San Francisco Public Safety Analysis

(A Comprehensive study on incident Rate Trends and Analysis)

Introduction

Police Department Incident Reports (2018 to Present) is sourced from the San Francisco government. It contains information on reported incidents that required police intervention in San Francisco from 2018 onwards. It allows researchers, analysts, and policymakers to gain insights into crime trends, patterns, and hotspots in the city. By analyzing the data, it's possible to identify the types of crimes occurring, their frequency, and their distribution across different neighborhoods and time periods. This information can aid in resource allocation, crime prevention strategies, and the assessment of public safety measures. Overall, these reports provides a comprehensive and up-to-date resource for studying crime in San Francisco and informing evidence-based decision-making in public safety.

Analysis

2.1 Streamlining Design and Enhancing User Experience: (reducing the cognitive load)

We understand the importance of simplifying the user interface, ensuring that it is clean and uncluttered. By organizing data logically and using clear labels, we aim to align with users' mental models and make information easily understandable. To avoid overwhelming users, we carefully limit the number of visualizations on each page, focusing on the most relevant ones. We provide context and explanations through tooltips, captions, and narratives, guiding users through their data interpretation journey. Furthermore, we strive for optimal performance by optimizing data models, reducing data volume, and employing data compression techniques. Our commitment to user-friendly interactions is evident in the intuitive navigation and filtering mechanisms we employ, facilitating effortless data exploration. Our ultimate goal is to alleviate cognitive load and enhance the user experience, allowing users to engage with the app in the most humane and meaningful way possible.

2.2 Analysis & Insights:

By conducting these analyses and exploring the provided data, policymakers, law enforcement agencies, and researchers can gain valuable insights into the performance of the San Francisco Police Department, crime trends, resource allocation, and the effectiveness of crime prevention strategies.

1. Supervisor District with the Highest Number of Cases Solved:

This can provide insights into the effectiveness of law enforcement efforts in different areas of the city.

2. Day of the Week with the Highest Number of Cases:

This information can be useful for resource allocation and scheduling of law enforcement personnel.

3. Average Response Time and Highest Weekday Case Volume:

It can identify the weekday with the highest case volume, allowing law enforcement agencies to allocate resources efficiently.

4. Most Common Types of Incidents Reported:

This information is valuable for understanding the prevalent crime trends and focusing on specific areas of concern.

5. Changes in the Number of Reported Incidents Over Time:

This analysis helps in identifying long-term trends, potential hotspots, and the effectiveness of crime prevention strategies.

6. Neighbourhoods with the Highest Number of Reported Incidents and Open Cases:

It can provide insights into areas with a high volume of open cases, which may require increased attention from law enforcement agencies.

7. Clearance Rate of Solved Incidents for Different Crime Types:

This analysis can shed light on the efficiency of the investigative process and the successful resolution of different types of cases.

2.3 Research questions:

Which Supervisor district has the highest number of cases solved?

We have chosen a bar plot to understand the data because bar plots are best for the comparison of categorical data and enable the audience to identify patterns, disparities, and trends more easily. To reduce the cognitive load, we have limited the number of graphs to one and maintained apt labels for easier understanding.

