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Developing brain abnormality recognize system using multi-objective pattern producing neural network

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Abstract

According to the survey, brain abnormal mortality rate is increased up to 86% due to the severe effect of brain injuries, brain tumor, brain stork and other genetic mutations. The brain abnormality may occur in different disease such as Glioblastoma, Ependymoma/anaplastic ependymoma, bipolar disorder and so on. Due to the dangerous brain disease, it has to be detected in earlier stage for avoiding the mortality rate. So, in this paper introduce the multi-objective pattern producing neural network for developing the automatic brain abnormality recognizes system. Initially the brain signal such as Electroencephalogram (EEG) is collected from patient, noise present in the signal is removed using frequency normalization principal component analysis approach. The noise free signal is further examined, different features are extracted by applying ISO map spectral feature and particle bee based features are selected. The selected features are fed into the above-mentioned classifier that recognizes the brain abnormality related features according to the effective activation function. Then the efficiency of the brain abnormality recognize system is implemented in MATLAB tool and the excellence of the system is evaluated in terms of using error rate, sensitivity, specificity, F-measure, Mathew correlation coefficient and accuracy.

1 Introduction

The continuous development of the technologies and people life style changes and affects entire life of human beings. Sometimes, the changes in the technology creates the depression, confusion, tension also leads to affect their brain function, cell activities and so on (Sapsosnik et al. 2004). In addition to this, structural changes of the brain create mood change, mental disorders, sadness, back pain, palpitations, headache, sleeping problems and so on. Not only has this, Guillain Barre Syndrome, hypophosphatemia, shock, hypotension, changed in neuromuscular function

and hypothermia that leads to brain death (Goswami and Bhaiya 2013). According to the survey of survival rate of last 5 years the 70% of the people affected by brain disorder due to the above brain disease. Along with this survey, in the year of 2000 and 2014, the central brain tumor registry united states are declared that most of the people affected by brain and spinal cord tumors which is affected in different age group people that reduces the survival rate of the people in the world. Based on the survey, the different brain diseases and related survival rates are shown in various age group people is listed in Table 1.

According to the Table 1, clearly shows that brain diseases are affect people health condition also reduce the survival rate of the persons. So, the brain disease is needed to predict in earlier stage (Kalaiselvi et al. 2013), but it is more difficult process due to the exact acquisition of the brain activities. The created framework uses the mind picture (Kumar et al. 2014), electromyography (EMG) (Guohua et al. 2009), electroencephalogram (EEG) for investigating the interior structure of the cerebrum additionally their exercises. Among the different factor, EEG has used to distinguish the unusual cerebrum movement since it catch

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