

基于RSSI混合滤波和最小二乘参数估计的测距算法

作者: 陶为戈, 朱映华, 贾子彦

单位: 江苏技术师范学院

基金项目: 国家自然科学基金项目; 常州市工业科技攻关计划项目

摘要:

针对基于RSSI的无线传感器网络定位测距问题, 在对数-常态分布模型下提出了一种混合滤波及最小二乘环境参数动态估计的测距算法。以锚节点作为参考节点, 采用基于均值滤波、中值滤波和高斯滤波的混合滤波方法优化RSSI值, 运用最小二乘法估计环境参数, 再由盲节点与锚节点的RSSI混合滤波优化值计算二者之间的距离。仿真结果表明, 混合滤波性能优于其它单一滤波方法, 环境参数估计相对误差小于2.5%, 空旷环境下100m范围内测距相对误差小于10%, 满足无线传感器网络定位测距要求。

关键词: 无线传感器网络; 测距算法; 混合滤波; 最小二乘; 接收信号强度指示

A Distance Measurement Algorithm Based on RSSI Hybrid Filter and Least Square Estimation

Author's Name:

Institution:

Abstract:

A distance measurement algorithm based on hybrid filter and least squares environmental parameters dynamic estimation is proposed for RSSI-based wireless sensor network localization in logarithmic normal distribution model. With anchor node as reference node, the RSSI value is optimized by applying hybrid filter based on mean filter, median filter and Gaussian filter. And the environmental parameters are estimated by using least squares method. Then the distance between the blind node and anchor node can be calculated by the RSSI value which is optimized by the hybrid filter. The simulation results show that the performance using hybrid filter is superior to other methods using single filter, the relative error of environment parameter estimation is less than 2.5%, and the relative distance measurement error within 100m in open environments is less than 10%. Therefore the practical requirements of wireless sensor network localization and distance measurement.

Keywords: WSN; distance measurement algorithm; hybrid filter; least squares; RSSI

投稿时间: 2012-08-13

[查看pdf文件](#)