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On Board Telemetry Anomaly Detection using Machine Learning

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Anomaly detection has numerous applications across various fields, including the space industry. A spacecraft must continuously monitor the health of its subsystems to detect non-nominal situations, but transmitting all telemetry data to the ground for analysis is not feasible due to limited transmission capacity and potential delays. Therefore, autonomous fault and anomaly detection is essential for timely response to unexpected events and ensuring the mission's success. The conventional approach in Space Operations involves using Out-of-Limits (OOL) alarms for anomaly detection, which may prove insufficient in identifying and responding to complex anomalies or unforeseen novelties within the range of nominal values. This talk proposes a Machine Learning approach for anomaly/novelty detection embedded into the radiation-tolerant LEON 3 processor for the HERA mission.

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