ECG PEAK RECOGNITION USING ARTIFICIAL NEURAL NETWORK

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ABSTRACT

Electrocardiogram (ECG) is an electrical recording of the cardiac activity which is an indication of the heart status. ECG peak recognition is fundamental for parameter detection or pattern recognition of an ECG signal. Normally a doctor determines the status of the patience's heart by observing the amplitude and duration of the peaks. Since the peaks have complex pattern, manual analysis could become inaccurate. Therefore the objective of this project is to develop an intelligent system to recognize the ECG signals. The input attributes of the neural network include amplitude, interval, pregradient, postgradient and degree of the ECG waveform. The output of the network is type of ECG peak corresponding to the set of input attributes. The selected neural network architecture is the Multilayer Perceptron (MLP) network, which is trained to recognize the peaks. The MLP network is trained with two different types of learning algorithms, namely the Levenberg Marquardt (LM) and the Bayesian Regularization (BR) and with different numbers of hidden neurons and transfer functions. After completion of the training process, the optimum MLP network is tested with a set of test data. Overall results show that the optimum MLP is able to recognized peaks in ECG signals. The MLP which has been trained with LM has given 85.48 % correct recognition from 977 independent test data. It takes 50 epochs to learn a training data consisting of 782 samples. The MLP which has been trained with BR algorithm has given 88.94 % correct recognition from 977 independent test data. It takes 62 epochs to learn a training data consisting of 782

samples. The project demonstrates the feasibility of a neural network system in recognizing peaks of ECG signals.