

Initial Result of Body Earthing on Student Stress Performance

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Abstract—The body earthing technique is a kind of method that can neutralize our positive charge and negative charge in our body by connecting to the earth. It is believed that body earthing gives a positive effect on human body. There is a possibility that EEG signals can verify the positive effect of body earthing. The experiment of body earthing is done by attaching the patched kit to the hand of the subjects. Then, low voltage of multimeter was used to measure the body voltage of the subjects and EEG signals were collected. After that, the collected EEG data were processed by Band-pass filter in MATLAB to filter out the Alpha and Beta frequency bands separately. The threshold of signal amplitude was set to $-100\ \mu\text{V}$ to $100\ \mu\text{V}$ in order to remove the noise of the signals. Next, the Power Spectral Density (PSD) graphs of each EEG signals were plotted and the maximum points of each signal were recorded. Then the peak points were plotted in a histogram to see the changes of the Alpha and Beta band signals. Lastly, the results of before the body earthed and after body earthed were compared through the histogram plotted. It is observed that, before the body earthed, the Alpha-band is low, while the Beta-band is high. Then after body earthed, the Alpha band increased, while the Beta band are decreased.

Keywords—body earthing; stress; EEG signal; PSD

I. INTRODUCTION

The Earth has many negatively charged free electrons [1]. When humans are direct connected to the earth, the free electron from the earth will be conducted in the body. This process is called body earthing. The function of body earthing is to balance the positive charge produced in our body cell in order to maintain the neutral of the body. Throughout history, humans were naturally absorbed the negatively charge by direct connecting to the surface of the earth. However, the modern lifestyles of humans have insulated themselves from grounding to the earth by wearing of the insulated products such as plastic shoes and mattress that is totally isolated the body to the ground. Body earthing is claimed can help to reduce stress [1].

A hectic lifestyles easily cause people to feel stress. Too much workload and need to be resolved in the short term also contributes stress to human. There is a positive stress and negative stress [2], but in this paper will be discussed a

negative stress. Prolonged stress can affect human in mental, physical and emotion [3]. The symptom of stress are headaches, pain back of neck and sleep disturbance [4].

Stress is a state of mental tension and worry caused by the problems in our life and work. Generally, the stress people will have symptoms like anxious, moody, short temper and others. Nowadays, the students are getting more stress due to the tight schedule of their study and a lot of quiz, assignment, project and examination. Subsequently, the student received pressure from family and community to get the best grades. Meanwhile, they also do not take care of their health. The unbalanced charge inside the human body may be one of the reasons that students getting stress easily throughout the day. Direct contact between the human and the earth reduce the induced voltage to human body [5]. This connection can be done by using conductive adhesive that usually patch on feet, conductive wire attached on body while sleeping or daily activities and barefoot while walking [1, 2].

It has been reported that EEG signals can be used to measure the stress levels [6]. The EEG signals are the signals that are generated by our brain. These EEG signals can be categorized into four bands of different frequency, such as Delta, Theta, Alpha and Beta bands. The frequency of EEG signals is different in each band such as Delta range from 0.5 Hz to 4 Hz, Theta range from 4 Hz to 8 Hz, Alpha range from 8 Hz to 13 Hz and Beta range from 13 Hz to 30 Hz. Usually, the Beta band is detected in active, busy, active concentration and alert people, while the Alpha band is detected from people in relaxation condition. Other than that, the Theta band is detected at drowsiness in older children and adult. Furthermore, the Delta band is mostly found in adults slow wave sleep.

The Patch kit is the body earthing product that can reduce the charge of our body. One end of patch kit is attached to the body part while one end is connected to a grounded wall outlet or ground rod [7]. Emotiv EPOC is a high resolution, multi-channel, wireless neuroheadset [8]. It consists of total 16 electrodes, while 2 electrodes are used as a reference. In addition, it got a Bluetooth USB adapter and the saline solution. The placement of the electrodes is based on the method of 10/20 international placement system. In the 10/20 international placement system, the electrode sites are labelled