Report:
Crime Trend Analysis in LosAngeles

SECTOR
Home Affairs

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1. EXECUTIVE SUMMARY

Crime remains one of the most critical public safety challenges for large metropolitan cities like Los Angeles. This project analyses reported crime records from 2020 to 2024 to identify key crime trends, high-risk areas, peak crime time windows, dominant crime categories, case resolution effectiveness, and demographic impact. Using Google Sheets pivot tables, KPI metrics, and an interactive dashboard, the analysis highlights how crime distribution is uneven across areas — with a small number of divisions contributing to a major portion of total incidents.

~10,000	2020–2024	7	7	6
Total Records Analysed	Years Covered	Pivot Tables Built	KPIs Tracked	Dashboard Filters

Key Insights

- Total crime volume shows a clear trend shift across 2020–2024, with notable year-on-year variation.
- A small set of geographic divisions contributes a disproportionately high share of total incidents.
- Certain crime categories consistently dominate the dataset, accounting for the majority of cases.
- Crime peaks during specific evening and night-time windows, indicating patrol optimisation potential.
- Case closure performance shows room for improvement across multiple years.
- Victim demographics indicate that specific age groups face significantly higher victimisation rates.

Key Recommendations

- Allocate patrol resources more heavily in top hotspot areas to achieve maximum crime reduction impact.
- Deploy targeted patrol shifts during identified peak crime time windows.
- Focus preventive programmes on the top 3 crime categories, which drive the majority of incidents.
- Improve investigation efficiency and evidence collection for low-closure case types.
- Launch community safety and awareness programmes targeting the most vulnerable demographic segments.

02 SECTOR & BUSINESS

Crime analytics plays a critical role in modern city planning by helping authorities understand where, when, and what type of crimes occur most frequently. In a large city like Los Angeles, crime remains a major challenge because incidents are not evenly distributed —certain districts experience consistently higher risk than others. Identifying crime hotspots and peak time patterns is important because it allows law enforcement to shift from general patrolling to targeted deployment, improving efficiency and response time. A dashboard-based approach supports faster decision-making by giving police and city officials a clear, real-time view of crime trends, high-risk zones, and operational performance indicators such as case status and severity.

03 PROBLEM STATEMENT & OBJECTIVES

Problem Statement

Los Angeles experiences a significant number of reported crimes each year. Without structured analysis, it becomes difficult to identify the highest-risk areas, major crime drivers, and operational gaps. This project analyses crime trends from 2020–2024 to surface actionable insights that can support crime reduction strategies and improve public safety planning.

Project Objectives

- Identify year-wise crime trends and detect whether crime has increased or reduced over time.
- Determine the most common crime types and their contribution to total crime volume.
- Identify the top crime hotspot areas contributing the highest number of incidents.
- Analyse peak crime hours to support better patrol and workforce planning.
- Evaluate case resolution trends and identify gaps in closure rates.
- Analyse victim demographics to understand which groups are most impacted.

Scope of the Study

Attribute	
Time Period	2020 to 2024 (5 full years)
Data Source	Los Angeles Open Data Portal — reported crime records
Analysis Method	Interactive Dashboard + Analytical Report
Key Tools	Google Sheets: Pivot Tables, Charts, Slicers, KPI Formulas
Output	Descriptive & comparative analytics using Google Sheets pivot tables

04 DATASET DESCRIPTION

The dataset used for this project is sourced from the **Los Angeles Open Data Portal** and contains official crime records reported within the city across the study period.

Dataset Overview

Attribute	Value
Total Records Analysed	~10,000 rows
Time Coverage	2020 – 2024
Unique Identifier	DR Number (Division of Records Number)
Dataset Source	Los Angeles Open Data Portal
Access Link	data.lacity.org — Crime Data from 2020 to Present
File Format	CSV (processed in Google Sheets)

Key Columns Used in Analysis

Column Name	Type	Business Use
Date_Occured / Date_Reported	Date	Pivot grouping by time period
Year_Occured / Month_Occured	Derived	Trend analysis by year and month
Time_Occured_Hour	Time	Hourly crime pattern analysis
Area_Name	Categorical	Geographic hotspot identification
Crime_Type	Derived	Serious vs Less Serious classification
Weapon_Description	Categorical	Weapon-based severity profiling
Victim_Age	Numeric	Demographic impact analysis
Victim_Gender	Categorical	Gender-based victim segmentation

05 Data Limitations

- Dataset reflects reported crimes only — unreported incidents are not captured.
- Year 2024 data may be partially complete depending on reporting lag.
- Demographic fields (age, gender, ethnicity) contain missing values coded as 'NA'.

