Journal of Electrical and Electronics Engineering (JEEE)
ISSN(P): 2250-2424; ISSN(E): Applied
Vol. 6, Issue 1, Jun 2016, 7-10
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AN EXTRACTION OF RESPIRATION COMPONENT OF LOCAL FIELD POTENTIAL SIGNAL

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ABSTRACT

An estimation method of respiration rhythm is introduced. To verify the relevance between respiration rhythm and local field potential signal, periodicity analysis and cross-correlation are adopted. The period of local field potential signal is figured out using power spectrum analysing, and the normalized cross-correlation between the estimated respiration local field potential data and the given data is 0.768, which shows a high relevance. Therefore, components which are corresponding to respiration of the raw local field potential signal must exist and can be extracted from the original LFP data. A method for extracting components corresponding to respiration rhythm from the raw data is developed here. In order to extract the respiration components of the local field potential signal, the power spectrum of the estimation of respiration component acquired before is analysed, and the frequency band where the spectrum concentrates is found. Then, the frequency band is adopted to filter the components of the local field potential signal in the frequency domain. Lastly, the filtered signal is transformed back to time domain, thus acquiring the extracted local field potential signal which is corresponding to respiration rhythm from the raw data. This method provides feasible approaches for analyses and designs of mechanisms involving interactions between nervous system and manmade devices.

KEYWORDS: Local Field Potential, Respiration Rhythm, Extraction Method, Power Spectrum

Received: Mar 22, 2016; Accepted**:** Jun 14, 2016; **Published:** Jun 24, 2016; **Paper Id.:** JEEEJUN20162

Original Article