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Journal of Information Technology and Software Engineering

Commentary

# Comparison of Wireless Sensor Networks and Communication Protocols

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## ABOUT THE STUDY

Energy efficient routing protocols have been identified as one of the energy saving mechanisms that can be used to manage the consumption of networks' available energy and extend network lifetime in studies on resource management in wireless sensor networks. Routing protocols aid in the discovery of pathways for the transmission of sensed events, and they must be able to extend the lifetime of a network despite some of the sensor nodes' limitations and the tough conditions in which they must operate.

This article starts by outlining the many options that may be utilized to extend the life of a network, with a particular focus on energy-efficient routing protocols, as well as network topology modeling. In addition, the study models the network in terms of energy usage, sensing, and event extraction analysis. Routing protocols were classified as homogeneous or heterogeneous, with further sub-categorization into static and mobile, as well as other behavioral characteristics of the routing protocols.

A sensor network is made up of a large number of wireless sensing nodes scattered over a sensor field. Sensor nodes can detect (measure), analyze data, and interact with other sensor nodes, acting as data producers and network relays. End users or administrators of the data may then make observations and react to happenings in a specific context. Wireless sensor nodes are extremely small and inexpensive. They may detect environmental conditions or other characteristics such as air quality, temperature, sound, pressure, and humidity, and transfer the data to a central database for processing.

The usual environment might be a biological structure, the real world, or the background of Information Technology (IT). Advanced mesh topology networking protocols enable sensor nodes to create a large connection area and connect cyberspace to the real world. The sensor module collects information about the environment around the sensor and converts it into electrical signals. The processor module obtains information on events occurring in the sensor's immediate surroundings, and the data is transferred to a destination node through a radio transmitter. As a result of technological advancements, the size and cost of sensors have decreased, sparking interest in the idea of deploying large numbers of disposable unattended sensors.

In recent years, much study has been conducted on the potential collaboration of sensors in data collecting and processing, management and administration of sensing activities, and data flow to the destination node. Sensors connecting over wireless communication lines can create an ad hoc network, which is a natural architecture for such dispersed collective sensors. A Wireless Sensor Network (WSN) should be able to deploy a large number of very tiny nodes capable of self-assembling and configuring for a common purpose.

Battlefield surveillance, environmental monitoring, disaster detection and rescue, precise and intelligent agriculture, medicine and health care, environmentally friendly structures, traffic control, and item tracking are just a few of the applications of WSNs. Monitoring underground mines for any trends, for example, to assure the safety and whereabouts of miners at all times, is an example of environmental monitoring and object tracking. When compared to wired networks, WSNs are less expensive to deploy. They can respond to network topological changes and dynamically adapt to changes in the environment in which they are installed.

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**Received:** 18-Mar-2022, Manuscript No. JITSE-22-17026; **Editor assigned:** 21-Mar-2022, Pre QC No. JITSE-22-17026 (PQ); **Reviewed:** 04-Apr-2022, QC No. JITSE-22-17026; **Revised:** 12-Apr-2022, Manuscript No. JITSE-22-17026 (R); **Published:** 20-Apr-2022, DOI: 10.35248/2165-7866.22.S6.003.

**Citation:** Kim SH (2022). Comparison of Wireless Sensor Networks and Communication Protocols. J Inform Tech Softw Eng. S6: 003.