

Effect of driving duration on eeg fluctuations

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Abstrak

Road accident is a leading problem in Indonesia that increases every year. Based on previous studies, mental fatigue is one of the biggest sources of road accident, that is majorly affected by mental workload. Driving duration is one of factors that triggers mental fatigue. Previous literature stated that Electroencephalogram (EEG) measurement is a gold standard to measure fatigue. However, there was limited study that addressing EEG indicators that affected by driving duration, and the previous research still had disagreements regarding the best EEG parameter to measure fatigue. Therefore, this study aimed to evaluate driving duration effect towards EEG fluctuation and determine the best EEG parameter related to fatigue. Seven participants were asked three hours driving in medium fidelity simulator. One-way ANOVA and correlation analysis were performed on the analysis to measure the effect of driving duration towards EEG indicator and determine the correlation of indicator. Receiver Operating Characteristics (ROC) curve was also utilized to determine the best variable that correlates with subjective sleepiness indices. The results showed that in the end of 3 hours driving, there was an increment of delta and theta activities, followed by decrement of alpha and beta activities. In addition, the correlation of all bands were significant, with positive result of alpha-beta band and theta-delta band, and negative result towards each other. Furthermore, results from Receiver Operating Characteristics (ROC) curve showed that RPR of theta, RPR of alpha, and ratio of α/β as the best indicators among others, that had accuracy of high degree (above 85%).