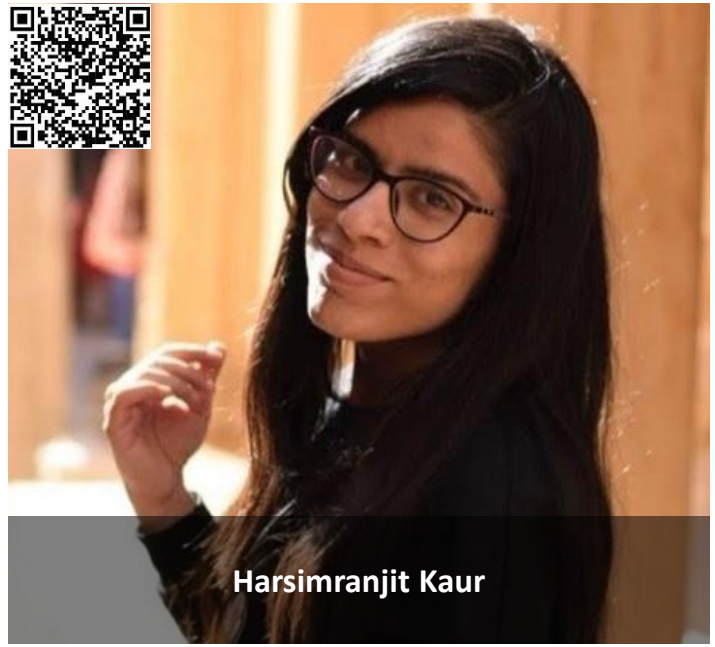
Analysis of the Crime Data of the City of Los Angeles

DAB103 – Analytical Tools & Decision Making

Group Number - 04

Section – 002

Meet the Team



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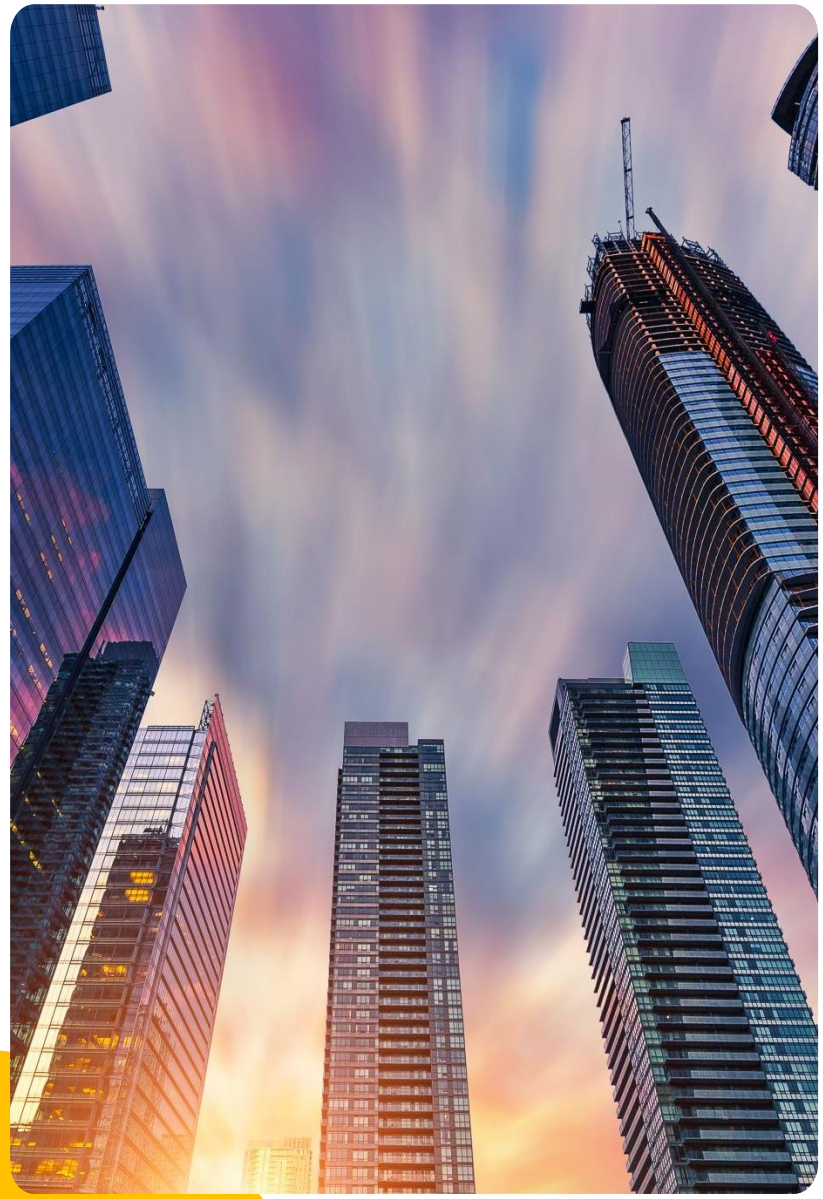
Background & Motivation

- Crime can have a wide range of consequences for both individuals and communities.
- With a significant high-tech industry, creative sector, modern transportation, manufacturing, trade, and venture capital investment in startups, Los Angeles has a thriving economy ("Los Angeles at a glance," n.d.). Additionally, it is known throughout the world for its vibrant local art scenes and entertainment sector ("Los Angeles," n.d.).
- As a result, Los Angeles places a high priority on safety and security in order to maintain a higher development & steady growth.



Problem Statement

- Lawrence J. Fennelly, 2020 discovered that Crime analysis results can aid in determining the extent of the evidence available and the necessity for further forensic and investigative efforts, such as conducting a threshold assessment.
- The analysis of crime data in Los Angeles is essential for the police department, government officials, businesses, and residents to identify crime patterns over the years, assess the effectiveness of crime prevention strategies, and build trust within the community.
- This helps in developing evidence-based policies and allocating resources to targeted interventions, ultimately making Los Angeles a safer and more secure place to live, work, and visit.

Project Proposal

This project will help identify areas with high crime rates for the Los Angeles Police Department (LAPD) along with the other trends that have been observed in the crime activities in Los Angeles over the past few years.

- This data can act as the basis to develop strategies to curb the crime issues in the city, thus ensuring the safety of the residents as well as tourists.
- This analysis can be used to find various trends in association with the crimes that have been happening around Los Angeles.
- This data helps to find whether the strategies which have been implemented by the authorities over the period have been effective enough or if they need any modifications.

