Experiment no 4

Aim :
Create basic charts using R programming language on dataset Crime or Police / Law and Order
● Basic - Bar chart, Pie chart, Histogram, Timeline chart, Scatter plot, Bubble plot
● Write observations from each chart

Objectives:
● To understand and apply basic data visualization techniques in R.
● To create various types of charts (Bar chart, Pie chart, Histogram, Timeline chart, Scatter plot, Bubble plot) using a crime-related dataset.
● To interpret and analyze the data through visual representations.

Theory:
Data visualization is an essential skill in data analysis that helps in understanding trends, patterns, and relationships within a dataset. R, a powerful statistical programming language, provides a wide range of tools for creating visually appealing and informative charts. In this experiment, we will use basic chart types to analyze crime data and derive insights.

Chart Types:
1. **Bar Chart**
   A bar chart is used to display categorical data with rectangular bars representing the frequency or count of each category.
2. **Pie Chart**
   A pie chart shows the proportion of categories as slices of a pie, useful for comparing parts of a whole.
3. **Histogram**
   A histogram is used to represent the distribution of numerical data by grouping it into bins.
4. **Timeline Chart**
   A timeline chart visualizes data points in chronological order, often used to show trends over time.
5. **Scatter Plot**
   A scatter plot displays the relationship between two numerical variables using points in a Cartesian plane.
6. **Bubble Plot**
   A bubble plot is an extension of a scatter plot where the size of the points (bubbles) represents an additional variable.
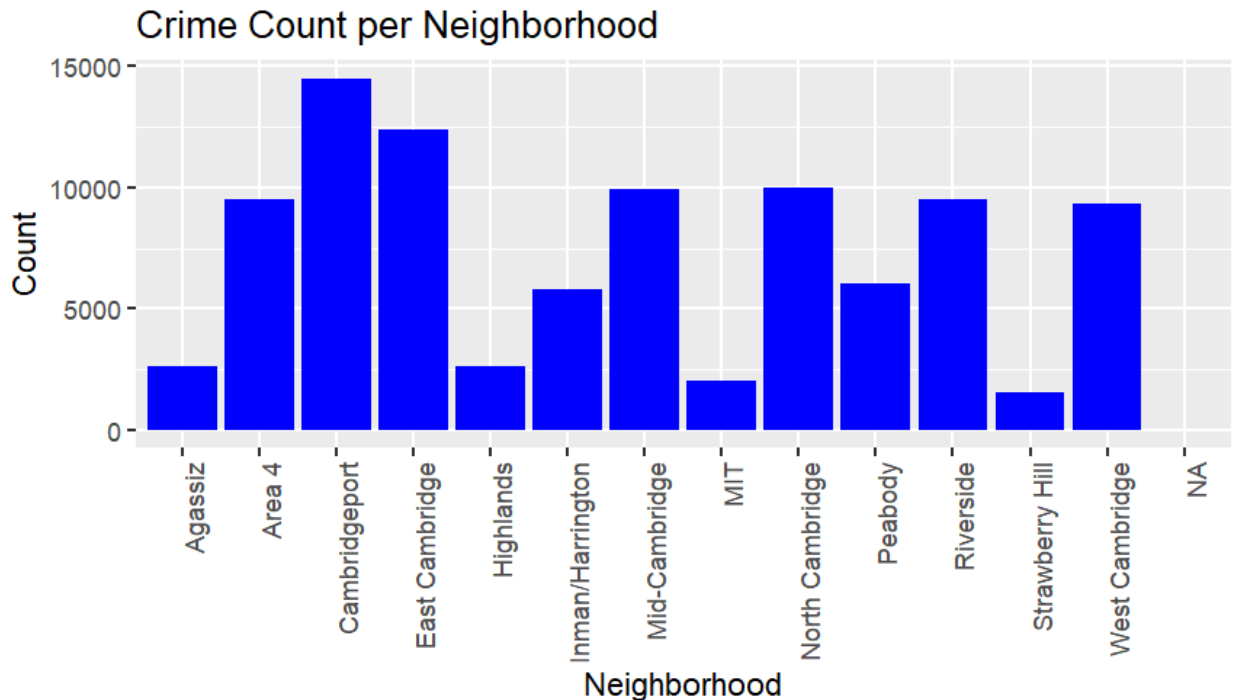
Bharatiya Vidya Bhavan's

