A REMOTE BODY WEIGHT CARE SYSTEM

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ABSTRACT

This study provides a system and method for monitoring one or more physiological parameters of a user. The system includes one or more wearable sensor modules sensing the one or more physiological parameters. One or more transmitters wirelessly transmit signals indicative of values of the one or more physiological parameters to a mobile monitor. The mobile monitor includes a processor processing the signals received from the transmitter in real time using expert knowledge. A device provides one or more indications of results of the processing. This study also provides wearable mobile sensors for use in the system. The method includes obtaining values of the physiological parameters of the user from one or more wearable sensor modules. Signals indicative of values of the one or more physiological parameters are wirelessly transmitted to a mobile monitor. The signals are processed in real time using expert knowledge, and one or more indications of results of the processing are provided to the mobile unit. Body fat is a major determinant of the resting rate of muscle sympathetic nerve discharge. This device can easily detect the activities of sympathetic neurotic through user's mobile digital devices which access to the remote server and then provides user tailored suggestions for weight control.

Keyword: Sympathetic, Android 4.0, BMI, Heart Beat, Weight Control.

INTRODUCTION

Biofeedback has been in use for many years to alleviate and change an individual's negative behavior patterns but existing systems have a number of significant drawbacks: Most current systems are reliant on powerful computers First of all, they require the user to be trained either by health professionals or complex online programmers. Once the user has been trained, they must remember to implement the internal physiological changes in their daily lives. The biofeedback sessions are rarely undertaken on a daily basis and certainly not in real time. This requires the user to remember specific events that occurred days before and recall his exact emotional responses.

RELATED WORK

There have been lots of researches in healthcare monitoring. Based on Jonathan’s research about the potential of extracting heart rate signal from video images, Pelegris P. [2] and his team proposed a new method to detect heart rate using a mobile phone without any hardware or special sensor. Christopher G. Scully [1] and his team then explore the potential of monitoring other parameters, such as cardiac R-R intervals and blood oxygen saturation using a mobile phone. Now, some applications that can detect heart rate and breathing rate using the camera in mobile phone have been available on the internet.

Currently, there is an increasing research activity on wearable biosensor systems that often use a mobile phone or a PDA as a small scale processing and communications platform or as a media user interface unit. Studies have shown that when working with mobile phone and PDA's implementing healthcare systems, the vast majority of them use a mobile device for processing and user interface platform but not as a sensor itself [3]. In this study we can also observe that users tend to be very concerned with the way a sensor affects their appearance or habits, thus utilizing a device embedded sensor as a camera provides a truly non invasive way of acquiring health information from the users without the need for them to train on how to use a new type of device provided they already feel comfortable enough using the menu of a mobile phone [3]. Moreover, the ease of use (simply
placing one’s finger on the camera) combined with the live feedback will likely be more appealing to the users and might play
a positive role in engaging them to a process that could benefit their health.

**SYSTEM ARCHITECTURE**

The system takes advantage of measuring sympathetic parts of the body, the device consists essentially of a remote server host,
as well as at least one handheld mobile digital devices; including construction of an operating system of the remote server host
system, a remote care web operating processing program, network access interface and links related weight loss
countermeasures database access interface, operating system and vitality sense of measured interface; as handheld mobile
digital device constructed.

**MOBILE APPLICATION**

*Android Platform*

Android is an open source operating system for smartphones and tablet PCs that uses a modified version of the Linux kernel
(www.android.com). Software can be written in Java and executed in a specialized virtual machine. The number and
functionality of Android devices grow rapidly and fit very well to the area of Body Sensor Networks (BSN). A smartphone is
unobtrusive and, hence, it can be used for daily monitoring whereas a tablet PC at the doctor's office can be used for better
visualization of the patient’s health parameters. Both devices are running the same system and allowing a seamless switching.
The hTC phone serves as an Android 4.0 device for our case study.

*Application Implementation*

Our system works as follows. First, this study provides portable, cordless, and wearable sensors, for monitoring queries
emotional and physiological responses to events as they occur. These results, gathered in real time, may be more effective and
relevant to the user than those recreated days later after they occurred, under artificial conditions. The new sensors may utilize
mobile phones and other technology to display the user's physiology and emotional state, real time coaching based on expert
knowledge, and to train the user to modify negative behavior patterns. As used herein, the term "wearable device" refers to a
device that the user can carry with him, for example, under or above his clothing, in his pocket, attached to his clothes, or in his
hand.

Secondly, this study provides a system for monitoring a user's emotional and physiological responses to events as they occur. In
addition, this study provides methods to analyze the user's state of mind and physiology. finally, this study provides
applications of the methods and sensors of the system.