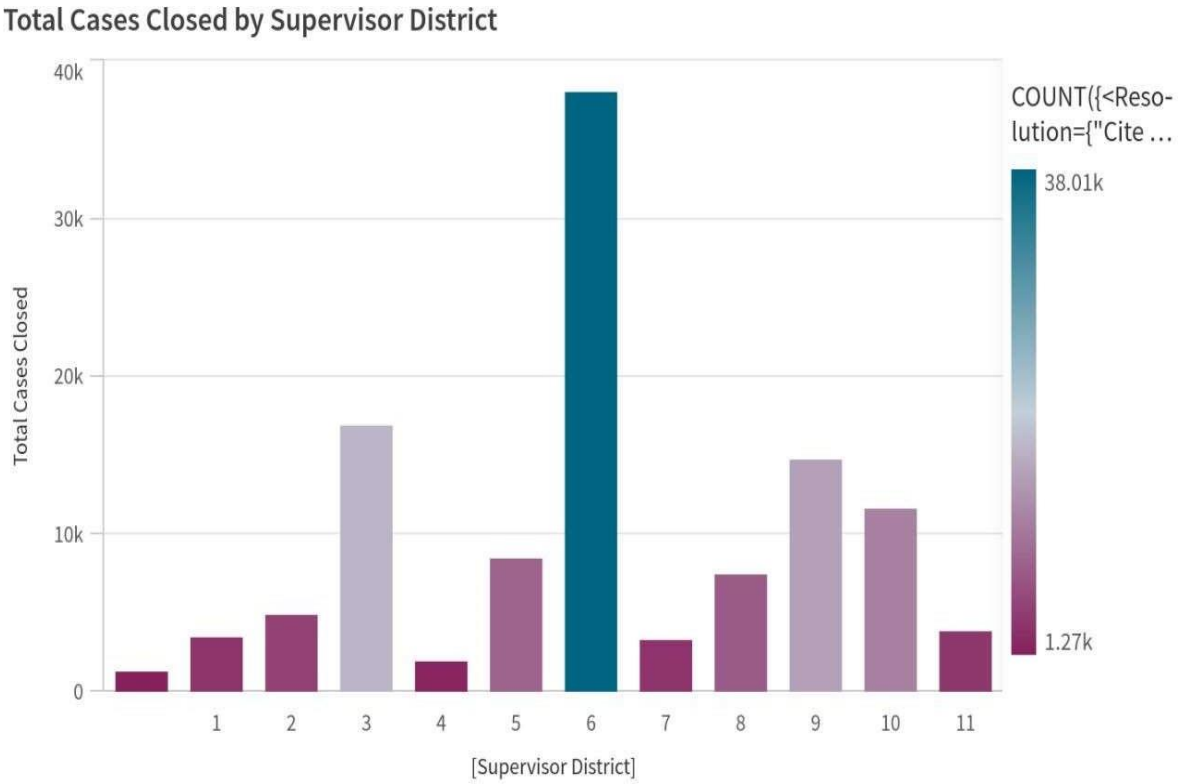

Fig 2.3.1: Cases closed per each supervising district.

Key Findings:

- Using the plot, it can be clearly emphasized that the 6th supervising district has the highest number of closed cases when compared to other 10 districts.
- Other districts might want to deal with the open cases to attain balance in their public safety.

Based on the obtained information, the law enforcement agencies of the 6th district has taken enough measures in their investigations and detection processes by enhancing collaborative efforts with the neighbourhood communities. The supervisor of 6th district has noted this as an key issue and introduced foot patrols and neighbourhood watching.

Which day of the week recorded the highest number of cases?

Although there are visualization techniques which may be apt for the obtained set of information. A bar plot is the best visualization for comparison of categorical variables over other plots. The story board is limited to one visualization to reduce the cognitive load as it is enough to establish a compelling story.

