Classification of Myoelectric Signals Using Multilayer Perceptron Neural Network with Back-Propagation Algorithm in a Wireless Surface Myoelectric Prosthesis of the Upper-Limb

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Abstract : This paper focuses on a wireless myoelectric prosthesis of the upper-limb that uses a Multilayer Perceptron Neural network with back propagation. The algorithm is widely used in pattern recognition. The network can be used to train signals and be able to use it in performing a function on their own based on sample inputs. The paper makes use of the Neural Network in classifying the electromyography signal that is produced by the muscle in the amputee's skin surface. The gathered data will be passed on through the Classification Stage wirelessly through Zigbee Technology. The signal will be classified and trained to be used in performing the arm positions in the prosthesis. Through programming using Verilog and using a Field Programmable Gate Array (FPGA) with Zigbee, the EMG signals will be acquired and will be used for classification. The classified signal is used to produce the corresponding Hand Movements (Open, Pick, Hold, and Grip) through the Zigbee controller. The data will then be processed through the MLP Neural Network using MATLAB which then be used for the surface myoelectric prosthesis. Z-test will be used to display the output acquired from using the neural network.

Keywords : field programmable gate array, multilayer perceptron neural network, verilog, zigbee

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