

Abstract

Classification of ECG beats using Neuro-Fuzzy approach is the aim of this work. In other words, feed-forward artificial neural network (ANN) is trained by the back-propagation algorithm in combination with fuzzy logic rules that controls the learning rate by if-then rules. Therefore, faster rate of convergence is achieved by this new designation in comparison with those in literature which they used the traditional back-propagation. On the other hand, Principal Component Analysis (PCA) and Discrete Wavelet Transform (DWT) are two powerful techniques that they used for feature extraction. In addition, Shannon entropy criterion is used for determining the optimal number of coefficients for the above techniques; therefore, dimensionality reduction is achieved. The performance parameters of the system are the CPU-time and the percentage average accuracy. As a result, three classifiers are proposed from this combination: PCA-ANN and DWT-ANN classifiers that they trained by the traditional back-propagation algorithm and DWT-Neuro-Fuzzy classifier with percentage average accuracy 96.83%, 98.59% and 98.68% and CPU-time 9.69, 7.75, and 7.42 seconds respectively.