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Description

Goal:

Although photoplethysmographic (PPG) signals can monitor heart rate (HR) quite conveniently in hospital environments, trying to incorporate them during fitness programs poses a great challenge, since in these cases, the signals are heavily corrupted by motion artifacts.

Methods:

In this paper, we present a novel signal processing framework which utilizes two channel PPG signals and estimates HR in two stages. The first stage eliminates any chances of a runaway error by resorting to an absolute criterion condition based on ensemble empirical mode decomposition. This stage enables the algorithm to depend very little on the previously estimated HR values and to discard the need of an initial resting phase. The second stage, on the other hand, increases the algorithm's robustness against offtrack errors by using recursive least squares filters complemented with an additional novel technique, namely time …