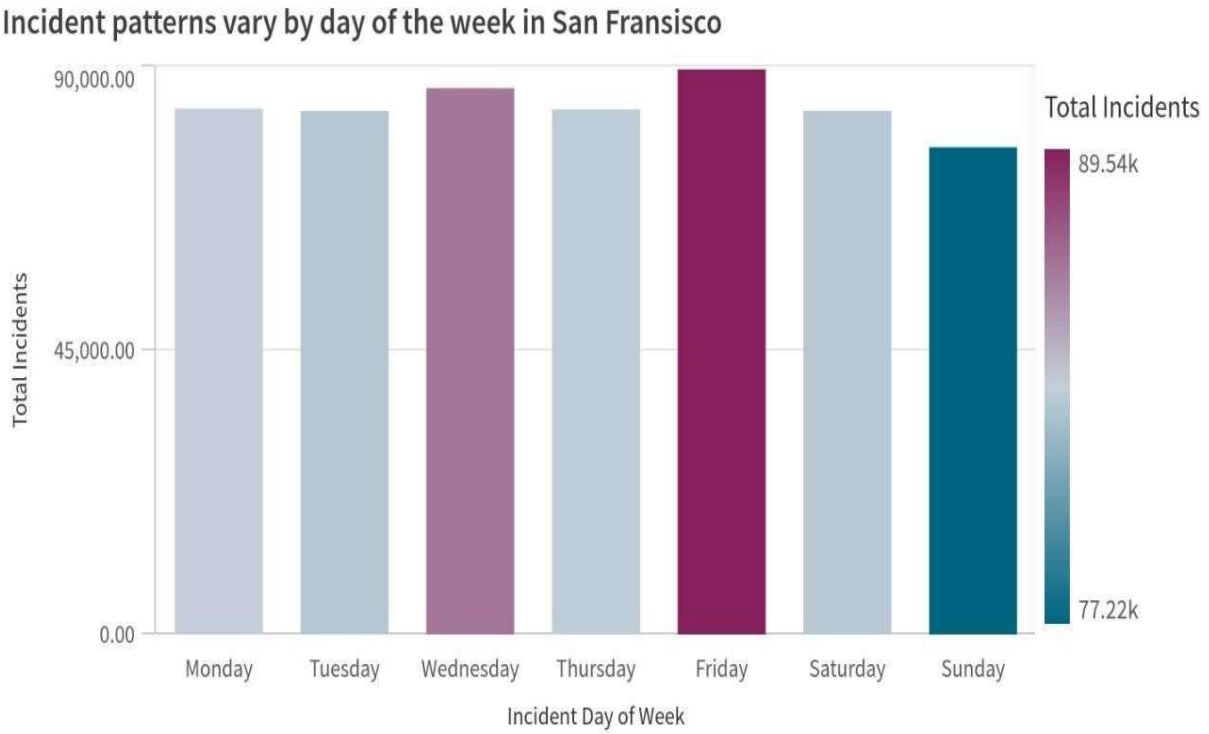

Fig 2.3.2: No of incidents by days of the week

Key findings:

- Friday is the day with the greatest number of incidents recorded of the week.
- Least number of cases were recorded on Sundays.

From the obtained data, Fridays reported highest number of cases. The possible reason can be due to start of the weekend. People tend to move out of their routine and celebrate their week. But people might get into drug usage and other mischievous acts. These kinds of acts are highly probable to get reported as incidents.

What is the Average Response time and Highest weekday case volume?

The dashboard used here describes a perfect story with all the visualisations included. We have used a bar plot to describe the volume of cases recorded on each day of the week because we are defining a categorical variable and a bar plot is the best choice for it. An area chart to plot the average response time of each police district of San Francisco. The area chart is used because it separates each district with proper colour disparities. The two KPI's presenting the highest number of recorded cases on a day and the other describing the average time taken to report a case once it is occurred.

