

Qlik Analysis of Road Safety and Accident Patterns in India

Project Report

Project Guide- Mr Anwar

Submitted By- Anika Saxena

1. Introduction:

1.1 Overview: A brief description about the project: The goal of this project is to increase road safety in India by identifying high-risk regions and analyzing accident patterns using Qlik's data analytics platform. Through the integration of many data sources, including traffic data, accident reports, meteorological data, road infrastructure, and demographic information, the project aims to detect patterns, pinpoint locations where accidents occur frequently, and forecast future incidents. In order to improve safety precautions and lower accident rates, these insights will support data-driven decision-making by government bodies, transportation agencies, and road safety groups.

Situation 1: Locating Hotspots

With the use of Qlik's analytics, areas or particular roads in India with a high accident frequency can be found. The platform will identify areas that are more likely to have accidents by analyzing accident data in conjunction with traffic volume, road conditions, and time of day. This data is essential for putting targeted interventions into place, such as enhanced traffic monitoring, better signage, and lowered speed limits.

Scene 2: Examination of Trends

In order to find trends and reoccurring causes of accidents, the platform will examine past accident data. This entails looking at various accident kinds (such as collisions and pedestrian accidents), seasonal fluctuations, and driving habits (such as speeding and inattentive driving). In order to address the underlying causes of accidents, awareness campaigns, driver training programs, and legislative reforms will be guided by the insights obtained.

3. Predictive Modeling Scenario

Qlik will estimate possible accident situations using real-time data and predictive analytics. The platform is designed to provide early warnings and suggest

proactive ways to reduce accidents by taking into account several elements, including weather forecasts, traffic flow patterns, and historical accident trends. Authorities will be able to better allocate resources and put preventative safety measures in place because of this predictive capabilities.

The overall goal of this initiative is to employ data analytics to save lives, increase road safety in India, and lower the number of accidents.

1.2 Purpose: The use of the project. What can be achieved using this: The project's objective is to use the Qlik platform to increase road safety in India. Through the examination of weather patterns, accident reports, road infrastructure, traffic data, and demography, our objectives are:

Determine Hotspots for Accidents

Identify locations with a high accident rate.

Benefit: To prevent accidents, implement targeted safety measures such improved signs and modified speed limits.

Examine Accident Patterns

Finding trends and typical causes of mishaps is the goal.

Benefit: Direct legislative changes, driver education programs, and awareness efforts to address the underlying problems.

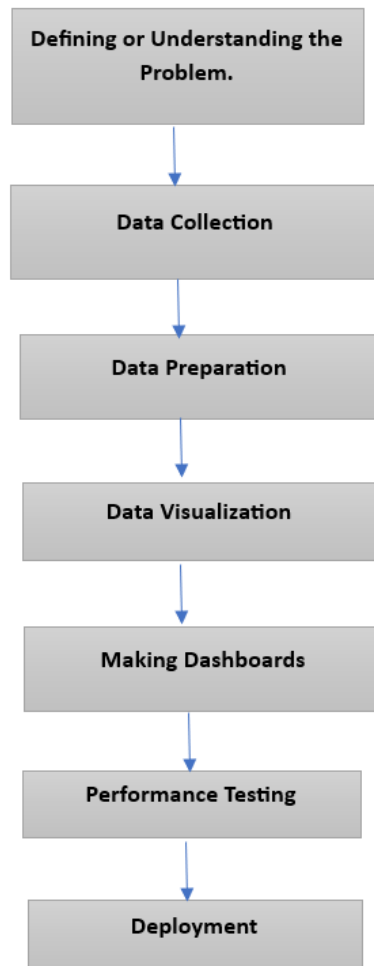
Estimate and Avoid Mishaps

Goal: Use current data to predict probable accidents.

Benefit: Increase overall road safety by preventing accidents with early warning systems and preventative initiatives.

By building safer roads in India, we hope to save lives, lower accident rates, and make well-informed decisions using Qlik's analytics.

1.3 Technical Architecture:



2. Define Problem:

2.1 Specify the business problem: India continues to have shockingly high rates of traffic accidents, which cause a substantial number of fatalities and injuries annually even if developments in transportation have made travel more efficient. The primary issues encompass elevated rates of accidents, an inadequate comprehension of accident trends, inadequate data-driven decision-making, and ineffective resource distribution. To improve road safety, we want to identify accident hotspots, analyze patterns and causes. In the end, this data-driven strategy seeks to lessen fatalities and accidents, sparing lives and improving road safety in India.

