Road Accident Analysis

A Data-Driven Approach to Improving Public Safety

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1. The Problem & Objectives

Raw accident data is unstructured, making it difficult for stakeholders to stakeholders to derive actionable insights. Our project aims to clean, analyze, clean, analyze, and visualize this data to identify key risks and recommend recommend interventions.

2. Our Project Objectives

Clean & Format

Ensure all raw data is consistent, accurate, and ready for analysis.

Analyze Frequency

Determine the total number of accidents per year, month, and day.

Assess Severity

Assess the distribution of accident severity levels (Fatal, Serious, Slight).

Find Correlations

Analyze how weather and speed impact accident severity. severity.

Propose Interventions

Suggest data-driven policy and infrastructure improvements. improvements.

3. Data Cleaning

A clean foundation is essential for any accurate analysis. This phase ensures the integrity and reliability of our data.

Data Cleaning & Preparation

Date/Time Formatting

Separated 'Date' and 'Time' into 2 different columns. Time column for precise for precise hourly and seasonal analysis.

Duplicate Removal

Identified and removed duplicate rows based on the 'Accident_Index' to 'Accident_Index' to ensure data integrity.

Standardizing Data

Corrected missing values and standardised all categorical data (e.g. ‘Light ‘Light Condition') for consistency.

4. Phase 2 & 3: Analysis & Insights

Understanding what happened, and why it happened.

Key Statistics Analysis

1. Casualties per Accident

   Median: 1, Mean: 1

2. Vehicles per Accident

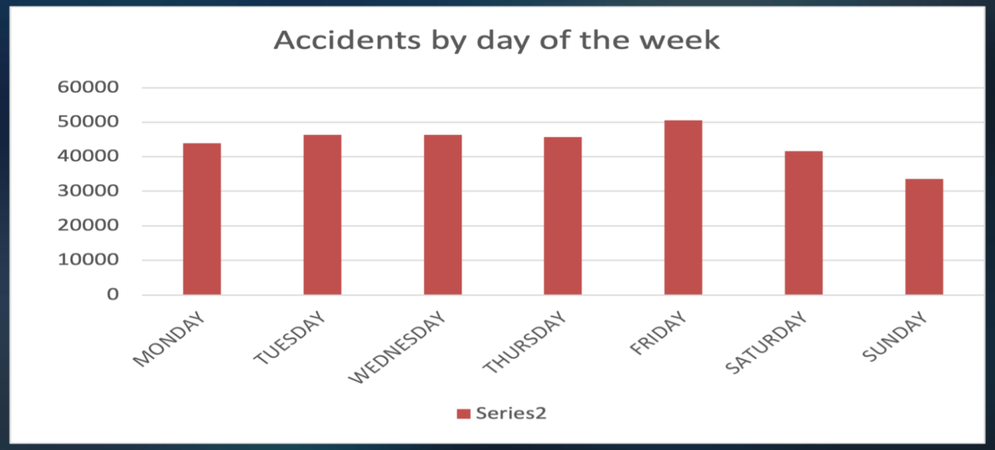
   Median: 2, Mean: 2

3. Speed Limit Analysis

   Median: 30 mph, Mean: 38 mph

Analysis: Accident Trends by Day

Chart Summary: Accidents peak on Friday, showing a clear daily pattern of accident occurrences, with a drop on Sunday.



Analysis: Distribution of Accident Severity

Legend:

1	2	3
Slight (86%)	Serious (13%)	Fatal (1%)

Chart Summary: The vast majority of accidents are Slight (86%), but Fatal and Serious accidents were 14% combined which is concerning.
is concerning.

5. Insight: Severity vs. Contributing Contributing Factors

How Speed Limits Impact Severity

Our analysis found a weak positive correlation between speed limit and severity. Most accidents occurred at 30mph zones overall, which accounted for a disproportionately high percentage of slight accidents.

Weather and Road Surface

'Dry road surfaces were a factor in 69% of all accidents, highlighting a key area for intervention regardless of the weather conditions.

6. Phase 4: Hotspot Analysis by Local Authority

Chart Summary: By replacing the map, we clearly see the top 5 districts by accident volume. ‘Birmingham' and ‘Manchester’ show the highest frequency.

