

Abstract

Recently, Photoplethysmograph (PPG) signal has been widely considered for detecting heart-related diseases. It is because the operational cost of using this signal is relatively lower than other signals, such as the electrocardiogram (ECG). However, PPG signal is very susceptible to noise. Therefore, removing noise from the PPG signal data is a must. In most cases, the noise in this signal is much worse than the ECG signal. In addition, most existing research on denoising algorithms based on PPG signals is incomprehensive due to focusing on single denoising algorithm. This research provides a solution to the problems by proposing a performance study of three denoising algorithms for PPG signals, i.e., Savitzky Golay, Butterworth, and Finite Impulse Response (FIR). Method used to achieve the objective are literature study on denoising algorithms, conduct experiments on the proposed algorithms, measure and analyze the performance of the denoising algorithms based on three metrics, namely Signal to Noise Ratio (SNR), Peak Signal to Noise Ratio (PSNR) and Mean Square Error (MSE). Rigorous experiments have been carried out, and it is proven that Savitzky's algorithm is better than the other two algorithms (i.e., Butterworth and FIR). Savitzky has SNR:17.5 dB, PSNR: 16.80 dB and MSE: 0.19. Meanwhile, Butterworth's performance is SNR: 10.168 dB, PSNR: 9.1 dB, and MSE: 0.3. Finally, the FIR algorithm has SNR: 4.796, PSNR: 16.7, and MSE: 0.2.