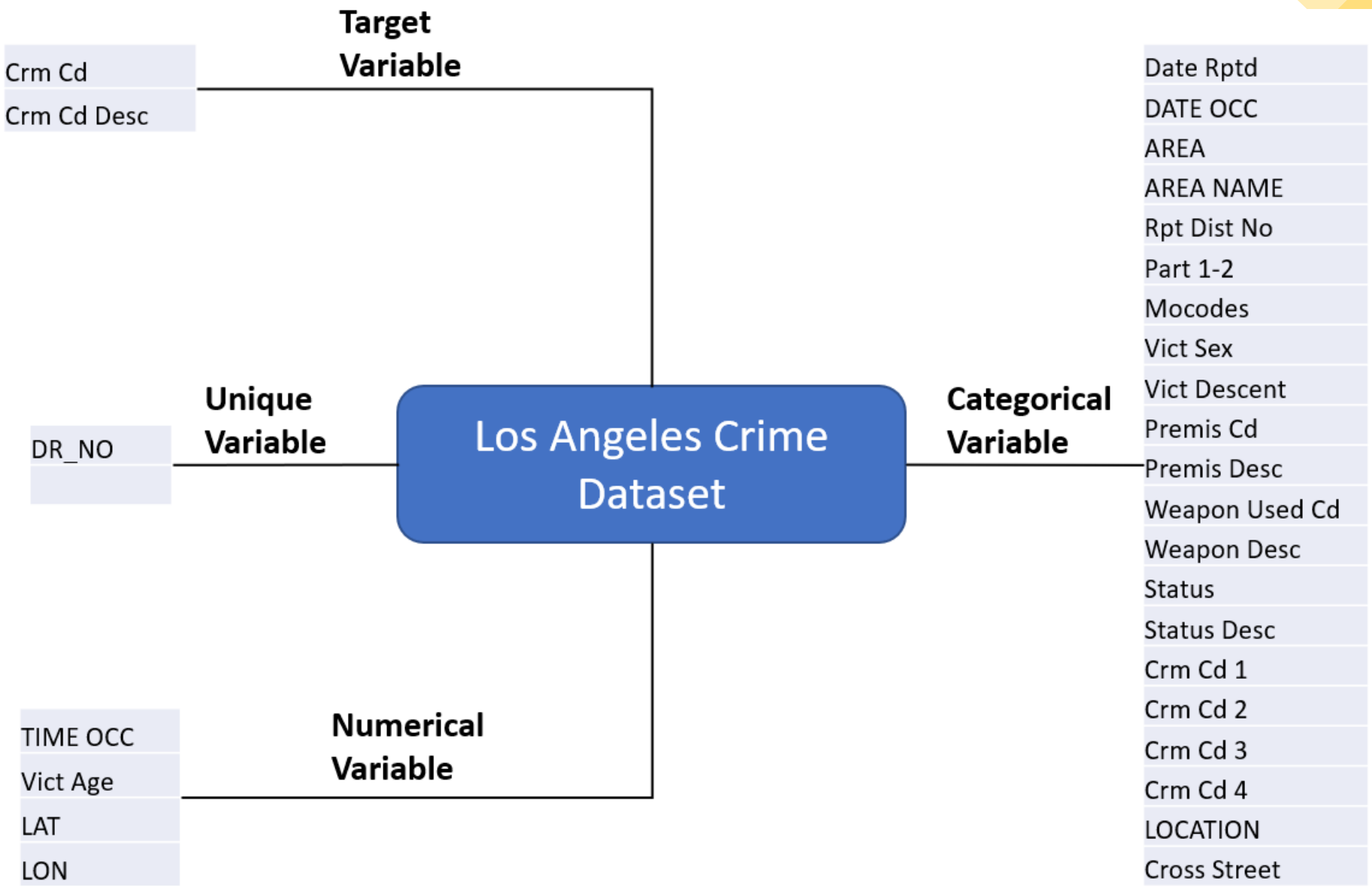
Analysis Questions

1. Analyze if there is any change in the trend of criminal activities pre and post COVID-19 pandemic.
2. What time of the day has most crimes recorded?
3. What type of crimes occurred most in the City of Los Angeles from 2010 - 2023?
4. Which area has been most vulnerable to criminal activities in the city of Los Angeles?
5. Analyze the data of victims of the crimes to know which gender and nationality is targeted the most.
6. Analyze the trend of crime activities on victim descent from 2010 to 2022
7. Analyzing the yearly as well as monthly trends of the crime rate in the City of Los Angeles from 2010 - 2022.
8. Which are the 3 main types of weapons used to perform criminal activities in Los Angeles?

Introduction to the Data Sets

- **Data Provided By**: Los Angeles Police Department.
- **Data Description:** Types of crime incidents, details of the weapons used to the crimes, details regarding the victims and the frequency of the crimes over many years.
- The data sets fulfil the need to answer analysis questions as there is data from 2010 to Present.
- We are 2 data sets to analyze the crimes in Los Angeles:
  - **Crime Data from 2010 to 2019 - https://catalog.data.gov/dataset/crime-data-from-2010-to-2019**
  - **Crime Data from 2020 to Present - https://catalog.data.gov/dataset/crime-data-from-2020-to-present**

Both the datasets must go through data cleaning process to remove invalid data and blank values.


Target Variable
Crm Cd
Crm Cd Desc
Unique Variable
DR_NO
Los Angeles Crime Dataset
Categorical Variable
Date Rptd
DATE OCC
AREA
AREA NAME
Rpt Dist No
Part 1-2
Mocodes
Vict Sex
Vict Descent
Premis Cd
Premis Desc
Weapon Used Cd
Weapon Desc
Status
Status Desc
Crm Cd 1
Crm Cd 2
Crm Cd 3
Crm Cd 4
LOCATION
Cross Street
Numerical Variable
TIME OCC
Vict Age
LAT
LON

Exploratory Data Analysis - EDA

Importing the Data

- We imported the .csv files for Crime Data from 2010-2019 and Crime Data from 2020 to Present.
- Both the data sets were connected and stored as single data set for analysis.

