Categorize epileptic and Non-epileptic ECoG signals with optimized SVM and NBC methods

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Abstract This paper presents two different methods for detection of seizure in brain. Here we investigate the use of the Naïve Bayes classifier and Support Vector Machine for the given signals. Naïve bayes is simple probabilistic classifier based on applying Bayes theorem with independent assumptions. On the other hand Support Vector Machine (SVM) algorithm is a common method of training machine to classifing of objects. Here we have trained our machines with our ECOG data using above methods and the trained data is used for the detection of brain epileptic seizure in the sample signal. Evaluating the response for epilepsy will enable the medico to obtain clues for the presence of the disease and rehabilitation program and will lead to more efficient step to control at early stages of the disease. Within this framework the signals were decomposed into the frequency sub-bands using DWT and a set of statistical features was extracted the sub-bands to represent the distribution of wavelet coefficients. Principal components analysis (PCA), independent components analysis (ICA) and linear discriminant analysis (LDA) is used to reduce the dimension of data. Then these features were used as an input to SVM and NBC with two discrete outputs: epileptic seizure or not. The performance of classification process due to different methods is presented and compared to show the excellent of classification process. These findings are presented as an example of a method for training, and testing a seizure prediction method on data individual petit mal epileptic patients. Given the heterogeneity of epilepsy, it is likely that methods of this type will be required to configure intelligent devices for treating epilepsy to each individual‘s neurophysiology prior to clinical operation.

Keywords : Categorization of Epileptic Signs