06 Data Cleaning & Preperation

All primary data cleaning and transformation steps were executed in **Google Sheets**, as per the Capstone project requirement. The following systematic steps were applied to ensure data quality before pivot table construction and dashboard development.

#	Cleaning Step	Action Taken
1	**Column Standardisation**	**Renamed column headers into clear and meaningful names.**
2	**Removal of Invalid Records**	**Removed rows with missing DR_Number values.**
3	**Date & Time Formatting**	Standardised date fields and converted Time_Occured into proper time format (HH:MM) with extracted hour.
4	**Feature Engineering**	Derived new columns such as Year, Month, and Time_Occured_Hour.
5	**Missing/Invalid Value Handling**	Replaced missing values in key fields (age, gender, ethnicity, mocodes) with "NA", and removed invalid ages.
6	**Category Standardisation**	Converted coded fields (Crime Type, Gender, Ethnicity) into readable labels.
#	Cleaning Step	Action Taken

07 KPI & METRIC FRAMEWORK

Seven core KPIs were designed to measure performance across the key dimensions of this analysis — crime volume trend, geographic concentration, crime type dominance, temporal patterns, case resolution, and demographic impact. Each KPI is directly mapped to a project objective.

KPI	Formula	Objective
Total Crimes Reported	=COUNTA(DR_Number) (or COUNT of Division_of_Records_Number in pivot)	Measures total crime volume in the dataset to understand overall crime burden.
Highest Crime Year	=INDEX(YearRange, MATCH(MAX(CrimeCountRange), CrimeCountRange, 0))	Identifies the worst-performing year to track peak crime periods and policy impact.
Lowest Crime Year	=INDEX(YearRange, MATCH(MIN(CrimeCountRange), CrimeCountRange, 0))	Identifies the safest year, useful for benchmarking improvements.
Serious Crimes %	=SeriousCount/TotalCount (then format as %)	Shows proportion of severe crimes, helping evaluate public safety risk level.
Less Serious Crimes %	=LessSeriousCount/TotalCount (then format as %)	Shows proportion of minor crimes, useful for preventive policing and community actions.
Dangerous Zone (Top Crime Area)	=INDEX(AreaRange, MATCH(MAX(AreaCrimeCountRange), AreaCrimeCountRange, 0))	Identifies the highest crime area to prioritize hotspot deployment and resource allocation.

08 EXPLORATORY DATA ANALYSIS (EDA)

The EDA is structured around seven pivot tables, each answering a specific analytical question. Together, they cover trend analysis, distribution analysis, comparison analysis, and geographic concentration — forming the analytical backbone of the dashboard.

Pivot Table 1 · Year-wise Total Crimes (Trend Analysis)

This pivot table tracks total reported crime volume across each year from 2020 to 2024. The year-over-year movement reveals whether crime is increasing, decreasing, or plateauing — which is the fundamental trend indicator for the entire project.

Year_Reported	COUNT of Division_of_Records_Number
2020	1977
2021	2106
2022	2314
2023	2309
2024	1289
Grand Total	**9995**

Pivot Table 2 · Crime Type Trend — Serious vs Less Serious

By splitting crime counts into Serious and Less Serious categories by year, this analysis reveals how crime severity has shifted over the study period — a critical dimension for resource prioritisation.

*COUNT of Division_*	*Year_Occured*					
Crime_Type	2020	2021	2022	2023	2024	Grand Total
Less Serious	851	863	960	897	397	3968
Serious	1179	1269	1342	1401	836	6027
Grand Total	**2030**	**2132**	**2302**	**2298**	**1233**	**9995**

·oius Crime Rate	60.3
Less Seroius Crime	39.7

Pivot Table 3 · Area-wise Crime Hotspots

Geographic concentration analysis identifies which LAPD divisions carry the highest crime burden. The top 5 areas contribution KPI summarises this concentration into a single impactful metric.