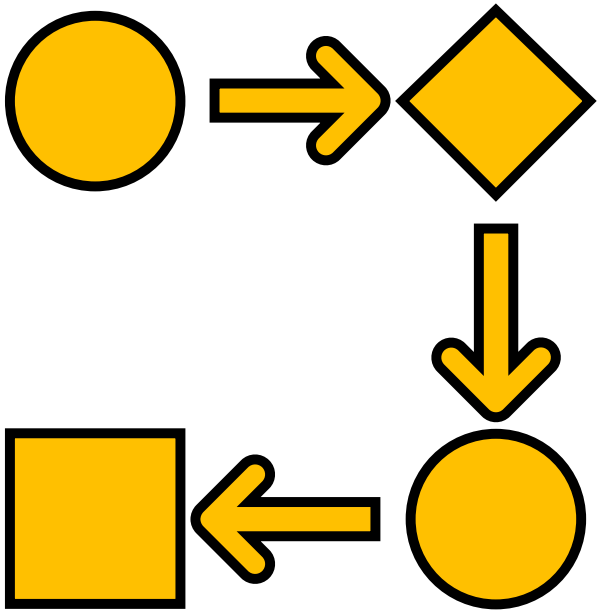
Exploring the Data

- To read and understand the data set completely, we analyzed the summary of the combined dataset along with the minimum and maximum values of the columns.

Data Cleaning

Since the data needed cleaning, we employed the following steps to ensure that our data is prepared for analysis:

- Finding the number of null values
- Dropping the unnecessary columns
- Finding the remaining columns names
- Finding the unique values in required columns
- Checking if there are any negative values in the columns where it isn’t relevant, like, age.
- Checking for duplicates



Data Transformation

We have modified the date and time in the data set to meet our analysis requirements.

For date modification, we:

- Converted the data column into string format.
- Split the date column into day, month and year columns.
- Converted all the columns into desired data type.

For time modification, we:

- Found the minimum and maximum recorded time.
- Grouped the time column into 4 categories – Morning, Afternoon, Evening, and Night.

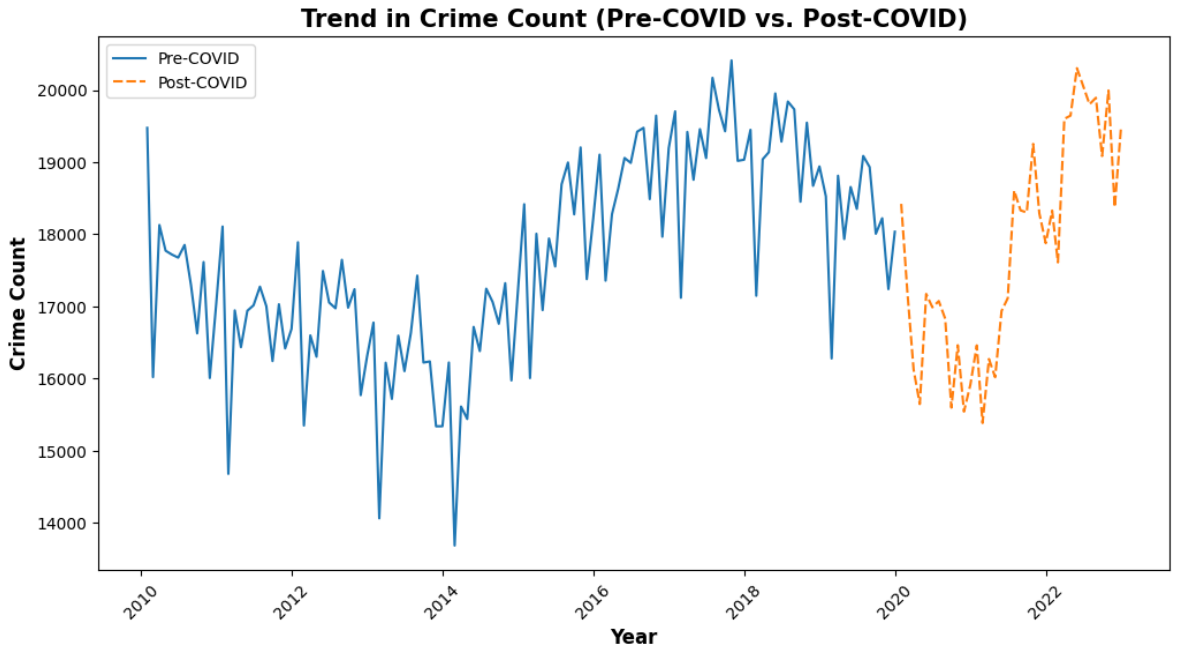
Data Analysis & Visualization

- From 2009 to 2023, the dataset contains information on different types of crime, which crime occurred in which time/hour/day/month/year and which weapon was used to perform the crime in Los Angeles city. It also shows the details about the victims of the crimes.
- Its capabilities allow you to evaluate a crime from a variety of perspectives, including area of crime, which day and at which time crime occurred, as well as the gender and nationality of the victim.
- It also helps in evaluating various trends as they have changed in the post-covid era in terms of criminal activities happening around the Los Angeles city.

1. Analysis of Pre-COVID & Post-COVID Trends in Crime Rate

- The blue line represents the trend in crime rate Pre-COVID, while the orange dotted line represent the rate of crime Post-COVID.

- As evident, though there was a significant drop in the year COVID was announced as the global pandemic, the crime rate has, in fact, alarmingly increased in Los Angeles ever since.

