Qlik Analysis Of Road Safety And Accident Patterns In India

Define Problem / Problem Understanding:

Specify the business problem:

Advancements in transportation technology have indeed made the world smaller, yet they've also amplified the peril to human life. Each year, countless lives are lost, and millions are left with severe injuries due to road accidents. To delve into this issue, a comprehensive study on road safety and accident trends in India is underway, employing Qlik Sense, a robust data analytics platform. This endeavor entails scrutinizing various facets of road incidents, encompassing accident types, locations, causes, and probable contributing factors to safety or hazards. Leveraging Qlik Sense facilitates a data-centric approach, harnessing visualizations and gleaned insights to decipher trends and potentially devise strategies for enhancing road safety across India.

Business Requirements

The objective of this analysis is to uncover key insights regarding user demographics, accident patterns, and critical areas of concern. Emphasis is placed on crafting engaging and interactive dashboards that visually communicate data, aiding in strategic planning and operational enhancements. The derived insights will play a pivotal role in guiding decision-making processes, enhancing safety protocols, and ensuring alignment with regulatory standards.

Literature Survey

Conducting a literature review for the analysis of Road Safety and Accident Patterns entails delving into prior research, articles, reports, and statistics pertinent to the subject matter. This involves examining methodologies and approaches employed for analyzing accident data, as well as the findings and implications derived from such studies. Academic databases such as PubMed, IEEE Xplore, Google Scholar, along with institutional repositories, serve as valuable resources for sourcing relevant literature. Furthermore, insights gleaned from government reports and publications can offer valuable updates on recent advancements in the field.

Social Impact

Create visualizations to display the demographic distribution of accidents across the country.
Compare the severity of accidents in different areas of traffic control.
Explore any correlation between speeding, weather, and total accidents.
Identify the leading causes of accidents.
Examine the distribution of age groups and gender of the victims.
Investigate the contribution of diverse types of vehicles to the total number of accidents.

Data Collection & Extraction From Database

Understand The Data

Data contains all the meta information regarding the columns described in the Excel files.Description of the Dataset:

There are nine data files that have been converted to Excel worksheets(.xlsx) for ease of use with respect to Qlik Sense. The list of files is as follows:

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Traffic Control Type: State/UT-wise accidents classified according to the type of traffic control during 2019
Columns of the dataset:
States/UTs
Traffic Light Signal - Total number of Accidents
Traffic Light Signal - Persons Killed
Traffic Light Signal - Persons Injured - Grievously Injured
Traffic Light Signal - Persons Injured - Minor Injury
Traffic Light Signal - Persons Injured - Total Injured
Police Controlled - Total number of Accidents
Police Controlled - Persons Killed
Police Controlled - Persons Injured - Grievously Injured
Police Controlled - Persons Injured - Minor Injury
Police Controlled - Persons Injured - Total Injury
Stop Sign - Total number of Accidents
Stop Sign - Persons Killed
Stop Sign - Persons Injured - Grievously Injured
Stop Sign - Persons Injured - Minor Injury
Stop Sign - Persons Injured - Total Injured
Flashing Signal/Blinker - Total number of Accidents
Flashing Signal/Blinker - Persons Killed
Flashing Signal/Blinker - Persons Injured - Grievously Injured
Flashing Signal/Blinker - Persons Injured - Minor Injury
Flashing Signal/Blinker - Persons Injured - Total Injured
Uncontrolled - Total number of Accidents – Number
Uncontrolled - Total number of Accidents – Rank
Uncontrolled - Persons Killed – Number
Uncontrolled - Persons Killed – Rank
Uncontrolled - Persons Injured - Grievously Injured
Uncontrolled - Persons Injured - Minor Injury
Uncontrolled - Persons Injured - Total Injured
Others - Total number of Accidents
Others - Persons Killed
Others - Persons Injured - Grievously Injured
Others - Persons Injured - Minor Injury
Others - Persons Injured - Total Injured
2. Pedestrians: State/UT-wise pedestrians involved in accidents according to

classification of age and gender during 2019.
Columns of the dataset:
State/UT
Less than 18 years – Male
Less than 18 years – Female
18-25 Years – Male
18-25 Years – Female
25-35 Years – Male
25-35 Years – Female
35-45 Years – Male
35-45 Years – Female
45-60 Years – Male
45-60 Years – Female
60 and Above – Male
60 and Above – Female
Age not known – Male
Age not known – Female
3. Pedestrians killed: State/UT-wise pedestrians killed according to classification of age and gender during 2019.
Columns of the dataset:
State/UT
Less than 18 years - Killed - Male
Less than 18 years - Killed - Female
18-25 Years - Killed - Male
18-25 Years - Killed - Female
25-35 Years - Killed - Male
25-35 Years - Killed - Female
35-45 Years - Killed - Male
35-45 Years - Killed - Female
45-60 Years - Killed - Male
45-60 Years - Killed - Female
60 and Above - Killed - Male
60 and Above - Killed - Female
Age not known - Killed – Male
Age not known - Killed – Female
4. Pedestrians killed – Impacting vehicles: State/UT-wise Pedestrians killed in accidents classified by the type of impacting vehicles during 2019

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Columns of the dataset:
States/UTs
Bicycles
Two Wheelers
Auto Rickshaws
Cars, Taxis, Vans and LMV
Trucks/Lorries
Buses
Other Non-Motorized Vehicles (E-rickshaw etc.)
Others
Total
5. Weather: State/UT-wise accidents classified according to the type of weather and severity of the accidents during 2019
Columns of the dataset:
States/UTs
Sunny/Clear - Total Accidents – Number
Sunny/Clear - Total Accidents – Rank
Sunny/Clear - Persons Killed – Number
Sunny/Clear - Persons Killed – Rank
Sunny/Clear - Persons Injured - Grievously Injured
Sunny/Clear - Persons Injured - Minor Injury
Sunny/Clear - Persons Injured - Total Injured
Rainy - Total Accidents
Rainy - Persons Killed
Rainy - Persons Injured - Grievously Injured
Rainy - Persons Injured - Minor Injury
Rainy - Persons Injured - Total Injured
Foggy and Misty - Total Accidents
Foggy and Misty - Persons Killed
Foggy and Misty - Persons Injured - Grievously Injured
Foggy and Misty - Persons Injured - Minor Injury
Foggy and Misty - Persons Injured - Total Injured
Hail/Sleet - Total Accidents
Hail/Sleet - Persons Killed
Hail/Sleet - Persons Injured - Grievously Injured
Hail/Sleet - Persons Injured - Minor Injury
Hail/Sleet - Persons Injured - Total Injured

Others - Total Accidents
Others - Persons Killed
Others - Persons Injured - Grievously Injured
Others - Persons Injured - Minor Injury
Others - Persons Injured - Total Injured
6. Killed on Two Wheelers - Impacting vehicles: State/UT-wise Two Wheelers killed in accidents classified by the type of impacting vehicles during 2019
Columns of the dataset:
States/UTs
Bicycles
Two Wheelers
Auto Rickshaws
Cars, Taxis, Vans and LMV
Trucks/Lorries
Buses
Other Non-Motorized Vehicles (E-rickshaw etc.)
Others
Total
7. Road Users Killed – Gender: State/UT-wise male and female persons killed in road accidents in terms of road user categories during 2019
Columns of the dataset:
States/UTs
Pedestrian – Male
Pedestrian – Female
Pedestrian – Total
Bicycles – Male
Bicycles – Female
Bicycles – Total
Two Wheelers – Male
Two Wheelers – Female
Two Wheelers – Total
Two Wheelers – Rank
Auto Rickshaws – Male
Auto Rickshaws – Female
Auto Rickshaws – Total
Cars, taxies Vans and LMV – Male
Cars, taxies Vans and LMV – Female

