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Localization of Buried People Using Received Signal Strength Indication Measurement of Wireless Sensor

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Abstract : City constructions collapse after earthquake and people will be buried under ruins. Search and rescue should be conducted as soon as possible to save them. Therefore, according to the complicated environment, irregular aftershocks and rescue allow of no delay, a kind of target localization method based on RSSI (Received Signal Strength Indication) is proposed in this article. The target localization technology based on RSSI with the features of low cost and low complexity has been widely applied to nodes localization in WSN (Wireless Sensor Networks). Based on the theory of RSSI transmission and the environment impact to RSSI, this article conducts the experiments in five scenes, and multiple filtering algorithms are applied to original RSSI value in order to establish the signal propagation model with minimum test error respectively. Target location can be calculated from the distance, which can be estimated from signal propagation model, through improved centroid algorithm. Result shows that the localization technology based on RSSI is suitable for large-scale nodes localization. Among filtering algorithms, mixed filtering algorithm (average of average, median and Gaussian filtering) performs better than any other single filtering algorithm, and by using the signal propagation model, the minimum error of distance between known nodes and target node in the five scene is about 3.06m.

Keywords : signal propagation model, centroid algorithm, localization, mixed filtering, RSSI
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