

Android Based Cardiac Ejection and Retinal Function of Human Body in Home Monitoring System

D.Kodandapani, V. Agalya, P. Ramesh, P.Velrajkumar, M.Hari



Abstract: The main objective of the paper is to measure carnal parameters, such as Blood pressure, Pulse rate, ECG (Electrocardiogram) monitoring, Temperature and retinal function (ERG-Electroretinagram) of a human subject. The individual is observed inside his own home itself. In this research the patient well being is observed by utilizing sensor and the procured information is transmitted to a microcontroller unit. The data is collected by receiver side with Bluetooth and displayed on android mobile.

Index Terms: Microcontroller, Blood pressure, ECG, Temperature, Retinal, Bluetooths

I. INTRODUCTION

Now days, innovation has entered in all parts of everyday life. Everyone's life has become very fast in the present technological environment. People are not cautious and attention free about their health [1]. Many of the researchers have done their work related to ECG and ERG. In [3] this paper only based on ECG monitoring system. Here ECG signal is captured by using sensor and sensed value is passed to the hospital by using wireless module. In [4] this paper based on ballistocardiography (BCG), to measure ballistic force of the heart. In this paper, BCG signal is captured by using sensor and the sensed signal is passed through Data acquisition (DAQ) and compared with the reference value. The output is the comparison of two values. So here is a need to plan a perfect framework that would give us the fast and precise body condition to send the outcomes to a smart phone by means of Bluetooth. Abdurrahman Mohammad Alaql presented a novel 'Analysis and Processing of Human Electroretinagram'. In [5] is based on ERG monitoring of the patients, where the function of human eye is monitored. The

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controlling unit of this device is, where the PC is in charge of initiating the test by triggering a timed pulse of light. The light

source is coordinated to the subject's eye and the cathodes are associated with the subject's pupil. ERG signal is passed through the microcontroller to convert from analog to digital. Then output of the ERG is displayed on LCD. Here MATLAB is used for triggering the light source. In [2] this paper author says that " the present emergency clinics are enormous with various wards arranged at better places, for example, men's wards, ladies' wards, maternity wards, general wards, uncommon rooms, and all the more critically ICU's. Specialists need to continue checking every one of the patients in these wards ceaselessly, and this requires increasingly number of medical caretakers and other concerned representatives. It isn't practical for the doctors to go to each ward and every patient as often as possible for every thirty minutes" .Keeping all these aspects in the mind, this paper has developed wireless carnal parameter monitoring in home itself. In this framework the patient's carnal parameters, for example, body temperature, circulatory strain, and heartbeat rate, ECG and ERG can be checked constantly. This is very much useful to medical application as it is compact in size and cost effective. In the event of crisis for elderly individuals who are enduring with heart infections nonstop checking of the patient [6] is required which is sometimes impractical in the clinic, or if the patient area is far away from the medical clinic .In such cases this model circuit is valuable to quantify the pulse and temperature of the individual and the data is transmitted to the restorative warning for the fundamental precautionary measures with the goal that patient can be leveled out, kept from significant circumstance before achieving the emergency clinic.

II. DESIGN METHODOLOGY

In this framework persistent observing of patient's various parameters, for example, body temperature, circulatory strain Pulse rate, ECG and retinal capacity are checked and showed on patient's side for patients comfort. The same information is transmitted persistently to the beneficiary side or in specialist's lodge where the information is gathered with Zigbee and Arduino and showed on smart phone. The proposed block diagram is shown in Fig 1.

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A. Block Diagram



Fig.1. Block diagram of proposed system.

Electroretinagram module plays a vital role in the proposed system. That block diagram is shown in Fig 2.

B. Electrorectinagram Module



Fig.2. Block diagram of Electroretinagram module.

Electroretinagram module contains of amplifier, band pass filter, Analog to digital convertor, and computer. For testing of eye functioning, Electrodes are fixed to the eye corona. Light is frequently passes to the eye vision. The electrodes will absorb the activity of eye ball pulse value. These pulse have minimum voltage level and maximum noise. So that signal is pass through the amplifier and band pass filter circuit. Amplifier circuit is used to amplify the signal and band pass filter is used to reduce the noise level of the signal. These signals are changed over into computerized by utilizing the ADC. The outcomes are appeared on PC and furthermore on LCD. LM35 is an incorporated circuit sensor used to gauge temperature with an electrical yield relative to centigrade temperature. Low yield impedance, straight yield, and exact natural adjustment of the LM35 gadget makes interfacing to readout. ECG sensor is utilized to quantify the electrical movement of the heart. That electrical action of the heart sign is simple in nature. That sign are amazingly loud. The deliberate pulse sign have least voltage level. So that signal is passed through the amplifier and band pass filter circuit. Amplifier circuit is used to amplify the signal and band pass filter is used to reduce the noise level of the signal. This is converted into analog to digital by using the microcontroller. Then result is displayed on computer and LCD. The Arduino Uno is an 8 bit microcontroller board, which has various types of controllers ICs, for example AT mega, ATMEL, etc... Arduino UNO microcontroller board is used to processing of analog to digital conversion and controlling the receiver part. The Bluetooth is one of the remote correspondence innovations utilized in a wide range of framework for remote correspondence. Bluetooth is used to transfer the data from one place to another place.