**METHODOLOGY**

*Start the measurement*

Allow the users were lying down to standing, a lot of blood flow to the feet, sympathetic effect.

4.3.2 Usually lying and standing one minute each measurement values obtained subtracted if it is less than 9

In behalf of abnormal night will be prone to hunger and midnight snack eating habits at night; index is normal ten to twenty.

Fig. 1 shows a block diagram of a sensor module for use in the system
Figure 1. Showing some details of a sensor module, according to architecture of the system.

**Android camera and sensor function**

MySQL, PHP Web Management database are ready for the system. The processor of the system of this study may be configured to calculate from the first signals one or both of a parameter indicative of an arousal state of the user and a parameter indicative of an emotional state of the user. Calculation of a parameter indicative of an arousal state of the user may include calculating a score of a sympathetic and parasympathetic activity of the user using an algorithm based on any one or more of the user's Electro Dermal activity (EDA), Heart Rate, EDA variability, and HR variability. The processor may be configured to calculate a parameter indicative of an arousal state of the user and to display the parameter indicative of an arousal state of the user on a display associated with the mobile unit as a two-dimensional vector. The first processor may be configured to display on a display associated with the mobile monitor any one or more of the following images: an image indicative of bio-feedback information relating to the user; an image indicative of a breathing activity of the user; an image including a graph indicative of an EDA activity of the user; an image including a graph indicative of a heart rate of the user; an image including a graph indicative of a heart rate variability of the user; and an image indicative of recommendation to improve the user's psycho-physiological state based on one or both of the user's physiological data and experts' knowledge.

An image indicative of breathing activity may include a bar having a length indicative of the breathing activity. An image indicative of bio-feedback information relating to the user may include one or more parameter target values.

The processor may be configured to calculate in a calculation based upon the first signals any one or more of the following: a breathing rate of the user; and a heart rate variability of the user. The user's rate of breathing may be calculated and analysis by monitoring changes in the electrical capacitance of the body while the user is breathing.

**Evaluation and Validation**

Fig. 2 depicts a sensor module that may be used in the system. The sensor module in contact with the user's finger. The user puts the tip of the middle finger touching the hTC phone surface, such that it covers both the camera and the adjacent ash, as shown in Fig. 2. The sensor module may be attached to the finger by a strap, or the sensor module may be shaped to fit over the finger. Alternatively, the finger may simply be applied to the sensor module.

![Figure 2: Example of using a smartphone for pulse reading.](image_url)
A video stream is captured from the camera at 60 frames per second. A segment of 256x256 pixels from the center of each video frame is fed into the proposed algorithm. In this study, a light source illuminates the skin surface with emitted light. The intensity of scattered light reflected from the skin and received by light detector depends on the blood flow in the skin.

When our application starts to receive stable signal (Fig. 4(b)), a countdown timer is provided for the user. During data capture, if the signal quality falls below certain limit, the mealy machine goes back to the pixels state and stops counting, indicating the user to reposition user’s finger. At the end of a successful computation, the result is displayed on the monitor (Fig. 4(c)).

![Figure 3: Users Interface.](image)

Figure 3: Users Interface.

![Figure 4: Display of heart beat on phone. (a) Monitor; (b) Data Acquiring; (c) Result Computed.](image)

Figure 4: Display of heart beat on phone. (a) Monitor; (b) Data Acquiring; (c) Result Computed.

![Figure 5: Display of heart beat on phone and tablet PC](image)

Figure 5: Display of heart beat on phone and tablet PC

Fig. 5 shows that our system combined with brainwave patterns, additional electroencephalogram measuring N-Series by
Neurosky, with the original composition, increasing the finger measurement method, and then continues to read the N-Series brainwaves observed four-wave of excitement and mental state of the sympathetic nervous degrees.

RESULTS AND DISCUSSION
We have shown that the technology available in a standard mobile phone camera has the potential to be used as an accurate multiparameter physiological monitor. Estimation of heart beat using intensity changes in the video signal provided results that were accurate compared to their respective standards. Heart beat measurements derived from an ECG and the mobile phone were also shown to agree favorably.

CONCLUSIONS AND FUTURE WORK
The mobile phone-based biofeedback applications can open new opportunities to use this technology as a persuasive tool in e-health as biofeedback is used to induce state of calmness on individuals which might affect positively user’s behavior.
Future work of mobile biofeedback might include other techniques of biofeedback such as ECG biofeedback, neurofeedback or muscle activity biofeedback which are used for treating other specific health related problems. This study was focused on the effects on stress and anxiety by means of biofeedback, but the equipment designed might be used to improve other problems of health, such as headache, cardiovascular disease, hypertension or other problems of health.

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