The Classification of Electrooculogram (EOG) Through the Application of Linear Discriminant Analysis (LDA) of Selected Time-Domain Signals

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Abstract Recently, Human Computer Interface (HCI) has been studied extensively to handle electromechanical rehabilitation aids using different bio-signals. Among various bio-signals, electrooculogram (EOG) signal have been studied in depth due to its significant signal pattern stability. The primary goal of EOG based HCI is to control assistive devices using eye movement which can be utilized to rehabilitate the disabled people. In this paper, a novel approach of four classes EOG has been proposed to investigate the possibility of real-life HCI application. A variety of time-domain based EOG features including mean, root mean square (RMS), maximum, variance, minimum, medium, skewness and standard deviation have been explored. The extracted features have been classified by the linear discriminant analysis (LDA) with the classification accuracy of training accuracy (90.43%) and testing accuracy (88.89%). The obtained accuracy is very encouraging to be utilized in HCI technology in the purpose of assisting physically disabled patients. Total 10 participants have been contributed to record EOG data and the range between 21 and 29 years old.

Keywords Human computer interface · HCI · Electrooculogram · EOG · Machine learning

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