

# Qlik Analysis Of Road Safety And Accident Patterns In India

## **Define Problem / Problem Understanding :**

### ***Specify the business problem:***

Technological advancement in transportation has minimised the distances but has increased the risk to life. Every year, accidents result in loss of lakhs of lives and serious injuries to crores of people. A study to analyse road safety and accident trends in India is to be conducted using Qlik Sense, a data analytics platform. This study involves examining data related to road incidents, such as types of accidents, locations, causes, and potentially factors contributing to road safety or risks. The use of Qlik Sense is a data-driven approach, utilizing visualizations and insights generated from the analysis to understand patterns and potentially inform strategies for improving road safety in India.

### ***Business requirements:***

The analysis aims to provide valuable insights into user demographics, accident patterns, and problem areas. The primary focus is on creating interactive and visually compelling dashboards to support strategic planning and operational improvements. The insights derived from this

analysis will be instrumental in making informed decisions, implementing better safety protocols, and ensuring compliance with regulations.

### ***Literature Survey:***

For my literature survey on Road Safety and Accident Patterns analysis, I researched and reviewed numerous previous studies, articles, reports, and figures on the topic. My exploration included delving into the various methods and techniques used for analyzing accident data, as well as examining the results and conclusions of these studies. I utilized several academic databases, including PubMed, IEEE Xplore, Google Scholar, and various institutional repositories, to gather comprehensive and relevant information. Additionally, I examined government reports and publications to gain insights into the latest developments in road safety and accident analysis. This thorough approach allowed me to compile a robust and detailed overview of the current state of research in this field.

### ***Social Impact:***

As part of my analysis on road safety and accident patterns, I carried out several tasks to provide a comprehensive understanding of the data:

- 1. Created visualizations to display the demographic distribution of accidents across the country:** I developed various charts and maps to illustrate how accidents are distributed among different demographic groups across various regions. These visualizations included heat maps and bar graphs to highlight areas with higher accident rates and the demographics most affected.
- 2. Compared the severity of accidents in different areas of traffic control:** I analyzed accident data to compare how the severity of accidents varies in

areas with different traffic control measures, such as intersections with traffic lights versus stop signs. I used statistical methods to quantify these differences and visualized them using comparative bar charts and scatter plots.

**3. Explored any correlation between speeding, weather, and total accidents:** I conducted a correlation analysis to determine how speeding and weather conditions influence the total number of accidents. This involved collecting data on speed limits, recorded speeds, weather conditions at the time of accidents, and total accident counts. I then used scatter plots and correlation matrices to present the relationships

**4. Identified the leading causes of accidents:** I performed a thorough analysis of the accident data to identify the most common causes of accidents. This involved categorizing accidents by cause and using pie charts and bar graphs to represent the frequency and percentage of each cause.

**5. Examined the distribution of age groups and gender of the victims:** I analyzed the demographic information of accident victims to understand how different age groups and genders are affected. I created age distribution histograms and gender ratio charts to visualize this data.

**6. Investigated the contribution of diverse types of vehicles to the total number of accidents:** I looked into how various types of vehicles contribute to the overall number of accidents. This analysis included categorizing accidents by vehicle type (e.g., cars, trucks, motorcycles) and using stacked bar charts and pie charts to illustrate the proportions and frequencies of each vehicle type involved in accidents. These steps provided a detailed and multifaceted view of road safety and accident patterns, allowing for more targeted and effective recommendations for improving road safety.

# Data Collection & Extraction From Database:

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, evaluate outcomes and generate insights from the data.

## Data Preparation:

To prepare the data for visualization in my analysis of road safety and accident patterns, I followed a meticulous process to ensure the data was clean, well-organized, and ready for creating insightful visualizations. Here are the steps I undertook:

### 1. Data Cleaning:

- **Removed Irrelevant Data:** I filtered out any data points that were not pertinent to the analysis, such as unrelated fields or records outside the scope of the study.

- **Handled Missing Data:** I addressed missing values by either imputing them with appropriate estimates or removing incomplete records if they were not critical.

### 2. Data Transformation:

- **Formatted Data:** I transformed the data into a consistent format, ensuring that all variables were standardized, such as converting dates to a common format and normalizing numerical values.

- **Categorized Data:** I grouped the data into meaningful categories, such as accident severity levels, vehicle types, age groups, and weather conditions, to facilitate easier analysis.

### 3. Data Exploration:

- **Identified Patterns and Trends:** I conducted exploratory data analysis (EDA) to uncover initial patterns, trends, and anomalies within the dataset. This involved generating summary statistics and preliminary visualizations like histograms and scatter plots.

