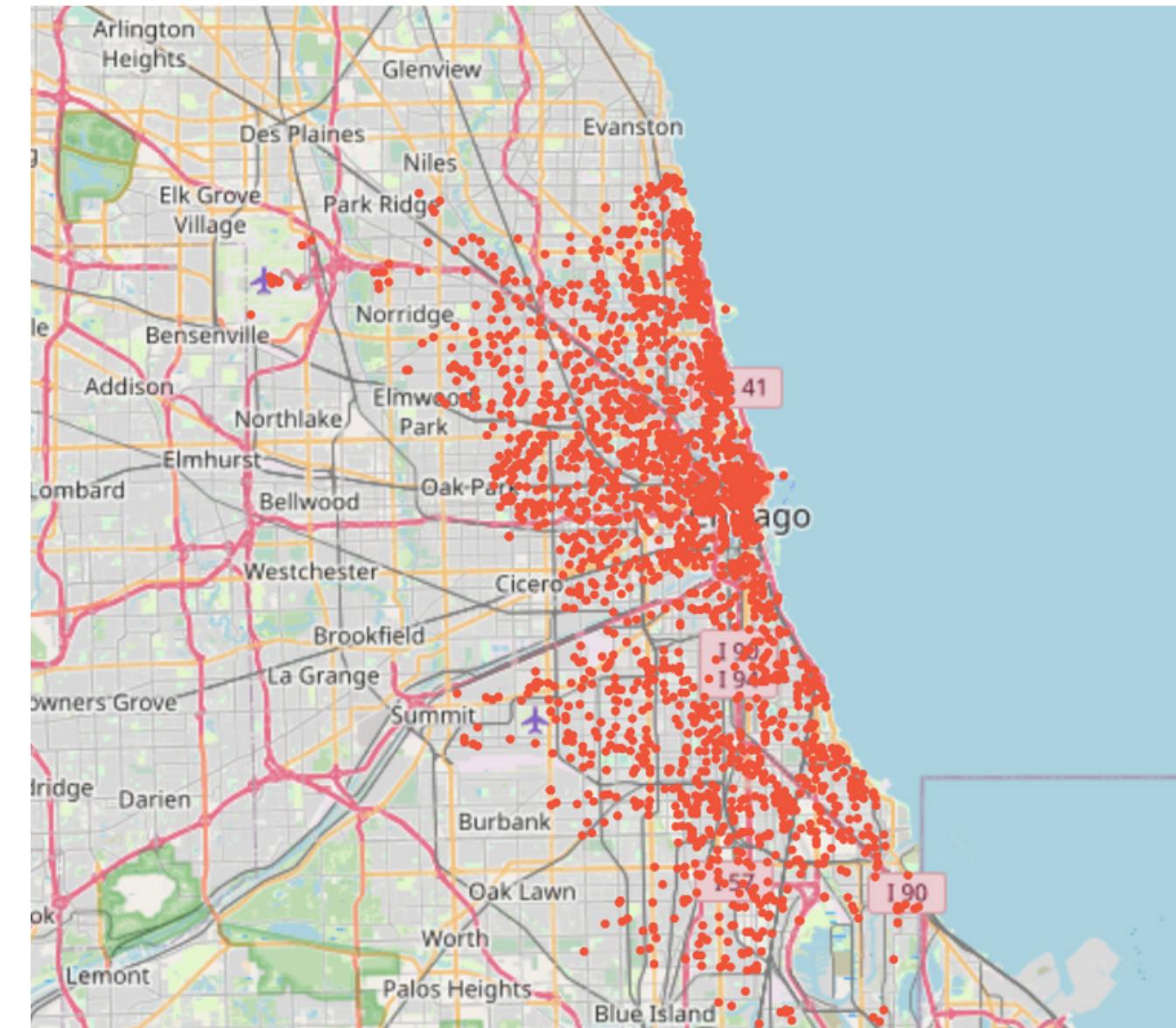
index	Name	Population	Crime Records	Crime Rate
37	Fuller Park	2567	587	0.228672
26	West Garfield Park	17433	3571	0.204841
68	Englewood	24369	4360	0.178916
44	Chatham	31710	5615	0.177073
29	North Lawndale	34794	6141	0.176496
69	Greater Grand Crossing	31471	5534	0.175844
27	East Garfield Park	19992	3455	0.172819
40	Washington Park	12707	2061	0.162194
54	Riverdale	7262	1155	0.159047
67	West Englewood	29647	4444	0.149897