2.2 Business Requirements: The project aims to develop interactive dashboards to analyze user demographics, accident patterns, and problem areas. These dashboards will aid in strategic planning, operational improvements, and regulatory compliance. Key requirements include:

1. **Data Integration:** Aggregate accurate data from various sources.
2. **Dashboard Design:** Create user-friendly, interactive dashboards with filters and multiple views.
3. **Data Visualization:** Utilize dynamic graphs, charts, and maps.

Success will be measured by the clarity of insights.

2.3 Literature Review:

Road traffic accidents result in a considerable number of fatalities and injuries each year, making road safety a major global problem. Improving road safety requires an understanding of the elements that contribute to accidents as well as an assessment of the efficacy of various solutions.

Road Safety Influencing Factors

1. **Human Behavior:** According to Dingus et al. (2016), driving while distracted, speeding, and driving while intoxicated are all significant causes of accidents. Traffic law enforcement and education are crucial.
2. **Vehicle Condition:** Inadequate maintenance on vehicles, such as malfunctioning brakes and tire blowouts, raises the chance of an accident (NHTSA, 2015).
3. **Road Infrastructure:** According to the Federal Highway Administration (2018), safety is greatly impacted by the quality of the lighting, signs, and road design.
4. **Environmental Factors:** Unfavorable weather, such as rain and fog, increases

the likelihood of accidents (Andrey et al., 2003).

The efficacy of interventions

Legislative Actions: Seat belt requirements and DUI legislation, for example, lower the number of fatal traffic accidents (Elvik, 2008).

Engineering Solutions: Roundabouts and pedestrian bridges are examples of improvements that improve safety (Retting et al., 2003).

Campaigns for Education: Initiatives to raise public awareness encourage safe driving practices (Tison et al., 2010).

Technological Innovations: According to Cicchino (2017), advanced driving assistance systems, or ADAS, help to prevent accidents.

The role of analytics

According to Abdel-Aty and Haleem (2011), predictive analytics forecasts high-risk behaviors and accident hotspots so that preventive measures can be taken.

Geospatial analysis visualizes accident data and looks for trends using geographic information systems (GIS) (Anderson, 2009).

The utilization of big data and machine learning improves the precision of data analysis related to road safety (Montella et al., 2011).

Real-time Data Monitoring: According to Barnaby and Boriboonsomsin (2008), telematics and the Internet of Things (IoT) offer instant feedback on driver and vehicle performance.

In summary,

A multimodal strategy that incorporates engineering solutions, education campaigns, legislative initiatives, and technology improvements is needed to improve road safety. Insights and proactive efforts to lower traffic accidents and improve safety are made possible by data analytics. In order to keep increasing road safety throughout the world, future research should concentrate on utilizing cutting-edge technologies and data-driven approaches.

2.4 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.

3. Data Collection

3.1 Collect the Data

The data used for this business analytics project was sourced from Kaggle, a well-known platform for datasets and data science competitions. The datasets from Kaggle are publicly available and often contain rich, structured information that is invaluable for in-depth analysis.

Accessing the Dataset

Kaggle Account: Ensure you have a registered account on Kaggle.

Dataset URL: Navigate to the Lending Club dataset page on Kaggle. The dataset can be found [here](#).

Google Drive Link: <https://drive.google.com/drive/folders/1-MflqLwrCE6tW3iWXjFXAfTLK7vjtoyN?usp=sharing>

3.2 Connect data with qlik sense:Log in to Qlik Cloud:

Access your Qlik Cloud account through the Qlik Cloud portal.

1. Create a New App:

- i. Navigate to the "Apps" section.
- ii. Click on "Create new app" and provide a name and description for your app.
- iii. Click "Create" and then "Open App" to start working on your new app.

2. Add Data:

- i. In the app, click on "Add Data" to begin the data import process.
- ii. Select "My Computer" to upload data files directly from your local storage.
- iii. Browse and select the pre processed Kaggle CSV files and click "Open."