- **Explored Relationships:** I examined relationships between different variables to identify potential correlations and causations, which would be critical for my visualizations.

### 4. Data Filtering:

- **Focused on Specific Subsets:** I filtered the data to concentrate on specific subsets that were most relevant to the research questions. For instance, I isolated data related to high-risk demographics or particular weather conditions.

- **Refined Data Scope:** I ensured that the data subsets chosen for visualization were comprehensive enough to provide meaningful insights while avoiding information overload.

### 6. Ensured Data Accuracy and Completeness:

- **Cross-Verification:** I cross-verified the data against original sources to confirm its accuracy.

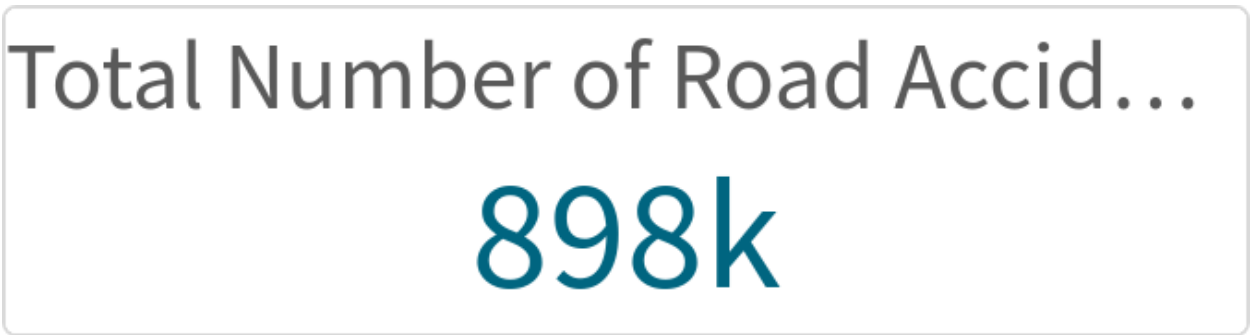
- **Completeness Check:** I ensured that all necessary data points were

present and adequately represented in the dataset.

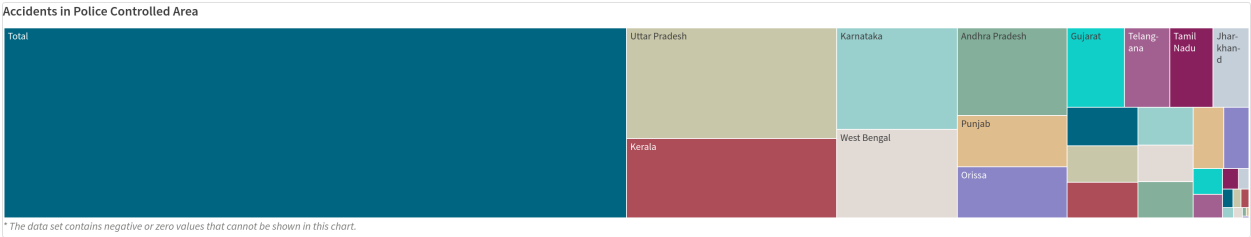
By carefully preparing the data through these steps, I was able to create clear, accurate, and insightful visualizations that effectively conveyed the key findings and trends in road safety and accident patterns. This preparation made the data easily understandable and ready for in-depth analysis and decision-making.

