**Technical Analysis Report**

**Introduction**

Road accidents happen a lot in the UK. They cause injuries, deaths, and cost money. We want to find out why they happen and how to stop them.

**Problem Statement**

Every day, road traffic accidents affect the lives of people across the UK. These incidents result in injuries, loss of life, and significant economic and emotional costs. Despite ongoing efforts, accident rates remain a major public safety concern, especially in urban areas where traffic is dense and road conditions are more complex. This analysis is focused on identifying key factors influencing accident severity in the UK, using traffic accident data from 2021–2022, in order to support smarter policy and infrastructure planning.

**Objectives**

* To identify patterns and trends in road traffic accidents in the UK.
* To determine key factors contributing to accident severity.
* To visualize accident characteristics for better public and institutional understanding.
* To support decision-makers with data-driven insights aimed at reducing road-related incidents.

**Target Audience**

* Transportation planners.
* Public safety officials.
* Government decision-makers who are responsible for road safety policies and infrastructure planning in the UK.
* Law Enforcement Agencies.
* Public Health and Safety Researchers.

**Dataset(s)**

**Primary Dataset:**

* File Name: UK data accident-cleaned.xlsx
* Source: <https://www.kaggle.com/datasets/ismayilbayramov1/uk-road-accident-project?select=UK+data+accident.xlsx>
* The data comes from the UK Department for Transport [UK department](https://data.gov.uk/dataset/road-accidents-safety-data)
* Timeframe: January 2021 – December 2022
* Record Count: 307,974 rows and 23 columns
* Tools Used: Microsoft Excel (data cleaning), Power BI (data visualization), and Canva (presentation/data visualization)

**Data Dictionary Overview:**

* Accident\_Index: Unique identifier for each accident
* Severity: Categorized as Slight, Serious, or Fatal
* Date, Time: Timestamp of the accident
* Road\_Type: Classification (e.g., A, B, Motorway)
* Speed\_Limit: Legal speed at the site
* Weather\_Conditions: E.g., clear, rainy, foggy
* Light\_Conditions: E.g., daylight, dark
* Urban\_or\_Rural: Area classification
* Number\_of\_Vehicles: Vehicles involved
* Number\_of\_Casualties: Injured or deceased individuals

**Data Types:**

* Categorical: Severity, Weather\_Conditions, Road\_Type
* Numerical: Number\_of\_Casualties, Speed\_Limit
* DateTime: Date, Time

**Data Handling**

* The dataset was cleaned in Microsoft Excel.
* Duplicate records and irrelevant columns were removed.
* Inconsistent categorical values, such as spelling variations, were standardized.
* Missing or null values were identified and either filled in where appropriate or excluded.
* Data was transformed to enable easier aggregation and filtering in visualization tools.
* Time fields were split and formatted to allow temporal analysis.

**Analysis and Findings**

Using Power BI, a range of visualizations was created:

* Severity Breakdown: The Majority of accidents were slight; however, serious and fatal accidents were more prevalent in rural areas and under poor lighting/weather conditions.
* Time Trends: Accidents peaked during rush hours (8–10 AM, 4–6 PM) and were more common during weekdays.
* Road Type vs Severity: Motorways and roads had a higher frequency of serious accidents, especially in adverse weather.
* Casualty Funnel: Funnel charts indicated that while most accidents resulted in minor injuries, a concerning percentage still led to serious harm or fatalities.

**Recommendations**

* 1. Implement stricter speed regulations on roads and high-risk zones.
  2. Invest in infrastructure such as road lighting and warning systems in adverse weather-prone areas.
  3. Educate drivers on the risks of driving during peak congestion and in dangerous conditions.
  4. Add more or better lighting where areas have poor lighting.

**Limitations and Assumptions**

* Some missing values in the weather and location fields.
* Geographic coordinates are missing in a few records, affecting mapping accuracy.
* The dataset does not include driver behavior or real-time traffic volume.
* Assumed the data was accurate, but any mistakes or gaps in how it was reported could have influenced the results.
* Lack of geolocation data prevented the creation of spatial visualizations such as heatmaps.

**References**

* UK\_Road\_Accident\_Project - [UK\_Road\_Accident\_Project](https://www.kaggle.com/datasets/ismayilbayramov1/uk-road-accident-project?select=UK+data+accident.xlsx)
* UK Department for Transport (2022). Road Safety Data
* Microsoft Excel - Data Cleaning
* Power BI - Data Analysis and Visualization
* Canva - Presentation Design