

# STRATEGIC RESOURCE ALLOCATION: ANALYZING CRIME PATTERNS AND TRENDS IN LOS ANGELES

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# PROBLEM DEFINITION, QUESTION & HYPOTHESIS

**Problem Definition:** Determine the distribution and frequency of crimes in Los Angeles to optimize law enforcement resource allocation.

**Question:** How does the frequency and distribution of reported crimes in different Los Angeles areas influence the allocation of law enforcement resources, and what patterns can be observed from the crime data in relation to seasonality, time of day, and victim demographics?

**Hypothesis:** Central Los Angeles has a significantly higher crime rate compared to other areas, and specific crimes like assault and vehicle theft are disproportionately common, influenced by factors such as seasonality, time of day, and victim demographics.



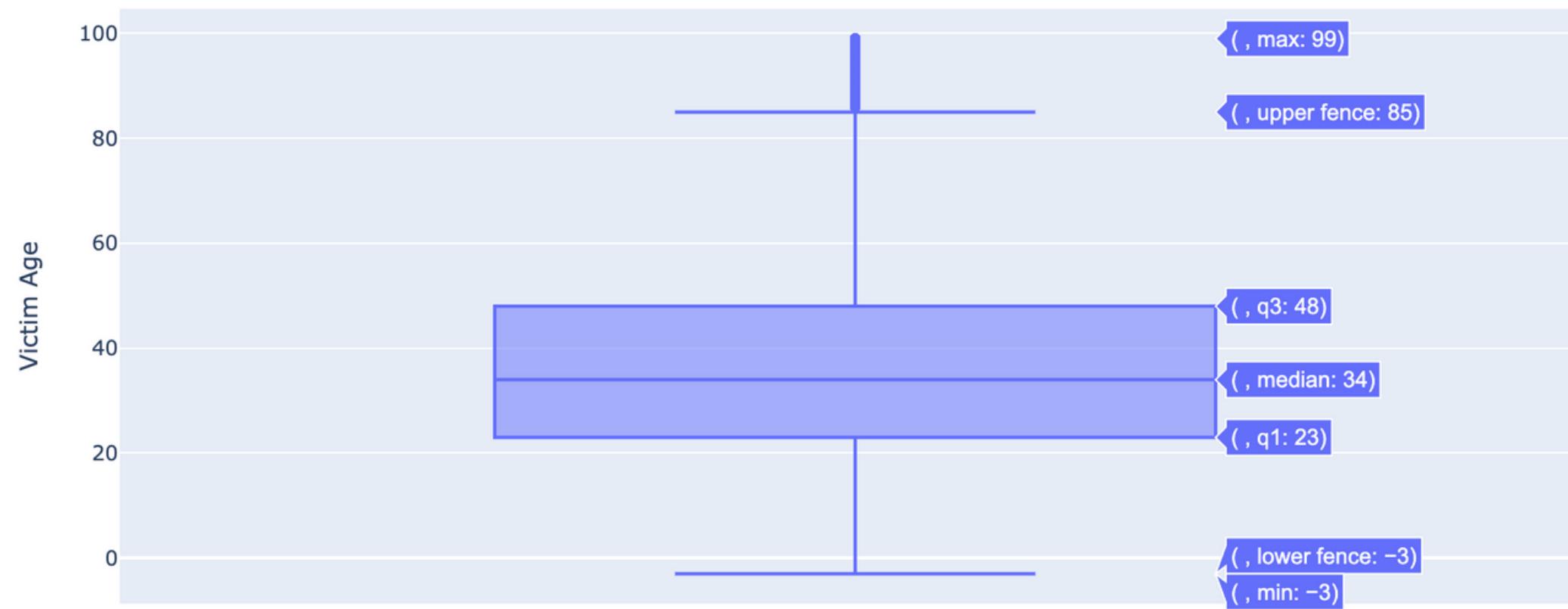
# DESCRIPTIVE STATISTICS

	DR_No	TIME OCC	AREA	Rpt Dist No	Part 1-2	Crm Cd	Vict Age	Premis Cd	Crm Cd 1	LAT	Lon
count	7.336560e+05	733656.000000	733656.000000	733656.000000	733656.000000	733656.000000	733656.000000	733656.000000	733656.000000	733656.000000	733656.000000
mean	2.166644e+08	1322.404632	10.628769	1109.217313	1.470226	500.400388	34.29581	332.646715	500.099289	33.975566	-118.012005
std	1.098984e+07	652.820274	6.117455	611.638904	0.499113	221.725037	19.79270	216.044656	221.495508	1.835311	6.364337
min	1.030447e+07	1.000000	1.000000	101.000000	1.000000	110.000000	-3.00000	101.000000	110.000000	0.000000	-118.667600
25%	2.102152e+08	900.000000	6.000000	615.000000	1.000000	330.000000	23.00000	108.000000	330.000000	34.015800	-118.431200
50%	2.202151e+08	1400.000000	11.000000	1128.000000	1.000000	440.000000	34.00000	401.000000	440.000000	34.059100	-118.323000
75%	2.301076e+08	1840.000000	16.000000	1608.000000	2.000000	649.000000	48.00000	502.000000	649.000000	34.162300	-118.273900
max	2.399306e+08	2359.000000	21.000000	2199.000000	2.000000	956.000000	99.00000	971.000000	956.000000	34.334300	0.000000



The dataset contains 733,656 entries detailing crime incidents, with Division of Records numbers averaging approximately 216.66 million, reflecting extensive record-keeping. Recorded events cover the entire 24-hour span, with an average incident time near 10 PM, and are geographically distributed across area codes 1 to 21 and reporting district numbers ranging from 101 to 2199. The crime codes range from 110 to 956, with the average code being 500, representing a diverse set of crime classifications. Victim ages mostly center around 34 years, though the range includes a broad spectrum from young to old. The dataset also includes location data with latitude and longitude points centering around 33.98°N and -118.01°W, which correlates with a specific geographic region.

