Research on Upper-Limb Exoskeleton Using Proportional Myoelectric Control for Assisting Rehabilitation and Physiological Information Monitoring

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Abstract

An upper-limb power-assist exoskeleton actuated by pneumatic muscles using proportional myoelectric control will be constructed. An experiment protocol is established, including collecting the EMG signals and the elbow angle, which is used for recording data for the following experiments. With the feature extraction procedure and the classification (back-propagation neural network), an EMG-angle model is built for pattern recognition. The angle that is predicted could be transferred to the control signals of the actuators (pneumatic muscles) according to the corresponding equations. The mapping from the input signal (EMG signal) to the output signal (voltage value) is set up. The upper-limb power-assist exoskeleton’s control scheme and the power-assist effectiveness will be evaluated and compared in some experiments.

On the other side, some sensors to monitor users’ physiological information like heart rate, temperature and blood pressure will be fixed on the exoskeleton. According to sensor networks, the data are monitored remotely by terminals, like mobile or PC.

References


