

Abstract

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Performance of ultralow-power IR-UWB correlator receivers for highly accurate wearable human locomotion tracking and gait analysis systems

In this paper we study low-power impulse radio ultra-wideband (IR-UWB) correlation receivers with suboptimal templates, as a promising candidate for a highly accurate wearable human locomotion tracking system. Such a system is theoretically capable of providing a ranging accuracy of 1mm in practical multipath fading channels at a SNR of 18dB. This ranging accuracy is ten times better than the ranging accuracy provided by currently available systems. Furthermore, we study the theoretical BER and the improved Ziv-Zakai lower-bound on ranging accuracy in AWGN and dense multipath fading channels. We show that low-power is traded for a minimal performance loss for both BER and TOA accuracy.