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Variance-Aware Routing and Authentication Scheme for Harvesting Data in Cloud-Centric Wireless Sensor Networks

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Abstract : The wireless sensor network (WSN) has made a significant contribution to the emergence of various intelligent services or cloud-based applications. Most of the time, these data are stored on a cloud platform for efficient management and sharing among different services or users. However, the sensitivity of the data makes them prone to various confidentiality and performance-related attacks during and after harvesting. Various security schemes have been developed to ensure the integrity and confidentiality of the WSNs' data. However, their specificity towards particular attacks and the resource constraint and heterogeneity of WSNs make most of these schemes imperfect. In this paper, we propose a secure variance-aware routing and authentication scheme with two-tier verification to collect, share, and manage WSN data. The scheme is capable of classifying WSN into different subnets, detecting any attempt of wormhole and black hole attack during harvesting, and enforcing access control on the harvested data stored in the cloud. The results of the analysis showed that the proposed scheme has more security functionalities than other related schemes, solves most of the WSNs and cloud security issues, prevents wormhole and black hole attacks, identifies the attackers during data harvesting, and enforces access control on the harvested data stored in the cloud at low computational, storage, and communication overheads.

Keywords : data block, heterogeneous IoT network, data harvesting, wormhole attack, blackhole attack access control
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