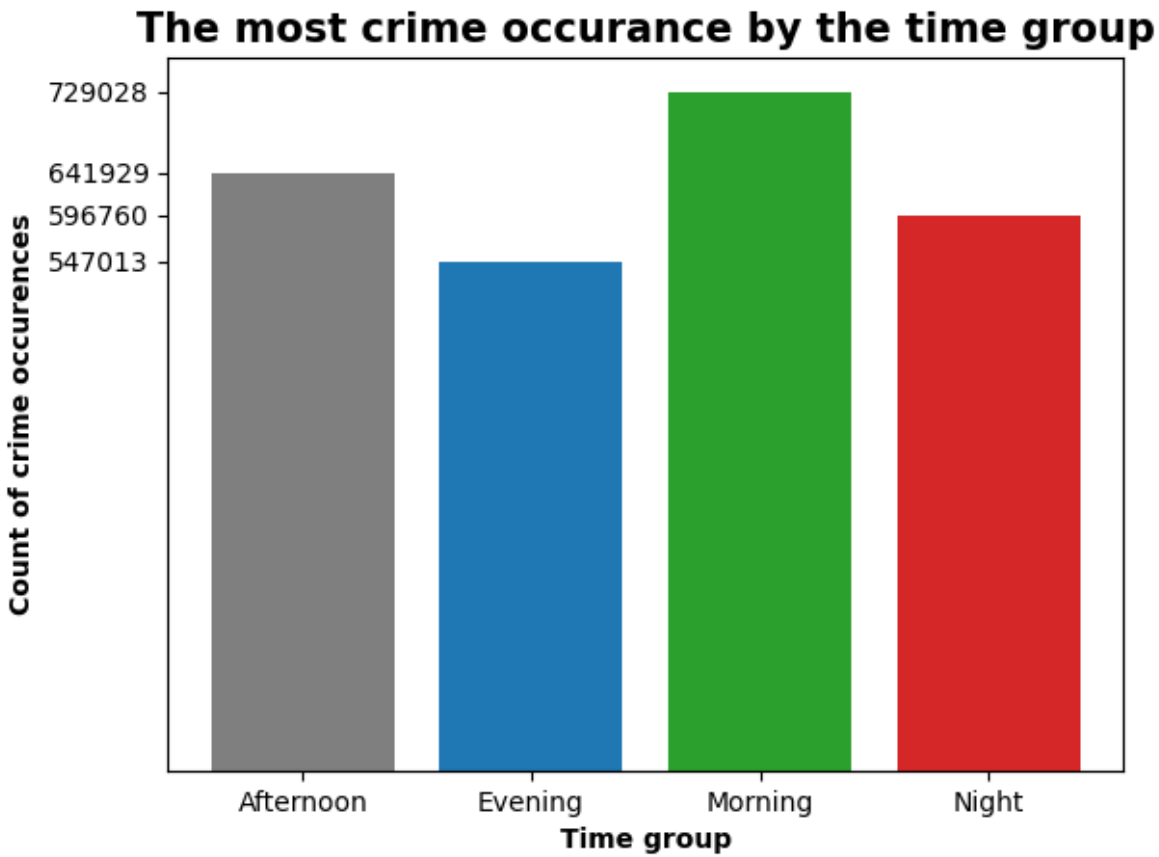


2. Time of the Day with Most Crimes Recorded

- The bar graph helps in analyzing the time of the day during which most crimes were recorded in Los Angeles ever since the year 2010.

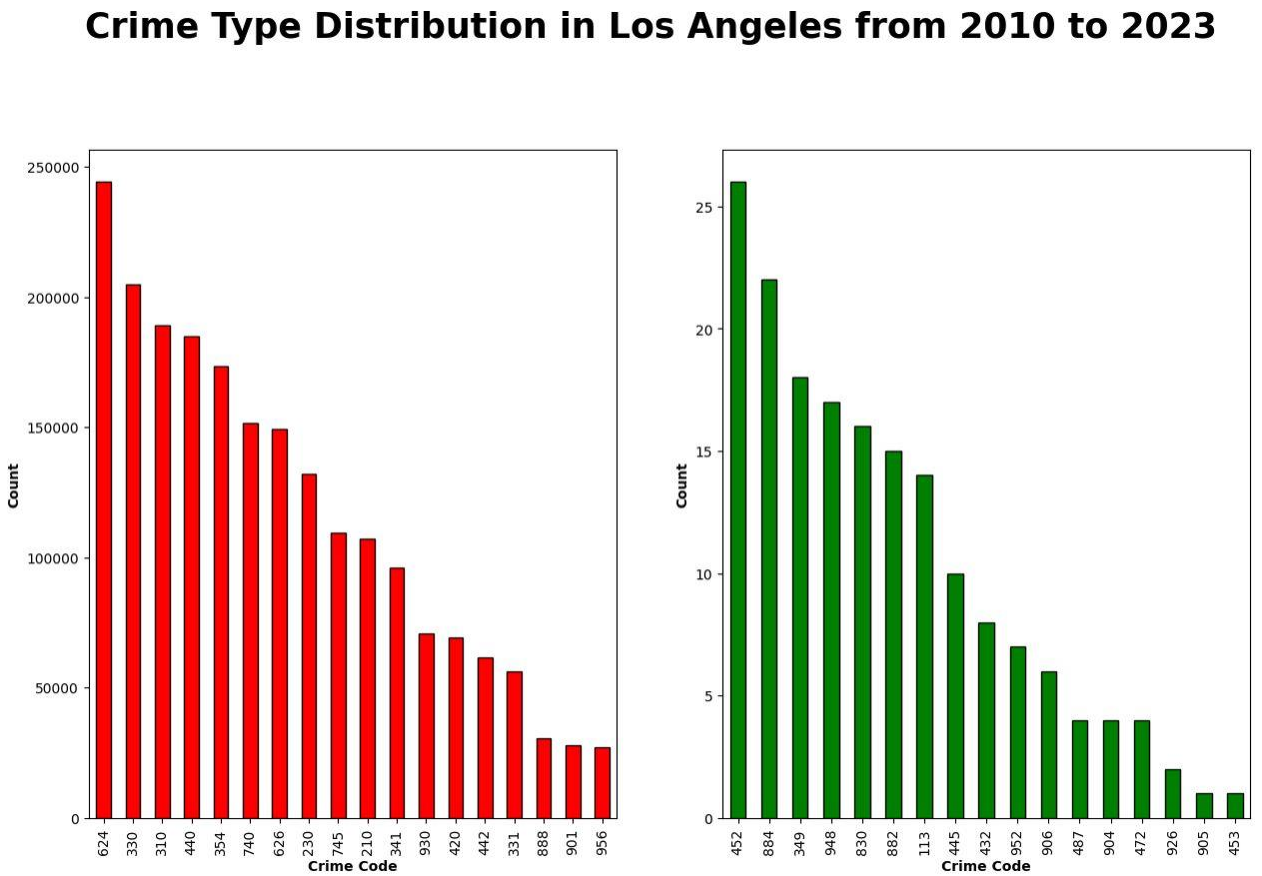
- As evident, Morning is the most preferable time for criminals to attack their victims with 729,028 recorded cases, followed by Afternoon and Night.

- Surprisingly, evening recorded the least number of cases throughout these years.