Severity by Road Surface Conditions

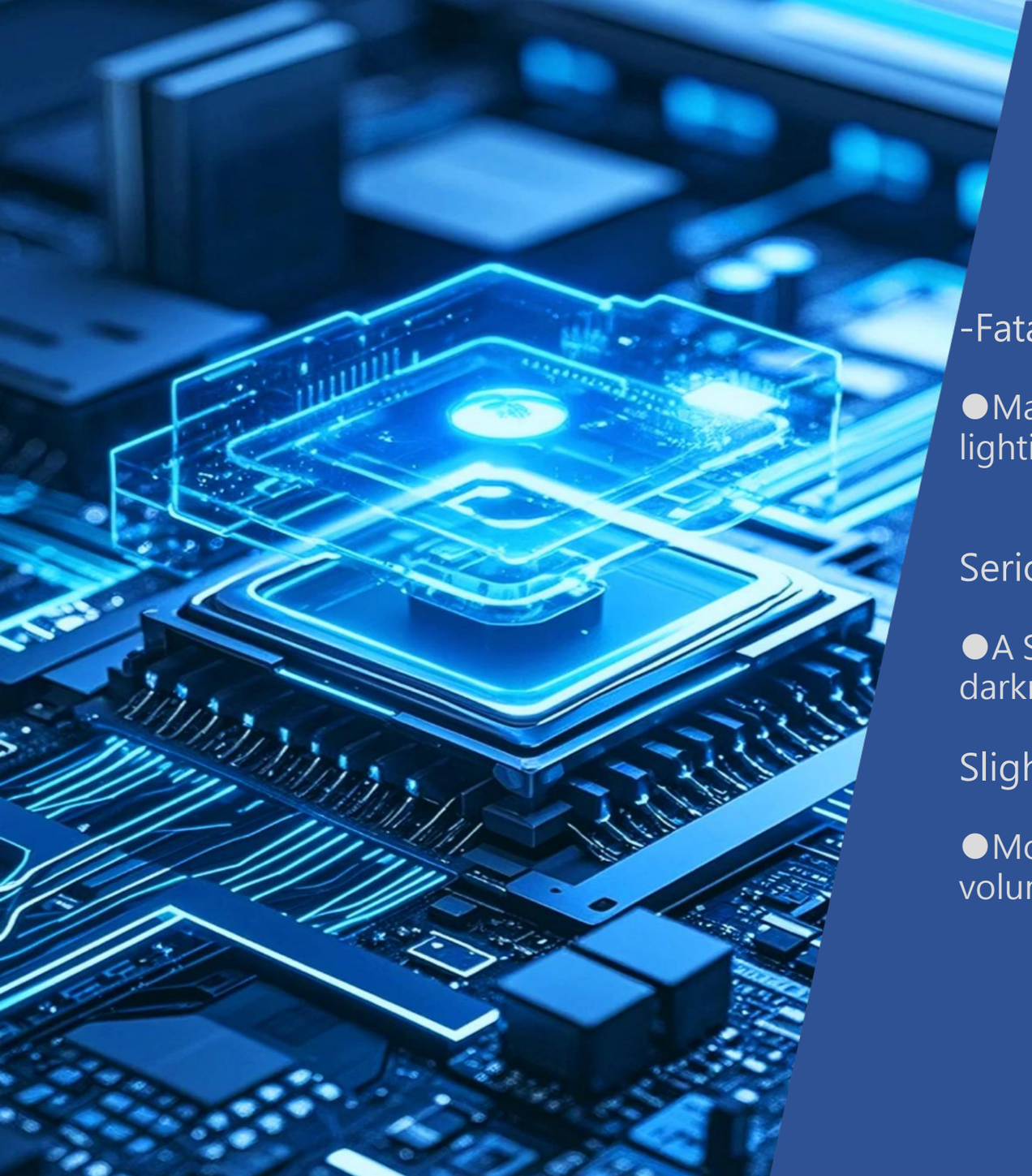
Fatal accidents

Mainly on dry roads, with a smaller but important share on wet/damp surfaces.

-Serious accidents: Follow the same pattern: dry first, wet/damp second, very few on ice/snow/flooded roads.

Slight accidents:

Majority on dry roads, then wet/damp, then other surface types.



Severity by Light conditions

-Fatal accidents

- Majority in daylight, with a significant number in darkness with street lighting and fewer where there is no lighting.

Serious accidents

- A Similar pattern, mainly daylight, then darkness with lights, then darkness with no/poor lighting.

Slight accidents:

- Mostly daylight, but night-time conditions still contribute a large volume.

7. Phase 5: Key Recommendations Recommendations

Hotspot Intervention

Focus resources on the top 3 authorities (Westminster, Manchester, Birmingham) with targeted junction and road surface reviews.

Speed & Weather Policy

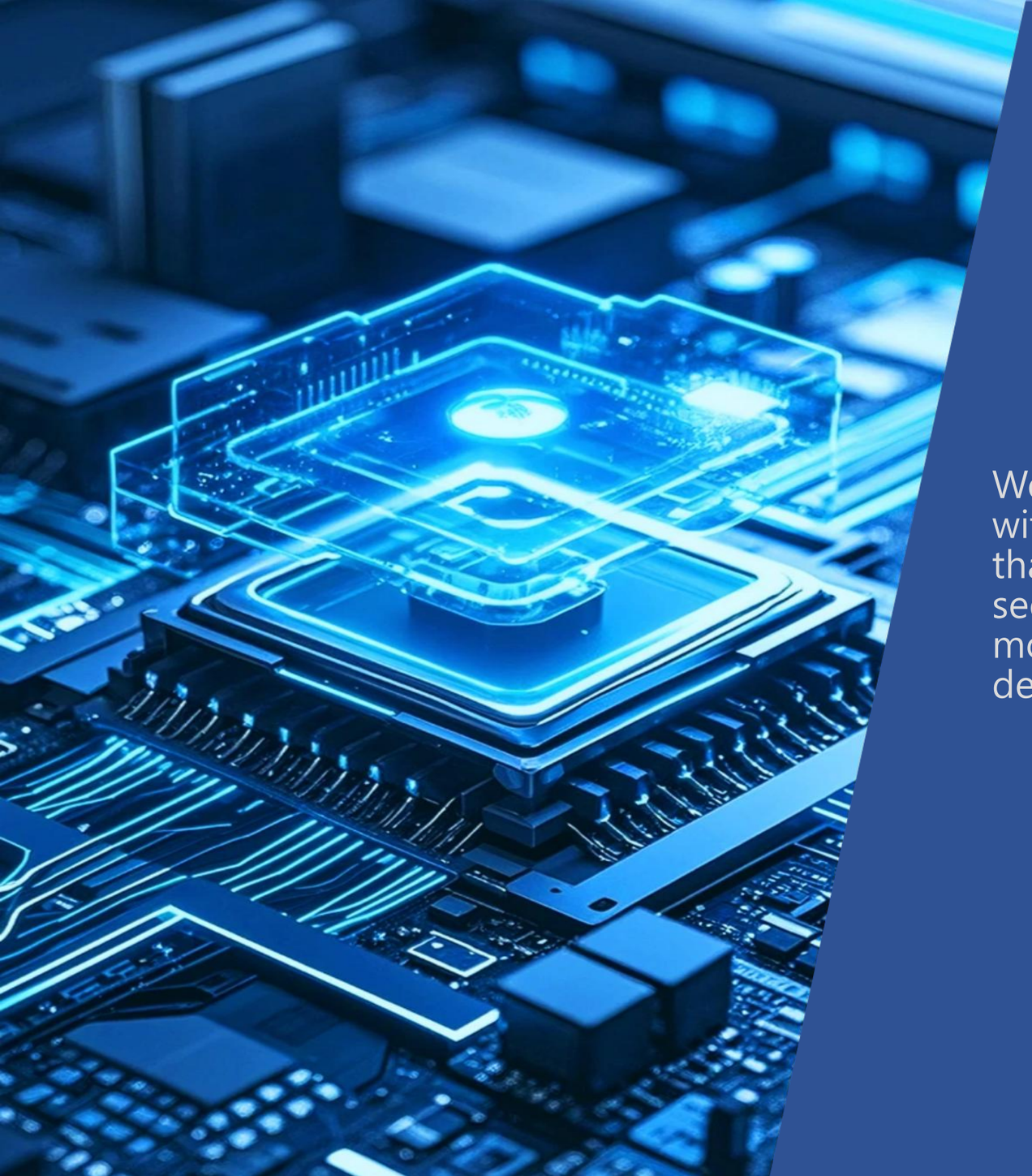
Launch public awareness campaigns for ‘Dry Weather' driving and review speed review speed limits on high-risk rural roads.

Targeted Enforcement by Time of Day

Allocate police resources and speed enforcement measures based on the specific times of day identified as high-risk in your analysis, rather than relying solely on weather forecasts to determine patrol schedules.

