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A Real Time Ultra-Wideband Location System for Smart Healthcare

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Abstract : Driven by the demand of intelligent monitoring in rehabilitation centers or hospitals, a high accuracy real-time location system based on UWB (ultra-wideband) technology was proposed. The system measures precise location of a specific person, traces his movement and visualizes his trajectory on the screen for doctors or administrators. Therefore, doctors could view the position of the patient at any time and find them immediately and exactly when something emergent happens. In our design process, different algorithms were discussed, and their errors were analyzed. In addition, we discussed about a , simple but effective way of correcting the antenna delay error, which turned out to be effective. By choosing the best algorithm and correcting errors with corresponding methods, the system attained a good accuracy. Experiments indicated that the ranging error of the system is lower than 7 cm, the locating error is lower than 20 cm, and the refresh rate exceeds 5 times per second. In future works, by embedding the system in wearable IoT (Internet of Things) devices, it could provide not only physical parameters, but also the activity status of the patient, which would help doctors a lot in performing healthcare.

Keywords : intelligent monitoring, ultra-wideband technology, real-time location, IoT devices, smart healthcare
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