Analyzing Canton Ohio

Criminal & Overdose Activity

Agenda

This proposal aims to conduct a comprehensive analysis of criminal and concerning patterns. By understanding temporal trends in several categories, we can provide actionable insights for law enforcement agencies to enhance their strategies and focus during specific times of the year.

- Establishing the datasets
- Configuring the datasets for analysis
- Overarching criminal activity
- Focus of Specific Issues
  - Domestic Violence
  - Theft in Canton Ohio
  - Drug Overdose

Compiling the Data

Making the choice:

- To see correlations between weather and crime trends
- Discover trends and patterns within criminal activity.

The Datasets:

- Openweather: Weather data from 1/1/2015 to 12/19/2023
- Canton Police Reports: Reported criminal activity from 1/3/2019 to 1/2/2024
- Canton Police Reports: Calls for Service (CFS) from 1/1/2019 to 12/22/2023

Compiling the Data

Cleaning the Data

- Weather
  - Kept fields: dt_iso, temp, feels_like, temp_min, temp_max, humidity, weather_description, rain_1h, and snow_1h
  - Created ‘temp_avg’ field to average the hour’s max and min temperature
  - Converted dt_iso to datetime and localized the UTC to ‘America/New_York’
  - Created ‘relation’ field to merge on with Reports or CFS
- CFS
  - Kept fields: CallType, CreatedDatetime
  - Created ‘relation’ field to merge weather dataset with
- Reported Crime
  - Kept fields: dordate, tor, ti1, offense, QOL_category, crimetype, crimeagainst, day_of_week
  - Created ‘relation’ field to merge weather dataset with

Data Modification Bonus

Weather Data:

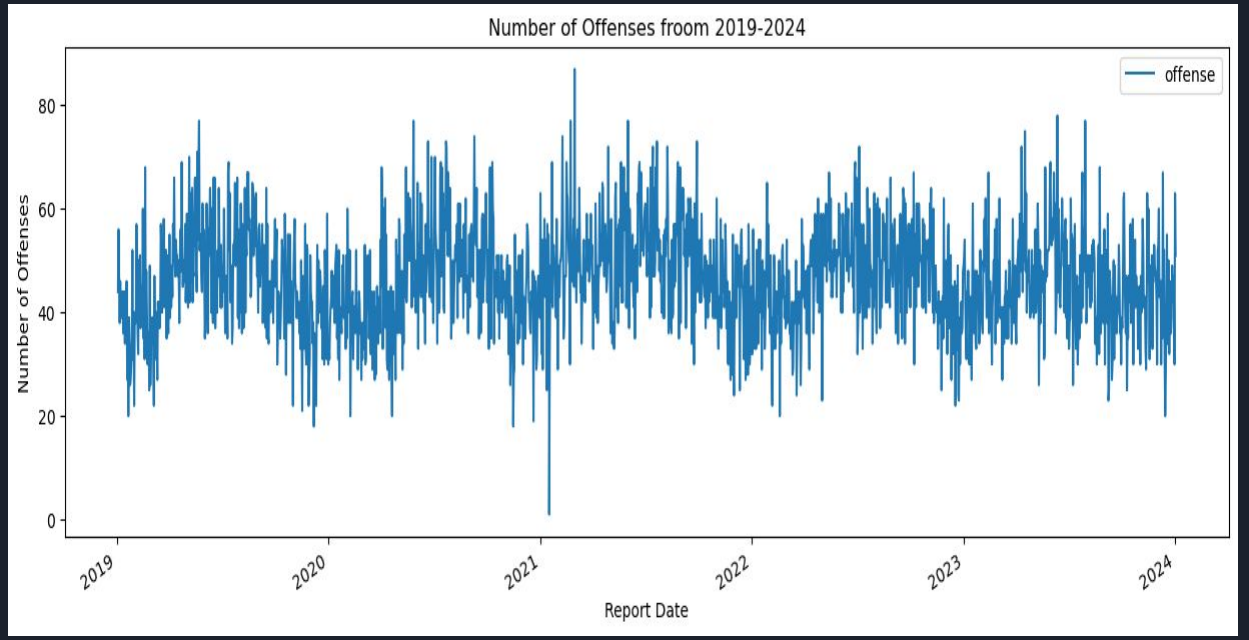
- Weather was logged every hour so by creating a column with the format Y-m-d H:00:00, we can merge DataFrames joining on the hour in a many-to-one relationship.
- Using:
  weather_df['Temperature Bin'] = weather_df['temp'].apply(lambda x: round(x / 5) * 5)
  We can round the temperature to the nearest multiple of 5 rounding, for example, 41 to 40 and 44 to 45.

An analysis of crime trends over time

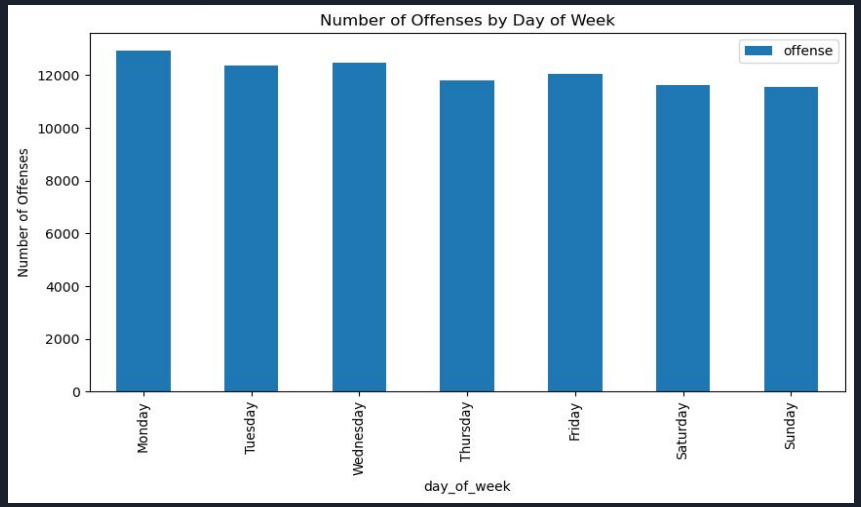
An analysis of crime trends over time in Canton

