World Academy of Science, Engineering and Technology
International Journal of Industrial and Manufacturing Engineering
Vol:9, No:04, 2015

Automated Process Quality Monitoring and Diagnostics for Large-Scale Measurement Data

Authors : Hyun-Woo Cho

Abstract : Continuous monitoring of industrial plants is one of necessary tasks when it comes to ensuring high-quality final products. In terms of monitoring and diagnosis, it is quite critical and important to detect some incipient abnormal events of manufacturing processes in order to improve safety and reliability of operations involved and to reduce related losses. In this work a new multivariate statistical online diagnostic method is presented using a case study. For building some reference models an empirical discriminant model is constructed based on various past operation runs. When a fault is detected on-line, an on-line diagnostic module is initiated. Finally, the status of the current operating conditions is compared with the reference model to make a diagnostic decision. The performance of the presented framework is evaluated using a dataset from complex industrial processes. It has been shown that the proposed diagnostic method outperforms other techniques especially in terms of incipient detection of any faults occurred.

Keywords : data mining, empirical model, on-line diagnostics, process fault, process monitoring
Conference Title : ICMSE 2015 : International Conference on Manufacturing Science and Engineering
Conference Location : Lisbon, Portugal
Conference Dates : April 16-17, 2015