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Intelligent Systems for Machine Condition Monitoring and Fault Diagnostics

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Abstract

Reliable machine condition monitoring systems are critically needed in industries to recognize equipment defects at their earliest stage so as to improve production quality, operation efficiency and safety. An intelligent monitoring system consists of modules such as data acquisition, signal processing, and diagnostics. Smart sensor-based data acquisition systems are used to collect signals wirelessly. Signal processing is a process to extract representative features from measurement for system analysis and fault detection in machinery systems. Diagnosis is a procedure to classify features/patterns into different categories corresponding to different equipment health states. New soft computing tools such as evolving neural fuzzy methods are used in automatic diagnostic classification. Appropriate machine learning algorithms can be used to improve decision-making convergence and adaptive capability to accommodate different machinery conditions.