عنوان مقاله:

Classification of auditory attention based on transferentropy feature

محل انتشار:

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خلاصه مقاله:

Speech separation is difficult for people withhearing loss in crowded surroundings. Unfortunately, withoutknowing which speaker the listener is referring to, hearing aidsare unable to distinguish the main speaker from otherdistractions. For this purpose, researchers are attempting todevelop a binaural speech separation system by analyzingelectroencephalography (EEG) signals so that they canimprove the quality of hearing aids. So far, various methodshave been used to examine EEG, and one of the methods thatmay be offered as a valuable method in this field is theapplication of information theory. Information theory wasintroduced by Shannon in ۱۹۴۸, allowing researchers toinvestigate the processing, transfer, and storage of informationmathematically. Transfer Entropy (TE) is one of the conceptsused in the theory of information to analyze EEG. Transferentropy is based on Wiener's principle, which is used toexpress the effect of one variable (such as X) to predict thefuture of another variable (such as Y), which can itself be usedin the definition as a suitable measure for mutual effects indifferent areas of the brain. As a result, extracting the transferentropy feature from EEG can check the effectiveness of thisfeature in speech separation. Therefore, the purpose of thisarticle is to classify electroencephalography signals into twogroups: auditory attention to the left or right ear, based on thefeature of transfer entropy; and finally, using the SupportVector Machine (SVM), the level of accuracy, sensitivity, andspecificity for ۲۰ normal subjects (۴۰ signals in total,considering the left and right ears) is presented according totransfer entropy feature so that the effectiveness of this featurecan be addressed for the classification of auditory attentionsignals.

کلمات کلیدی:

(auditory attention, classification,Electroencephalography (EEG), information theory, SupportVector Machine (SVM), Transfer Entropy (TE

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