

HUMAN BODY TEMPERATURE AND HEART RATE MONITORING ON MOBILE SCREEN OVER BLUETOOTH WIRELESS TECHNOLOGY

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Abstract-This paper is based on the development of a Pic controller based system for monitoring the Human body temperature and Heart rate monitoring on the mobile screen display with the use of Bluetooth wireless technology. In today's world, everyone is suffering from different health problems, according to the reports the major causing health issue is heart attacks. In order to help the people, we came up with this project where everyone can monitor their heart rate and body temperature and use efficient medical services can be taken before the serious issues. This proposed approach uses two sensors which give the readings of heart rate and body temperature of a patient which are controlled by PIC microcontroller. These readings are displayed on the mobile screen with the help of Bluetooth technology and buzzer is used to alert the rise and fall of heart rate and body temperature.

Keywords-Heartbeat sensor; Temperature sensor; Bluetooth technology; Pic microcontroller.

I. INTRODUCTION

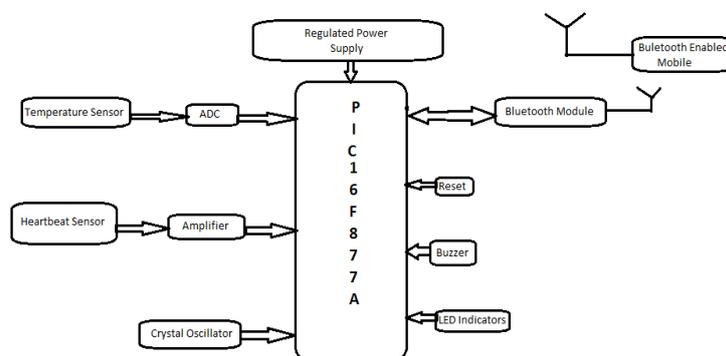
In today's world, more than 2 million people are at a high risk of having a heart attack. It would be helpful if there was a way for people to monitor their heart. Basically, the word Heartbeat is the sound of values in his/her heart contracting or expanding as they force blood to flow from one region to another. The number of times the heart beats per minute (BPM), is the heart rate. Normally the human heartbeat is 72 BPM. The pulse rate may fluctuate and increase with exercise, illness, injury, and emotions. Females ages 12 and

older, in general, tend to have faster heart rates than do males. Athletes, such as runners, who do a lot of cardiovascular conditioning, may have heart rates near 40 beats per minute and normal human body temperature is also known as normothermia or eutheria, is the typical temperature range found in humans i.e... the range is typically stated as 36.5 degrees C to 37.5 degrees C (97.7-99.5 degrees in F). Temperature can be measured by using a different kind of sensor like thermistors, thermocouples, Integrated circuits(Ic's) sensors.

II. METHODOLOGY

Heartbeat monitor and display system is a portable and the best replacement for the old model Stethoscope which is less efficient. The heartbeat rate is calculated manually using stethoscope where the Probability of error is high because the heartbeat rate lies in the range of 70 to 90 per minute whose occurrence is less than 1 sec. So this device can be considered as a very good alternative instead of a stethoscope. The functioning of this device is based on the truth that the blood circulates for every one heartbeat. which can be sensed by using a circuit formed by the combination of an LDR and LED. Depending upon the rate of circulation of blood per second the heartbeat rate per minute is calculated. The temperature is read by the ADC (Analog to Digital Converter) module of the microcontroller Unit. This ADC data is processed and converted into the actual temperature reading by the microcontroller.

Block Diagram-



III. EXPLANATION

The project aim is to monitor the temperature of the human body and heartbeat/rate of the patient is monitored easily in our mobile phone over the Bluetooth wireless technology. Heartbeat is defined as the valves in his/her heart which is expanding or contracting they pump blood from one region to another region, normal human heartbeat in 72 BPM we can feel heart rate and the beat of the heart in any of the artery that lies close to the skin is nothing but that is pulse. As we don't know the health conditions of people more than 2 million are having a high risk of a heart attack this project may them to minimize the risk of sudden heart attacks because it monitors the heart rate of the patient. So this is the way to solve this problem. Euthermia is also called a normal human body temperature and its typical ranging is about 36.5 C-37.5 C (97.7 F-99.5 F).

According to the ages heart rate differs like

For New Born	-	140
For 7 Years children	-	85-90
For 14 Years children	-	80-85
For Adult	-	70-80

The temperature sensor used in this project is LM35 the output of this sensor is analog voltage according to temperature, as LM35 is a low-cost sensor whereas its output voltage is proportional to centigrade temperature scale and one more advantage of using LM35 sensor is calibration in Kelvin is not required subtraction of large constant voltage to obtain the required centigrade temperature. The LM35 temperature sensor has zero offset voltage i.e. its output is zero at 0 C, its maximum output would be $150 \times 10 \text{ mv} = 1.5 \text{ v}$.

