II: Data Visualization --

Link to dataset : Crimes Against Women

This dashboard analyses crimes against women in India, focusing on crime types, frequency, and regional distribution
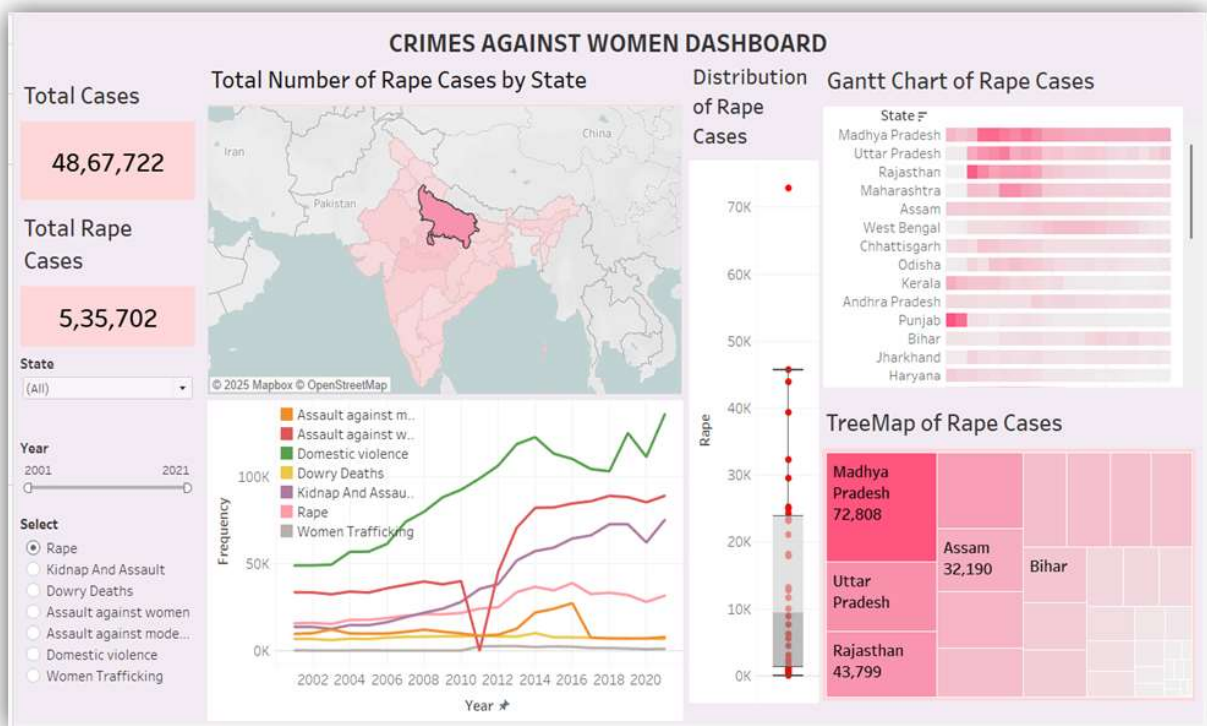
National Crime Records Bureau (NCRB) 2023: Reported crimes against women in India rose by **20%** in the past five years. Crimes against women rose from 1,23,000 in 2020 to 1,43,000 in 2022 doesn't immediately convey the **rate of increase** or **magnitude** of the problem.

Hence Figures Alone Increase Cognitive Load. Visualization shifts the mental effort required for understanding numbers into a perceptual task, which is much easier for the human brain to handle.

By presenting crime against women through visuals like graphs, charts, and maps, we reduce this load required to analyse raw data and understand the gravity of the situation.

Semantics-: Crime Statistics, Gender-Based Violence, Temporal Analysis, Assault on Women, Insult to Modesty, Human Trafficking, Importation of Girls, Year-on-Year Trends and Crime Correlation

Data Abstraction :

DATA TYPE-: TABLE

Column	Type	Range/ Cardinality	Description
STATE/UT	Categorical	35	
DISTRICT	Categorical	640	
Year	Ordinal	2001–2021	
Rape	Quantitative	0–4,000+	Number of rape cases reported.
Kidnapping and Abduction	Quantitative	0–5,000+	Number of kidnapping and abduction cases reported.
Dowry Deaths	Quantitative	0–200+	Number of dowry-related deaths reported.
Assault on women with intent to outrage modesty	Quantitative	0–20,000+	Number of assault cases with intent to outrage modesty.

Insult to modesty of Women	Quantitative	0–3,000+	Number of cases of insulting the modesty of women reported.
Cruelty by Husband or his Relatives Domestic Violence	Quantitative	0–10,000+	Number of cases of domestic violence or cruelty.
Importation of Girls	Quantitative	0–50+	Women trafficking

<u>Task Abstraction</u> :

