Data Analysis Summary and Insights

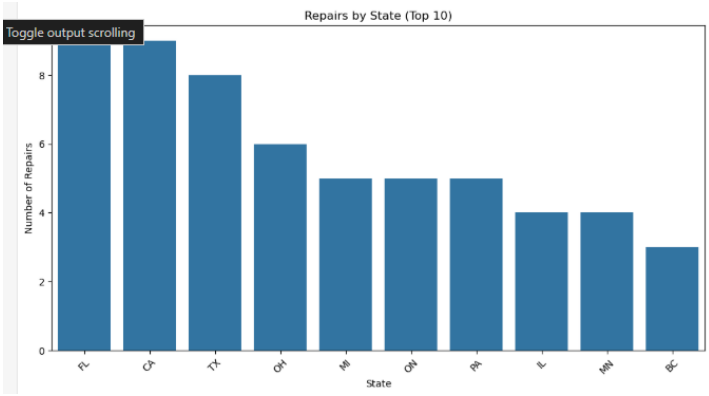
A. Column-Wise Analysis:

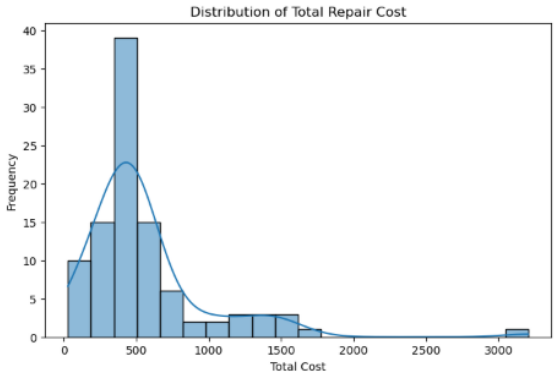
- The dataset contained 100 rows and 52 columns with numerical, categorical, and text data.
- CAMPAIGN_NBR was entirely empty (100% missing data) and was removed.
- Other columns had missing values ranging from 2% to 12%, which were handled through imputation (categorical: "UNKNOWN", numerical: median values).
- Text-heavy columns (CUSTOMER_VERBATIM, CORRECTION_VERBATIM) were identified for deeper insights.

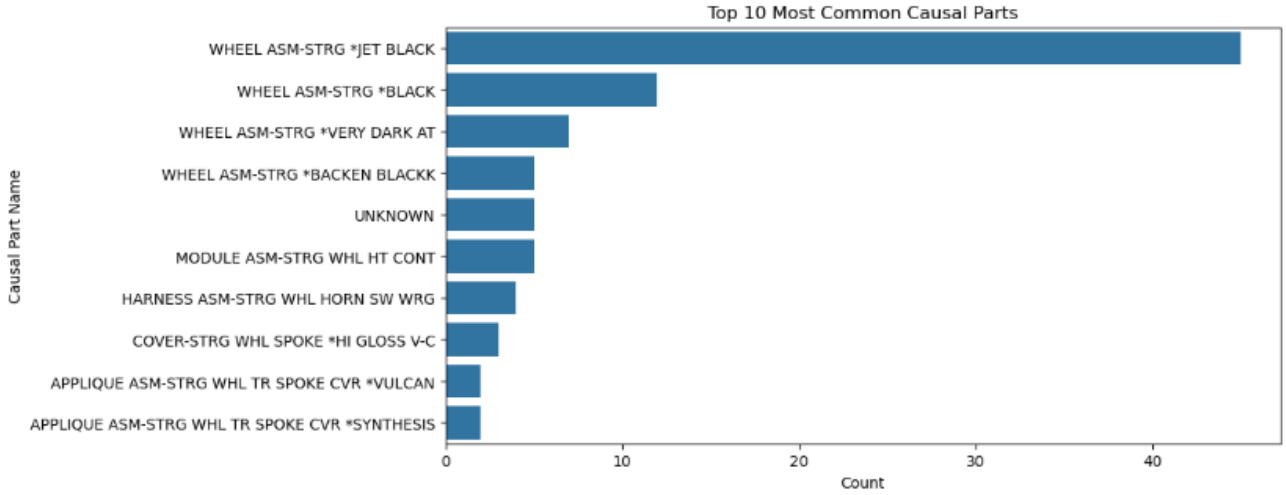
B. Data Cleaning & Summary

- Missing values were addressed appropriately in categorical and numerical columns.
- Text standardization was applied to categorical values (case normalization, whitespace trimming).
- Outliers in TOTALCOST were identified but retained to assess potential high-cost repair
- Top 5 insightful columns: TOTALCOST, CAUSAL_PART_NM, PLATFORM, STATE, REPAIR_DATE.
- Total epair Cost: Skewed distribution, with some very high-cost repairs.
- Frequent Causal Parts: Steering-related components were the most commonly failing parts.
- Geographic Trends: Some states had significantly higher repair counts than others.

C. Visualizations







- Total Repair Cost Distribution – The cost varies significantly, with a peak around a lower range but some high-cost outliers.
- Most Common Causal Parts – Some parts are more prone to failures, which could guide inventory planning.
- Repairs by State – Certain states see significantly more repairs, indicating possible location-based trends.

D. Generated tags & Key takeaways

- Customer Complaints (CUSTOMER_VERBATIM):
  - Common issues: STEERING, WHEEL, HEATED, NOT WORKING.
  - Frequent complaints about steering malfunctions and heating failures.
- Repair Actions (CORRECTION_VERBATIM):
  - Common actions: REPLACED, REMOVED, MODULE, REPAIR.
  - Most repairs involved replacing steering-related components.

E. Recommendations:

- Proactive Maintenance: Encourage preemptive steering system inspections to reduce failures.
- Root Cause Analysis: Investigate why steering modules are frequently failing—potential design or material flaw?
- Inventory Optimization: Ensure high availability of commonly replaced parts (steering modules, heating components) to improve repair efficiency.
- Location-Based Strategies: High-repair regions may need targeted customer service efforts or preventive campaigns.

By implementing these insights, stakeholders can reduce failure rates, enhance customer satisfaction, and optimize repair operations.