Advanced data visualization

Experiment-4

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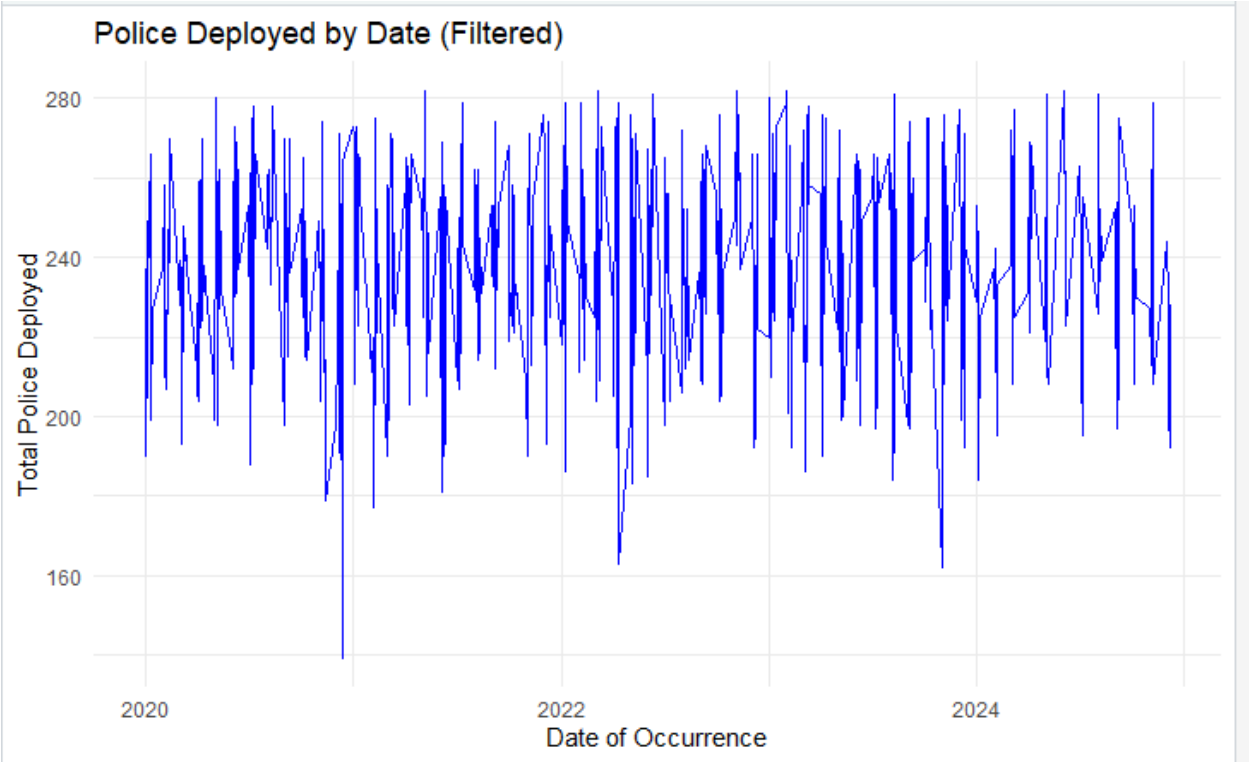
Aim: Create Basic charts using R on dataset Crime or Police/law and order**.**

Dataset description: The dataset covers crime reports with details on the date, time, city, and description of crimes in India. Below is the brief description of each attribute:

- **Report Number**: A unique identifier for each crime report.
- **Date Reported**: The date when the crime was officially reported to the authorities.
- **Date of Occurrence**: The date when the crime took place.
- **Time of Occurrence**: The exact time the crime occurred.
- **City**: The city where the crime occurred.
- **Crime Code**: A numeric code representing the type of crime.
- **Crime Description**: A textual description of the type of crime committed.
- **Victim Age**: The age of the victim at the time of the crime.
- **Victim Gender**: The gender of the victim.
- **Weapon Used**: The type of weapon used in the crime (if any).
- **Crime Domain**: The category of crime (e.g., violent or non-violent).
- **Police Deployed**: The number of police officers deployed to respond to the crime.
- **Case Closed**: Whether the case was closed (`Yes` or `No`).
- **Date Case Closed**: The date when the case was officially closed, if applicable.