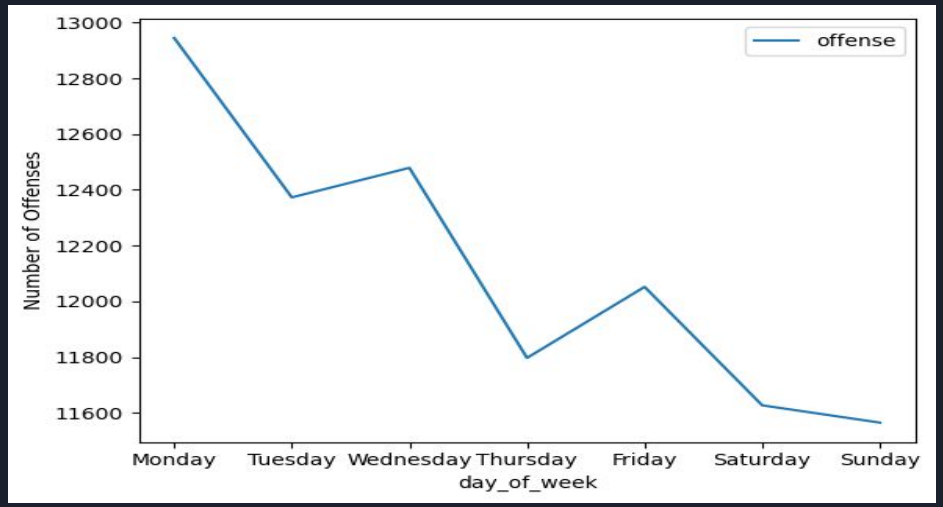
- Hi's and Low's
  - Peak's around the start of the year
  - Low's towards the end of the year

  - What outlying factors might factor into these trends?
    - 2021 for example
      - Global pandemic, elections, natural disasters



By Day of the Week

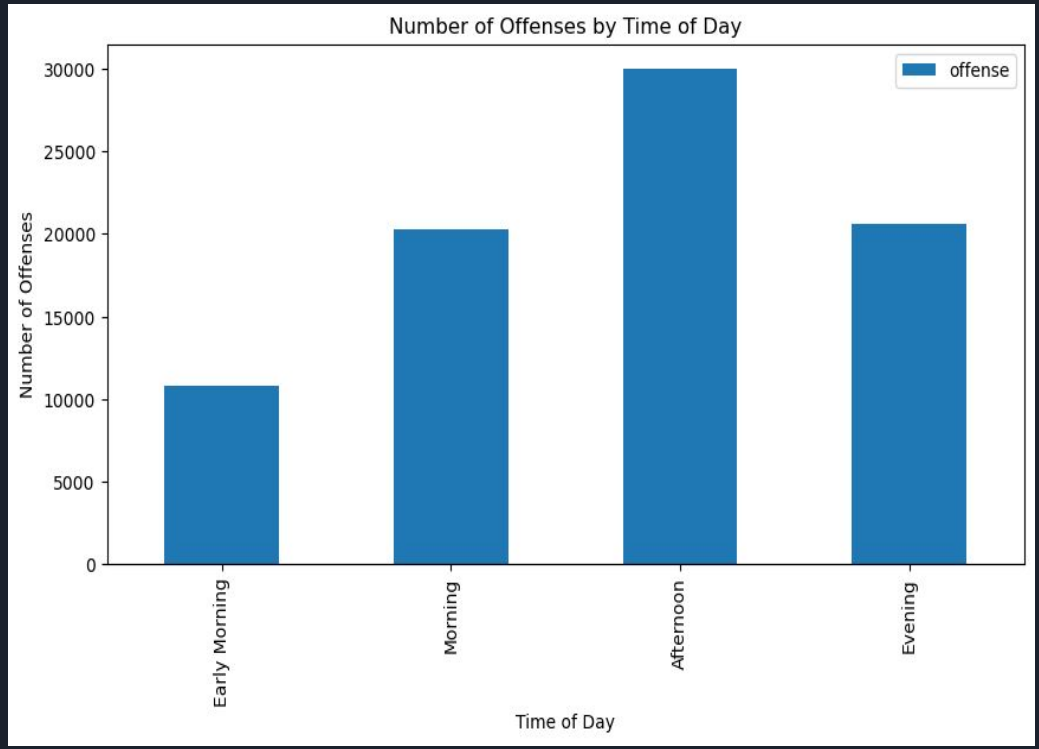




Relatively not much change by day but if we look at the line graph we can see a downward trend in overall crime by day of the week

By Time of Day

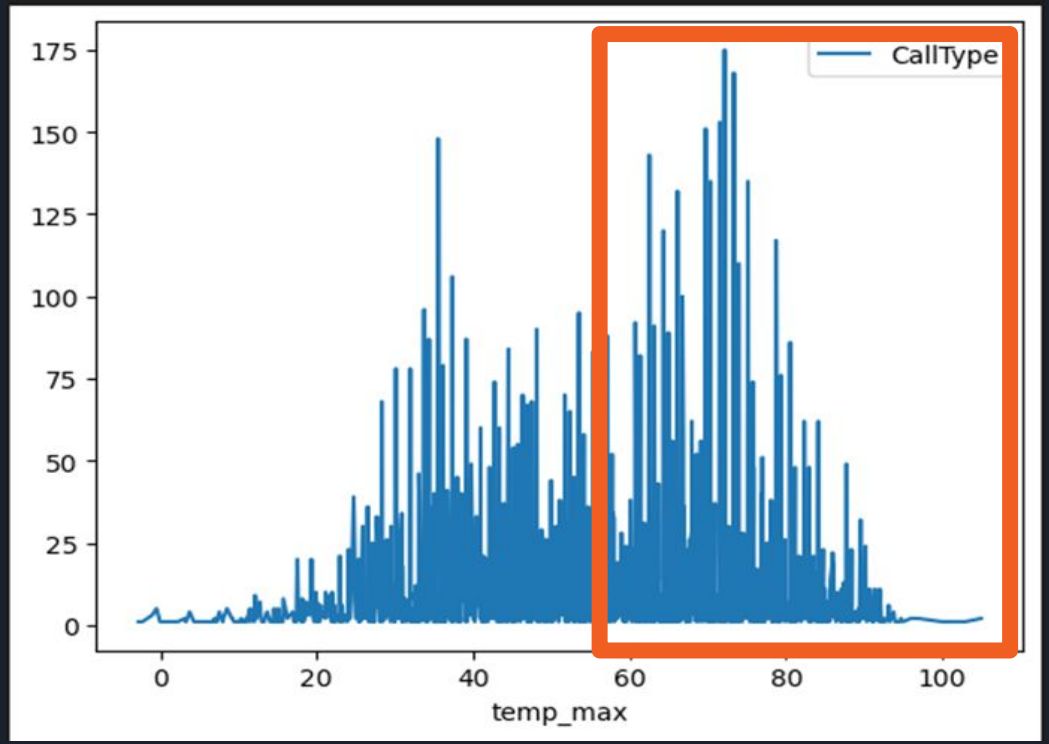
- Early morning spanning from Midnight to 6:00 AM
- Morning spanning from 6:00 AM to Noon
- Afternoon spanning from Noon to 6:00 PM
- Evening spanning from 6:00 PM to Midnight