Sardar Patel Institute of Technology

(Autonomous Institute Affiliated to University of Mumbai)
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
Bharatiya Vidya Bhavan's

1. Crime Count per Neighborhood

The bar graph illustrates the crime count in different neighborhoods of Cambridge, Massachusetts. Among the neighborhoods analyzed, Cambridgeport and East Cambridge reported the highest crime counts, with figures exceeding 10,000. In contrast, Strawberry Hill and West Cambridge had significantly lower crime rates, with counts below 2,000. The majority of neighborhoods, including Agassiz, Area 4, Highlands, Inman/Harrington, Mid-Cambridge, MIT, North Cambridge, Peabody, and Riverside, exhibited crime counts ranging between 5,000 and 10,000. These findings highlight the varying levels of criminal activity across different regions of Cambridge.

Bharatiya Vidya Bhavan's
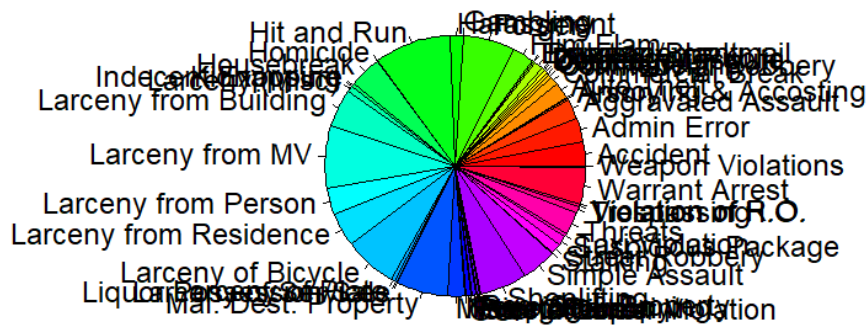
Sardar Patel Institute of Technology

(Autonomous Institute Affiliated to University of Mumbai)
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
Bharatiya Vidya Bhavan's

