

Enhancing Resilient Operations via Predictive Maintenance: A Simulink-based Machine Learning Approach for Induction Motor Bearings

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Abstract

This work seeks to strengthen resilient operations across diverse sectors by implementing predictive maintenance for induction motors. The proposed approach integrates Simulink-generated signals with machine learning, combining Support Vector Machines (SVM) for precise fault classification and regression neural networks for short-term forecasting. Motor current and rotor speed are used as key input parameters, collected through Simulink simulations under realistic operational conditions. These data sets are used to train machine learning models capable of detecting potential bearing-related faults before they escalate. By enabling early failure detection, the framework supports operational efficiency, reliability, and continuity in electrical systems.

Keywords

Resilient, Operations, Predictive Maintenance, Simulink, Machine Learning