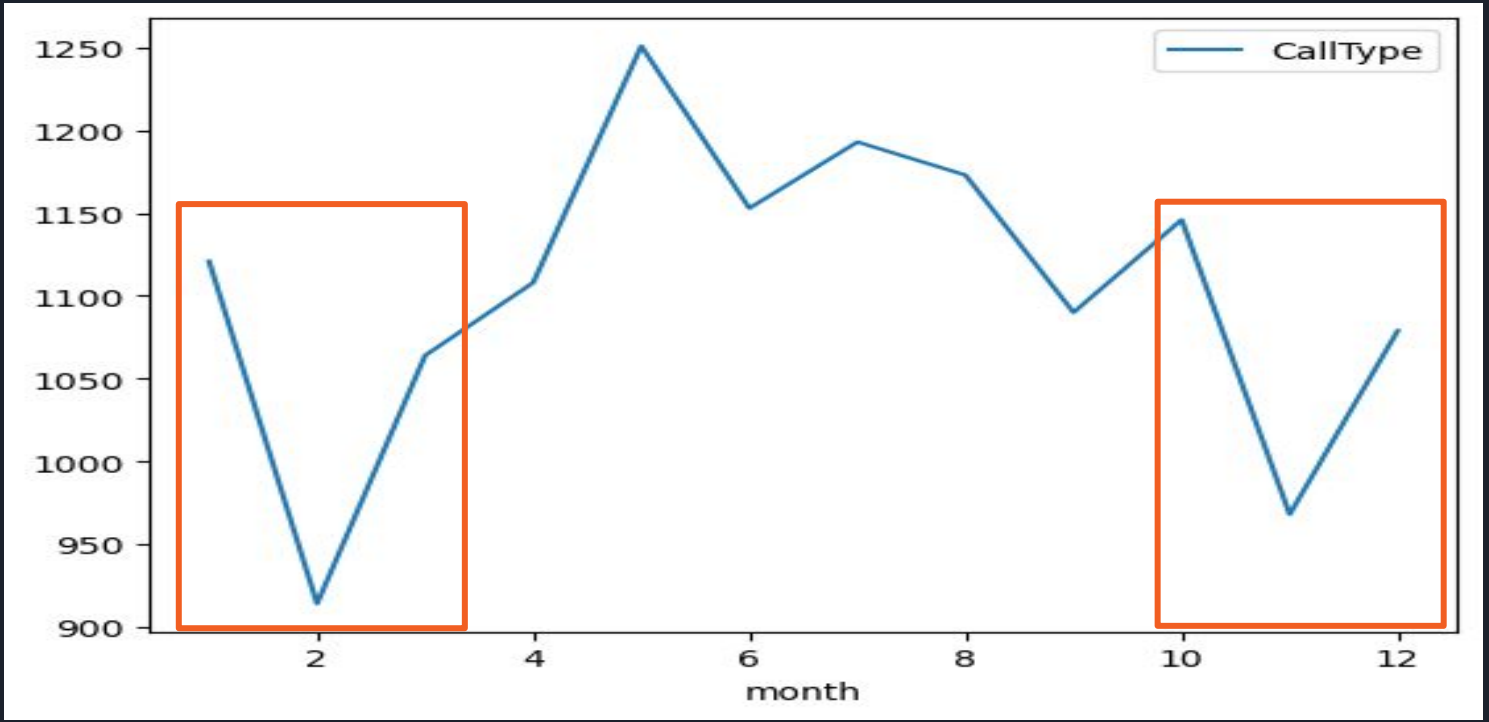
Domestic Violence in Canton Ohio

•The graph shows how domestic violence increases with the increase in temperature

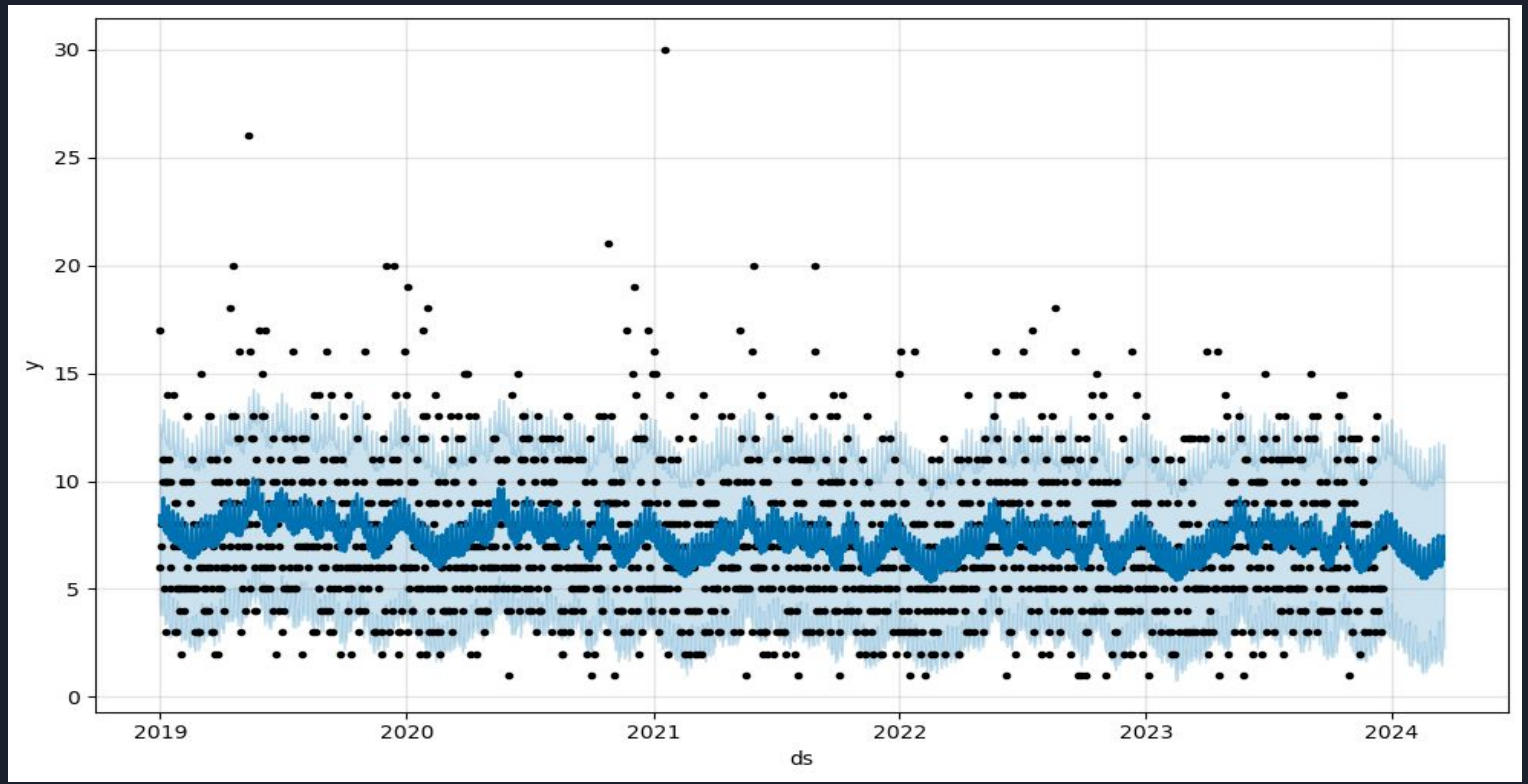
•***According to CNN.com, there is a direct correlation between high temperatures and hot tempers***



