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Machine Learning and Validity of Binaural Beat Protocols: Trainability and Interpretability

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Abstract

Statement of the Problem: Binaural beat (BB) is a form of sound wave therapy in which both ears received sounds of slightly different frequencies, yet auditory cortex perceived as a single signal [1]. BB therapy is provided in frequency ranges corresponding to electroencephalogram (EEG) bands (theta, alpha, beta, and gamma). Studies have shown benefits of different types of BB therapy for treatment of anxiety, depression, mood, and memory [1-4]. Studies used different cognitive and EEG tests for studying psychological and neurological changes following BB stimulation [3, 4]. However, the unknown mechanism of BB therapy is a challenge for end users to implement BB in clinics [5]. The unknown mechanism might be due to lack in validation processes. In this study, machine learning and regression analysis was applied to study the neurological and psychological changes.

Biography:

Muhammad Abul Hasan received his PhD in Biomedical Engineering from University of Glasgow, UK in 2014 while MEng and BEngg degrees from NED University, Pakistan. He is a CO-PI of neurocomputation lab funded by Higher Education Commission under National Centre for Artificial Intelligence, Pakistan. He is working on neuromodulation using central and peripheral stimulation for cognitive enhancement (improving peak performance), pain management using non-invasive technologies, neuro-rehabilitation, and signal processing.

Speaker Publications:

1. Huang L, and Charyton C. (2008). "A comprehensive review of the psychological effects of brainwave entrainment". Altern Ther Health Med. 14 (5), 38–50.
2. Chaieb L, Wilpert E, Reber T, and Fell J. (2015). "Auditory beat stimulation and its effects on cognition and mood states". Front Psychiatry 6, 1-9.
3. Gao X, et al. (2014). "Analysis of EEG activity in response to binaural beats with different frequencies". Int J Psychophysiol. 94 (3), 399–406.
4. Goodin P, et al. (2012). "A high-density EEG investigation into steady state binaural beat stimulation". PLoS One 7 (4): 1-8.
5. Jirakittayakorn N, and Wongsawat Y. (2017). "Brain responses to a 6-Hz binaural beat: effects on general theta rhythm and frontal midline theta activity". Front. Neurosci. 11, 1-11.

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