



Problem Statement - 1

**STRUCTURAL HEALTH MONITORING FOR
OFF HIGHWAY VEHICLE –
FRAMES (CHASSIS) / TRANSMISSION CLUTCH**

BACKGROUND

Time is money in mines, preventing down time due to frame failure results in 24X7 utilization of mining equipment. This becomes much more critical in autonomous and connected vehicles without operators.

PROBLEM DESCRIPTION AND EXPECTED SOLUTION

Propose innovative ideas to monitor the performance and to detect any system deterioration before it occurs in the frames / transmission clutch life prediction by using potential signatures (machine vibration, standard performance monitoring data) from the machine. Potentially, Caterpillar team is looking for ideas through innovative methods as mentioned below :

- Low cost digitized method to detect any system deterioration related to weld integrity/clutch life
- Machine Learning - Machine learning is a method of data analysis that automates analytical model building
- Statistical approach - the science of collecting, exploring and presenting large amounts of data to discover underlying patterns and trends
- Mixed approaches – Combination of above three

CONSTRAINTS

No compromise on performance and structural integrity

EXPECTED OUTCOME FORMAT:

- Solution - Data driven or physics-based approach
- Technology description in power point and Simulation model demo





Problem Statement - 2

IMPROVING THE ACCURACY OF GPS DATA

BACKGROUND

Industries leverage the location data for their business applications and as there is a need for continuous improvement, everyone looks for an opportunity to improve the accuracy of GPS data.

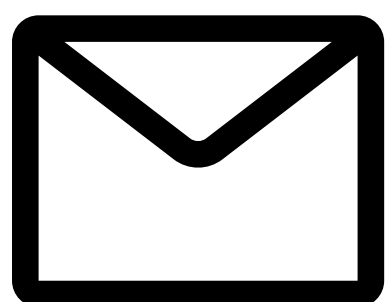
PROBLEM DESCRIPTION AND EXPECTED SOLUTION

Location and navigation using global positioning systems (GPS) is deeply embedded in our daily lives. While GPS works well under clear skies, its location estimates can be wildly inaccurate (with a margin of error of 50 meters or more) when we need it the most. To overcome this challenge, you need to develop a software upgrade to GPS which substantially improves location accuracy.

EXPECTED OUTCOME FORMAT

- Algorithm to identify and impute inaccurate GPS data with a more accurate GPS
 - Document assumption and limitation of the approach if necessary
 - Success metric will be based on results accuracy and computation efficiency
- Cross-validation results of the approach or model
- Final Report

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