The North side of Chicago is the most safe

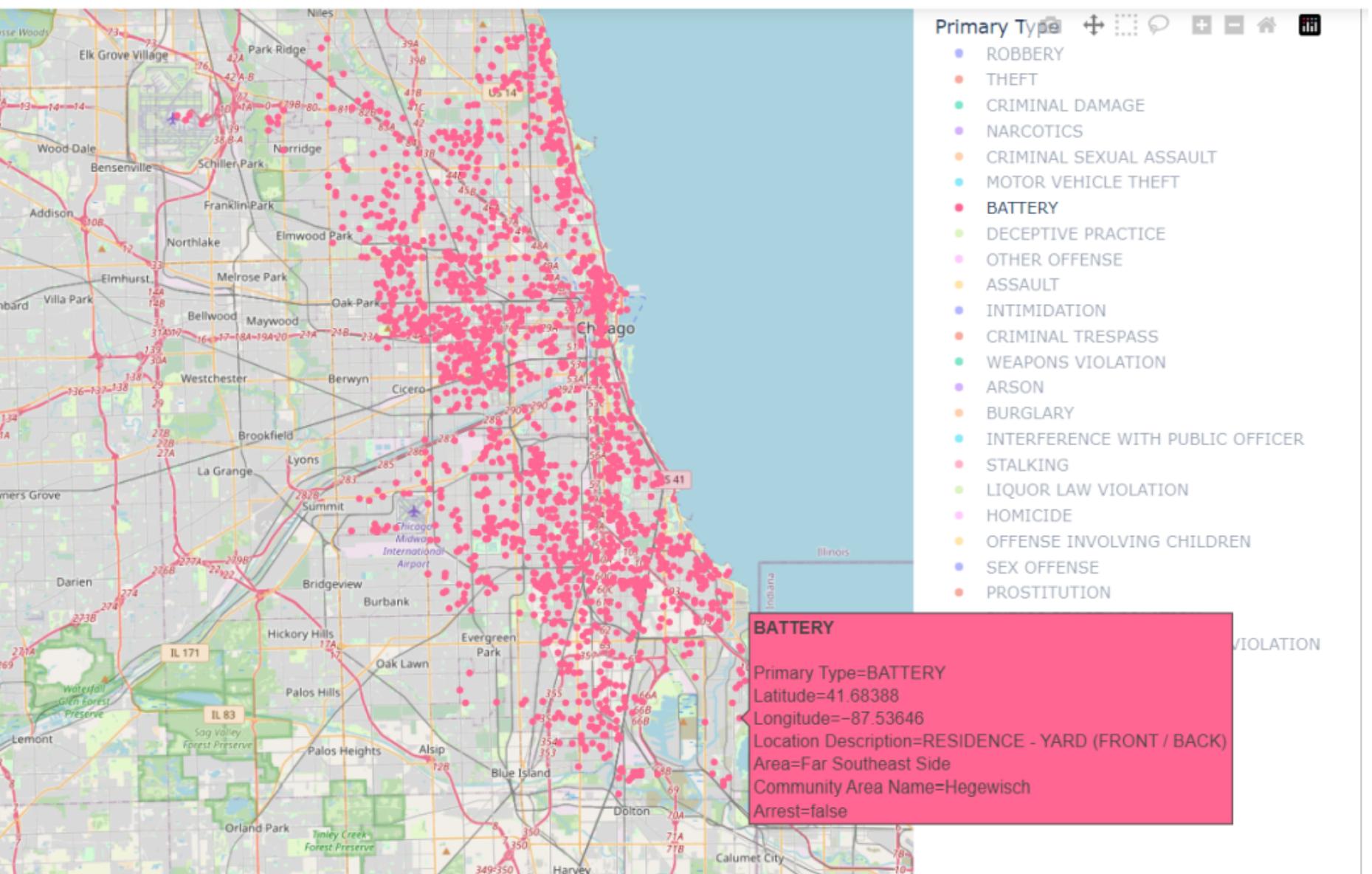
Name	Population	Crime Records	Crime Rate	Crime per 100.000 People	Area
Dunning	43147	1411	0.032702	3270.215774	Northwest Side
Norwood Park	38303	1142	0.029815	2981.489701	Far North Side
Forest Glen	19596	556	0.028373	2837.313737	Far North Side
Mount Greenwood	18628	493	0.026466	2646.553575	Far Southwest Side
Edison Park	11525	274	0.023774	2377.440347	Far North Side

