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Energy-efficient and multi-stage clustering algorithm in wireless sensor networks using cellular learning automata

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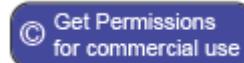
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Abstract

One of the main challenges in wireless sensor networks is the energy constraints of sensor nodes which must be considered precisely when designing algorithms for such networks. Clustering is known as one of the methods that can be used for addressing this challenge. In this paper, an efficient method for clustering wireless sensor networks using cellular learning automata has been presented (LaClustering). Proposed method selects cluster heads through several stages; each considers one parameter affecting the overall performance of the clusters. Parameters considered in different stages of the proposed algorithm are energy levels of the sensor nodes, number of neighbors of each node, network connectivity, and formation of balanced clusters. To evaluate the performance of the proposed method, several experiments have been conducted using the J-sim simulator and the proposed method has been compared with some of the best clustering algorithms reported in literature. The simulation results have shown that the proposed method is more energy efficient than other clustering algorithms.

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