ATTENTION MONITORING WITH ELECTROENCEPHALOGRAPHY AND ARTIFICIAL NEURAL NETWORK

Uduwila Arachchi Charitha Senarathne

(139102N)

University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
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Department of Computational Mathematics

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Declaration

I declare that this dissertation does not incorporate, without acknowledgment, any material previously submitted for a Degree or a Diploma in any University and to the best of my knowledge and belief, it does not contain any material previously published or written by another person or myself except where due reference is made in the text. I also hereby give consent for my dissertation, if accepted, to be made available for photocopying and for interlibrary loans, and for the title and summary to be made available to outside organization.

Name of Student
Charitha Senarathne

Signature of Student
Date:

University of Moratuwa, Sri Lanka.
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Supervised by
Prof. Asoka S. Karunananda

Signature of Supervisor
Date:

Abstract

It's a well-known fact that people lose attention without notice in many instances. Learning is one of them. If we remain attentive in whole leaning process, it will certainly improve our learning efficacy. If there is any possibility to identify whether we remain attentive during learning process and remind us when we lose the attention, then we can certainly improve our learning effect. In this research, monitoring EEG signals with ANN technology is used to identify whether student remain attentive during learning process.

In normal classroom environment, observation is the main way to identify whether student is attentive to the lecture. However, this needs huge effort from teacher to monitor the students. Distance learning is popular among current society, in that case it is rather difficult to use standard methods like observation to monitor the attention. Neurons in our brain are always active and emit electric pulses all the time, hence we can use those to measure the level of attention in above scenarios.

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A research has been conducted to monitor attention in a particular task by a person and to signal the person immediately so that he/she can get the mind back to the task. The solution will collect the EEG data from subjects and transformed them in to frequency domain using Fast Fourier Analysis (FFT). These data are used to train an Artificial Neural Network (ANN) regarding known EEG wave patterns of attention and monitor the current EEG wave forms in a prescribed time interval. Upon receiving the current wave pattern, it will be fed in to the trained neural network and detect whether the person has lost the attention. Then it will generate a vibration alert to the mobile phone if the attention has been lost.

The solution has been tested with in a classroom scenario with 20 students and results shows that 75% of students were able to get back to the class in few seconds.

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