# BOX PLOT OF VICTIM AGE

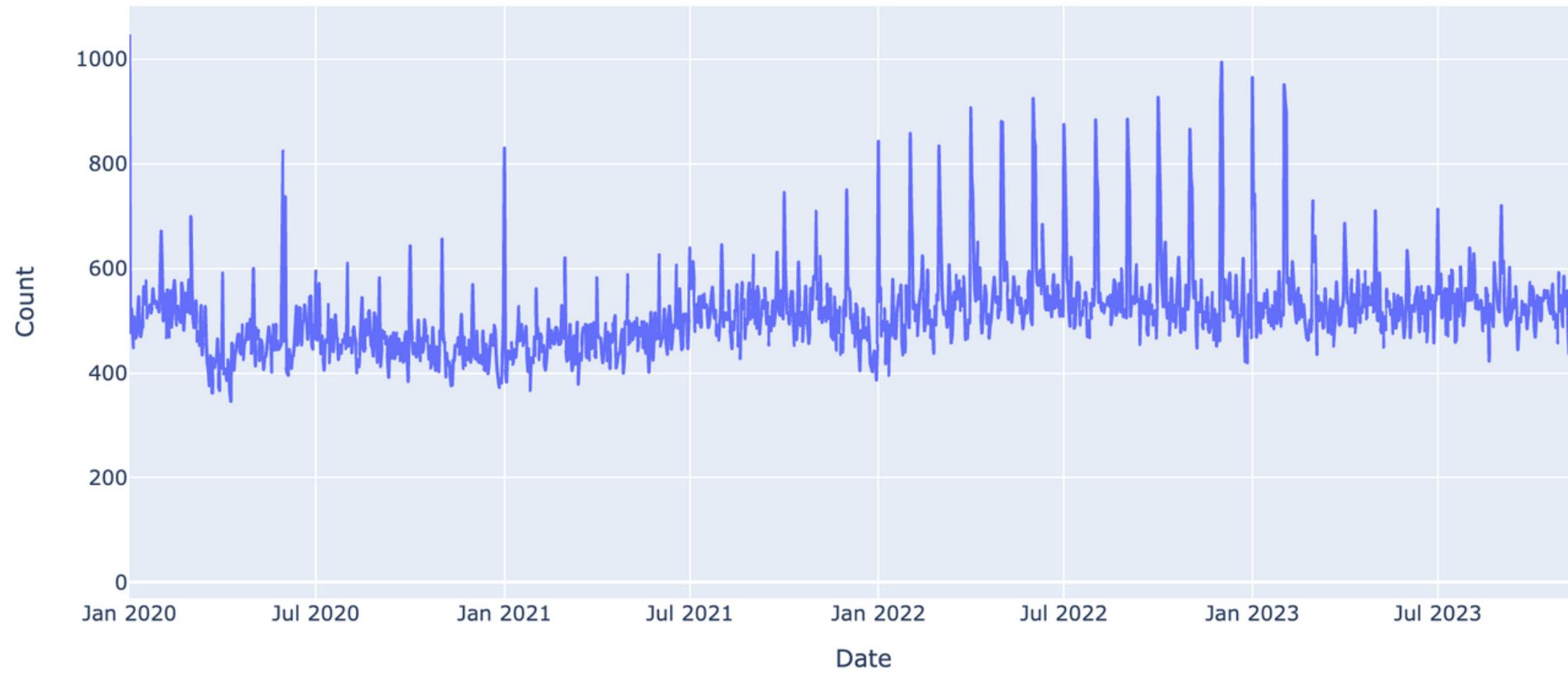


- The median age of victims is 34 years.
- Half of the victims are between the ages of 23 and 48 (interquartile range).
- The youngest age recorded is an outlier at -3, which may indicate data entry errors.
- The oldest victim is 99 years old.
- Victims older than 85 are considered outliers, indicating very few victims in this age range.