Theft is more intense in the central and East side of Chicago

Battery is distributed normally throughout the city



- Primary Type**
- ASSAULT
 - THEFT
 - DECEPTIVE PRACTICE
 - CRIMINAL DAMAGE
 - CRIMINAL TRESPASS
 - MOTOR VEHICLE THEFT
 - OTHER OFFENSE
 - PROSTITUTION
 - ROBBERY
 - BATTERY
 - BURGLARY
 - HOMICIDE
 - WEAPONS VIOLATION
 - PUBLIC PEACE VIOLATION
 - SEX OFFENSE
 - NARCOTICS
 - OFFENSE INVOLVING CHILDREN
 - LIQUOR LAW VIOLATION
 - CRIMINAL SEXUAL ASSAULT
 - STALKING
 - INTERFERENCE WITH PUBLIC OFFICER
 - ARSON
 - INTIMIDATION
 - PUBLIC INDECENCY
 - CONCEALED CARRY LICENSE VIOLATION
 - OTHER NARCOTIC VIOLATION
 - KIDNAPPING
 - OBSCENITY



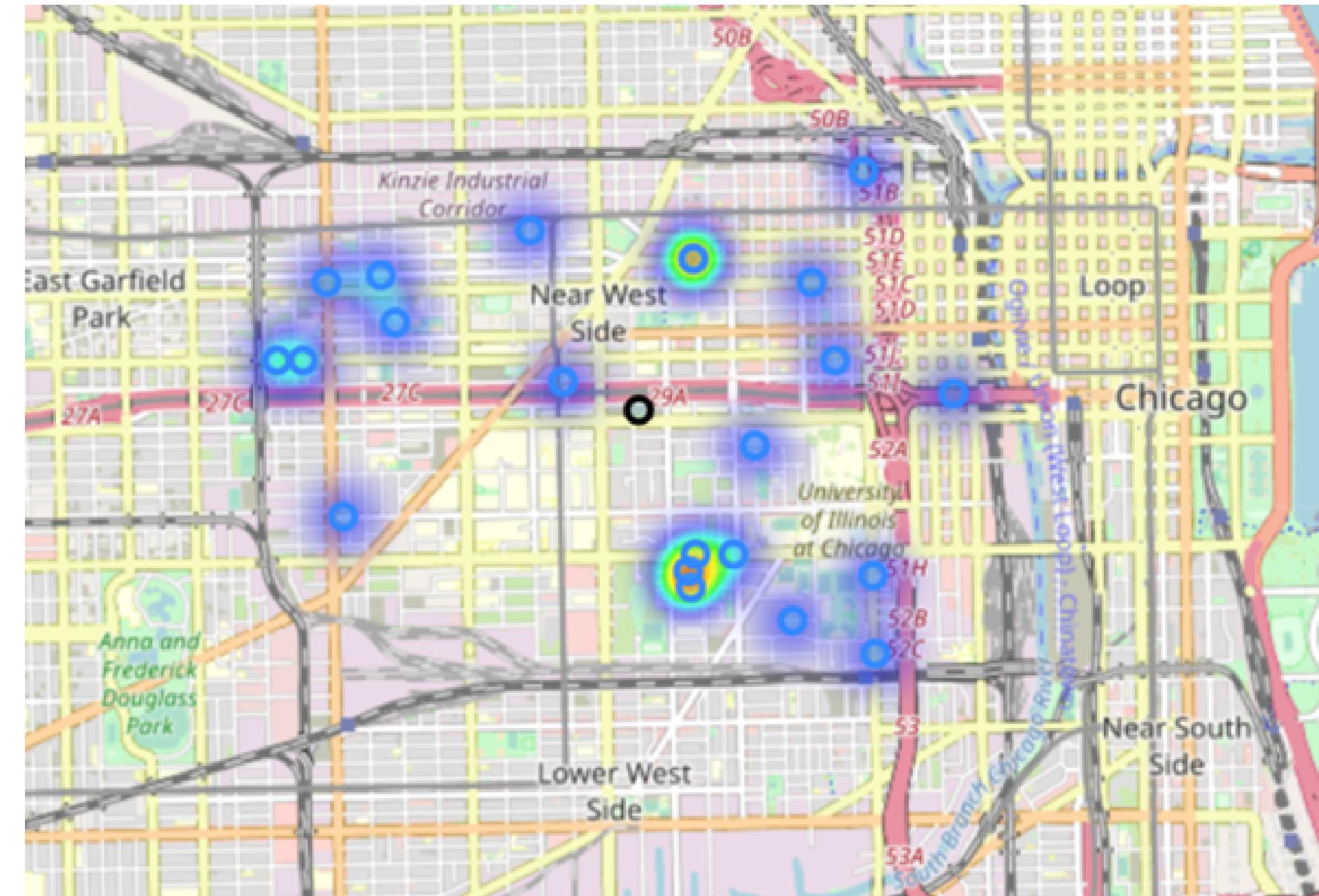
A Deeper Analysis

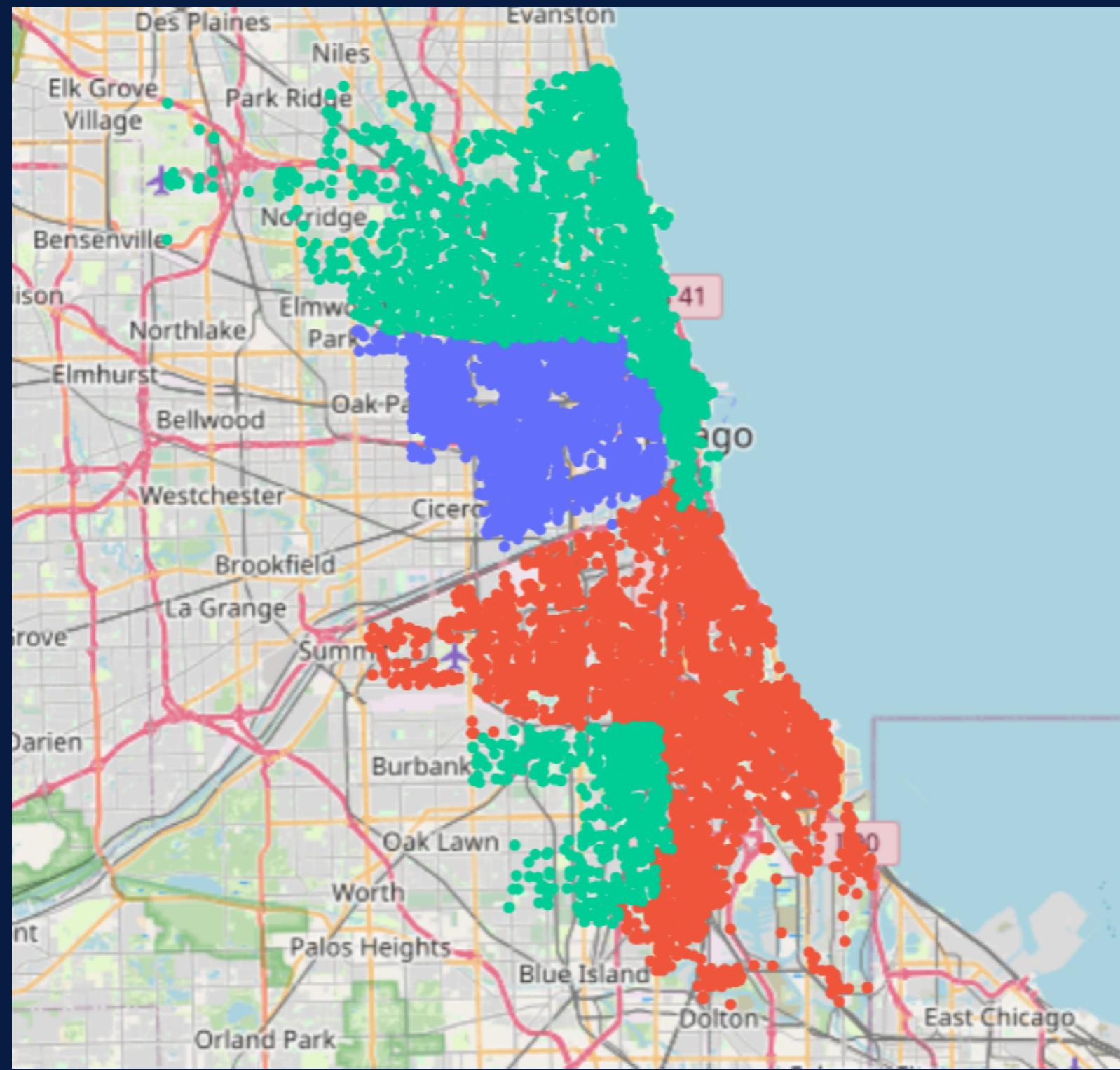
Location: Near West Side

Crimes in 26/06/2022
Event: Chicago Pride Parade

Expecting high number of crimes in the city

Black circle: Centre location of crimes → best place to add an additional patrol car





