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Proposing an Algorithm to Cluster Ad Hoc Networks, Modulating Two Levels of Learning Automaton and Nodes Additive Weighting

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Abstract : An Ad Hoc network consists of wireless mobile equipment which connects to each other without any infrastructure, using connection equipment. The best way to form a hierarchical structure is clustering. Various methods of clustering can form more stable clusters according to nodes' mobility. In this research we propose an algorithm, which allocates some weight to nodes based on factors, i.e. link stability and power reduction rate. According to the allocated weight in the previous phase, the cellular learning automaton picks out in the second phase nodes which are candidates for being cluster head. In the third phase, learning automaton selects cluster head nodes, member nodes and forms the cluster. Thus, this automaton does the learning from the setting and can form optimized clusters in terms of power consumption and link stability. To simulate the proposed algorithm we have used omnet++4.2.2. Simulation results indicate that newly formed clusters have a longer lifetime than previous algorithms and decrease strongly network overload by reducing update rate.

Keywords : mobile Ad Hoc networks, clustering, learning automaton, cellular automaton, battery power
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