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Poster Presentation

Driver Cognitive Fatigue Detection Based on Changes in EEG Frequency Bands in Non-Professional Drivers During a Simulated Driving Task

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Abstract

Driver fatigue may impose the risk of crashes and is a leading cause of death in transportation industry. This study aimed to detect driver cognitive fatigue based on changes in EEG frequency bands in non-professional drivers during a simulated driving task. In a descriptive-analytical study, 12 healthy male car drivers took part in a two hour driving session on a simulated monotonous road, while EEG signals were recoded. The four EEG frequency bands, including delta, theta, alpha and beta were extracted and calculated using Fast Fourier Transform technique. The findings suggest significant differences in delta, theta, alpha and beta activities at the prefrontal, parietal sites, and also in the average activity during the driving sections. There were significant differences at the central site for delta, theta and alpha activities. At the temporal site, significant differences were found for delta and beta activities. No significant differences were observed for the four frequency bands at the occipital site. To prevent the risk of cognitive fatigue in transportation industry, it is necessary to estimate the changes in EEG activities during driving. The findings proposed the drop in beta activity as a potential fatigue indicator, but for developing a fatigue countermeasure device, some implications still exist that need further investigation.

Keywords: Driver Fatigue, EEG, Driving Simulator, Fatigue Countermeasure.

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