

A PORTABLE DEVICE FOR HEALTH MONITORING AND AUDIO VISUAL REPORTING

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ABSTRACT

Stress is the main issue in day today life because of increasing cases of mental retardation and heart attacks. Stress has huge impact on human body. Skin conductance increases with increasing stress level. Skin conductance, also known as Galvanic Skin Response (GSR) is a method of measuring the electrical conductance of the skin, which varies with its moisture level. GSR is of interest because the sweat glands are controlled by the sympathetic nervous system, so moments of strong emotion, change the electrical resistance of the skin. We have additional feature of heart beat detection system to identify severe heart condition and even heart attack.

Our system deals with digitization of these pulses to check the biomedical parameters of human body. We plan to create a portable device to check the stress level of human being and provide the instant result on any android device screen with audio announcement. Digital heart beat pulses can be demonstrated on PC using display devices. Using professional software records of pulses can also be maintained which is not possible in traditional systems. Our project deals with the system of combined approach to heart beat and GSR values to predict the condition of patient.

Keywords: GSR, Heart Beat, Galvanic, Arousal

1. INTRODUCTION

At present, the computer can be used for emotion recognition through a variety of signals; common signals mainly include the speech signal, facial expression, human gesture and physiological signals etc. Picard in the literature believes that speech, facial expression and human gesture can be deliberately hidden by people, but the autonomic nervous activity cannot be controlled by people. Therefore, in recent years, a large number of domestic and foreign scholars and research institutions increasingly pay attention to physiological signals such as the galvanic skin response signal (GSR), heart rate (HR), electrocardiogram (ECG), electromyogram (EMG), respiration, skin temperature etc., which have been used into emotion recognition research. GSR signal contains substantial information about human emotion, the GSR signal is controlled by the sympathetic nervous system of the human body, and human's mood changes will directly affect the changes of the endocrine system, and then lead to changes in the sympathetic nervous system of human body and reflect on the GSR of human body.

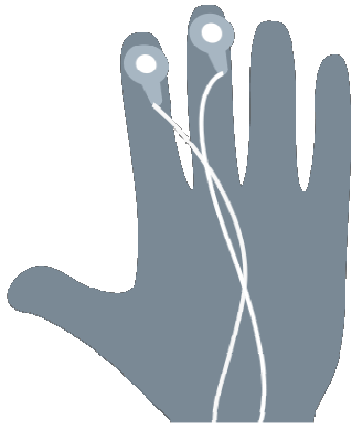


Fig.1: Skin Conductance

2. EXISTING SYSTEM

Heartbeat, ECG and body temperature based systems. The Pulse Sensor is a plug-and-play heart-rate sensor for Arduino. It can be used by students, artists, athletes, makers, and game & mobile developers who want to easily incorporate live heart-rate data into their projects. Essence it is an integrated optical amplifying circuit and noise eliminating circuit sensor. Clip the Pulse Sensor to your earlobe or fingertip and plug it into your Arduino, you can ready to read heart rate. Also it has an Arduino demo code that makes it easy to use

2.1 DRAWBACKS

- Highly accurate and reliable biomedical tool.
- Battery power and portable device.
- Galvanic Skin Response is far accurate and it varies from person to person proportional to stress level.
- Audio announcement and real-time screening on any android device by interfacing project with wireless Bluetooth connectivity.

3. PROPOSED SYSTEM

3.1 SKIN CONDUCTANCE

One of the most sensitive markers for emotional arousal is galvanic

skin response (GSR), also referred to as skin conductance (SC) or electro-dermal activity (EDA). EDA modulates the amount of sweat secretion from sweat glands. The amount of sweat glands varies across the human body, being highest in hand and foot regions (200–600 sweat glands per cm²). While sweat secretion plays a major role for thermoregulation and sensory discrimination, changes in skin conductance in hand and foot regions are also triggered quite impressively by emotional stimulation: the higher the arousal, the higher the skin conductance. It is noteworthy to mention that both positive (“happy” or “joyful”) and negative (“threatening” or “saddening”) stimuli can result in an increase in arousal – and in an increase in skin conductance.

3.2 HEART BEAT

Our system is also equipped with laser type heart beat sensor for increased efficiency and accurate results. Whenever the system detects finger it starts to pass the laser through our veins and one photo resistor is present to detect the amount of light passing through veins. System is highly efficient and usable directly interfacing with microcontrollers.

