

Abstract

This innovation introduces a contactless vital sign monitoring system utilizing Frequency-Modulated Continuous Wave (FMCW) radar technology. The method in this innovation can detect the heartbeat and respiration simultaneously using one deep neural network. It includes a hybrid architecture of Convolutional Neural Networks (CNNs) and Transformers for feature extraction and a novel customized diffusion model for estimation refinement. Through multi-task learning, the innovation utilizes the correlation between heartbeat and respiration signals and achieves the detection of these two biomarkers. The evaluation showcases precise detection of key ECG points while significantly reducing signal noise, promising groundbreaking advancements in non-invasive vital sign monitoring for health-care and daily life scenarios, with potential implications for remote patient care and health monitoring.

No figure