

Data analysis using R and Quarto

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1 Information on the Quarto project

Project title: Data analysis using R and Quarto

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Subject: Statistical analysis of Los Angeles crime reports

Data source: Los Angeles crime types (based on 2024 data) (<https://catalog.data.gov/dataset?tags=crime>)

The screenshot shows the Data.gov website interface. The browser address bar displays <https://catalog.data.gov/dataset?tags=crime>. The website header includes the Data.gov logo, navigation links (DATA, METRICS, OPEN GOVERNMENT, CONTACT), and a User Guide icon. A blue banner below the header reads "DATA CATALOG" with links to "Datasets" and "Organizations".

The main content area features a search bar with the placeholder "Search datasets...", a "Tags:" section with a "crime x" tag, and a "Filter by location" section with a map of the United States. The search results section displays "503 datasets found" and lists three datasets:

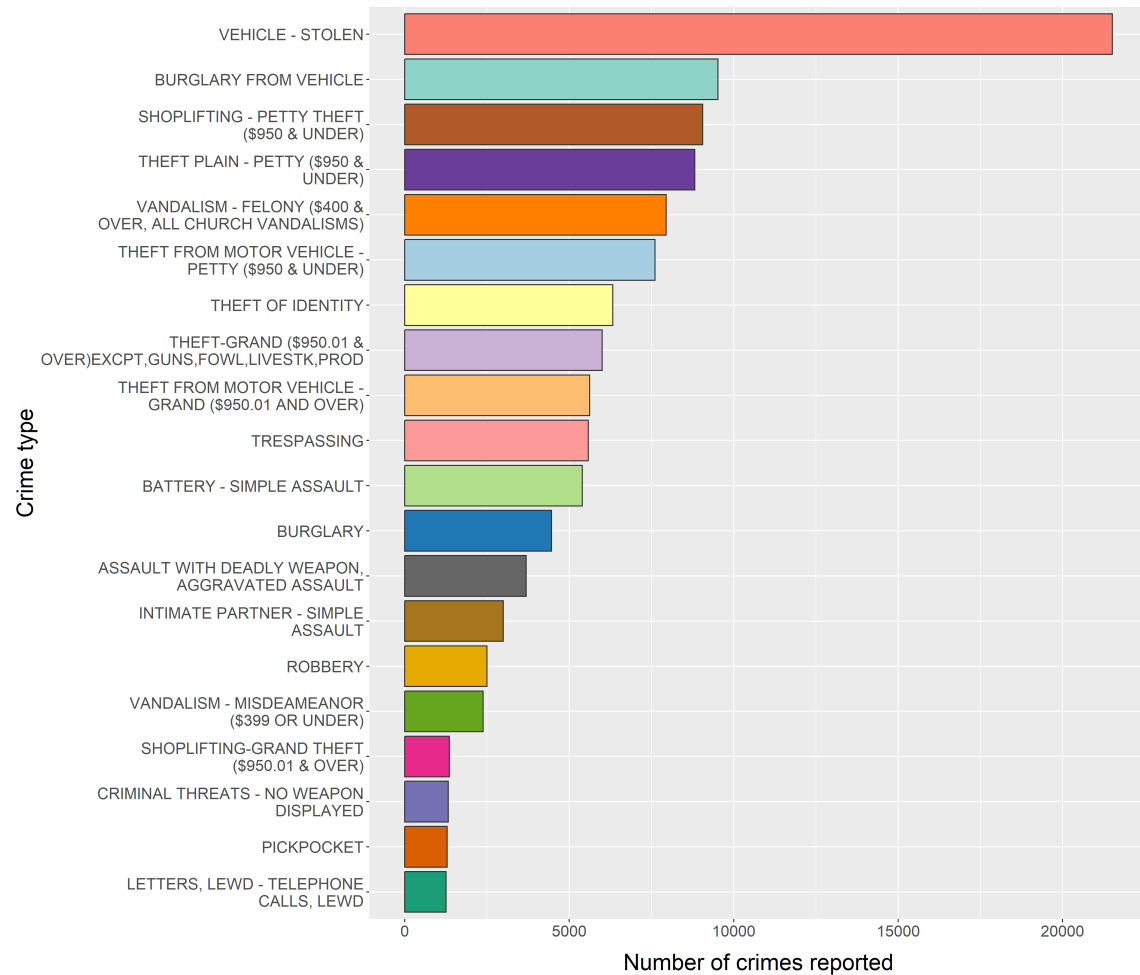
- Crime Data from 2020 to Present** (City of Los Angeles) - Starting on March 7th, 2024, the Los Angeles Police Department (LAPD) will adopt a new Records Management System for reporting crimes and arrests. This new system is... (Formats: CSV, RDF, JSON, XML)
- NYPD Arrest Data (Year to Date)** (City of New York) - This is a breakdown of every arrest effected in NYC by the NYPD during the current year. This data is manually extracted every quarter and reviewed by the Office of... (Formats: CSV, RDF, JSON, XML)
- Crime Incidents in 2024** (District of Columbia) - The dataset contains a subset of locations and attributes of incidents reported in the ASAP (Analytical Services Application) crime report database by the District of... (Formats: HTML, ArcGIS GeoServices REST API, OGC WMS, CSV, ZIP, GeoJSON, 1 more in dataset)