# MONTHLY TIME SERIES PLOT OF CRIMES FROM JAN 2020 TO PRESENT

Time Series Plot of Crimes over the Duration

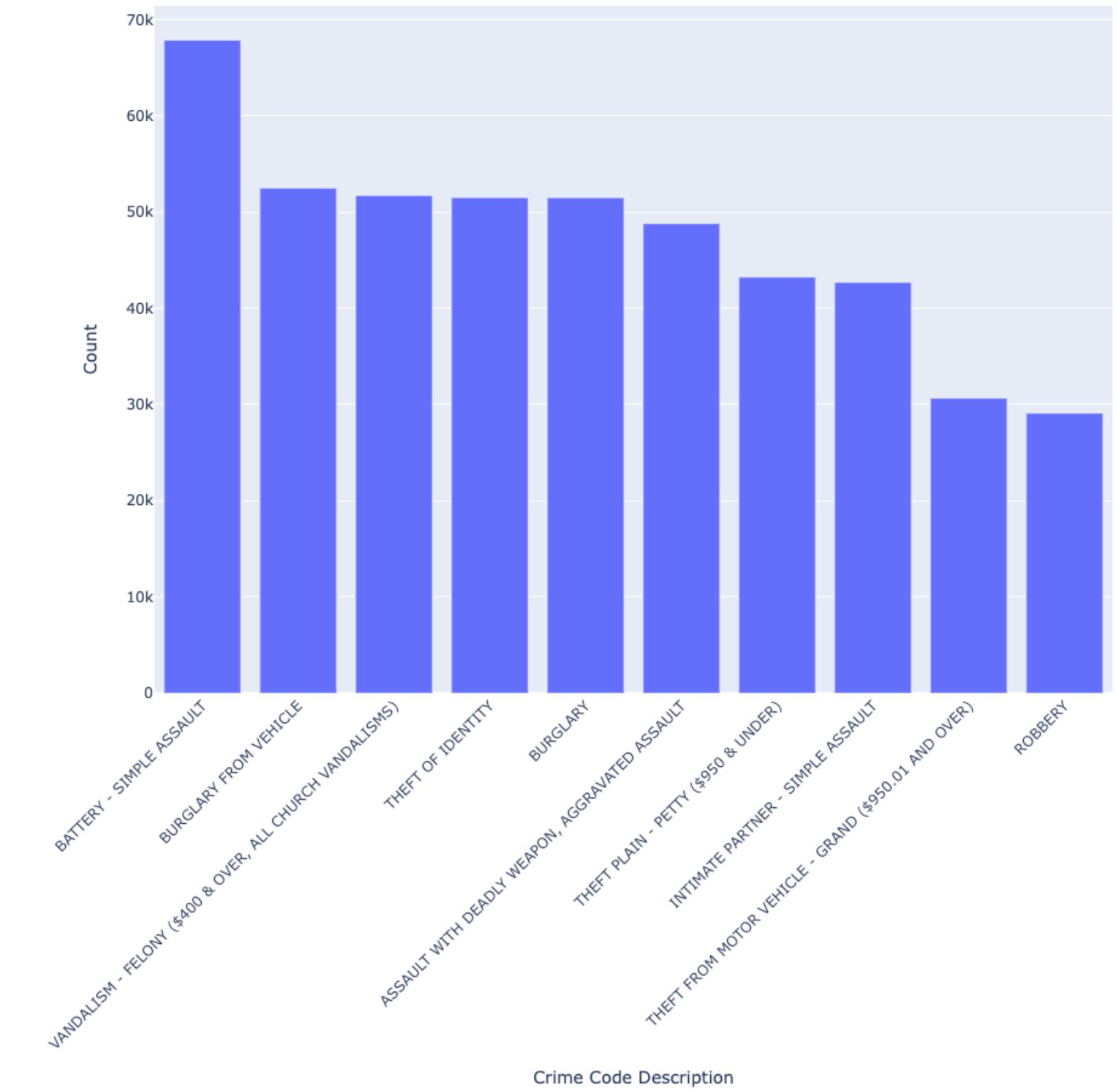


- There is a visible pattern of spikes, suggesting periodic increases in crime incidents.
- The overall trend in crime counts appears to be relatively stable until early 2023, after which there is a noticeable decline.
- Some exceptionally high spikes indicate days with significantly higher crime counts.
- The sharp drop at the end may indicate incomplete data for the most recent period or a sudden decrease in crime incidents.

# BAR CHART OF TOP 10 CRIME CODE DESCRIPTIONS

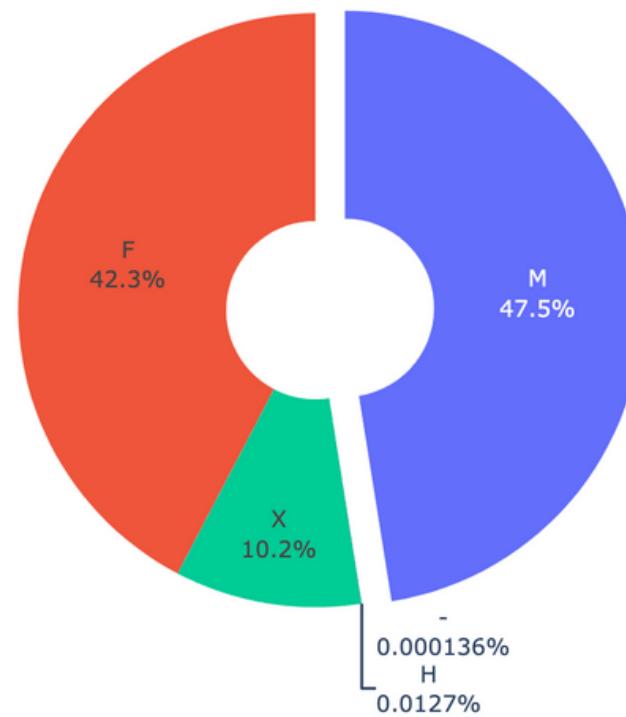
- **Battery:** Highest occurrence among reported crimes in Los Angeles.
- Property Crimes:** Burglary from vehicle, theft of identity, and burglary are prominent.
- Violent Crimes:** Aggravated assault and robbery are also common but less frequent.
- Theft Variants:** Different types of thefts, including petty and grand theft, are significant.