2. Crime Type Distribution

The provided pie chart illustrates the distribution of various crime types in a given area. Among the crimes reported, Larceny from Building constitutes the largest portion, followed by Larceny from MV and Larceny from Person. Other significant crime categories include Larceny from Residence, Larceny of Bicycle, and Simple Assault. Smaller proportions of the reported crimes fall under Hit and Run, Homicide, Indecent Exposure, Kicking/Spitting, Liquor Law Violations, Malicious Property Damage, Narcotics Violation, Simple Assault, Theft, Threat of Assault, Warrant Arrest, Weapon Violations, and Violations of R.O. These findings offer a comprehensive overview of the predominant crime types within the region.
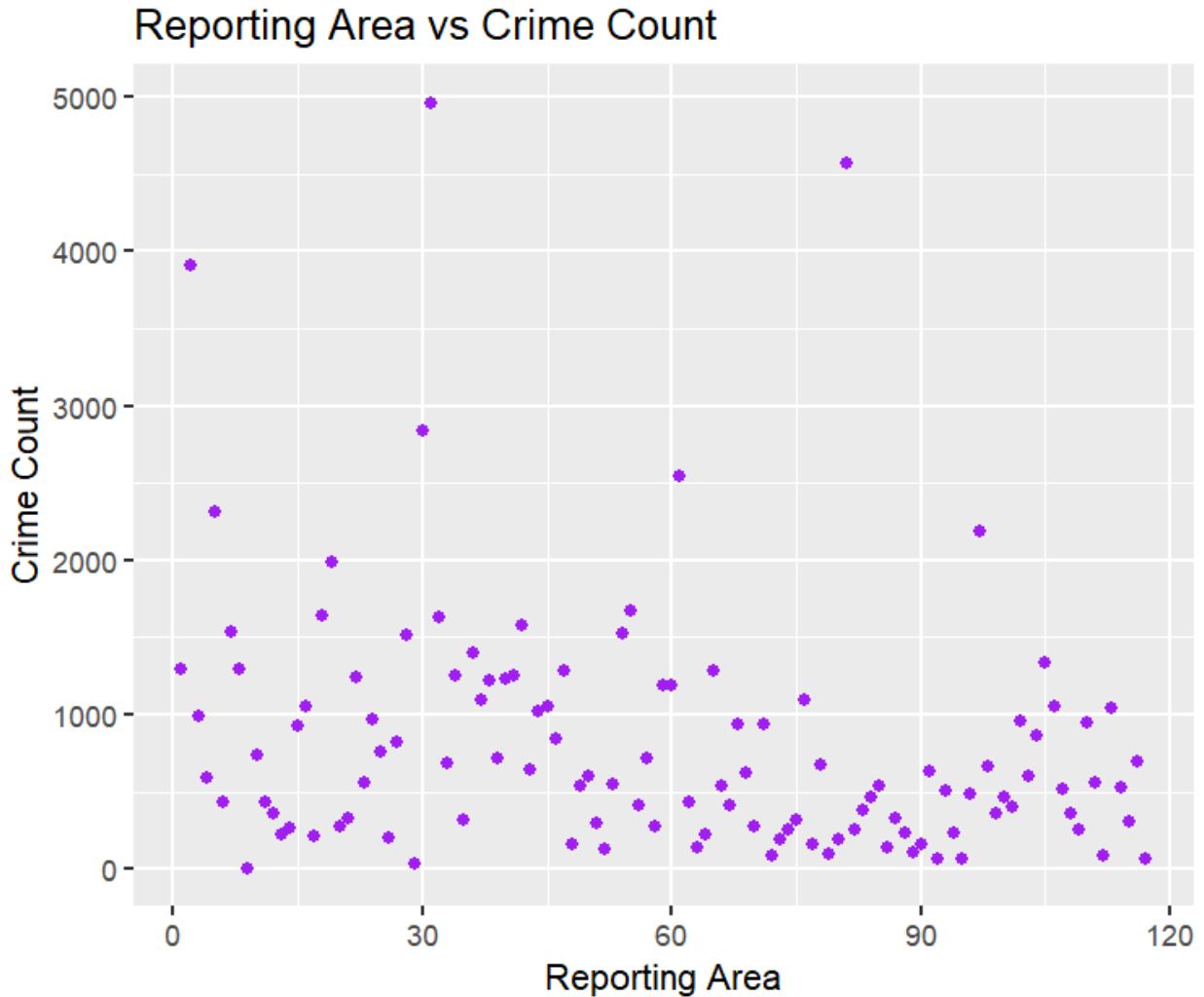
Bharatiya Vidya Bhavan's

Sardar Patel Institute of Technology

(Autonomous Institute Affiliated to University of Mumbai)
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
Bharatiya Vidya Bhavan's

3. Reporting Area vs Crime Count

The scatter plot illustrates the relationship between reporting areas and crime counts. The x-axis represents the reporting areas, while the y-axis indicates the corresponding crime counts. The data points are scattered across the graph, suggesting a moderate positive correlation between reporting areas and crime counts. This means that as the reporting area increases, there is a general trend of increasing crime counts. However, there are also instances where reporting areas with higher numbers do not necessarily have significantly higher crime rates, indicating that other factors may influence the distribution of crime within the region.