The principle behind the heartbeat sensor is photoplethysmography, Plethysmograph an instrument mainly used to it measures the changes in the blood volume through any of the organs in the human body that causes a change in the light intensity through that organ. There are two basic types of photoplethysmography they are,

- A. *Transmittance photoplethysmography and*
- B. *Reflectance photoplethysmography*

Reflectance Photo plethysmography:- A light source and a light detector are placed on the same side of a body part. Reflectance photoplethysmography is used in this design.

Transmittance photo plethysmography:- In this light source and light detector are placed on the opposite side of the body part.

Heartbeat sensor is a chip and also it has a fingertip probe connected to it, the finger is placed in between the probe so it will measure the heartbeat of the patient in terms of beats per minute. Bluetooth is wireless transmission technology this is used in this project to display both the heartbeat rate and temperature of the patient continuously, over signal or information sent by the Bluetooth module and Bluetooth used here is a short-range wireless transmission.

The crystal oscillator is used vibrating mechanical resonance circuit used for generating signals by varying the frequency, crystal oscillator generates the pulses to the heartbeat sensor where microcontroller controls the crystal

for synchronizing the operation, the process of synchronization is called aa machine cycle.

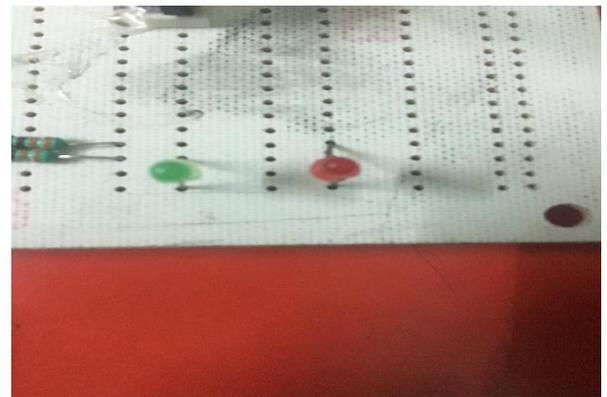
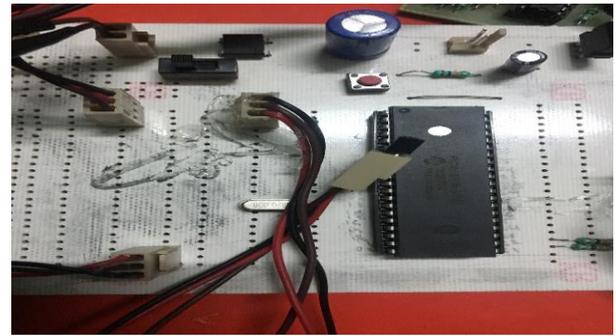
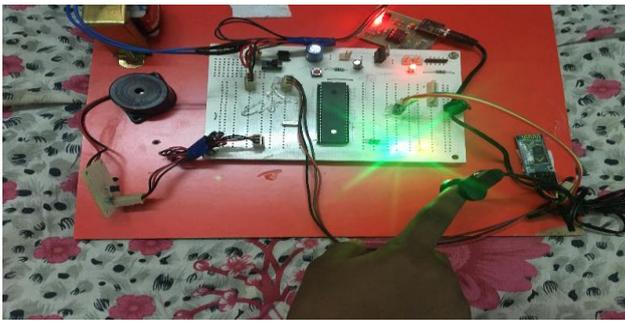
As we are in an advanced generation it's easy to monitor the wireless patient monitoring system to measure heartbeat and body temperature of the person by using embedded technology, the project describes the simple low-cost microcontroller-based human temperature and heartbeat measuring device with mobile phone displayed output.

The power supply is a supply of electrical power, it is a system that supplies electrical and other types of energy to an output load, regulated power supply (RPS) consist of a transformer, rectifier, filter, regulator. A transformer is an electrical device that transfers electrical energy from one circuit to another circuit through inductively coupled conductors without changing its frequency, the transformer we use here is step down transformer in case of this primary winding induces more flux than secondary winding, and this is having less number of turns so it releases less amount of flux and releases less voltage. The rectifier converts alternating current to direct current. Filters are used to remove the unwanted frequency components from the output of the rectifier. Regulators are used to maintaining constant output without any fluctuations.