The left sidebar includes a "Topics" section with "Local Government - 118" and "Older Adults... - 1", and a "Topic Categories" section stating "There are no Topic Categories that match this search".

2 Most common crime types

This chart shows an analysis of Los Angeles crime types in 2024 by frequency.

Twenty most common offences are presented.



Conclusion:

The most common crime type in the LA area in 2004 was vehicle theft (an outstanding number of over 20,000 cases reported). The remaining types of offences are less variable in frequency, and none of them exceeded 10,000.

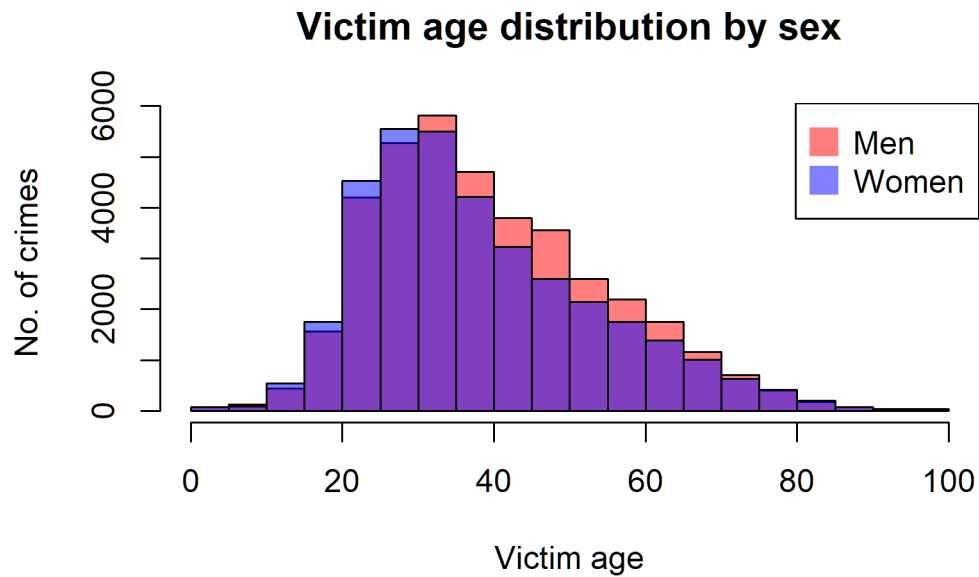
3 Victim age analysis

Victim age structure: entire sample



Conclusion: This chart presents age distribution in *the entire population*. Most victims are adults aged 20–40 years. The data seems to be distributed normally, as confirmed below in a statistical test.

Victim age structure: by age



Conclusion: This chart presents overimposed histograms of the age for *male* and *female* victims. The sex-specific histograms are very similar and nearly overlap, although *male* victims are slightly older.

Only *male* and *female* genders are included (categories *other/unknown* were omitted due to low sample size).

Summary statistics

N: 76839

Min: 2

25th perc.: 27

Mean: 39

Median: 36

SD: 15

75th perc.: 49

Max: 99

Conclusion: The youngest victim was 2 years old, and the oldest 99 years old. Median victim age was 36 years.

