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Classification of multi-channel electroencephalogram time series with a linear discriminant analysis

Yongxiang Gao and **Jinxin Zhang**
Sun Yat-sen University, China

Epilepsy is a chronic neurological disease characterized by epileptic seizures that affect approximately 50 million people worldwide. An electroencephalogram is the most dominant method to detect epileptic seizures, it contains information about brain activity. Therefore, an automatic diagnostic method needed to be proposed to help the doctor make the correct decision, many methods have also been developed during the past years but there is no unanimous opinion. In this work, a strategy has been proposed to differential EEG as normal, epileptic seizures and interictal. Maximal overlap wavelet transform was used to extract wavelet coefficients, five features (variance, Pearson correlation coefficient, Hoeffdings'D measure, Shannon entropy, interquartile range) were calculated from EEG and then input to the linear discriminant classifier for the classification purpose. Data were collected from the Department of Neurology, the Second Affiliated Hospital of Guangzhou Medical University containing 34 healthy people, 30 epileptic seizures patients and 21 interictal patients. Here only db4 was used. The performance of classifiers was evaluated use leave-one-out cross-validation in terms of accuracy and auc. Results show that the accuracy of healthy and epileptic seizures is 1 and auc is 1. The accuracy of interictal and epileptic seizures is 92.16% and auc is 0.96. The method we proposed can extract information from EEG.

Biography

Yongxiang Gao has been studying full-time in the graduate program for Master's Degree on Epidemiology and Health Statistics in the School of Public Health, Sun Yat-sen University from September 2016 to now. The normal study period is three years.

gao_yongxiang@163.com

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