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Cars, taxies Vans and LMV – Total
Trucks/Lorries – Male
Trucks/Lorries – Female
Trucks/Lorries – Total
Buses – Male
Buses – Female
Buses – Total
Other non-Motor vehicles(E-Rickshaw) – Male
Other non-Motor vehicles(E-Rickshaw) – Female
Other non-Motor vehicles(E-Rickshaw) – Total
Others – Male
Others – Female
Others - Total
Causes: State/UT-wise Accident victims classified according to the causes of accidents during 2019
Columns of the dataset:
States/UTs
Over-Speeding - Number of Accidents – Number
Over-Speeding - Number of Accidents – Rank
Over-Speeding - Persons Killed – Number
Over-Speeding - Persons Killed – Rank
Over-Speeding - Persons Injured - Grievously Injured
Over-Speeding - Persons Injured - Minor Injury
Over-Speeding - Persons Injured - Total Injured
Drunken Driving/ Consumption of alcohol and drug - Number of Accidents
Drunken Driving/ Consumption of alcohol and drug - Persons Killed
Drunken Driving/ Consumption of alcohol and drug - Persons Injured - Grievously Injured
Drunken Driving/ Consumption of alcohol and drug - Persons Injured - Minor Injury
Drunken Driving/ Consumption of alcohol and drug - Persons Injured - Total Injured
Driving on Wrong side - Number of Accidents
Driving on Wrong side - Persons Killed
Driving on Wrong side - Persons Injured - Grievously Injured
Driving on Wrong side - Persons Injured - Minor Injury
Driving on Wrong side - Persons Injured - Total Injured
Jumping Red Light - Number of Accidents
Jumping Red Light - Persons Killed
Jumping Red Light - Persons Injured - Grievously Injured

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Jumping Red Light - Persons Injured - Minor Injury
Jumping Red Light - Persons Injured - Total Injured
Use of Mobile Phone - Number of Accidents
Use of Mobile Phone - Persons Killed
Use of Mobile Phone - Persons Injured - Grievously Injured
Use of Mobile Phone - Persons Injured - Minor Injury
Use of Mobile Phone - Persons Injured - Total Injured
Others - Number of Accidents
Others - Persons Killed
Others - Persons Injured - Grievously Injured
Others - Persons Injured - Minor Injury
Others - Persons Injured - Total Injured

Accidents – Severity and Vehicles: State/UT-wise vehicle type of victims and severity of accidents during 2019
Columns of the dataset:
States/UTs
Pedestrian - Number of Road Accidents
Pedestrian - Number of Persons – Killed
Pedestrian - Number of Persons - Grievously Injured
Pedestrian - Number of Persons - Minor Injured
Bicycles - Number of Road Accidents
Bicycles - Number of Persons – Killed
Bicycles - Number of Persons - Grievously Injured
Bicycles - Number of Persons - Minor Injured
Two Wheelers - Number of Road Accidents
Two Wheelers - Number of Persons – Killed
Two Wheelers - Number of Persons - Grievously Injured
Two Wheelers - Number of Persons - Minor Injured
Auto Rickshaws - Number of Road Accidents
Auto Rickshaws - Number of Persons – Killed
Auto Rickshaws - Number of Persons - Grievously Injured
Auto Rickshaws - Number of Persons - Minor Injured
Cars, Taxis, Vans and LMV - Number of Road Accidents
Cars, Taxis, Vans and LMV - Number of Persons – Killed
Cars, Taxis, Vans and LMV - Number of Persons - Grievously Injured
Cars, Taxis, Vans and LMV - Number of Persons - Minor Injured

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Trucks/Lorries - Number of Road Accidents
Trucks/Lorries - Number of Persons – Killed
Trucks/Lorries - Number of Persons - Grievously Injured
Trucks/Lorries - Number of Persons - Minor Injured
Buses - Number of Road Accidents
Buses - Number of Persons – Killed
Buses - Number of Persons - Grievously Injured
Buses - Number of Persons - Minor Injured
Other non-motorized vehicle (E-rickshaw etc.) - Number of Road Accidents
Other non-motorized vehicle (E-rickshaw etc.) - Number of Persons – Killed
Other non-motorized vehicle (E-rickshaw etc.) - Number of Persons - Grievously Injured
Other non-motorized vehicle (E-rickshaw etc.) - Number of Persons - Minor Injured
Others - Number of Road Accidents
Others - Number of Persons – Killed
Others - Number of Persons - Grievously Injured
Others - Number of Persons - Minor Injured
Total - Number of Road Accidents
Total - Number of Persons – Killed
Total - Number of Persons - Grievously Injured
Total - Number of Persons - Minor Injured

DATA PREPARATION

Prepared The Data For Visualization

Indeed, preparing the data for visualization is a crucial step in gaining meaningful insights. Here's a breakdown of the process:

1. **Cleaning the Data**: This involves removing irrelevant or missing data points, correcting errors, and ensuring consistency in formatting. Cleaning ensures that the data is accurate and reliable for analysis.

2. **Transforming the Data**: Data may need to be reshaped or aggregated to facilitate visualization. This can involve grouping data, calculating summary statistics, or converting data into a format compatible with visualization tools.

3. **Exploring the Data**: Exploratory data analysis helps to identify patterns, trends, and relationships within the dataset. This step can involve generating summary statistics, creating simple visualizations, or using statistical methods to uncover insights.

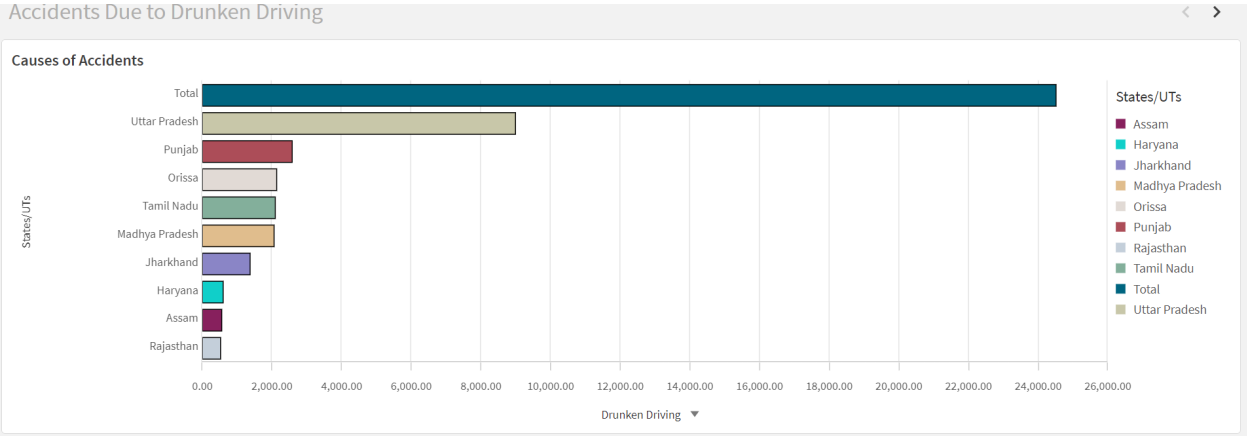
4. **Filtering the Data**: To focus on specific subsets of data or address specific research questions, filtering may be necessary. This could involve selecting data based on certain criteria, such as time periods, geographical regions, or demographic factors.

5. **Preparing for Visualization Software**: Data needs to be formatted appropriately for visualization software such as Qlik Sense. This may involve structuring data into tables or matrices, organizing variables, and ensuring compatibility with the software's data import capabilities.

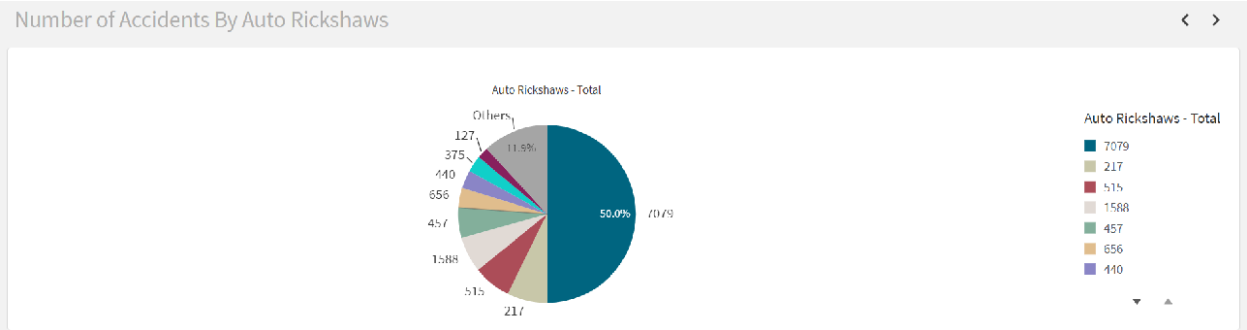
6. **Ensuring Accuracy and Completeness**: Before proceeding with visualization, it's essential to verify that the data is accurate, complete, and free from errors. This may involve cross-referencing with external sources, validating calculations, and conducting quality checks.

