D. Sommer / M. Golz

Feature Reduction for Microsleep Detection

Abstract. In stages of extreme fatigue, e.g. while car driving, dangerous microsleep events may occur. Their detection in spontaneous biosignals still poses a challenge. For this purpose it is necessary to analyze signals with high temporal dynamics, like the brain and eye electric activity. From both types of measurements the Power Spectral Densities were estimated and were subsequently reduced by five different methods. Their performances were evaluated empirically in order to get lowest errors for the detection of microsleep events. The detection was realized by Computational Intelligence methods. It turned out that feature reduction performs best when averaging in many small spectral bands or in flexible spectral bands was utilized. Their free parameters were optimized by genetic algorithms. The Support Vector Machine with RBF kernel function established as best performing classification tool.