

Artificial Neural Networks with Decision Trees for Diagnosis Issues

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Abstract : This paper presents a new idea for fault detection and isolation (FDI) technique which is applied to industrial system. This technique is based on Neural Networks fault-free and Faulty behaviors Models (NNFM's). NNFM's are used for residual generation, while decision tree architecture is used for residual evaluation. The decision tree is realized with data collected from the NNFM's outputs and is used to isolate detectable faults depending on computed threshold. Each part of the tree corresponds to specific residual. With the decision tree, it becomes possible to take the appropriate decision regarding the actual process behavior by evaluating few numbers of residuals. In comparison to usual systematic evaluation of all residuals, the proposed technique requires less computational effort and can be used for on line diagnosis. An application example is presented to illustrate and confirm the effectiveness and the accuracy of the proposed approach.

Keywords : neural networks, decision trees, diagnosis, behaviors

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