Decision-making analysis using arduino-based Electroencephalography (EEG): an exploratory study for marketing strategy

ABSTRACT

Business technology has brought conventional marketing methods to the next level. These emerging integrated technologies has contributed to the growth and understanding of the consumer decision making process. Several studies have attempted to evaluate media content, especially on video advertising or TV commercials using various neuroimaging techniques such as the electroencephalography (EEG) device. Currently, the use of neuroscience in Malaysia's marketing research is very limited due to its limited adoption as an emerging technology in this field. This research uncovers the neuroscientific approach, particularly through the use of an EEG device; examining consumers' responses in terms of brain wave signals and cognition. A proposed theoretical framework on the factors affecting visual stimulus (movement, color, shape, and light) during the decision-making process by watching video advertising had been customized using two conceptual models of sensory stimulation. Ten respondents participated in the experiment to investigate the spectral changes of alpha brain wave signals detected in the occipital lobe. A 2-channel Arduino-based EEG device from Backyard Brains and Spike Recorder software was used to analyze the EEG signal through Fast Fourier Transform (FFT) method. Results obtained from the investigated population showed that there was statistically significant brain wave activity during the observation of the video advertising which demonstrated the interconnection with short-term memory through visual stimulus. Application of the neuroscience tool helped to explore consumer brain responses towards marketing stimuli with regards to the consumers' decision-making processes. This study manifests a useful tool for neuromarketing and concludes with a discussion, together with recommendations on the way forward.

Keyword: Arduino-based electroencephalography (EEG); Neuromarketing; Short-term memory; TV commercials; Visual cognition