Qlik Analysis of Road Safety and Accident Patterns in India

Abstract

India's road safety and accident patterns analyzed using Qlik Sense. Leveraging datasets to discover high-risk areas, times, and causes of accidents for road safety improvement. The support covers the complete process, including:

1. realize the problem
2. Collecting data
3. Creating visual images and dashboards
4. Performance testing

1. Define Problem / Problem realize

1.1 Specify the Business Problem

Road safety is a critical issue in India, where the incidence of road accidents and fatalities is alarmingly high. This thesis aims to analyze and understand the patterns and factors conducive to road accidents in India. The goal is to discover high-risk areas, times, and causes of accidents to develop effective strategies for reducing accidents and enhancing road safety.

1.2 Business Requirements

This project requires comp data analysis to uncover patterns and trends in road accidents. Key essentials include:

- Collecting and examining extensive road accident data.
- Presenting analysis results through user-friendly dashboards created in Qlik Sense, offering actionable insights.
- enforce real-time updates in dashboards to reflect the latest trends and incidents, ensuring data remains current.
- Enabling customizable filters to allow users to filter data by various parameters such as location, time, and cause of accidents.
- optimize dashboards for performance efficiency to ensure responsiveness and the ability to handle large datasets in effect.

1.3 Literature Survey

The study of road safety and accident analysis has been extensively covered in various key literature.

- The "Global Status Report on Road Safety" by WHO (2018) highlights the global impact of road traffic injuries and the importance of comp data analysis for improving road safety.
- The "Road Accidents in India" report by the Ministry of Road Transport and Highways (2020) provides detailed statistics and analysis of road accidents in India, focusing on key factors and trends.
- "Traffic Safety and Human Behavior" by Porter (2011) explores the influence of human conduct on road safety and stresses the importance of behavioral analysis in accident prevention.

1.4 Social or Business Impact

Analyze road safety data, in effect, can have important social and business impacts:

- discover high-risk factors and areas allows us to implement targeted interventions, thereby reducing road accidents and fatalities.
- Data insights can help policymakers draft informed and effective road safety policies.
- Reducing road accidents can result in important system benefits, including lower healthcare costs, reduced loss of productivity, and minimized substructure damage.
- in the end, improving road safety enhances the overall well-being of social clubs, ensuring safer travel for all citizens.

2. Data Collection

2.1 Collect the Dataset

For this analysis, we need datasets that cover various critical aspects:

- **Accident Data**: information on road accidents including date, time, location, badness, and cause.
- **Vehicle Data**: Details about the vehicles involved in accidents, including type, condition, and enrollment details.
- **Demographic Data**: Insights into the single involved in accidents, covering their age, gender, and driving knowledge.
- **Situation Data**: information about weather, road conditions, and vileness at the time of accidents.

You can access the dataset through this link: Dataset Link

2.2 Connect Data with Qlik Sense

In Qlik Sense, we follow these steps to process the data:

1. **Import Datasets**: Load the collected datasets into Qlik Sense.
2. **Data Integration**: Combine different datasets into a comp data model.
3. **Data proof**: Rigorously check the data to ensure its accuracy and completeness.

3. Data Preparation

3.1 Prepare the Data for visual image

The data readying process involves several key steps:

- **Data Cleaning**: Remove any duplicate or irrelevant records.
- **Data shift:**Convert data into suitable formats for analysis, such as adjusting date formats and normalizing collected data.
- **Data Collection and Grouping:**Collect data and group it by various dimensions such as time and location to ease comparative analysis.
- **Creating Measured Fields**: Create derived metrics, such as conniving the accident rate per 100,000 population, to gain additional insights.

4. Data visual image

4.1 Number of Unique visual image

The data visual image process includes creating various types of visual images to convey insights in effect. We use heat maps to show accident density by location, and time series charts display trends over time (such as monthly or yearly accident rates). in addition, we employ bar charts to compare accident causes, vehicle types, and demographics, while pie charts illustrate the dispersion of accidents by badness.Scatter plots analyze the correlation between different factors, such as weather and accident badness. in addition, geospatial maps envision accident locations on a map with interactive layers.
Link to the visualization- Visualization of road accidents in India Link