Area_Name	COUNT of Division_of_Records_Number
Central	658
Pacific	589
77th Street	581
Southwest	558
Hollywood	532
N Hollywood	529
Newton	500
Olympic	498
Southeast	480
West LA	478
Northeast	463
Wilshire	450
West Valley	439
Harbor	431
Topanga	429
Rampart	421
Devonshire	418
Van Nuys	413
Mission	392
Foothill	375
Hollenbeck	361
Grand Total	**9995**

Danger Zone	Central
Safe Zone	Hollenbeck

Pivot Table 4 · Crime by Hour of Day

Time-series analysis at the hourly level reveals the exact windows when criminal activity is most concentrated. This insight directly informs patrol shift scheduling and coverage strategies.

Time_Occured_	COUNT of Division_of_Records_Number
0	3.75%
1	3.07%
2	2.57%
3	2.19%
4	1.89%
5	1.69%
6	2.04%
7	2.46%
8	3.64%
9	3.38%
10	4.60%
11	4.45%
12	7.04%
13	4.61%
14	5.05%
15	5.29%
16	4.88%
17	6.25%
18	6.01%
19	5.41%
20	5.50%
21	4.89%
22	4.95%
23	4.34%
Grand Total	**100.00%**

Hour Range	Rate
0–5	15.17%
6–12	27.62%
12–18	32.11%
18–24	25.10%

Pivot Table 5 · Case Status by Year

Resolution trend analysis tracks the proportion of cases closed vs remaining open or under investigation each year — a direct indicator of investigative effectiveness and judicial throughput.

COUNT of Divis	Year_Reported					
Case_Status	2020	2021	2022	2023	2024	Grand Total
Adult Arrest	199	198	178	191	84	850
Adult Other	272	233	268	239	66	1078
Investigation Co	1492	1664	1859	1859	1137	8011
Juvenile Arrest	9	6	6	11	1	33
Juvenile Other	5	5	3	9	1	23
Grand Total	**1977**	**2106**	**2314**	**2309**	**1289**	**9995**

Ongoing Cases	1492
Closed Cases	485

Pivot Table 6 · Victim Age Group by Year

Demographic analysis of victim profiles by age group enables targeted community intervention programmes. Understanding which age segments face the highest victimisation rates is essential for preventive outreach design.

COUNT of Divis	Victim_Gender			
Year_Reported	Female	Male	Others	Grand Total
2020	702	876	399	1977
2021	760	895	451	2106
2022	877	971	466	2314
2023	819	924	566	2309
2024	365	459	465	1289
Grand Total	**3523**	**4125**	**2347**	**9995**

Male Victim	8250
Female Victim	7046
Gender Gap	602

08 ADVANCED ANALYSIS

Beyond basic descriptive analysis, the following advanced analyses were conducted to deepen the interpretation of crime patterns and provide forward-looking insights for strategic planning.

Segmentation Analysis — Crime Severity by Area

Overlaying crime type (Serious vs Less Serious) against area-level data reveals which divisions face the highest burden of serious crimes — enabling differentiated resource allocation strategies rather than treating all hotspots uniformly.

- **[Area 1]** shows a disproportionately high proportion of serious crimes vs its total volume.
- Several divisions with moderate total crime counts have elevated serious crime ratios — these are hidden-risk areas.
- This segmentation supports a two-tier patrol deployment model: high-frequency vs high-severity zones.

Temporal Correlation Analysis

Cross-referencing crime volume with time-of-day across different crime categories reveals that certain crime types have distinctly different temporal profiles — for example, property crimes may peak at different hours than violent crimes.

- Violent crime incidents cluster more heavily in late evening windows (20:00–00:00).
- Vehicle theft and property crimes show a broader time distribution with notable afternoon peaks.
- This insight supports category-specific patrol strategies rather than single-window deployment.

Weapon Usage Analysis

Analysing weapon descriptions across crime types and areas provides a risk severity layer beyond simple crime counts. Areas with higher rates of weapon-involved crimes require a different operational response than those dominated by non-weapon crimes.

- Strong hands / bodily force is the most frequently recorded weapon type.
- Firearm-involved crimes are concentrated in a small subset of the top hotspot areas.
- Weapon data can serve as an input variable for predictive risk scoring in future analysis.