Top 10 Crime Code Descriptions for Los Angeles



# DONUT CHART OF VICTIM GENDER

Distribution of Victim Gender



M  
F  
X  
H  
-



**Gender Distribution:** Males and females are almost equally victimized.

**Non-binary Representation:** A notable proportion of victims identifies as non-binary or gender X.

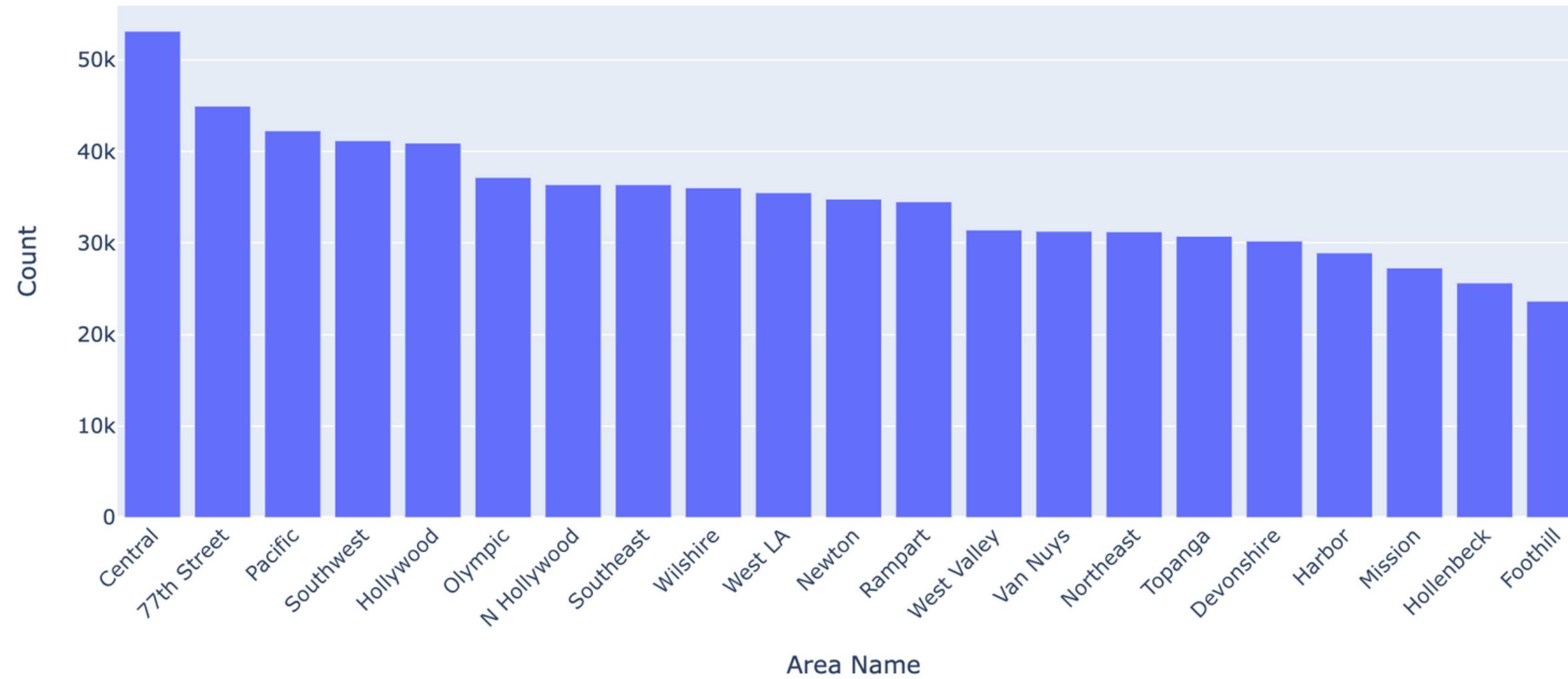
**Minimal Unspecified Data:** Very few victims are unidentified or unspecified in gender.

**Homogeneity in Victim Profile:** The distribution suggests a relatively homogeneous victim profile across genders.

# BAR CHART OF CRIME DISTRIBUTION IN AREAS OF LOS ANGELES



Crime Distribution in Los Angeles Areas



- The "Central" area experiences the highest crime count, surpassing 50,000 incidents.
- There is a relatively even distribution of crime counts among the next several areas, with each reporting between approximately 30,000 and 40,000 incidents.
- "Mission," "Hollenbeck," and "Foothill" areas show the lowest crime counts, each falling below 30,000 incidents.
- The distribution suggests a variation in crime prevalence by area, with central and denser regions experiencing more crime.

# HEXBIN MAP OF CRIME DISTRIBUTION IN LOS ANGELES

Crime Distribution in Los Angeles



- **High Density Areas:** Central regions show the densest crime occurrences.
- **Decreasing Gradient:** Crime counts diminish as they radiate out from the city center.
- **Concentration:** Certain hotspots with the highest crime rates are visible.
- **Geographic Spread:** Crimes are distributed throughout the city, with pockets of higher intensity.



