工程与应用

ICA方法用于脑电信号*α*波提取的研究

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摘要　　为在有效提取闭眼脑电信号α波的同时能够很好地保留原始信号中的其余信息，采用独立分量分析方法提取闭眼脑电信号中的α波。构造一组频率在α波频率之间的正弦和余弦信号作为对α波的参考信号，然后把这些信号以及实测闭眼脑电信号作为ICA混合矩阵的输入端，采用fastICA 算法进行信号分离，实现对α波的分离和提取，并进一步对所提取的α波进行了功率谱分析。结果表明，分离出的信号频率集中在8~13 Hz之间，完全符合α波形的特点，且去除α波后的其余信号与原始信号相关系数达到0.942，说明有效地保留了原始信号的其余信息。

关键词　　快速独立分量分析算法　脑电信号　α波　信号分离　特征提取

分类号

Study on extraction of *α* rhythm in EEG with ICA method

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Abstract

In order to extract the *α* rhythm effectively and preserve the other information of eyes-closed-EEG signal simultaneously，a novel method，based on the ICA theory，is used to extract the *α* rhythm.Constructing a series of sine and cosine signals as a reference of *α* rhythm，take these series signals and EEG signal to be the input of ICA mixing matrix，the fastICA algorithm is adopted to separate the signals，thereby realize the *α* rhythm extracting from EEG signal，and analyze the power chart of the extracted *α* rhythm.The frequency of the *α* rhythm extracted concentrate between 8 Hz and 13 Hz.It shows that the rhythm extracted is correct.And the correlation coefficient between separation signal and original signal is 0.942，it shows that other information is preserved effectively.Using ICA method for *α* rhythm extracting is effective.

Key words　fast Independent Component Analysis（fastICA）　ElectroEncephaloGraph（EEG）signal　*α* rhythm　signal separation　character extraction

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