A Neighborhood and Machine Learning-Enabled Information Fusion Approach for the WSNs and Internet of Medical Things

ABSTRACT

Data redundancy or fusion is one of the common issues associated with the resource-constrained networks such as Wireless Sensor Networks (WSNs) and Internet of 'ings (IoTs). To resolve this issue, numerous data aggregation or fusion schemes have been presented in the literature. Generally, it is used to decrease the size of the collected data and, thus, improve the performance of the underlined IoTs in terms of congestion control, data accuracy, and lifetime. However, these approaches do not consider neighborhood information of the devices (cluster head in this case) in the data refinement phase. In this paper, a smart and intelligent neighborhood-enabled data aggregation scheme is presented where every device (cluster head) is bounded to refine the collected data before sending it to the concerned server module. For this purpose, the proposed data aggregation scheme is divided into two phases: (i) identification of neighboring nodes, which is based on the MAC address and location, and (ii) data aggregation using k-mean clustering algorithm and Support Vector Machine (SVM). Furthermore, every CH is smart enough to compare data sets of neighboring nodes only; that is, data of nonneighbor is not compared at all. 'ese algorithms were implemented in Network Simulator 2 (NS-2) and were evaluated in terms of various performance metrics, such as the ratio of data redundancy, lifetime, and energy efficiency. Simulation results have verified that the proposed scheme performance is better than the existing approaches.