Road Accident Analysis Dashboard – Documentation

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1 Document Control

1.1 Version History

Version	Date	Change Description	Author
1.1	21-Jul-2025	Initial Version	Harini SV

2 Introduction

2.1 Document Purpose

This document outlines the technical architecture, development process, and design specifications for the Road Accident Analysis Dashboard developed using Microsoft Power BI.

2.2 Document Scope

This dashboard analyzes accident data with focus on accident severity, road surface conditions, light conditions, weather, vehicle type, day, time, and location trends.

2.3 Definitions

Term	Meaning
CY	Current Year
PY	Previous Year
YoY	Year over Year
KPI	Key Performance Indicator
DAX	Data Analysis Expressions (Power BI Formulas)

2.4 References

1. Microsoft Power BI Documentation
2. DAX Reference Guide
3. Power Query M Language Guide
4. Road Accident Reporting Guidelines

3 Overview of BI Architecture

1. Data Source: Excel (.xlsx)
2. Power Query used for cleaning and transforming data
3. Power BI Desktop for data modeling and visualization
4. Date Table created for time intelligence functions
5. DAX used for KPI calculations (CY, PY, YoY)
6. Dashboard shared via Power BI Service

4 BI Project Code

4.1 Requirements Description

This dashboard provides insights into:

1. Total Accidents and Casualties (CY & PY)
2. Monthly Trends of Accidents
3. Severity-based Visualizations
4. Area-wise and Time-wise Breakdown
5. Vehicle Type and Road Type Insights

4.2 Deployment, Refresh & User Access Instructions

1. File uploaded to Power BI Service
2. Scheduled refresh set up from Excel file (OneDrive)
3. Access restricted to authorized users via permissions

4.3 Exclusions

1. Real-time data streaming
2. Machine Learning Prediction
3. External API integrations

5 Applications

5.1 Applications in Scope

1. Microsoft Power BI Desktop
2. Power BI Service
3. Excel

5.2 Applications Not in Scope

1. Power BI Mobile App
2. Azure Data Factory
3. External Databases (SQL, Oracle)

6 Technical Details

1. Data Cleaning: Replaced nulls, standardized text, extracted date and hour
2. Transformation: Date normalization, joining with Calendar table
3. Visualizations: Line Charts, KPI Cards, Bar & Donut Charts, Maps
4. Measures built using `TOTALYTD`, `CALCULATE`, `SAMEPERIODLASTYEAR`

7 Data Dictionary

Column Name	Description	Example	Data Type
Accident_Index	Unique ID for each accident	BS0000001	String
Accident Date	Date of accident	1/1/2021	Date
Day_of_Week	Day accident occurred	Thursday	String
Junction_Control	Type of junction control present	Give way or uncontrolled	String
Junction_Detail	Junction type	T or staggered junction	String
Accident_Severity	Severity of accident	Serious	String
Latitude	Latitude of accident location	51.512273	Float
Light_Conditions	Lighting conditions	Daylight	String
Local_Authority_(District)	Governing district	Kensington and Chelsea	String
Carriageway_Hazards	Any hazards on road	None	String
Longitude	Longitude of accident location	-0.201349	Float
Number_of_Casualties	Number of people injured/killed	1	Integer
Number_of_Vehicles	Number of vehicles involved	2	Integer
Police_Force	Reporting police force	Metropolitan Police	String
Road_Surface_Conditions	Road condition at the time	Dry	String
Road_Type	Type of road	One way street	String
Speed_limit	Speed limit in mph	30	Integer
Time	Time of accident	15:11	String (HH:MM)
Urban_or_Rural_Area	Whether urban or rural	Urban	String
Weather_Conditions	Weather when the accident occurred	Fine no high winds	String
Vehicle_Type	Type of vehicle involved	Car	String

8 Risk Assessment

Risk	Mitigation
Refresh failures	Set up email alerts
Date mismatch in day-of-week	Used Power Query for alignment
Missing values in time/date	Imputed or tagged as "Unknown"

9 Test Data

9.1 Test Data Requirements

1. At least 2 years of accident data
2. Fields must include location, time, severity, vehicle type

9.2 Test Data Control

1. Validated using slicers and filters in Power BI
2. Cross-checked total counts with original data

10 Design Document

Dashboard Design Includes:

1. **Top Section**: KPI Cards (Total Accidents, Casualties)
2. **Center**: Monthly Casualty Trend (CY vs PY)
3. **Left Panel**: Filters (Weather, Area, Road Type)
4. **Bottom**: Bar & Donut Charts for Vehicle Type, Road Surface, Light Conditions
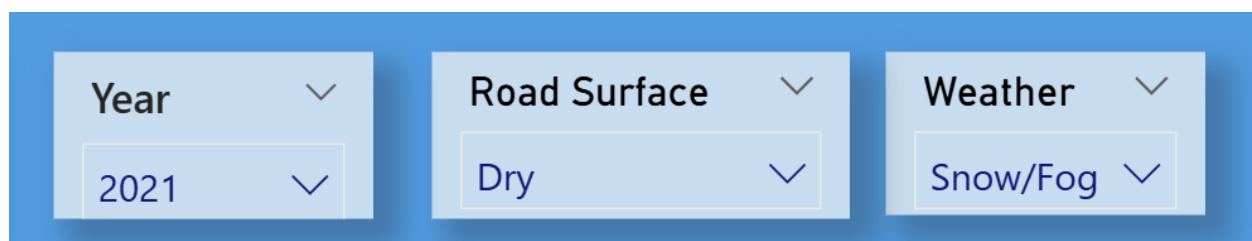5. **Map**: Geographical distribution of accidents

11 Dashboard explanation

11.1 Main dashboard

1. The above dashboard depicts all the accident details in both 2020 and 2021 year.
2. The cards give the KPI values of current year casualties; accidents; fatal, serious, slight casualties total count.
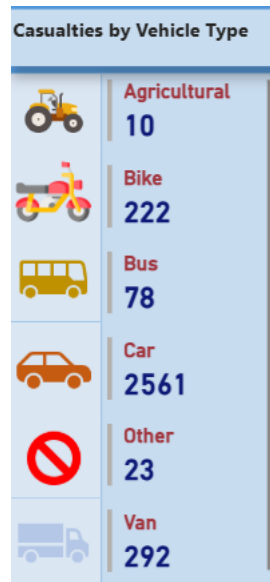
11.2 Filters/Slicers

1. These are the filters used in this analysis for finding respective data year wise (or) according to road surface (or) weather condition during the accident.
2. These help in identifying the correct factors affecting accident rates in every location given in data.

11.3 Vehicle types visualized

1. This part of dashboard gives the details on casualties found by vehicle type.
2. It makes us clearly understand which affects the accident rate relatively.

11.4 Road Safety KPIs – Current Year

1. This part displays current year accident and casualty statistics.
2. It breaks down casualties into fatal, serious, and slight categories.

12 Dependencies

1. Microsoft Power BI Desktop
2. Power BI Pro license (for sharing)
3. Excel file connectivity (OneDrive or local)
4. Internet connectivity for Service refresh