Data Connection Configuration:

1. Review and Load Data:

- i. After uploading, Qlik Cloud will display a preview of your data.
- ii. Verify that the data is correctly imported and formatted.
- iii. Make any necessary adjustments, such as renaming fields or changing data types.
- iv. Click "Load Data" to load the datasets into your Qlik app.

2. Data Model Viewer:

- i. Use the Data Model Viewer to see how the data tables are related.
- ii. Ensure that all data relationships and keys are correctly set up.

Create Visualizations:

1. Dashboard Design:

- i. Go to the "Sheets" section within your app.
- ii. Create a new sheet and start adding visualizations like charts, graphs, and tables.

2. Add Filters and Dimensions:

- i. Use the "Fields" panel to drag and drop dimensions and measures into

your visualizations.

- ii. Apply filters to refine data views and enhance interactivity.

3. Enhance Visualizations:

- i. Customize the appearance and functionality of your visualizations.
- ii. Use advanced features like drill-downs, dynamic coloring, and data storytelling to make your dashboard more compelling.

4. Data Preparation

4.1 Prepare the data for visualization:

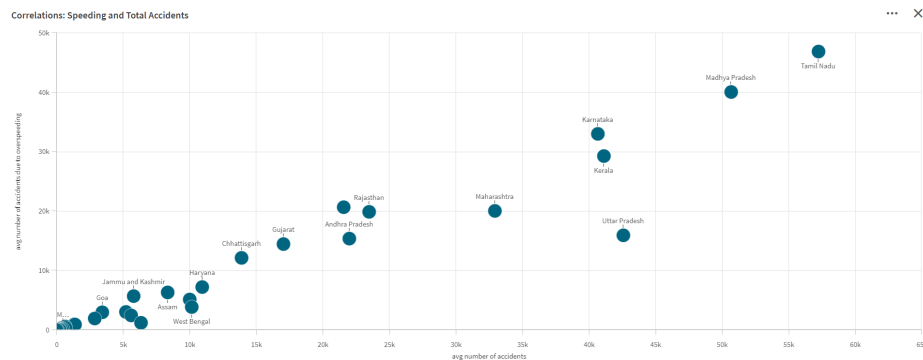
Preparing the data for visualization involves cleaning the data to remove irrelevant or missing data, transforming the data into a format that can be easily visualized, exploring the data to identify patterns and trends, filtering the data to focus on specific subsets of data, preparing the data for visualization software, and ensuring the data is accurate and complete. This process helps to make the data easily understandable and ready for creating visualizations to gain insights into the performance and efficiency. Since the data is already cleaned; we can move to visualization.

5.Data Visualization

Data visualization is the process of creating graphical representations of data to help people understand and explore the information. The goal of data visualization is to make complex data sets more accessible, intuitive, and easier to interpret. By using visual elements such as charts, graphs, and maps, data visualizations can help people quickly identify patterns, trends, and outliers in the data.