Data Visualization

Number Of Unique Visualizations



State wise number of accidents by Auto Rickshaws



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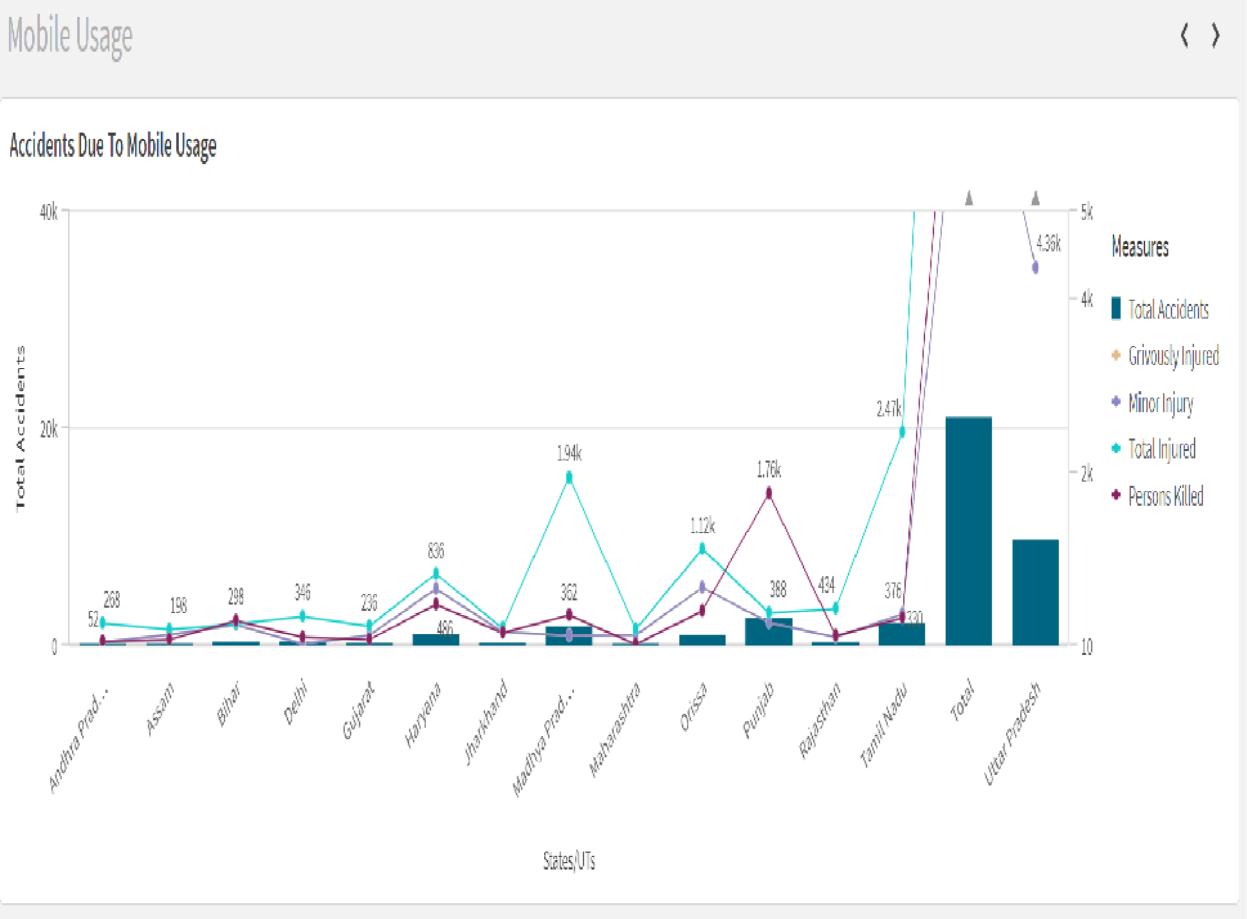
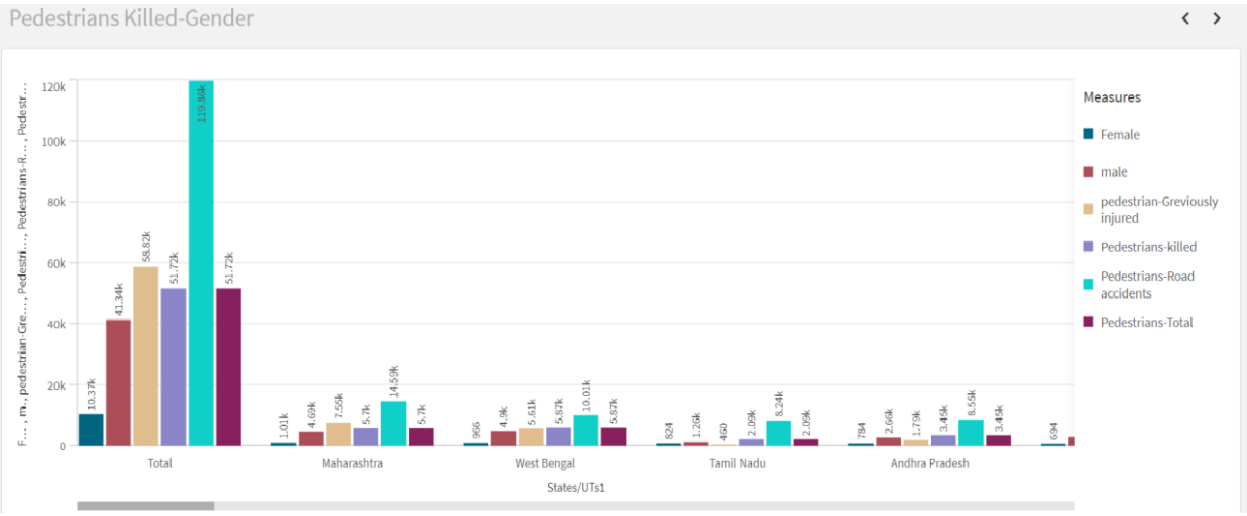


