Monitoring of Upper-Limb EMG Signal Activities Using a Low Cost System; Towards a Power-Assist Robotic Arm

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Abstract

Many human activities depend on upper-limb motion, which can be characterized and estimated using the activation levels of the electromyography (EMG) signal of the upper-limb muscles. Researchers are devoting much effort to investigating these activities during elbow extension and flexion. Also, a few studies have concluded with the development of a power-assisted arm. However, the systems introduced so far are expensive and there are long waiting lists of people requesting such systems. The aim of the present work is to develop a power-assist arm based on the EMG signal activities of the upper-limb, and this paper describes the first part of this study focusing on the monitoring of EMG signals during upper limb activities based on the development of a low-cost system. The relationship between elbow motion and the activity level of the biceps muscle is characterised using relevant extracted features (RMS and STD). The new low-cost system is then validated against the Biopack specialised biomedical measurement system.

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