Abstract

Sleep apnea is a potentially serious breath disorder. This can be detected using a test called as Polysomnography (PSG). But this method is very inconvenient because of its time consuming and expensive nature. This can be overcome by using other methods like Respiratory rate interval, ECG – derived respiration and heart rate variability analysis using Electrocardiography (ECG). These methods are used to differentiate sleep apnea affected patients and normal persons. But the major drawback of these is in performance. Hence, in this paper this disadvantage is overcome by considering Sequency Ordered Complex Hadamard Transform (SCHT) as a feature extraction technique. A minute to minute classification of thirty – five patients based on sensitivity, specificity and accuracy are 93.74%, 96.15% and 95.6%.


10. Laiali Almazaydeh, Khaled Elleithy, Miad Faezipour, “Obstructive Sleep Apnea Detection Using SVM-Based Classification of ECG Signal Features”, 34th Annual International Conference of the IEEE EMBS San Diego, California USA, 28 August - 1 September, 2012


16. B. Yilmaz, M. Asyali, E. Arik, S. Yektin and F. Ozgen, Sleep stage and obstructive
apneic epoch classification using single-lead ECG, Biomedical Engineering Online 9 (2010),
1–14.
17. C. Avci, I. Delibasoglu and A. Akbas, Sleep apnea detection using wavelet analysis of
ECG derived respiratory signal, International Conference on Biomedical Engineering (2012),
272–275.
18. G. Sannino, L. De Falco and G. De Pietro, An automatic rules extraction approach to
support OSA events detection in a mHealth system, IEEE Journal of Biomedical and Health
Informatics (2014), will be published.
19. A. Thommandram, J.M. Eklund and C. Mcgregor, Detection of apnoea from respiratory
time series data using clinically recognizable features and kNN classification, 35th Annual
International Conference of IEEE Engineering in Medicine and Biology Society (2013),
5013–5016.
Ming, Visual attention recognition based on nonlinear dynamical parameters of EEG,
21. G. Li and W.Y. Chung, Detection of driver drowsiness using wavelet analysis of heart
rate variability and a support vector machine classifier, Sensors 13 (2013), 16494–16511. V.P.
Rachim et al. / Sleep apnea classification using ECG-signal wavelet-PCA features 2881
22. A. H. Khandoker, J. Gubbi and M. Palaniswami, Automated scoring of obstructive sleep
apnea and hypopnea events using short-term electrocardiogram recordings, IEEE Transactions
on Information Technology in Biomedicine (2009), 1057–1067.

Index Terms

Computer Science  Signal Processing

Keywords

ECG, SCHT, Sleep Apnea, SVM