Technology offer

Motor Neurons Signal Processing Algorithm

Field of use
Human-machine interfaces, Medicine

Current state of technology
Stage of Development:
Available for demonstration

Patent status
PCT patent pending

Developed by
University of Maribor

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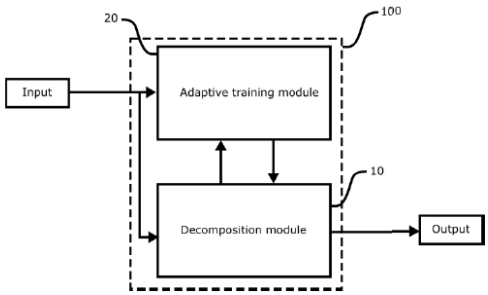

Background

Human-machine-interfaces (HMI) present an invaluable prospect for improving, through advancement of scientific knowledge and development of rehabilitation devices, the lives of millions of people who suffer from various neuromuscular disorders, paralysis and amputations worldwide. In addition, HMI have far reaching applications beyond clinic. Consumer electronics and Internet-of-Things (IoT) devices becoming integral parts of human daily life, HMI also presents the opportunity for humans to control their environment through their thoughts. At the core of every HMI system is a neural interface which taps into motor and sensory pathways to observe (i.e. record) and modulate (i.e. stimulate) the activity of the nervous system. Robust, reliable, accurate, adaptive, high-information throughput and easy-to-deploy neural interface technologies are critical in realising the potential and fulfilling the promises of future HMI.

Description of the invention

Electromyography signal, defined as the electrical activity of muscles, is the result of commands (i.e. electrical activity) sent from brain via a network of specialised cells (i.e. neurons) running through spinal cord and connecting to the muscle fibres. Muscle fibres are the constituting elements of each muscle. Therefore, the EMG signal can mathematically be modelled as the summed electrical activity of muscle fibres (within a muscle tissue) caused by the activity of motor neurons at the spinal cord level. This invention is a device which deciphers the motor neuron activity within the output layers of spinal cord from EMG recordings, hence forming a direct interface with nervous system. In other words, the "Input" to the system is the electromyography (EMG) signal, and the "Output" of the system is the time occurrence of each motor neuron activity constituting the EMG signal.

Main advantages

The invention assures reliable, accurate and adaptive real-time signal processing capability in the most crucial advantage of the invention over the existing methods.

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