World Academy of Science, Engineering and Technology
International Journal of Industrial and Systems Engineering
Vol:12, No:06, 2018

A Method for False Alarm Recognition Based on Multi-Classification Support Vector Machine

Authors : Weiwei Cui, Dejian Lin, Leigang Zhang, Yao Wang, Zheng Sun, Lianfeng Li

Abstract : Built-in test (BIT) is an important technology in testability field, and it is widely used in state monitoring and fault diagnosis. With the improvement of modern equipment performance and complexity, the scope of BIT becomes larger, and it leads to the emergence of false alarm problem. The false alarm makes the health assessment unstable, and it reduces the effectiveness of BIT. The conventional false alarm suppression methods such as repeated test and majority voting cannot meet the requirement for a complicated system, and the intelligence algorithms such as artificial neural networks (ANN) are widely studied and used. However, false alarm has a very low frequency and small sample, yet a method based on ANN requires a large size of training sample. To recognize the false alarm, we propose a method based on multi-classification support vector machine (SVM) in this paper. Firstly, we divide the state of a system into three states: healthy, false-alarm, and faulty. Then we use multi-classification with '1 vs 1' policy to train and recognize the state of a system. Finally, an example of fault injection system is taken to verify the effectiveness of the proposed method by comparing ANN. The result shows that the method is reasonable and effective.

Keywords : false alarm, fault diagnosis, SVM, k-means, BIT
Conference Title : ICRM 2018 : International Conference on Reliability and Maintainability
Conference Location : Venice, Italy
Conference Dates : June 21-22, 2018