

Qlik Analysis of Road Safety and Accident Patterns in India Project Report

Project Guide- Mr Anwar

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1. Introduction:

1.1 Overview. A quick description of the project. The initiative attempts to improve road safety in India by identifying high-risk areas and analysing accident trends with Qlik's data analytics platform. The project integrates data from traffic, accident records, meteorology, road infrastructure, and demographics to find patterns, identify common accident spots, and estimate future accidents. The insights collected will help government bodies, transportation agencies, and road safety organisations make data-driven decisions to improve safety and minimise accidents.

Scene 1: Locate Hotspots Qlik's analytics can identify places or highways in India with high accident rates. The software analyses accident data, traffic volume, road conditions, and time of day to identify high-risk regions for accidents. This data is vital for executing targeted interventions like traffic monitoring, signs, and speed limit reduction.

Scene 2: Analysis of Trends The platform analyses previous accident data to identify trends and recurrent causes. This involves analysing various types of incidents (e.g., collisions, pedestrian accidents), seasonal changes, and driving behaviours (e.g., speeding, inattention). The insights will inform awareness efforts, driver training programmes, and legal amendments to tackle the underlying causes of accidents.

Scene 3: Predictive Modelling Scenario. Qlik utilises real-time data and predictive analytics to forecast possible accident situations. The platform uses weather forecasts, traffic flow patterns, and historical accident statistics to deliver early warnings and recommend preventative steps to decrease accidents. This predictive skill helps authorities allocate resources efficiently and adopt preventative safety measures.

The effort intends to use data analytics to improve road safety in India and minimise accidents.

1.2 Purpose: What the project is used for. What can be accomplished with this:

This initiative aims to improve road safety in India using the Qlik platform. The research will analyse weather trends, accident records, road infrastructure, traffic statistics, and demographics to identify accident hotspots.

- Goal: Identify areas with high accident rates.

- Benefit: Implement targeted safety measures like enhanced signage and reduced speed restrictions to reduce accidents.

- Examine accident patterns.

- Goal: Identify accident patterns and causes.

- Benefits include direct legal changes, driver education programmes, and awareness campaigns to address underlying concerns.

- Estimate and prevent accidents.

- Goal: Utilise existing data to forecast prospective accidents.

- Benefit: Improve road safety through early warning systems and proactive prevention measures.

2. Define Problem:

2.1 Describe the Business Problem: India continues to suffer frighteningly high rates of traffic.

Annually, accidents result in a substantial number of fatalities and injuries, notwithstanding

Transportation innovations have improved travel efficiency. The primary problems are

Factors contributing to high accident rates include a lack of awareness of patterns, poor

data-driven decision-making, and inefficient resource allocation. To improve road safety, the

purpose is to identify. Identify accident hotspots, analyse patterns, and create a data-driven plan

to minimise deaths and improve road safety in India. The project seeks to create interactive

dashboards that analyse user demographics, accident trends, and issue locations.

2.2 Business criteria: Key criteria for achieving project goals are as follows:

1. Data Integration: Collect reliable data from a variety of sources.

2. Design user-friendly interactive dashboards with filters and different perspectives.

3. Data Visualisation: Use dynamic graphs, charts, and maps to easily communicate findings.

Success will be determined by the clarity and usability of the information offered by these dashboards.

2.3 Literature Review: Road traffic accidents cause numerous lives and injuries annually, making road safety a major global concern. To improve road safety, it's important to identify accident causes and assess the success of remedies.

Road Safety Influencing Factors:

1. Human Behavior: Distractions, speeding, and intoxicated driving are significant causes of accidents. Traffic law enforcement and education are crucial (Dingus et al., 2016).

2. Vehicle Condition: Poor vehicle maintenance, such as malfunctioning brakes and tire blowouts, increases accident risk (NHTSA, 2015).

3. Road Infrastructure: Quality of lighting, signage, and road design greatly impacts safety

(Federal Highway Administration, 2018).

4. Environmental Factors: Adverse weather conditions like rain and fog elevate accident likelihood (Andrey et al., 2003).

Efficacy of Interventions:

- Legislative Actions: Seat belt mandates and DUI laws reduce fatal accidents (Elvik, 2008).
- Engineering Solutions: Roundabouts and pedestrian bridges enhance safety (Retting et al., 2003).
- Campaigns for Education: Public awareness initiatives promote safe driving practices (Tison et al., 2010).
- Technological Innovations: Advanced driving assistance systems (ADAS) help prevent accidents (Cicchino, 2017).

