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A novel approach for detection of deception using Smoothed Pseudo Wigner-Ville Distribution (SPWVD)

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ABSTRACT

For many years, the uncertainty of lie-detection systems has been one of the concerns of defense related agencies. Clearly the results of these systems must be generalized by a high value of accuracy to be acceptable by judicial systems. In this paper, a new method based on P300-based component has been proposed for lie-detection. In this regard, the test protocol is designed based on Odd-ball paradigm concealed information recognition. This test was done on 32 people and their brain signals were acquired. After preprocessing, the classic features are extracted from each single trial. After that, time-frequency (TF) transformation is applied on the sweeps and TF features are produced thereupon. Then, the best combinational feature vector is selected in order to improve classifier accuracy. Finally, Guilty and Innocent persons are classified by KNN and MLP. We found that combination of Time-Frequency and Classic features have better ability to achieve higher amount of accuracy. The obtained results show that the proposed method can detect deception by the accuracy of 89.73% which is better than other previously reported methods.

KEYWORDS

Lie-Detection; Electroencephalography (EEG); P300 Component; Odd-Ball Paradigm; Time-Frequency Transform

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