

A Real Time Set Up for Retrieval of Emotional States from Human Neural Responses

Authors : Rashima Mahajan, Dipali Bansal, Shweta Singh

Abstract : Real time non-invasive Brain Computer Interfaces have a significant progressive role in restoring or maintaining a quality life for medically challenged people. This manuscript provides a comprehensive review of emerging research in the field of cognitive/affective computing in context of human neural responses. The perspectives of different emotion assessment modalities like face expressions, speech, text, gestures, and human physiological responses have also been discussed. Focus has been paid to explore the ability of EEG (Electroencephalogram) signals to portray thoughts, feelings, and unspoken words. An automated workflow-based protocol to design an EEG-based real time Brain Computer Interface system for analysis and classification of human emotions elicited by external audio/visual stimuli has been proposed. The front end hardware includes a cost effective and portable Emotive EEG Neuroheadset unit, a personal computer and a set of external stimulators. Primary signal analysis and processing of real time acquired EEG shall be performed using MATLAB based advanced brain mapping toolbox EEGLab/BCILab. This shall be followed by the development of MATLAB based self-defined algorithm to capture and characterize temporal and spectral variations in EEG under emotional stimulations. The extracted hybrid feature set shall be used to classify emotional states using artificial intelligence tools like Artificial Neural Network. The final system would result in an inexpensive, portable and more intuitive Brain Computer Interface in real time scenario to control prosthetic devices by translating different brain states into operative control signals.

Keywords : brain computer interface, electroencephalogram, EEGLab, BCILab, emotive, emotions, interval features, spectral features, artificial neural network, control applications

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020