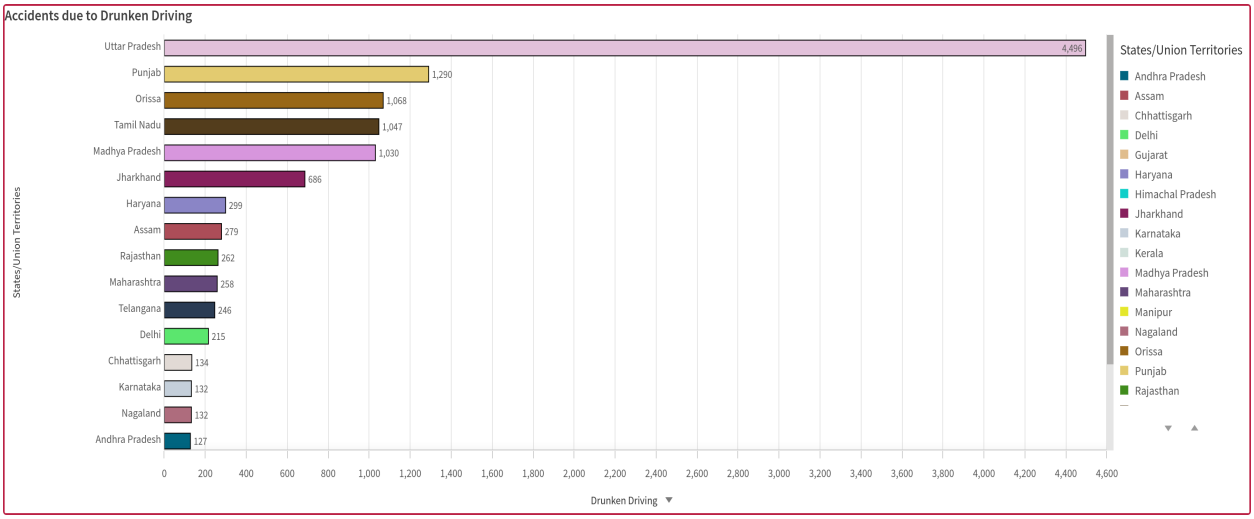


Fig.- Showing accidents due to drinking and driving

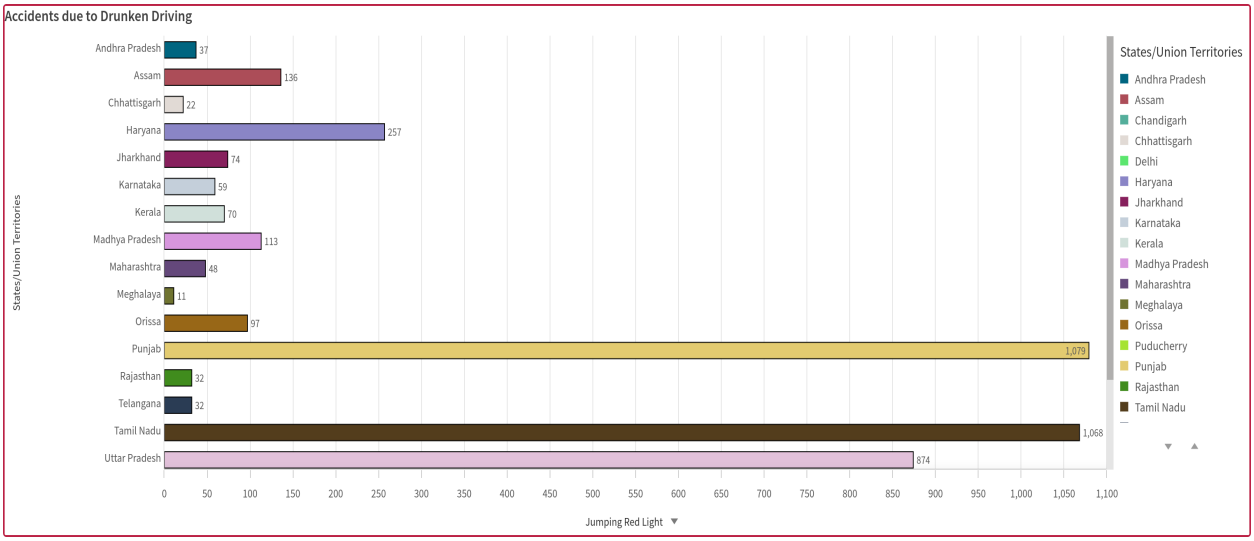


Fig.- Showing a bar chart of accidents caused due to jumping red light

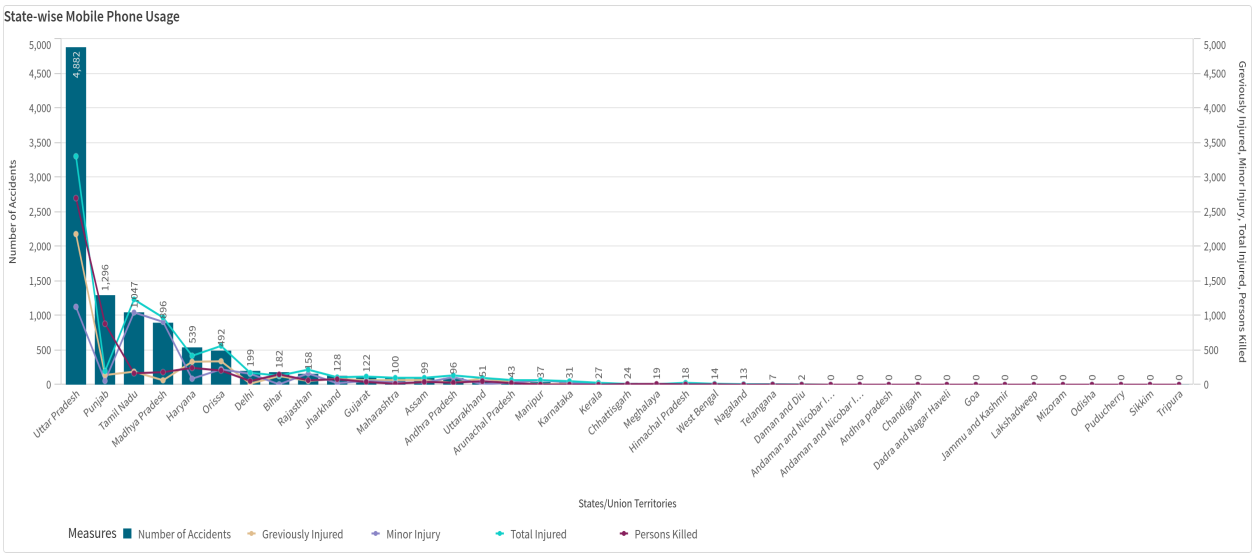


Fig.- Showing a chart of accidents due to mobile phone usage

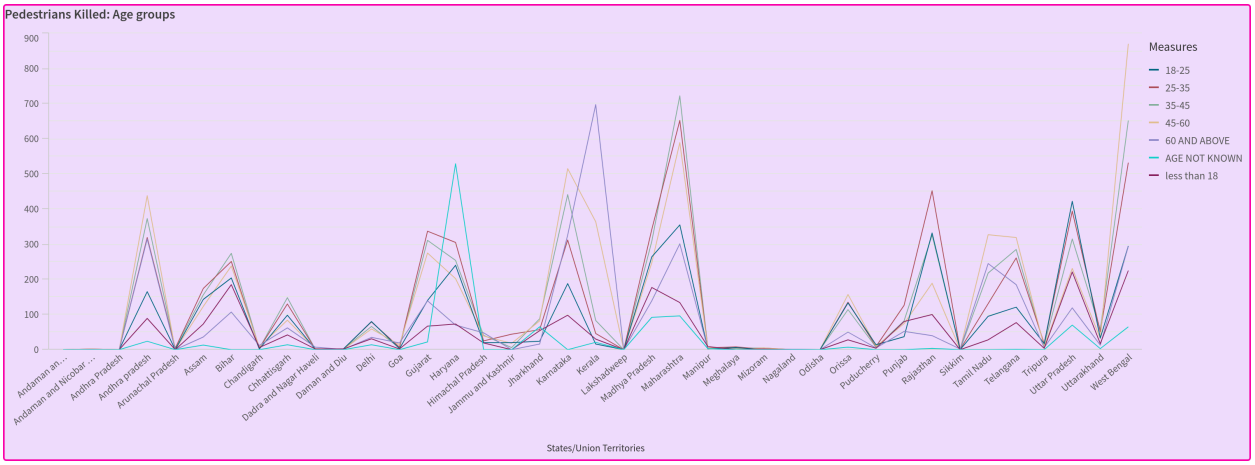


