1.Introduction

2. 1.1 Overview

This project is centered on the analysis of road safety and accident patterns in India using Qlik Sense, a sophisticated data analytics and visualization tool. The main objective is to use data to gain insights into the frequency, causes, and distribution of road accidents across different regions in India. Visualizing this data enables stakeholders to pinpoint critical areas for intervention, thereby improving road safety measures and lowering accident rates.

1.2 Purpose

The primary goal of this project is to provide a detailed analysis of road safety data to inform policy-making, enhance road infrastructure, and increase public awareness. Through this analysis, we aim to:

- Identify high-risk areas and accident hotspots.
- Understand the causes and circumstances leading to road accidents.
- Support the development of targeted safety campaigns.
- Facilitate data-driven decisions for infrastructure improvements.

1.3 Technical Architecture

The technical framework of the project comprises the following components:

- Data Sources: Gathering road accident data from government databases, traffic department reports, and other relevant sources.
- Data Integration: Utilizing Qlik Sense to integrate, clean, and prepare the data.
- Data Visualization: Designing Qlik Sense dashboards and visualizations to present data insights.
- User Interface: Creating interactive dashboards for stakeholders to explore and analyze the data.

2. Define Problem / Problem Understanding

2.1 Specify the Business Problem

This project tackles the significant issue of high road accident rates in India, which result in substantial human and economic losses. There is a need for a systematic analysis of accident patterns to formulate effective road safety strategies

2.2 Business Requirements

Data Accessibility: Integrating various data sources into a single platform for comprehensive analysis.

• Interactive Visualizations: Creating user-friendly and interactive visualizations for stakeholders.

• Real-time Analysis: Providing the capability to update and analyze data in real-time for timely decision-making.

2.3 Literature Survey

A review of existing literature reveals that road accidents are influenced by various factors, including road conditions, traffic volume, driver behavior, and weather conditions. Previous studies highlight the importance of data analytics in identifying patterns and devising strategies to mitigate accidents. However, there is a need for more localized and granular data analysis to address specific regional issues in India.

3. Data Collection

3.1 Collect the Dataset

Data is collected from multiple sources, including:

• Government databases (e.g., Ministry of Road Transport and Highways).

• Traffic police accident reports.

• Hospital records of accident-related injuries.

• Meteorological data for weather conditions during accidents.

3.2 Connect Data with Qlik Sense

The collected data is imported into Qlik Sense through data connectors. The process includes:

• Setting up data connections to various data sources.

• Importing data into Qlik Sense's data manager.

• Ensuring data integrity and accuracy during the import process.

4. Data Preparation

4.1 Prepare the Data for Visualization

Data preparation involves cleaning and transforming the data to ensure it is suitable for visualization. This process includes:

• Removing duplicate and irrelevant records.
• Handling missing values and outliers.
• Normalizing and standardizing data formats.
• Creating calculated fields and measures for analysis.

5. Data Visualizations

5.1 Visualizations

Various types of visualizations are created to represent the data, including:
• maps: To identify accident hotspots.
• Trend Analysis: To observe changes in accident rates over time.
• Pie Charts and Bar Graphs: To display the distribution of accidents by cause, time, and location.
• Geospatial Maps: To illustrate the geographical distribution of accidents.

6. Dashboard

6.1 Responsive and Design of Dashboard

The dashboard is designed to be responsive and user-friendly, featuring:
• Interactive Filters: Allowing users to filter data by time, location, cause, etc.
• Drill-down Capabilities: Enabling detailed analysis by zooming into specific data points.
• Mobile Compatibility: Ensuring the dashboard is accessible on various devices.

7. Report

7.1 Report Creation

Comprehensive reports are generated from the dashboard insights, including:
• Executive Summaries: Highlighting key findings and recommendations.
• Detailed Analysis: Offering in-depth analysis of specific trends and patterns.
• Visual Reports: Incorporating charts, graphs, and maps for better understanding.

8. Performance Testing

8.1 Amount of Data Rendered

Performance testing involves evaluating the dashboard’s efficiency in handling large datasets, which includes:

• Measuring load times for different data volumes.

• Assessing the responsiveness of visualizations as data size increases.

8.2 Utilization of Data Filters

Testing the effectiveness of data filters ensures they work seamlessly with the visualizations. This involves:

• Checking the accuracy and speed of data filtering.

• Ensuring that filtered data correctly reflects in all relevant visualizations and reports.