



A new method for secure data aggregation in WSN

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Abstract

Due to the inherent limitations of wireless sensors (limited resources), communication overhead has always been a major concern in wireless sensor networks. Data aggregation is a fundamental way to reduce overhead information and thus increase network life. Because the results of data aggregation are used for critical decisions, accuracy in the final aggregation of this data is very important. As the use of wireless sensor networks is expanding day by day in critical security markers, the security parameter must also be considered. For such sensitive and important applications, data aggregation protocols must be very effective and accurate, and at the same time the information of each node must be protected from the risk of theft by the enemy. In this paper, we propose an effective scheme for data aggregation. The main idea of our plan is to integrate accurate data without adding significant overhead to the wireless sensor network

1. Introduction

Wireless sensor networks are becoming increasingly popular in many applications [1–4] such as military surveillance and civilian usage. A wireless sensor network is composed of hundreds or thousands of tiny resource-constrained sensors, equipped with nonrechargeable batteries. For such sensors, transmission is much more energy consuming than computation. Therefore, the amount of communication overhead should be kept as low as possible, in order to extend the lifetime of wireless sensor networks (WSNs). Large sensor networks usually generate substantial amounts of data, and as in many cases, there is high redundancy in their raw data. Hence, it is important to design efficient data processing technique to reduce redundant data and the amount of transmission. Data aggregation [6–10] is an essential paradigm to eliminate data redundancy and save energy. During a typical data aggregation process, sensor nodes are organized into a tree hierarchy rooted at the base station (BS). The non-leaf nodes act as aggregators, fusing data collected from their child nodes and forwarding the aggregated results towards the BS. In this way, only aggregated data are returned to the base station, rather than the summation of the data generated in each node. Compared with the centralized approach where all raw data are returned, data aggregation can reduce communication overhead significantly and hence increase the lifetime of WSNs. Aggregation accuracy is desired for the final decision which is based on the aggregation result, especially for some sensitive applications where a small difference of result may lead to completely different decisions. In applications such as battlefield surveillance and forest fire monitoring, such variation deviating from the accurate result may lead to very severe consequences. Therefore, aggregation accuracy is an important criterion for data aggregation scheme. Because of the low-cost and flexibility, the sensor network has the potential to change the way of people communicating with environment and the others. Wireless sensor networks have become a popular platform for pervasive computing. For example, sensor networks may be deployed in personal environment, such as houses and human body. People might