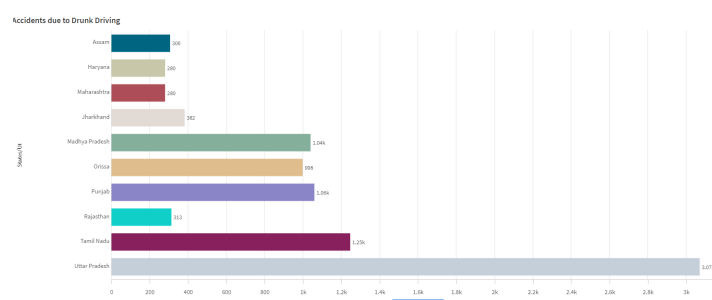
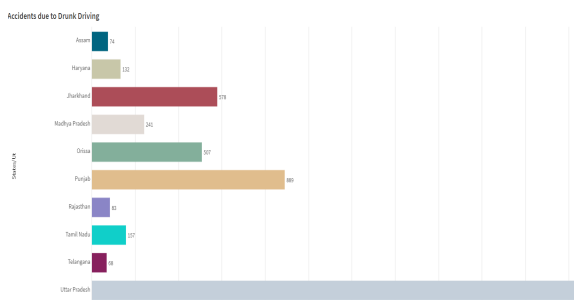
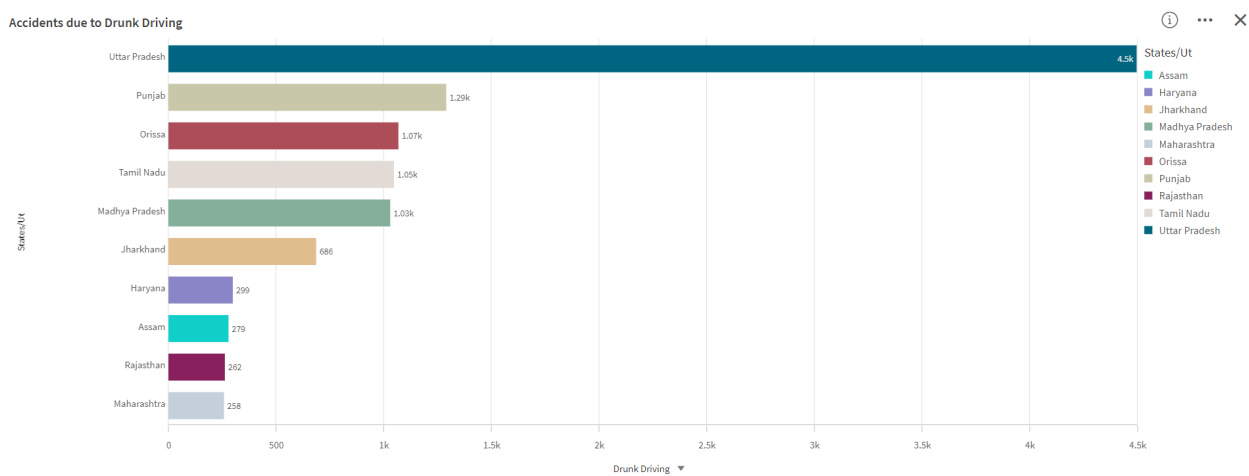
Road Safety and Accident Patterns in India

This visualization contains the accidental report of various causes of accident, Minors and Genders affected by it and many more. Some common types of visualization used to analyze are Bar charts, Map chart, Line chart, Pie Chart, Tree map, KPI, Gauge, Correlations.