3. Types of Crimes that Occurred the Most in the City of Los Angeles from 2010 - 2023

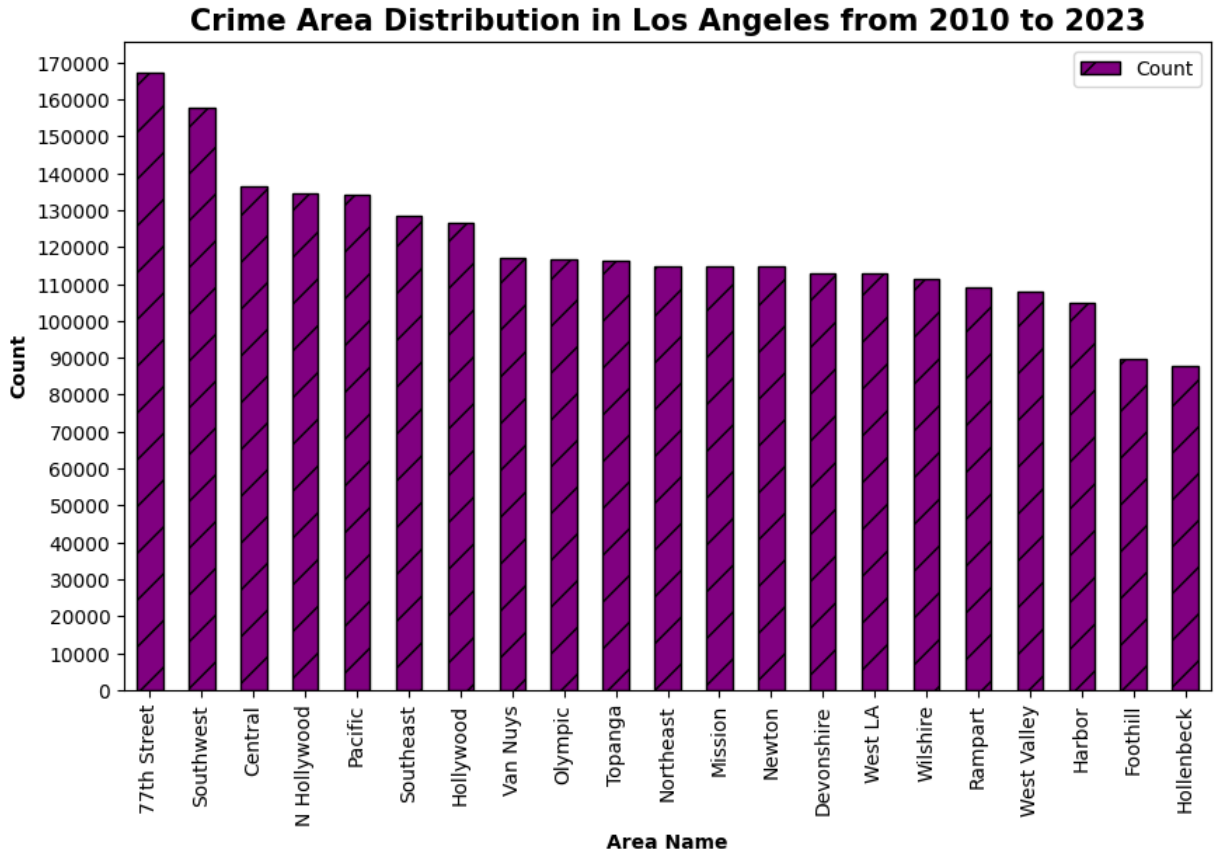
- The graphs show the distribution of crimes that occurred in Los Angeles across various crime codes.
- The bars are representing the total number of recorded occurrences across the crimes that have been recorded under the designated crime code.
- The left graph shows the codes of the highest recorded crime codes, and the right graph shows the least recorded ones.

