Abstract

Effective *motor imagery* (MI) classification based on electroencephalogram (EEG) signals for Brain Computer Interface (BCI) is an active area of research. Classification is largely dependent on feature extraction and the type of classifier. In the project, the objective is to explore feature set based on *bispectrum* of EEG for MI classification. Support Vector Machine (SVM) is chosen as the classifier to be used. EEG from a publicly available dataset - BCI competition IV has been used for the experiments.

As part of this project, detailed studies have been carried out on the different features that can be extracted from an EEG signal and the physiology behind MI tasks. Based on the survey, an architecture exploiting bispectrum of EEG for MI classification has been proposed. Bispectrum is computed and two types of features are extracted : a. derived features and b. statistical features of the bispectrum for each MI signal. These two feature sets have been tried individually as well as combined. As part of the experimentation on use of bispectrum for MI classification, the above features are used to form three different feature vectors and their applicability explored. In addition to this, Principal Component Analysis (PCA) has been applied to the combined feature set. Experiments for PCA have been done by varying the number of trials as well as by differing the order for the PC. Classifying results obtained support our hypothesis that derived and statistical features of the bispectrum can be used to classify between left and right hand motor imageries.