

Error Correction Method for 2D Ultra-Wideband Indoor Wireless Positioning System Using Logarithmic Error Model

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Abstract : Indoor positioning technologies have been evolved rapidly. They augment the Global Positioning System (GPS) which requires line-of-sight to the sky to track the location of people or objects. This study developed an error correction method for an indoor real-time location system (RTLS) based on an ultra-wideband (UWB) sensor from Decawave. Multiple stationary nodes (anchor) were installed throughout the workspace. The distance between stationary and moving nodes (tag) can be measured using a two-way-ranging (TWR) scheme. The result has shown that the uncorrected ranging error from the sensor system can be as large as 1 m. To reduce ranging error and thus increase positioning accuracy, This study purposes an online correction algorithm using the Kalman filter. The results from experiments have shown that the system can reduce ranging error down to 5 cm.

Keywords : indoor positioning, ultra-wideband, error correction, Kalman filter

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