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Abstract

The concurrent usage of actigraphy and heart rate variability (HRV) for sleep efficiency quantification is still matter of investigation. This study compared chest (CACT) and wrist (WACT) actigraphy (actigraphs positioned on chest and wrist, respectively) in combination with HRV for automatic sleep vs wake classification. Accelerometer and ECG signals were collected during polysomnographic studies (PSGs) including 18 individuals (25 to 53 years old) with no previous history of sleep disorders. Then, an experienced neurologist performed sleep staging on PSG data. Eleven features from HRV and accelerometry were extracted from series of different lengths. A support vector machine (SVM) was used to automatically distinguish sleep and wake. We found 7 minutes as the optimal signal length for classification, while maximizing specificity (wake detection). CACT and WACT provided similar accuracies (78% chest vs 77% wrist), larger than what yielded by HRV alone (66%). The addition of HRV to CACT reduced slightly the accuracy, while improving specificity (from 33%

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