B9DA106 DATA VISUALISATION

Programme	MSc in Data Analytics
Module/Subject Title	Data Visualization
Lecturer	Neeraj Jha
Assessment Number	2
Assignment Title	Practical Assignment – Tableau + Power BI
Group members	
Member 1	Delvin Vallooran Jose (20039903)
Member 2	Muhammed Mukhsith Thekke Mattara (20040105)
Member 3	Eldhose Thelakkattu Benny (20044108)

Objective

The goal of this project is to explore and visualize trends in Indian IPC crimes across states and districts using Tableau and Power BI. The resulting dashboard supports crime monitoring, helps in identifying high-risk regions, and informs strategic resource planning.

Dataset Summary

This dataset contains district-wise records of crimes committed under the Indian Penal Code (IPC) across India from 2001 to 2012. It includes year-wise data on various criminal offenses such as theft, murder, kidnapping, and assault, reported across multiple states and union territories. Organized by district and crime type, the data allows for detailed trend analysis and regional comparisons. Using tools like Tableau and Power BI, users can visualize patterns, identify high-crime areas, and monitor changes over time. The dataset is valuable for government officials, law enforcement, and researchers aiming to support crime prevention and public safety through datadriven insights.

A custom severity classification was created: FATAL:

e.g., Murder, Rape, Dowry Death

SEVERE: e.g., Attempt to Murder, Kidnapping

MODERATE: e.g., Theft, Riots

NORMAL: e.g., Cheating, Forgery

Dataset link : https://www.kaggle.com/datasets/avinashgupta01/01district-wise-crimes-committed-ipc-2001-2012-csv

Intended Users of the Dashboard

Government policy makers, law enforcement agencies, social researchers, and NGOs working on crime prevention and public safety strategies.

Key Visualizations

1. What are the yearly trends of IPC crimes across different severity levels?

- Chart: Line chart with slicer/parameter to switch between severity types

- Insight: This chart shows how fatal, severe, moderate, and normal crimes have fluctuated across years (2001–2012).

- Tools: Tableau used parameters; Power BI used slicers with a SWITCH DAX measure.

2. Which states have the highest number of IPC crimes?

- Chart: Top 10 states bar chart (descending order)

- Insight: Identifies the most crime-prone states to help focus preventive action.

- Tools: Tableau used a Top N filter. Power BI required applying Top N filter with total crime field.

3. What is the crime severity composition in each state?

-Chart: Donut chart with slicer

- Insight Helps understand whether crimes in a selected state are mostly fatal, moderate, or severe.

- Tools: Tableau used filter actions; Power BI used a slicer to update the donut chart.

4. How do crime types vary over time state and district?

- Chart: Multi-line chart (one for each severity level)

- Insight: Reveals which crime types are rising or falling over time across the country.

- Tools: Both tools used YEAR on X-axis and SEVERITY in the legend.

5. Which years and states or district had the highest crime intensity?

- Chart: Heatmap (Tableau) / Matrix with conditional formatting (Power BI)

-Insight: Shows year-over-year variation of IPC crime intensity for each state.

- Tools: Tableau used size and color encoding; Power BI simulated heatmap via matrix + color scale.Filters, Parameters, and Calculated Fields

- **Filters Used:**
  - Year slicer (Power BI)
  - State/UT filter (Tableau + Power BI)
  - District button slicer (Power BI)
- **Parameters:**
  - Tableau: Crime type switcher for donut and line chart
- **Calculated Fields / Measures:**
  - FATAL_CRIMES, SEVERE_CRIMES, MODERATE_CRIMES, NORMAL_CRIMES (both tools)
  - Dynamic title measures in Power BI (e.g., MapTitle)

Insights and Observations

- **IPC crime volumes** rose steadily until 2010, with a minor drop in 2012
- **Moderate crimes** (e.g., Theft, Riots) were most frequent
- Districts like **Patna** and **Mumbai** consistently ranked in top 10
- **Severe and Fatal crimes** are rising in Tier-2 districts, demanding action
- Most states had **Normal crimes as the largest proportion** but hidden fatal crime spikes were identified through drill-down

Similarities Between Tableau & Power BI

- Both support bar, line, donut charts, and map visuals
- Calculated fields are supported in both tools
- Slicers (Power BI) and Parameters (Tableau) enable interactivity
- Filters can be applied to individual charts or across entire dashboards
- Both support drill-downs and tooltips

Example:
Switching between crime types in the line chart was done using parameters in Tableau, and with a slicer + dynamic measure in Power BI.

Differences Between Tableau & Power BI

- **Forecasting**: Built-in in Tableau, requires setup in Power BI
- **Heatmaps**: Native in Tableau, simulated with matrix + conditional formatting in Power BI
- **Visual formatting**: Tableau is more intuitive with layout and design; Power BI is more data-driven
- **Parameter flexibility**: Tableau parameters can control multiple sheets, while Power BI slicers are chart-specific unless synced
- **Tooltip control**: Easier in Tableau with custom tooltips

Example:
In Tableau, donut chart titles were dynamically set using parameters, while in Power BI, a DAX measure and card visual were used.

Tableau made exploratory charting fast and fluid, especially for forecasting and story-style dashboards. Power BI, on the other hand, offered better control over filtering, dynamic components, and conditional visuals. Using both tools enhanced my understanding of visual communication and user interactivity.

Conclusion

The dashboard effectively visualizes Indian IPC crimes from 2001 to 2012 and allows users to interactively explore trends by state, district, year, and severity. It supports early detection of crime spikes and helps prioritize districts/states for action. Using both Tableau and Power BI also highlights the strengths and differences between the tools.