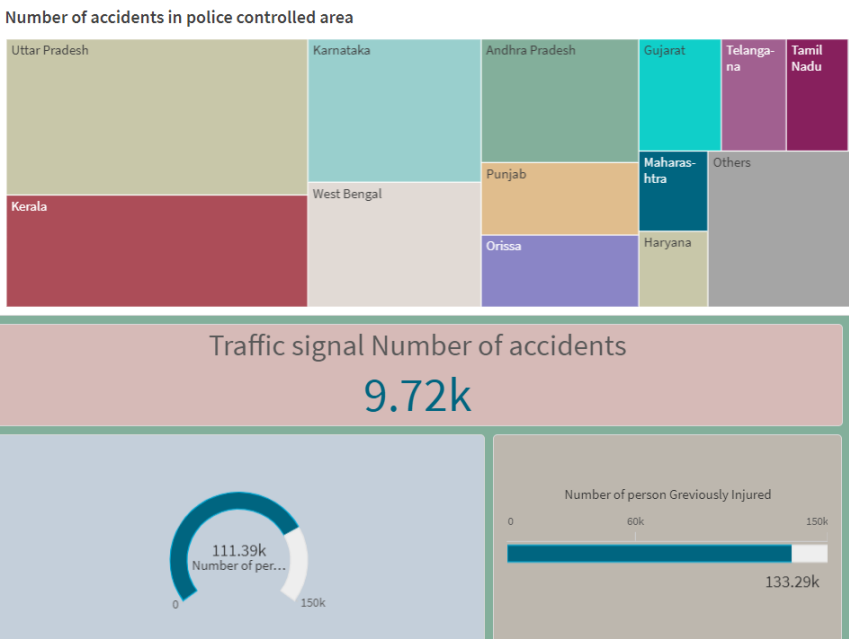


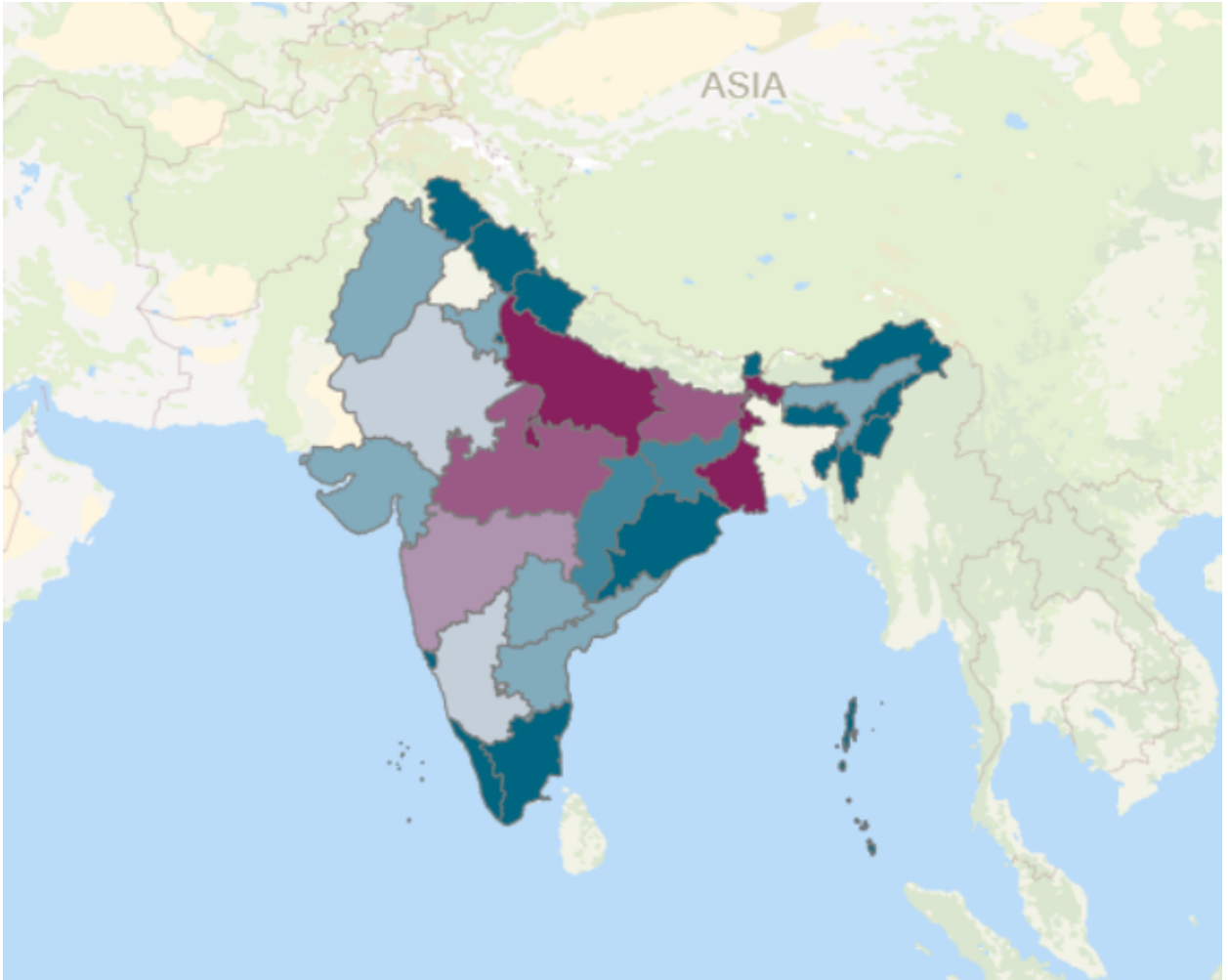
This chart shows the correlation between accidents by over speeding and total

accidents.

