基于差分算法的异构无线传感器网络多重覆盖节点调度方案

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摘 要：

针对部署区域中存在多个不同覆盖质量需求的目标，本文提出一种基于多重覆盖算法的异构节点调度机制。该算法在满足区域覆盖要求和重点区域监测目标多重覆盖的要求，及节点能量的约束条件下，以网络的有效覆盖率最大和工作节点数目最少为目标，借助改进的差分算法来对节点状态进行优化达到提高网络覆盖性能和降低网络能耗的目的。仿真结果显示，本文的算法在满足热点目标监测要求的前提下，最大限度的兼顾网络的区域覆盖质量，减少了网络的能耗；较之随机调度算法，本文算法在覆盖率和网络能耗方面优于后者。

关键词：无线传感器网络 ；异构网络；节点调度；多重覆盖；差分算法

A Node Scheduling Scheme based on Weighted Multiple Coverage Algorithm for Heterogeneous Sensor Networks

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Abstract:

A optimal heterogeneous sensor node scheduling schemes based on weighted multiple coverage algorithm is proposed to solve the problems of different point coverage requirements in the area coverage. The algorithm uses the efficient coverage and working number of sensors as objective functions in the context of different qualities of coverage for different points of interest(POI)while satisfying the area coverage and sensor energy. Using of improved differential evolution algorithm to exchange the sensor status in the network , the proposed node scheduling scheme can enhance the network coverage performance and reduce the energy consumption. Simulation results demonstrate the effectiveness of the proposed approach. While satisfying special POI coverage requirement, it can also provide the maximum coverage for the area. Comparing with random scheduling algorithm, the proposed approach has higher coverage rate and energy efficiency.

Keywords: wireless sensor networks ; heterogeneous networks ; node scheduling ; weighted multiple coverage; differential evolution algorithm

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