Test for normal distribution:

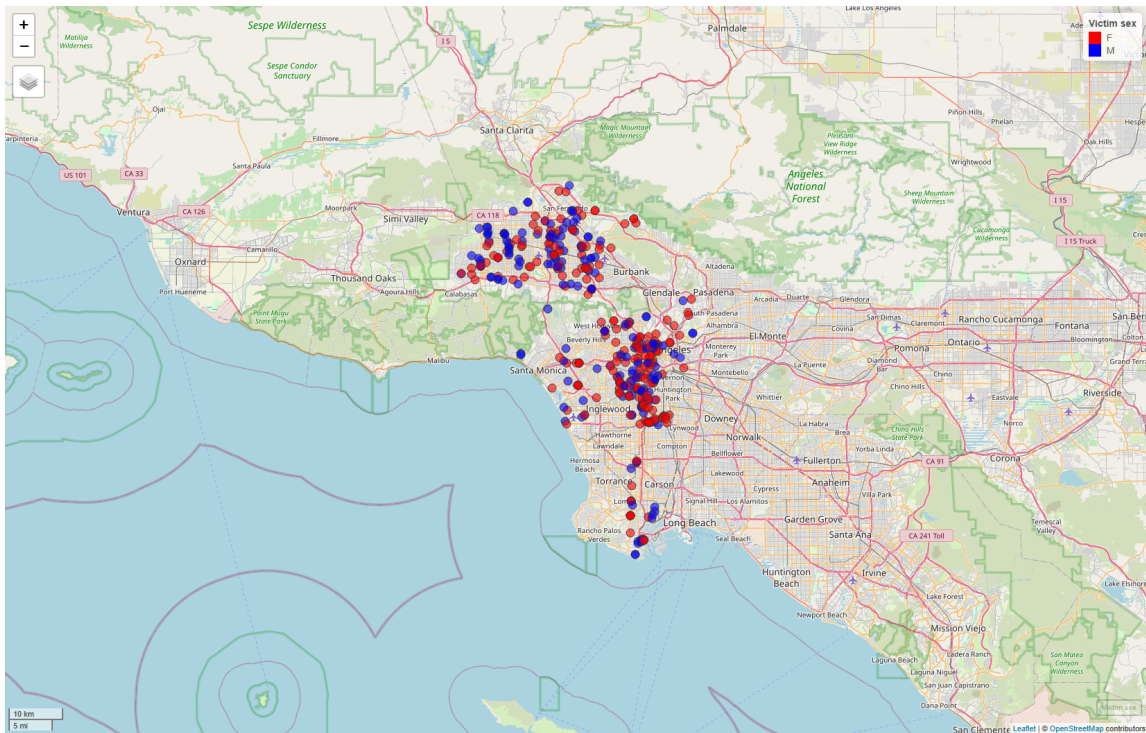
Shapiro-Wilk normality test

```
data: head(data_prep$Vict.Age, n = 5000)
W = 0.95593, p-value < 2.2e-16
```

Conclusion: The p value in Shapiro-Wilk test is very low, confirming normal statistical distribution of the data.

4 Geographical distribution of crime

Certain offences may exhibit a heterogeneous geographical distribution. To illustrate this, information on the geographical location of assaults on minors was extracted from the dataset, thereby yielding a smaller subset of data that can be clearly displayed on a map. Colors indicate victim sex.



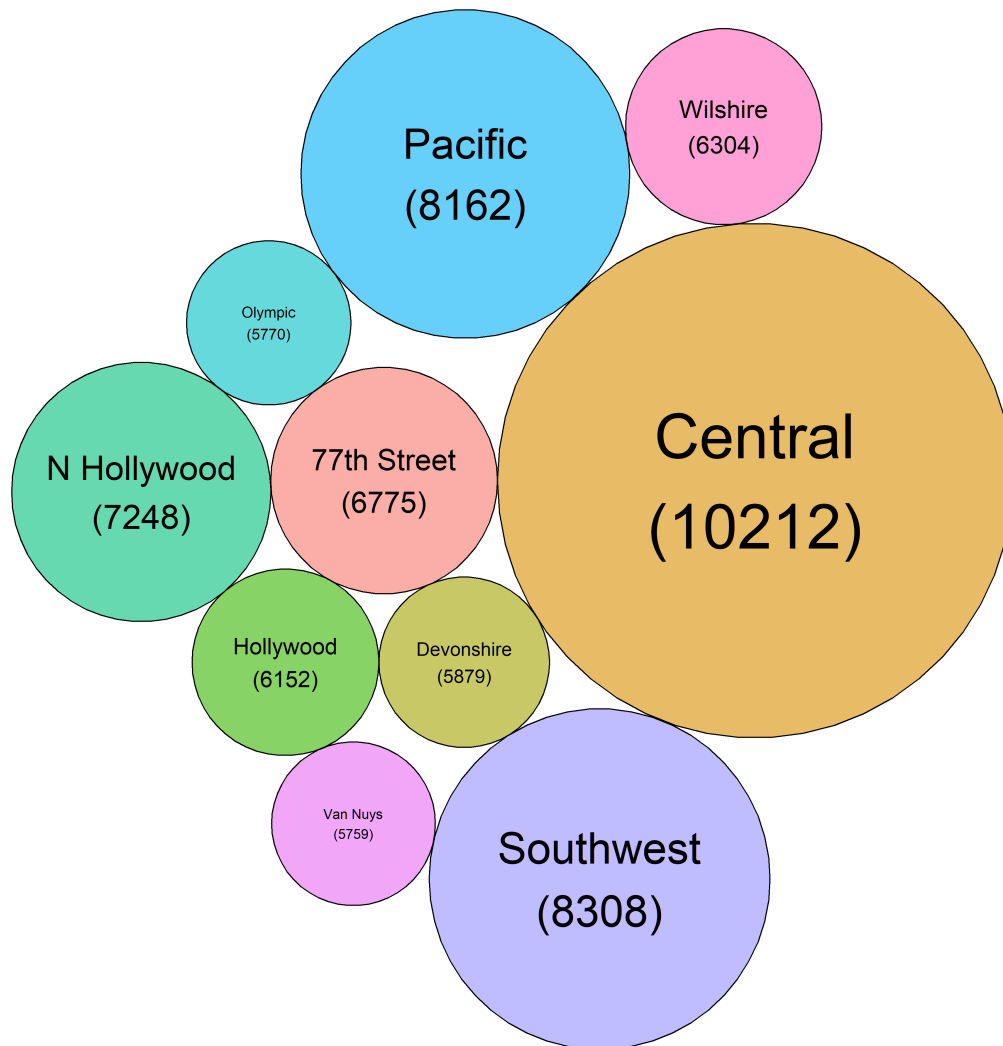
Conclusion:

