Abstract: IR-UWB Vital Sign Measurement System for u-Health Care Era

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Abstract

This paper presents a novel respiration rate estimation method based on joint amplitude and time of arrival (TOA) using impulse-radio ultra-wideband (IR-UWB) radar signals. The proposed method utilizes two characteristics of reflected IR-UWB signals. First, both the maximum amplitude and TOA of reflected IR-UWB signals provide the respiration rate information regardless of body movement. Second, the frequency components of respiration are concentrated in a narrowband. Hence, in the proposed method, the convolution of the temporal sequence of the maximum amplitude and that of the TOA is used such that any unexpected frequency components are reduced, thus improving the frequency components of respiration. The analysis results of the measured data show that the frequency components of respiration are improved more than 10dB compared with those obtained using other existing methods.

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