## Data Visualisation:

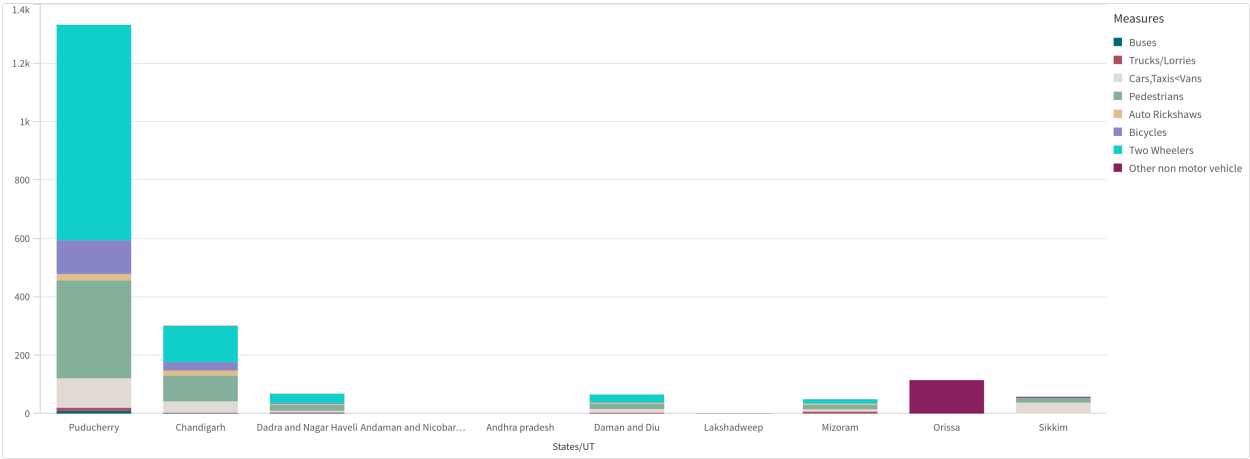
### Total Number of Road Accidents -



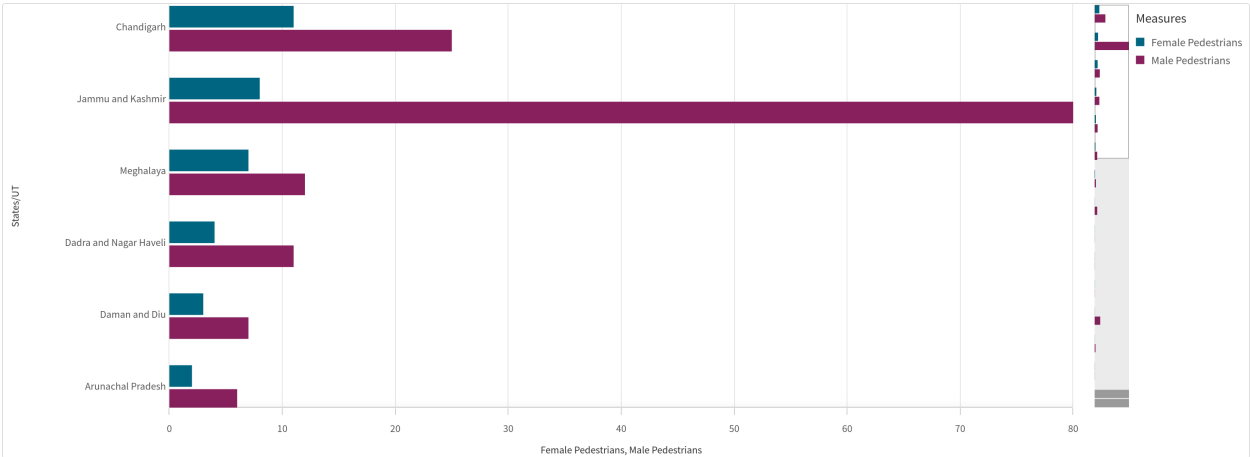
### Total Number of Road Accidents -



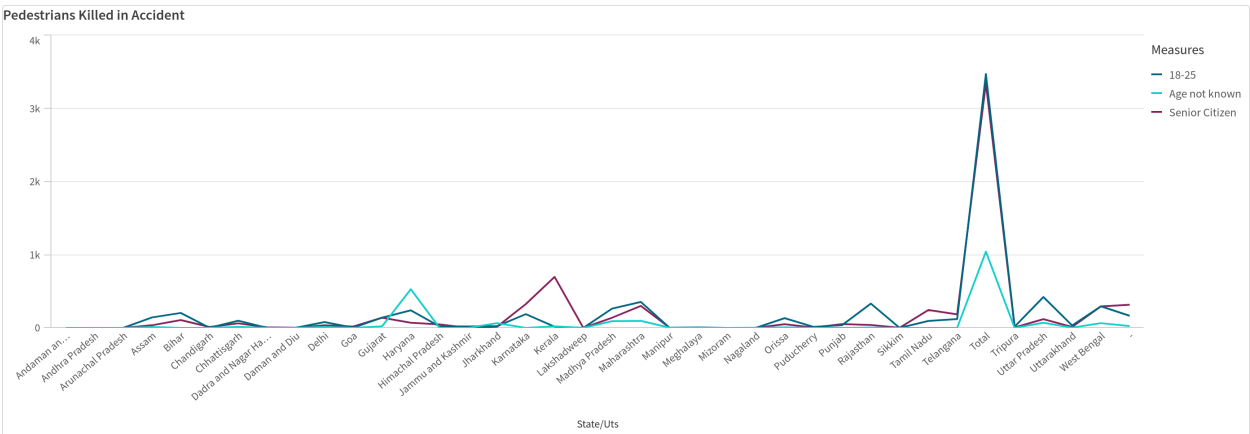
# Road users killed Vehicle Distribution