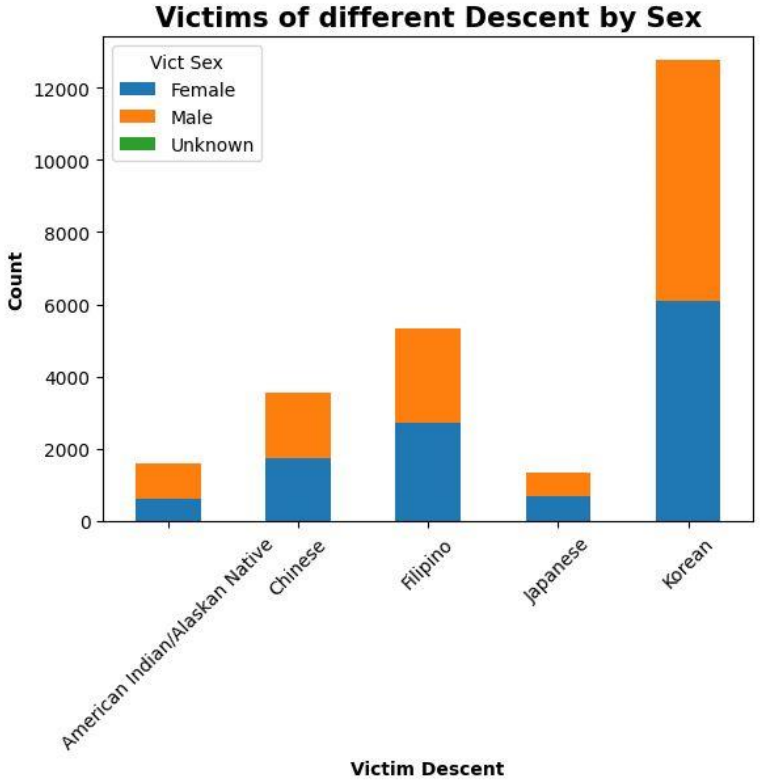


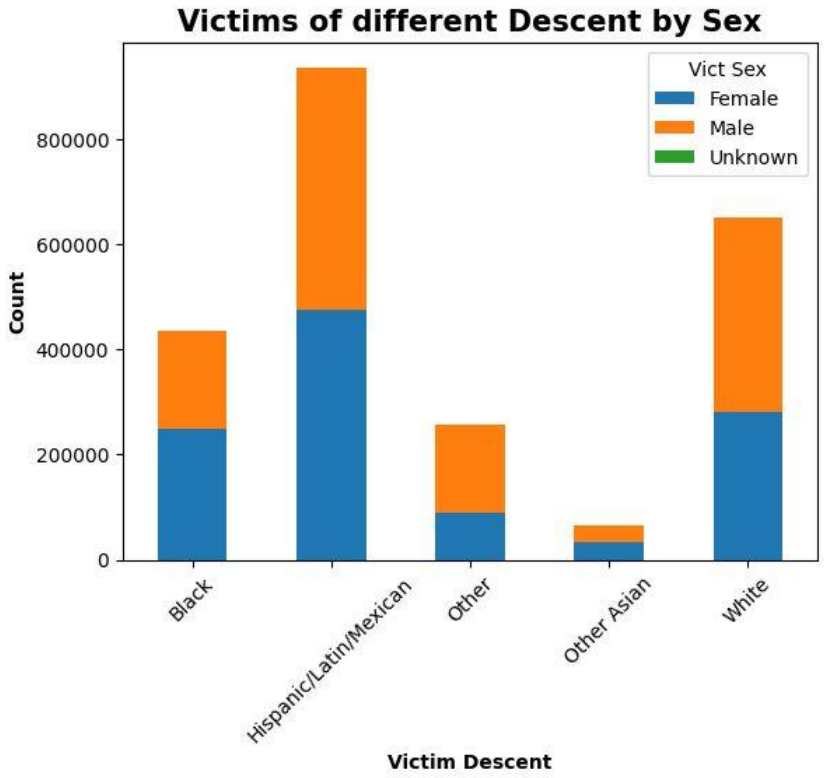
4. The Most Vulnerable Areas to Crime in Los Angeles

- The graph represents the areas in Los Angeles that have been most vulnerable to the criminal activities over the years.

- As evident, 77th Street is the one of the more dangerous areas with more than 160,000 crimes reported between the years 2010 to 2023.



