

Maximizing the Lifetime of Wireless Sensor Networks Using Solar Energy Harvesting Technology

By

Khalid Mohammad Shtewy Al-Smoul

Supervisor

Dr. Ali Asa'ad Al-Dahoud, Prof.

Co-Supervisor

Dr. Thamer Al-Rawashdeh

Abstract

The use of Wireless Sensor Networks (WSNs) in recent years has grown dramatically in many applications such as military applications, environmentally applications and health assistant applications. However, they have many problems related to power consumption, performance, and reliability, installation cost, and hardware cost.

Thus, many algorithms in the WSNs context have been considered to propose an improved solar Low Energy Adaptive Clustering Hierarchy (LEACH) technique for maximizing the lifetime, increasing the performance, increasing the reliability, and decreasing the costs. This proposed technique improves the selecting Cluster Heads (CHs) process and powering it with a renewable energy (solar cell). The OMNeT++ tool has been employed to simulate such technique. After many scenarios have taken place with different data sets, this study finds that the lifetime of WSNs has been maximized, the performance has been improved, the reliability has also been improved, and finally the cost has been decreased.