EEG Sensors Detect Brain Dysfunctions and Intervene in Dangerous Driving

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To reduce car accidents due to brain dysfunctions and attention defects, specifically epileptic seizures and drowsy driving. This study proposes a new technology for a car emergency system that involves the use of popular electroencephalogram (EEG) dry-electrode, non-contact, low-noise sensors. The preliminary prototype involved the connection of the Neurosky Mindwave Mobile© Headset by Bluetooth to an Arduino-based remote-controlled car. The car speed and response time when sensing abnormal attention values in the range set (i.e., more than 30 and less than 300) were detected to determine the needed improvements in the analysis and accuracy of sensing. The car connected and sent the EEG signals in 2.99 seconds on average. Also, It was observed that the sensor indicated close values of attention when measuring in fixed time intervals of one minute. A direct relation was found between the change in attention values collected and the time of detection. Currently, the system is being developed by combining convolutional neural networks (CNN) to improve the recognition process by detecting paroxysms and abnormal montages in the EEG-visualized data using MATLAB. The car would take a classification-based reaction to ensure the driver's safety. In the developed system, different reactions are made in cases of drowsiness and epilepsy. Generally, the results indicate that common EEG headsets can be a promising solution regarding control systems if the connection errors were fixed and Wi-Fi connectors were added. Also, the paroxysms and changes in EEG montages can have a broad practical role in active car safety systems.

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