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. DDi : Degree Difference of sensor i, DCi : Sum of distances between sensor i and its neighbors and DMi : 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


31. E.I. Oyman, C. Ersoy, Multiple sink network design problem in large scale wireless
3663-3667.
32. A. Bogdanov, E. Maneva, S. Riesenfeld, Power-Aware Base Station positioning for
and Communications Societies( INFOCOM 2004), Hong Kong, March 2004.
33. Demin Gao, Haifeng Lin, Xiaofeng Liu, Routing protocol for k-anycast communication in
rechargeable wireless sensor networks, Computer Standards & Interfaces, Volume 43, January
34. Saeid Mottaghi, Mohammad Reza Zahabi, Optimizing LEACH clustering algorithm with
mobile sink and rendezvous nodes, AEU - International Journal of Electronics and
Communications, Volume 69, Issue 2, February 2015, pp. 507-514
35. E.I. Oyman, C. Ersoy, Multiple sink network design problem in large scale wireless
3663-3667.
36. A. Bogdanov, E. Maneva, S. Riesenfeld, Power-aware base station positioning for
sensor networks, in: INFOCOM 2004. Twenty Third AnnualJoint Conference of the IEEE
38. Konstantopoulos C, Pantziou G, Gavalias D, Mpitziopoulos A, Mamalis B. A
rendezvous-based approach enabling energy-efficient sensory data collection with mobile sinks.
39. Liang W, Luo J, Xu X. Prolonging network lifetime via a controlled mobile sink in wireless
December, pp. 1–6.
40. Ouchitachen H, Hair A, Idrissi, N. Joint mission and communication aware node
placement problem in mission-specific mobile sensor networks. In: Codes, Cryptography and
mobile sensor networks. In: TELKOMNIKA Indonesian Journal of Electrical Engineering Vol. 15,
No. 3, September 2015, pp. 401-408.

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