

Analysis of electroencephalogram, revealing the processing algorithm of depth of anesthesia monitor

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Abstract:

Monitoring the depth of anesthesia is very important to prevent undesirable events during surgery. According to direct effect of anesthetic drugs on synaptic activity of neurons and after introducing of anesthesia depth monitor (BIS) in 1996, there was great interest on electroencephalogram analysis as a depth of anesthesia estimator. Now there are large numbers of methods and algorithms in this field and every new method is compared with BIS as a gold standard. Main components of BIS algorithm is composed of three sub parameters including time, frequency and higher order statistics (bispectrum) domain parameters. These sub parameters are weighted and summed to produce BIS index but the combination algorithm still is not in the public domain.

The main aim of this study is to reveal BIS algorithm to improve its efficiency and designing different methods based on data mining concepts. We introduce proper methods for calculating three sub parameters. Additionally, we collected electroencephalograms from patients undergoing surgery. Extraction of three sub parameters from the data is the next step. Finally, based on proper statistical methods and our data bank, we introduce an algorithm to calculate BIS index.

Keywords:

Depth of anesthesia, Electroencephalogram, Higher order statistic, Bispectrum, BIS index

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