INVERTIS UNIVERSITY BAREILLY

PROJECT REPORT

CSED INVERTIS UNIVERSITY

BIG DATA ANALYSIS

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INDEX

1. Introduction

Road accidents are a critical public safety issue in India, leading to a significant number of **fatal, serious, and slight casualties** annually. To better understand and analyze this complex problem, this Road Accident Dashboard has been developed.

The dashboard provides a comprehensive visualization of accident data, allowing for a detailed examination of key factors. It aggregates and displays critical metrics, offering insights into how casualties are distributed across different **vehicle types, road types, and light conditions**, as well as comparing incidents in **urban vs. rural** areas.

This report details the dashboard's features and the key findings derived from its analysis, serving as a resource for understanding the dynamics of road accidents in India.

2. Objective of Project

- Analyze the patterns and causes of road accidents using real-world data.
- Identify the most common factors—such as road type, driver experience, weather, light conditions, and reckless behaviors—that contribute to accidents.
- Quantify the distribution of accidents by driver age, experience, vehicle ownership, and environmental variables.
- Visualize key insights with interactive dashboards to support data-driven decision-making.
- Provide actionable recommendations to improve road safety and reduce accident rates, based on analytical findings.

3. Key Performance Indicators (KPIs)

- Total Accidents: Count of road accidents recorded within the selected period.
- Accident Severity Rate: Percentage distribution of accident severity categories.
- Most Common Accident Cause: Leading cause identified across all recorded accidents.
- Accidents by Road Surface Type: Proportion of accidents occurring on each road surface category.
- Driver Experience Impact: Number of accidents segmented by years of driver experience.
- Accidents by Driver Age Group: Count of accidents within each driver age segment.
- Vehicle Ownership Relation: Count and percentage of accidents by owner vs. employee drivers.
- Accidents under Various Conditions: Frequency of accidents under different weather, light, and road conditions.

4. Visualizations (Charts)

- Number of Accidents: A large numeric card displaying the total recorded accidents.
- Accidents by Road Surface Type: A donut chart visualizing the proportion of accidents occurring on different road surface categories (asphalt, earth, gravel, unknown, other).
- Vehicle Driver Relation: A donut chart showing the percentage breakdown of accidents by the driver's relation to the vehicle (owner, employee, other, unknown).
- Cause of Accident: A horizontal bar chart presenting the frequency of different causes, such as no distancing, lane changes, and careless driving.
- Driving Experience by Age of Driver: A grouped bar chart illustrating how accident counts vary by driver age band and years of driving experience.

5. Filters

- Sex of driver: Filter accident data based on the gender of the involved driver.
- Weather conditions: Filter accidents according to specific weather conditions at the time of the incident.
- Light conditions: Filter data by various lighting conditions, such as daylight, darkness with lights lit, and others.

6. Dataset Description

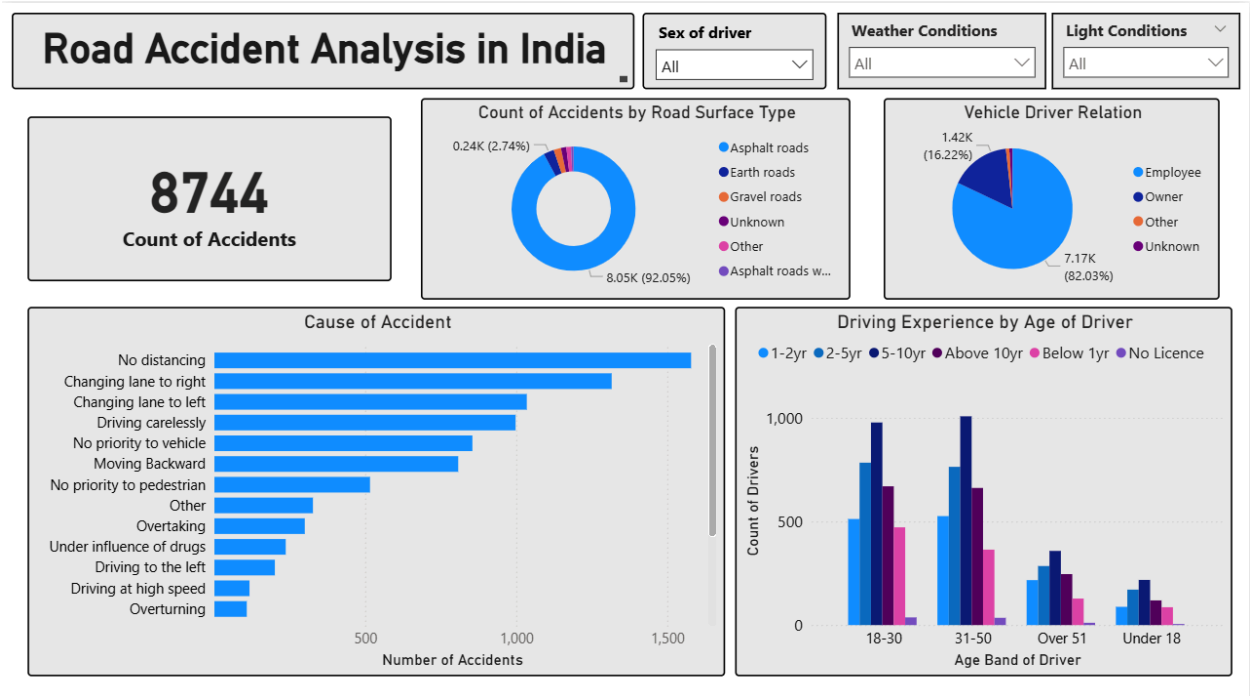
The dataset was collected from Kaggle and contains traffic accident records. The dataset consists of approximately 12,316 rows and 15 columns. Key fields include: - Cause of Accident - Age Band of Driver - Driving Experience - Road Surface Type - Weather Conditions - Light Conditions - Vehicle Driver Relation - Sex of Driver

7. Functional Requirements

View Name	Description	Required Columns
Total Accidents KPI	Displays the total number of recorded accidents within the selected period.	(Count of rows)
Road Surface Type Chart	Donut chart visualizing accident proportions across road surfaces.	Road_Surface_Type
Vehicle Driver Relation Chart	Donut chart showing accidents by driver-vehicle relation (owner, employee).	Vehicle_Driver_Relation
Cause of Accident Chart	Bar chart showing frequency of different accident causes.	Cause_of_Accident
Driving Experience by Age Chart	Bar chart showing accident counts by driving experience and age.	Driving_Experience, Age_Band_of_Driver

8. Dashboard Overview

A Power BI dashboard was created to visually represent the accident data.
The dashboard includes filters and visualizations that help understand the patterns and contributing factors of accidents.



9. Key Insights

• Most accidents occur on asphalt roads.
• Majority of drivers involved in accidents are employees.
• Common causes of accidents include lack of distancing, lane change errors, and careless driving.
• Drivers aged between 31-50 years have the highest accident involvement.
• Drivers with 1-5 years of driving experience are more prone to accidents.

10. Conclusion

The analysis shows that human behavior and road surface conditions play a major role in accident occurrence.
Awareness programs, strict enforcement of traffic rules, and driver training can help reduce road accidents in India.

11. Recommendations

•Provide better driver training to ensure safe driving practices.
•Improve Road maintenance, especially asphalt surfaces.
•Conduct awareness campaigns focusing on lane discipline and safe driving distance.
•Implement stricter enforcement for inexperienced drivers.