4. Bubble Plot of Crime Types by Reporting Area
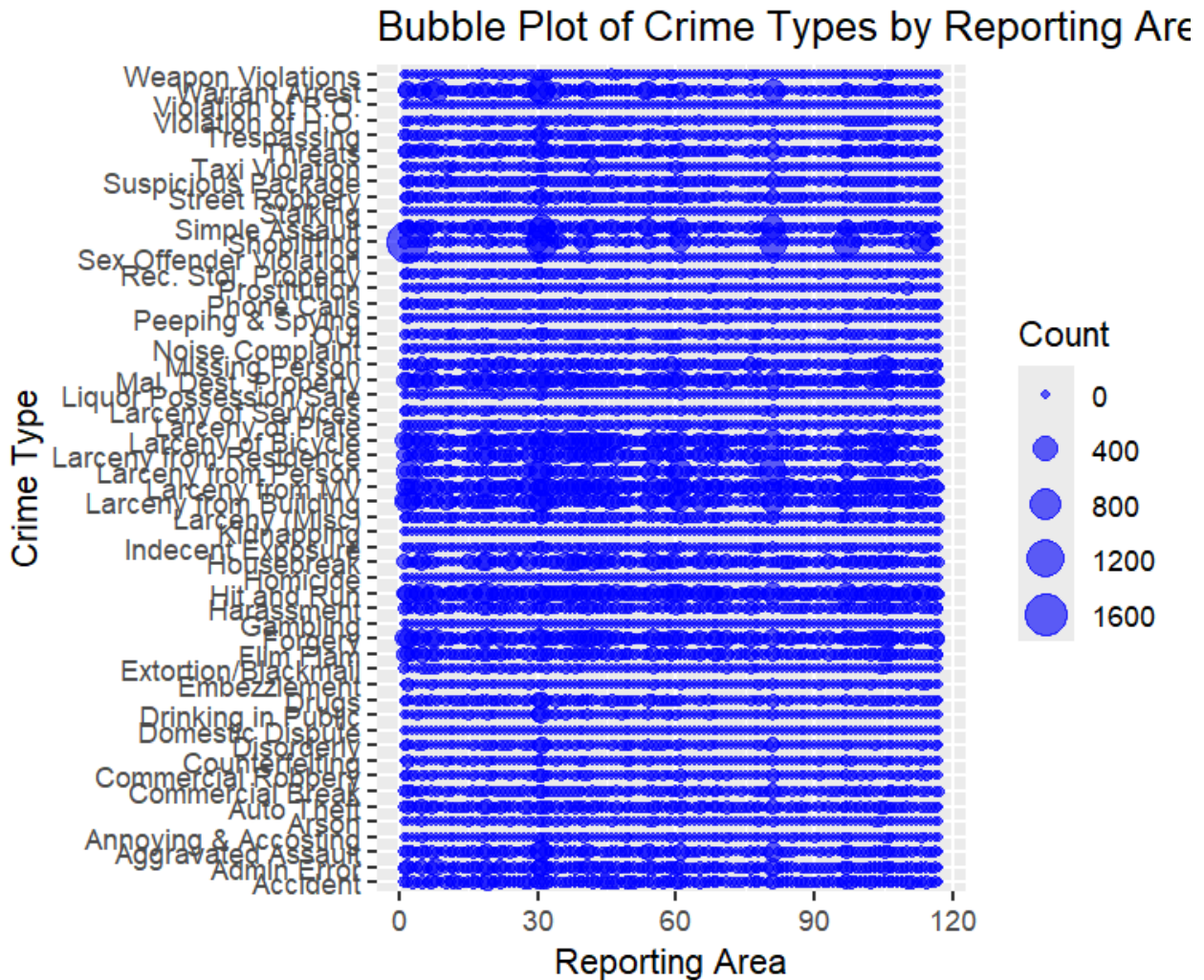
The bubble plot illustrates the distribution of various crime types across different reporting areas. The x-axis represents the reporting areas, while the y-axis indicates the crime types. The size of each bubble corresponds to the crime count for a particular crime type within a specific reporting area. The bubble plot reveals that certain crime types, such as Larceny from Building, Larceny