Crime Data Analysis - Final Report

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Our project on Crime Data Analysis, where we have studied crime trends across India using interactive visualizations. Our objective was to analyze how crime varies across states, which types of crimes are most prevalent, the region of occurrence of crime in the state like highways, roads, banks, etc., and what happens to juveniles after they are arrested. To achieve this, we developed visualizations that make the data more intuitive and easier to interpret.

This is structured into four key sections:

- **State-wise Crime Distribution** using a Choropleth Map
- **Crime Occurrence Trends** using a Waffle Chart
- **Crime Type Breakdown** using a Word Cloud
- **Juvenile Arrest Pathways** using a Sankey Chart

1 State-wise Crime Distribution

How does crime vary across different states in India?

To analyze this, we will use a choropleth map where each state will be represented with a distinct color intensity based on the total number of reported crimes. The map will include the following features:

- States with higher crime rates will be shaded in darker colors, while those with lower crime rates will be lighter.
- An interactive hover feature will display the exact number of crimes reported in each state.

Insights and Inferences

- **Crime Hotspots:** Darker regions on the map indicate states with higher crime occurrences.

- **Potential Causes:** States with high crime rates may have higher population densities, urbanization, or socio-economic disparities.

- **Crime-Free Zones:** Some states might show minimal or no crime data, possibly due to underreporting or genuinely lower crime rates.
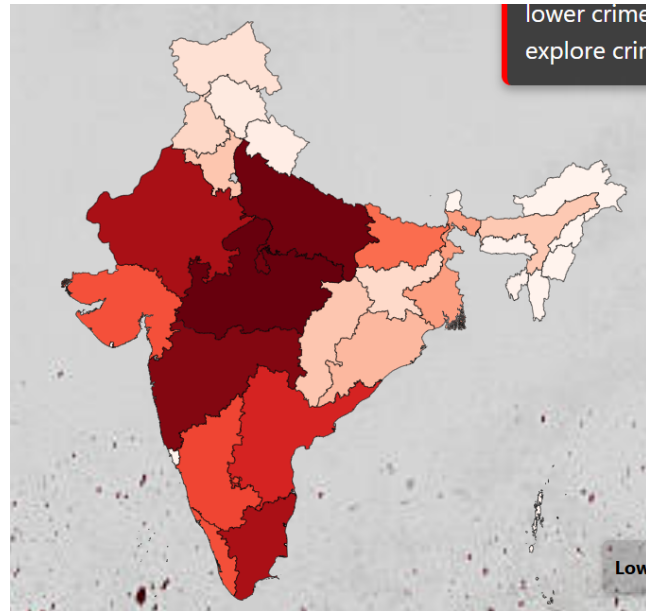

Figure 1: Choropleth Map

2 Crime Occurrence by Region

Where do crimes occur the most?

To analyze this, we used a **waffle chart** that breaks down crime occurrences by location, such as **residential areas, highways, banks, rivers, and other places**. This visualization helps in understanding crime distribution across different environments.

The chart includes:

- **Color-coded blocks** representing different regions where crimes occur.

- **Percentage-based visualization** to highlight the most common crime locations.

- **Interactive elements** where hovering over a block reveals detailed statistics.

Key Insights

- **High-Risk Areas:** Certain locations, such as residential areas report a higher number of crimes.

- **Financial Institution Crimes:** Banks and other financial institutions show a notable crime rate, often related to theft and fraud.

- **Environmental Factors:** Crimes near rivers or isolated places may indicate specific types of offenses like illegal activities or smuggling.
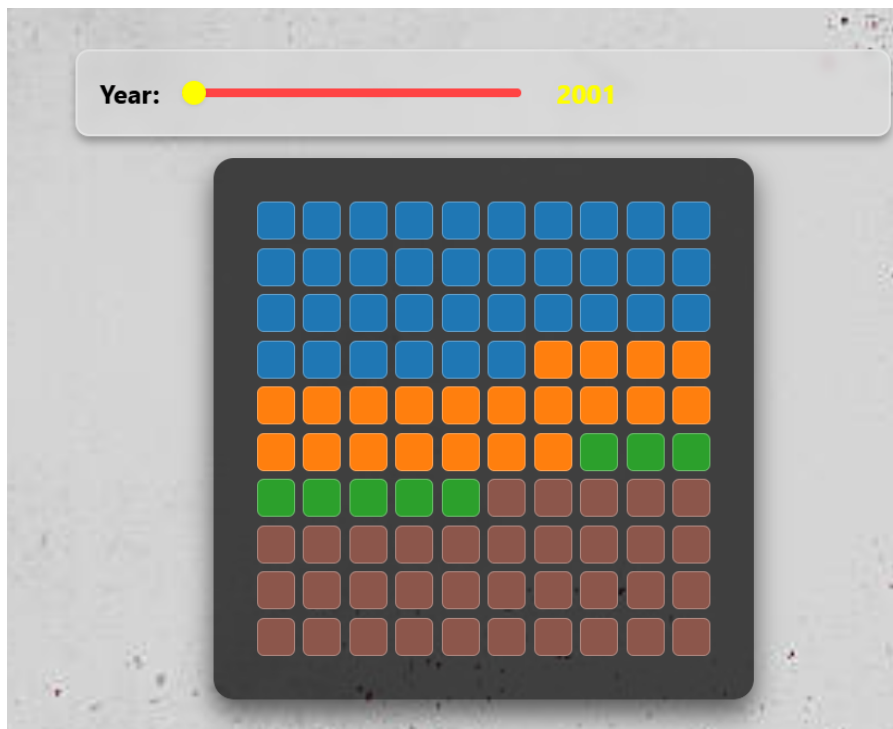
Figure 2: Waffle Chart: Crime Occurrence by Region

