Title: Wearable Healthcare Device and Method for Monitoring Physiological Stress

Abstract:

This invention discloses a wearable healthcare device and method for monitoring a patient's physiological stress level. The device comprises a sensor array to detect physiological parameters (e.g., heart rate variability (HRV), respiratory rate, skin conductance), a processing unit employing a proprietary algorithm to calculate a composite physiological stress index, and a communication module to transmit the index. The method involves affixing the device, acquiring data, processing it via the proprietary algorithm, providing alerts based on thresholds, and transmitting data for analysis. The proprietary algorithm is designed to account for individual patient variations and may utilize machine learning for improved accuracy.

Field of the Invention:

This invention relates to the field of wearable healthcare devices and methods for physiological monitoring, specifically focusing on the assessment and monitoring of physiological stress levels.

Background of the Invention:

Existing wearable healthcare devices often monitor individual physiological parameters such as heart rate variability (HRV) and skin conductance. However, there remains a need for a device and method that provide a more comprehensive and accurate assessment of overall physiological stress by integrating multiple parameters and utilizing advanced signal processing techniques. The present invention addresses this need.

Summary of the Invention:

The present invention provides a novel wearable healthcare device and method for monitoring physiological stress. The device incorporates a sensor array to measure at least HRV and skin conductance, a processing unit that uses a proprietary algorithm to compute a composite physiological stress index reflecting overall stress level, and a communication module to transmit the index for remote monitoring and analysis. The method includes affixing the device, acquiring data,

processing it with the proprietary algorithm, generating alerts based on predetermined thresholds, and transmitting the stress index for further analysis and storage. The proprietary algorithm is designed to account for individual patient variability and may utilize machine learning for improved accuracy over time. The device is designed for comfortable and reliable operation, potentially incorporating features such as a flexible biocompatible substrate and power management system.

Detailed Description:

The wearable healthcare device includes a sensor array for detecting at least heart rate variability (HRV) and skin conductance. These signals are processed by a dedicated processing unit which incorporates a proprietary algorithm to calculate a composite physiological stress index. This index is a weighted combination of the input physiological parameters, adjusted by the proprietary algorithm to account for factors such as individual patient baselines, age, sex, and activity level. The algorithm's specific details are described in Appendix A [Note: Appendix A would contain the detailed description of the proprietary algorithm]. The processing unit may further incorporate machine learning techniques to improve the accuracy of the stress level assessment over time. The calculated composite stress index is transmitted via a communication module, such as a Bluetooth Low Energy (BLE) module with secure encryption, to a remote device (e.g., smartphone, computer) for further analysis, data storage, and potential user feedback. The device may further include a power management system that dynamically adjusts power consumption based on the detected physiological parameters and communication needs. The device may be designed with a flexible, biocompatible substrate to conform comfortably to the user's body. The method further includes providing visual and/or auditory alerts to the patient if the calculated composite physiological stress index exceeds predetermined thresholds.

Claims:

1. A wearable healthcare device comprising:

a. a sensor array configured to detect at least one physiological parameter selected from the group consisting of heart rate variability (HRV), respiratory rate, and skin conductance;

b. a processing unit configured to process data from said sensor array to calculate a composite physiological stress index based on a proprietary algorithm incorporating at least HRV and skin conductance; and

c. a communication module configured to transmit said composite physiological stress index to a remote device.

2. A method for monitoring a patient's physiological stress level, comprising:

a. affixing a wearable healthcare device to the patient's body, said device comprising a sensor array capable of detecting at least heart rate variability (HRV) and skin conductance;

b. acquiring physiological data from said device;

c. processing said physiological data using a proprietary algorithm to calculate a composite physiological stress index;

d. providing a visual and/or auditory alert to the patient based on predetermined thresholds of said composite physiological stress index; and

e. transmitting said composite physiological stress index to a remote device for further analysis and data storage.

3. The wearable healthcare device of claim 1, wherein said proprietary algorithm is configured to account for individual patient baselines and variations due to factors including age, sex, and activity level.

4. The method of claim 2, wherein said proprietary algorithm utilizes machine learning techniques to improve the accuracy of stress level assessment over time.

5. The wearable healthcare device of claim 1, wherein said sensor array is integrated into a flexible, biocompatible substrate conforming to the curvature of the user's body.

6. The wearable healthcare device of claim 1, wherein the communication module utilizes Bluetooth Low Energy (BLE) communication with secure encryption.

7. The wearable healthcare device of claim 1, further comprising a power management system configured to dynamically adjust power consumption based on the detected physiological parameters and communication needs.

Textual Description of Diagrams (optional):

[Note: This section would include descriptions of any figures or diagrams included in the application. Since none are provided, this section is left blank. Diagrams would typically illustrate the device's components, the algorithm's flow chart, or other relevant aspects of the invention.]