from MV, and Larceny from Person, are more prevalent in multiple reporting areas, as evidenced by the larger bubbles. In contrast, some crime types, like Homicide and Extortion, appear less frequently across the reporting areas. The plot also highlights the varying levels of criminal activity within different reporting areas, with some areas exhibiting higher counts of certain crimes compared to others.
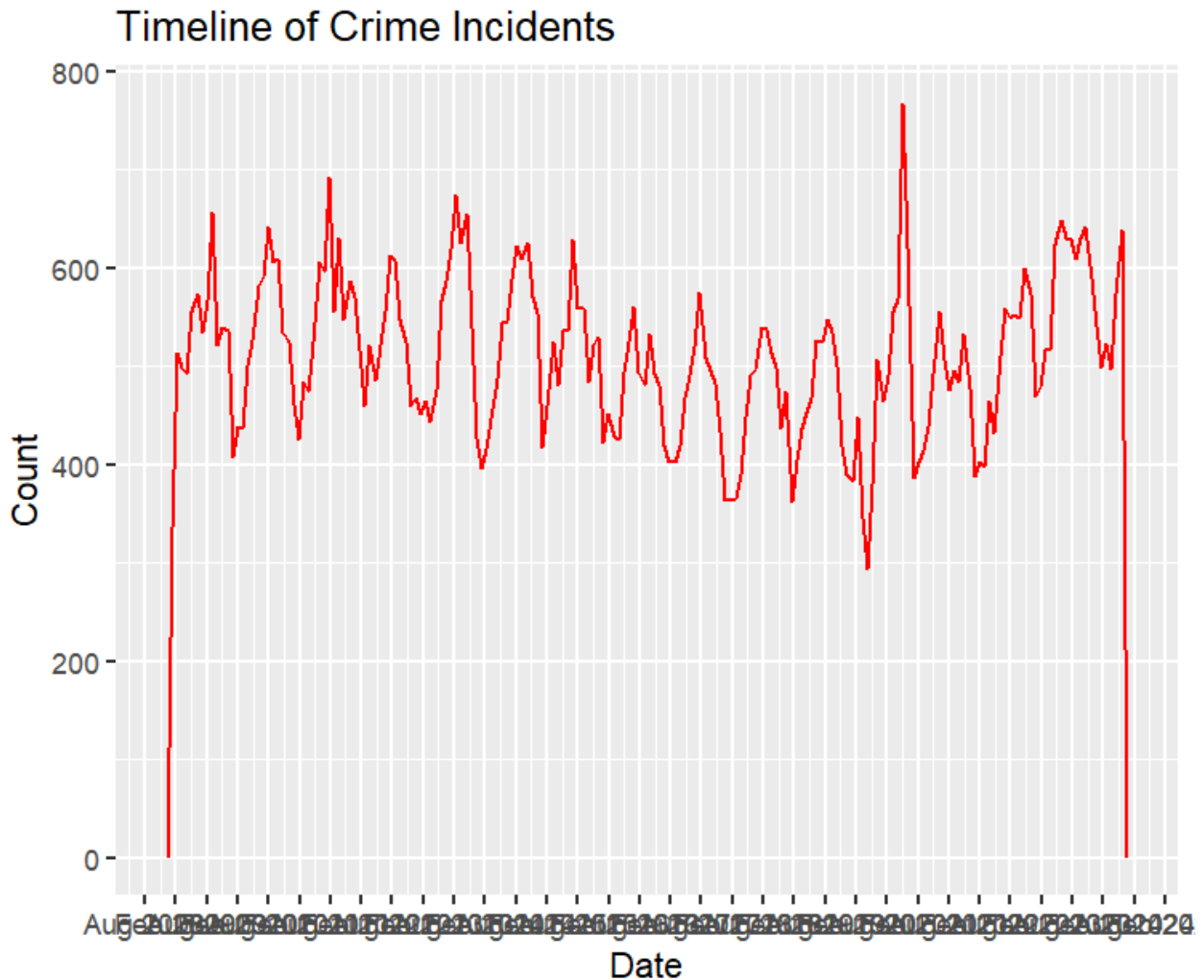
Bharatiya Vidya Bhavan's