Fig.- Showing pedestrians of different age groups killed in accidents

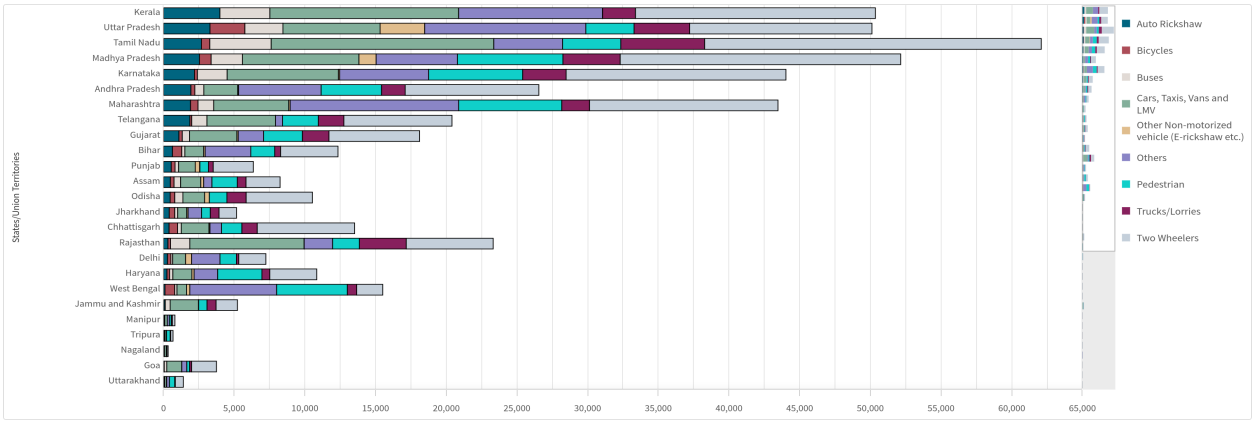


Fig.-Accidents caused by different vehicles

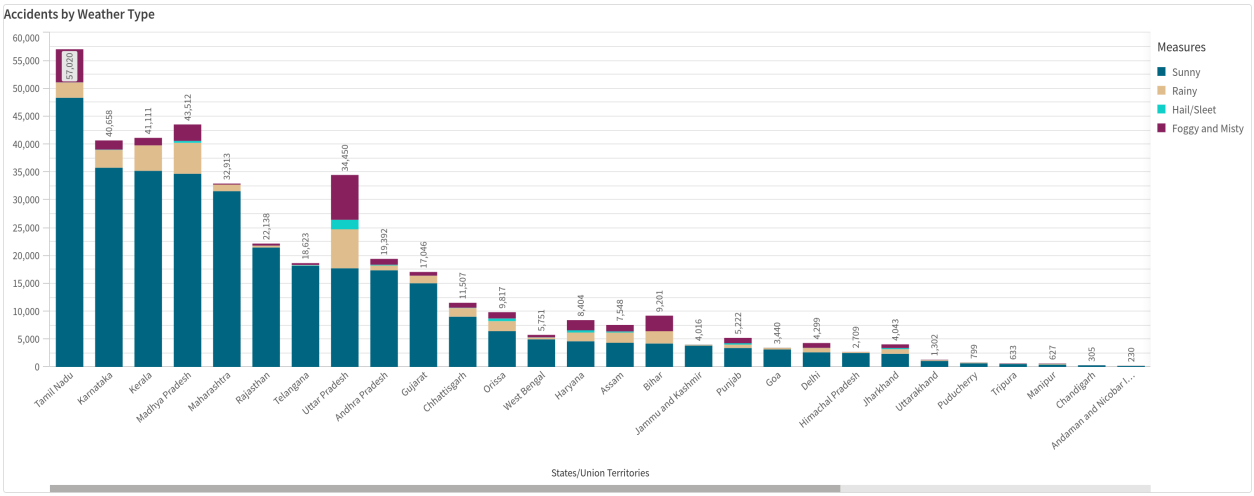


Fig. - Showing accidents occurred in different weather types

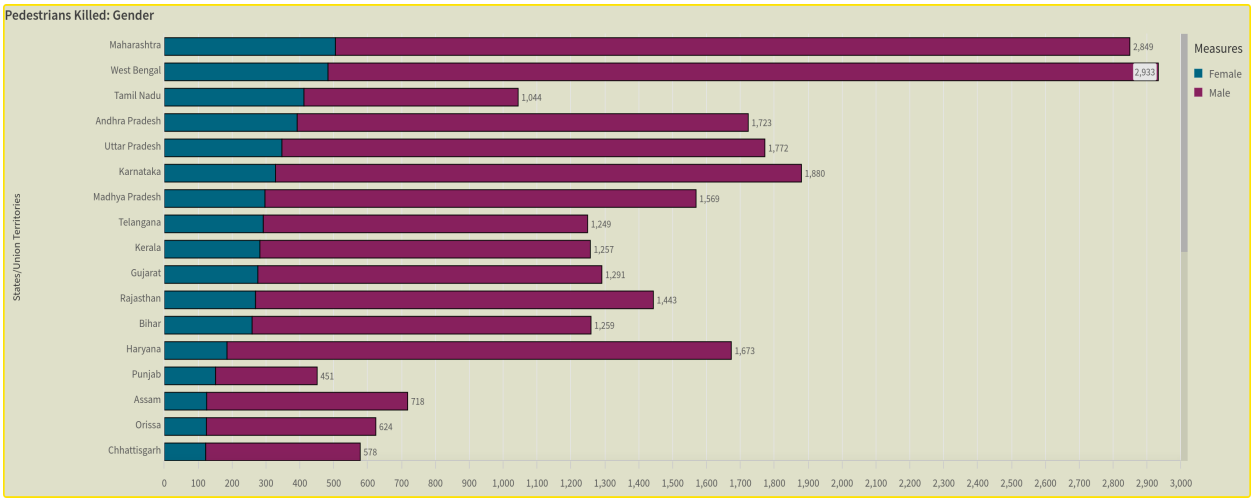
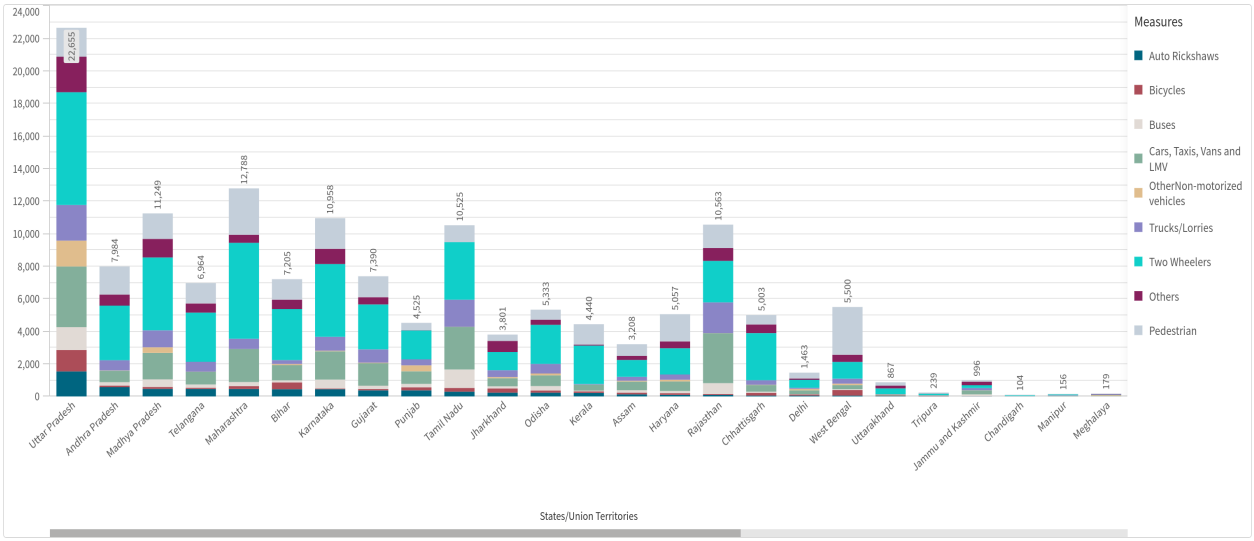


Fig.- Showing pedestrians killed of different genders in road accidents



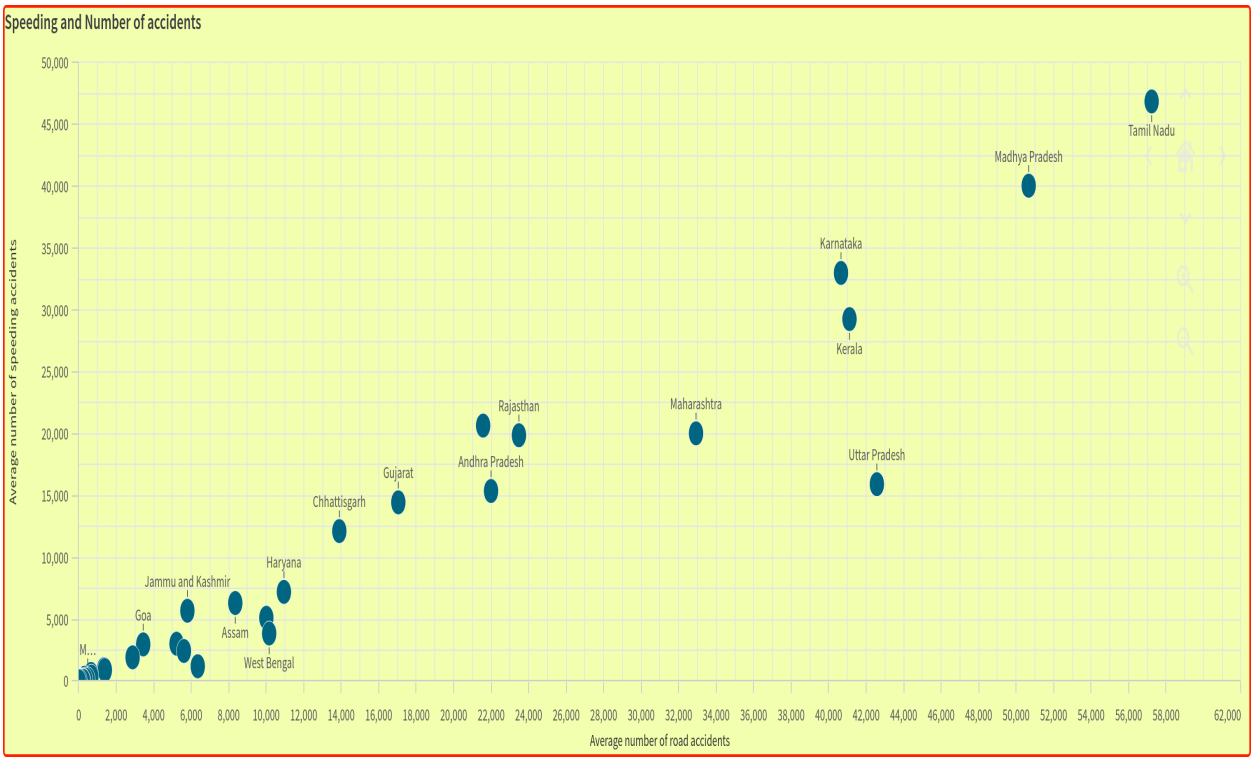


Fig.- Showing accidents due to speeding and number of vehicles

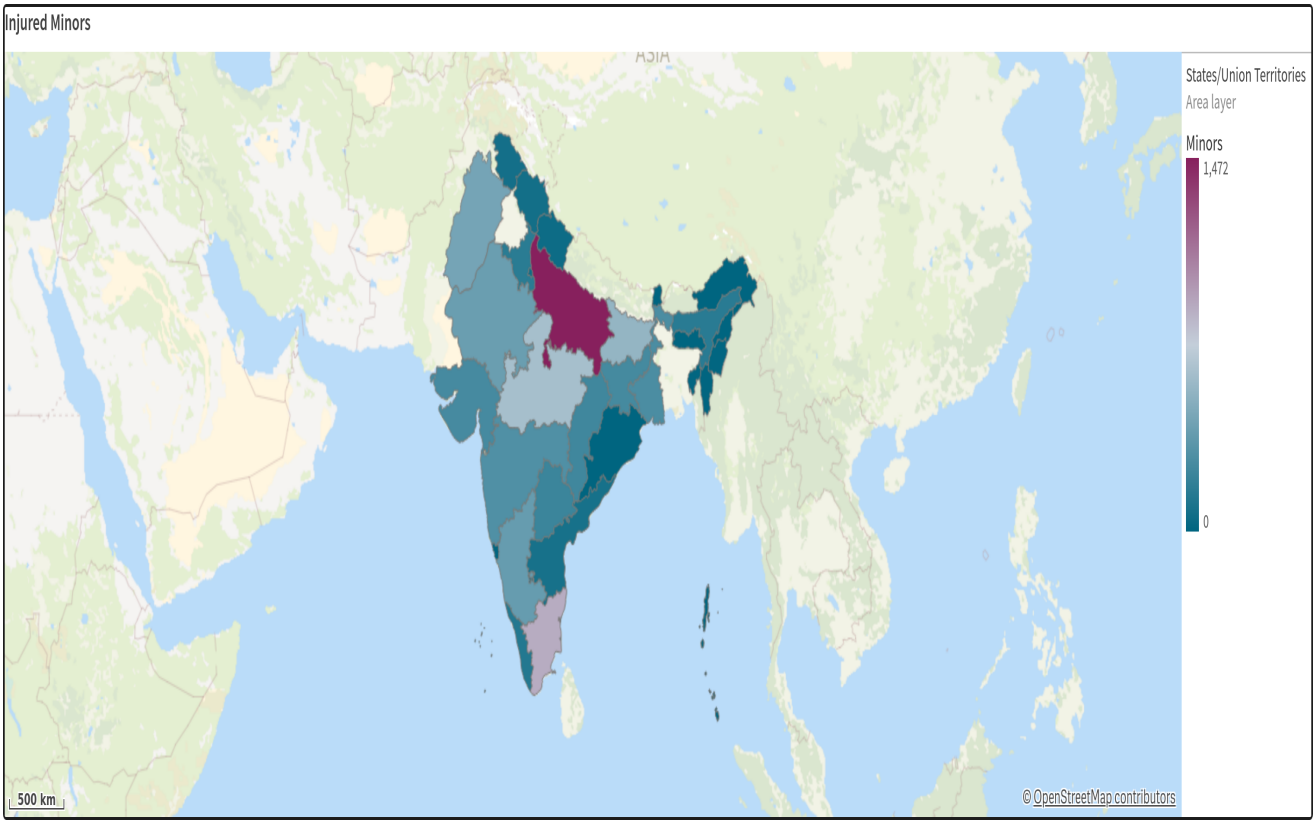


Fig.- Showing accidents of minors state-wise

5. Dashboard

5.1 Responsive and Design of Dashboard

The dashboard design process emphasizes responsive design, ensuring the dashboard adapts seamlessly to various devices, including desktops, tablets, and smartphones.The design of the user interface ensures intuitiveness and user-friendliness, with straightforward navigation and convenient access to filters and insights.Additionally, we offer customization options, allowing users to personalize their view by selecting different filters and parameters.