# Pedestrians killed



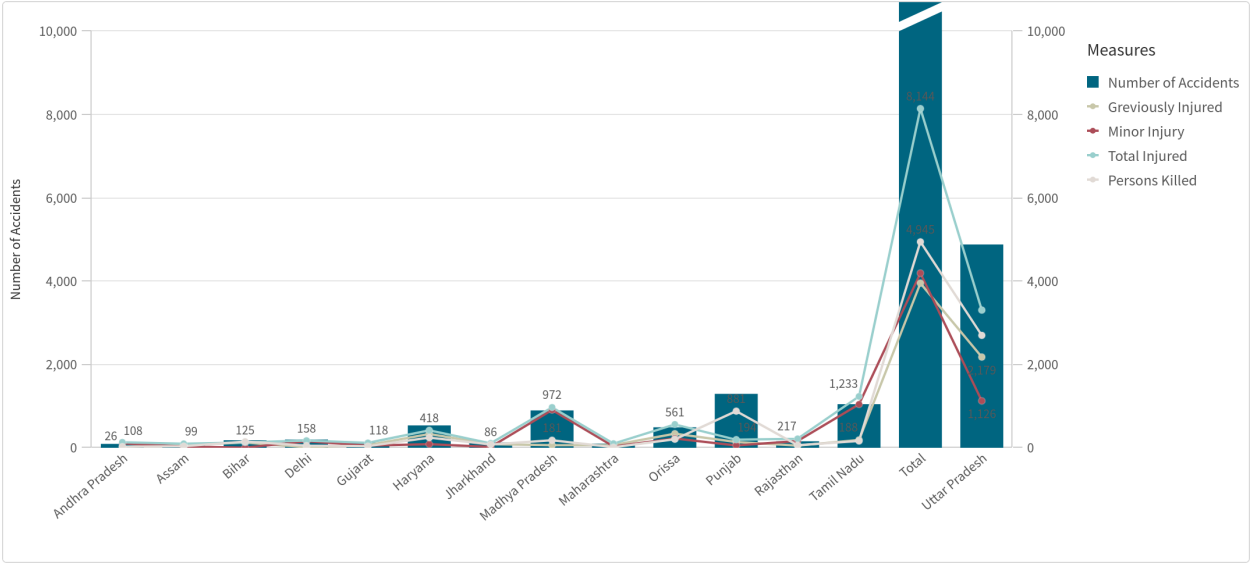
# Pedestrians killed in Accident



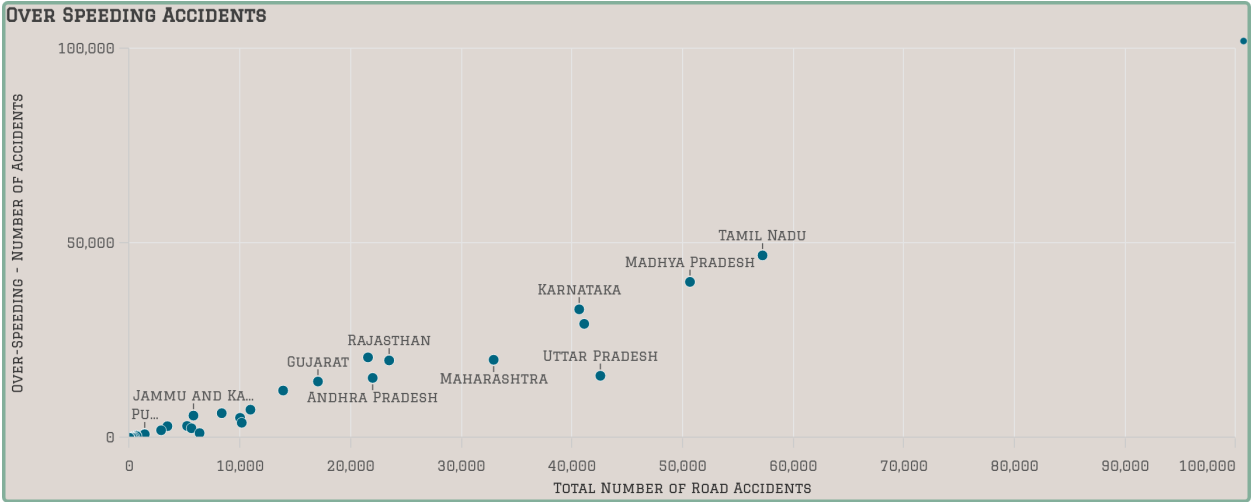
# Accidents at traffic signals



