Hearing disorder detection using auditory evoked potential (AEP) signals

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ABSTRACT
Hearing deficit diagnoses is an important part of the audiological evaluation. The hearing disorder impairs human communication and learning. A traditional hearing test is constrained in its application and time-consuming since it requires the person to respond directly. The main objective of this study is to build an intelligent hearing level evaluation approach using Auditory Evoked Potential (AEPs) to address these concerns. For this purpose, two types of AEP signals (hearing auditory stimulus and hearing nothing) have been collected from five subjects with normal hearing abilities. Ten different statistical features have been extracted in ten different time window length (one second to ten seconds). The obtained feature sets have been classified by the K-Nearest Neighbors (K-NN) algorithm. Different types of the parameter of K-NN have been investigated also to achieve the best outcome. Experimental results show that the maximum classification accuracy of 97.80% has been achieved with the standard deviation feature and K-NN classification algorithm (Distance: Manhattan, K-neighbors: 4, Leaf size: 1, weight: uniform). The obtained performance indicates that the proposed method is very encouraging for diagnosing the AEPs responses.

KEYWORDS
Auditory evoked potential (AEP): Electroencephalogram (EEG); Brain-computer interface (BCI); Machine learning: K-nearest neighbors (K-NN)

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