Summary Report for Task 1 - Data Tagging

Approach to Tagging Each Field

The dataset provided includes free-text fields (**Complaint, Cause, and Correction**) that needed to be tagged based on predefined categories from the **Taxonomy Sheet**. Here's how I approached tagging each field:

1. **Root Cause** – Extracted the underlying failure reason from the **Cause** column by identifying keywords and matching them with predefined root causes in the taxonomy. If a direct match was unavailable, logical reasoning was applied based on the nature of the complaint.
2. **Symptom Condition** – Identified the **main issue** described in the **Complaint** column. For example, complaints about "oil leakage" were mapped to **"Leakage"**, while issues like "engine not starting" were mapped to **"Failure to Start"** from the taxonomy.
3. **Symptom Component** – Focused on the affected **part of the system**. For example, complaints mentioning "steering" were tagged under **"Steering System"**, while brake issues were assigned **"Braking System"** based on the predefined categories.
4. **Fix Condition** – Analyzed the **Correction** column to determine the type of action taken, such as **"Replaced," "Calibrated," "Adjusted," or "Cleaned"**, ensuring consistency with the taxonomy.
5. **Fix Component** – Identified the exact component that was fixed or replaced, such as **"Fuel Pump," "Brake Pads," or "Sensors,"** based on references in the Correction column. If an exact match wasn't found, the closest relevant component from the taxonomy was assigned.

Potential Insights

Frequent Failure Conditions – The most common root causes included **loose connections, missing components, and sensor malfunctions**, indicating recurring quality control issues.

High-Impact Components – Critical systems like **steering, braking, and electrical sensors** accounted for a majority of failures, suggesting areas that need enhanced monitoring.

Common Repair Actions – A large percentage of fixes involved **component replacements, recalibrations, and software updates**, indicating that preventive maintenance and software optimizations could significantly reduce failures.

Patterns in Customer Complaints – Issues related to **steering system failures, fuel system leaks, and dashboard errors** appeared frequently, showing potential design or manufacturing defects.

Potential Improvements & Recommendations

Predictive Maintenance – Implement AI-based predictive analytics to flag high-risk components **before failure occurs**, reducing downtime and repair costs.

Supplier & Quality Control Enhancements – Since many failures were due to **loose or missing components**, manufacturers should implement **stricter quality checks** at production stages.

Standardized Repair Guidelines – Many fixes involved **trial-and-error approaches**. Introducing **AI-assisted diagnostics** could standardize repairs and improve efficiency.

Failure Trend Analysis for Design Improvements – Steering and braking issues were frequent, suggesting that **design optimizations** could improve **vehicle reliability and safety**.