3 Crime Type Breakdown by State

What are the most frequently reported crime types in each state?

A word cloud visualization will be used to highlight the most common crimes in different states. Features of this visualization include:

- The size of each word represents the frequency of occurrence for that crime.

- Color variations to differentiate between crime categories.

- Interactive elements where hovering over a word displays additional statistics.

Observations

- **Dominant Crime Types:** Certain crimes may appear more frequently in specific states.

- **Trends in Reporting:** Crime patterns may differ based on geography, culture, and law enforcement efficiency.

- **Policy and Prevention:** Understanding common crime types can help in targeting preventive measures.

Figure 3: Word Chart

4 Juvenile Arrest & their Current Paths

What happens to juveniles after they are arrested?

A Sankey chart will illustrate the journey of juveniles from arrest to various outcomes such as rehabilitation, cases pending, or dealt with fine. The chart will include:

- Flow representation showing how juveniles transition between different legal stages.

- Line thickness representing the proportion of cases following each path.

- Interactive filtering to explore different years or regions.

Insights

- **Rehabilitation vs. Recidivism:** The chart helps visualize whether juveniles are successfully rehabilitated or re-enter the criminal system.

- **Effectiveness of Legal Measures:** A higher proportion of rehabilitated individuals may indicate effective intervention programs.

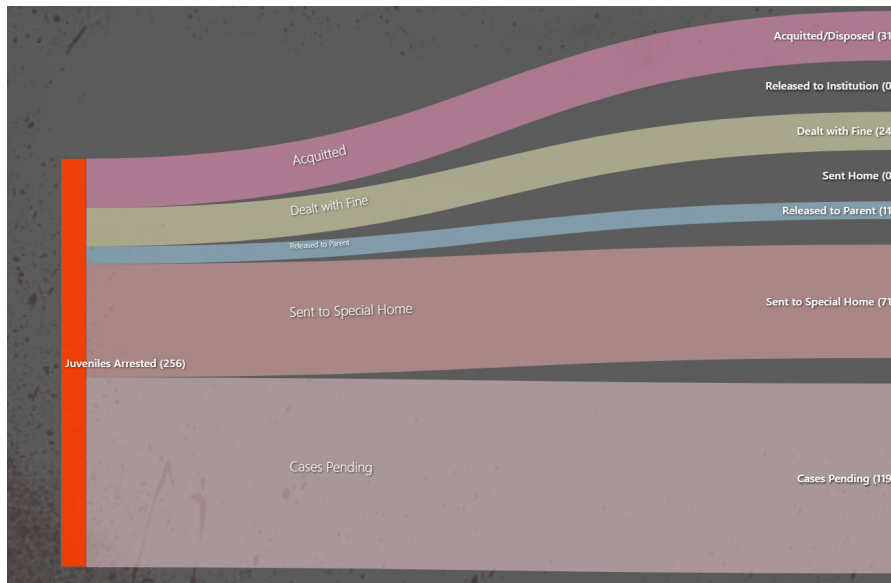- **Regional Differences:** Some states may have better systems for juvenile justice and rehabilitation.

Figure 4: Sankey Chart

5 Contributions

Each member contributed to one visualization. The report writing and website development were then divided among the team members.

- Sravani: Sankey Chart for Juvenile Crime Pathways, word chart and the final report.

- Radha: Waffle Chart for Crime Occurrence Trends, word chart and the final report.

- Mrudani: Choropleth for State-wise Crime Distribution, and the website.