

基于 AVMC 算法的 WSN 节点分布优化策略

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摘要: 能耗和通信质量问题制约着无线传感器网络技术的发展, 合理的节点部署既能降低能耗又能促进网络通信, 就此提出一种基于蚁群算法(ACA, ant colony algorithm)、拟物力(VMF, virtual material force)和质心算法(CA, centroid algorithm)的 WSN 节点分布优化策略(AVMC). 首先, 该策略中采用蚁群算法选取合理个数和位置的节点, 将节点位置优化模型转化为简单的线性模型; 其次, 运用拟物力算法对选中的节点进行位置优化; 最后, 结合 Voronoi 图在点与点之间的专属特性, 采用质心算法提高节点位置精度. 实验仿真结果表明, 该优化策略能够减少 WSN 中节点冗余度, 并在提高监测区域覆盖率的基础上提高了网络节点覆盖效率.

关键词: 蚁群算法; 拟物力; 质心算法; 覆盖率

Distribution optimization strategy of WSN nodes

based on AVMC algorithm

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Abstract: The development of wireless sensor networks is restricted by energy consumption and communication quality. But reasonable node deployment can reduce energy consumption and promote network communication. In this paper, a distribution optimization strategy of WSN nodes based on ant colony algorithm, virtual material force and centroid algorithm is proposed. Firstly, ant colony algorithm is used to select nodes with reasonable number and location, and transforming the node optimization model into a simple linear model. Secondly, we use the algorithm of quasi physical force to optimize the location of the selected nodes. Finally, we combine with the exclusive characteristics of Voronoi diagrams between points and points to precise location accuracy of nodes using centroid algorithm. And experimental simulation results show that, the optimization strategy can reduce nodes redundancy in WSN, and improve the coverage efficiency of network nodes on the basis of improving the coverage rate of monitoring area.

Key words: ant colony algorithm; virtual material force; centroid algorithm; coverage rate

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