Energy efficient data collection through hybrid Inequality clustering for wireless sensor network

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Abstract Today, Cluster based routing protocols are the most useful schemes for extending Wireless Sensor Networks lifetime through dividing the nodes into several clusters and electing of a local cluster head for aggregating/fusing of cluster nodes data and transmitting a packet to Base Station. However, there are several energy efficient cluster-based methods in the literature; most of them used the topological neighborhood or adjacency as main parameter to form the clusters. The existing clustering algorithms are either static or dynamic depending on the frequency of clustering. In static clustering, clusters are formed once, which reduces the clustering overhead but leads to early energy drain of a few nodes in the network. The network lifetime can be improved by dynamic clustering in which clusters are reformed after every round, which increases the clustering overhead. To optimize the parameters, including clustering overhead, network lifetime, energy hole, FND (first node dies) and LND (last node dies) in WSN, a hybrid Inequality clustering with layering protocol (HICL) is proposed. The HICL is a hybrid of static and dynamic clustering approaches. In HICL, the network is divided into layers and clusters of various sizes. The cluster heads are ed based on available energy, the distance to the sink and the number of neighbors. Once the cluster is formed, the same structure is maintained for a few rounds. The data are forwarded to the sink through a multi-hop layer-based communication with an in-network data compression algorithm. In comparison with the existing protocols, the HICL balances energy and achieves a good distribution of clusters, extends the lifetime of the network and avoid the energy hole problem.

Keywords : Keywords: Wireless sensor network, Inequality clustering, Network lifetime, Routing lifetime