The map clearly shows two large and two smaller clusters corresponding to areas where the majority of these offences (assaults on minors) occur, indicating where preventive measures in this regard should be intensified.

No clear pattern is evident regarding the victims' sex.

5 Areas most affected by crime

This chart shows 10 areas with the highest crime rate. The diameters of the circles are proportional to the number of reported crimes in the respective areas. Exponential transformation was applied to better highlight the differences.

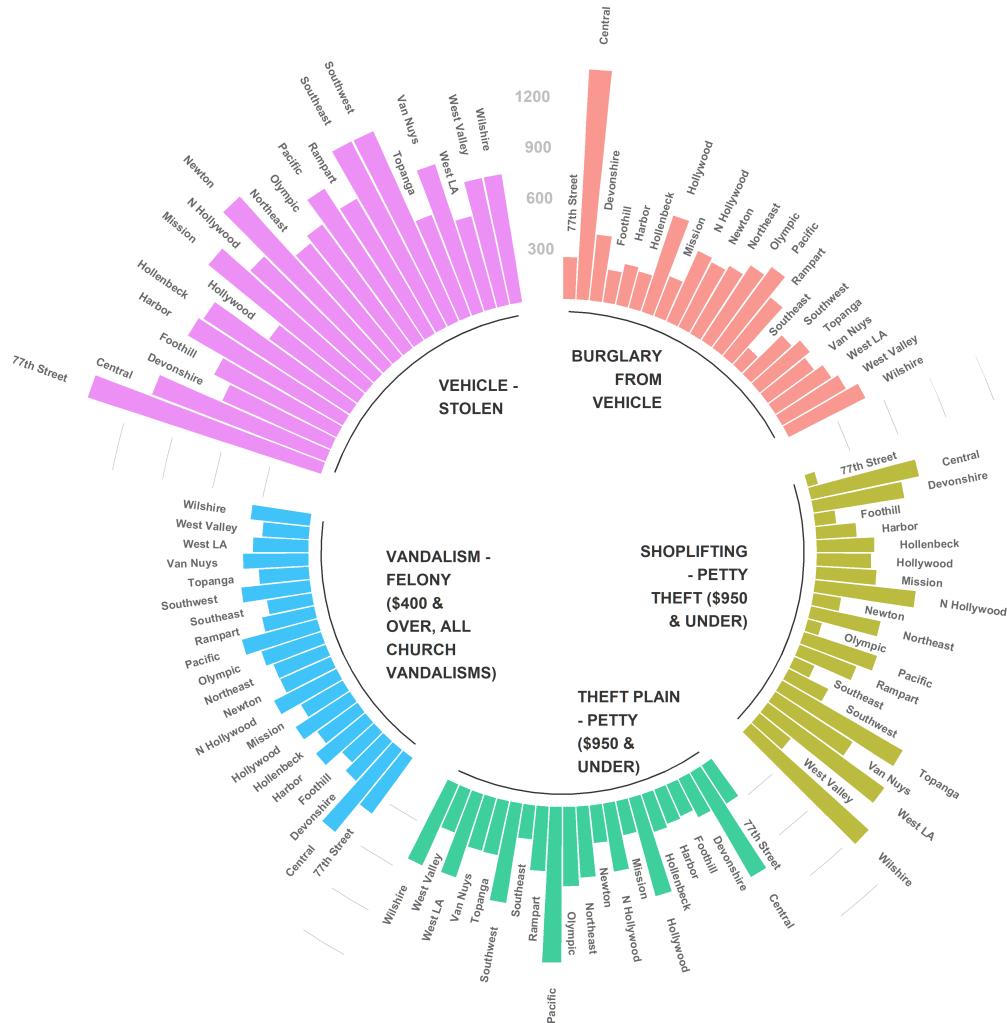


Conclusion:

Most reports are from the Central area, followed by Southwest and Pacific.

6 Crime distribution by area

The chart below shows crime distribution in the LA region by area. Five most common offences are presented.

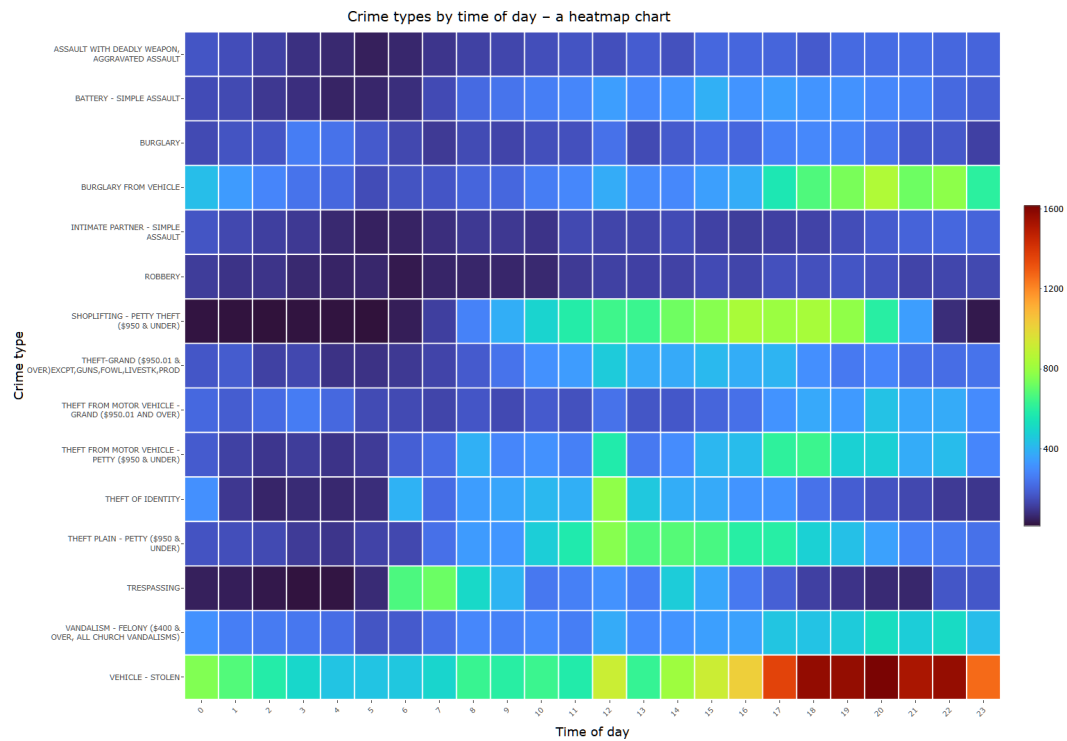


Conclusion:

For certain crimes there are marked differences in the number of reports depending on area. For instance, “BURGLARY FROM VEHICLE” occurred overwhelmingly in the “Central” area (with more than twice as many reports as in any other area). Other offences show more homogeneous distribution (e.g. “VANDALISM”).

7 Crime types by time of day

The chart below shows a heatmap of the probability of specific crimes depending on time of day. Fifteen most common offences are presented.



Conclusion:

- Vehicle-related crimes (stealing or burglary from vehicle) are committed significantly more often during evening hours, starting around 5:00 PM.
- Most cases of theft occur in the middle of the day.
- Trespassing is clearly limited to early morning hours.
- Offences such as burglary are equally distributed throughout the day.