# Over Speeding Accidents

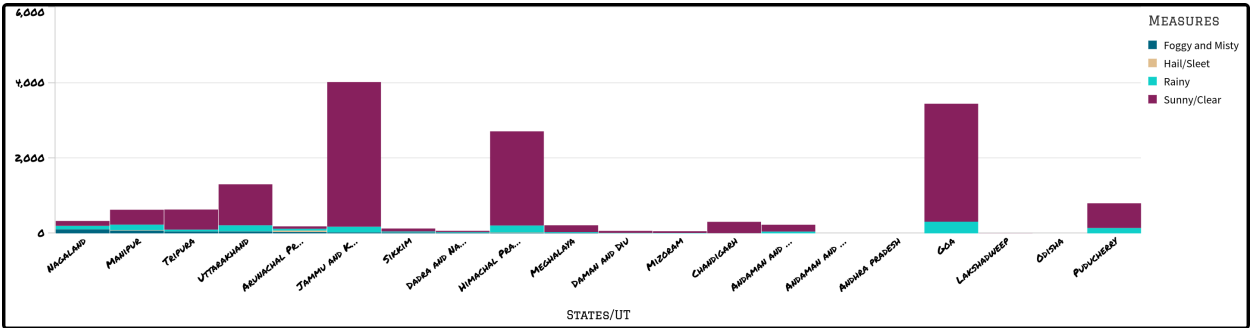


# Over Speeding Accidents

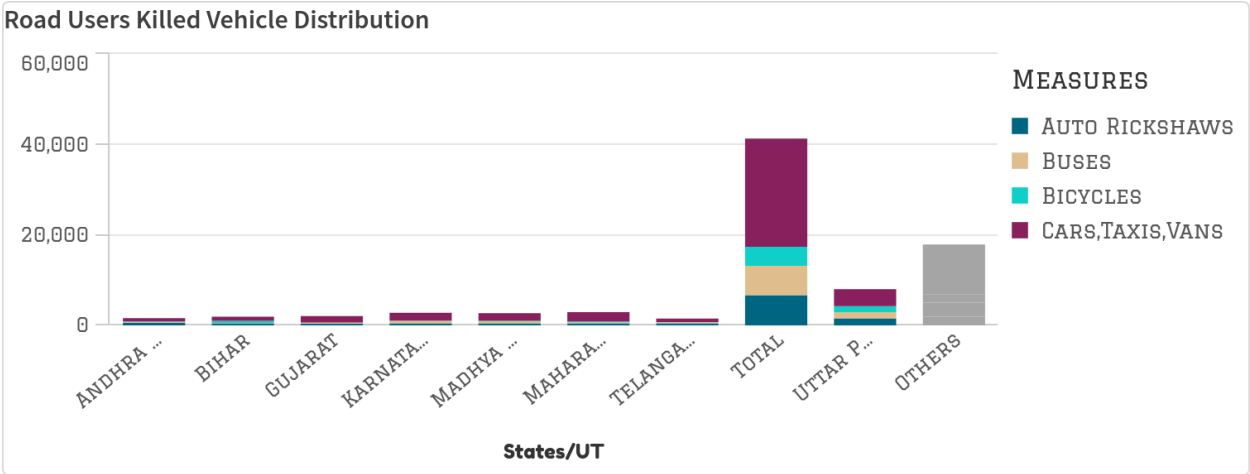




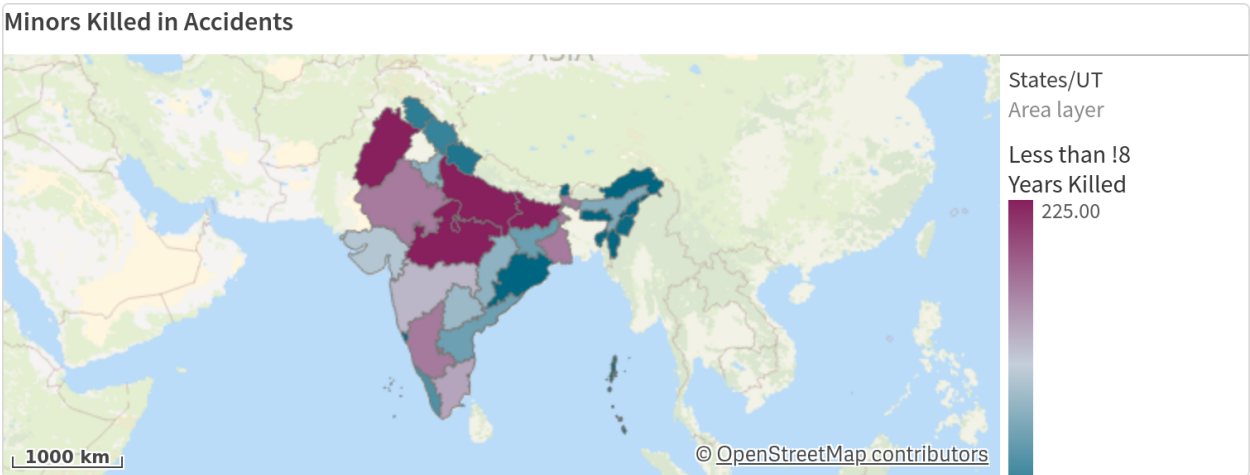
