عنوان مقاله:

Monitoring Physiological State of Drivers Using In-Vehicle Sensing of Non-Invasive Signal

محل انتشار:

ژورنال مهندسی عمران, دوره 10, شماره 4 (سال: 1403)

تعداد صفحات اصل مقاله: 11

نویسندگان:

Siti Fatimah Abdul Razak

Sharifah N. M. Sayed Ismail

Bryan Hii Ben Bin

Sumendra Yogarayan

Mohd Fikri Azli Abdullah

Noor Hisham Kamis

خلاصه مقاله:

Eighty percent of traffic accidents are caused by human error, called hypo vigilance, stemming from drowsiness, stress, or distraction while driving. This poses a significant threat to road safety. An electrocardiogram (ECG) is often used to monitor drivers' health. Thus, enhancing vehicles with Internet of Things (IoT) sensors and local analytical databases becomes crucial for real-time detection and transmission of relevant health data to avoid things that compromise road traffic safety. This study introduces a cost-effective in-vehicle ECG sensing prototype using an AD۸۲۳۲ sensor integrated with an Arduino Uno and an AD۸۲۳۲ Wi-Fi module placed on the steering wheel to monitor the driver's heart signal while driving. Short-term heart rate variability (HRV) features were computed through Python from the acquired ECG data, and supervised machine learning techniques such as AdaBoost, Random Forest, Naïve Bayes, and Support Vector Machine (SVM) classified the features into normal and abnormal classes. Naive Bayes exhibited the highest accuracy (۹۰.۹۱%) and F۱ score (۸۵.۷۱%), surpassing Random Forest's lower accuracy (۶۳.۶۴%) and F۱ score (۵۰.۰۰%). These findings indicate the prototype's potential as a valuable tool for ensuring safe and efficient driving, proposing integration into standard vehicle safety systems for enhanced road traffic safety. Doi: ۱۰.۲۸۹۹۱/CEJ-۲۰۲۴-۰۱۰-۰۴-۰۱۴ Full Text: PDF

کلمات کلیدی:

.ADAS; Driver Monitoring System; ECG; Vehicle Safety