DIMENSIONALITY REDUCTION TO EEG CLASSIFICATION USING NEURAL NETWORK TO DETERMINE THE DEPTH OF ANESTHESIA

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Abstract

One of the major problems in the surgery is the creation of appropriate anesthetic conditions in patients, anesthesiologist should preserve patients at an appropriate level of anesthesia during surgical interventions and also prevent overdose or anesthetic doses to anesthetized patients. . Therefore, anesthesiologists make innovative decisions about the depth of anesthesia and adjust the dose of anesthesia through all significant changes in vital signs based on experiences. So today, overdose or dose deficiency and consciousness during surgery can complicate anesthesia. The main problem is the poor recognition of the complex levels of consciousness during anesthesia and the inability to assess the depth of anesthesia. . Ensuring adequate depth of anesthesia during surgery and in intensive care unit is necessary and necessary. In the case of neglecting the precise control of the depth of anesthesia, there is a risk of unwanted alertness during surgery or a lack of consciousness. In recent years, special attention has been paid to the processing of the EEG signal in order to estimate the depth of anesthesia. Therefore, separation of consciousness and anesthesia is one of the main and most important courses in surgery. Therefore, the purpose of the study is to use the characteristics of entropy, spectral and nonlinear to determine the depth of anesthesia. In this case, non-linear dimensional reduction methods will be used to improve the results. Then multi layer perceptron (MLP) neural network was used to classify the depth of anesthesia. The results of the classification of anesthesia depth with MLP classification with four dimensionality reduction method showed that the accuracy, and sensitivity and the specificity to detect depth of anesthesia with LLE were 79.46%, 80.06% and 79.4%, respectively.

Key words: depth of anesthesia, EEG signal, Feature extraction, classification, dimension reduction method