Abstract

Wireless sensor networks (WSNs) have recently gained the attention of researchers in many challenging aspects. The energy conservation is one of the most important issues in these networks. Due to the limited access to the nodes, both the network structure and the manner of communication between the nodes decide the energy expenditure in WSNs. One of the best solutions, in this context, is to cluster the network. This paper presents a new clustering algorithm for solving the energetic constraint in WSNs. More precisely, a critical network is considered, where each sensor satisfies its own missions depending on its locations. In addition to fulfill their mission, the sensor tries to maintain a good neighboring nodes quality. First, the mission and communication costs of sensors are minimized jointly using Sensor's Genetic Algorithm (SGA), then the Multi-Objective Weighted Clustering Algorithm (MOWCA) is developed. It aims at dividing a network into different clusters and at selecting the best performing sensors in terms of power to communicate with the Base Station (BS). MOWCA is based on three critical parameters. $\text{DD}_i$ : Degree Difference of sensor $i$, $\text{DC}_i$ : Sum of distances between sensor $i$ and its neighbors and $\text{DM}_i$ : Mission distance of sensor $i$. Later on and in order
to balance energy consumed in different formed clusters, the Base Station Genetic Algorithm (BGA) is established. Simulation results demonstrate that the proposed algorithms are very advantageous in terms of convergence to the appropriate locations and are so efficient in regards to energy conservation in WSNs.

References


Index Terms

Computer Science Wireless

Keywords