(#33) Smart Powertrain Monitoring and Predictive Analysis for An Autonomous Guided Vehicle

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Abstract

Autonomous Guided Vehicles (AGVs) are essential in industrial automation, but their reliability is often compromised by powertrain failures, particularly in the battery and motor systems, leading to operational inefficiencies. Existing research typically focuses on either the battery or motor, neglecting the interdependencies crucial for effective fault detection. This research addresses these gaps by developing an IoT-based real-time monitoring system that uses the MQTT protocol to track key powertrain parameters like current, voltage, and temperature. Machine learning algorithms are employed to predict motor and battery health, with models classifying motor conditions and estimating battery State of Charge (SOC) in real time. By utilizing real-world AGV data, this study offers a more comprehensive and practical approach to enhancing AGV reliability and efficiency.

Keywords: *Autonomous Guided Vehicles, Powertrain failures, Internet of Things, Machine learning*