# Road users killed



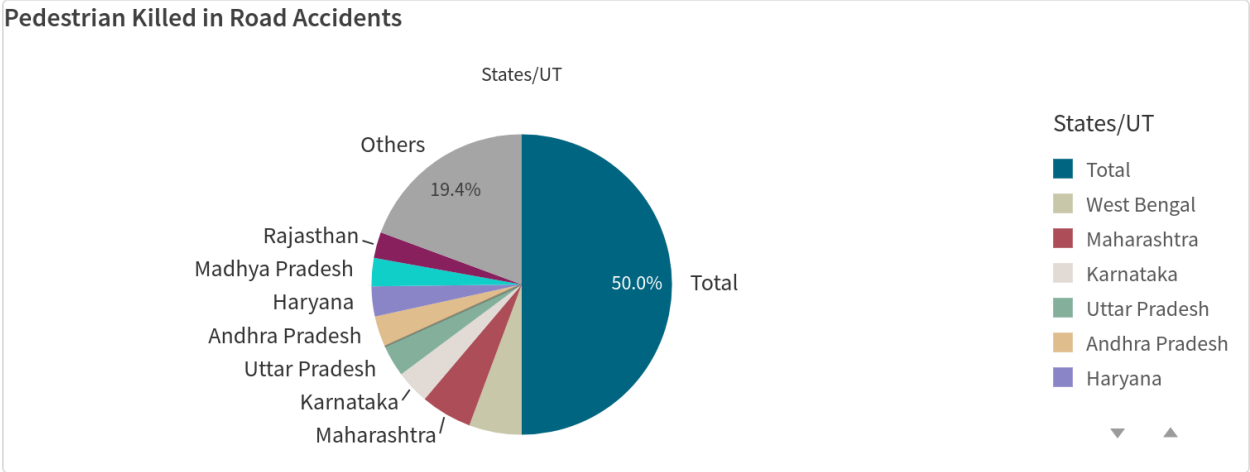
# Mobile Usage



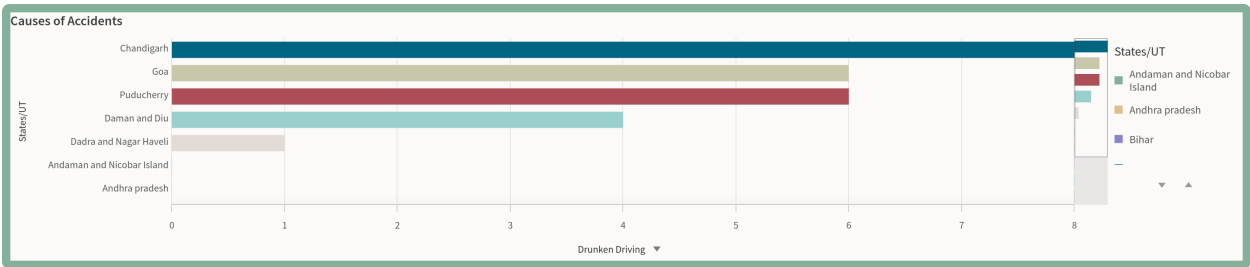
# Road users killed vehicle distribution



