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GB/T 43555-2023

Intelligent service - Predictive maintenance - Algorithm evaluation method

智能服务 预测性维护 算法测评方法

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Foreword

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Predictive maintenance has gradually developed into the main mode of operation and maintenance services, and has been widely used in many industries: Algorithms are predictions The core of whether predictive maintenance can be effectively implemented requires a standardized evaluation system to scientifically and reasonably evaluate the accuracy and effectiveness of predictive maintenance algorithms: ity and applicability: Predictive maintenance is aimed at equipment or components in various industries, using signal analysis such as vibration, image, current, and voiceprint as a means, combined with a new generation of information It uses information technology to carry out condition monitoring, fault diagnosis and remaining life prediction, formulate operation and maintenance decision-making plans and arrange reasonable maintenance activities for new equipment operations: Dimensional model: This document targets conditions monitoring, fault diagnosis, life prediction and other algorithms in predictive maintenance, and extracts common tests in the industry: Evaluation indicators and methods, establish a universal algorithm evaluation system, and provide support for application and promotion in various industries: Practitioners of predictive maintenance are usually divided into equipment users, equipment manufacturers and solution providers: This document is for the above-mentioned practitioners Provide evaluation basis for personnel, such as providing important support materials for equipment users' procurement and acceptance, and describing equipment manufacturers and solution providers Provides basis for the advantages of the predictive maintenance technology solutions it provides: Intelligent service predictive maintenance algorithm evaluation method

1 Scope

GB/T 43555-2023 specifies how to evaluate a predictive maintenance algorithm, and the need is acute because these algorithms are unusually easy to make look good. Failures are rare, so an algorithm that predicts nothing will fail is right almost all the time; accuracy is therefore a meaningless metric, and the numbers that matter are how many real failures were caught, how many false alarms were raised for each one, and - the metric most often omitted - how far in advance the warning came, since a correct prediction that arrives too late to act on has no value. Evaluation also depends entirely on the data: a model tested on the same run-to-failure dataset it was tuned on will report a performance it cannot repeat on a plant. This document specifies the classification of algorithm tests in predictive

maintenance, the evaluation process, the test indicators, the evaluation requirements and the requirements on the evaluation data, and describes the test methods. Under ICS 25.040.40 and CCS N19, it is written for the vendors of predictive maintenance systems, for the manufacturers and asset owners buying them, and for the third-party evaluators asked to judge a claim.

This document stipulates the algorithm test classification, evaluation process, test indicators, evaluation requirements and evaluation data requirements in predictive maintenance: Description test method: This document is suitable for the testing and evaluation of algorithms such as condition monitoring, fault diagnosis, and life prediction in predictive maintenance:

2 Normative reference documents

The contents of the following documents constitute essential provisions of this document through normative references in the text: Among them, the dated quotations For undated referenced documents, only the version corresponding to that date applies to this document; for undated referenced documents, the latest version (including all amendments) applies to this document:

GB/T 40571-2021 General requirements for predictive maintenance of intelligent services

3 Terms and definitions

The following terms and definitions apply to this document: 3:1 conditionmonitoringconditionmonitoring Detect and collect information and data reflecting machine status:

Note: If a malfunction or failure occurs, the machine condition deteriorates: [Source: GB/T 20921-2007,2:5] 3:2 fault diagnosis faultdiagnosis The examination of symptoms and syndromes in order to determine the nature (type, condition, extent) of a malfunction or failure: [Source: GB/T 20921-2007, 2:6, with modifications] 3:3 life predictionlifeprediction Analyze the symptoms of failure to estimate future status and remaining service life:

Note: Life prediction usually refers to remaining service life prediction: [Source: GB/T 20921-2007, 2:16, with modifications] 3:

4 Continuous or intermittent maintenance based on observed conditions to monitor, diagnose or predict the condition of a structure, system or component status indicators: [Source: GB/T 40571-2021, 3:5, with modifications] 3:5 confidencelevel A quality criterion indicating how correct the diagnosis/prediction is:

Note 1: It is expressed as a percentage: