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A Novel Approach to Trust Management in Unattended Wireless Sensor Networks

Abstract:

Unattended Wireless Sensor Networks (UWSNs) are characterized by long periods of disconnected operation and fixed or irregular intervals between sink visits. The absence of an online trusted third party implies that existing WSN trust management schemes are not applicable to UWSNs. In this paper, we propose a trust management scheme for UWSNs to provide efficient and robust trust data storage and trust generation. For trust data storage, we employ a geographic hash table to identify storage nodes and to significantly decrease storage cost. We use subjective logic based consensus techniques to mitigate trust fluctuations caused by environmental factors. We exploit a set of trust similarity functions to detect trust outliers and to sustain trust pollution attacks. We demonstrate, through extensive analyses and simulations, that the proposed scheme is efficient, robust and scalable.