

ABSTRACT

Playing games is one way to fill your spare time when not doing something, not only that playing games can also be a solution to relieve stress. Playing games in a certain period of time will certainly affect the condition of one's brain waves. Human brain waves must undergo changes when under normal conditions and when doing activities, in this case playing games.

In this final project, an analysis of the alpha and beta waves of the human brain has been carried out when under normal conditions and when playing the game, which provides a comparison of the two conditions and shows the desired analysis results. Respondents' brainwaves were taken using 4-channel Electroencephalograph (EEG) by utilizing the Principal Component Analysis (PCA) method when under normal conditions and playing the game. The PCA method used has an orthogonal transformation statistical procedure to convert several correlated observations into a collection of uncorrelated linear values. The signal identification method uses the K-Nearest Neighbor (K-NN) classification. K-NN is a method of classification of objects based on training data that has the closest distance to the object.

The result of this study obtained of differences in alpha and beta signals of a persons brain when in normal conditions and playing games and determine which channels and features are the most effective to use, namely TP9. The test result obtained show an average accuracy of 94,44% for both types of signals. The result of the signal from comparison show that under both conditions, alpha signals are more likely to appear in brain signals and in their complexity, the most complex game play conditions compared to normal conditions. The highest accuracy of the alpha signal in the TP9 channel with 94,44% and for beta signal in the AF8 channel with percentage of 96,29%. Percentage accuracy of test data obtained by 73,61% after testing with TP9 channel.

Keywords: *Playing game, EEG, Alpha, Beta, PCA, K-NN, Eigen Value.*