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LEACH Enhancements for Wireless Sensor Networks Based on Energy Model

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Abstract: The low-energy adaptive clustering hierarchy (LEACH) protocol is one of the most adaptive protocols used in the wireless sensor networks (WSNs). LEACH is a hierarchical model that provides a powerful strategy for energy balancing, using head rotations. However, the original LEACH protocol suffers from many drawbacks and many researchers proposed new methods to mitigate them. In this paper, we propose two approaches based on an energy model to enhance cluster heads (CHs) selection method through not only minimizing the power consumption of network nodes, but also minimizing the number of CHs. The first proposed approach effectively selects a cluster head that has the lowest power consumption when communicating with other nodes. In addition to what is proposed in the first approach, the idea of incorporating the shortest distance has been considered in the second proposed approach. This significantly decreases the energy consumption and increases the lifetime of associated nodes.