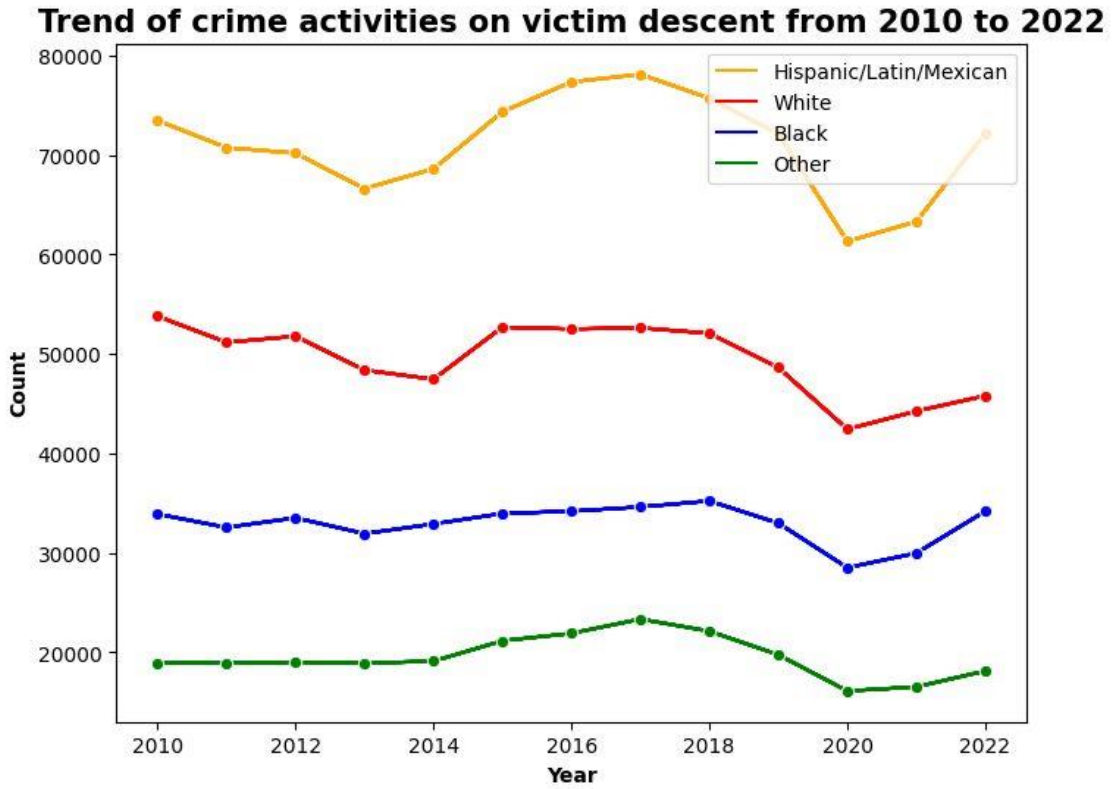


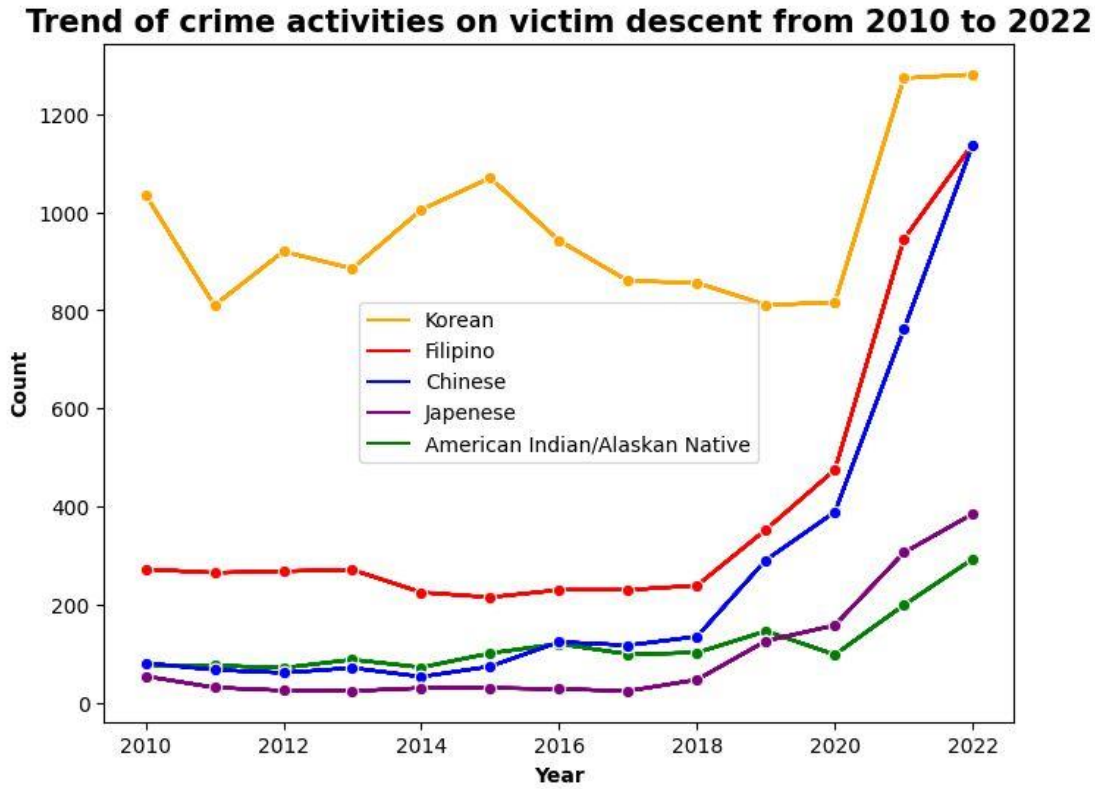


5. Nationality & Gender that have been Targeted the Most

- The graph at the left shows the least targeted nationality, and the one at the right depict those who have been targeted the most.

- As we can see, Hispanic/Latin/Mexican are targeted the most, with the recorded crime number being more than 800,000. Also, females seem to be victimized more than the males.

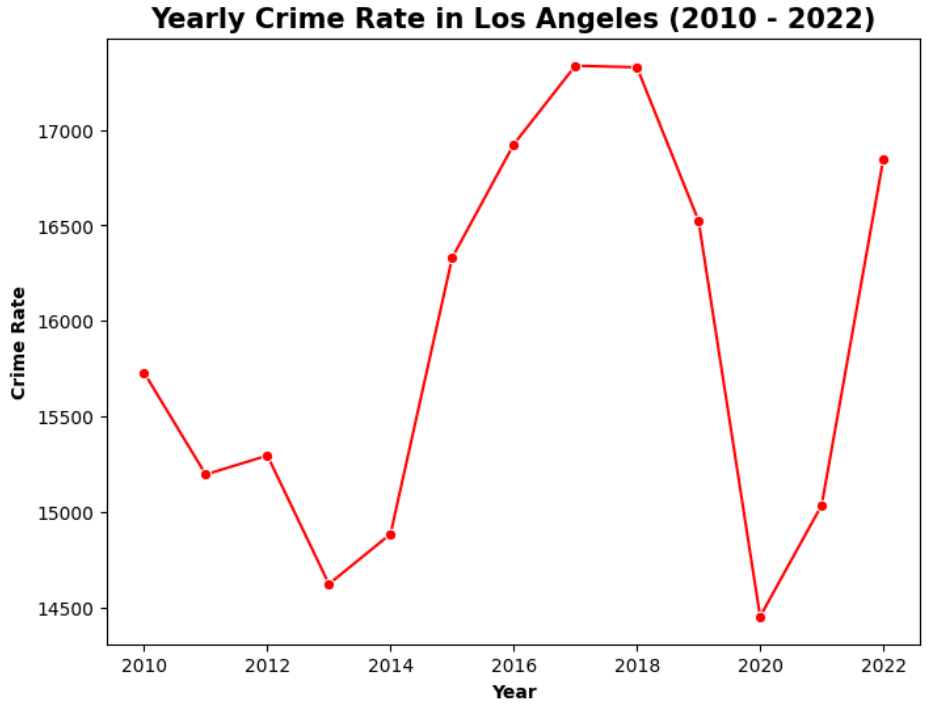


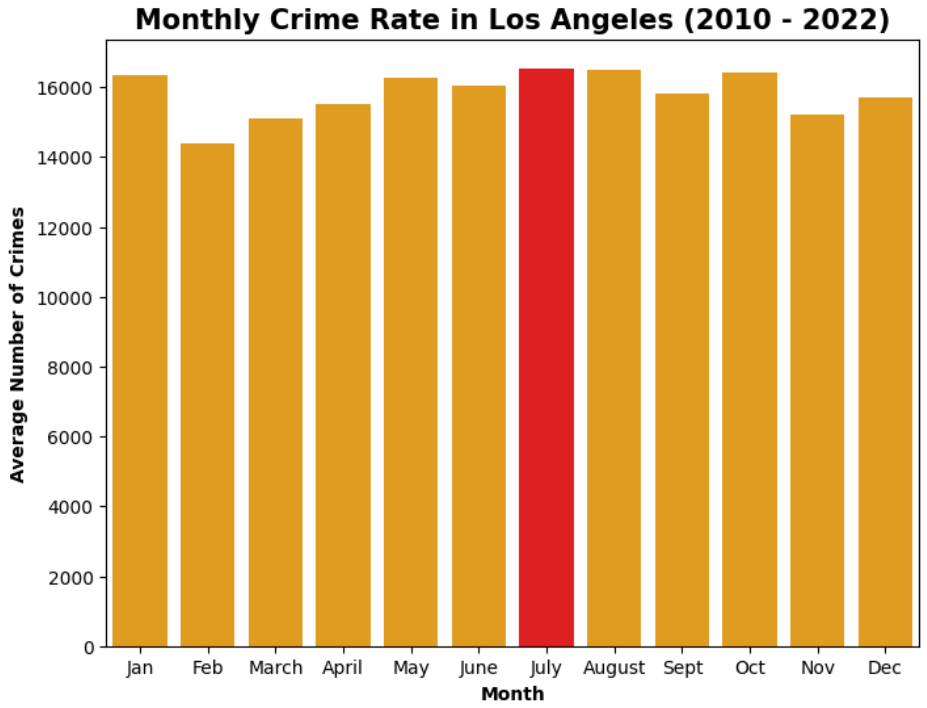


6. Trend of crime activities on victim descent from 2010 to 2022

- The above graphs show the trends in criminal activities recorded against people of different descents, as recorded from 2010 to 2022.

- As evident, there has been a visible rise in crime for all the descents.





