Sleep Apnea Detection from ECG Signal based on MLP-NN and GA

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Abstract : Sleep apnea is an important disease and its name is derived from the Greek word. In this disorder, breathing is interrupted frequently during sleep and start again. Interrupting respiration may last for 10 to 30 seconds, leading to a decrease in blood pressure and not getting oxygen to the brain [1]. During apnea, people wake up with a dry mouth, a sweaty body and a headache. These continuous wake-ups do not allow the patient to fall into deep sleep and so these people spend the next day with fatigue and drowsiness [2]. Early diagnosis of apnea can help the patient's health at bedtime, which can prevent heart attacks and strokes. Two signals such as EEG and ECG are usual at this field [3, 4]. This article use ECG signals to detect apnea in bedtime. Proposed method use hybrid model of Multi Layered Perceptron Neural Network (MLP-NN) and Genetic Algorithm (GA) which MLP-NN used for training signal data and GA used for optimizing signal states and mark them. Then some evaluation criteria use for guaranteed proposed approach such as MSE, SNR, PSNR, Accuracy, Sensitivity and Specificity. The results of our research show that this method is very efficient and we can have a performance superiority to previous ones [5, 6, 7, 8].

Keywords: Sleep Apnea Disease; ECG Signal; Biological Signal Processing; MLP-NN, GA.

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