Role of Analytics:

- Predictive Analytics: Forecast high-risk behaviors and accident hotspots for preventive action (Abdel-Aty and Haleem, 2011).
- Geospatial Analysis: Use geographic information systems (GIS) to visualize accident data and identify trends (Anderson, 2009).
- Big Data and Machine Learning: Enhance precision in road safety data analysis (Montella et al., 2011).
- Real-time Data Monitoring: Telematics and IoT provide instant feedback on driver and vehicle performance (Barnaby and Boriboonsomsin, 2008).

Improving road safety requires a multimodal strategy that includes engineering solutions, education campaigns, legislative acts, and technology improvements. Data analytics helps prevent accidents and enhance safety. Future research should prioritise modern technology and data-driven strategies to improve road safety internationally.

2.4 Social Impact:

- Develop visualisations showing the demographic distribution of accidents across the country.
- Evaluate the severity of accidents across different traffic control regions.
- Investigate relationships between speeding, weather, and overall accidents.
- Identify the main causes of accidents.
- Examine victim age and gender distribution.
- Examine how different vehicle types affect overall accident rates.

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.

3.2 Connect data with qlik sense:

1. Log in to Qlik Cloud

- Access Qlik Cloud: Navigate to the Qlik Cloud portal and log in to your account.

2. Create a New App

- Navigate to Apps:
 - Go to the "Apps" section in Qlik Cloud.
 - Click on "Create new app."
 - Provide a name and description for your new app.
 - Click "Create" and then "Open App" to start working on your new app.

3. Add Data

- Begin Data Import:
 - In your app, click on "Add Data."
 - Select "My Computer" to upload data files directly from your local storage.
 - Browse and select the pre-processed Kaggle CSV files, then click "Open."

Data Connection Configuration :-

1. Review and Load Data:

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

● Data Model Viewer:

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

2. Create Visualizations

1. Dashboard Design:

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

2. Add Filters and Dimensions:

- Use the "Fields" panel to drag and drop dimensions and measures into your visualizations.
- Apply filters to refine data views and enhance interactivity.

3. Enhance Visualizations:

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

4. Data Preparation

4.1 Preparing the Data for Visualization

Preparing the data for visualization involves several crucial steps to ensure it is accurate, complete, and ready for analysis. Initially, this process includes cleaning the data by removing any irrelevant or missing information. Following this, the data is transformed into a format that can be easily visualized. Exploring the data helps in identifying patterns and trends, while filtering focuses on specific subsets relevant to the analysis. Finally, preparing the data for visualization software ensures it is ready for creating meaningful and insightful visual representations. Given that the data is already cleaned, we can proceed directly to visualization.

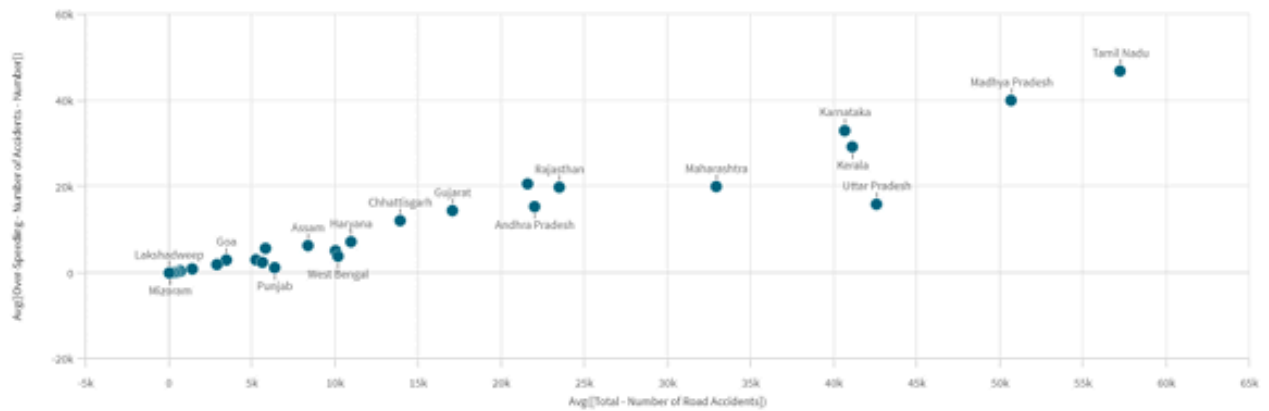
5. Data Visualization

Data visualization is the practice of creating graphical representations of data to facilitate understanding and exploration. The primary goal is to make complex data sets more accessible, intuitive, and easier to interpret. By employing visual elements such as charts, graphs, and maps, data visualizations enable users to quickly identify patterns, trends, and outliers. In the context of Road Safety and Accident Patterns in India, this visualization will encompass various aspects, including accident causes, and the demographics of minors and genders affected. Common types of visualizations used for this analysis include bar charts, map charts, line charts, pie charts, tree maps, key performance indicators (KPIs), gauges, and correlation graphs. These visual tools collectively provide a comprehensive understanding of the data, aiding in the identification of critical insights.