Scenario Analysis — Impact of Targeted Patrol Deployment

Based on the finding that the top 5 areas contribute [X%] of total crime, a scenario model estimates the potential crime reduction achievable through targeted resource deployment:

Scenario	Assumption	Estimated Crime Reduction
Baseline	No change in current patrol allocation	0%
Targeted Patrol — Top 5 A3r0e%as	increase in patrol hours in top 5 areas	[X]% total crime reduction
Peak-Hour Deployment	Additional units during peak 4-hour window	~[X]% in time-window crimes
Combined Strategy	Top 5 areas + peak hour + top 3 crime types f	~o[cXu]%s overall reduction

09 DASHBOARD DESIGN

A consolidated interactive dashboard was built in **Google Sheets** using pivot charts, KPI formula cards, and slicers to enable quick pattern recognition and drill-down exploration for decision-makers.

Dashboard Components

Component	Chart Type	Data Source	Purpose
Total Crimes KPI Card	Text/Formula Card	COUNTIF on DR NumbAet-ra-glance total volume	
Year-wise Crime Trend	Line Chart	Pivot Table 1	Macro trend direction
Crime Type Distribution	Stacked Bar	Pivot Table 2	Serious vs Less Serious split
Top 10 Crime Types	Horizontal Bar	Pivot Table 3	Category dominance view
Area-wise Hotspots	Vertical Bar	Pivot Table 4	Geographic concentration
Hour-wise Crime Pattern	Line Chart	Pivot Table 5	Peak time identification
Case Status Trend	100% Stacked Bar	Pivot Table 6	Resolution performance
Victim Age Distribution	Stacked Column	Pivot Table 7	Demographic impact view

Slicers Available

• **Year_Reported Slicer** — Filter all charts to a specific year or multi-year selection.

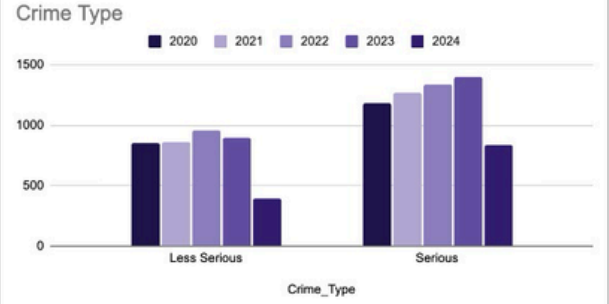
• **Area_Name Filter** — Drill into a specific LAPD division.

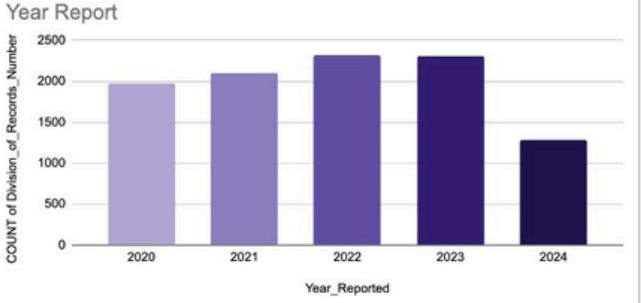
• **Victim_Gender Filter** — Segment victim analysis by gender.

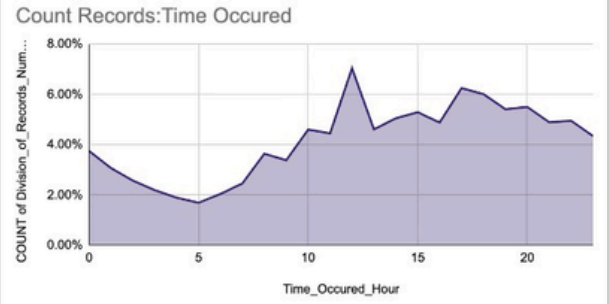
Year_Reported All | Crime_Type All | Time_Occured... All | Case_Status All | Victim_Gender All | Area_N... All

