

ABSTRACT

Indonesia ranks first in the world for the highest number of online gamers in the age range of 16-64 years, with a high rate of problematic gamers. This condition warrants attention, considering the growing trend of gaming behavior, which is linear with the negative impacts. Electroencephalogram (EEG) signals offer a robust, non-invasive approach to analyzing the brain activity of gamers and are often used in neuroscience to examine cognitive functions quantitatively. Event-related potential (ERP) is one of the components of EEG that can assist in analyzing brain responses to stimuli. However, not all parts of the brain represent ERP from the brain activity of gamers. It necessitates channel selection by identifying the most relevant channels. There are three testing scenarios: without channel selection, using baseline metaheuristic algorithms, and hybrid metaheuristic algorithms by combining each method from the baseline metaheuristic algorithms with Binary SFS. The channel that has been selected will be carried out feature extraction with two features used, MaxPeak and Power. The last step is classification using Logistic Regression and Voting Classifier. The test results prove that the hybrid metaheuristic algorithm improves accuracy, sensitivity, specificity, and computation time more effectively than regular metaheuristic algorithms. Channel C3 and C4 are the most dominantly selected channels by baseline and hybrid metaheuristic algorithms.

Keywords: Problematic gamers, Electroencephalogram (EEG), Metaheuristic algorithm, Event Related Potential (ERP)