# TABLE THAT SHOWS THE FREQUENCY OF SPECIFIC CRIMES IN A CERTAIN AREA

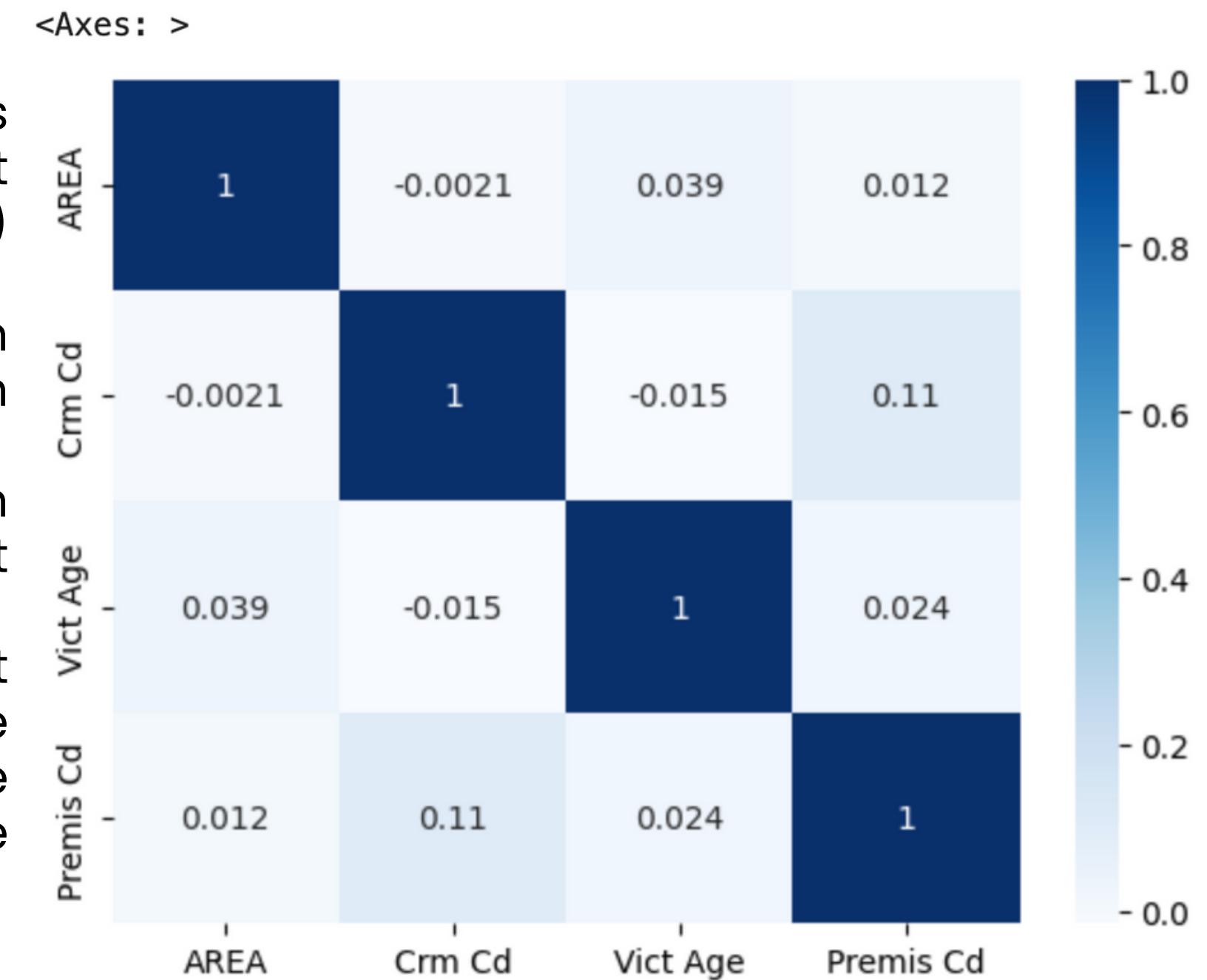
AREA NAME	77th Street	Central	Devonshire	Foothill	Harbor	Hollenbeck	Hollywood	Mission	N Hollywood	Newton	Northeast	Olympic	Pacific	Rampart
Crm Cd Desc														
ARSON	144	178	42	66	68	67	102	65	76	135	98	107	93	102
ASSAULT WITH DEADLY WEAPON ON POLICE OFFICER	71	151	13	51	23	59	54	35	32	49	30	25	32	37
ASSAULT WITH DEADLY WEAPON, AGGRAVATED ASSAULT	5320	3750	1190	1559	2099	2196	2531	1797	1756	3495	1535	2466	1878	2879
ATTEMPTED ROBBERY	443	435	101	92	153	155	270	149	141	339	183	280	153	329
BATTERY - SIMPLE ASSAULT	4153	6215	2346	2155	2801	2867	4061	2277	3005	3888	2401	4029	2946	3812
BATTERY ON A FIREFIGHTER	7	40	4	6	8	10	18	6	4	6	10	6	20	19
BATTERY POLICE (SIMPLE)	256	295	55	60	74	80	184	75	84	97	84	83	139	92
BATTERY WITH SEXUAL CONTACT	155	368	147	124	110	115	266	171	186	163	112	204	215	193
BEASTIALITY, CRIME AGAINST NATURE SEXUAL ASSLT WITH ANIM	0	2	0	1	0	0	1	0	0	0	0	1	0	0
