Road Accident Dashboard Project

Project Title

Road Accident Analytics and Reporting Dashboard

Introduction

Road accidents remain a major public safety concern, resulting in significant fatalities, injuries, and infrastructure losses each year. To promote evidence-based decision-making and improve road safety, this project aims to build a comprehensive dashboard capturing accident and casualty statistics for 2021 and 2022. Leveraging an extensive, granular dataset, the dashboard will provide actionable insights, trends, and comparisons for various governing bodies and the general public.

Objectives

The primary objectives of this project are:

- To analyze and visualize the total number of casualties resulting from road accidents, segmented by severity and vehicle type.
- To provide monthly and yearly trends, enabling stakeholders to compare accident data across 2021 and 2022.
- To identify risk factors such as road type, time of day, surface conditions, and area, facilitating targeted policy interventions.
- To offer stakeholder-relevant KPIs that drive data-driven strategies for road safety improvements.

Data Description

- **File Format:** .xlsx (Excel Spreadsheet).
- **Volume:** Contains approximately 3.07 million rows and 21 fields (columns).
- **Key Fields (from provided sample):**

    - Accident_Index
    - Accident Date
    - Day_of_Week
    - Junction_Control
    - Junction_Detail
    - Accident Severity
    - Latitude
    - Light_Conditions
    - Local_Area
    - (Other fields likely include vehicle type, road surface, road type, etc.).
- **Years Covered:** 2021 and 2022, as per the dashboard's scope.

The data captures comprehensive information for each recorded accident, including date, severity, geographic attributes, environment conditions, and contextual factors.

Methodology

- **Data Acquisition & Preparation:** Collected the .xlsx dataset, filtered relevant years (2021 & 2022), and performed data cleaning for accuracy and completeness.
- **Data Transformation:** Standardized and categorized severity, vehicle types, location, time, and surface conditions for analysis.
- **KPI Development:** Computed primary and secondary KPIs as specified (total casualties, breakdown by severity, vehicle type, road type, surface, and light condition).
- **Trend & Comparative Analysis:** Grouped data by month and year for temporal analysis. Compared key KPIs between years to identify trends and improvements or regressions.
- **Aggregation & Visualization:** Used statistical and graphical techniques (bar charts, line graphs, pie charts, heatmaps) to visualize distributions and trends clearly for stakeholders.

- **Stakeholder Mapping:** Analyzed stakeholder data needs, ensuring dashboard interactivity and accessibility according to requirements.

Insights

Key insights that stakeholders can derive from the dashboard include:

- **Casualty Distribution:** Identification of accident severity hotspots by area and time, highlighting periods or locations of increased risk.
- **Vehicle Risk Analysis:** Determination of the vehicle types most often involved in multi-casualty incidents, allowing targeted intervention for specific transport modes.
- **Road-Type and Surface Risk:** Pinpointing which road types and surfaces are consistently associated with higher casualty rates, supporting engineering/mapping efforts.
- **Temporal Trends:** Understanding how accident frequency and severity shift monthly and between years, aiding in seasonal or annual safety campaigns.
- **Environmental Conditions:** Evaluation of light and weather-related conditions contributing to accident likelihood and severity.

Visualizations Summary

The dashboard is envisioned to include:

- **KPI Cards:** Displaying total, serious, slight, and fatal casualty counts by year.
- **Pie/Bar Charts:** Casualties by accident severity, vehicle type, road type, and light conditions for proportion visualizations.
- **Line/Area Charts:** Monthly trends contrasting 2021 and 2022, spotting anomalies or significant shifts.
- **Heatmaps/Maps:** Geospatial distribution of accidents to reveal high-risk zones.
- **Comparison Panels:** Overview of previous and current year statistics enabling quick comparative analysis.
- **Filter Capabilities:** Dynamic filtering by area, vehicle, severity, time of day, or condition.

Conclusion

This project delivers a robust analytics dashboard for road accident data spanning over 3 million records and two years. Through the introduction of carefully designed KPIs and insightful visualizations, stakeholders such as government bodies, emergency services, transportation agencies, and the public can gain unprecedented insight into road safety patterns. The tool provides a strong foundation for data-driven policy making, targeted safety interventions, and transparent communication with the public about trends and ongoing efforts to reduce road casualties.