1. Introduction

A wireless sensor network (WSN) consists of several sensor nodes deployed over a geographical area for the purpose of target tracking and monitoring physical phenomena like temperature, vibration, humidity and so on. The power source of a sensor node supplies the energy needed by the device for data acquisition and data transmission to the base station. This power source often consists of a battery with limited amount of energy. In addition, it is difficult or sometimes impossible to recharge or replace the battery as nodes may be deployed in an unattended or unpractical environment. Therefore, improving the energy efficiency and maximizing the lifetime of the network are the major challenges in WSNs. Clustering is a key technique used to both extend the lifetime of WSNs and make them scalable by forming clusters.

2. Our Approach

In LEACH algorithm, cluster head is selected dynamically and by round mechanism, which must expend additional energy for new cluster head establishment. If current cluster head acts continuously as the local control center, then the frequency of cluster head update would be reduced. On the other hand, once the cluster head depleted, it will make the whole cluster lose connection to the base station. Therefore, keeping the cluster head alive (operational), is the main goal to keep the connectivity of the network. Thus, the lifetime of a cluster is defined as the time that the instance cluster is working until its cluster head death (lose its remaining energy). Considering this trade off we propose an energy efficient continuous working time (C.W.T.) strategy that could apply to the data transmission phase of LEACH algorithm to improve its performance. In our model a selected cluster head keeps working continuously until its residual energy reaches a predefined threshold. Once the residual energy of current cluster head becomes less than discussed threshold, it would be replaced with other candidate in the network and the cluster set up phase will be called to establish the new cluster head and form a new cluster. With this mechanism, the frequency of cluster updates and the energy dissipation of new cluster head establishments can be reduced. The results of simulations demonstrate that using C.W.T. model can reduce the energy consumption of each cluster effectively and increase the system useful lifetime.

References
