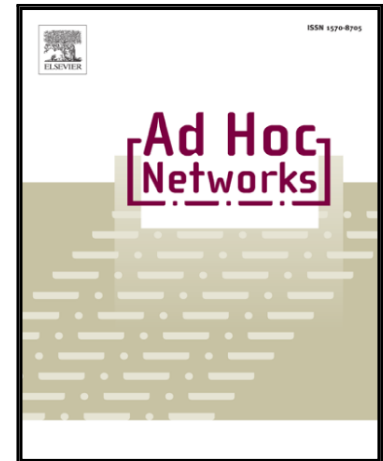


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Heterogeneous Fault Diagnosis for Wireless Sensor Networks

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Abstract

Fault diagnosis has been considered as a very challenging problem in wireless sensor network (WSN) research. Faulty nodes having different behavior such as hard, soft, intermittent, and transient fault are called as heterogeneous faults in wireless sensor networks. This paper presents a heterogeneous fault diagnosis protocol for wireless sensor networks. The proposed protocol consists of three phases, such as clustering phase, fault detection phase, and fault classification phase to diagnose the heterogeneous faulty nodes in the wireless sensor networks. The protocol strategy is based on time out mechanism to detect the hard faulty nodes, and analysis of variance method (ANOVA test) to detect the soft, intermittent, and transient faulty nodes in the network. The feed forward probabilistic neural network (PNN) technique is used to classify the different types of faulty nodes in the network. The performance of the proposed heterogeneous fault diagnosis protocol is evaluated using network simulator NS-2.35. The evaluation of the proposed model is also carried out by the testbed experiment in an indoor laboratory environment and outdoor environment.

Keywords: Wireless Sensor Networks, Heterogeneous Fault, Fault Diagnosis, Probabilistic Neural Network, ANOVA

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