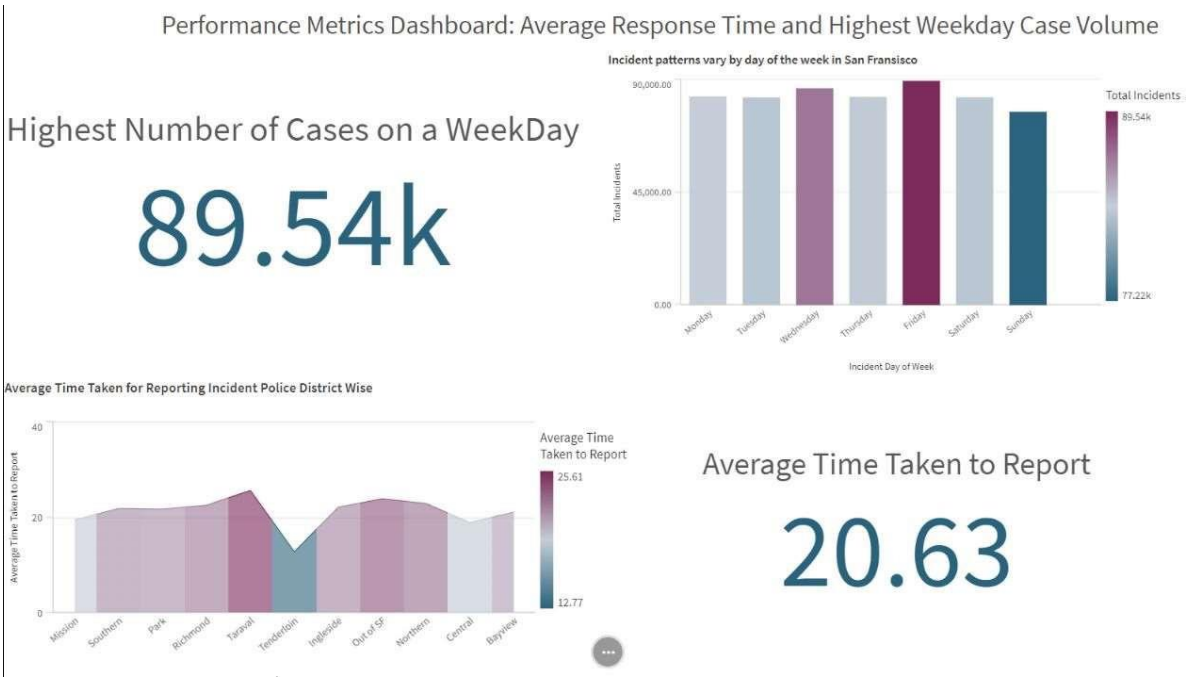

Fig 2.3.3: Average Response time and highest Weekday case volume

Key Findings:

- Fridays recorded a total 89.54k cases.
- Time taken to report an incident once it is occurred is 20.63hrs.
- Tenderloin has the least response time when compared other Police districts.

From the dashboard, it is conclusive that Fridays record the greatest number of incidents with almost 90 thousand cases. These cases are mostly reported in the district of Tenderloin. Which means all these cases reported have an average response time of 14hrs. That might be due to the strategies implemented by law enforcement agencies to get more communities involved in the mock drills and other awareness activities.

What are the most common types of incidents reported?

The dashboard elaborates the overall story of Larceny thefts, which is the incident that took place at highest frequency. The bar graph plots different types of incidents in San Francisco region. The first KPI shows the total number of Larceny thefts in San Francisco. The second bar plot describes all the different types of larceny thefts. The second KPI shows the total number of Vehicle Larceny Thefts. Although Cognitive load is something which should be looked upon but sometimes if it is important to understand the context, much data can be used for a greater number of plots.

