AN AUTOMATIC RECOGNITION OF STRESS LEVEL VIA AN EEG

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ENDORSEMENT

I hereby acknowledge that I have read this report and I find that its contents meet the requirements in terms of scope and quality for the award of the Bachelor of Electronic Engineering Technology (Medical Electronic) With Honours

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DECLARATION

I hereby declare that the final year project book is an authentic record of my own work carried out of one year Final Year Project for the award of Bachelor of Electronic Engineering Technology (Medical Electronic) With Honours, under the guidance of Engr. Hjh Wan Rosemehah Binti Wan Omar from 7 September 2015 to 01 June 2016.

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ABSTRACT

Stress is a body's way of responding to any kind of demand or threat and occurs when pressure exceeds our perceived ability to cope. When threatened, nervous systems feel responds by releasing a flood of stress hormones, including adrenaline and cortisol, which rouse the body for emergency action. Even though, most stress suffer negative effect which affects lifestyle and human feeling such as tension, anxious, angry and frustrated. Besides, stress can be quantified from human bio-signals such as Electroencephalogram (EEG). Among these bio-signals, the changes in Autonomous Nervous System (ANS) due to stressors can be apparently and effectively represented by EEG signals. The purpose of this study was to recognize the stress level based on brain signal using an electroencephalogram (EEG). A total of 22 Politeknik Sultan Salahuddin Abdul Aziz Shah (PSA) semester 2 students from different departments participated in this research. Experimental approach was undertaken to assess student's stress level. The approach was divided into two sections; Management and Laboratory. A set of Depression Anxiety Stress (DAS21) questionnaire was distributed to students for management analysis. Besides the questionnaire based method, features from EEG signals were used for the laboratory setup during two cognitive states; Closed-Eyes (CE) and Open-Eyes (OE) protocol. The EEG was recorded which include Fp1 channel for the left brain, Fp2 channel for the right brain, Fpz for the ground, A1 and A2 earlobes as a references. EEG data were analyzed using MATLAB software consisting of band-pass Fast Fourier Transform (FFT) filtered to eliminate any influences of artifacts in the alpha (8-13Hz) and beta (13-30HZ) ranges. As a result, stress level or pattern can be indicated by high Beta power and low Alpha power at the Frontal Lobe of human brain. Finally, Visual Basic was used for automatic recognition to display the results.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Many people suffer from stress in daily life. While there is a close relationship between stress and mental health (emotions such as anger, anxiety, and depression), can also have effects on physical health.

Stress also influences the desire to study, performance at campus, and one's general attitude towards life. Student stress is defined as an uncomfortable feeling, negative emotion such as anger, anxiety, pressure and disappointment sourced from their work aspects as a student. For this matter, stressed student is someone with their uncontrollable emotion towards changes in campus culture which requires a student to give hundred percent's their commitment, and at the same time, student have to manage their daily life. Student have to study more, doing the assessment and coursework also prepare to final examination.

Normally, high level of stress will lead into study unsatisfactory, class absentee, and delay the coursework. Stress adapting reactions of a student includes psychological reactions (anxiety and sadness), physiological (headache, high blood pressure) and attitude related (alcohol and smoking addiction, lifestyle and insomnia).

Furthermore, bad studies environment will lead into stress factor and causing result for GPA and CGPA (Cumulative Grade Point Average).

The basis of this study is to recognize the level of stress experienced by Politeknik students. Experimental approach has been undertaken to assess students stress by questionnaires for demography, analyze via an EEG and intepretated by MATLAB software. Then, design by Visual Basic has been used for automatic recognization to display the result.

1.2 Problem Statement

Nowadays, there is a lot of students in Higher Education Institution (IPT) with different field of study. As a student, may feel stress on their daily life to get better result affected many factors such as a lot assessment to submit or during an examination period. Due to this reason student will become so pressure and will lead to mental problem if are over stress. This situation will affect their body either physically or mentally, especially in their brain condition. Therefore, to recognize the level of stress, EEG signal processing was proposed in this study.

1.3 Objective

The main objective of this research is to develop an Automatic Recognition System of Stress Level via an EEG, in order to achieve this research, the sub objective consists of:

1.3.1 To collect an EEG signal

1.3.2 To investigate the characteristic of human brain memory

1.3.3 To analyze the brain signal

1.3.4 To validate system of stress signal

1.4 Scope of Project

This study was done to screen the level of stress among full-time students in Polytechnics Sultan Salahuddin Abdul Aziz Shah, Shah Alam. The target sample for this survey comprised all the full-time students according to semester 2 students, various Cumulative Grade Point Average (CGPA) and different Department of studies. Addition, this study used questionnaire and laboratory test to recognize the level of stress. This study was carried out in one year period.

1.5 Importance of Research

This study is to analyze the brain signal by using EEG and to recognize the level of stress experienced by Polytechnic students. EEG was proposed in this study because it is non-invasive thus no painful and better results. Besides, a system of stress signal has been developed by using Visual Basic to validate the system.

Figure 1.1: The Importance of Research

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