BIGAMY	0	1	0	0	0	0	0	0	1	1	0	1	2	1
BIKE - ATTEMPTED STOLEN	0	2	0	0	0	0	0	0	0	0	2	0	1	0
BIKE - STOLEN	27	778	123	35	94	58	387	85	347	59	306	330	1352	252
BLOCKING DOOR INDUCTION CENTER	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BOMB SCARE	5	70	12	6	9	4	41	9	4	8	23	18	55	14
BRANDISH WEAPON	1301	1053	392	373	610	539	741	527	541	815	431	833	419	745
BRIBERY	0	0	0	0	0	1	1	1	0	0	1	0	0	0
BUNCO, ATTEMPT	27	10	4	8	34	3	8	6	17	26	24	5	6	26
BUNCO, GRAND THEFT	157	177	372	202	207	162	311	210	289	125	273	358	374	190
BUNCO, PETTY THEFT	75	93	97	93	60	66	146	79	96	53	72	106	68	60
BURGLARY	1873	2219	3107	1746	2048	1510	2366	1368	3228	2169	2344	2772	3955	1653
BURGLARY FROM VEHICLE	1569	8034	2084	1281	1429	1156	3615	1549	3053	2291	2647	2783	3275	2289
BURGLARY FROM VEHICLE, ATTEMPTED	30	39	20	11	35	25	18	17	28	28	30	37	48	34
BURGLARY, ATTEMPTED	140	133	246	120	139	125	142	105	146	128	145	214	259	123
CHILD ABANDONMENT	4	2	1	1	1	0	0	2	0	3	0	2	1	1

