MECHATRONICS BOOK SERIES SYSTEM DESIGN AND SIGNAL PROCESSING

VOLUME 1

Editors
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CONTENTS

CHAPTER 18

Development of Robotic Manipulator to Assist Human by Using Brain Signal

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18.1 Introduction

Nowadays, technologies play main role in a life of human. Every day we can hear new invention for new technologies so that it can help many people for any works. And, now people are trying to develop new technologies which can help improve disable peoples' life style [1]. According to the research made by Peter Tan from Peer Counselor of Kuala Lumpur Independent Living Centre, there are almost 197,519 disabled people and they need other people to help them to do their routine life. Some of these people are inherited their disability from their parents, some are paralyzed due to accident, health and many more. People who are paralyzed or have other severe movement disorders need alternative methods for communication and control [2]. Currently available augmentative communication methods require some muscle control. Whether they use one muscle group to supply the function normally provided by another (e.g., use extraocular muscles to drive a speech synthesizer) or detour around interruptions in normal pathways (e.g., use shoulder muscles to control activation of hand and forearm muscles), they all require a measure of voluntary muscle function [3]. Thus, they may not be useful for those who are totally paralyzed (e.g., by amyotrophic lateral sclerosis (ALS) or brainstem stroke) or have other severe motor disabilities [4]. These individuals need an alternative communication channel that does not depend on muscle control. They need a method to express their wishes that does not rely on the brain's normal output pathways of peripheral nerves and muscles.

Robotic arm is one of the technologies that have already developed early in 1954. As mentioned in Saeed B., "Robots are very powerful elements of today's industry. They are capable of performing many different tasks and operations precisely and do not require common safety and comfort elements human need" [6-7].

18.2 System Design of Electroencephalogram Signal Acquisition

EEG signal is one of the methods that can bring a lot help to improves others live in the future especially the disable people due to accident, paralyses, inherited or many more. By doing this project, I would like to make sure that all my objectives are successful. In order to make it run smoothly I try to figure out what is best solution that I might need to improves this project.

This development has been divided into two parts: Construction of robotic arm and Brain Signal processing by using EEG signal processing and biomedical data processing. The first part of the project, Construction of robotic arm is being covered by the other project member. This report basically focuses on Brain Signal processing using EEG signal processing and biomedical data processing. Fig. 18.1 represents the block diagram of signal conditioning.