INDIAN INSTITUTE OF SCIENCE (IISC), BENGALURU
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SUMMARY REPORT

Project Topic: Road Accidents Analysis and Visualization Dashboard**.**

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Report Introduction:

This report presents the findings and insights derived from the analysis and visualization of road accident data using Power BI. The purpose of this project was to analyze the factors contributing to road accidents and provide recommendations for improving road safety.

Background:

Road accidents pose a significant public health and safety concern worldwide. Understanding the factors (Junction control, severity, weather conditions, Vehicle type etc.) influencing accidents is crucial for developing effective prevention strategies. This project aimed to analyze road accident data to identify trends, patterns, and correlations that can inform road safety initiatives.

Research Methods:

- Data Preparation:
  The provided dataset was imported into Power BI. Data cleaning techniques were applied to handle missing values, outliers, and inconsistencies. Necessary data transformations were performed to prepare the dataset for analysis.

- Exploratory Data Analysis (EDA):
  The dataset was explored to understand the distribution and characteristics of variables. Key trends, patterns, and correlations within the data were identified. Relevant KPIs were selected based on the analysis, including Accident Severity Distribution, Number of Accidents Over Time, Distribution of Accidents by Day of the Week, Weather Conditions vs. Accident Severity, and Road Surface Conditions vs. Accident Severity.

- Dashboard Design:
  An interactive dashboard was designed to communicate insights from the data effectively. The dashboard includes a variety of visualizations such as bar charts, line charts, pie charts, cards etc. The layout of the dashboard was designed to be intuitive and user-friendly, allowing stakeholders to easily explore and understand the data. The visualizations used are:

  - **Accident Severity Distribution (KPI Cards):** Utilized separate KPI cards to visualize the distribution of accident severity levels (slight, serious, fatal casualties etc.). This allows stakeholders to quickly grasp the severity distribution and prioritize interventions accordingly.

  - **Number of Accidents Over Time (Area Plot):** Used an area plot to illustrate the trend in the number of accidents over time. This enables stakeholders to identify long-term patterns and potential factors contributing to fluctuations in accident rates.

  - **Distribution of Accidents by Day of the Week (Bar Chart):** Employed a bar chart to display the distribution of accidents across different days of the week. This aids in identifying any trends or patterns in accident occurrence based on specific days, facilitating targeted enforcement and awareness campaigns.

  - **Weather Conditions vs. Accident Severity Count (Pie Chart):** Represents the relationship between weather conditions and accident severity using a pie chart. This provides a clear visual depiction of the proportion of accidents attributed to different weather conditions and their corresponding severity levels, aiding in understanding weather-related risk factors.

- **Road Surface Conditions vs. Accident Count (Column Chart):** Utilized a column chart to illustrate the distribution of accidents based on road surface conditions. This visualization helps identify which road surface conditions are associated with a higher number of accidents, informing infrastructure maintenance and improvement strategies.

Insights Provided:

- **Accident Severity Distribution:** Insights from KPI cards reveal the proportion of accidents categorized as severe, serious, or fatal. This information guides resource allocation and policy development to address the most critical safety concerns.

- **Number of Accidents Over Time:** Analysis of the area plot reveals temporal trends in accident occurrence, highlighting periods of heightened risk and potential contributing factors such as seasonal variations or changes in traffic patterns.

- **Distribution of Accidents by Day of the Week**: The bar chart indicates whether certain days experience a higher frequency of accidents, facilitating the scheduling of enforcement efforts and educational initiatives to target peak accident periods.

- **Weather Conditions vs. Accident Severity Count:** Insights gleaned from the pie chart shed light on the correlation between weather conditions and accident severity, enabling stakeholders to implement appropriate measures to mitigate weather-related risks.

- **Road Surface Conditions vs. Accident Count:** Examination of the column chart identifies which road surface conditions are associated with the highest number of accidents, guiding maintenance prioritization and infrastructure improvements to enhance road safety.

Conclusion:

In conclusion, the development of the Road Accidents Dashboard using Power BI offers valuable insights into road safety. By analyzing accident severity distribution, trends over time, and factors such as weather and road conditions, stakeholders can make informed decisions to reduce accidents and save lives. The dashboard provides a user-friendly interface for understanding complex data, facilitating targeted interventions and resource allocation. These insights can inform policy decisions and interventions aimed at improving road safety. Moving forward, continued updates and collaboration will be essential to ensure the dashboard remains a valuable tool in promoting road safety for all.

Recommendations:

Based on the findings, the following recommendations are proposed:

- Implement targeted interventions to address factors contributing to severe accidents, such as improving road infrastructure and enhancing enforcement of traffic regulations.
- Develop public awareness campaigns to educate drivers about safe driving practices and the importance of adhering to traffic laws.
- Enhance data collection and reporting mechanisms to facilitate ongoing monitoring and evaluation of road safety initiatives.

This executive summary provides a concise overview of the road accidents analysis and visualization project, highlighting the key findings and recommendations for improving road safety.