<u>Problem Breakdown-:</u>

- **Identify Trends**: We observe crime patterns over time.
- **Compare**: Crime distribution across states.
- **Correlate**: See if certain crimes rise together.
- **Summarize**: Provide an overview of total cases.
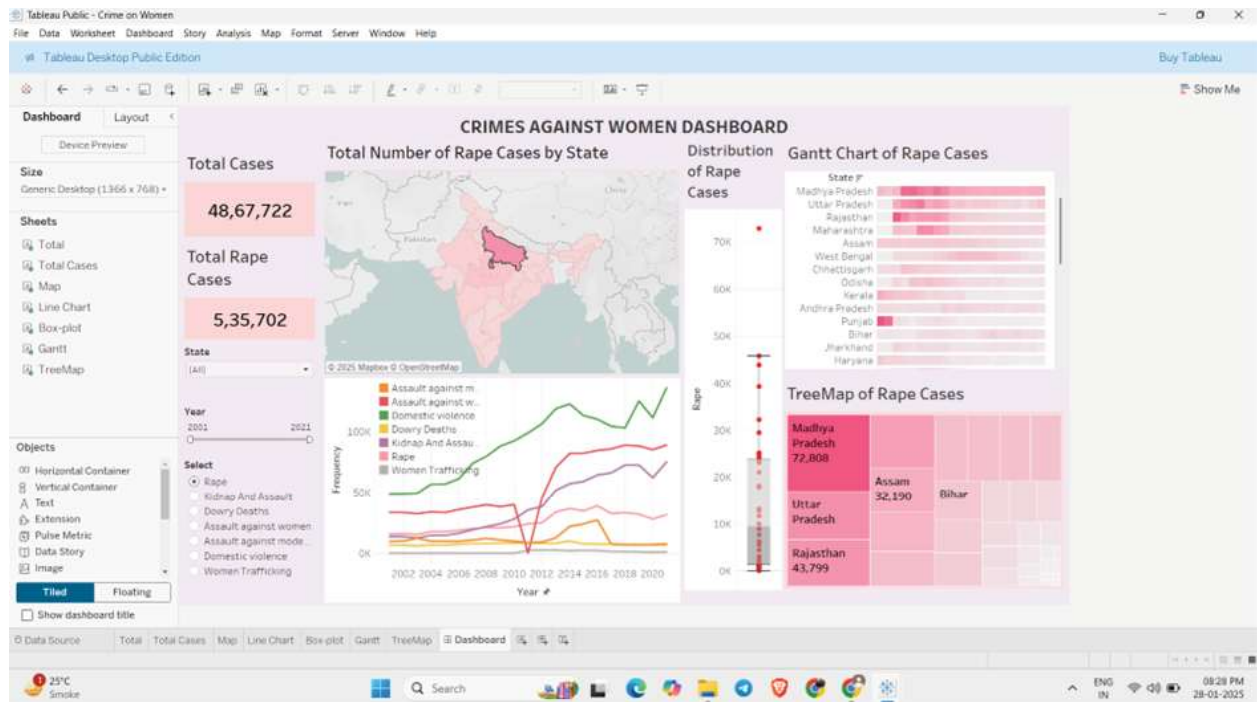- **Filter & Drill Down**: Allow users to focus on specific years, states, or crime types.

Task Objectives and Visual Encoding Scheme (Idiom)

- **Present**: Show violence against women summary.
- **Analyse**:
  - **Find Trends** → Line Chart
  - **Compare States** → Choropleth Map
- **Explore**:
  - **See Time-Based Progression** → Gantt Chart.
  - **Find Contribution of Each State** → Treemap

Marks, Channels, Action and Target and Scalability For Visualizations :

Visualization	Marks (Dimensionality)	Channels	Action	Target
Choropleth Map (Crime type by State)	2D (Polygons)	Colour (State type)	Explore (Discover) Browse	Space (States) Topology
Line Chart (Crime Trends Over Time)	1D (Lines)	Colour (Crime Type)	Explore (Identify trends)	Attribute (Crime occurrence over time)
Gantt Chart (State-wise Crime type over Time)	1D (Bars)	Colour (Intensity for cases)	Explore (Compare)	Attribute (State-wise Case)
Tree map (Crime by State)	2D (Rectangles)	Size (Proportional to cases), Colour (Magnitude)	Query -: Identify (Compare contributions)	(Cases by state)
Boxplot (Crime Type Distribution)	1D (Box, Whiskers)	Shape (Box structure)	· Analyse (Understand distribution) · Locate	· Trends (Spread of cases) · Outliers

Narrative Covered through the Dashboard :

An Alarming Crisis
Crimes against women have surpassed **48 lakh cases**, with **1.58 lakh dowry deaths** reported—an unimaginable toll that reflects the pervasive nature of this issue in society.

Where It's Worst
A **choropleth map** reveals the harsh truth: states like **Uttar Pradesh, Bihar, and Madhya Pradesh** emerge as epicentres of dowry deaths and rapes where the problem is most severe.

Getting Better or Worse?
Trends over time, shown in a **line chart**, reveal troubling spikes, especially around **2012-2013**, related to policy changes. We try to analyse are we making enough progress?

Hidden Stories in the Data
A **box plot** exposes the **uneven distribution** of dowry deaths, with some states showing extreme outliers. These outliers need research of regions facing a higher burden of this crisis.

State-by-State Over Time
A **Gantt chart** tracks dowry deaths across states, showing periods where certain regions experienced **sharp surges**, pushing us to explore what triggered these changes.

The Biggest Contributors

Finally, a **tree map** drives the point home: states like **Uttar Pradesh** dominate the narrative, contributing significantly to dowry deaths and rapes highlighting the urgency to act in these regions.