

狭长直隧道环境中WSN的RSSI加权质心定位算法

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摘要：

采用无线传感器网络技术对井下人员和车辆进行准确定位是矿井作业安全保障的重要技术手段，但因井下巷道的空间半封闭特征和无线信号在巷道内传输的多径衰落等原因，使得传统平面和三维定位算法不能完全适用于井下巷道中的移动节点定位。针对这一问题，本文提出了一种改进的基于RSSI加权质心定位算法，该算法在巷道内节点分布模型的基础上，充分考虑巷道内无线传感器网络节点的异构性和移动性，将异构节点最大通信半径引入到权值的分配上，修正了权值。仿真实验表明，与普通的加权质心算法相比，提高了定位精度，且更适用于井下巷道、公路与铁路隧道。

关键词：节点定位；RSSI；加权质心算法；异构节点；狭长直隧道

A Weighted Centroid Localization Algorithm Based on RSSI for Wireless Sensor network in Straight Narrow Tunnel

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Abstract:

Wireless sensor network technology for mine personnel and vehicles is an important technology for accurate positioning means of mine work safety, but because of the space of underground roadway semi-closed characteristics and wireless signal transmission in the tunnel multipath fading, the traditional planar and three-dimensional localization algorithm cannot be fully applicable to the underground tunnel for mobile node localization. To solve this problem, proposed an improved weighted centroid localization algorithm based on RSSI. The algorithm is based on node coverage model tunnel on the tunnel, fully considered with node heterogeneity and mobility, imported heterogeneous node communication radius' influence for the assignment of weights, and adjusted weights. Simulation results show that the algorithm has higher location accuracy comparing with ordinary weighted centroid and more suitable for underground tunnel, highway and rail tunnels.

Keywords: node localization; RSSI; weighted centroid localization algorithm; heterogeneous node; straight narrow tunnel

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