Abstract

The efficiency of cluster formation has a sound effect on limiting battery lifetime in cluster based wireless sensor networks. Fuzzy based decision support system enables node to make evaluation and pass a soft decision on the state of being configured as normal or cluster leader without the presence of precise information about different clustering parameters. In this paper, a distributed fuzzy based cluster formation is presented in which the set of appropriate cluster heads are elected to setup clusters and optimal routes toward the base station are constructed based on the candidate gateway nodes. Initially, the base station partitions the network into different tiers and then nodes define themselves to the corresponding tier. The minimum distance from the border of corresponding tier and energy level limit the selection probability of node to become cluster head or gateway node. The fuzzy logic toolbox is developed in C++ and integrated with OMNeT++ simulation platform to implement the protocol and experimental results reveal that the proposed protocol prolongs the network lifetime compared to LEACH-C and CHEF protocols.
References


Index Terms

Computer Science  Fuzzy Systems

Keywords

Cluster head election, fuzzy based cluster formation, network lifetime, wireless sensor networks.