Road Safety and Accident Patterns in India

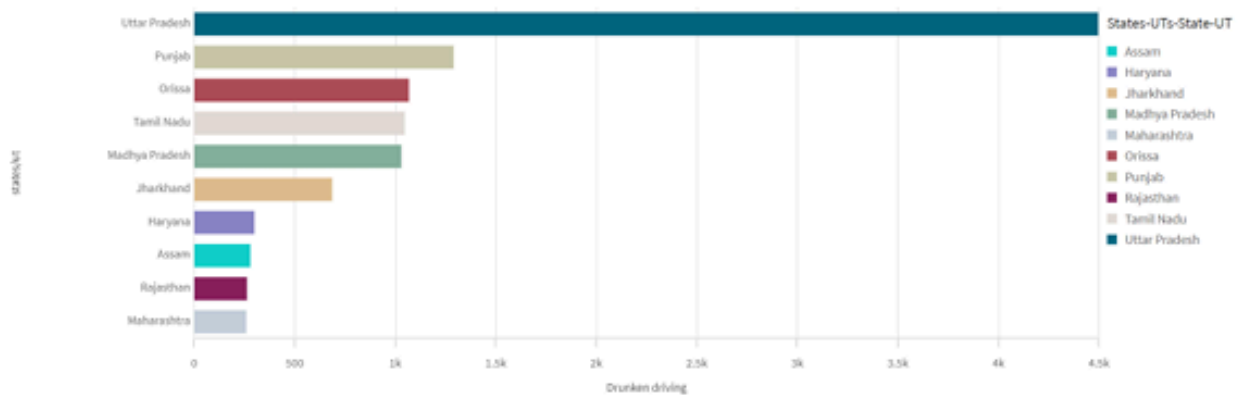
This visualization project explores various aspects of road safety and accident patterns in India. It includes detailed reports on the causes of accidents, as well as the impact on different demographics such as minors and genders. To analyze this data effectively, several types of visualizations are employed, including bar charts, map charts, line charts, pie charts, tree maps, key performance indicators (KPIs), gauges, and correlation graphs. These visual tools help in providing a comprehensive and insightful analysis of the accident data.

correlation:- speeding and total accident



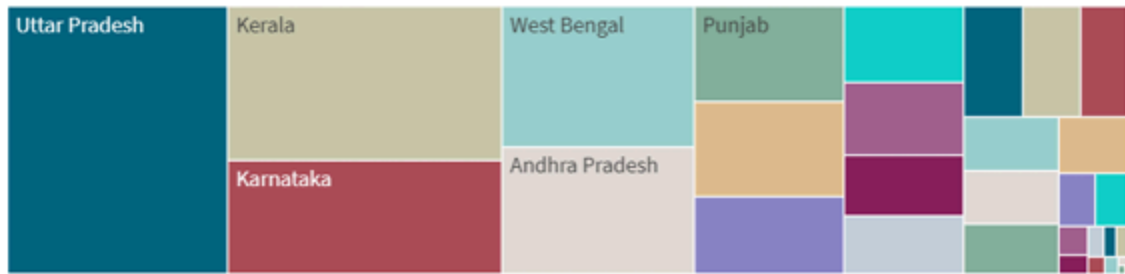
This chart shows the correlation between accidents by over speeding and total accidents.

