

Secure Data Exchange in Environmental Health Monitoring System through Wireless Sensor Network

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Abstract

Recently, disseminating latest sensory information regarding the status of environmental health in the surroundings of human life is one of very important circumstances which must be known by everyone. These circumstances should be accessible at anytime and anywhere by everyone through any type of end-user devices, both fixed and mobile devices, i.e., Desktop PCs, Laptop PCs, and Smartphones. Wireless Sensor Network (WSN) is one of the networks which deals with data sensors distribution from sensor nodes to the gateway node toward a Data Center Server. However, there is a big possibility for many adversaries to intercept and even manipulate data sensors crossing the network. Hence, a secure data sensor exchange in the system would be strongly desirable. In this research, we propose an environmental health conditions monitoring system through WSN and its implementation with considering secure data sensor exchange within the network and secure data sensor access. This work may contribute to support a part of smart cities and take in part the Internet of Thing (IoT) technology. In our proposed system, we collect some environmental health information such as temperature, humidity, luminosity, noise, carbon monoxide (CO) and carbon dioxide (CO₂) from sensor nodes. We keep the confidentiality and integrity of transmitted data sensors propagating through IEEE802.15.4-based communication toward a gateway node. Further, the collected data sensors in the gateway are synchronized to the Data Center Server through a secure TCP/IP connection for permanently storing. At anytime and anywhere, only legitimated users who successfully pass-through an attribute-based authentication system are able to access the data sensors.

Keywords: WSN, Internet of Thing, data sensor confidentiality and integrity, and attribute-based authentication

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