传感技术学报
中国微米纳米技术学会
全国高校传感技术研究会 主办

穿戴式动态睡眠呼吸监测系统的设计

作　者：吴丹, 徐效文, 王磊, 金星亮

单　位：中南大学

基金项目：中科院“百人计划”

摘　要：

本系统基于数字呼吸感应体积描记技术(RIP)和人体传感网络(BSN)开发平台,将织物传感器整合到衣物中,设计了穿戴式的睡眠呼吸监测系统,可以实时实现胸、腹呼吸监测。系统中的信号处理算法可以对信号质量进行评估，并提取出动态呼吸率和运动等信息。通过对10位测试者进行整夜的睡眠呼吸监测实验，并且和Biopac生理记录仪的结果进行对比分析，证明了本系统测量准确、工作稳定。由于其成本低，未来可以应用于家庭中进行睡眠呼吸疾病的监测。

关键词：睡眠呼吸监测；家庭保健；穿戴式；呼吸感应体积描记技术(RIP)；人体传感网络(BSN)

Design of Wearable Dynamic Sleeping Respiration Monitoring System

Author's Name:

Institution:

Abstract:

This paper presents a wearable device for continuous monitoring of respiratory signal. The system took advantages of a proven respiratory inductive plethysmograph (RIP) technology and a wireless body sensor networks (BSN) development platform. The textile RIP sensor was integrated into a suit and comfortably worn around thorax or abdomen for monitoring respiration during sleep. An intelligent signal processing algorithm was implemented for extracting the dynamic respiration and motion information. In-situ experiments from ten healthy subjects suggested that this system worked as intended and measured accurately. Due to the high reliability and low cost of this system it is believed to meet the future demands on home-based monitoring for diagnosis of sleep disorder-related diseases.

Keywords: Sleeping respiration monitoring; Home healthy； Wearable; RIP; BSN

投稿时间：**2009-10-15**

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