



ANALYSIS OF NON-BINARY FAULT TOLERANT EVENT DETECTION IN WIRELESS SENSOR NETWORKS

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Abstract- A distributed non-binary fault tolerant event detection technique is proposed for a wireless sensor network (WSN) consisting of a large number of sensors. The sensor nodes may be faulty due to harsh environment and manufacturing reasons. In the existing works on event detection, the detection of event is decided by only one threshold level. The objective of this paper is to extend the fault recognition and correction algorithm for non-binary event detection. The analysis presented here takes into account both the symmetric and non-symmetric error in a straightforward manner. In addition, simulation is done for symmetric error and 75 percentage of the errors can be corrected. The theoretical analysis shows that more than 95 percentage of symmetric errors can be corrected and almost 92 percentage of non-symmetric errors can be corrected (for $k=2$, i.e. half of the neighbors give correct decision), even when as many as 10 percentage of the sensor nodes are faulty.

Index terms: Distributed algorithm, fault-tolerance, non-binary event detection, non-symmetric error, symmetric error, wireless sensor networks.