Pedestrians Killed-Gender



Pedestrians Killed- Group-wise

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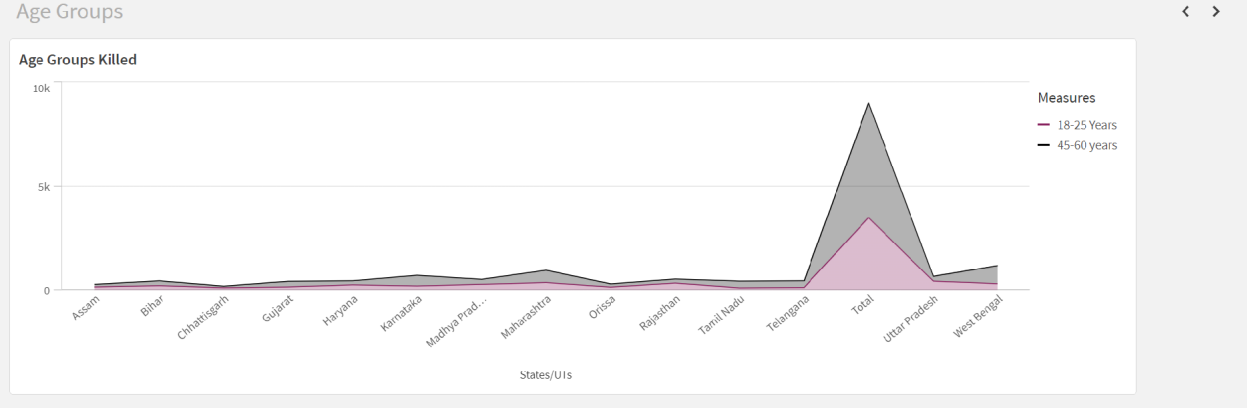
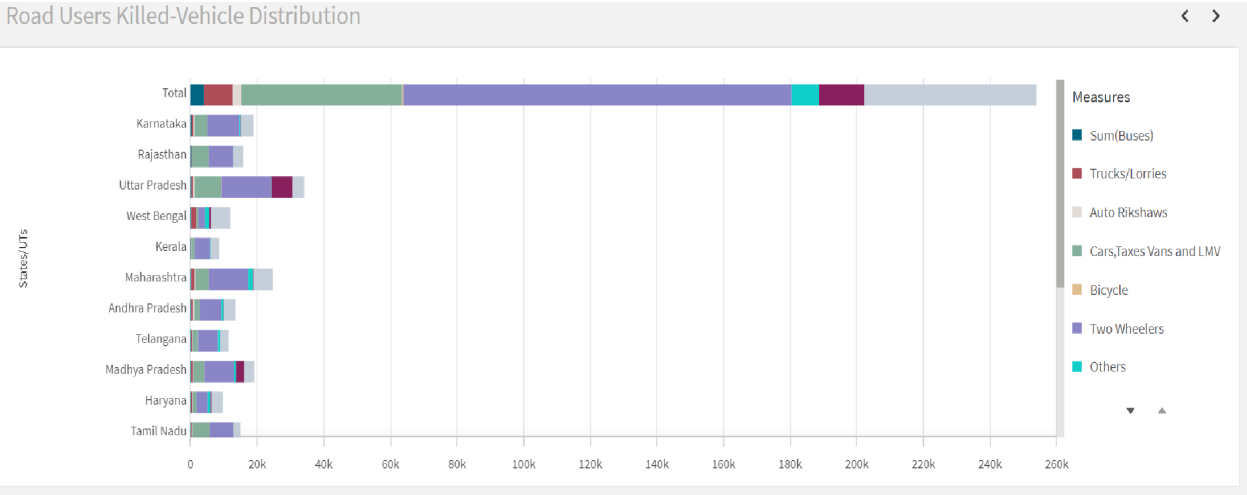
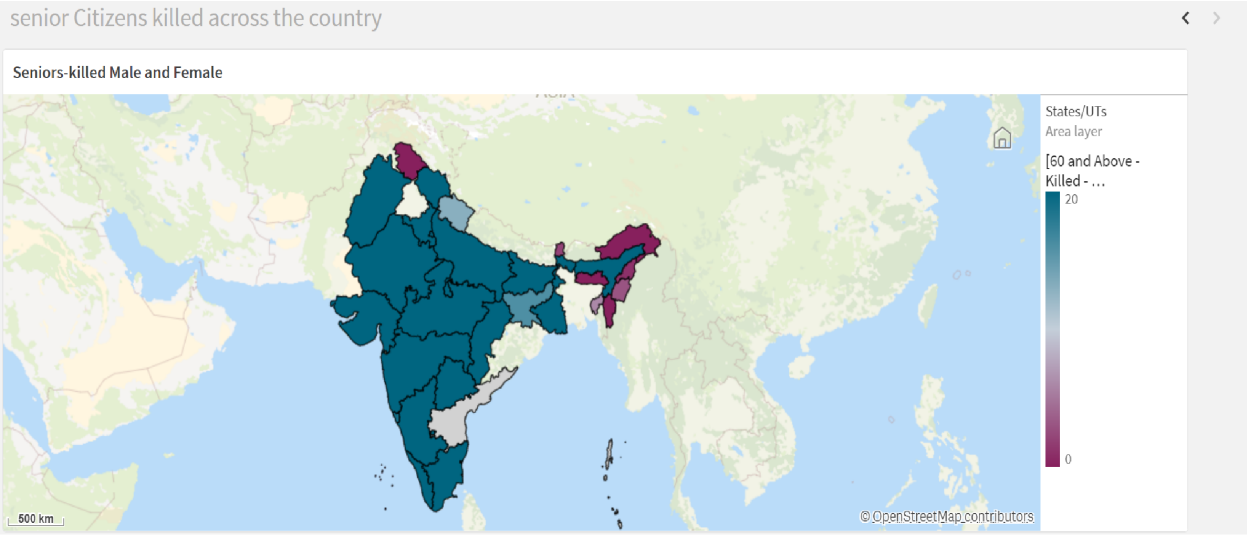


State Wise-Road Users Killed



Senior Killed-State Wise



State Wise-Accidents By Weather Type

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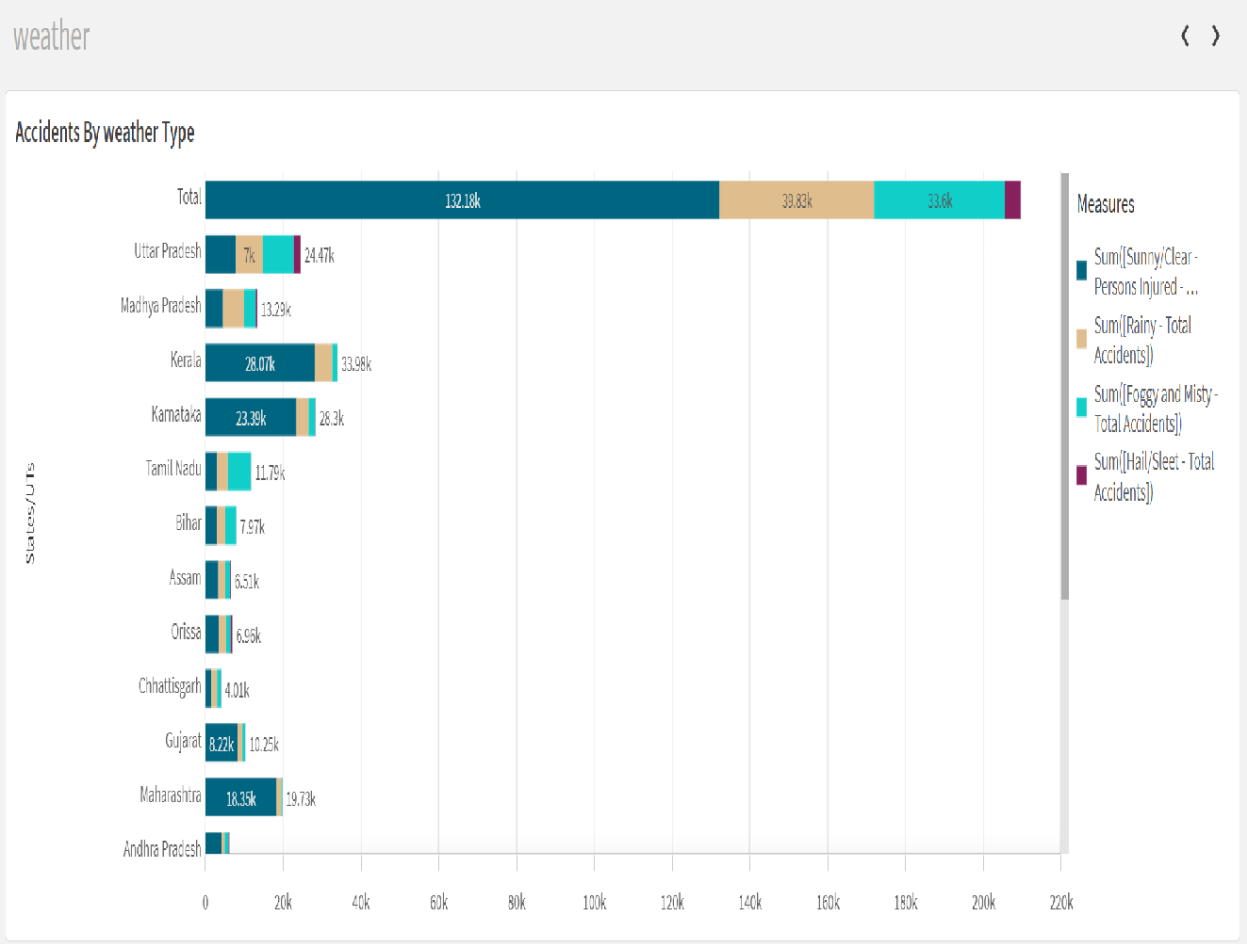

