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(54) SYSTEM AND METHOD FOR HEART RATE DETECTION WITH MOTION ARTIFACT REDUCTION

(57) An electronic system (100) for heart rate detection comprising: a random sampling sensor module (10) including a first sensor circuit configured for providing nonuniform random samples below Nyquist rate of a PPG signal (S1), a second sensor circuit configured for providing nonuniform random samples below Nyquist rate of a motion signal (S3), said motion signal being sampled with the same nonuniform pattern as the PPG signal; a heart rate detection module (30) configured for receiving a plurality of said PPG signal nonuniform random samples (S1) and calculating a power spectral density value set based on a Lomb-Scargle periodogram of said PPG signal samples; receiving a plurality of said motion signal nonuniform random samples (S3) and calculating a power spectral density value set based on a Lomb-Scargle periodogram of said motion signal samples; normalizing the calculated PPG and motion signal power spectral density value sets; subtracting the normalized motion signal power spectral density values from the normalized PPG signal power spectral density values; renormalizing the PPG signal power spectral density value set; and calculating a heart rate value (S2) based on the frequency corresponding to a highest power peak of the calculated PPG signal power spectral density value set in a frequency range of interest.

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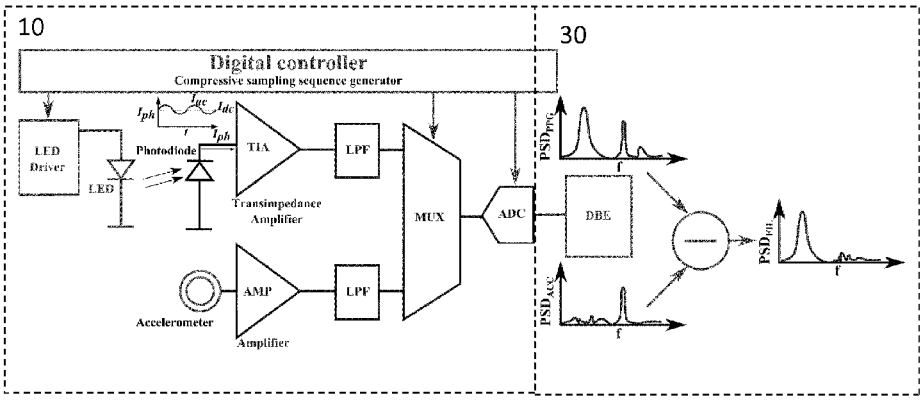
10
30
Digital controller
Compressive sampling sequence generator
LED Driver
LED
Photodiode
TIA
Transimpedance Amplifier
LPF
MUX
ADC
DBE
AMP
Amplifier
Accelerometer
PSD_PPG
PSD_ACC
PSD_HR
f

Figure 3