Domestic Violence in Canton Ohio

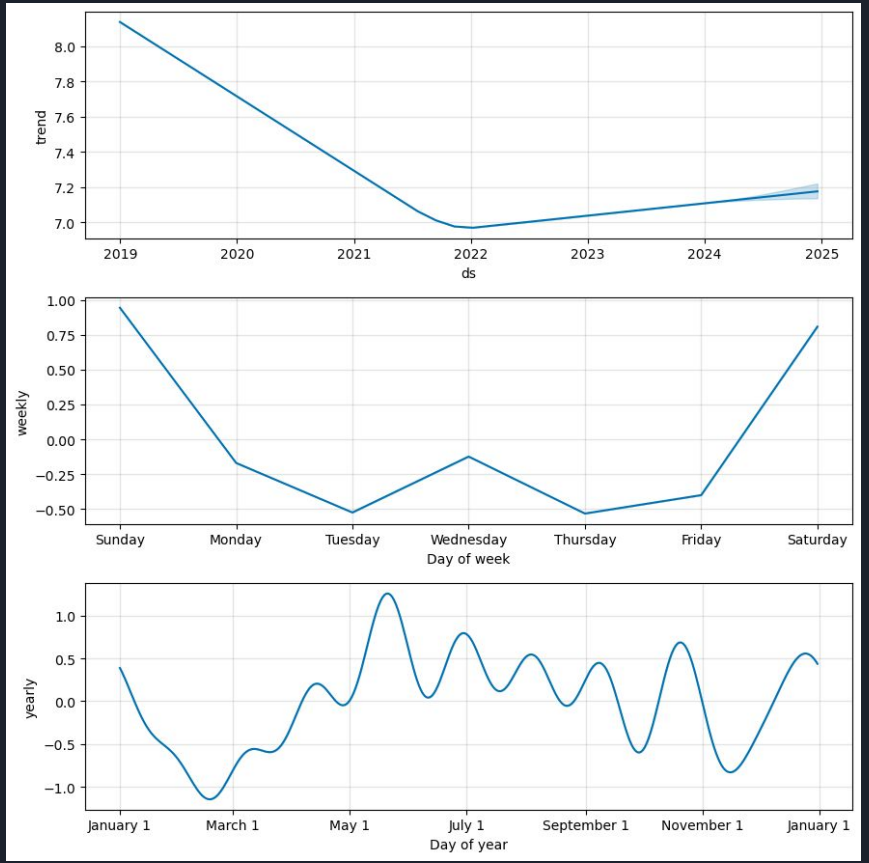


Future of Domestic Violence

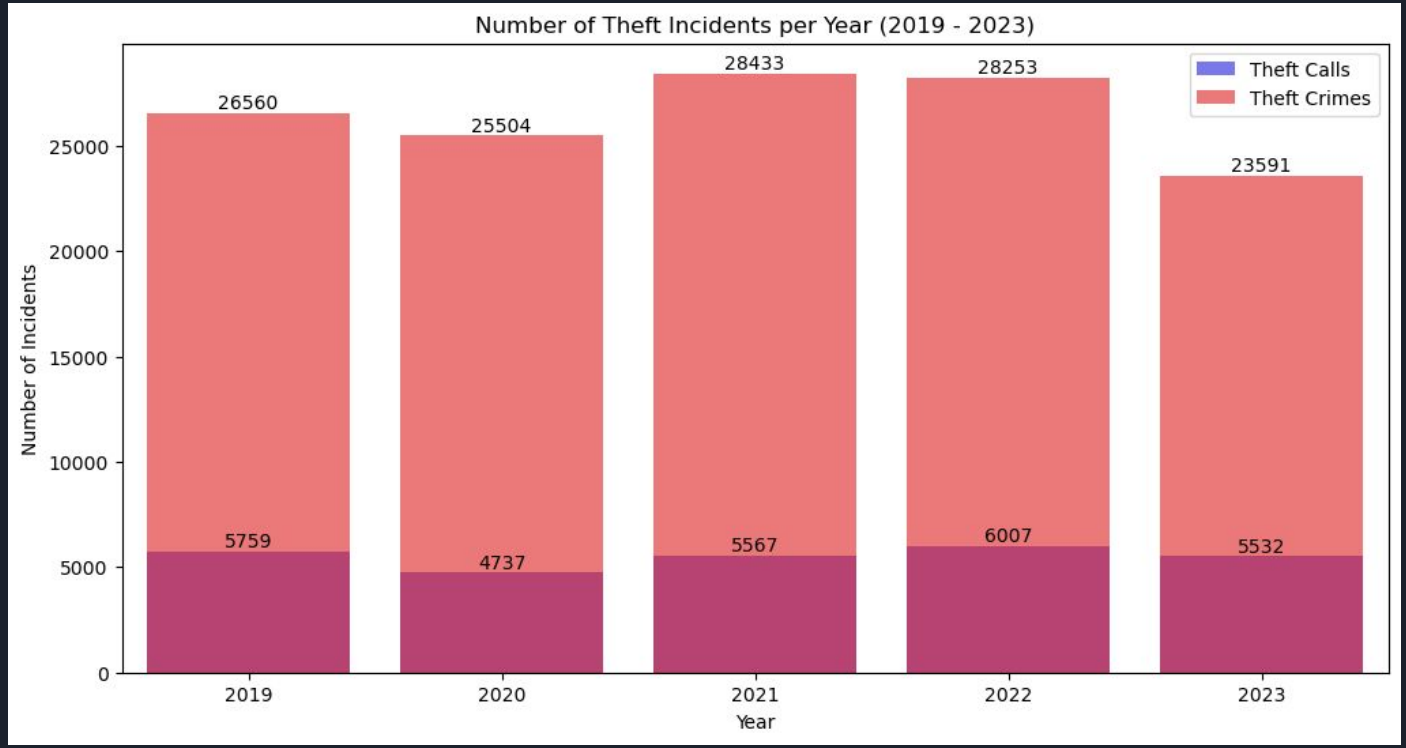


Future of Domestic Violence components

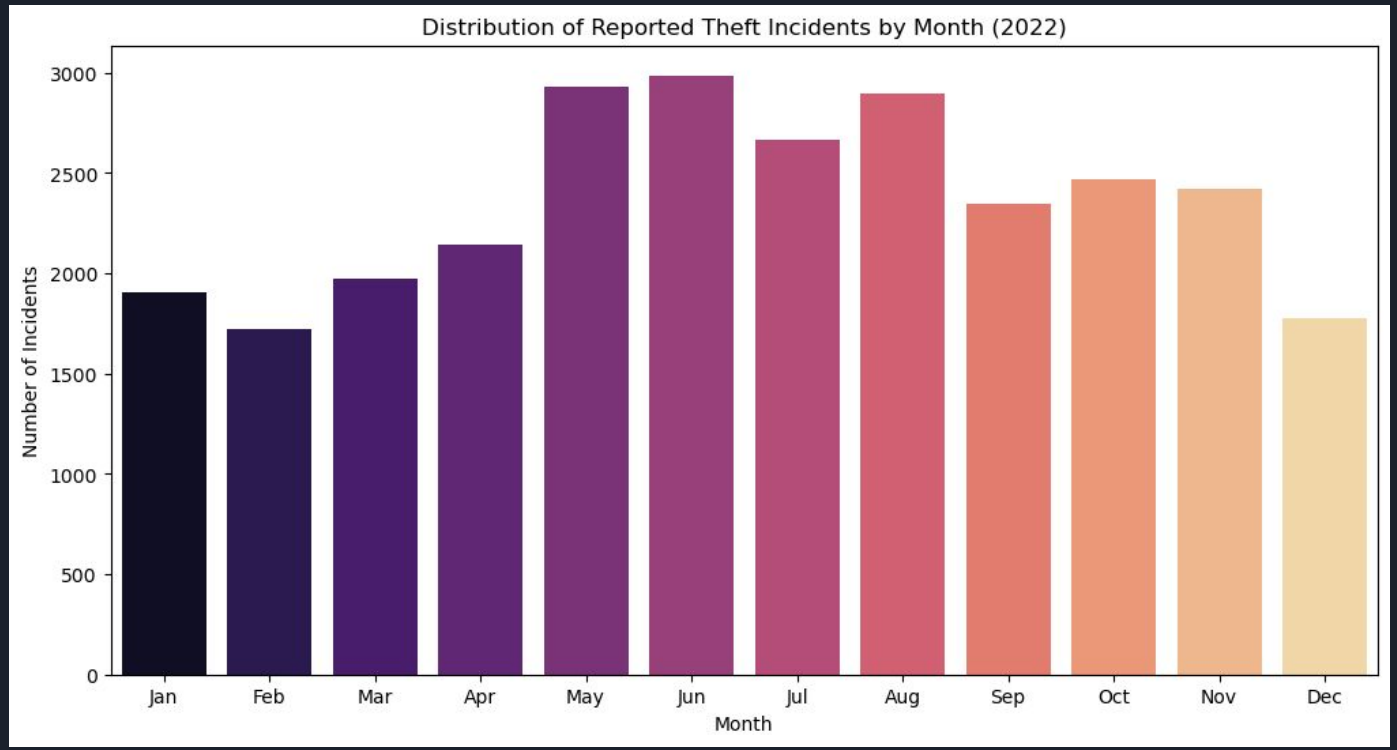
- Slow increase into 2024 & 2025
- Future issues indicate during weekends and Wednesday
- February into March continues to be lowest.
- June appears to be likelihood peak for domestic violence.