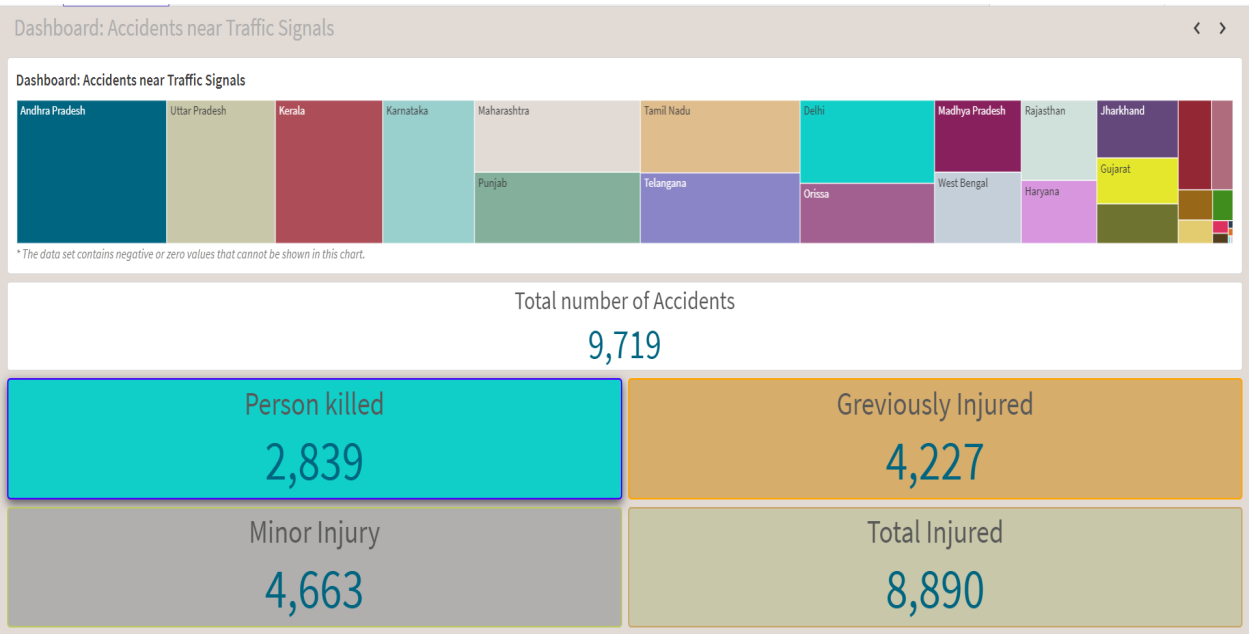


Fig.Dashboard showing Accidents near Traffic signals

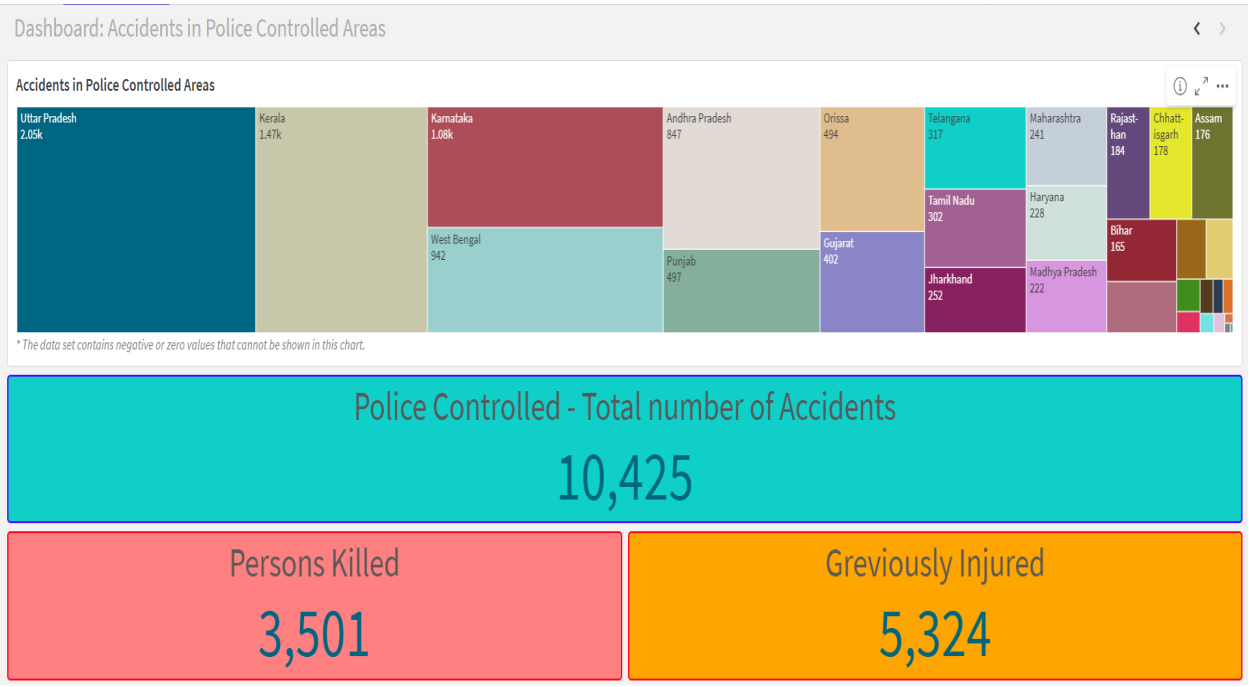
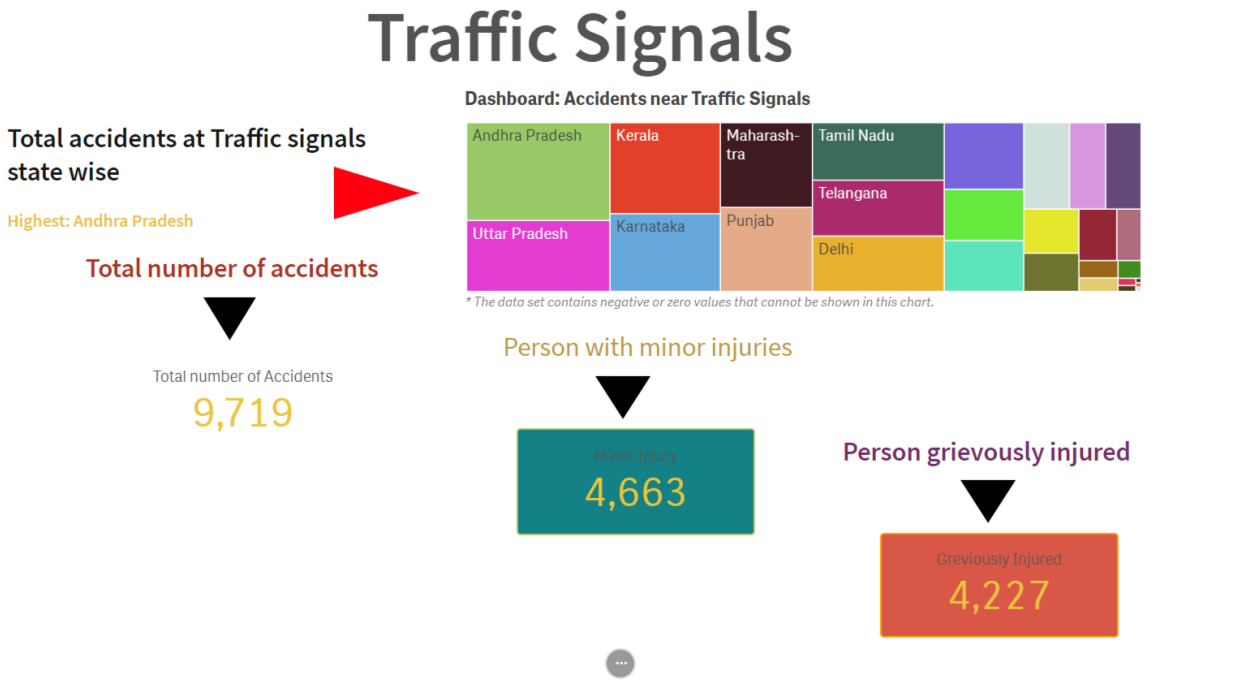