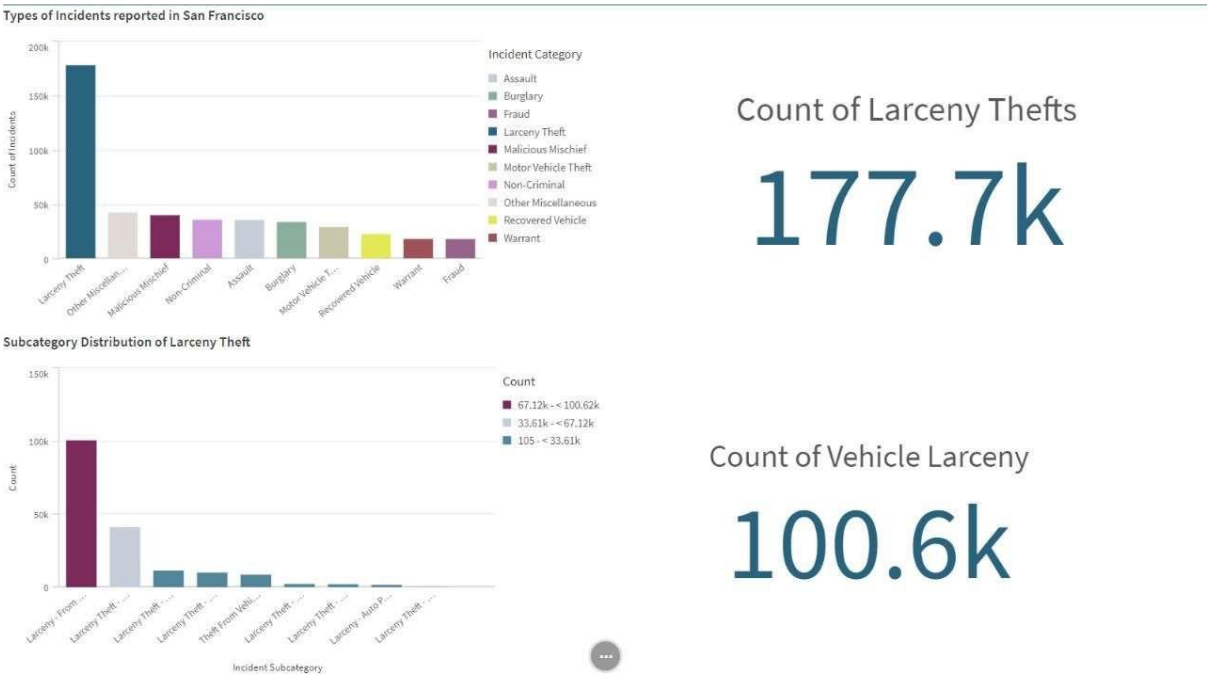

Fig 2.3.4: Type of incidents reported and that Incident Analysis

Key Findings:

- Larceny thefts share the highest frequency in incident ratio in San Francisco.
- The total number of larceny incidents are equal to 177 thousand.
- Vehicle larcenies are highest in larceny thefts, with over 100 thousand cases.

From the incidents reported, larceny thefts share the highest amount of incident count of 177k cases and that is because it is easier to perform these when compared to other incidents. Out of the larceny thefts, vehicle larcenies are high in number and that is because they are easier to access when parked outdoors and leftover overnights.

How has the number of reported incidents changed over time annually?

The area chart plots total number of incidents over the span of 5 years (2018 to 2022). This is a perfect plot to determine the incidents rate over years as area and color intensity would clearly explain the incident rate. We have only used a single graph and proper labels to maintain the cognitive load, however it is sufficient to understand the context from the story.

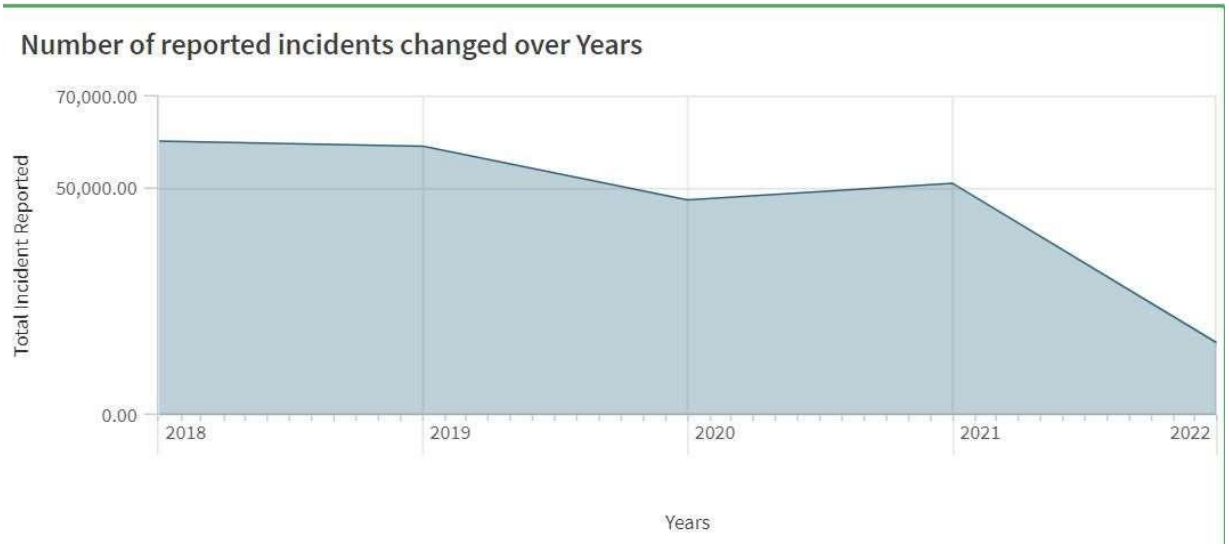

Fig 2.3.5: Reported incidents from 2018 to 2022.

Key Findings:

- There is a steady decline in the incident reports rate from the year 2018.
- Steady downward pattern is observed until 2021, from 2021 to 2022 there is a rapid drop in incident rate.

The plot clearly shows, the incident rate over the span of 5 years. From the year 2018 to 2019, there is not much difference in incident rates. From 2019 to 2020, the incident rate started dropping that is due to the government change after 2019. There is a slight increase in the incident rate from 2020 to 2021, that is due to the COVID 19 lockdown and resulting in economic instabilities and cyber attacks as there was more online activity than earlier years. As the COVID19 effect has been reduced the government has tried to establish the economic stability, which resulted in rapid downfall of incident reports rate.