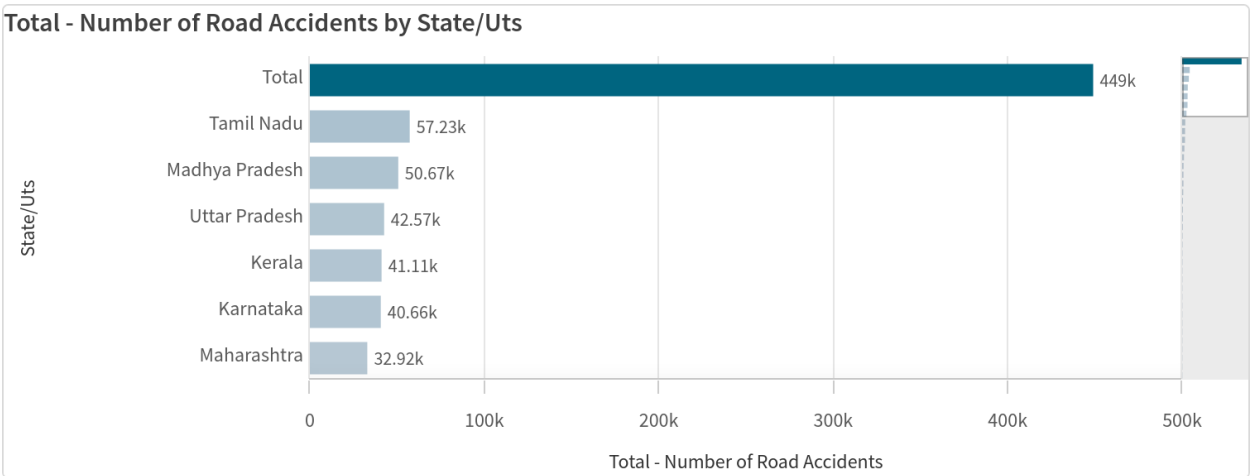
# Minors Killed in accidents



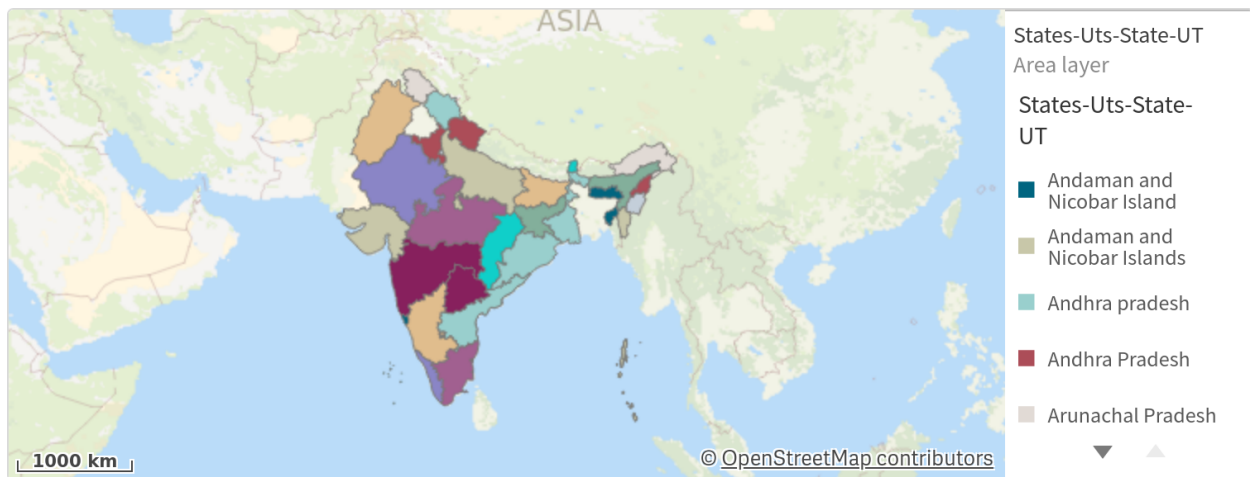
# Pedestrians killed in road accidents



# Pedestrians killed in road accidents



## Road accidents distribution



## Storytelling:

A data story is a way of presenting data and analysis in a narrative format, with the goal of making information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and analysis in a logical and systematic way and a conclusion that summarizes the key findings and highlights their implications. Data stories can be told using a variety of media, such as reports, presentations, interactive visualizations and videos. To effectively communicate my analysis of road safety and accident patterns, I created a compelling data story. This approach enabled me to present the data and analysis in a narrative format, making the information more engaging and easier to understand.