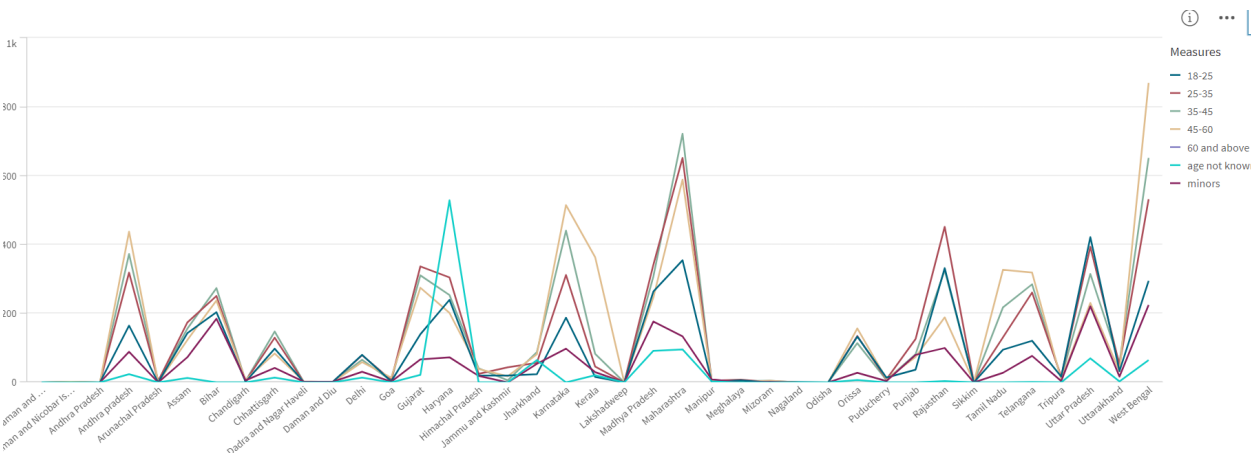


This graph shows the Accidents caused by Drunken Driving, no of people killed and total injured





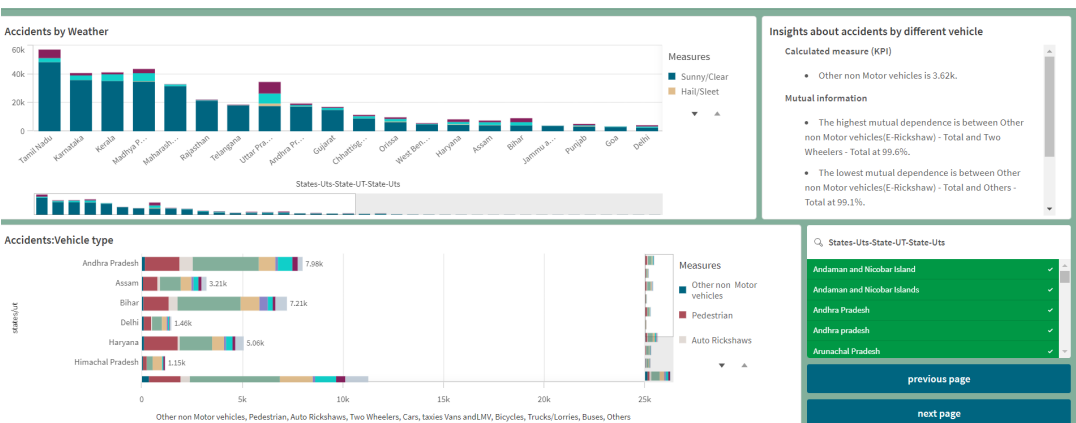
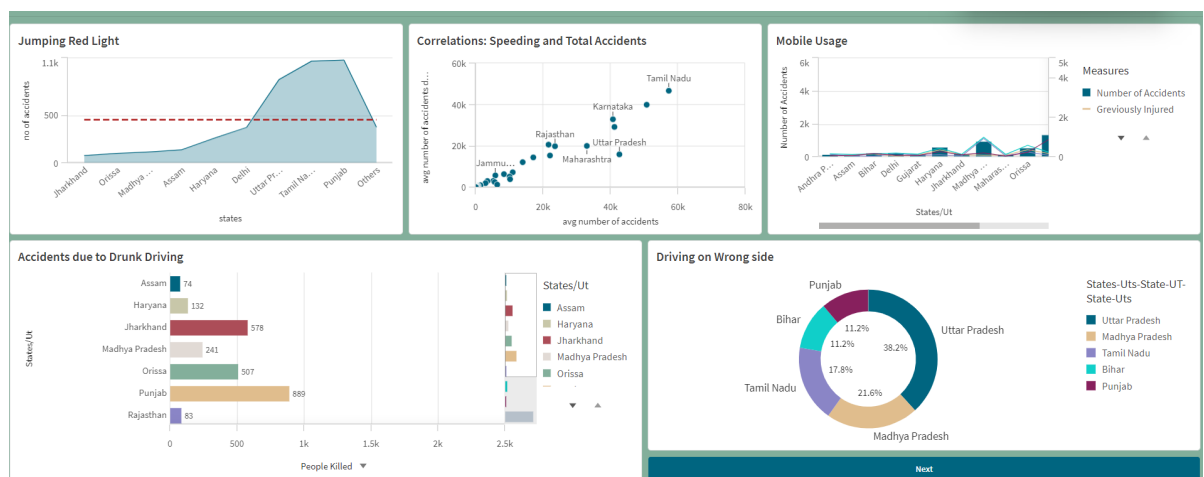
The map shows the number of minors killed in different states.