Accidents due to drunken driving



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

number of accidents in police control area

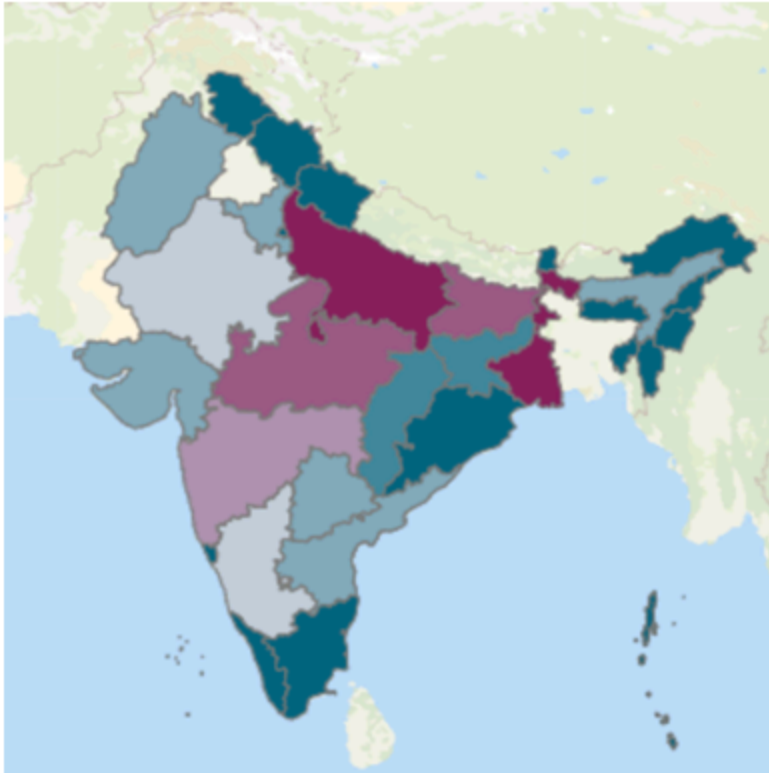


* The data set contains negative or zero values that cannot be shown in this chart.

Number of accidents near traffic signals

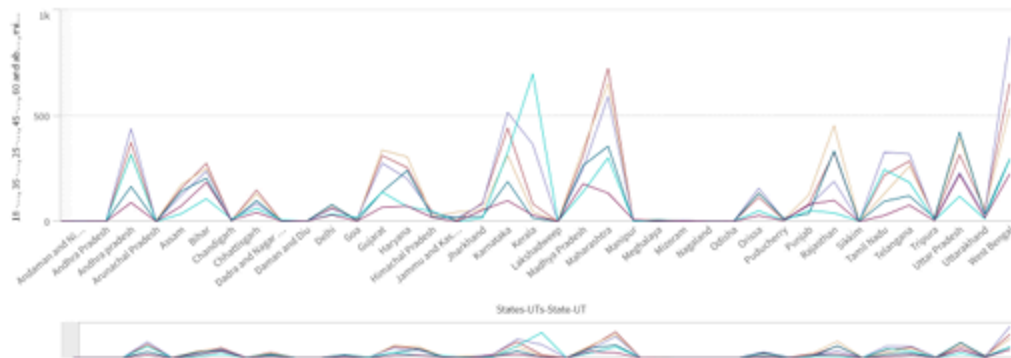


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The map shows the number of minors killed in different states

Pedestrian killed - age group



and the age group of people were killed

Accidents due to drunken driving



Mobile usage



correlation: speeding and total accident



Pedestrian killed - age group



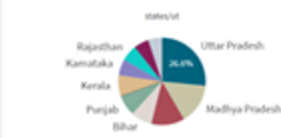
accidents by weather



Pedestrian killed Gender



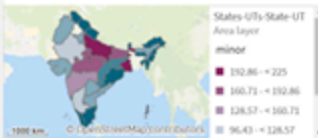
Accidents due to driving on wrong sides



Insights

- Calculated measure (KPI)**
- The total Sum[Driving on Wrong side - Number of Accidents] is 24,43k.
- Ranking**
- The top states/ut is Uttar Pradesh with Sum[Driving on Wrong side - Number of Accidents] is 24,43k.

Minors killed



number of accidents in police control area



* The data set contains negative or zero values that cannot be shown in this chart.

total number of accidents

10.43k

number of people killed

3.5k

greviosly injured

5.32k

number of people killed

2.84k

number of accidents

9.72k

greviosly injured

4.23k

Number of accidents near traffic signals

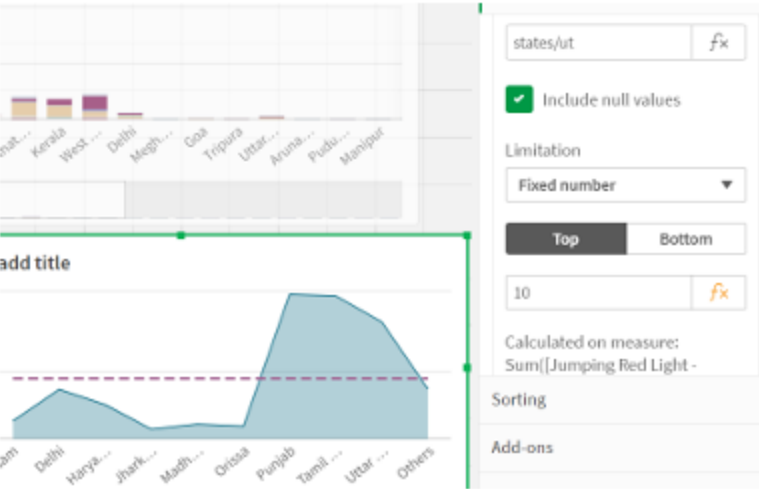


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7 Performance testing:

Applications on Data Filters:

Data filter of 5 States



Conclusion

This report provides a detailed analysis of road safety and accident patterns in India, uncovering key factors influencing accidents and casualties. It offers actionable insights that can be utilized to enhance safety measures and strategies for reducing accidents and improving overall road safety.