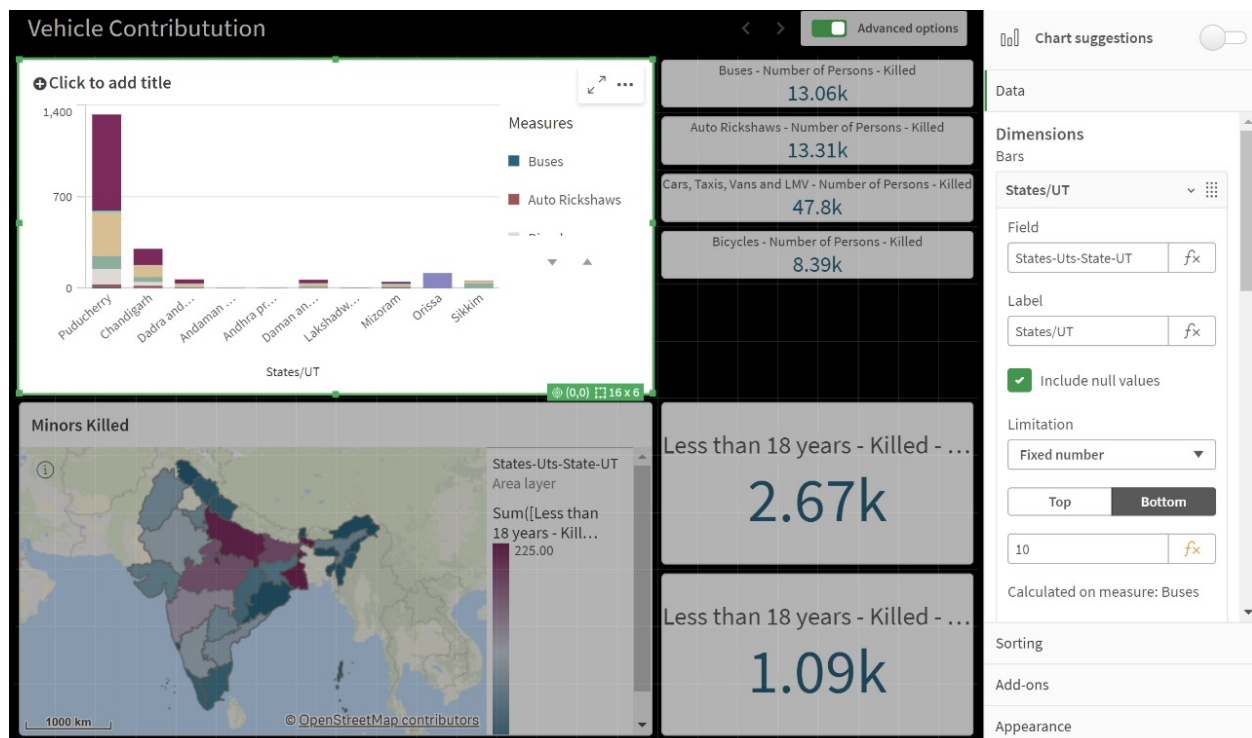
## Performance Testing:

To enhance the interactivity and depth of my road safety and accident

patterns analysis, I implemented various selections and filters within the data. This allowed users to customize their views and focus on specific subsets of data based on individual fields or dimensions.

## Application Of Data Filters:

To enhance the interactivity and utility of my road safety and accident patterns analysis, I implemented selections within the data. This feature allowed users to filter data based on individual fields or dimensions, choose specific values within a field to include or exclude from analysis, and create complex filters based on predefined conditions and logic.



## Use Of Master Items/Calculated Fields:

To streamline and enhance my road safety and accident patterns analysis, I leveraged Qlik Sense's powerful features, such as reusable filter objects, Master Items, and Calculated Fields. These tools allowed for consistent and efficient application of filters across multiple visualizations and dashboards. Here's how I utilized these features:



## Implementing Reusable Filter Objects in Qlik Sense

### Master Items:

**Creation of Master Items:** I created Master Items for frequently used fields such as age group, gender, geographic region, accident severity, and weather conditions. By defining these as Master Items, I ensured consistency and ease of use across all visualizations and dashboards.

**Consistent Filtering:** Using Master Items allowed me to apply the same filters across different charts and graphs without having to redefine them each time. This not only saved time but also maintained consistency in the

analysis.

### **Calculated Fields:**

**Defining Calculated Fields:** I created Calculated Fields for complex filters that combined multiple conditions. For example, a Calculated Field for “High-Risk Accidents” might combine conditions such as speeding in adverse weather conditions and nighttime driving.

**Simplified Analysis:** These Calculated Fields enabled me to apply complex logic in a straightforward manner, making it easier to analyze specific scenarios without repeatedly setting up complex conditions.