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Experiment on arm rehabilitation for muscle contraction monitoring using LabVIEW-based system

Abstract

Patient that experiencing stroke or accident will leads to arm muscle paralysis and they could either suffer from partial arm paralysis or total arm paralysis. However, one of the challenge is to make the treatment session performs better. Currently, the patient has to go to rehabilitation centres or hospitals to get the treatment as the rehabilitation device is not portable. Furthermore, they have to go back and forth for recuperation session as accommodation or other facilities are not provided at certain rehabilitation centres. Therefore, the arm rehabilitation for muscle contraction monitoring system is developed to lessen the above issue. This project is focusing on patient's arm mobility to heal and maintain the strength of affected muscle. Thus, the doctor will be able to observe the patient's upper limb arm activity in real time monitoring using the Labview application. This system could assist the doctor to diagnose and analyse the current patient's arm performance from the recorded data. The parameters such as patient's hand grip, distal phalanges, elbow motion and bicep muscle contraction will determine the level of grip, the movement and the contraction activities via input from Arduino interface. Experiments have been conducted on 25 volunteers from different categories such as gender, age and physical condition based on proposed parameters. The results show that the development of arm rehabilitation for muscle contraction monitoring system could be used to determine the patient's condition based on the activity of finger gripped, muscle arm contraction and hand movement values as well as to strengthen the patient's arm throughout the rehabilitation process.