PROJECT ID: 730R

Stress detection in learning STEM subject among primary school student by using EEG Signal

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ABSTRACT

Stress in learning Science, Technology, Engineering and Mathematics (STEM) subjects has become crucial among students in Malaysia. Malaysia education Blueprint in 2020 reported that Malaysia has scored at the lower ranked in programme for international student assessment (PISA) for mathematics and science test. Thus, this research study aims to provide sufficient proof of correlation between STEM topic questions and stress levels through emotion detection during the test time. The research was conducted according to a conventional methodology for an EEG machine. Mel-Frequency Cepstral Coefficients (MFCC) will be used to extract features from the data, and MLP will be used as a classifier. The result of this study shows that, low grade students tend to have low stress level compared to medium and high-grade students. This research may benefit the students, teachers, parents to have an early detection for stress level among primary school students especially in learning STEM subjects.

PROBLEM STATEMENT

Science, technology, Engineering, Mathematics called as STEM are the most important subject for students to do well in school. Unfortunately, most of the students are struggling to cope with these subjects. In 2018, 45.2% of secondary students (aged 17) in Malaysia were enrolled in STEM but that percentage has declined to 43.7% in 2019. STEM education does not only help students who plan to go into STEM careers. Students can build mental habits that will help them succeed in any field by focusing on logical thought processes and problem-solving. The problem in this research study is to find out either STEM subject might cause stress or not.

RESEARCH OBJECTIVES

- Identify the level of Stress among primary school students towards STEM.
- Analyse the correlation between emotion and stress among primary school student by using neural networks.

RESEARCH SIGNIFICANCE

This research can help the students to identify their motivation and interest towards STEM subjects and help the teacher and parents to understand more the student's ability in learning STEM. In addition, the execution of computing techniques used can measure stress among primary school students in learning STEM.

RESEARCH PROTOCOL

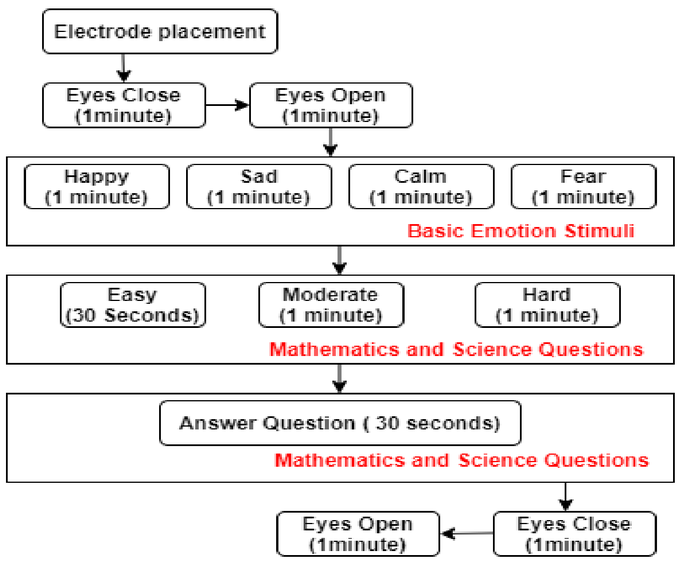

Figure 1 Experimental Design

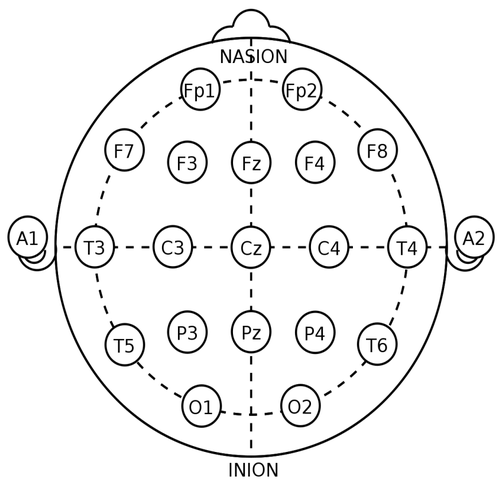

Figure 2 Electrode Placement

CONCLUSION

Our analysis of the result shows that, the lowest grade students are having positive (+ve) valence and arousal which shows happy emotion. While intermediate scorer subjects are having both positive (+ve) and negative (-ve) valence which shows fear emotion. High grade students having stress due to high expectation to score high in exam but still manage to answer questions correctly.

Future Work

we'll also be looking towards analyzing more data, since more data will lead to a more accurate and consistent outcome. Finally, we'll compare stress levels and early detection of anxiety among STEM students.

