1. Introduction

1.1 Overview

     This project focuses on analyzing road safety and accident patterns in India using Qlik Sense, a powerful data analytics and visualization tool. The primary aim is to leverage data to gain insights into the frequency, causes, and distribution of road accidents across different regions in India. By visualizing this data, stakeholders can identify critical areas for intervention to enhance road safety measures and reduce accident rates.

1.2 Purpose

The primary purpose of this project is to provide a comprehensive analysis of road safety data to inform policy-making, improve road infrastructure, and enhance public awareness. Through this analysis, we can achieve several objectives:

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

1.3 Technical Architecture

The technical architecture of the project involves the following components:

- **Data Sources:** Road accident data from government databases, traffic department reports, and other relevant sources.
- **Data Integration:** Qlik Sense is used to integrate, clean, and prepare the data.
- **Data Visualization:** Qlik Sense dashboards and visualizations to display the data insights.
- **User Interface:** Interactive dashboards for stakeholders to explore and analyze the data.

2. Define Problem / Problem Understanding

2.1 Specify the Business Problem

The primary business problem addressed in this project is the high incidence of road accidents in India, leading to significant human and economic losses. There is a need for a systematic analysis of accident patterns to formulate effective road safety strategies and reduce accident rates.

2.2 Business Requirements

- **Data Accessibility:** Integration of various data sources into a single platform for comprehensive analysis.
- **Interactive Visualizations:** Creation of user-friendly and interactive visualizations for stakeholders.
- **Real-time Analysis:** Capability to update and analyze data in real-time for timely decisive

making.

- **Customizable Dashboards:** Flexibility to customize dashboards based on user requirements and preferences.

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

The dataset is collected from multiple sources, including:

- Government databases (e.g., Ministry of Road Transport and Highways).
- Traffic police accident reports.
- Hospital records for 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 involves:

- 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 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:

- **Heat-maps:** To identify accident hotspots.

- **Trend Analysis:** To observe changes in accident rates over time.
- **Pie Charts and Bar Graphs:** To show the distribution of accidents by cause, time, and location.
- **Geospatial Maps:** To visualize the geographical distribution of accidents.

6. Dashboard

6.1 Responsive and Design of Dashboard

The dashboard is designed to be responsive and user-friendly, with features such as:

- **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:** Providing 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. This includes:

- Measuring load times for different data volumes.
- Assessing the responsiveness of visualizations with increasing data size.

8.2 Utilization of Data Filters

The effectiveness of data filters is tested to ensure 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.