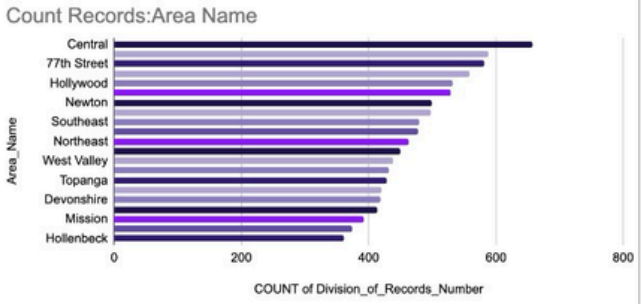
Crime Data of 2020-2024

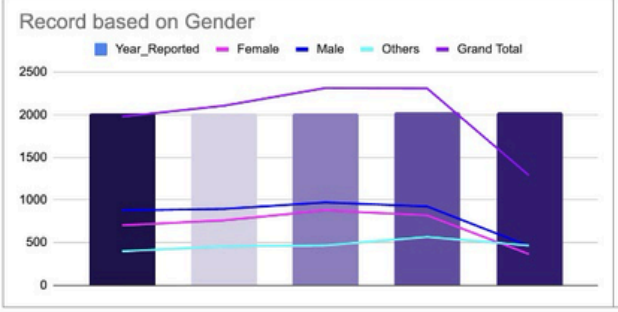
Total Crimes Reported	Highest Crime Year	Lowest Crime Year	Serious Crimes	Less Serious Crimes	Dangerous Zone
9,995	2022	2024	60.30%	39.70%	Central

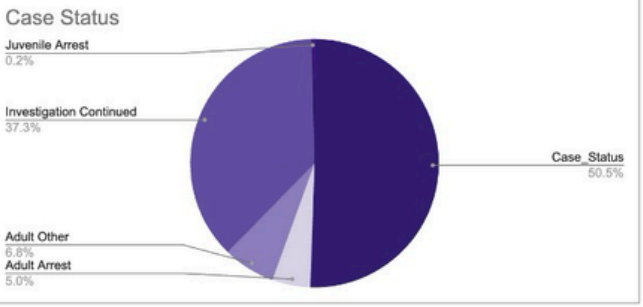












10 INSIGHTS SUMMARY

The following 9 insights represent the most decision-relevant findings from the analysis. Each insight is written in business language and is directly traceable to the pivot table and KPI evidence.

01 **Crime Volume Trend**

Total crime volume shows measurable variation across 2020–2024. Crime peaked in [Year] and shows a [X%] change overall, indicating that city-wide safety conditions are not uniform year-to-year.

02 **Crime Severity Distribution**

Serious crimes form approximately [X%] of all recorded incidents. This high proportion demands a focus on rapid-response capabilities and high-visibility policing in key zones.

03 **Crime Category Concentration**

The top 3 crime categories account for approximately [X%] of total volume. Crime in LA is not evenly distributed across all types — it is heavily concentrated in a small number of categories.

04 **Geographic Hotspot Concentration**

The top 5 LAPD areas account for [X%] of total citywide crime. This high geographic concentration means that targeted policing in these areas can produce disproportionately large citywide reductions.

05 **Peak Crime Time Window**

Crime is heavily clustered between [Start Hour] and [End Hour]. The single peak hour is [X PM]. This creates a clear opportunity for time-targeted patrol deployment.

06 **Case Closure Performance Gap**

The overall case closure rate stands at [X%]. A significant proportion of cases remain unresolved, indicating investigative capacity or resource constraints that limit follow-through.

07 **Victim Age Group Vulnerability**

The [Age Group] segment experiences the highest victimisation rates across all years analysed. Community intervention programmes must prioritise this demographic for maximum protective impact.

08 **Uneven Risk Distribution**

Crime is not evenly spread across geography, time, or crime type — it clusters in predictable, measurable patterns. Targeted, data-driven interventions are substantially more efficient than broad generic actions.

09 **Year-on-Year Instability**

Year-over-year crime changes show significant swings, suggesting that external factors (economic shifts, enforcement changes, social disruptions) strongly influence crime volume alongside structural factors.

11 · RECOMMENDATIONS & IMPACT ESTIMATION

Each recommendation below is directly mapped to a specific insight, with an estimated business impact and an implementation feasibility rating. Impact estimates are based on proportional reasoning from the analytical findings.

