

不对称链路环境下的WSN节点定位算法

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摘要:

针对无需测距定位算法DV-Hop在含有不对称链路的复杂环境中存在较大定位误差的问题, 从5个方面对其进行了改进: 首先采用邻居节点挖掘措施确保相邻节点的准确识别; 接着使用最小跳数方法计算未知节点到锚节点之间的真实跳数; 然后使用改进的平均跳距计算方法减小平均跳距误差; 其次采用一种新的方程组求解方法完成节点初步定位; 最后采用一种校正技术对初步估计坐标进行校准。仿真结果表明, 改进算法以适当增加通信成本和计算开销为代价, 有效避免了不对称链路的影响, 在明显提高定位精度的同时降低了网络成本。

关键词: 无线传感器网络; 定位; DV-Hop算法; 不对称链路

A Localization Algorithm for Wireless Sensor Networks with Asymmetric Links

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Abstract:

For conquering the problem of poor locating performance by using DV-Hop algorithm in the complex environment with asymmetric links. Several approaches were put forwarded in this paper. Firstly, a neighbor nodes mining method is used to ensure the accurate identification of adjacent nodes. Secondly, the minimum hop-count mechanism is used for calculate the real hop count between nodes. Thirdly, a new method of computing average hop-size is adopted to reduce its error. And then, a novel method of solving a system of equations is presented to estimation the initial location of unknown node. Finally, a coordinate calibration technology is used to further improve the positioning accuracy. Simulation results show that, the improved algorithm can effectively avoid the influence of asymmetric links, significantly improve the positioning accuracy and reduce the cost of network.

Keywords: wireless sensor networks (WSNs); localization; DV-Hop algorithm; asymmetric links

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