III. RESULTS AND DISCUSSIONS

A. Simulation Circuit

Simulation circuit of proposed system is shown in Fig.3. This simulation circuit is made with the help of PROTEUS 8 software. This is the open source software for simulating the circuit diagram. In this software each components have their libraries. In simulation time if any components are needed, go to the pick device option in schematic capture window then search that components and pick and paste to the working path.



Fig.3.Simulation diagram.

From fig 3 POT is considered as the sensors. POT is a variable resistance. In this resistance value is given to the microcontroller. But proteus software only accepted the .hex file. So by using the Arduino software .into file is converted into .hex file. Then this program is coded in microcontroller. Microcontroller is used to convert the analog voltage to digital voltage and this value is display on LCD.

B. Simulation Result

Simulation result of proposed system as shown in Fig4. While doing the simulation process get the approximate output from the circuit. The output will be changed in accordance with the change in resistance value.



Fig.4.Simulation Result.

The maximum and minimum resistance value of the sensor is given in Table 1.



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Tuble T Resistance value for various sensor		
FUNCTION	INPUT	OUTPUT
CARDIAC	MAX-1K Ω	ABNORMAL
	MIN-500 Ω	NORMAL
RETINAL	MAX-10K Ω	ABNORMAL
	MIN-500 Ω	NORMAL
TEMPERATUR	MAX-1K Ω	ABNORMAL
E	MIN-500 Ω	NORMAL
PULSE	MAX-1K Ω	ABNORMAL
	MIN-16 Ω	NORMAL

Table 1 Resistance value for various sensor

C. Hardware Implementation

In this research an android based minimal effort pulse and body temperature observing framework has been actualized. The device is compact and light weight with the goal that it very well may be conveyed effectively anyplace. Different sensors are utilized to screen the pulse, circulatory strain, body temperature and convert into computerized structure. These factors are contrasted and wanted qualities put away in the processor and showed on the LCD show and send to android versatile through Bluetooth. Equipment execution of proposed framework is appeared in figure 5.



Fig.5. Hardware implementation of proposed system.

Here Pulse sensor and LM35 sensor detects the beat, pulse, circulatory strain and temperature. Electrodes are fixed to the hand and eye corona to sense the ECG and retinal function. These sensed values are transmitted to the amplifier circuit through the microcontroller unit. Crystal oscillator generates 11.0952MHz of signals used to operate microcontroller. The data of the sensor circuit convert to ADC and displays the values on LCD and also on android mobile via Bluetooth.

The following results are obtained while testing: figure 6 shows the display of heart beat, body temperature.



Fig.6.Welcome Screen displayed after switch on the kit.

At the initial stage, the sensors reads zero, when not in contact with the human body except temperature, as the temperature sensor reads room temperature.

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Fig.7.Values obtain from initial stage.

The sensors are fixed to the relevant place of the body as shown in the figure 7. The sensored values are send through the microcontroller and displayed on LCD as shown in the figure 8.



Fig.7. Hardware setup.



Fig.8.output parameters.

Hardware kit is interfaced to computer with the help of RS232 cable and Output of ECG, ERG, pulse rate and temperature values are viewed in the computer by using Lab VIEW software as shown in Fig. 9.



Fig.9.Digital output using Lab VIEW.

The patient can monitor As a result for those patients for whom it is must to monitor our body condition continuously using android mobile phone.

IV. CONCLUSION

In the proposed system the prototype contain ATmega328 Microcontroller, Bluetooth module, LCD, individual sensors and other equipment circuit to send the message to the corresponding observer mobile phone for playing it safe to take care about the patient in a given fixed time interim.



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The auto alert office in this frameworks works for the strange conditions, when the perusing of the indispensable signs surpasses from fixed level. The gadget has enough extent of progress in further research. In future, enhancement of this work can be done by adding automatic administration of medicines to the patients during the critical conditions and to track the location of the people by using GPS tracking system. In Automatic Injection System, when the level of heart beat goes high or too low, this system will inject the medicine into body of the patient automatically. GPS Tracker is used to track the patient at any period of time. Added to this features, the patient also gets advice from the pre stored voice recorder.

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