**Concept paper**

Analysis of Crimes on Los Angeles and its reasoning

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Executive Summary

It has been observed through *USA today* that increase in crime rate has been observed in 2022. In 2019 it was 54 persons per 1000 residents and in 2022 it raised to 60 per 1000 residents. In order to study this change in crime data from the City of Los Angeles (from 2020 and onwards), has been selected. The study aims to uncover patterns, trends, and insights that can contribute to a better understanding of crime dynamics within the specified areas. Through data-driven exploration, the project seeks to contribute to a deeper understanding of crime, its behaviors and their impact on specific areas. Ultimately providing law enforcement agencies and policymakers with valuable insights into crime dynamics, aiding in the formulation of effective strategies for crime prevention, resource allocation, and community safety enhancement. The data has been scraped from the crime reports (available at data.gov) maintained by Los Angeles Police Department (LAPD). The research findings would delve deeper into the classification of crimes, the most and least repeated crimes at which specified locations, identifying patterns of any kinds that emerge through this crime record data. Furthermore, the research would help LAPD and the administrative departments to address the cause of increase in crime rate and prevent them from happening in future.

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# Introduction

## Background

Los Angeles, a sprawling metropolis on the West Coast of the United States, is renowned for its diverse culture, entertainment industry, and iconic landmarks like Hollywood. This dynamic city boasts a rich tapestry of communities and opportunities, attracting millions of residents and tourists alike. However, alongside its vibrant aspects, Los Angeles faces challenges, including an increasing crime rate. While LA offers numerous opportunities, economic disparities and social issues persist, contributing to crime rates. Understanding the complex interplay between socio-economic factors, demographics, and law enforcement efforts is essential to addressing and mitigating the challenges associated with rising crime in this iconic city.

In Los Angeles, crime has fluctuated over time, peaking between the 1970s and 1990s. In Los Angeles, crime has increased since the beginning of the 2020s. The crime rate in the city has demonstrated a tangible escalation from 2019 to 2023, rising from 54 incidents per 1000 residents to 60 per 1000 residents. The city of Los Angeles, situated in California, boasts a population of approximately 4 million residents within its expansive 502 square miles of land (Chang et al., 2022). Demographically, the population comprises 49.5% males and 50.5% females, with 42.9% identifying as White Americans, 39.7% as Latin Americans, and the remaining 17.4% encompassing African Americans, Asians, and AIAN. Notably, the crime rate in Los Angeles has shown a concerning upward trajectory.

## Dataset and Variables

It is important to note that there are many factors that are related to this increase in these crimes. Factors include inflation, mental illness, use of narcotics substances, hostility and anger are the root causes identified by the LAPD and psychologists. These factors are mostly said to be attributed with the ethnicity and racial discrimination but this study shall focus on that aspect as well to identify the fact behind this hypothesis. The data available at data.gov provided by LAPD itself includes the details of crimes reported in LA from January 2017 to August 2023. These crime reports that comprise of five and a half years would be enough to examine the trends of criminal activities. The data is well detailed and describes all useful aspects related to the crimes that occurred individually including their time of occurrence and reporting, the type of crime the sex and ethnicity of victim and the criminal, the weapon utilized in that corresponding crime, the exact location and many more like these. All this data supplies perfect opportunity to recognize patterns in these crimes and allowing the authorities to predict the next crime successfully in order to counter it.

The variables in the dataset are as under:

* SR\_NO - Serial number
* Date\_Reported - the date then the crime was reported
* Date\_occured - the date when this crime took place
* Time - the time when this crime occurred
* Area\_Code - the code zip code of the area in which this crime happened
* Area\_Name - the name of the area that is algned to that code
* Report\_Distt\_no - the police station district number in which this crime was reported
* Crime\_Code - each crime is associated a code that helps better classify them.
* Crime\_Code\_Explained - the code of the crime elaborated
* Mo\_Codes - Modus operandi
* Victim\_Age - the age of victim
* Victim\_Sex - gender of the victim
* Premisis\_Code - the code of the premises in which the crime was reported
* Premisis\_Code\_Explaimed - the premises code explained
* Weapon\_Code - the code of the weapon that was utilized in this crime
* Weapon\_Description - the weapon code explained
* Status - the status of the report (meaning the case is closed or pending etc.)
* Status\_Explained - the status's abbreviation mentioned in the "status" column
* Location - the exact location where this crime occurred
* Cross\_Street - street name where the crime occurred
* Latitude - the latitude coordinate where crime occurred
* Longitude - the longitude coordinate where crime occurred

**Research Questions**

The concern of this study is to analyze the top 5 crimes that occur in LA while analyzing the victims of these crimes and in which category the criminal falls into. Also, the study shall analyze the success rate of LAPD to inspect how essentially the LAPD police is tackling with these issues. The study aims to reduce these crimes by focusing on the root cause of these crimes occurring in this infamous city along with proposing the possible measure to eradicate these domestic hazards. This study shall focus on the following research questions:

* To what extent does the changing demographic composition of Los Angeles relate to shifts in the city's overall crime rate from 2017 to 2023, and can we identify specific demographic factors that correlate with crime trends?
* How does the geographical distribution of crime incidents, as determined by latitude and longitude data, correlate with the types of crimes reported, and what implications does this have for law enforcement resource allocation?
* What impact, if any, does the status of a crime report have on the clearance rate, and can we identify factors that contribute to delayed or unresolved cases?
* In light of the upward trajectory in crime rates observed from 2019 to 2023, what role does economic factors such as unemployment play, and how might targeted economic interventions impact crime reduction in Los Angeles by 2025?