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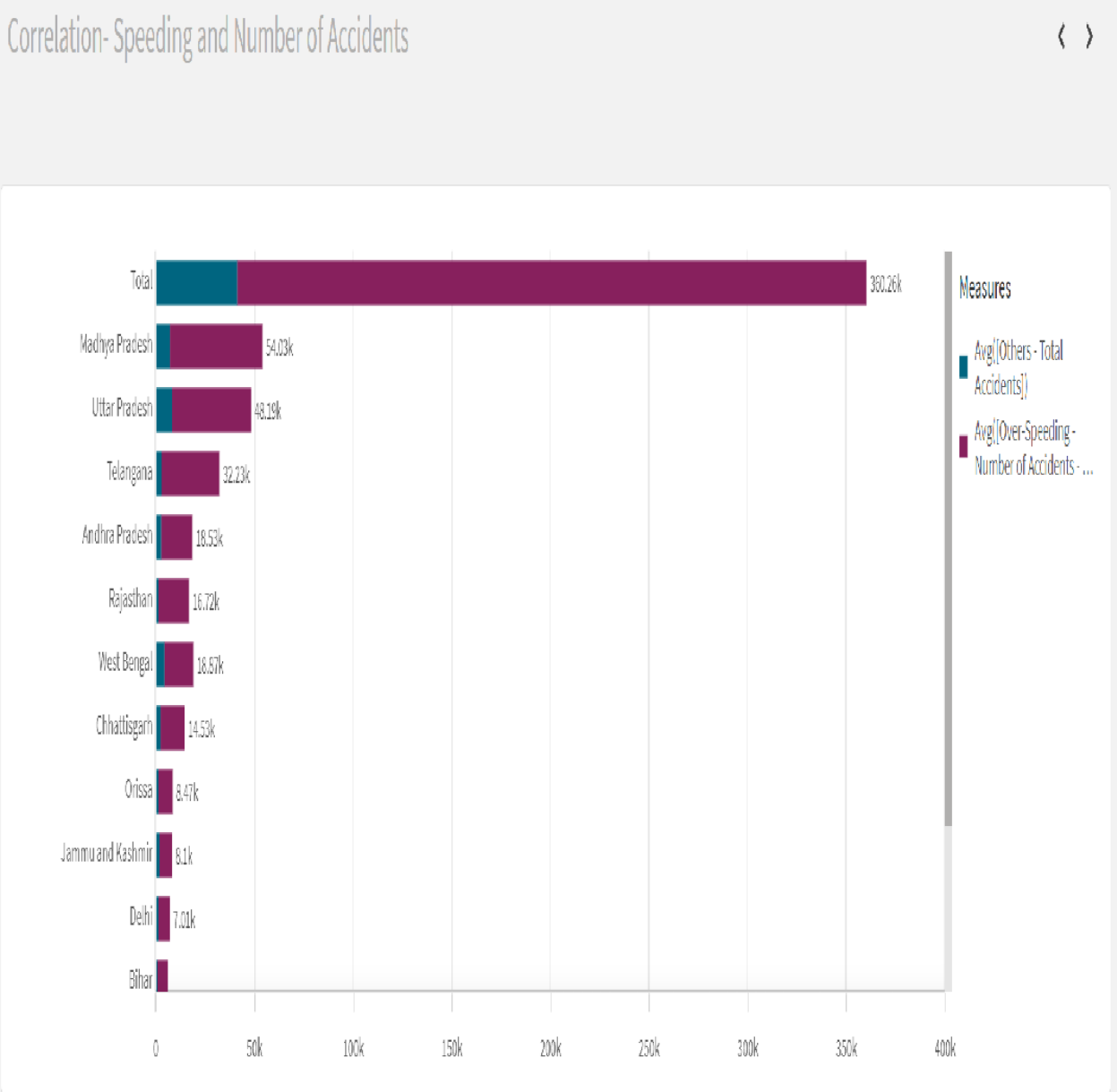

Dashboard

Responsive And Design Of Dashboard

Accidents Near Traffic Signals Due To Avoiding Rule

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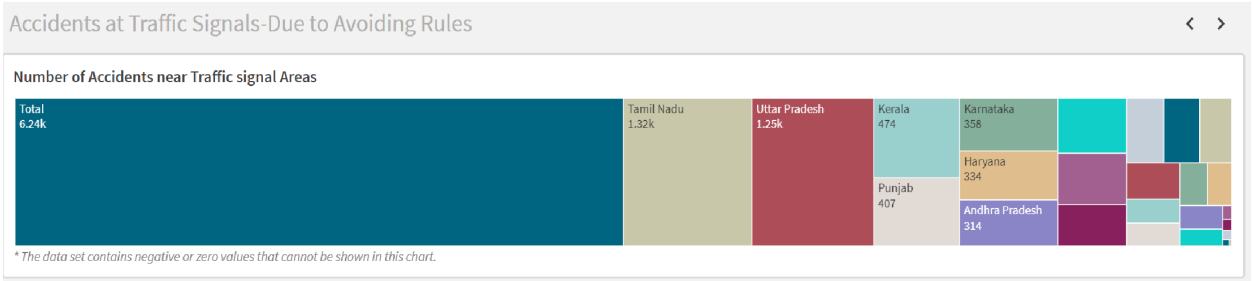
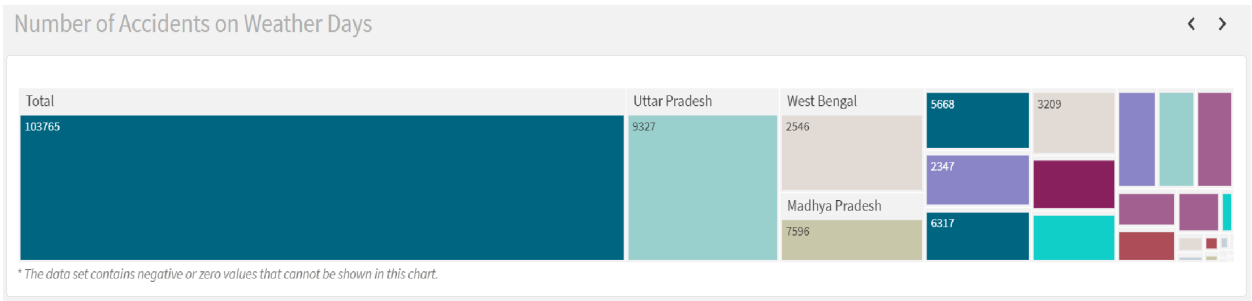


State Wise-Accidents on Weather Days



Storytelling/Report

Design Of Story

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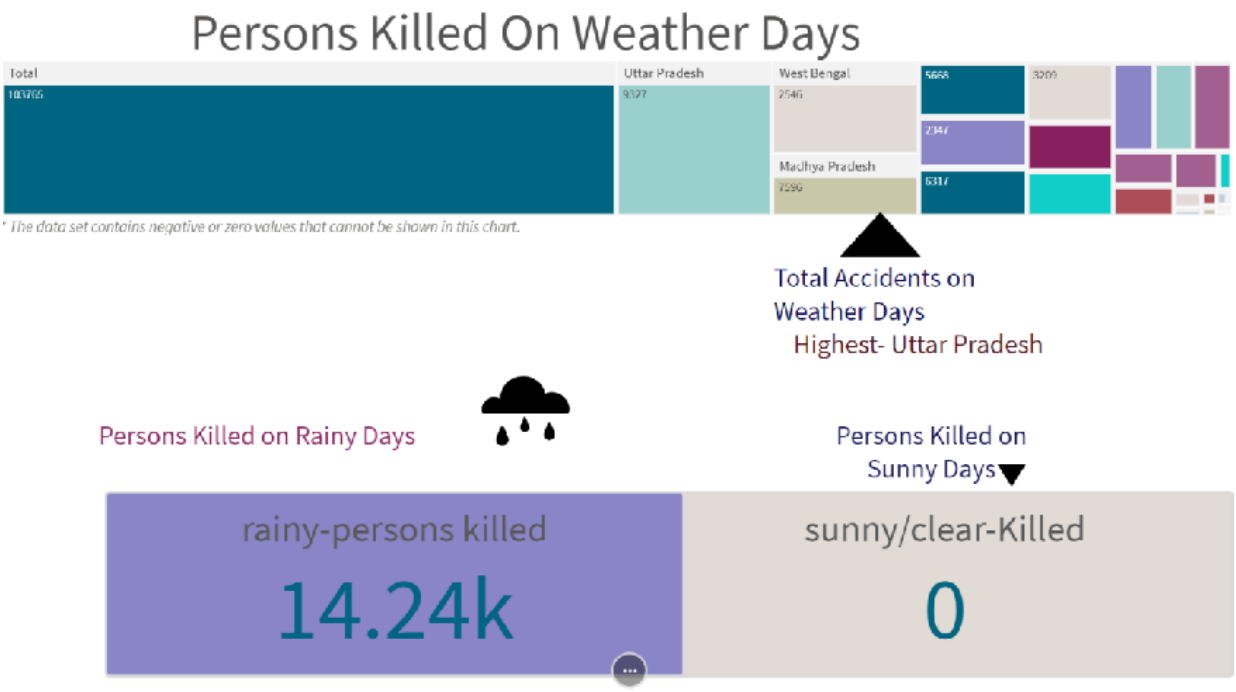