Note: this table is not the whole result and a screenshot of a part of the result

- Central Focus:** Central LA shows the highest incidence of crime.
- Consistent Pattern:** Crime counts are notably higher in the central and southern regions.
- Gradual Decline:** Less crime is reported as you move to the outskirts, like in Topanga and Devonshire.
- Northern Variation:** Areas like Van Nuys and Northeast show mid-range crime frequencies.
- Southern Contrast:** Harbor and Foothill report lower crime counts, contrasting with nearby areas.

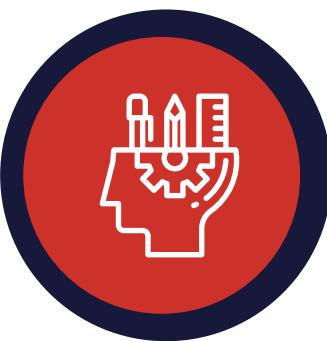
# BAR CHART OF TOP 10 CRIME CODE DESCRIPTIONS

- The correlation matrix presents the relationships between the 'AREA', 'Crm Cd' (Crime Code), 'Vict Age' (Victim Age), and 'Premis Cd' (Premises Code) variables.
- All variables show very low correlation values with each other, as indicated by the correlation coefficients, which are all close to zero.
- The strongest correlation observed is between 'Crm Cd' and 'Premis Cd' at 0.11, suggesting a slight positive relationship.
- Overall, the lack of strong correlations implies that there is no direct linear relationship between the location of the crime (area), the type of crime, the age of the victim, and the type of premises where the crime occurred.



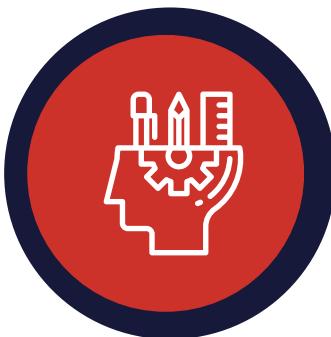
# OVERALL KEY FINDINGS FROM LOS ANGELES CRIME DATA ANALYSIS

1. Central Los Angeles exhibits the highest crime rates, suggesting a critical focus area for resource allocation.
2. Assault and vehicle-related thefts are the most frequent crimes, highlighting potential targets for crime prevention measures.
3. Minimal correlation between different types of crimes indicates diverse criminal activity with few overlapping patterns.
4. The notable percentage of non-binary or unspecified victim categories suggests the need for more inclusive victim support services.
5. Seasonal and temporal crime trends offer predictive insights for law enforcement to anticipate and prepare for crime fluctuations.



