BCG signal detection fiber optic sensor

Overview

In this paper, we proposed a non-invasive cushion based optical fiber sensor (OFS) with a deep learning model. The study examines various signal processing methods, including Wavelet. Abstract: In order to achieve portable heart rate signal acquisition and analysis, and to benchmark the precision of electrocardiogram testing, a heart rate demodulation system based on fiber optic sensing is proposed. The heart monitoring system collects BCG. The aim of this work is to present a method for accurately estimating heart and respiration rates under different actual conditions based on a mattress which was integrated with an optical fiber sensor. During the estimation, a ballistocardiogram (BCG) signal, which was obtained from the optical. At present, ballistocardiograph (BCG) offers an unobtrusive solution for medical institutions, yet there is no gold standard to measure the actual quality of the collected BCG signals.

Article Content

High Fidelity MZI-BCG Sensor With Homodyne Demodulation for

An all-optical active homodyne detection aided fiber-optic Mach-Zehnder interferometer (MZI) vital signs monitoring system is proposed and investigated. The active homodyne detection is mainly realized

IJK complex detection within BCG signal based on multi-core fiber sensors

BCG signal is detected based on proposed multi-core fiber sensors and IJK complex is extracted and explored for biomedical applications.

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Across the world, healthcare costs are projected to continue to increase, and the pressure on the healthcare system is only going to grow in intensity as the rate

Vital Signs Monitoring Using Fiber Optic Sensors

This paper explores the efficacy of using non-invasive fiber optic sensors (FOS) for continuous monitoring of vital signs, particularly heart rate (HR) and respiratory rate (RR), through

Ballistocardiography monitoring system based on optical fiber ...

An optical fiber interferometer-based ballistocardiography (BCG) monitoring system aided with the IJK complex detection algorithm is proposed in this paper. A new phase modulation method

A Ballistocardiography monitoring system based on optical fiber ...

Citations (26) References (29) Abstract An optical fiber interferometer-based ballistocardiography (BCG) monitoring system aided with the IJK complex detection algorithm is

Compressed sensing framework for BCG signals based on the optical fiber ...

However, there are few studies about BCG signal compression based on CS. Therefore, we propose to develop a CS framework for BCG signal, which consists of an optical fiber sensor-based heart

Sleep condition detection and assessment with optical fiber ...

We introduce the sensor with an optical fiber interferometer to capture ballistocardiography (BCG) and electrocardiogram (ECG) signals from the human body.

A Spectral-Based Approach for BCG Signal Content Classification

Recently, an interesting microbend Fiber Optic Sensor (FOS) has been placed under mattresses; this noninvasive and unobstructive method is boosting the use of the BCG in telemedicine since it

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Quality evaluation of ballistocardiogram from fiber optic sensors using ...

A packaging structure for fiber Bragg grating sensors is proposed, and experimental results demonstrate its effectiveness in capturing BCG signals. Evaluating the quality of

IJK complex detection within BCG signal based on multicore fiber sensors

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Ballistocardiography reconstruction based on optical fiber sensor

Ballistocardiography (BCG) is the record of body recoils resulted from heart ejection during each cardiac cycle. To detect the detail information in the BCG signal, high sensitivity optical fiber Mach-Zehnder

Heart Rate Demodulation System for BCG Signal Analysis

Abstract: In order to achieve portable heart rate signal acquisition and analysis, and to benchmark the precision of electrocardiogram testing, a heart rate demodulation system based on

AI-driven system for non-contact continuous nocturnal blood pressure ...

Here we introduce a non-contact system for continuous monitoring of nocturnal blood pressure, utilizing ballistocardiogram signals. The key component of this system is the utilization of...

Contactless Arrhythmia Detection and Short-Term HRV Analysis

This article presents a noncontact ballistocardiogram (BCG) monitoring system utilizing a fiber optic sensor (FOS) for PAC identification and short-term heart rate variability (HRV) analysis.

A deep-learning-based optical fiber sensor for non-invasive ...

In this paper, we proposed a non-invasive cushion based optical fiber sensor (OFS) with a deep learning model. The key novelty of our research is to use a non-invasive OFS to map BCG to

Noninvasive Measurement of Vital Signs With the Optical Fiber Sensor ...

Abstract As a vital sign of human, ballistocardiography (BCG) signal is widely used to indicate the health status of an individual. It can be captured by optical fiber sensor in a non-invasive

Noninvasive Human Ballistocardiography Assessment Based on Deep ...

Ballistocardiography (BCG) is a vibration signal of human cardiac activity, which can be obtained by an optical fiber sensor (OFS) in a noninvasive way. The proposed OFS, as a low power

A Wearable Sandwich Heterostructure Multimode Fiber

The optical fiber sensor primarily achieves HR monitoring by detecting both the heartbeat signal and the ballistocardiography (BCG) signal. The key distinction

Compressed sensing framework for BCG signals based on the optical

Abstract: A compressed sensing (CS) framework is built for ballistocardiography (BCG) signals, which contains two parts of an optical fiber sensor-based heart monitoring system with a CS module and an

Digital Optical Ballistocardiographic System for Activity, Heart Rate ...

It is common to find that most BCG systems are composed of complex conditioning electronics with stages for the transduction, amplification, filtering, and leveling of the signals since

Accurate Estimation of Heart and Respiration Rates Based on an

So, in this study, a specially designed detection method was developed in order to accurately extract heart and respiration rates from BCG signals on the basis of a fiber sensor.

Non-Invasive Measurement for Cardiac Variations Using a Fiber Optic Sensor

The purpose of this study is to investigate the cardiac response after different exercises using a 3 × 3 demodulation scheme-based ballistocardiography (BCG) monitoring system. A fiber

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