7. Yearly & Monthly Trends in Crime Rates from 2010 to 2022

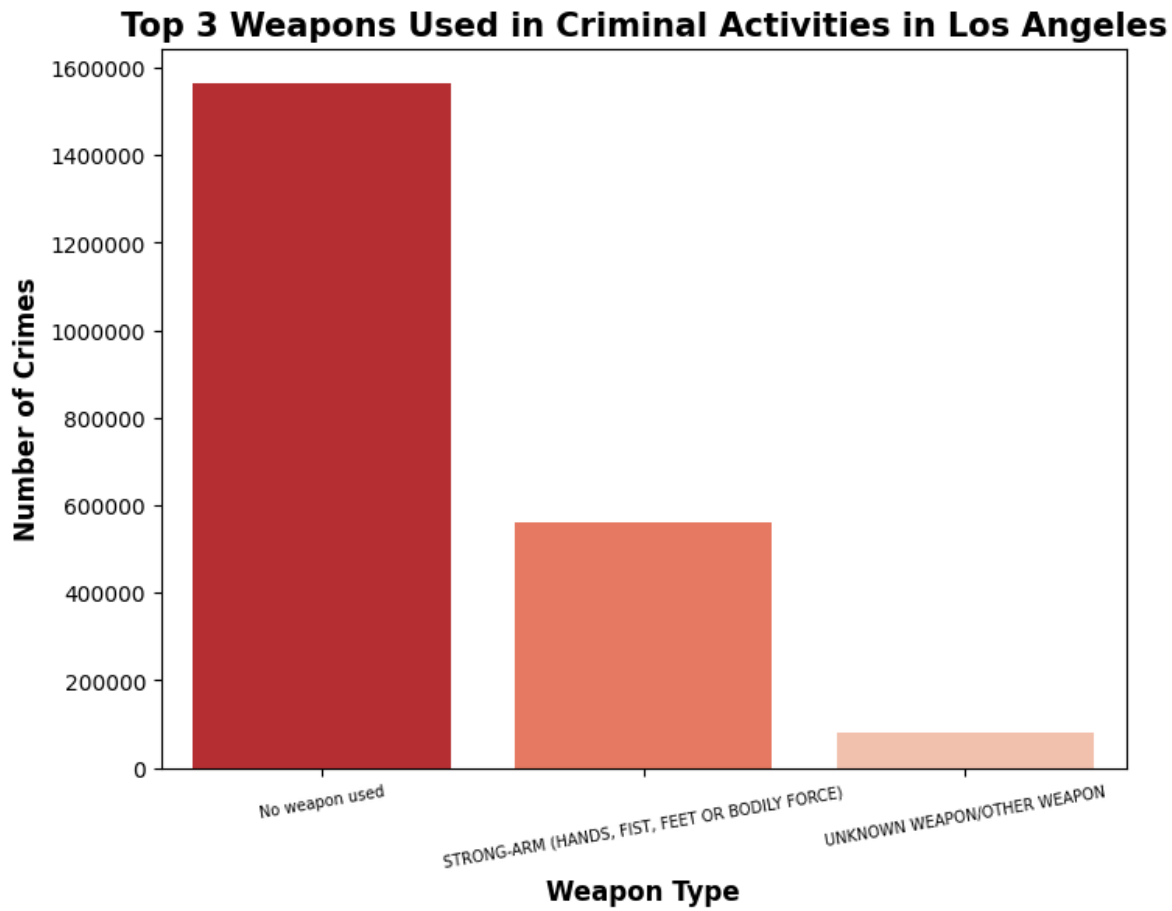
- We have used line graph to depict the yearly trend in the crime rate that has occurred in Los Angeles from 2010 to 2022. As evident, the crime rate has been on high since 2014. Even though it dropped during the COVID lockdown in 2020, it has shot up ever since at an alarming rate.

- For the monthly trend analysis, we have used the bar graph after calculating the mean of each month throughout the years. Even though the crime rate has been almost similar through all the months, July seem to still top the charts.

8. Top 3 Weapons Used by the Criminals

- The bar graphs represent the top 3 weapons that have been used by criminals from 2010 till present in Los Angeles.

- Surprisingly, most of the crimes (almost 1,600,000) have been performed without any weapon being used.



Conclusions

1. For **Pre-COVID and Post-COVID trends in crime rate**, we can analyze that the crime rate has been significantly high throughout the years ever since 2010, apart from the drops in 2013-14 and 2020-21.

2. For **the time of the day with most recorded crime over the years**, surprisingly, mornings had the highest crime rate and evenings had the least.

3. While analyzing **the types of crime that occurred most in the city of Los Angeles**, we can see the highest recorded crime codes and the lowest recorded ones in two separate graphs for easy bifurcation.

4. While analyzing **the most vulnerable areas in Los Angeles**, we could see that 77th Street has continuously recorded the highest crime rate since 2010, which makes it a concerning point for the police department, citizens, and tourists.

5. While analysing **the gender and nationality that has been targeted the most by the criminals**, it came as no surprise that women topped the charts and Hispanic/Latin/Mexican community has been a favorite target for almost all types of crimes.

6. However, when we analysed **the trends of different criminal activities on victim descents**, we could see that that despite the variation in the change rate, the crime rate has eventually been on rise for the people of all the descents.

7. Now even when we analyse **the monthly and yearly trends in the crime rate in LA**, we could see that it has been on an upward slope ever since 2014 throughout years apart from the times when COVID was at peak, and even though all the months record a high average number of crime, July tops the charts by a little margin. This makes the crime rate a continuous concern.

8. However, when we tried to find **the weapons that have been used most by criminals**, we were surprised to see that most of the crimes that occurred have no records of weapons used.

Recommendations

Since we carried out our analysis considering how it could be beneficial for the Los Angeles Police Department, our recommendations for them are:

- The law enforcement agencies and policymakers could prioritize addressing the most frequent types of crimes that have been the favorite of criminals in the City of Los Angeles from 2010 - 2023.
- The vulnerable areas identified by the analysis could receive increased police patrols and community outreach programs to prevent criminal activities in those areas.
- The yearly and monthly trends of crime rates can provide valuable information to the policymakers and law enforcement agencies to develop strategies to reduce crime rates in the City of Los Angeles.
- By analyzing the trend of criminal activities pre and post COVID-19 pandemic, law enforcement agencies and policymakers can identify the impact of the pandemic on crime rates and re-evaluate their strategies accordingly.

References

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Thank You