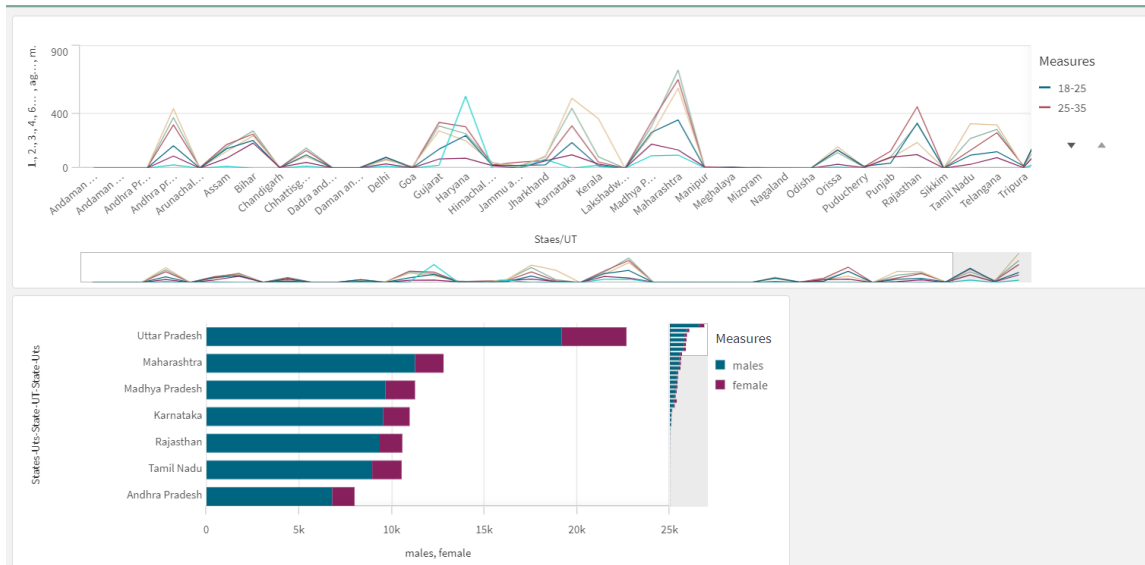
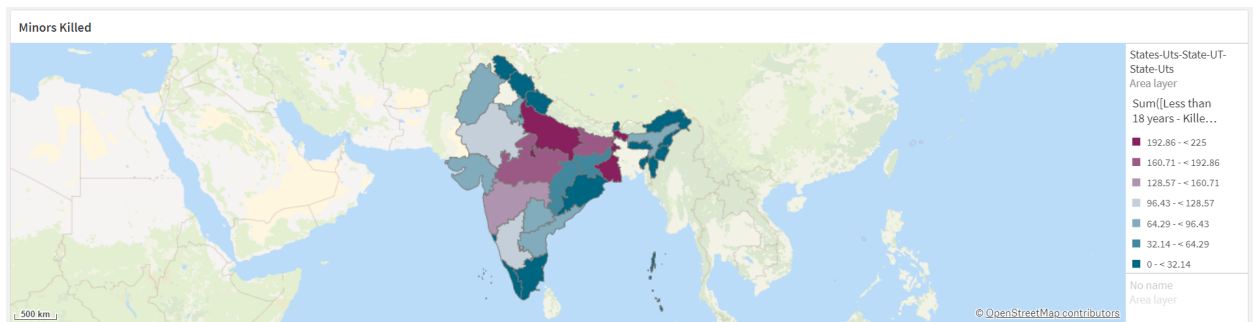


and the age group of people were killed.