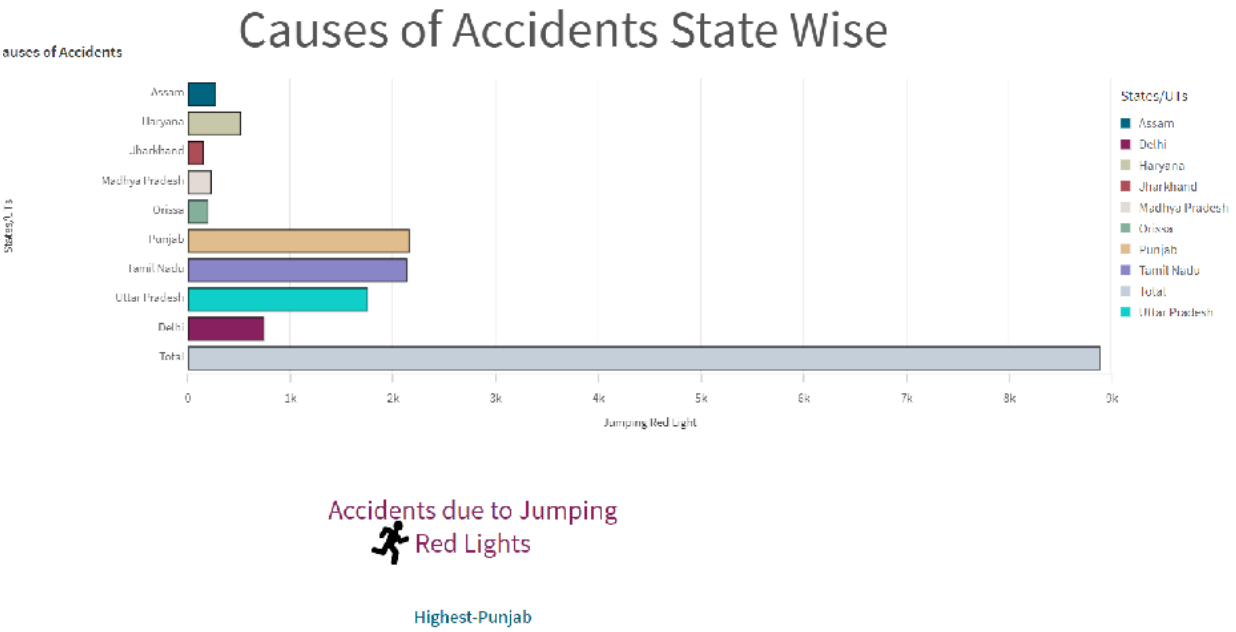

Accidents due to Jumping Red Lights

Highest-Punjab

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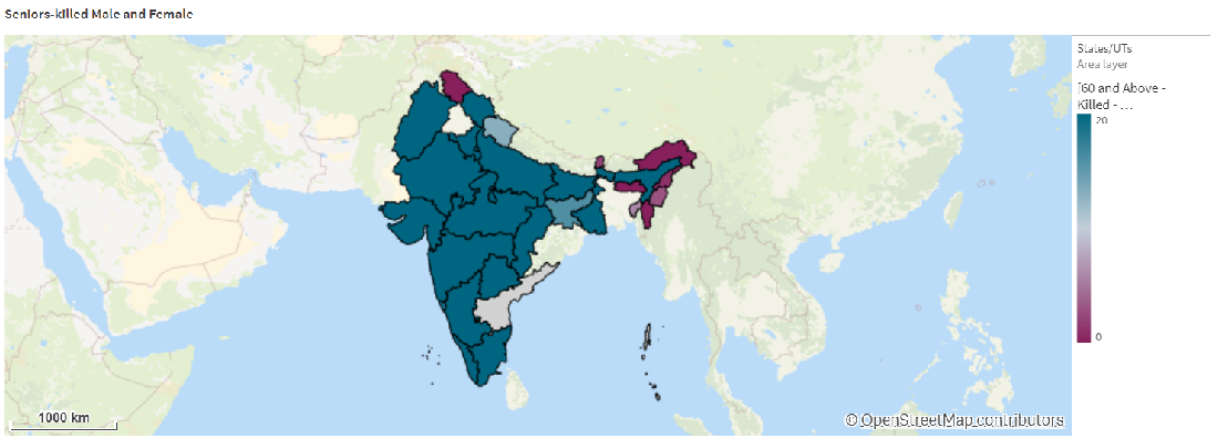
Accidents Due to Mobile Usage

Highest accidents-Uttar Pradesh



This Colour indicates the states where Seniors (60 and above M & F) are Killed

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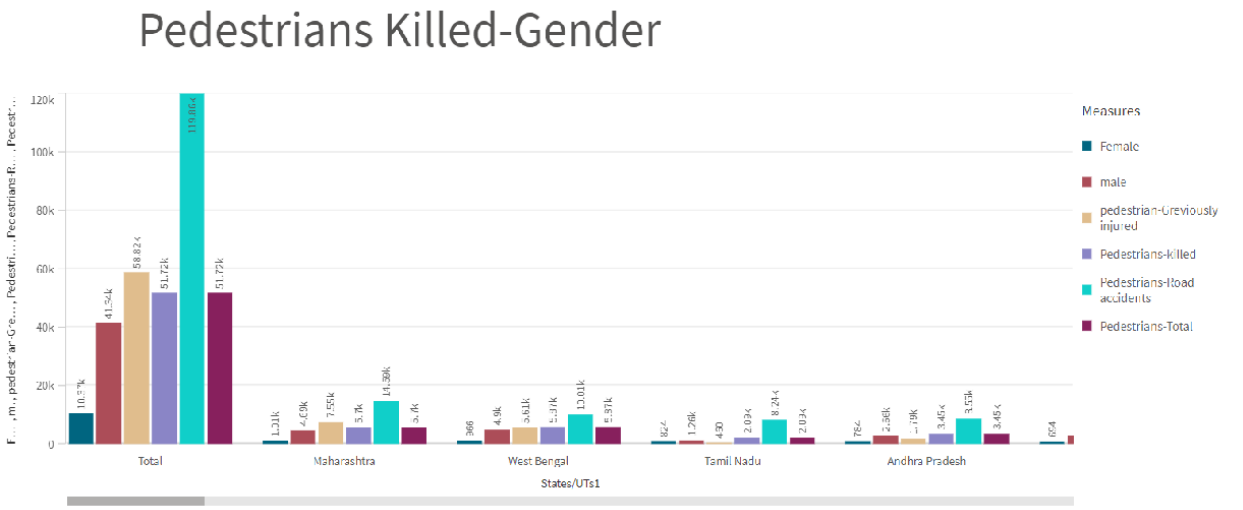
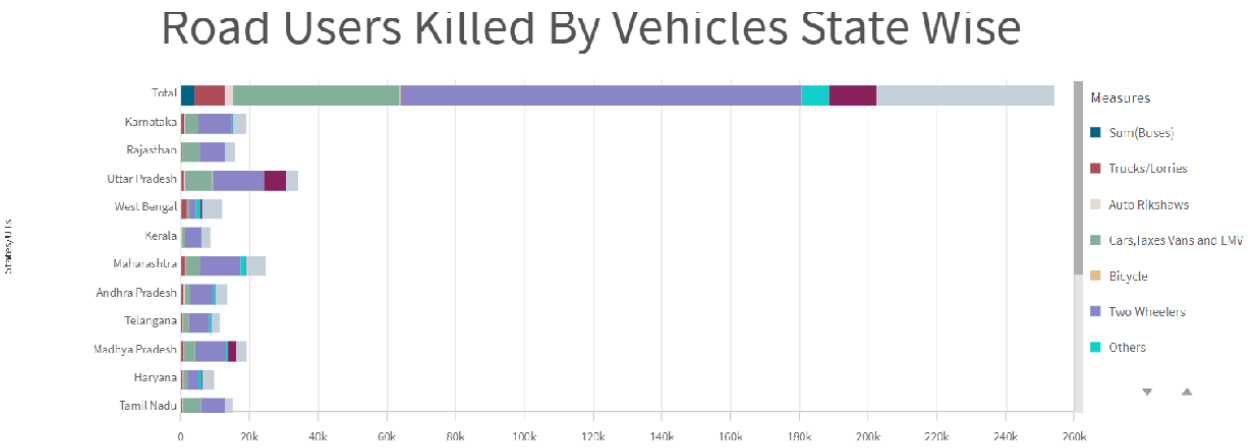


