

Cluster head selection using fuzzy logic and chaotic based genetic algorithm in wireless sensor network

ABSTRACT

Wireless sensor networks (WSNs) are composed of hundreds or thousands of sensor nodes in order to detect and transmit information from its surrounding environment. The sensor nodes have limited computation capability, limited power and small memory size. In these networks, sensor nodes are dependent on low power batteries to provide their energy. As energy is a challenging issue in these networks, clustering models are used to overcome this problem. In this paper, fuzzy logic and chaotic based genetic algorithms are combined to extend the lifetime of sensor nodes. In other words, fuzzy logic is proposed based on three variables-energy, density and centrality-to introduce the best nodes to base station as cluster head candidate. Then, the number and place of cluster heads are determined in base station by using genetic algorithm based on chaotic. Our simulation results in the NS-2 show the longer network lifetime of the proposed algorithm than the LEACH, DEEC, SEDEEC and GFS protocols.

Keyword: Genetic algorithm; Clustering; Wireless sensor network; Fuzzy logic; Chaotic; Lifetime