

Feature Reduction in Biosignal Processing

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Abstract. Feature reduction is common in biosignal analysis, especially in case of quantitative EEG analysis. Mostly, summation in the spectral domain is applied to reduce the number of estimated power spectral density values, which gains between four and twelve band power values. Depending on the problem, on signals under analysis and on methods used for further processing it is an open question if such a strong decrease in the number of features is optimal. Modern Soft Computing methods offer the feasibility of processing a large amount of different features without considerable performance deteriorations. In this paper we apply such methods and compare empirically the case of no feature reduction to four variants of feature reduction. Our data set consist of more than 3,700 examples of microsleep events experienced by young adults in an overnight driving simulation study. More than 4,600 features were extracted from seven EEG and two EOG channels utilizing the modified periodogram method. Results showed that summation in many fixed bands, or in fewer, but freely optimized bands is more optimal than no reduction, or strong reduction to four bands commonly selected in EEG analysis.