Pedestrians Accidents

Highest-Maharashtra



Highest-Two Wheelers State-Uttar Pradesh

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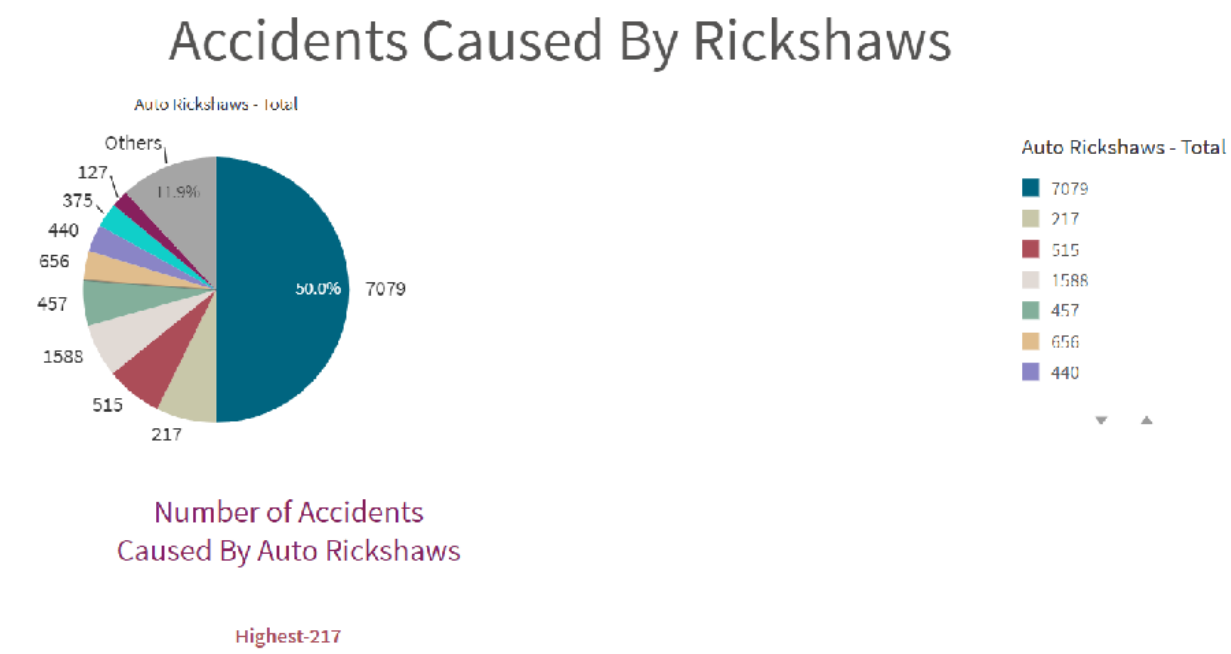

