

系统工程

基于本体的工业综合预报警系统设计与实现

赵佳宝¹, 谈晓洁², 焦小澄¹, 张亮¹

1. 南京大学工程管理学院, 江苏 南京 210093;
2. 南京大学信息管理系, 江苏 南京 210093

摘要:

针对流程工业制造过程中产生的海量实时数据因数据量大、可读性可理解性差而带来的知识获取困难以及面向应用需求的处理利用不充分等问题, 应用本体论建模的方法和技术, 构建了一种以测点、区域、生产设备与过程的多级别综合预警报警知识库为核心的综合预警报警系统。通过运用本体知识系统的推理机制, 利用分布于企业生产控制网络不同节点上的实时数据, 实现了对工业生产过程可能隐患进行综合预警报警等功能。该系统已成功应用于某大型化工企业管控一体化系统中, 对提升企业生产本质安全与管控一体化系统应用水平起到了积极作用。

关键词: 综合预警报警系统 本体论 网络本体语言 语义网络规则语言

Design and implementation of Ontology-based industrial integrated alarm management system

ZHAO Jiabao¹, TAN Xiaojie², JIAO Xiaocheng¹, ZHANG Liang¹

1. School of Management and Engineering, Nanjing Univ., Nanjing 210093, China;
2. Dept. of Information Management, Nanjing Univ., Nanjing 210093, China

Abstract:

There are a mass of real-time data sampled from the manufacturing processes of process industry, and it is very important to take the most advantage of these data with suitable and effective methods. It can make the production keep well-balanced, improves the management of production, and alerts people to any danger. Unfortunately, the process data are abstract and lack of readability and intelligibility. Hence an Ontology-based approach is presented for the design and implementation of industrial integrated alarm management systems. First, it is discussed that how to implement an ontology-based method to construct a multilevel knowledge base system that contains detector level, location level and process level alarms. Then an intelligent ontology management sub-system is added to the real-time supervisory system. The reasoning mechanism and integrated interactive interface are shown consequently. Finally, the design and implementation of Ontology-based industrial integrated alarm management systems are introduced and analyzed. An application example is presented to verify the proposed method.

Keywords: integrated alarm management system Ontology web Ontology language (OWL) semantic web rule language (SWRL)

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