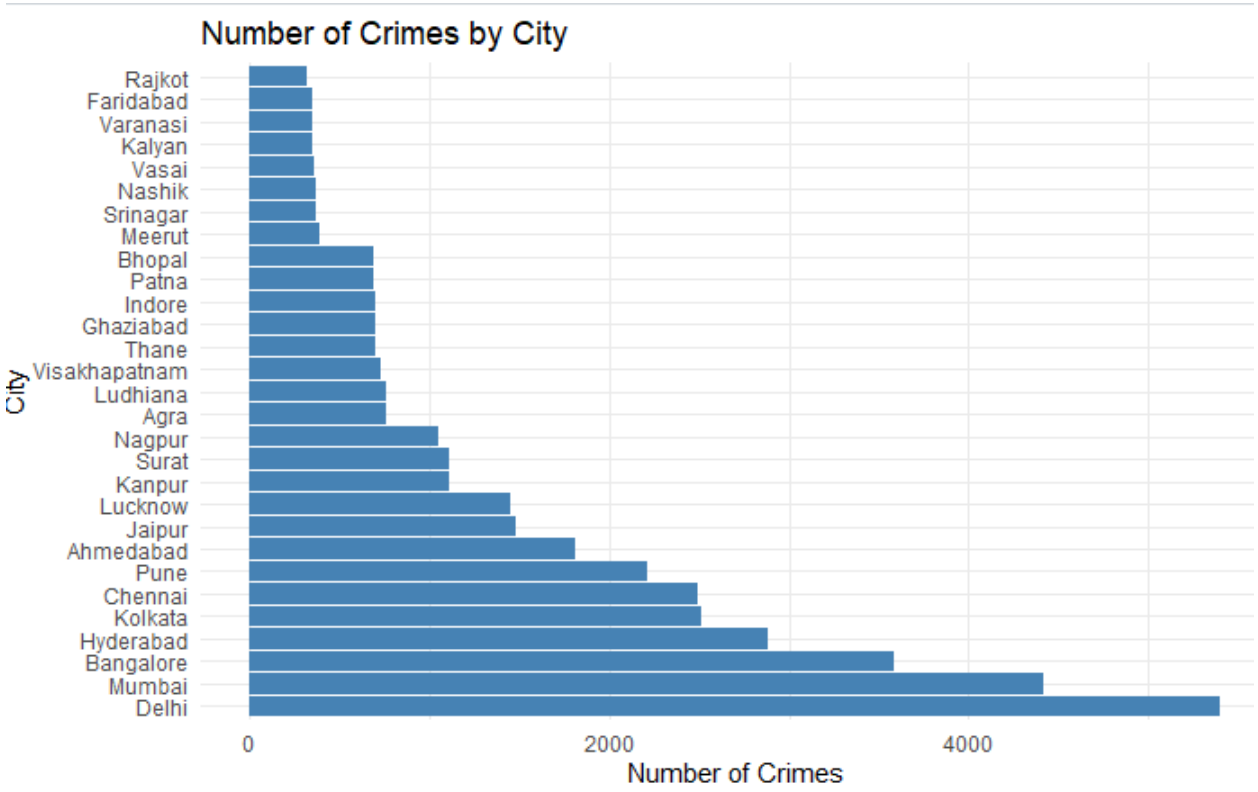
Charts analysis:



1. Police Deployed by Date

This line chart displays the trend of police deployment over time. Key observations include:

- **Variance**: The plot shows considerable fluctuation in the number of police deployed across the date range from 2020 to 2024. This suggests variable law enforcement response, which could be influenced by the severity of crimes, special events, or policy changes over time.
- **Trend Analysis**: There is no clear upward or downward trend, indicating that the total police deployment might be relatively stable across the years. The variations appear to be short-term.
- **Data Spread**: The deployment numbers vary mainly between 160 to 280 officers, with few extreme peaks or dips.

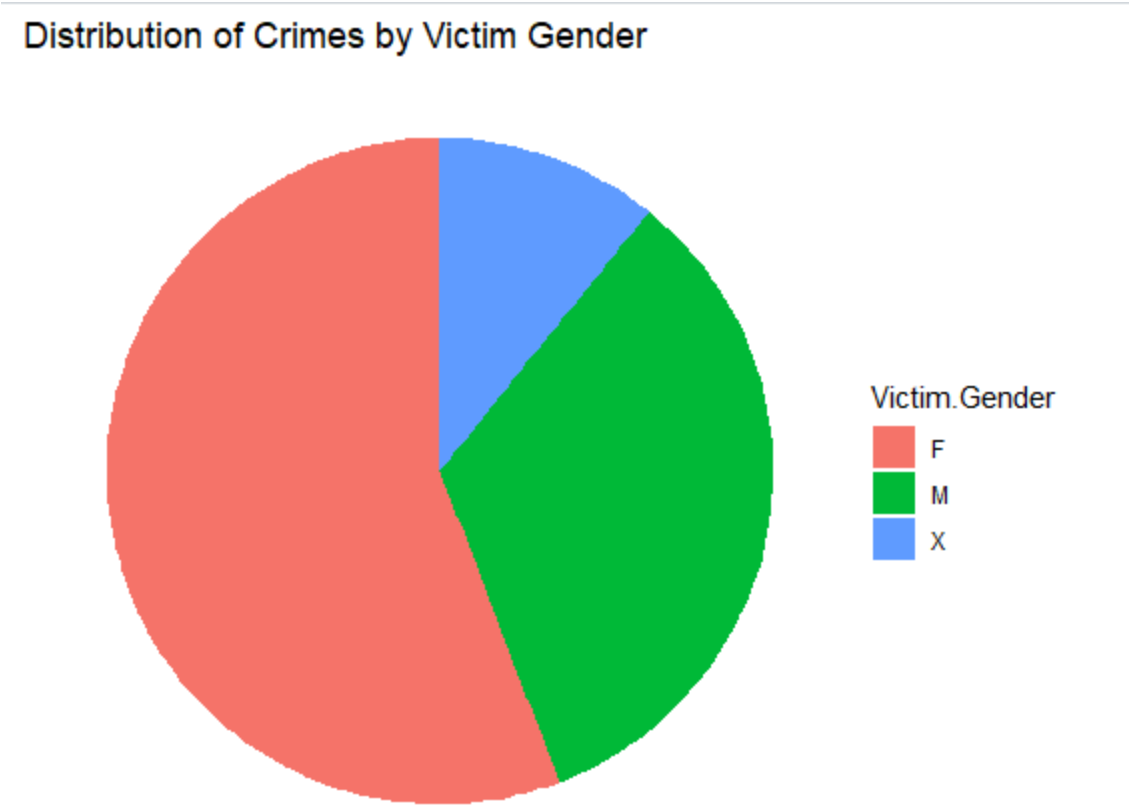


2. Number of Crimes by City

- **High Crime Cities**: Delhi, Mumbai, and Hyderabad feature the highest numbers, suggesting they are hotspots for criminal activities, possibly due to larger populations and more reporting facilities.
- **Low Crime Cities**: Cities like Rajkot and Faridabad have significantly fewer crimes reported, which could be due to smaller populations or possibly less crime.
- **Urban vs. Rural**: The chart might also reflect an urban-rural divide, where more urbanized cities have higher reported crimes.

