**APS: Air Pressure System in Heavy Vehicles**

**Overview:** The Air Pressure System (APS) in heavy vehicles is a critical component responsible for various functions, including braking and suspension. Due to its complexity and importance, the APS requires regular maintenance to ensure vehicle safety and performance. This maintenance is typically conducted on a monthly basis, leading to significant time and financial expenditures.

**Given Data:**

* Maintenance logs detailing the frequency and type of issues encountered in the APS.
* Historical repair records distinguishing between APS-related problems and issues from other components.
* Performance metrics before and after maintenance activities.
* Environmental and operational conditions data that might impact the APS.

**Aim:** The primary goal is to develop a predictive model that accurately determines whether a detected issue originates from the APS or another component of the vehicle. This model should:

* Reduce unnecessary repairs and maintenance tasks.
* Lower overall maintenance costs.
* Minimize downtime for heavy vehicles.
* Improve the reliability and safety of the vehicle fleet.

**Model Requirements:**

* High accuracy in distinguishing APS issues from other component problems.
* Robustness to various environmental and operational conditions.
* Minimization of false predictions to avoid unnecessary repairs and associated costs.
* Integration capability with existing vehicle diagnostic systems for real-time monitoring and decision-making.

**Final Outcome:** By implementing this predictive model, we expect to achieve the following outcomes:

* A reduction in maintenance costs due to fewer unnecessary repairs.
* Improved maintenance scheduling and resource allocation.
* Enhanced vehicle uptime and operational efficiency.
* Increased reliability and safety of heavy vehicles through precise issue identification.

This project aims to leverage machine learning techniques to create a cost-effective and reliable solution for heavy vehicle maintenance management.