

论文

煤矿井下基于RSSI的加权质心定位算法

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摘要:

针对基于无线传感器网络的矿井灾害无线监测信息系统, 提出了一种基于接收信号强度 (RSSI) 的加权质心定位算法。算法首先动态获取路径衰落指数, 然后通过加权质心算法计算出自身位置。动态获取路径衰落指数实时计算了定位区域下的路径损耗指数, 能够准确反映巷道不同区域对信号衰落的影响, 增强了测距算法对环境的适应能力。加权质心算法通过加权系数体现各参考节点对质心坐标决定权的大小, 提高了定位精度。实验测试表明, 算法提高了定位精度, 计算量小, 定位流程简单, 适合用于煤矿井下环境。

关键词: 加权质心算法; 接收信号强度; 煤矿井下; 人员定位; 无线传感器网络

A weighted centroid localization algorithm based on received signal-strength indicator for underground coal mine

Abstract:

A weighted centroid localization algorithm based on received signal strength indicator (RSSI) was proposed for underground mine disaster monitoring system which based on wireless sensor network (WSN). It firstly accessed to the path of decline index dynamically, and then calculated its own location by weighted centroid algorithm. When it accessed to the path of decline index dynamically, path loss exponent was calculated in location areas which accurately reflects the affect of the signal fading in different tunnel areas and enhances adaptive capacity to the environment of distance detection algorithm. Weighted centroid algorithm embodies the impact of each reference node to the centroid coordinate by weighted coefficients, which improves the accuracy of personnel localization. The experimental results show that the proposed algorithm achieves better positioning accuracy with simple calculation and process, which demonstrates it is suitable for coal mine environment.

Keywords: weighted centroid algorithm; received signal strength indication; underground coal mine; personnel location; wireless sensor network

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