Abstract: Multi-Layer Clustering Method Using Candidate Cluster Head Node in Wireless Sensor Network Environment

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Abstract

Wireless Sensor Network (WSN) is most important present minimizing energy consumption. Among various clustering methods, the Low-Energy Adaptive Clustering Hierarchy (LEACH) mechanism takes the hierarchical approach of segmenting multiple clusters for efficient energy management. The mechanism, however, configures new clusters in every round, so the energy consumed whenever configuring clusters shortens the useful lifetime of the entire network. For this reason, this paper generates clusters and selects Candidate Cluster Head (CCH) in the initial round under the sensor network environment. Subsequent rounds continue, without performing re-clustering, until all of the CCHs selected become Cluster Head (CH), thereby addressing the issue of energy consumption in the setup phase for clustering. The proposed model consumes around 30% more energy than the conventional LEACH in the initial round, but its total energy consumption declines in as the round continues. The Network Simulation tool (NS-2) proves that its energy efficiency improves by up to 13.3% in the 1,000-node environment compared to when 100 sensor nodes are employed.