Cluster 1

Far Southeast Side, South Side,
Southwest Side

Cluster 2

West Side

Cluster 3

Central, Far North Side, Far
Southwest Side, North Side,
Northwest Side

Similarities between regions of each
cluster:

Number of crimes, most common
type of crime

Cluster 1 (South)

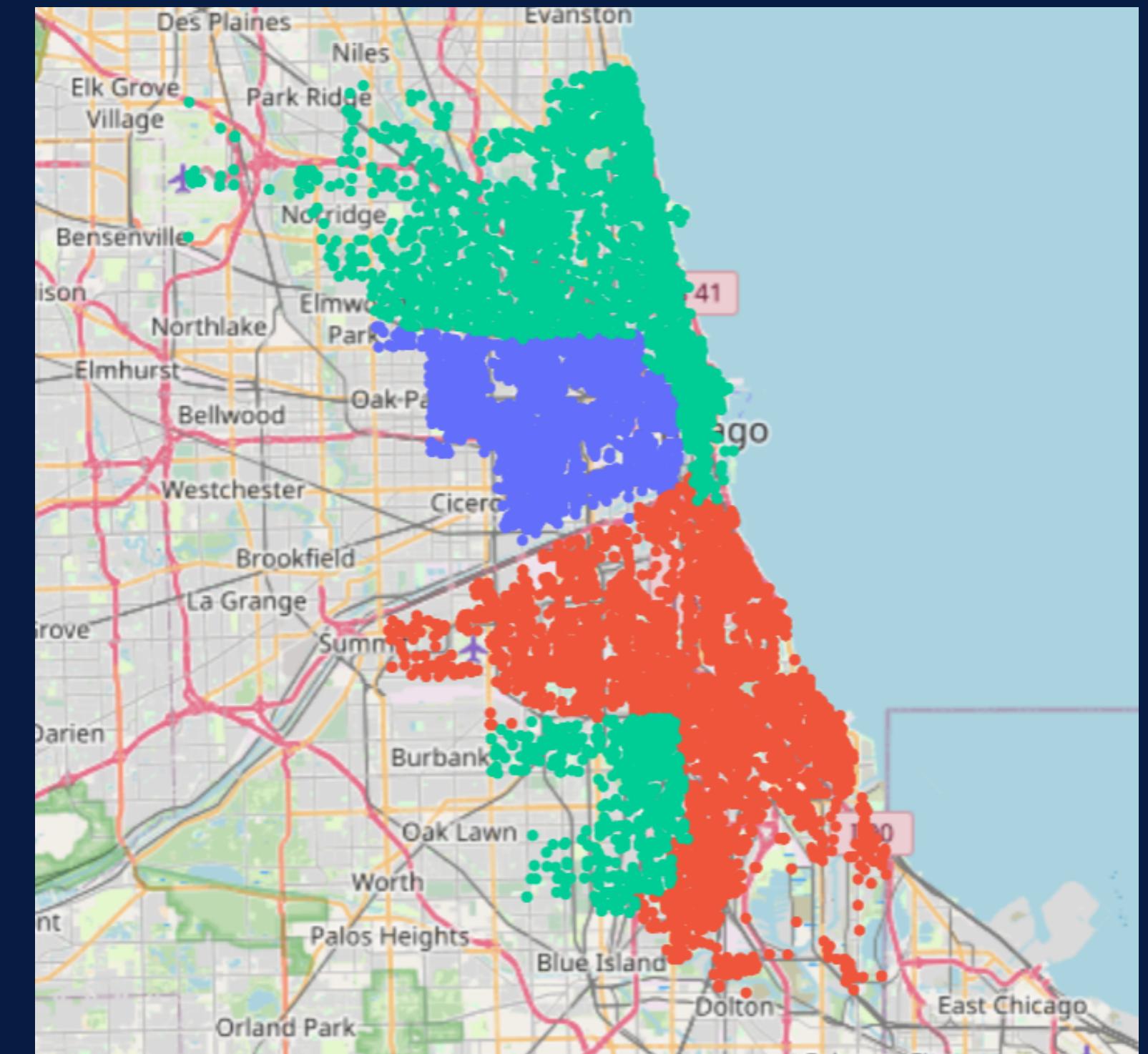
- Regions with relatively high number of crimes
- Most common crime: Battery

