sEMG Classification and Prosthetic Hand

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In this day and age, The EMG Robot Prosthetic Arm is available in 14 hand gestures and is worth tens of thousands of dollars. Therefore, it is difficult to provide free support to people with disabilities in the country. I aimed to make a prosthetic hand for less than $ 500. and I chose 9 kinds of hand movements that require human beings to live. This study is the design and manufacture of 'Robot Arm' and 'EMG signal Estimation Algorithm'. The Robot Arm was made similar to the size of an adult's arm. and I used openCM9.04c (32bit) as the control board of the 'Initial Robot Arm Prosthesis'. I developed a control program called "Miracle EMG Viewer" with python to use the functions needed for robot arm prosthesis research. The EMG signal generated by hand movement were extracted and stored by using the control program. The EMG sensor used in this study is 2-channel PSL-iEMG2. In addition, wet electrodes attached to the body to detect EMG signals. The 'EMG signal Estimation Algorithm' was designed and programed to move the robot hand according to the classified EMG signal. mathematical methods (FFT, OLS, machine learning) were applied to the algorithm to reduce data storage for the classification of surface EMG signals. I have measured success rates for 2 month. I have found four motion signals that can be distinguished, Robot hand motion test according to the EMG signal showed that the robot hand operated correctly at a rate of about 70%.

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