Comparison of Different Feature Extraction and Machine Learning Algorithms for EMG Signal Classification

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Biological signals could not be modeled and processed easily because of their complex, sophisticated structure and mathematical formulation. However, recently, the algorithms and programs developed for the processing signals without the need for mathematical formulation rapidly led to an improvement of biological signals [Hudson & Cohen, 2000].

Although the initial period of Artificial Intelligence studies designed for pattern recognition, nowadays this process has become more parallel with both image processing techniques and pattern recognition. The development of artificial intelligence techniques gave an opportunity to the experts to enter input data into the results of computers. In the mid-1980s, artificial neural networks models have been an alternative of artificial intelligence. Decision trees are also used extensively for classification throughout the history. Although decision trees are the simplest machine learning algorithm, they also give as close accurate as the neural networks.

In this study the EMG data that are collected from 25 subjects were analyzed. Two separate groups of myopathy and ALS patients and a control group are the participants of the research.

We preprocessed the EMG signals and used autoregressive method (AR) and discrete wavelet method (DWT) for feature extraction. Features are applied to various classification algorithms, namely Multilayer perceptron, C 4.5, CART, K-NN, Random forest tree. All the data are compared each other on the table try to find out the best classification and feature extraction methods.