



# Traffic Accident Analysis

## Problem Statement

Road traffic accidents remain a major public safety concern, resulting in significant loss of life, injuries, and economic impact each year. Despite the availability of large volumes of accident data, government authorities and stakeholders often lack actionable insights to understand when, where, and why accidents occur, and how accident severity can be reduced.

The absence of structured analysis and decision-support tools limits the ability of policymakers to:

- Identify accident-prone locations (hotspots)
- Recognize high-risk time periods
- Understand the impact of environmental and road conditions
- Prioritize safety interventions effectively

This project aims to analyze historical road accident data to uncover key patterns, identify high-risk scenarios, and translate insights into practical, data-driven recommendations that support improved road safety planning and policy decisions.

## Project Derivables (Deliverables)

### **1** Cleaned and Standardized Dataset

- Removal of duplicates and inconsistencies
- Standardized location and categorical values
- Engineered time features (hour, day, month)
- Ready-to-use dataset for analysis and reporting

### **2** Exploratory Data Analysis (EDA)

- Statistical summaries of accident frequency and severity
- Time-based trend analysis (hourly, daily, monthly)
- Location-based analysis (state, city, area type)
- Environmental impact analysis (weather, road conditions)

### **3** Interactive BI Dashboard

- Executive-level KPI cards:
  - Total Accidents
  - Fatal Accidents
  - Total Casualties
  - Fatality Rate (%)
- Visualizations:
  - Accidents by time of day and day of week
  - Top accident-prone states and cities
  - Accident causes vs severity
- Dynamic filters:
  - Year
  - City
  - Weather conditions

## Key Insights & Findings Report

- Identification of accident hotspots
- Peak risk periods and high-severity conditions
- Patterns linking road, weather, and driver factors to accident outcomes
- Data-backed explanations for accident severity trends

## Data-Driven Safety Recommendations

- Targeted enforcement strategies based on time and location
- Infrastructure improvement priorities
- Weather-responsive safety interventions
- Severity-reduction strategies to minimize casualties

## Documentation & Portfolio Assets

- GitHub repository with:
  - Cleaned data
  - Analysis notebooks
  - Dashboard screenshots
  - Project documentation (README)
- Executive-ready project report for stakeholders