Which neighborhoods or areas have the highest number of reported incidents and open cases respectively?

The comparison chart shows the total number of cases reported and open cases in all the police districts. To maintain the cognitive load, we have limited the number of plots to one and we can conclude a reasonable story through it and maintained the legends.

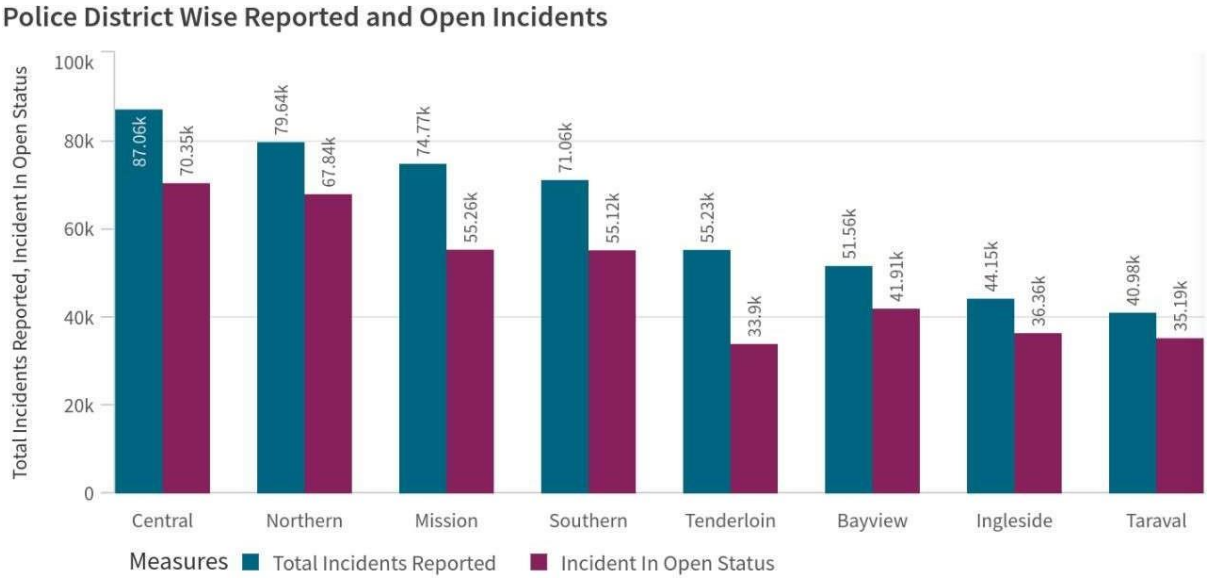

Fig 2.3.6: Comparing the total cases to active cases in each police district.

Key Findings:

- Central district has highest number of cases reported with the cases count of 87k, while the open cases are 70.35k.
- Tenderloin has the least number of active cases of 33.9k.
- Taraval has the least number of active cases of 41k.

From the plot, it can be clearly noted that the Central district has the highest number of reported and active cases. Based on the incident percentage, Tenderloin has the least number of open cases when compared to other police districts that is due to the socio-economic improvement and community collaborations.

What is the clearance rate of solved incidents for different types of crimes?

The stacked bar graph shows the solved incidents and the open cases of most common incidents that took place in San Francisco. To reduce the cognitive load, we have only represented only the 10 most common incidents out of all incidents. Stacked bar easily compares between the categories and provides an easier understanding of the context.