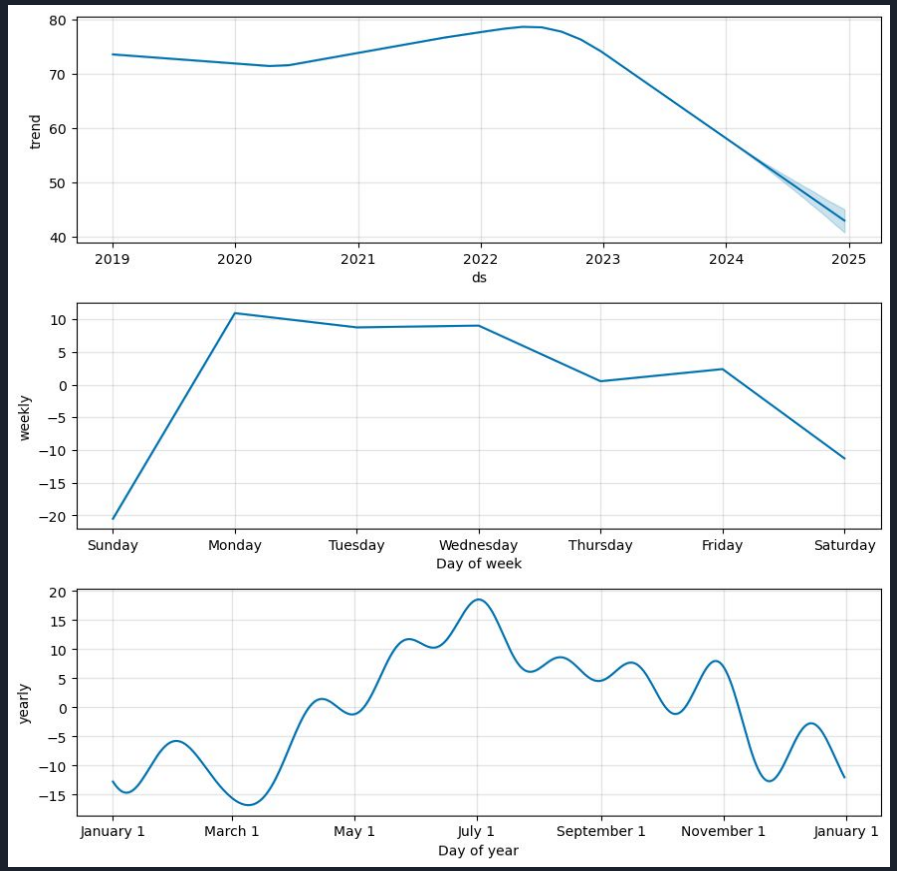
Reported Theft



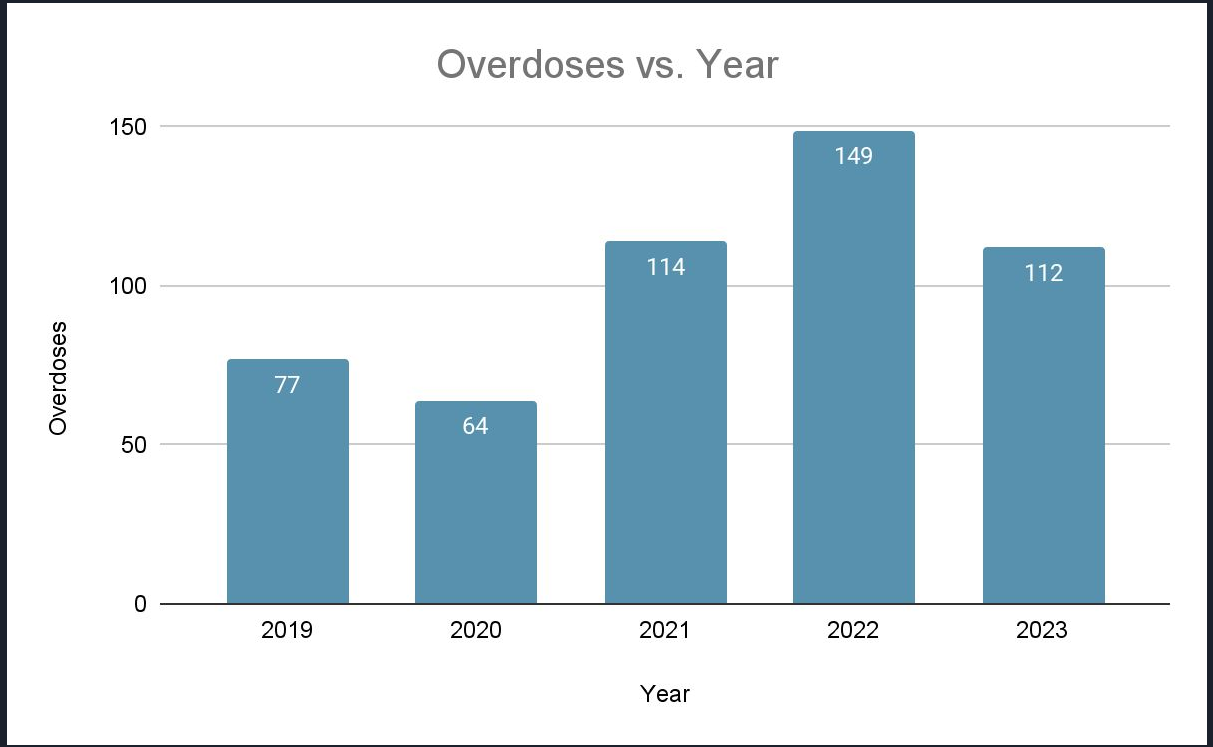
Reported Theft 2022 Focus



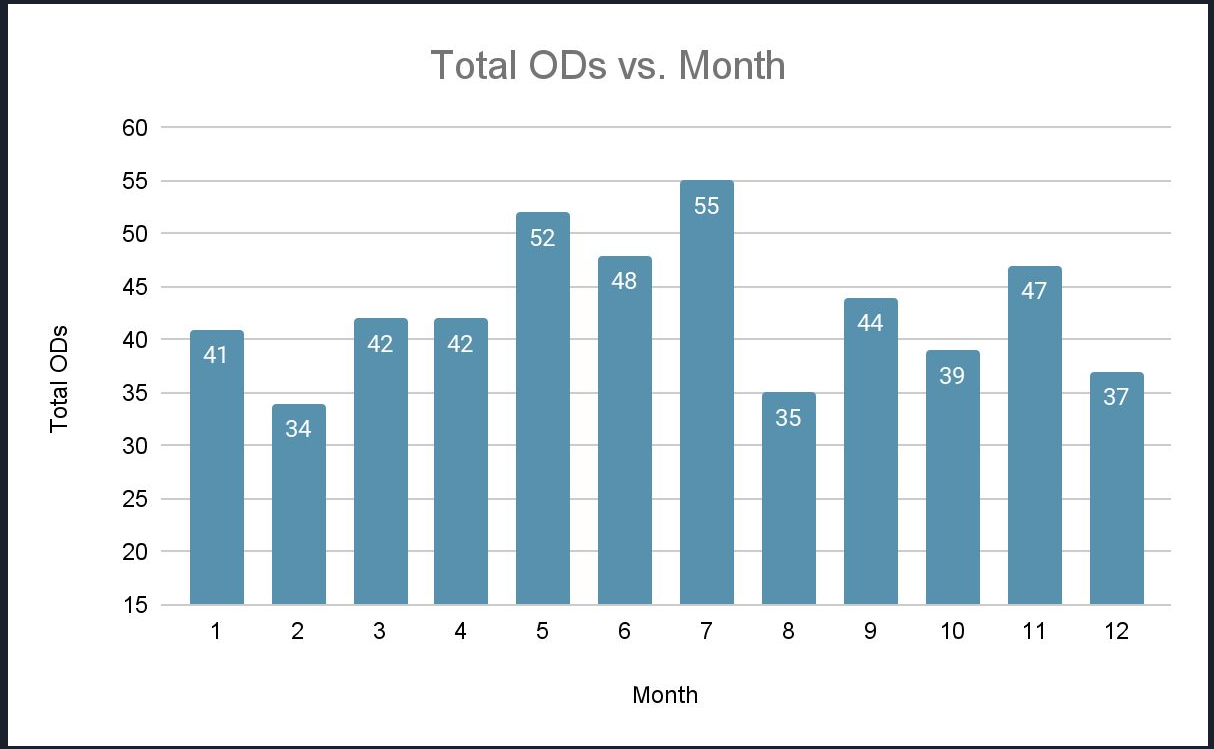
