论文

DV-Hop定位算法在随机传感器网络中的应用研究

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摘要

DV-Hop节点定位算法是一种重要的与距离无关的定位算法。在各向同性的密集网络中，DV-Hop可以得到比较合理的定位精度，然而在随机分布的网络中，节点定位误差较大。该文根据DV-Hop算法定位过程，在平均每跳距离估计、未知节点到各参考节点之间距离的计算和节点位置估计方法等3个方面进行了改进，分析和仿真了不同改进措施和综合改进的定位性能。结果表明，与有关方法相比，该文提出的改进措施可极大地提高节点定位精度。此外，该文改进措施不改变DV-Hop算法的定位过程，因此不需要增加网络通信量和额外硬件支持，是理想的与距离无关算法。

关键词   传感器网络   DV-Hop算法   节点定位

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Study on the Application of DV-Hop Localization Algorithms to Random Sensor Networks

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Abstract

DV-Hop algorithm is one of the important range-free localization algorithms. The algorithm performs better in isotropic density sensor networks, however, it has larger location errors in randomly distributed networks. According to the localization principle of the DV-Hop algorithm, this paper proposes three improvements including the estimation of average single hop distance, the calculation of distance between unknown nodes and reference nodes and the estimation of node positions. These improvements can be used independently or jointly to replace the corresponding steps in the DV-Hop algorithm. The localization performances are analyzed in theory and with simulations. The results show that the proposed improvements can greatly enhance the localization accuracy of the unknown nodes. In addition, the proposed schemes do not change the localization process of the DV-Hop algorithm, and hence they need no further communication resource and additional hardware requirement.

Key words   Sensor network   DV-Hop   Node localization

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