📄 Traffic Slowness Analysis Report

📌 Project Title:

Analysis of Traffic Slowness in Brazil (Weekdays)

📁 Dataset Summary:

The dataset contains traffic information recorded by hour across weekdays (Monday to Friday) with several contributing factors such as rain, accidents, vehicle breakdowns, and traffic slowness percentage.

🧼 Data Cleaning

✔️ Converted `'Slowness in traffic (%)'` from string (with commas) to float
✔️ Removed irrelevant columns such as metadata
✔️ Ensured consistency in datatypes for numerical analysis
✔️ Verified data shape and structure (135 rows across 18 columns)

📊 Exploratory Data Analysis (EDA)

- 📉 **Distribution Analysis**
  - Visualized histogram of `Slowness in traffic (%)`
  - Found skew toward lower slowness, with peaks during rush hours
- 🚧 **Incident Frequency**
  - Counted occurrences of incidents such as:
    - Accident 🚑
    - Rain 🌧️
    - Vehicle breakdown 🔧
  - Visualized using vertical and horizontal bar charts

📈 Correlation Analysis

- Computed Pearson correlation values

- Key positive correlations with `Slowness in traffic (%)`:
  - 🚧 Road works
  - 🚑 Accidents
  - 🌧️ Rain

These factors significantly impact traffic delays.

🗒️ Weekday Analysis

- Split data by weekday using time-index mapping
- For each weekday (Monday–Friday), plotted:
  - Traffic slowness vs. coded hour
  - Identified peak congestion hours (typically early morning and late afternoon)

🔍 Key Insights:

- 🚗 **Accidents** are the most impactful incident on traffic delay
- ☁️ **Fog and rain** also contribute to moderate slowness
- 🕒 Peak delays are observed between **7 AM – 9 AM** and **5 PM – 7 PM**
- 📅 **Tuesday and Thursday** showed higher overall congestion compared to other days

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✅ **Conclusion**
This analysis helps urban planners and traffic control authorities to prioritize infrastructure improvements and deploy emergency services effectively during high-risk hours and days.

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