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SMART SENSOR NETWORK FOR REAL-TIME ANOMALY DETECTION IN RAILWAY FREIGHT WAGONS

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Summary: New intelligent monitoring solutions for railway vehicles are emerging as a result of the growing demand for operational safety and efficiency. Since traditional freight wagons lack such monitoring systems, railway operators are unable to detect events that could lead to dangerous failures, costly maintenance, and operational inefficiencies. To address these challenges, this paper introduces an advanced real-time monitoring system featuring a distributed wired sensor network designed for railway freight wagons, which can be retrofitted in existing vehicles.Multiple acquisition nodes are strategically placed to gather data from various distributed sensors, which is then locally processed to enable real-time detection of hazardous situations, such as derailing, overweight, load imbalances and overheating axle boxes. An onboard gateway, equipped with a mobile communication module, transmits the wagon geolocation, alerts and collected sensor data to back-office. This allows the operator to monitor the wagon operations in real-time and to identify emerging issues before they lead to significant disruptions. As a result, deploying this system enables proactive hazardous detection, while improving the overall fleet management and maintenance costs.SMARTWAGONS:

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