## Problem Statement

The research problem centers around analyzing a substantial dataset of crime data from Los Angeles spanning from 2017 to the present, consisting of more than 750,000 cases reported. The objective is to uncover patterns and insights to better understand crime dynamics in specific areas. Key questions include exploring spatial and temporal patterns, understanding crime types and descriptions, examining victim characteristics, identifying crime hotspots, tracking law enforcement efforts, and studying weapon usage. This research aims to provide valuable insights for law enforcement agencies and policymakers, aiding in the development of effective strategies for crime prevention, resource allocation, and community safety enhancement in Los Angeles.

## Objective and goals

### Objectives

The objectives of this research are as under:

* Analyzing the criminal activity in the city of Los Angeles to derive insights
* Examining the activeness of police among the criminal activity of Los Angeles
* Finding out the top 5 crimes and their ratio’ in Los Angeles
* Analyzing the victim’s age and gender with respect to the respective crime

### Goals

The goals of this research are as under:

* Achieve a measurable reduction in the total number of reported crimes within a specified time frame.
* Identify the top five crime categories with the highest increases in occurrences and develop strategies to reduce them.
* Decrease crime rates in identified high-crime hotspots by a certain percentage
* Implement predictive policing to allocate resources during high-crime periods and reduce crime rates during these times.
* Establish partnerships with community organizations and achieve a certain level of participation in community crime prevention programs.
* Measure the adoption and impact of policy recommendations within local government and law enforcement agencies.

## Expected outcomes

It is expected to receive high crime rate in some specific areas than the other areas of LA. Also, it shall be observed weather ethnicity has any significant trend in crimes. An expected outcome is that females are more victims to harassments and other crimes. Moreover, most crimes take place at night so it would also be analyzed in order to prove these hypotheses. By conducting a thorough analysis of Los Angeles crime data and implementing data-driven strategies, we aim to achieve the following outcomes:

* A deeper understanding of crime patterns and their underlying causes.
* Enhanced crime prevention and law enforcement efforts.
* Improved resource allocation for crime reduction.
* Targeted intervention programs to address the root causes of crime.
* Reduction in the overall crime rate and increased public safety.

# Methodology

In order to analyze criminal data for the city of Los Angeles the dataset is available at (LAPD, 2022) website. The data is extremely credible as it is provided by LAPD itself. The data is collected by LAPD as it occurs and is made available for public after removing personal credentials of the citizens. The data consists of the following columns: data reported, date occurred, time occurred, area code, area name, district number where crime is reported, Part 1 2, crime code, crime code description, Mo codes, victim age, victim gender, victim descent, code of premises where crime happened, name of premises where crime happened, weapon code, weapon description, status, description of status, crime code 1 - 4 (describing multiple codes for a single crime, location, cross street, latitude and longitude. The data is secondary and shall be analyzed using quantitative analysis methods. The data analytics approach will involve data cleaning, exploration, visualization, statistical analysis, machine learning, and predictive modeling. Researcher shall employ various data analytics tools and software to carry out this analysis.

**Predictive Data Analysis**

This research on criminal activity shall delve deeper into the analysis of these crimes to predict the occurrence of crimes beforehand through machine learning algorithms. Through predictive data analysis it would become easier to identify the patterns in crimes that shall help LAPD to predict the criminal activity, so that possible measures could be taken to lower the crime rate. Lowering the crime rate is the first and foremost purpose of this research and to prevent the crime on a long run, predictive data analysis is a necessity to be implemented.

# Conclusion

In conclusion, the comprehensive analysis of the extensive crime dataset obtained from data.gov presents an invaluable opportunity to glean profound insights and discern patterns within the realm of criminal activity. This analytical endeavor promises to equip the Los Angeles Police Department (LAPD) with a markedly improved approach to combating crime compared to their existing methodologies. By harnessing the power of data-driven insights, the LAPD can enhance its crime prevention strategies, resource allocation, and overall effectiveness in safeguarding the community. The identification of spatial and temporal trends, crime type correlations, victim profiles, and hotspots will enable more targeted and efficient law enforcement efforts. In a world where crime dynamics continuously evolve, the utilization of data analytics is paramount in staying ahead of criminal elements. As such, this research serves as a pivotal step towards a safer and more secure Los Angeles. It empowers the LAPD and other relevant stakeholders to make informed decisions, thereby reinforcing their commitment to the well-being and safety of the city's residents. In this endeavor, data analysis emerges as an indispensable tool in the ongoing quest to combat crime effectively.

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