

Road Accident Analysis: Power BI Project Documentation

Project Overview

Purpose:

This Power BI project analyzes road accidents to identify patterns, high-risk factors, and areas for intervention. It provides insights into accident types, affected vehicles, time trends, and more, aiding decision-making for policymakers, traffic departments, and public safety organizations.

Key Objectives:

- Understand accident distribution by type (car, van, bike, etc.).
- Identify peak times and locations for road accidents.
- Highlight trends and anomalies for preventive measures.

Data Sources:

This project leverages datasets containing accident statistics, including vehicle types, timestamps, and accident severity.

Data Model

The underlying data model contains the following key components:

Tables:

- **AccidentDetails**: Contains data on accident type, date, time, and severity.
- **VehicleDetails**: Includes vehicle types involved in accidents (car, bus, bike, etc.).
- **LocationData**: Geographical data on accident locations (latitude, longitude, city).

Relationships:

- **AccidentDetails** → **VehicleDetails** (one-to-many): Each accident can involve multiple vehicles.
- **AccidentDetails** → **LocationData** (one-to-one): Each accident is tied to a single location.

Fields:

- **AccidentDetails**:
 - AccidentID (Primary Key)
 - Date

- Time
- Severity (Minor, Major, Fatal)

- **VehicleDetails:**

- VehicleID (Primary Key)
- VehicleType (Car, Bus, Bike, etc.)
- Involved (Yes/No)

- **LocationData:**

- LocationID (Primary Key)
- City
- Coordinates (Latitude, Longitude)

Visualizations

Dashboards and Reports:

1. Accident Trends by Date and Time:

- A line chart shows the number of accidents over time, highlighting peaks (e.g., weekends or holidays).
- Filters for specific years, months, or days.

2. Vehicle Type Involvement:

- A bar chart shows the distribution of accidents by vehicle type (e.g., cars have the highest involvement).
- Icons for each vehicle type are used to enhance visual appeal.

3. Severity Analysis:

- A pie chart displays the proportion of minor, major, and fatal accidents.
- Conditional formatting emphasizes critical categories.

4. Location Insights:

- A map visualization marks accident hotspots using geospatial data.
- Tooltip information includes accident count and severity distribution.

Filters and Slicers:

- Year, Month, and Day filters.
- Vehicle type slicers.
- Severity and location-based filters.

Static Resources

Theme:

- The default theme file (`CY24SU10.json`) customizes the report's appearance with consistent colors and fonts.

Registered Resources:

- Custom icons representing vehicle types:
 - Car.png
 - Bike.png
 - Bus.png
 - Van.png
 - Other.png
- A background image enhances the dashboard's visual appeal.

Conclusion

This Power BI project offers actionable insights into road accidents, aiding stakeholders in reducing risks and improving public safety. Future enhancements could include:

- Integration with real-time traffic data.
- Predictive analytics for accident forecasting.
- Advanced drill-through capabilities for deeper analysis.