Sardar Patel Institute of Technology

(Autonomous Institute Affiliated to University of Mumbai)
Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
Bharatiya Vidya Bhavan's

5. Timeline of Crime Incidents

The line graph illustrates the temporal distribution of crime incidents over a specific period. The x-axis represents the date, while the y-axis indicates the crime count. The line plot reveals a fluctuating trend in crime incidents, with periods of increased activity followed by periods of decreased activity. Overall, the graph suggests a relatively consistent level of crime throughout the analyzed time frame, with minor variations in the frequency of reported incidents.

6. Crime Count by Type
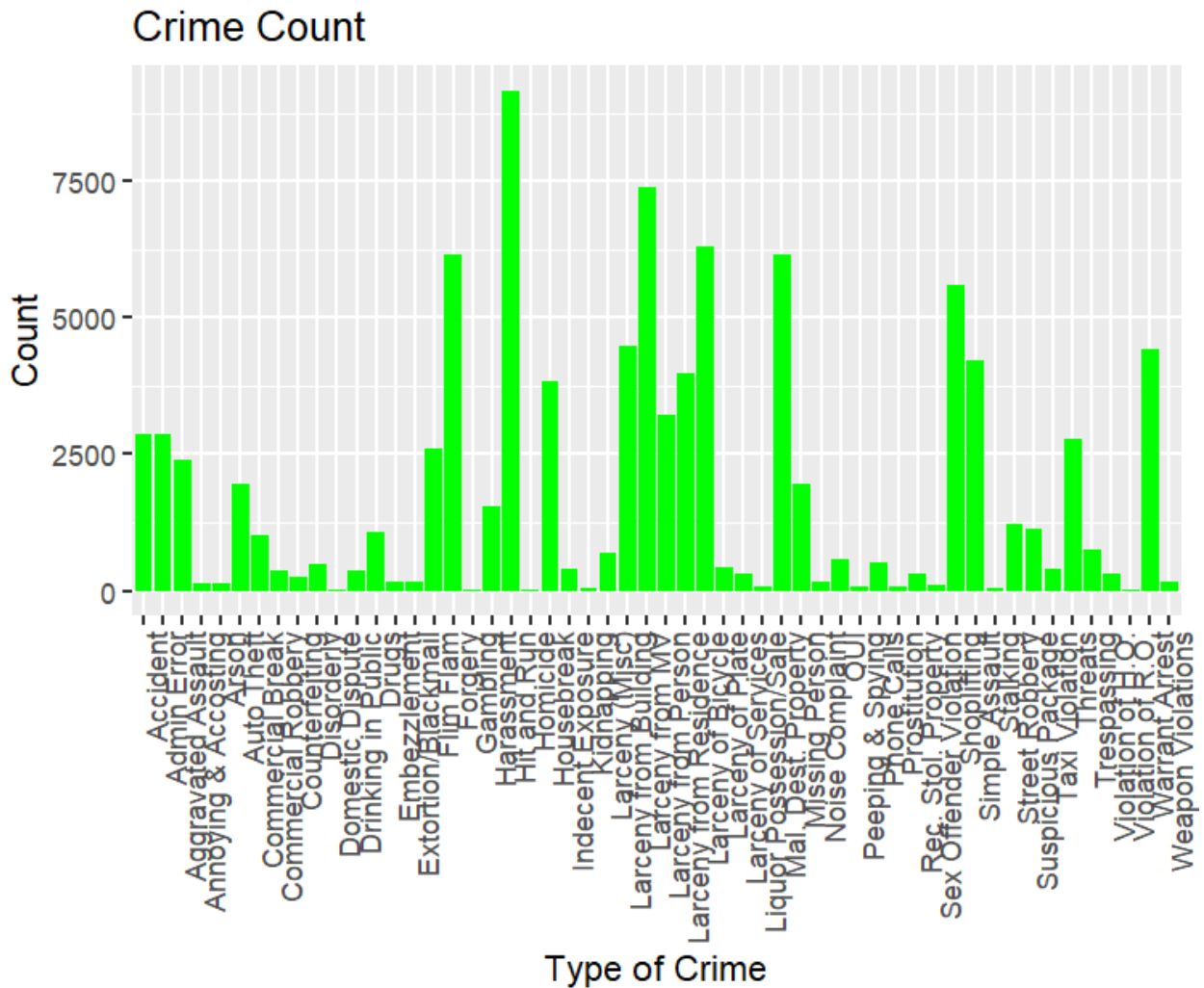
The provided bar graph illustrates the frequency of various crime types in a given area. Among the crimes reported, Larceny from Building and Larceny from MV stand out as the most common, with significantly higher counts compared to other categories. Other notable crime types include Larceny from Person, Larceny from Residence, and Simple Assault, which also exhibit relatively high frequencies. A majority of the remaining crime types, such as Accident, Aggravated Assault, Arson, Auto Theft, and Domestic Dispute, have considerably lower counts. These findings offer a comprehensive overview of the predominant crime types within the region.