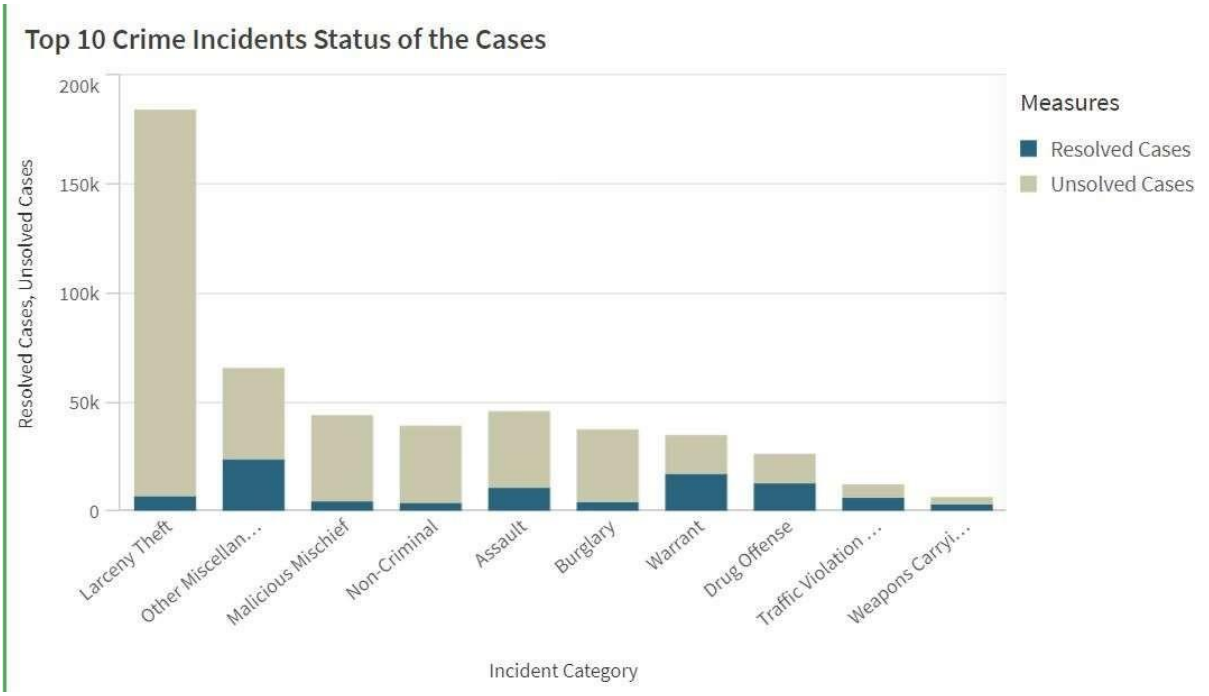

Fig 2.3.7: Rate of solved incidents for 10 most common types of crimes

Key Findings:

- The resolved Larceny thefts rate is very low when compared to the unresolved cases.
- If the rate of open cases is considered, then drug offense cases are solved at a good rate.

From the obtained findings, Larceny thefts cases are not solved at a good rate. That might be due to lack of evidence and lack of investments on these kind of thefts as they were very less valued when compared to other crimes. While on the other hand, drug offense is considered a serious crime and henceforth the crimes were focused and are aimed to solve and decrease these cases. On miscellaneous crimes, although the open cases are not that great, the data need to be more coherent to understand and analyze its patterns.

Conclusion:

In conclusion, the analysis of the Police Department Incident Reports (2018 to Present) from the San Francisco government has provided several insights into crime trends and patterns in the city. By examining the data, we were able to answer key questions and draw important conclusions. The analysis revealed that the 6th Supervisor district had the highest number of cases solved, indicating effective law enforcement efforts in that area. Fridays recorded the highest number of reported incidents, possibly due to the start of the weekend and increased social activities. The average response time for reported incidents was 20.63 hours, with the Tenderloin district demonstrating the shortest response time among the police districts. The most common type of incident reported was larceny theft, with vehicle larcenies being the highest within that category. The number of reported incidents showed a steady decline from 2018 to 2021, with a rapid drop in 2022. Central district had the highest number of reported incidents, while Tenderloin had the least number of open cases, indicating successful crime resolution efforts. The clearance rate for different types of crimes varied. Larceny thefts had a lower clearance rate compared to other crimes, potentially due to challenges in gathering evidence. Drug offenses showed a higher clearance rate, reflecting focused efforts on tackling these types of crimes. Overall, our project provides valuable insights into crime in San Francisco, aiding in resource allocation, crime prevention strategies, and public safety assessment. The findings can inform evidence-based decision-making for law enforcement agencies, policymakers, and researchers, contributing to the improvement of public safety in the city.

References

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