SYSTEM ENGINEERING

基于变长度移动窗口和HMM的工业过程故障在线诊断

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摘要　An integrated framework is presented to represent and classify process data for on-line identifying abnormal operating conditions. It is based on pattern recognition principles and consists of a feature extraction step, by which wavelet transform and principal component analysis are used to capture the inherent characteristics from process measurements, followed by a similarity assessment step using hidden Markov model (HMM) for pattern comparison. In most previous cases, a fixed-length moving window was employed to track dynamic data, and often failed to capture enough information for each fault and sometimes even deteriorated the diagnostic performance. A variable moving window, the length of which is modified with time, is introduced in this paper and case studies on the Tennessee Eastman process illustrate the potential of the proposed method.

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分类号

**On-line Fault Diagnosis in Industrial Processes Using Variable Moving Window and Hidden Markov Model**

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**Abstract** An integrated framework is presented to represent and classify process data for on-line identifying abnormal operating conditions. It is based on pattern recognition principles and consists of a feature extraction step, by which wavelet transform and principal component analysis are used to capture the inherent characteristics from process measurements, followed by a similarity assessment step using hidden Markov model (HMM) for pattern comparison. In most previous cases, a fixed-length moving window was employed to track dynamic data, and often failed to capture enough information for each fault and sometimes even deteriorated the diagnostic performance. A variable moving window, the length of which is modified with time, is introduced in this paper and case studies on the Tennessee Eastman process illustrate the potential of the proposed method.

**Key words** wavelet transform; principal component analysis; hidden Markov model; variable moving window; fault.

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