Traffic Intelligence - Data Analytics Assignment

Objective:

Students will create a detailed traffic performance report based on the dataset, analyzing vehicle flow, congestion patterns, and peak-hour distributions.

Attribute Information:

• Timestamp: Date and time of traffic data collection

• Location: Specific road segment or intersection where data is collected

• Vehicle Count: Number of vehicles detected per time interval

• Vehicle Type: Classification (Car, Bus, Truck, Motorcycle, Bicycle)

• Speed: Average speed of vehicles in km/h

• Weather Conditions: Weather impact (Clear, Rainy, Foggy, Snowy)

• Accident Reports: Number of accidents recorded during the time period

• Traffic Signal Timing: Duration of red, yellow, and green light phases (if applicable)

• Lane Occupancy: Percentage of road occupied by vehicles

• Average Waiting Time: Time vehicles spend waiting at intersections

Task:

• Import the Dataset: Load the provided traffic dataset into Power BI.

• Data Cleaning: Ensure data consistency, handle missing values, and create new columns if necessary.

• Interactivity: Ensure the dashboard is interactive with slicers and filters.

Key Insights from the Dashboard:

• Traffic Flow Analysis: Total vehicles recorded in the dataset, categorized by location and time intervals.

• Peak-Hour Congestion: Identification of morning and evening peak congestion periods.

• Vehicle Type Distribution: Breakdown of vehicle types across different locations.

• Impact of Weather: How weather conditions influence traffic speed and congestion.

• Accident Trends: Distribution of accidents across different times and locations.

- Traffic Signal Efficiency: Effectiveness of traffic signals in managing congestion.
- Comparative Lane Analysis: Lane occupancy and waiting times across different roads.

Required Power BI Visualizations:

- Line Chart: Traffic volume trends over time.
- Bar Chart: Vehicle type distribution at different locations.
- Pie Chart: Contribution of each vehicle type to overall traffic.
- Heatmap: Peak congestion times and accident hotspots.
- Scatter Plot: Speed vs. congestion levels by weather conditions.
- KPI Cards: Total vehicle count, peak congestion time, and accident rate.
- Maps: Geographic visualization of traffic density in different areas.

Power BI Visualizations

Below is a sample Power BI visualization representing traffic analytics.

Sample Traffic Analytics Dashboard: