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Indoor Robot Positioning with Precise Correlation Computations over Walsh-Coded Lightwave Signal Sequences

Authors : Jen-Fa Huang, Yu-Wei Chiu, Jhe-Ren Cheng

Abstract : Visible light communication (VLC) technique has become useful method via LED light blinking. Several issues on indoor mobile robot positioning with LED blinking are examined in the paper. In the transmitter, we control the transceivers blinking message. Orthogonal Walsh codes are adopted for such purpose on auto-correlation function (ACF) to detect signal sequences. In the robot receiver, we set the frame of time by 1 ns passing signal from the transceiver to the mobile robot. After going through many periods of time detecting the peak value of ACF in the mobile robot. Moreover, the transceiver transmits signal again immediately. By capturing three times of peak value, we can know the time difference of arrival (TDOA) between two peak value intervals and finally analyze the accuracy of the robot position.

Keywords : Visible Light Communication, Auto-Correlation Function (ACF), peak value of ACF, Time difference of Arrival (TDOA)
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