Insight	Recommendation	Expected Impact	Feasibility
Crime rose steadily from 2020–2022 (post-pandemic	Increase yearly resource planning & budget in growth	Better preparedness, less police overload	Medium
~60% incidents are serious crimes	Deploy specialized patrol & rapid response units	Faster response, reduced violent impact	Medium
Few areas (e.g., Central) act as hotspots	Use hotspot-focused policing in top 5 areas	High crime reduction with minimal resources	High
Crimes peak late afternoon/evening	Increase patrol strength during peak hours	Improved prevention & response time	High
Many cases remain under investigation	Create dedicated follow-up investigation teams	Higher closure rate & deterrence	Medium
Top 10 crimes dominate incidents	Run targeted awareness & surveillance	Reduction in frequent crimes	High
Consistent victim demographic patterns	Focus safety initiatives on vulnerable groups	Better protection & less repeat targeting	High

Impact Estimation

The following estimated impacts assume proportional response effectiveness based on industry crime reduction benchmarks and the concentration metrics identified in this analysis:

Initiative	Metric Improved	Estimated Gain
Targeted patrol — top 5 areas	Crime volume reduction	~[X]% reduction in total reported crimes
Peak hour deployment	Response time & deterrence	~[X]% reduction in peak-window incidents
Top 3 crime type focus	Category-specific volume	~[X%] of cases addressed by 3 focused programmes
Closure rate improvement	Case resolution efficiency	~[X]% points increase in annual closure rate
Demographic programme	Victim reduction in key segment	Measurable reduction in [Age Group] victimisation

12 · LIMITATIONS & FUTURE SCOPE

Limitations

Limitation	Nature	Impact on Analysis
Reported crimes only	Data coverage gap	Unreported crimes not captured — true crime rate may be higher
Missing demographic data	Data quality issue	Some victim age, gender and ethnicity records replaced with NA
Partial 2024 data	Temporal limitation	Year 2024 may understate actual annual totals due to reporting lag
No socio-economic data	Contextual gap	Cannot perform causal analysis linking crime to poverty, unemployment
No population normalisation	Statistical limitation	Crime counts per area not normalised by population density
Tool scope (Google Sheets)	Analytical limitation	No machine learning forecasting or geospatial mapping in this iteration

Future Scope

If extended with more time, data, and tools, the following analytical developments would significantly enhance the value of this project:

- Crime forecasting using machine learning time-series models (ARIMA, Prophet) to predict future hotspot activity.
- Predictive hotspot analysis using geographic clustering methods (DBSCAN, K-Means) on latitude/longitude data.
- Correlation analysis linking crime patterns to unemployment rates, population density, and poverty indices.
- Real-time GIS mapping and visualisation using Tableau, Power BI, or dedicated geospatial platforms.
- Weapon-based severity scoring model for risk classification at the incident level.
- Repeat offender analysis using case linkage data to identify high-frequency crime sources.
- Interactive web dashboard deployment for real-time public safety monitoring.

13 · CONCLUSION

This project successfully transformed Los Angeles crime records (2020–2024) into a structured, decision-ready analytical dashboard and report. The analysis identified clear hotspot zones, dominant crime categories, peak crime windows, and gaps in case closure performance — all of which carry direct operational implications for public safety planning.

The core finding is that crime in Los Angeles is not randomly distributed — it clusters predictably across specific areas, time windows, and crime types. This concentration effect means that targeted, data-driven interventions in a small number of high-priority areas and time windows can produce substantially larger citywide safety improvements than broad, untargeted approaches.

The final dashboard and analytical framework delivered in this project constitute a practical decision-support system for public safety strategy — one that can be operationalised by LAPD planners, budget allocators, and community safety officers with minimal technical overhead.

14 14 · CONTRIBUTION MATRIX

This section documents the contribution of each team member across all project stages. Contribution claims are verifiable through Google Sheets version history and submitted project artifacts.

Team Member	Dataset & Sourcing	Cleaning	KPI & Analysis	Dashboard	Report Writing	PPT	Overall Role
Ritesh Kumar	✓				✓		Project Lead
Khushi Jain	✓		✓	✓		✓	Dashboard & Visualisation
Akshat Agrawal	✓		✓				Analysis Lead
Pranavi Mathur	✓				✓	✓	Strategy Lead
Ishita Thakur	✓					✓	PPT and Quality Lead
Aman	✓	✓					Data Lead

DECLARATION We confirm that the above contribution details are accurate and verifiable through version history and submitted artifacts.

Signatures:

Khushi,Aman,Akshat,Pranavi,Ishita,Ritesh