3.1 PROPOSED APPROACH: A COMBINED SYSTEM OF HEART BEAT AND GSR

Our proposed system is a portable device which measures the electrical conductance between 2 points, and is essentially a type of highly sensitive ohmmeter. GSR allows us to spot such strong emotions or body problems by simple attaching two electrodes to two fingers on one hand. In the severe panic condition or all abnormal condition the resistance values decreases to certain level. We calculate that and term them as abnormal condition based on GSR values. The system is far accurate compared to heartbeat monitoring alone, or body temperature monitor which can

change in normal conditions also. We use android application to display the numeric sensor values and audio announcement to make use of the system very simple and impressive for common man.

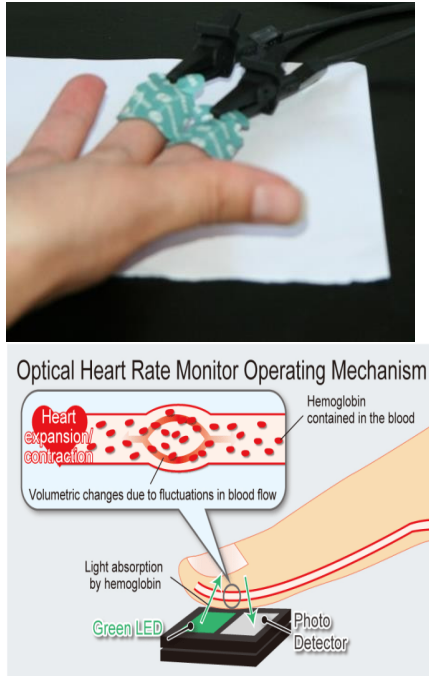


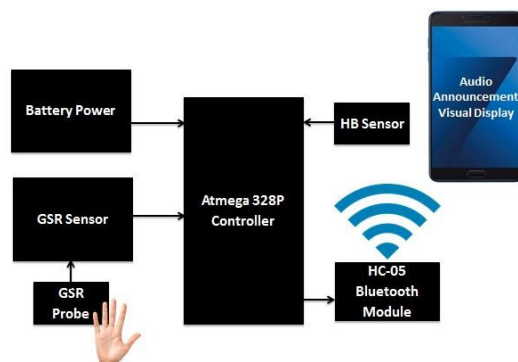
Fig.2: Galvanic Skin Response

Fig.3: Heart Beat System

3.2 ADVANTAGES

1. Highly accurate and reliable biomedical tool.
2. Real time recording to have patient's history.
3. Galvanic Skin Response is a new parameter implemented newly which is used.
4. Project can be further enhanced to see the body parameter from remote locations using internet.

4. BLOCK DIAGRAM



5. SENSOR DETAILS

5.1 GSR SENSOR

Electro dermal activity (EDA), is the property of the human body that causes continuous variation in the electrical characteristics of the skin. Historically, EDA has also been known as skin conductance, galvanic skin response (GSR), electro dermal response (EDR), psych galvanic reflex (PGR), skin conductance response (SCR), sympathetic skin response (SSR) and skin conductance level (SCL). The long history of research into the active and passive electrical properties of the skin by a variety of disciplines has resulted in an excess of names, now standardized to electro dermal activity (EDA).



Fig.4: GSR Sensor

5.2 HEART BEAT SENSOR

Heartbeat sensor provides a simple way to study the function of the heart which can be measured based on the principle of psycho-physiological signal used as a stimulus for the virtual- reality system. The amount of the blood in the finger changes with respect to time. The sensor shines a light lobe (a small very bright LED) through the ear and measures the light that gets transmitted to the Light Dependent Resistor. The amplified signal gets inverted and filtered, in the Circuit. In order to calculate the heart rate based on the blood flow to the fingertip, a heart-rate sensor is assembled with the help of LM358 OP-AMP for monitoring the heartbeat pulses.

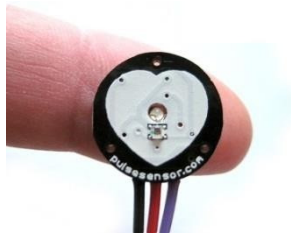


Fig.5: Heart Beat Sensor

8. CONCLUSION

Thus we created a new concept of biomedical tool for body parameter measurement. If our system is implemented doctors from several countries can come together to work for a patient as they digital information based on new feature and that too of GSR level high accuracy. Our system can be readily implemented in hospitals to check the body parameter value for body conductivity. It's a self-independent system to analyze the body condition. It has the additional Heart Beat sensor to properly identify the heart condition and can warn for heart attack chances.

8.1 FUTURE WORK

In future system can be designed in much smaller size to fit human wearable devices like watch or necklace. If stress increases beyond higher value then human body should get proper medicine automatically so heart attacks or panic attacks can be avoid. It can be used as anti-suicide device also if a person's stress level increases they think about suicide then it should send SMS so family members to alert about the situation.

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