Cluster 2 (West)

- Highest number of crimes (by far)
- Most common crimes: Battery and Theft

Cluster 3 (North)

- Regions with low number of crimes
- Most common crime: Theft

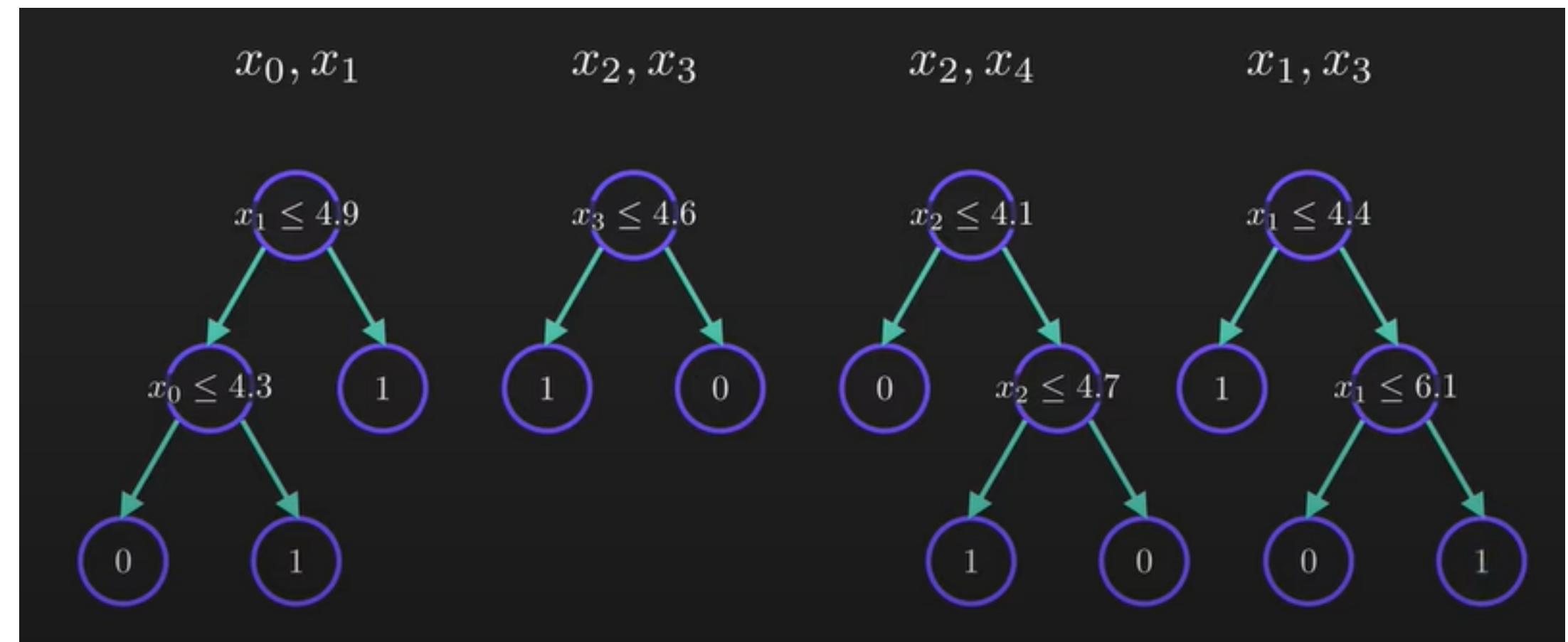


Random Forrest Classifier

Target: Predict type of crime in
Chicago

Features:

- Date and time
- Address
- Latitude & Longitude



Random Forrest Classifier

Modify categorical data



grouping primary type values

training the model using
Random Forrest algorithm



Accuracy: 40%

```
True label: 4 Predicted label: 1
True label: 0 Predicted label: 0
True label: 0 Predicted label: 0
True label: 0 Predicted label: 0
True label: 1 Predicted label: 0
True label: 1 Predicted label: 0
True label: 1 Predicted label: 0
True label: 0 Predicted label: 0
True label: 1 Predicted label: 0
True label: 0 Predicted label: 0
True label: 1 Predicted label: 1
True label: 0 Predicted label: 0
True label: 3 Predicted label: 0
True label: 1 Predicted label: 0
```

Thank you!