



## Best Function Analysis in Epilepsy Diagnosis by SMO-based-SVM Method

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Epileptic seizure (or crisis) is a clinical event occurring abnormal electrical changes resulting in the nerve cells of the brain. EEG signals are mainly used in epilepsy diagnosis. Electroencephalography (EEG) signals are mainly used in epilepsy diagnosis. Therefore, analysis of EEG signals is very important in epilepsy diagnosis. Since the frequency content of epileptic EEG signals differ in before and after the seizure, Discrete Wavelet Transform (DWT) method, which analyzes in the frequency domain, has a very important place. This method is used as an ideal bandpass filter for seizure detection and classification [1]. DWT is also used to extract the features and characteristics of epileptic EEG signals at different scales and resolutions [2]. The dataset [3] used in this study consists of five (A-E) different sets with each 100 single-channel EEG segments of 23.6-sec duration. While set A and B were recorded from 5 healthy volunteers, set C, D, and E were recordtaken from 5 patients. Set C and Set D contain activities measured from the non-attack interval, while set E only includes activities with epileptic attacks. In this study, a 3-class system was designed using data sets A, C and E.

In this study, SMO-based-SVM method was used for diagnosis of epilepsy. Also, which of the functions of this method was investigated to have better performance. EEG data of patients (set-C and set-E) and healthy (set-A) were used for this. Low (CA) and high (CD) frequency coefficients are obtained by applying second order DWT to these data. From the CA and CD coefficients, 6 different features are extracted in the time domain and these features was given to the classifier in which the SMO-SVM method (normalizedpolykernel, polykernel, puk ve RBFkernel functions) is used.

The results showed that the puk function of SMO-SVM classifier in diagnosing epilepsy using the extracted features from both the CA (92% success rate) and CD (89.66% success rate) coefficients was more successful than the other functions.

**Keywords:** EEG, Epilepsy, SMO-SVM.

### REFERENCES

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