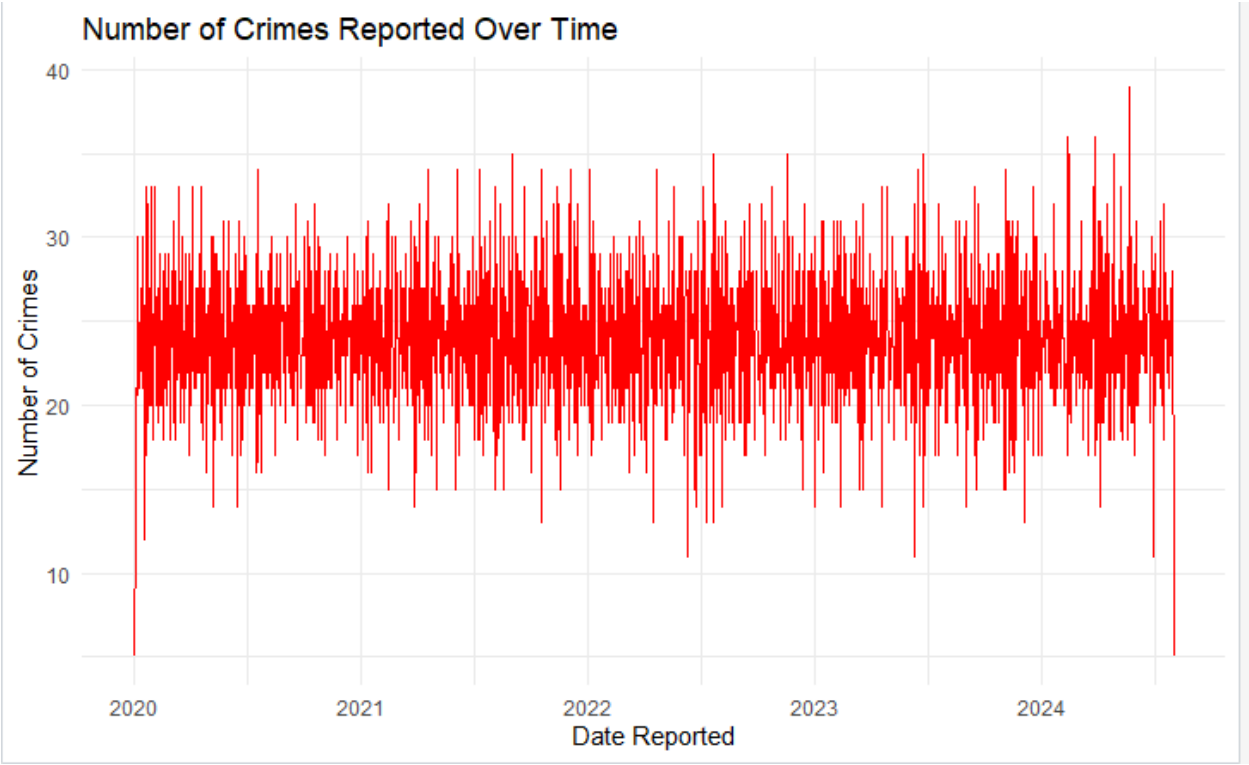
3. Distribution of Victim Age

- **Age Group**: The distribution is relatively uniform, with a slightly higher frequency in the 30s to 40s age range. This could indicate that individuals in these age groups are more susceptible to crimes or more likely to report them.
- **Children and Elderly**: The frequency of crimes involving very young and elderly victims is notably lower, which might be due to these groups being less exposed to common crime environments or less likely to report crimes.
- **Policy Implications**: Understanding the victim age distribution can help in tailoring preventive measures and resources to demographics more at risk.



4. Distribution of Crimes by Victim Gender

- **Female Victims (F)**: The red segment occupies more than half of the pie chart, suggesting that females are more often victims of crimes. This could indicate a higher vulnerability or a higher likelihood of reporting crimes among females.
- **Male Victims (M)**: The blue segment, while smaller than the red, still represents a substantial portion of the chart. This shows that males are also significantly affected by crimes, though to a lesser extent than females.
- **Non-Binary/Unspecified Victims (X)**: The green segment is the smallest, indicating that individuals who do not identify as male or female or whose gender has not been specified are less frequently victimized. This could be due to a smaller population size or underreporting.



5. Number of Crimes Reported Over Time

- **Overall Trend**: The graph shows a fluctuating pattern in the number of crimes reported over the years. There are noticeable peaks and troughs, indicating periods of higher and lower crime rates.
- **High Frequency Periods**: Certain periods, particularly around mid-2021 and late 2023, show higher spikes in the number of crimes reported. This could indicate specific events or conditions that led to increased crime rates during these times.
- **Low Frequency Periods**: There are also periods with lower crime reports, such as early 2020 and mid-2022. These dips could be due to effective law enforcement measures, seasonal variations, or other factors reducing crime rates.

Conclusion: In this experiment with the crime dataset, various basic charts were successfully created using R to visualize critical aspects of crime data, enhancing the understanding and accessibility of complex crime statistics. The charts created included a line chart showing the police deployment over time, a bar chart categorizing the number of crimes by city, a histogram displaying the age distribution of victims, a pie chart on the distribution of crimes by victim gender, and another line chart depicting the number of crimes reported over time. These visualizations provided a multidimensional view of the data, highlighting key trends such as crime hotspots, demographic vulnerabilities, and temporal variations in crime occurrence and police response.