6. Dashboard

6.1 Responsive and Design of Dashboard

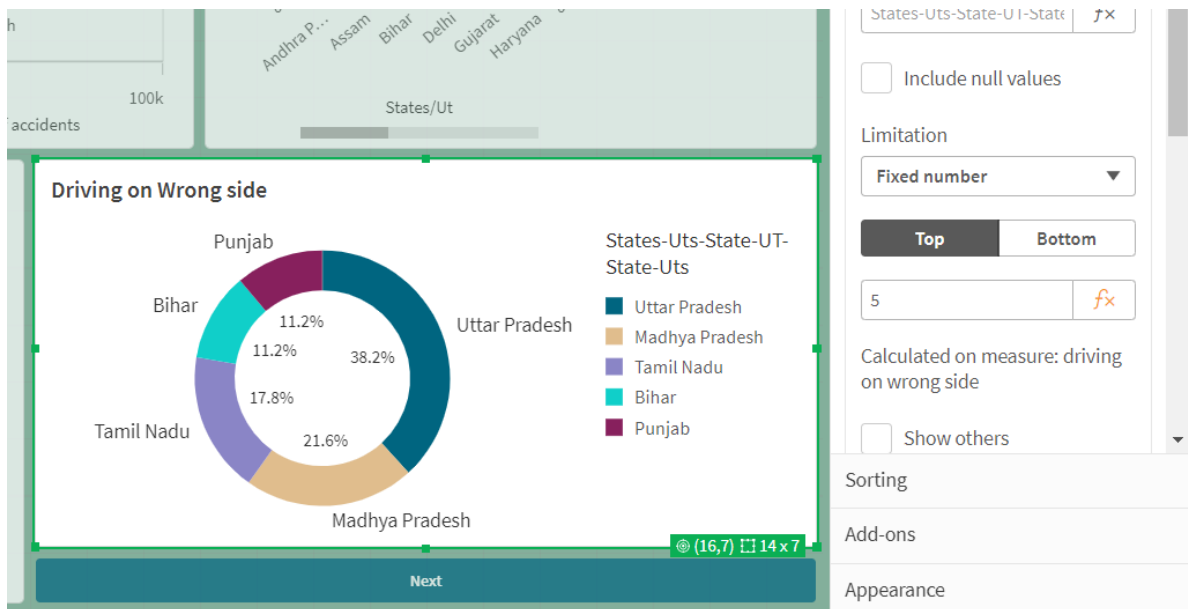




7 Performance testing:

Applications on Data Filters:

Data filter of 5 States



Use of Master Items:

Assets Properties

Fields

Master items

Charts

Custom objects

Search

Dimensions

Measures

Create new

18-25

25-35

35-45

45-60

60 and above

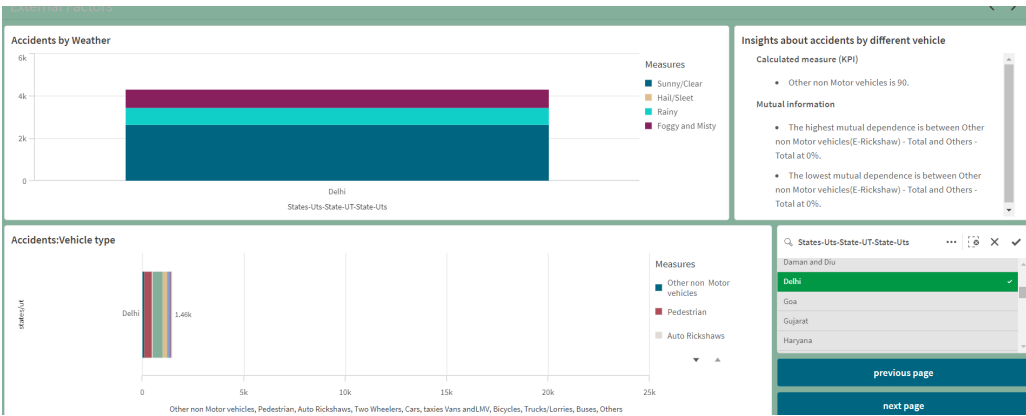
acc by weather

accidents

age not known

female

Use of Filters:



Conclusion:

This report provides a detailed analysis of Road Safety and Accident Patterns, uncovering key factors influencing accidental factors and casualties and offering actionable insights for improving lending strategies