METHODOLOGY

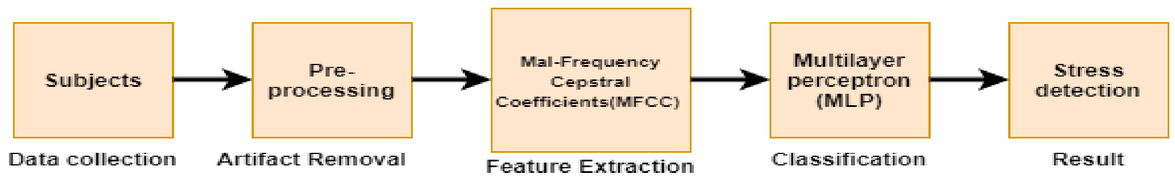

Figure 3 Data Analysis Process

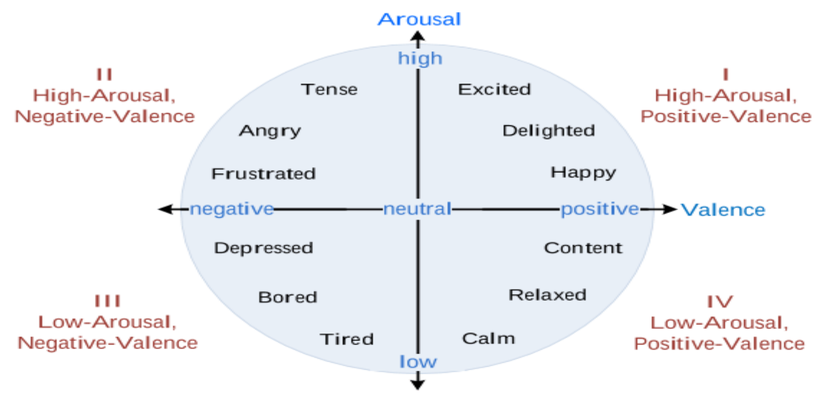

Figure 4 Russel's Model Of Affect

RESULT ANALYSIS

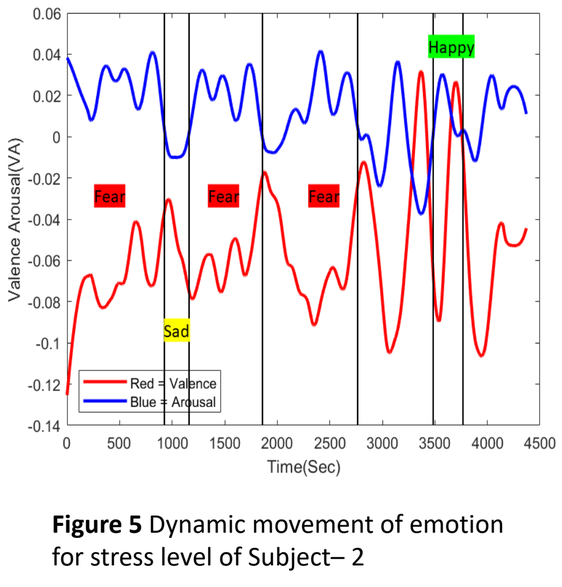

Figure 5 Dynamic movement of emotion for stress level of Subject– 2

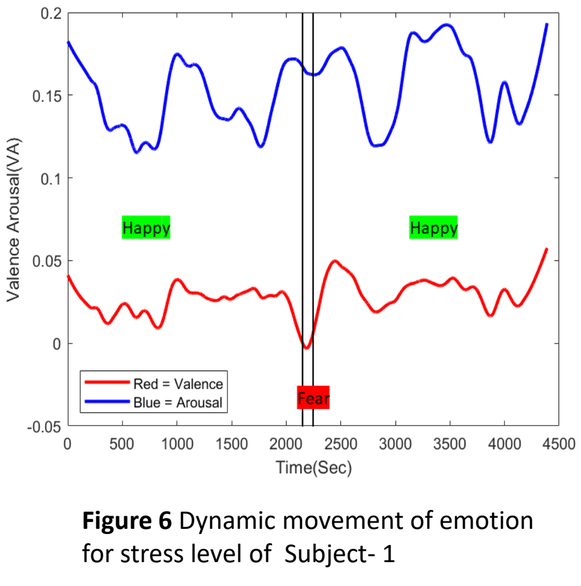

Figure 6 Dynamic movement of emotion for stress level of Subject- 1

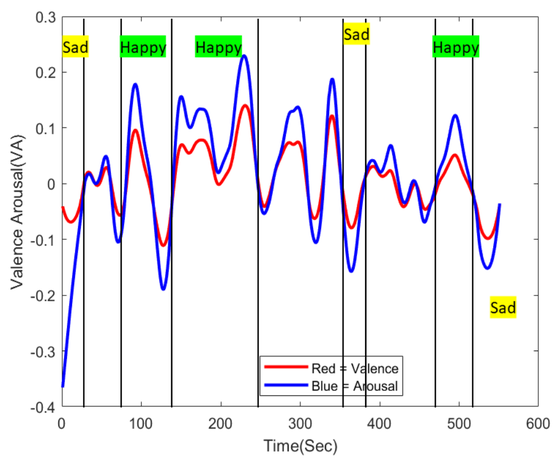

Figure 7 Dynamic movement of emotion for stress level of Subject- 7

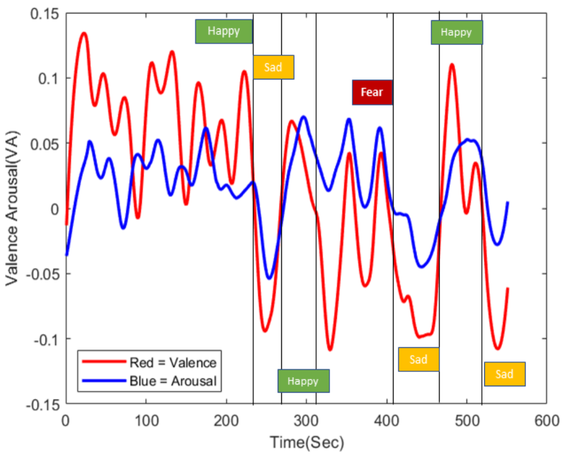

Figure 8 Dynamic movement of emotion for stress level of Subject-5

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[2] Russell, J. A. (1980). A circumplex model of affect. *Journal of personality and social psychology*, *39*(6), 1161.

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