

Systolic and Diastolic Multiclass Classification of PPG Signals using Neural Network with Random Weight

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Abstract:

Photoplethysmography (PPG) signals can be defined as a type of signal which obtained through a noninvasive optical method that contains information of the cardiovascular system such as arterial blood pressure, tissue perfusion, heart rate and respiratory rate. Due to its noninvasive characteristics and independent capability to identify blood pressure, many researches focused on identifying blood pressure using PPG signals. As false peak and point detection can affect estimation of blood pressure significantly, the important first step of identifying blood pressure which is accurate detection of systolic peaks and diastolic points is necessary. However, only peak detection of systolic for Neural network with random weight (NNRW) classifier has been done. Therefore, this research project aims to classify systolic peak and diastolic point through multiclass classification of PPG Signals using NNRW Classifier. The total of 20 features separated evenly for systolic and diastolic act as the input for the classifier and multiclass that act as output are True Systolic peak (TS), False Systolic Peak (FS), True Diastolic point (TD) and False Diastolic point (FD). The generation of confusion matrix aids the evaluation of performance by the classifier. The findings exhibit the convincing overall accuracy and *Gmean* with 99.67 and 99.68 percent, respectively. In addition, the performance of classification on true systolic peak and true diastolic point also obtained 99.72 and 99.95 percent, respectively. The results extracted from experiments show the capability of the proposed approach to identify systolic peaks and diastolic points of PPG Signals..

Keywords: MATLAB; Classification; PPG; Systolic; Diastolic

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