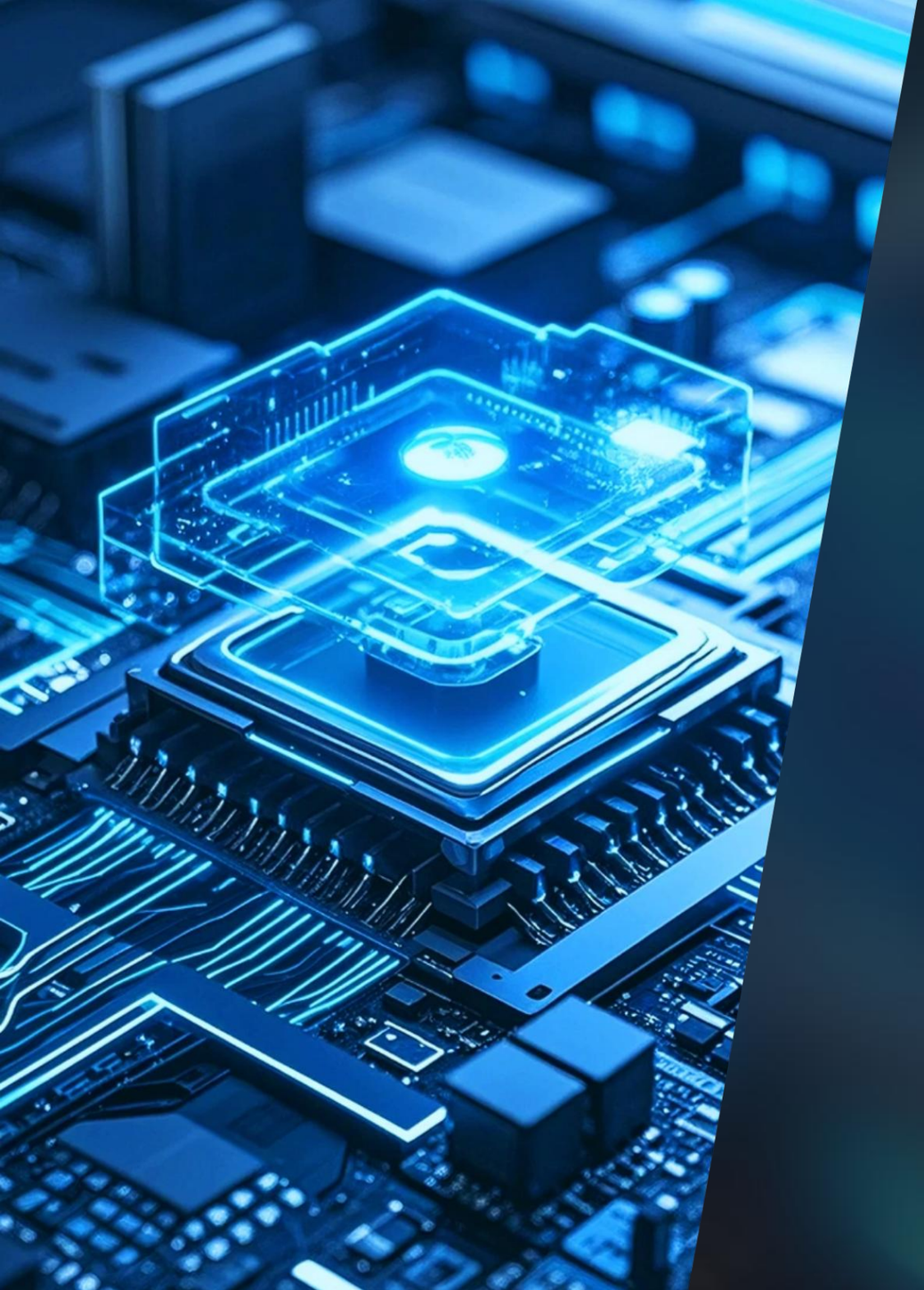
Future Monitoring

Implement the full dashboard to continuously monitor these trends and measure and measure the impact of new interventions.



Conclusions

We have analysed the occurrence of accidents and severity within a 2-year period in the United Kingdom. Key findings are that certain conditions, such as weather, and light conditions, seem to have less impact as compared to when the factors were more favourable. This is to say that more factors are at play in determining the occurrence of accidents.



8. Thank You