

基於肌電圖之機械臂定位控制

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摘要

肌電圖 (Electromyography, EMG) 是一種在肌肉收縮過程所產生的生理訊號，經常被應用在義肢或是復健上。為了探討使用者移動的意圖，以肌電圖做為義肢或機器的控制命令，是非常直接且直覺的方式。由於肌電圖有不確定性、非線性以及時變的特性，因此我們使用類神經網路去分析肌電圖的訊號以找出肌電圖以及手臂角度的關係。我們利用二頭肌的肌電訊號並採用 MAV(mean absolute values) 的特徵值做為分析前臂運動的訊號。在本篇論文中，我們發展出了基於肌電圖定位機械臂的系統，同時也利用 Labview 設計了一套人機介面來整合訊號擷取以及機械臂的控制。

EMG-based Robot Regulation Control

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The logo of National Chiao Tung University is a circular emblem with a gear-like outer border. Inside the circle, there is a stylized building with the letters 'E', 'S', and 'A' on its facade. Below the building, the year '1896' is inscribed. The word 'Abstract' is overlaid in the center of the logo.

Abstract

Electromyographic (EMG) signal, generated due to muscle contraction, is often used for rehabilitation devices. As an indicator for human motion intention, it is quite intuitive to use the EMG as the command for robot or prosthesis control. However, EMG signals are inconsistent, nonlinear, time varying and uncertain. To deal with these properties, we propose using the neural-network to find out the relationship between EMG and the joint angle of the elbow. As the forearm movement is tackled, we measure EMG from biceps muscle and mean absolute values (MAV) as the feature. An EMG-based robot regulation control system is developed with a user-friendly interface.