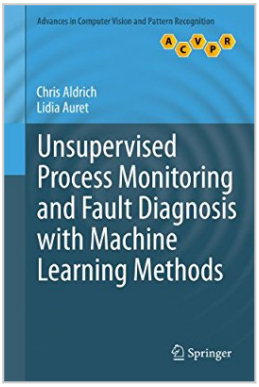

Unsupervised Process Monitoring and Fault Diagnosis with Machine Learning Methods (Advances in Computer Vision and Pattern Recognition)

By Chris Aldrich, Lidia Auret

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This unique text/reference describes in detail the latest advances in unsupervised process monitoring and fault diagnosis with machine learning methods. Abundant case studies throughout the text demonstrate the efficacy of each method in real-world settings. The broad coverage examines such cutting-edge topics as the use of information theory to enhance unsupervised learning in tree-based methods, the extension of kernel methods to multiple kernel learning for feature extraction from data, and the incremental training of multilayer perceptrons to construct deep architectures for enhanced data projections. Topics and features: discusses machine learning frameworks based on artificial neural networks, statistical learning theory and kernel-based methods, and tree-based methods; examines the application of machine learning to steady state and dynamic operations, with a focus on unsupervised learning; describes the use of spectral methods in process fault diagnosis.

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- Rank: #2617537 in eBooks
- Published on: 2013-06-15
- Released on: 2013-06-15
- Format: Kindle eBook

Editorial Review

Review

From the reviews:

“The text elaborates a range of classifiers used for supervised and unsupervised machine learning methods, for different types of processes. … The rich examples of various industrial processes and the illustration of subsequent simulation results qualify the work as a reference textbook for graduate studies in machine learning.” (C. K. Raju, Computing Reviews, October, 2013)

From the Back Cover

Algorithms for intelligent fault diagnosis of automated operations offer significant benefits to the manufacturing and process industries. Furthermore, machine learning methods enable such monitoring systems to handle nonlinearities and large volumes of data.

This unique text/reference describes in detail the latest advances in *Unsupervised Process Monitoring and Fault Diagnosis with Machine Learning Methods*. Abundant case studies throughout the text demonstrate the efficacy of each method in real-world settings. The broad coverage examines such cutting-edge topics as the use of information theory to enhance unsupervised learning in tree-based methods, the extension of kernel methods to multiple kernel learning for feature extraction from data, and the incremental training of multilayer perceptrons to construct deep architectures for enhanced data projections.

Topics and features:

- Reviews the application of machine learning to process monitoring and fault diagnosis
- Discusses machine learning frameworks based on artificial neural networks, statistical learning theory and kernel-based methods, and tree-based methods
- Examines the application of machine learning to steady state and dynamic operations, with a focus on unsupervised learning
- Describes the use of spectral methods in process fault diagnosis

This highly practical and clearly-structured work is an invaluable resource for all researchers and practitioners involved in process control, multivariate statistics and machine learning.

Dr. Chris Aldrich is a Professor in the Department of Metallurgical and Minerals Engineering at Curtin University, Perth, Australia. **Dr. Lidia Auret** is a Lecturer in the Department of Process Engineering at Stellenbosch University, South Africa.

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