

二次修正误差的 DV-Hop 改进算法

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摘要: 针对 DV-Hop 算法中估算节点间距离和确定未知节点坐标时存在较大误差的问题,提出了一种基于二次修正误差的 DV-Hop 改进算法(Secondary Correction Error DV-Hop, SCEDV-Hop).SCEDV-Hop 算法首先采用多通信半径进行通信,细化节点间跳数值,同时采用正交多项式拟合方法,修正未知节点和信标节点间的估算距离.最后将未知节点与信标节点间的估计距离和距离误差共同作为加权因子构造加权矩阵,采取先相减然后再平方的策略求解定位方程组得到未知节点坐标,并且利用解得冗余信息再一次修正未知节点的位置坐标.通过仿真实验验证, SCEDV-Hop 算法对未知节点进行定位时可以有效降低定位误差,提高定位精确度.

关键词: DV-Hop 定位算法; 正交多项式拟合; 距离误差; 加权矩阵; 冗余信息

The Improved DV-Hop Localization Algorithm Based on Secondary Correction Error

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Abstract: Due to the low localization accuracy of the DV-Hop localization algorithm, this paper proposed an improved DV-Hop localization algorithm based on secondary correction error (Secondary Correction Error DV-Hop, SCEDV-Hop). Firstly, multi communication radius is adopted in SCEDV-Hop to refine the hop value between nodes. Moreover, orthogonal polynomial fitting method, a mathematical model, is taken advantage of to correct the distance error. Then subtraction first and then square, a strategy, is introduced to solve the equations. At the same time, the distance and distance error are taken as weighting factors to construct the weighted matrix to solve the unknown node coordinates. Finally, the redundant information obtained by solving the equations is employed to refine the coordinates of unknown nodes. Simulation experiment result showed that the SCEDV-Hop can effectively decrease positioning error and increase the positioning accuracy.

Key words: DV-Hop localization algorithm; orthogonal polynomial fitting; distance error; weighted matrix; redundant information

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