Project Title

CrashLens – Road Accident Analysis Dashboard (2021–2022)

📄 1. Problem Statement Document

1.1 Background

Road accidents remain one of the leading causes of fatalities and serious injuries worldwide. Government bodies, transport departments, and emergency services generate large volumes of accident-related data every year. However, this data is often scattered, underutilized, and presented in non-intuitive formats, making it difficult for stakeholders to extract actionable insights.

For the years **2021 and 2022**, stakeholders require a **centralized, interactive, and data-driven dashboard** that provides a comprehensive overview of road accident casualties, trends, and contributing factors.

1.2 Problem Definition

Currently, stakeholders face the following challenges:

- Lack of a **single source of truth** for road accident casualty data
- Difficulty in comparing **current year vs previous year trends**
- Limited visibility into **accident severity, vehicle types, road types, and surface conditions**
- Inability to quickly identify **high-risk areas, times (day/night), and road conditions**
- Manual reporting processes that are **time-consuming and error-prone**

These issues prevent timely decision-making, policy formulation, and effective deployment of road safety measures.

1.3 Stakeholders

The dashboard is intended to support decision-making for the following stakeholders:

- Ministry of Transport
- Road Transport Department
- Police Force
- Emergency Services Department
- Road Safety Corps
- Transport Operators
- Traffic Management Agencies

- General Public
- Media Organizations

1.4 Business Impact

Without an analytical dashboard:

- Accident trends remain hidden
- Safety policies lack data-backed justification
- Emergency response planning is inefficient
- Public awareness initiatives are less targeted

With a proper dashboard:

- Decision-makers can identify **patterns, risks, and priorities**
- Authorities can plan **preventive and corrective measures**
- Emergency services can optimize **resource allocation**

1.5 Proposed Solution

Develop **CrashLens**, an interactive **Road Accident Analysis Dashboard** using historical data from **2021 and 2022**, enabling stakeholders to visualize, analyze, and compare accident casualties across multiple dimensions such as time, severity, vehicle type, road type, and environmental conditions.

📄 2. Requirement Document (BRD + FRD)

2.1 Business Requirements

BR-1

The system shall provide a **consolidated view of total casualties** resulting from road accidents.

BR-2

The system shall allow stakeholders to **compare casualties between current year and previous year**.

BR-3

The system shall enable analysis of **accident severity and vehicle involvement**.

BR-4

The system shall identify **high-risk road types, surfaces, and locations**.

BR-5

The system shall support **data-driven policy and safety decisions**.

2.2 Functional Requirements

2.2.1 Primary KPIs

- **Total Casualties** after accidents
- **Total Casualties by Accident Severity**
o Fatal
o Serious
o Slight
- **Percentage contribution of each severity type**
- **Maximum casualties by vehicle type**

2.2.2 Secondary KPIs

- **Total Casualties by Vehicle Type**
o Car
o Motorcycle
o Bus
o Truck
o Bicycle
o Others

2.2.3 Trend Analysis Requirements

- Monthly trend comparison of:
o **Current Year (CY) vs Previous Year (PY)** casualties
- Ability to detect:
o Seasonal patterns
o Sudden spikes or drops in accidents

2.2.4 Dimensional Analysis

The dashboard shall provide casualty distribution based on:

- **Road Type**
  - Single carriageway
  - Dual carriageway
  - Roundabout
  - One-way street
  - Slip road
- **Road Surface**
  - Dry
  - Wet
  - Snow / Ice
- **Area / Location**
  - Urban
  - Rural
- **Light Condition**
  - Day
  - Night

2.2.5 Filtering & Interactivity

The dashboard shall allow filtering by:

- Year (2021, 2022)
- Quarter
- Month
- Road Surface
- Area (Urban/Rural)

All visuals shall update dynamically based on selected filters.

2.3 Non-Functional Requirements

- **Performance:** Dashboard should load within 3–5 seconds
- **Usability:** Simple, intuitive, and visually clear layout

- **Scalability:** Capable of handling additional years of data

- **Accuracy:** KPIs must reflect validated source data

- **Security:** Read-only access for public users, controlled access for internal users

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2.4 Tools & Technology Stack

- **Data Source:** Road accident dataset (2021–2022)

- **Data Storage:** SQL Database

- **Visualization Tool:** Power BI

- **Data Processing:** SQL Queries, DAX

- **Deployment:** Power BI Service

2.5 Success Metrics

- Reduction in manual reporting time

- Improved decision-making efficiency

- Clear identification of accident-prone factors

- Positive stakeholder feedback