



TRUST AWARE DATA AGGREGATION AND INTRUSION DETECTION SYSTEM FOR WIRELESS SENSOR NETWORKS

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Abstract: Data Aggregation (DA) is one of the most frequently used techniques in Wireless Sensor Networks (WSNs) to improve the network lifetime. It involves gathering, consolidating, and routing the sensory data collected by sensor nodes. However, research studies have demonstrated that the dependability of the DA process affects severely when malicious nodes are present in the network. Many security solutions using cryptography and Intrusion Detection System (IDS) have been proposed in the literature for smooth conduction of the aggregation process. However, these solutions require more energy and processing capacity, which are the main constraints for sensor nodes. To this end, the current study presents Trust-Aware Data Aggregation and Intrusion Detection System (TDAGIDS) for clustered WSNs. This TDAGIDS has two modules viz., trust management and intrusion detection. Each node runs a Trust Management System (TMS) that computes the trust value of neighbor nodes by observing their activities. On the other hand, the Base Station (BS) is equipped with IDS that collects the trust values of network nodes and runs a statistical test to identify malicious nodes. In this way, TMS at the node level and IDS at BS level work in collaboration to detect and isolate the malicious nodes from the DA process. The simulation results show the effectiveness of the TDAGIDS over baseline T-LEACH (Trusted Low Energy Adaptive Clustering Hierarchy) protocol and recently proposed TDAGIOT (Trust based Data Aggregation for Internet of Things) method.

Index terms: Data aggregation, intrusion detection, LEACH protocol, malicious activities, reputation ratings, security attacks, trust management, wireless sensor networks.