Reported Theft Prophet Analysis



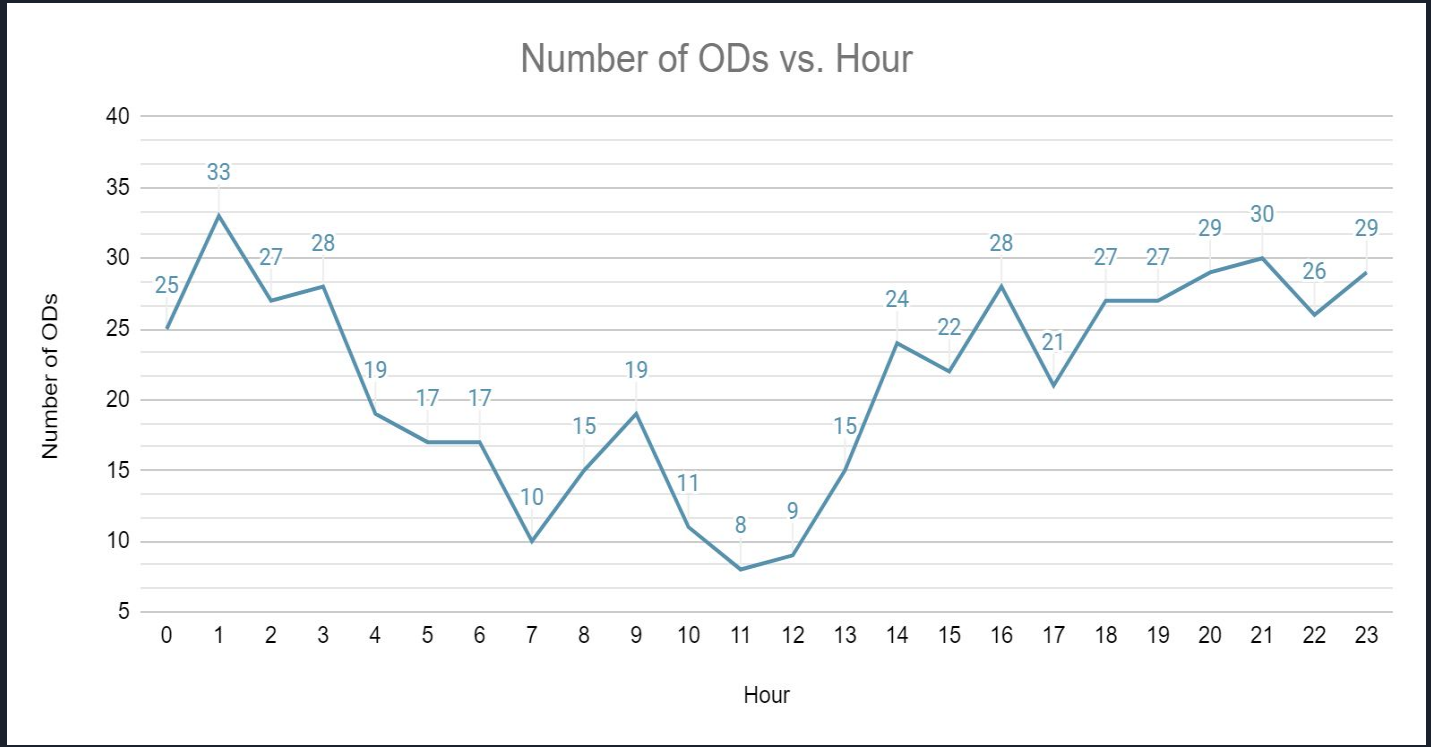
Reported Overdoses



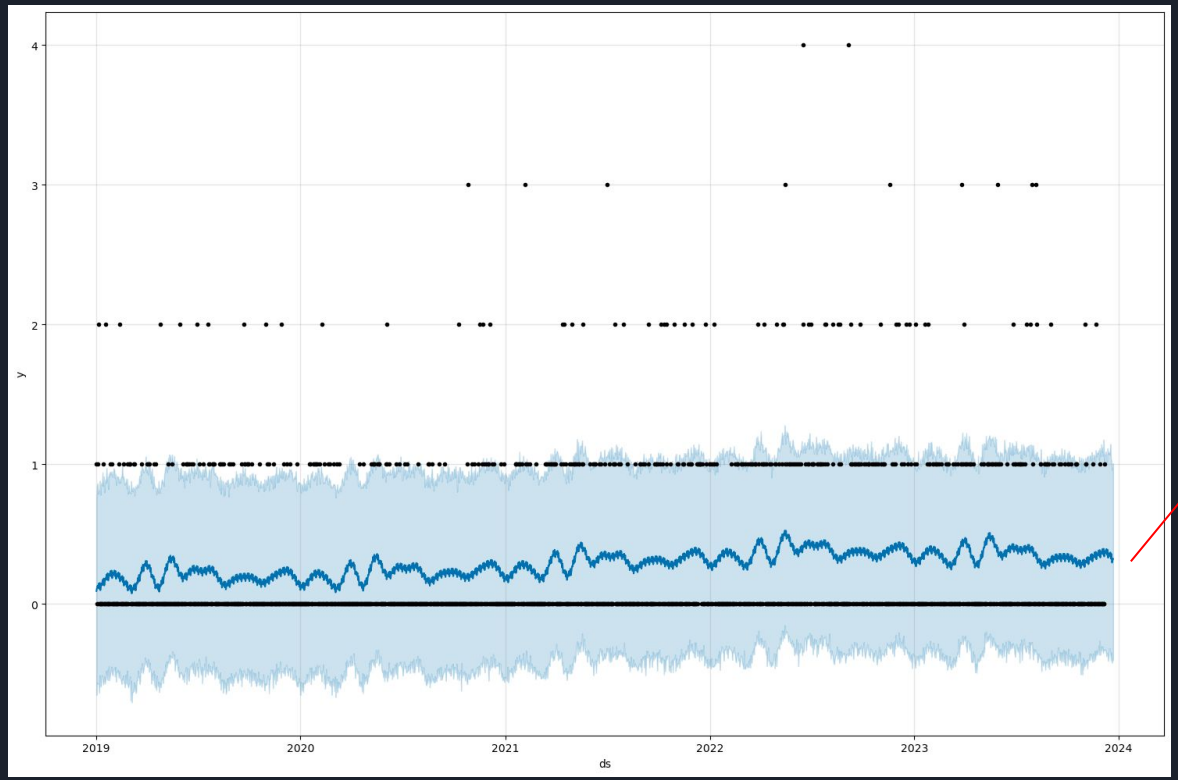
Reported Total Overdoses by Month

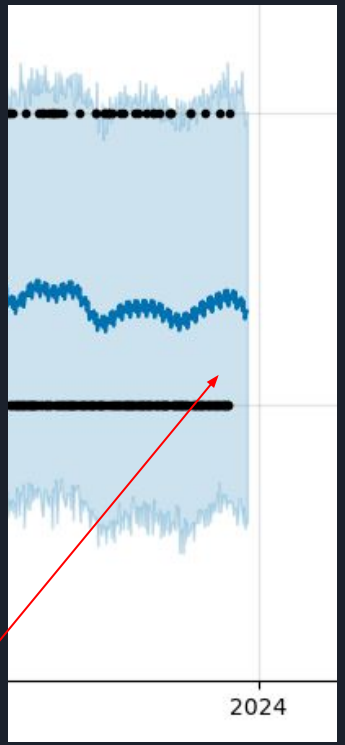


Reported Total Overdoses by Hour



Overdose: Can it be predicted?