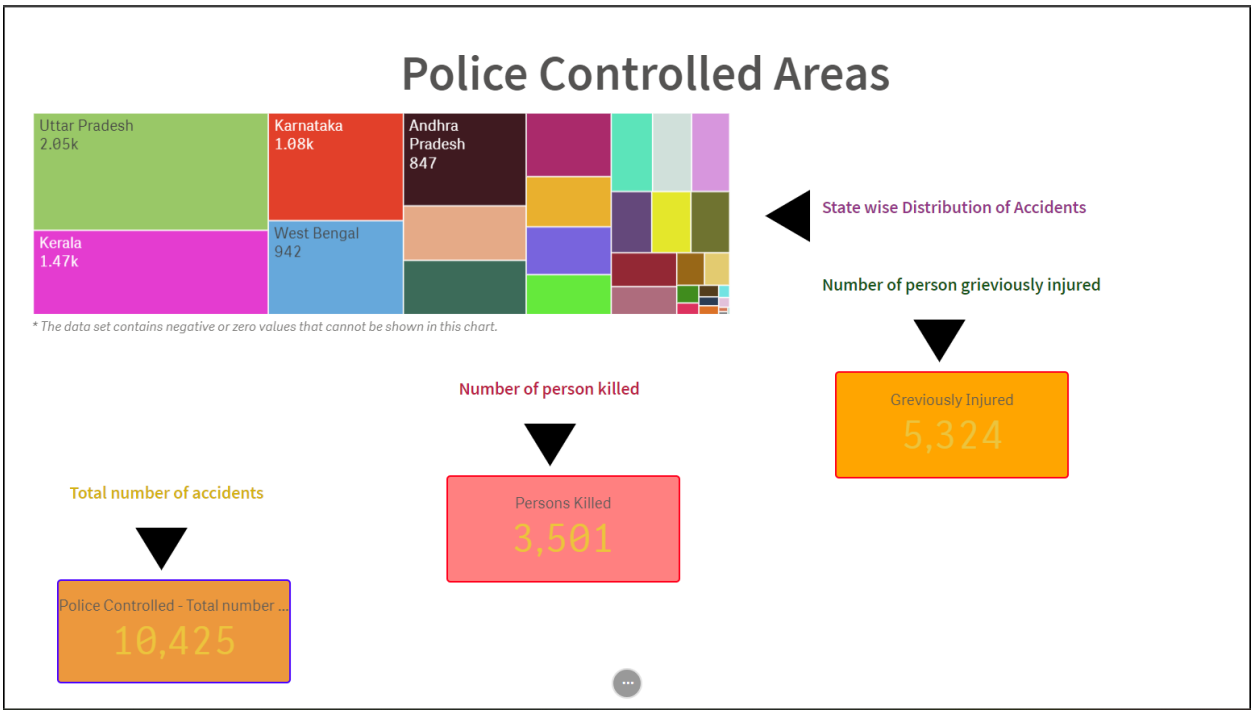
Fig.Dashboard showing accidents near police controlled area

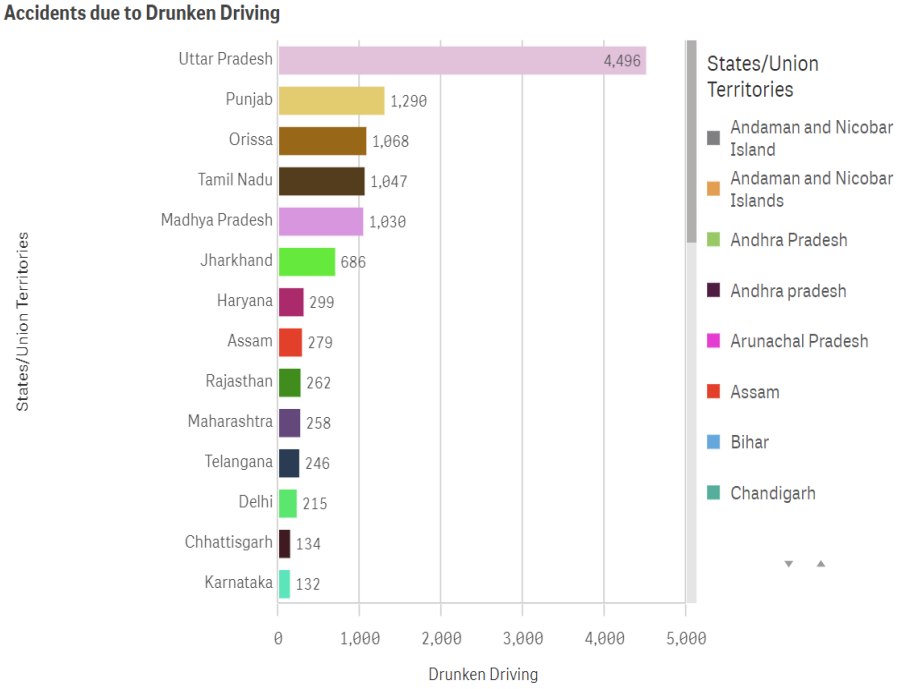
6. Story

6.1 Story Creation

Story creation involves several critical steps. First, narrative growth is essential to guide users through the key findings and insights from the analysis. Next, organize a storyboard layout to present a visual image in a logical sequence that tells a coherent story.Contextual data attach to each visual image, aiding users in understanding the insights. in addition, we integrate interactive elements, empowering users to delve deeper into the data and extract valuable insights.





