

基于独立元分析和非线性指数分析的脑电信号中伪迹分量的自动去除

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脑电 (electroencephalography, EEG) 信号中不可避免地存在着眼动、心跳、肌电信号以及线性噪声等伪迹干扰, 这些伪迹的存在极大地影响了脑电信号分析的准确性, 因此在进行脑电信号分析前需要去除伪迹干扰。为了有效地去除伪迹, 结合独立元分析和非线性指数分析, 提出一种自动识别并去除脑电信号中伪迹分量的方法。该方法还可同时用于提取脑电信号中的基本节律如 α 波等。相应的模拟与实际脑电数据的实验结果表明所提议的方法具有很好的识别和去除脑电信号伪迹分量的性能。

Automatic Removal of Artifacts from EEG Data Using ICA and Nonlinear Exponential Analysis

Artifacts such as eye movements, cardiac signals, muscle noise and line noise, etc., present serious problems for the accuracy of electroencephalographic (EEG) analysis. In order to remove these artifacts effectively, an automatic artifacts removal scheme for EEG data is proposed. The scheme combines independent component analysis (ICA) and nonlinear exponential analysis. In addition, the proposed scheme can be used to detect basic rhythms, such as α rhythm, etc., from EEG data. Experimental results on both the simulated data and the real EEG data demonstrate that the proposed scheme for artifacts removal has excellent performances for detecting and removing these artifacts from EEG data.

关键词