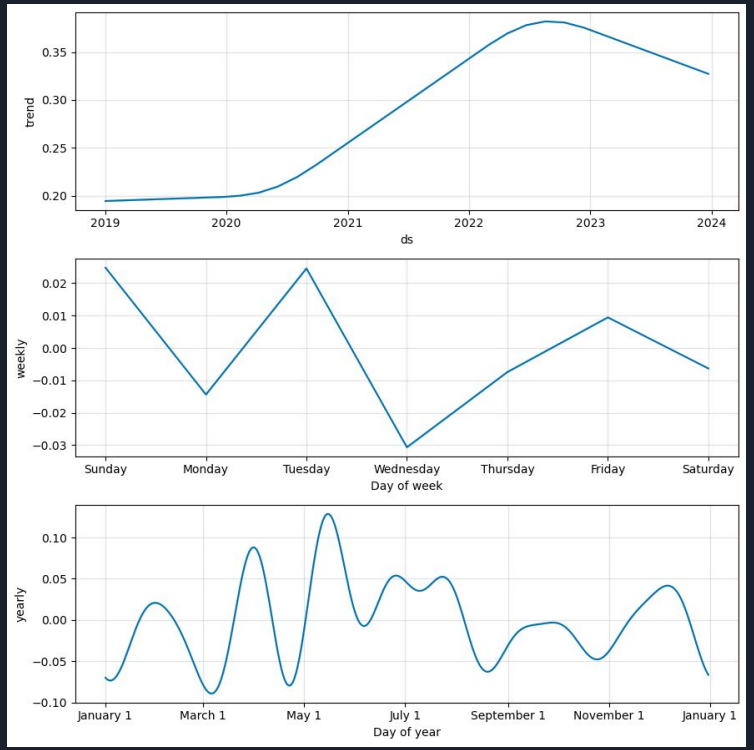




Overdose: Can it be predicted?

How can it be prevented?

- Mediation could be provided to those that have overdosed in the past.
- Drug abuse helplines could reach out on predicted peak days: Sundays & Tuesdays
- Helplines can boost efforts during predicted peak months: April & June.



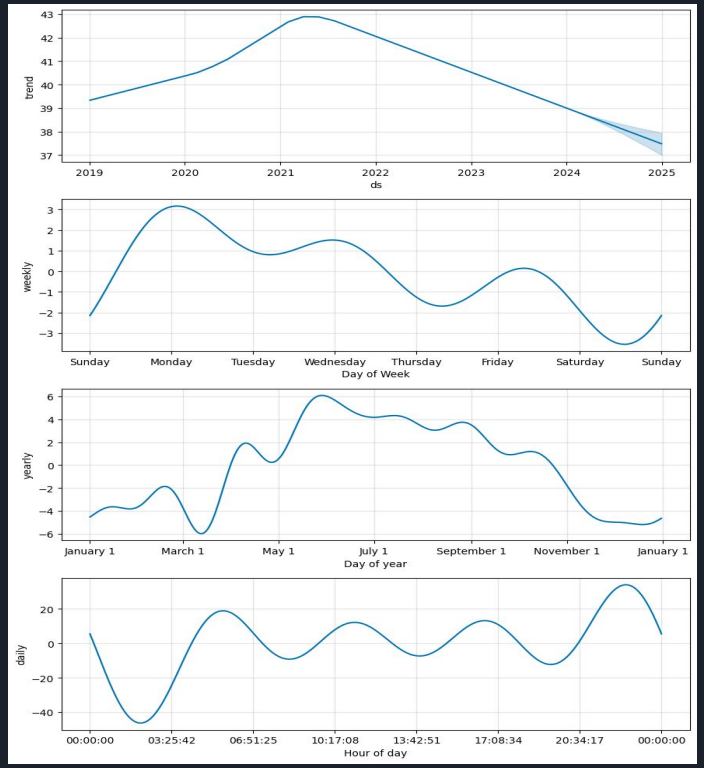
The Big Picture

As a group we took our combined interest with crime statistics and trends they display

Having this data allows us to correlate trends and better help people prepare themselves against crime and for police resources to be used efficiently.

The ultimate goal of this project is to hopefully one day be able to create a model than can give an accurate prediction as to when and what crime might be committed. We also hope that one day a model could be used to predict possibilities of a “bad batch” fueling overdose issues.

Forecasting Crime for 2024



- Using the offenses over time data we can predict the amount of crimes
- This is not an accurate model
- This is only based off of overall crime trends vs time
- Many other factors to consider that would contribute to creating an overall accurate forecast

Summary Findings

Overall crime trends are showing a decline, however, that doesn't mean specific types of crime are declining. There were outliers in 2021 near the beginning of the year were reported crime dropped dramatically then spiked just as dramatically months later. Afternoons from 12:00 to 18:00 hours show to be the highest time of reported criminal activity and calls for service.

Focusing on specific crime, Domestic Violence appears to have some correlation to temperature as stated in a CNN article (Christensen, 2023). There is a major decline in Domestic Violence for the months of February and November during the timeframe of the dataset however, the overall Domestic Violence trend is showing a slight increase into 2024 and 2025.

Covid-19 shut down may have stunted Theft reports in 2020 however, the following year jumped with a slow decline into 2023. The month of June was the most reported thefts for 2022 followed by May and Aug. The overall trend for Thefts is showing a decline into 2024.

Most overdoses to occur in the timeframe of the dataset was in 2022. The months of July, May, and June were the highest months for people to overdose during the hours of 16:00 and 03:00. While there is a slow decline into 2024, we can expect a monthly increase as we approach April 2024 based on Prophet’s predictions.

Questions?

Thank you!