

# Functional Link PSO Neural Network Based Classification Of EEG Mental Task Signals

## Abstract

Classification of EEG mental task signals is a technique in the design of Brain machine interface [BMI]. A BMI can provide a digital channel for communication in the absence of the biological channels and are used to rehabilitate patients with neurodegenerative diseases, a condition in which all motor movements are impaired including speech leaving the patients totally locked-in. BMI are designed using the electrical activity of the brain detected by scalp EEG electrodes. In this paper five different mental tasks from two subjects were studied, combinations of two tasks are used in the classification process. A novel functional link neural network trained by a PSO algorithm is proposed for classification of the EEG signals. Principal component analysis features are used in the training and testing of the neural network. The average classification accuracies were observed to vary from 80.25% to 93% for the 10 different task combinations for each of the subjects. The proposed network has an average training time of 0.16 sec. The results obtained validate the performance of the proposed algorithm for mental task classification.