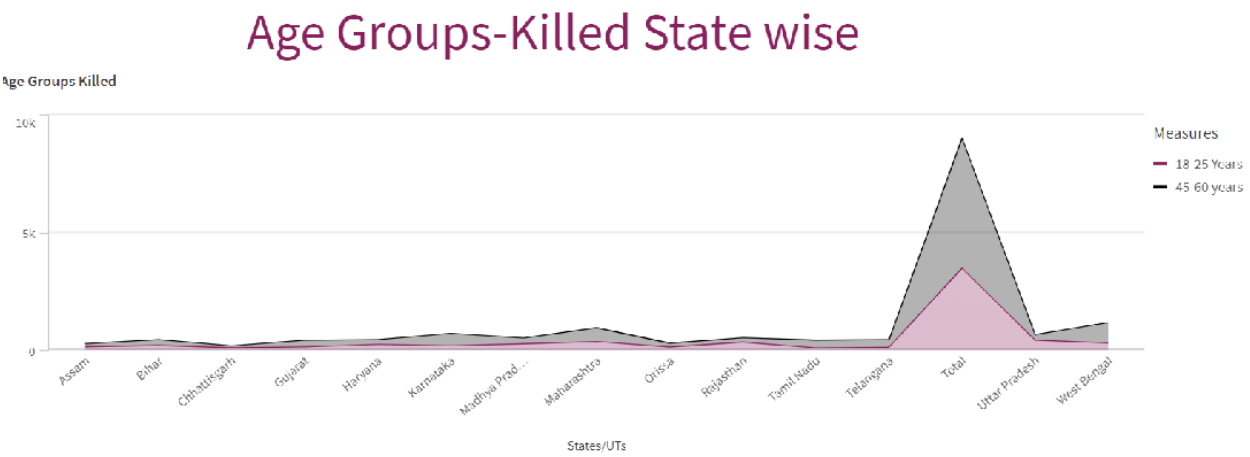

Persons Killed Between
age 18-25 years state wise

Persons Killed Between
age 45-60 years

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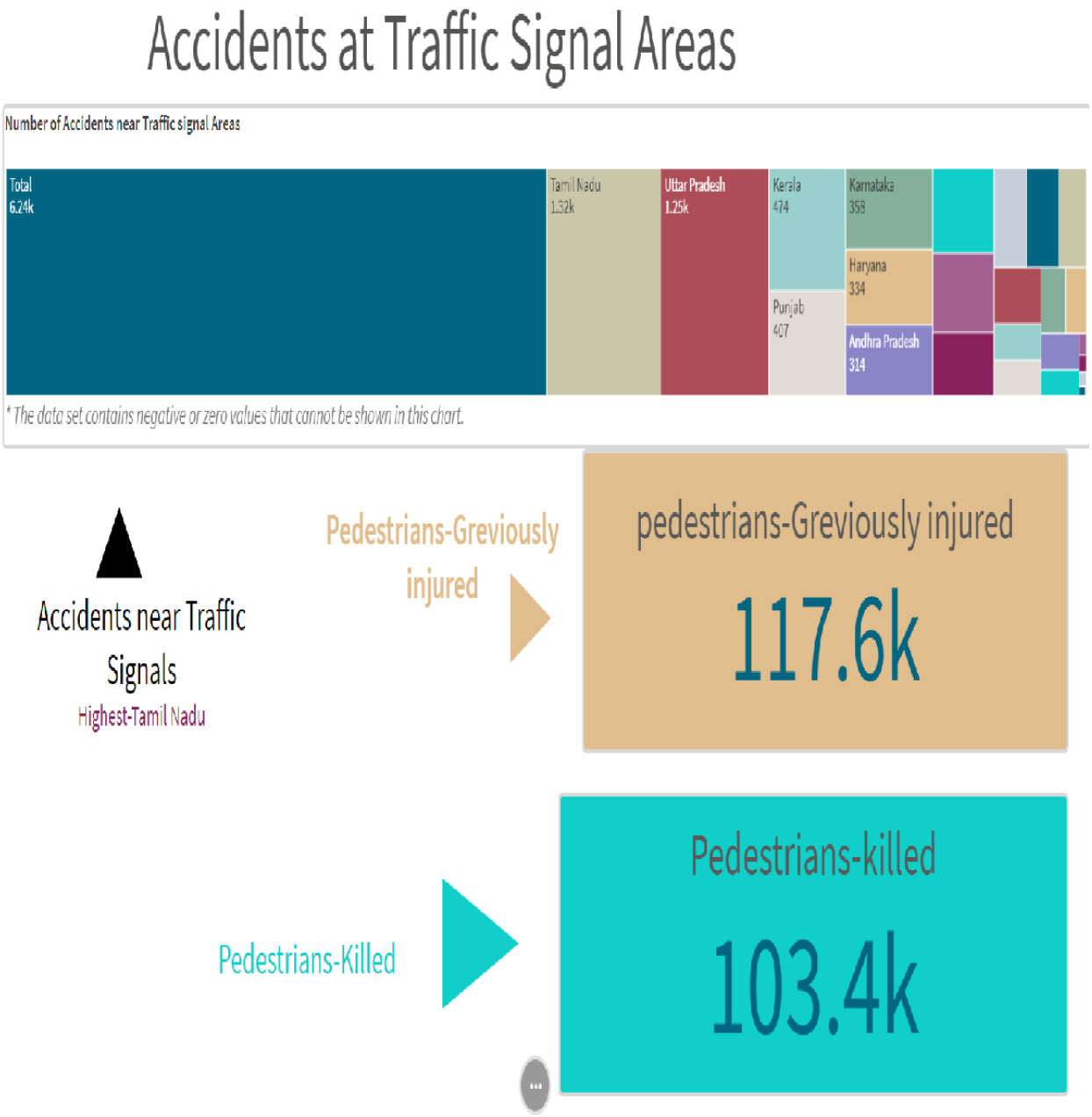

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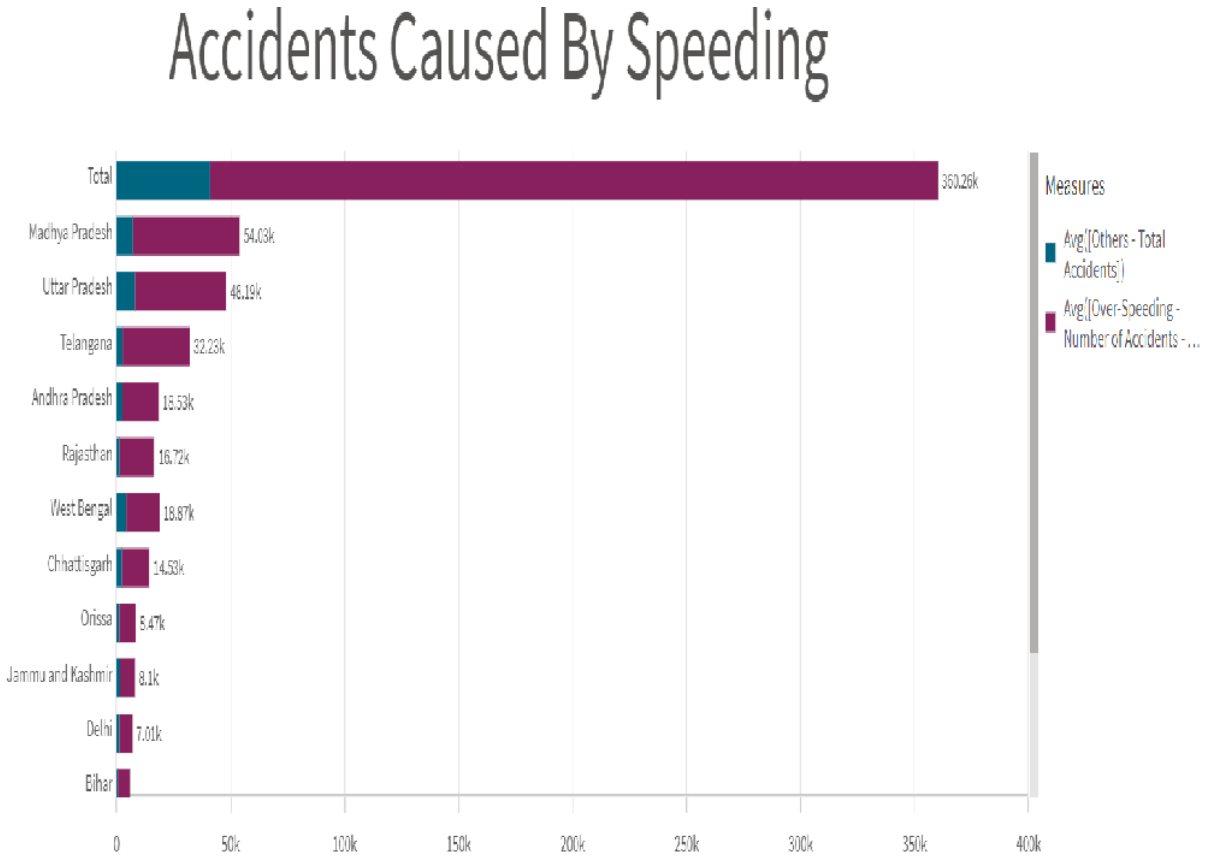

Highest-Madhya Pradesh

Performance Testing

Amount Of Data Rendered-
Total data rendered in this dataset is 37kb
This 37kb data is roughly equivalent to 18-19 pages of plain text
Utilization Of Data Filters-
Use Of Master Items/Calculated Fields
Qlik Sense allows the creation of reusable filter objects like Master Items, Calculated Fields which can simplify the process of applying consistent filters across multiple visualizations and dashboards.

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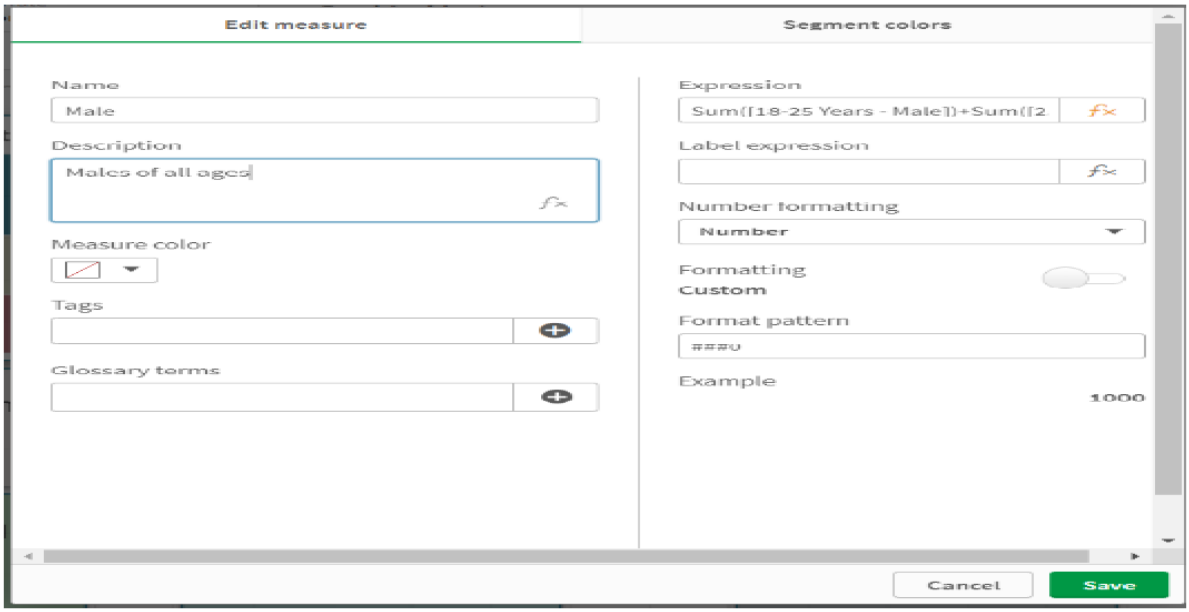

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