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基于博弈的大规模无线传感器网络分簇算法

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Game Theoretic Clustering Algorithm for Large Scale WSN

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摘要 合理的分簇方式能够有效延长大规模无线传感器网络(LS-WSN)的寿命，从而降低其部署使用成本。当前很多WSN分簇的研究均假设节点均匀分布，这与实际应用中的大规模WSN有所差距。该文针对节点非均匀分布的大规模WSN，提出了一种分簇算法。该算法在基于蜂窝结构虚拟网格的位置分簇之后，引入博弈理论设计分簇调整流程，使网络达到各簇中节点数尽量均匀的分簇状态。理论分析和仿真结果证明，通过该方法进行分簇，可以有效均衡各个簇中的节点数，从而延长网络有效寿命。

关键词： 泛在网络 无线传感器网络 分簇 节能 博弈

Abstract： Reasonable clustering algorithm can prolong the Large Scale Wireless Sensor Network (LS-WSN) lifetime, so as to reduce the cost of using it. Up to now, most research on WSN clustering assumes that the nodes in WSN are uniformly distributed. But this assumption is different from practical LS-WSN. In this paper, a novel clustering algorithm is proposed, which is suitable for the non-uniformly distributed LS-WSNs. In the proposed algorithm, LS-WSN is clustered according to the location aware clustering method, which based on the hexagons virtual grid, then the clusters are adjusted following a game theoretic adjustment process. After the algorithm, the numbers of nodes in each cluster is nearly similar. Theoretical analysis and simulation results show that the proposed algorithm can effectively balance the number of nodes in each cluster, thus prolonging the effective lifetime of WSN.

Keywords： Ubiquitous network   Wireless Sensor Network (WSN)   Clustering   Power saving   Game theory

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