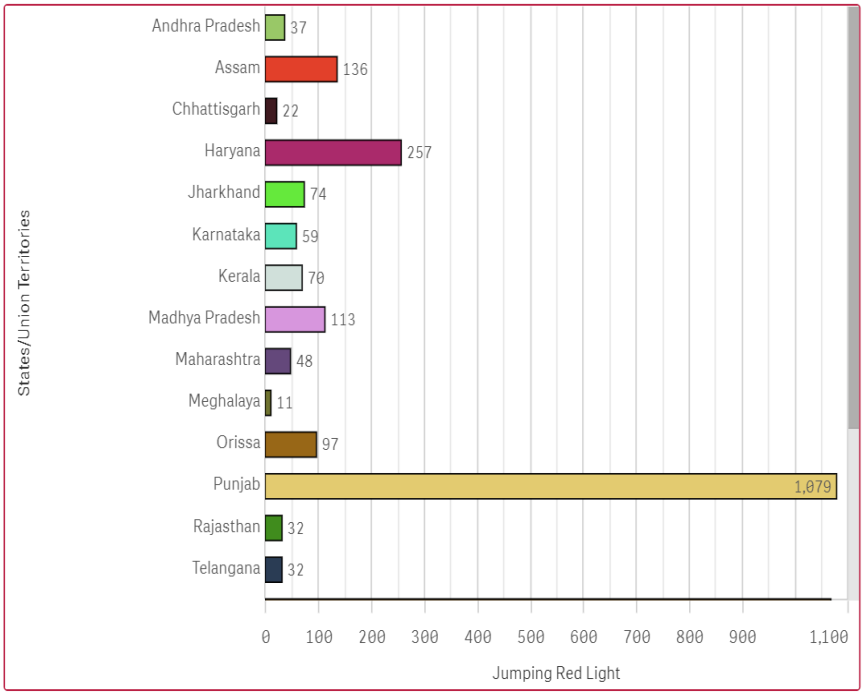


Cause:
Drunken Driving

Highest: Uttar Pradesh

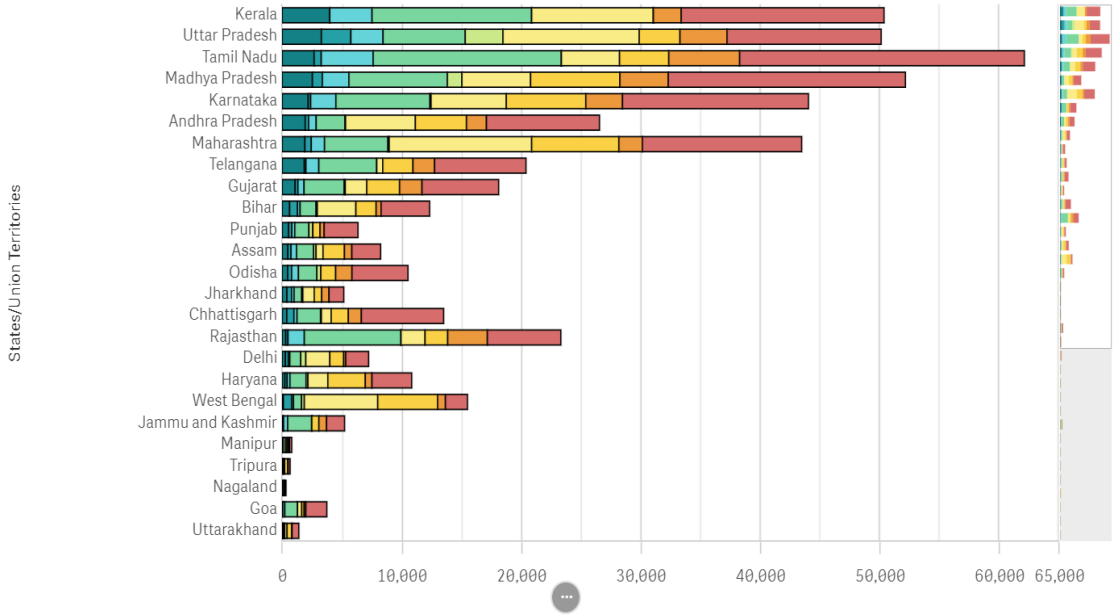
Cause:
Jumping Red Signal

Highest: Punjab

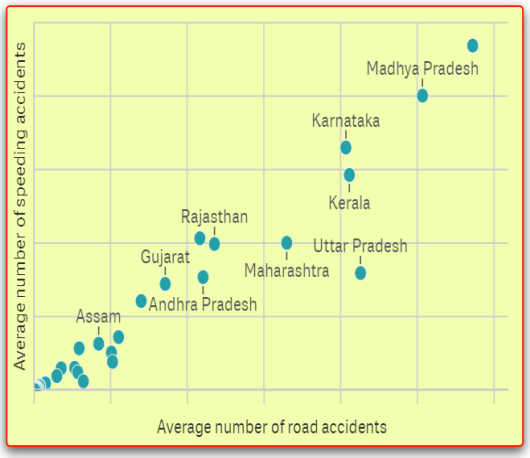


Accidents by Vehicle Type

Vehicle type that is involved in most accidents: Two Wheeler

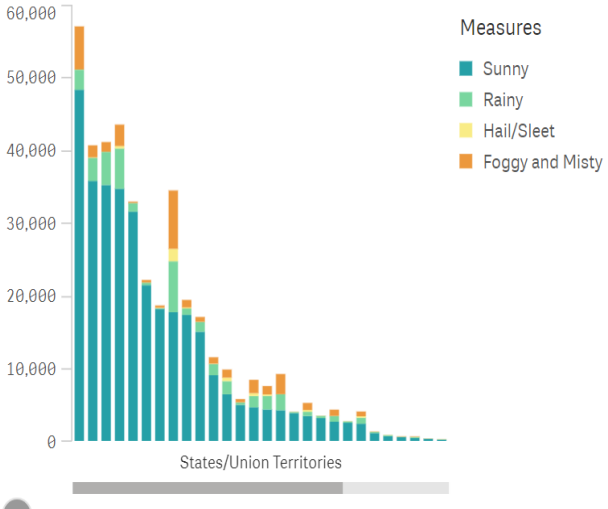


Speed and weather

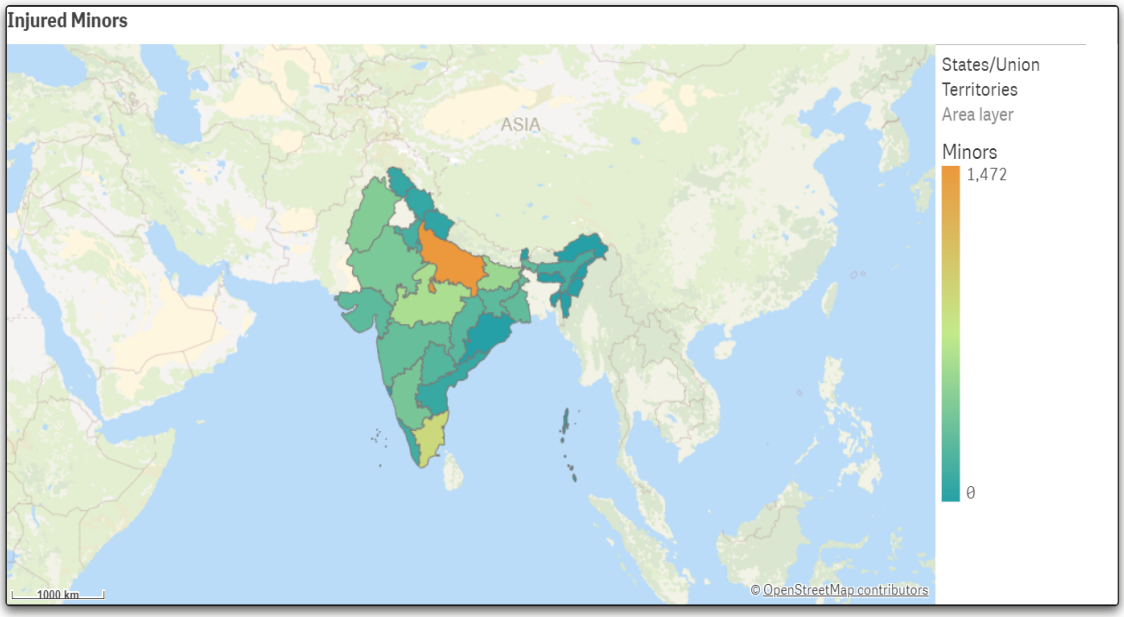


Positive Correlation between Speeding and Number of Accidents

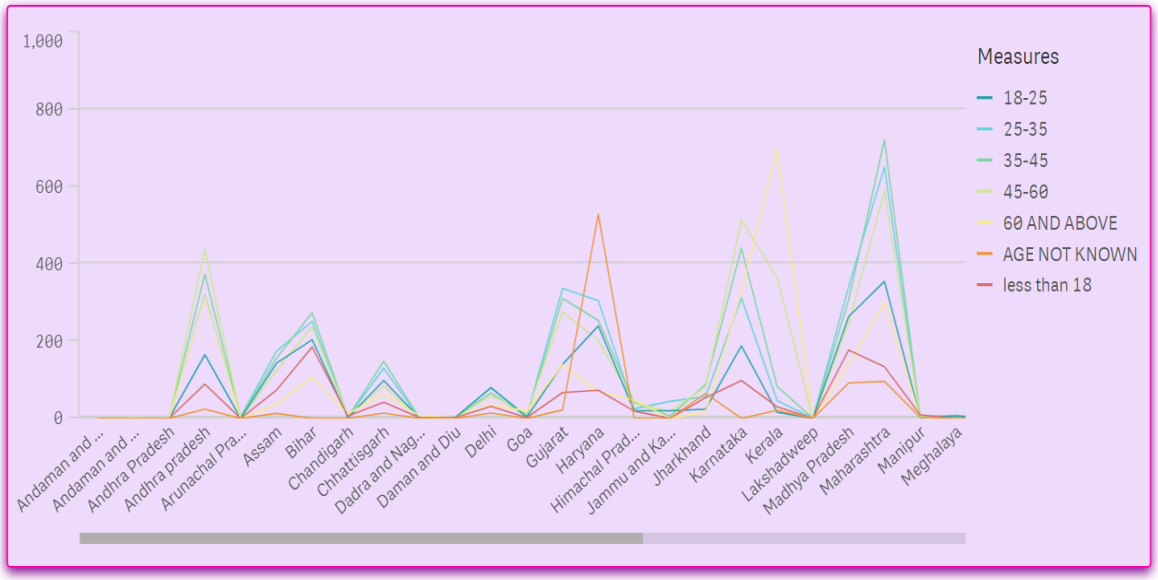
Maximum number of accidents occur during Sunny weather



Highest Number of Minors Injured : Uttar Pradesh and Tamil Nadu respectively



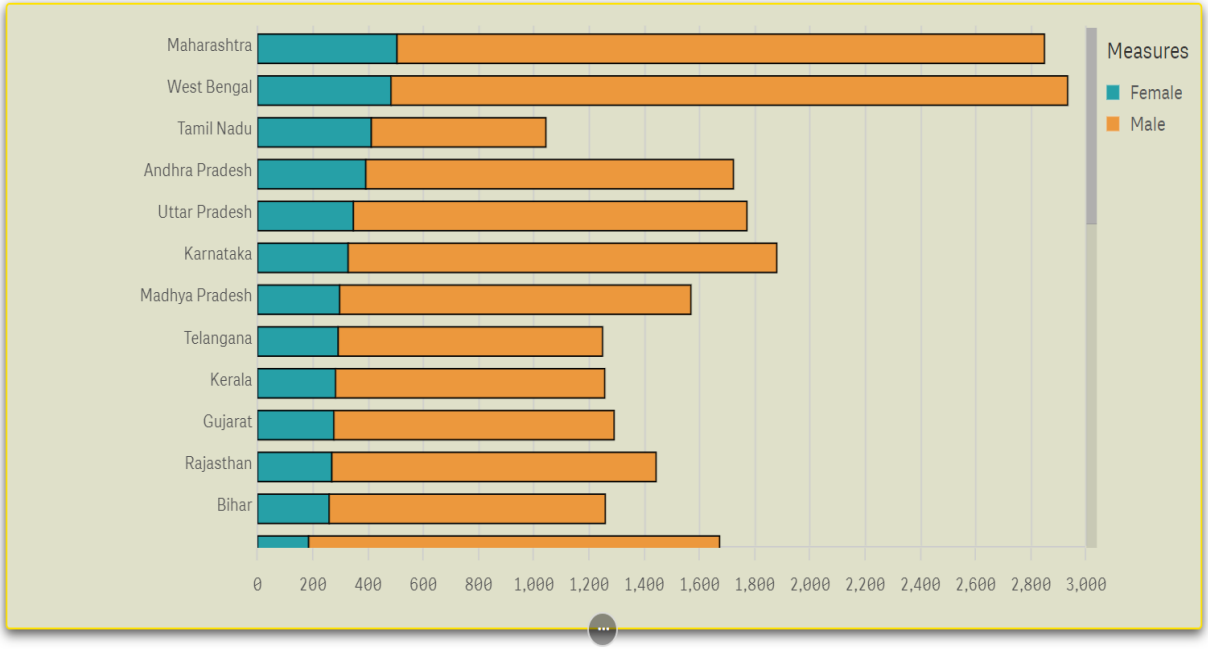
Pedestrians Killed : Age



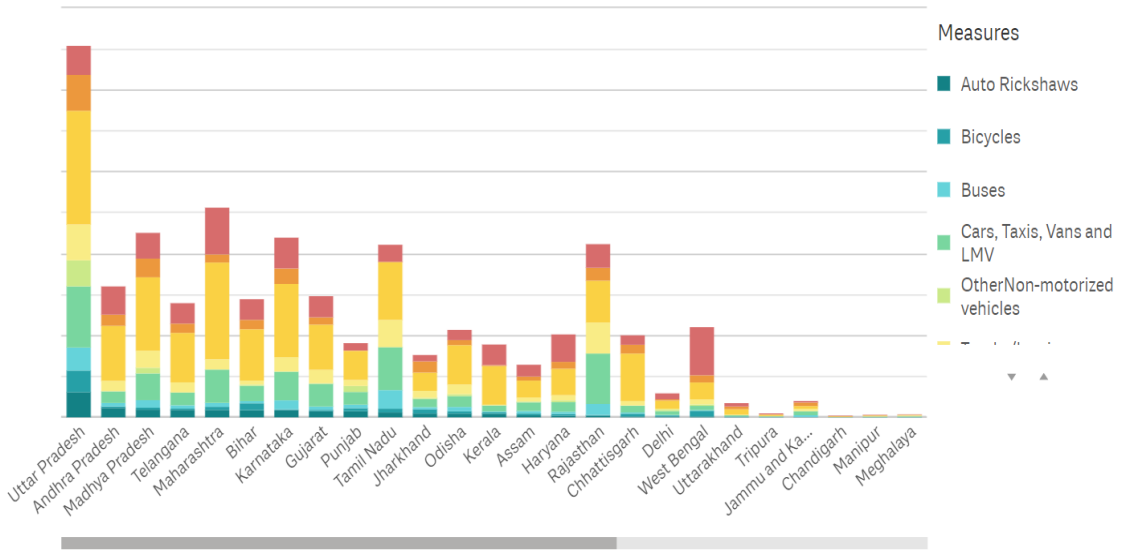
Age group with highest number of pedestrians killed : 25-35 Years

Pedestrians Killed: Gender

Highest number of pedestrians killed : Male



Road Users Killed



Road User Category with highest number of deaths: Two Wheeler

Conclusion

This documentation has provided a comp analysis of road safety and accident patterns in India using Qlik Sense. By leveraging extensive datasets, we aimed to identify high-risk areas, times, and causes of accidents, in the end providing insights to enhance road safety and reduce accident rates. The process encompassed understanding the problem, collecting and preparing data, creating a detailed visual image, and developing a responsive dashboard. The insights derived from the analysis can significantly impact social and business aspects by aiding in the reduction of road accidents through targeted interventions, informing effective policy formulation, and contributing to system savings. Qlik Sense dashboards enable stakeholders to access data for decisions. This project emphasizes the significance of comprehensive data analysis in tackling critical issues like road safety. Leveraging analytics tools like Qlik Sense for actionable insights.