# CONCLUSION - CONNECTING THE PROBLEM AND HYPOTHESIS TO THE FINDINGS

Central Los Angeles, as a high-crime area, likely requires increased police presence and possibly community intervention programs to tackle the specific issue of assaults and vehicle thefts. Detailed analysis of crime timings could further enhance police patrolling schedules. Moreover, recognizing the diversity in victim profiles, particularly non-binary individuals, may necessitate tailored support services. Understanding crime seasonality could lead to strategic planning for resource allocation during peak crime periods, ensuring a data-driven approach to crime prevention and community safety initiatives.

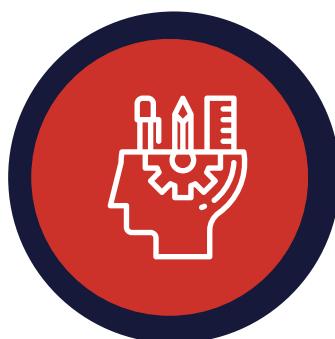


# CREATIVE AND INNOVATIVE SOLUTIONS

These recommendations are designed to create a synergistic effect on reducing crime rates and enhancing community resilience, using a data-driven approach to address both the symptoms and root causes of crime in Los Angeles.

## **1. Integrated Community Safety Initiative:**

- Develop a holistic safety program in Central Los Angeles, where high-impact crime deterrence methods, like increased police patrols and community watch programs, are integrated with community-based initiatives. These could include job training, recreational programs to engage youth, and partnerships with local organizations to address socio-economic factors that may contribute to the high crime rates.



## **2. Smart Policing Through Data Analytics:**

- Implement a smart policing strategy that employs advanced data analytics and machine learning to predict crime hotspots and peak times. By analyzing patterns in crime related to seasonality and time, law enforcement can proactively deploy resources and customize intervention programs. Additionally, this strategy should include the development of a mobile application that would allow residents to report crimes in real-time, contributing to the dataset and enabling quicker police response.



## **3. Victim Support and Inclusion Program:**

- Establish an inclusive victim support framework that not only provides resources and services to all demographics but also uses data to identify and address specific needs of various victim groups, including non-binary individuals. This program should also focus on education and outreach to ensure that all community members are aware of the support available to them and feel encouraged to come forward in the event of a crime.



# VIDEO LINK, REFERENCE AND APPENDIX

Video link: [https://youtu.be/\\_s0Wr-qRZx4](https://youtu.be/_s0Wr-qRZx4)

OpenAI. (2023). ChatGPT (GPT-4 version) [Large language model]. <https://chat.openai.com/>



You

Central Los Angeles exhibits the highest crime rates, suggesting a critical focus area for resource allocation.

Assault and vehicle-related thefts are the most frequent crimes, highlighting potential targets for crime prevention measures.

Minimal correlation between different types of crimes indicates diverse criminal activity with few overlapping patterns.

The notable percentage of non-binary or unspecified victim categories suggests the need for more inclusive victim support services.

Seasonal and temporal crime trends offer predictive insights for law enforcement to anticipate and prepare for crime fluctuations. Answer questions based on these key findings and relate to hypothesis: How does the frequency and distribution of reported crimes in different Los Angeles areas influence the allocation of law enforcement resources, and what patterns can be observed from the crime data in relation to seasonality, time of day, and victim demographics? Central Los Angeles has a significantly higher crime rate compared to other areas. Assault and vehicle thefts like assault and vehicle theft are disproportionately common, influenced by factors such as seasonality, time of day, and victim demographics.



You

make this morec specific



ChatGPT

Central Los Angeles, as a high-crime area, likely requires increased police presence and possibly community intervention programs to tackle the specific issue of assaults and vehicle thefts. Detailed analysis of crime timings could further enhance police patrolling schedules. Moreover, recognizing the diversity in victim profiles, particularly non-binary individuals, may necessitate tailored support services. Understanding crime seasonality could lead to strategic planning for resource allocation during peak crime periods, ensuring a data-driven approach to crime prevention and community safety initiatives.



ChatGPT

The high crime rates in Central Los Angeles suggest a significant need for law enforcement resources in this area. The prevalence of assaults and vehicle thefts could guide targeted prevention strategies. The data implies varied criminal activities without strong correlations, suggesting multiple, distinct factors at play. The presence of a notable non-binary or unspecified victim group underscores the need for inclusive victim support. Seasonal and temporal trends in the data could inform proactive policing, helping to anticipate and mitigate crime surges during certain periods. These patterns align with the hypothesis, reflecting the complex interplay of various factors influencing crime and its reporting.