EEG-BASED MENTAL REHABILITATION FOR WAR-AFFECTED ARMED FORCES

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The understanding of human emotions for developing applications is new avenue in human computer interface. In Sri Lankan context military troops and other individuals involved in war are generally suffering from post-war negative mental conditions. Although different types of rehabilitation programs are being conducted currently, Brain Computer Interface technology, which was at first used for disabled people, is today used for entertainment, memory capacity improvement, brain activity development of healthy people. Gaming is one application of this concept. Thus, Brain Computer Interface technology could be effectively utilized in the process of mental rehabilitation for war-affected armed forces and individuals with emotional control disabilities. In this research, we separate one emotion and use as a parameter which represented in the game. This separated parameter is not merely parameters but which logically connects with the real-life characteristics, which will assist the subjects to control emotion in critical situations. By practicing this game, subjects will be trained to eliminate negative emotions. Detection of emotions during gaming is the basic concept behind the mechanism. There is the use of emotion for therapeutic aspects and training elimination of negative emotions though BCI game has never been done before. Therefore, the previous literature available is relatively less in this area. In this research, we focus on identifying human emotion, anger as the negative emotion with wireless 16 biosensor EEG head set and use anger driven game for monitoring the ability to self-control the emotion; furthermore, statistically comparison is done between efficiency of detecting anger and relatively low electrode number and a few features. In this paper, it is discussed how anger can be separated from other closely coupled emotions like frustration and sadness. The results will conclude the best feature excretion method for emotion separation and best combination of electrodes for emotion anger. Finally, we statistically analyse the effectiveness of real time EEG based Game which will help people identify negative emotions as quickly as possible when it occurs, and train them to eliminate such blocking emotions and possibility to use this as a tool to help patients effectively.

Keywords: *Anger Detection, Brain Computer Interface, EEG, Emotion Classification, Feature Selection*