Heartbeat sensor and temperature sensor are connected to the pins of microcontroller that gives information to the microcontroller to process the signal, where we use ADC converters because microcontrollers can understand only the digital data input. Bluetooth module is also connected to the microcontroller pin to process the data information to the Bluetooth module, crystal oscillators are used that generates the pulses to the heartbeat calculation process. A buzzer is used to indicate the alert beep sound when the temperature and heartbeat value is exceeded then the threshold value which is fixed by the circuit designer in the program than the buzzer indicates the sound of warning alarm to be alert to the patient. A reset button is used to clear the data and it generates the newly calculated output. LED indicators used are red and green where the temperature and heartbeat is exceeded than the threshold value then it is indicated with the red color light that patient is abnormal, whereas when the patient temperature and heartbeat value is less than the threshold value and equal to the fixed threshold value then it is indicated color of light is green which says that the patient is in normal condition. Now the processed information is displayed on the Bluetooth enabled mobile phone, by pairing a mobile phone with Bluetooth module it displays the calculation of heartbeat and temperature of the patient.

IV. RESULT ANALYSIS

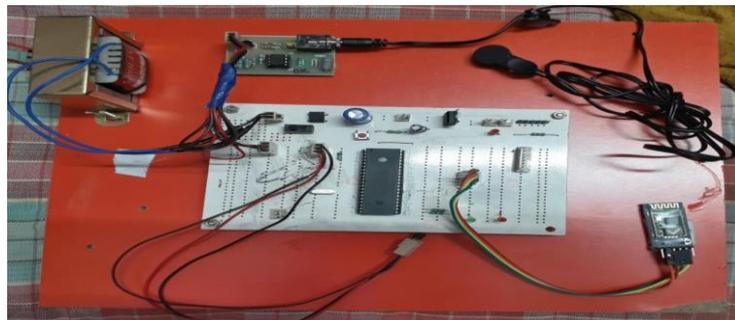
The project "human body temperature and heart rate monitoring on mobile screen over bluetooth wireless technology" was designed In health care systems, as the time grows, the data related to health will be produced and amassed incessantly, resulting in implausible dimensions of data.



V. OUTPUT

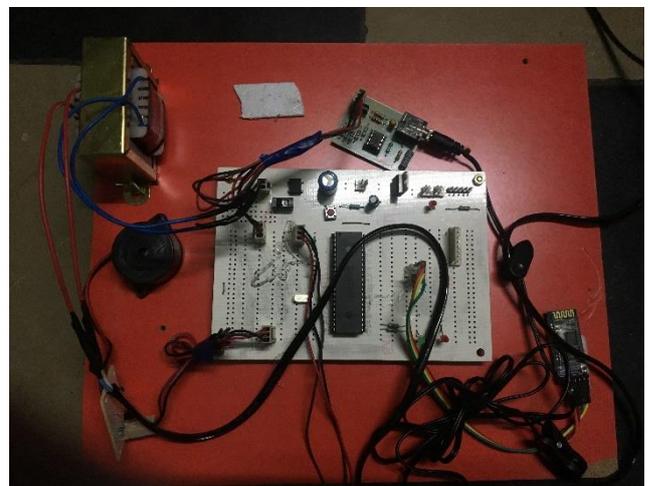
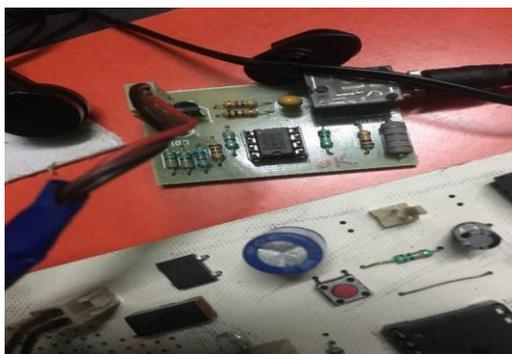
Our project “human body temperature and heart rate monitoring on mobile screen over bluetooth wireless

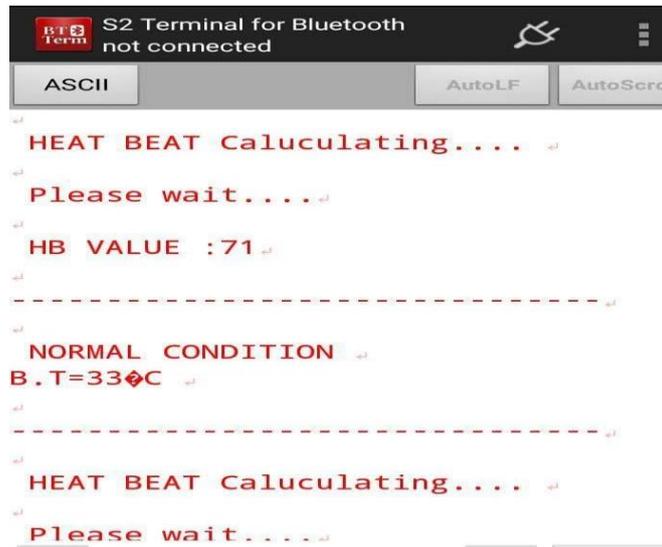
technology”, the output measured data i.e.. Body temperature and heart rate can be can be observed on the mobile screen.



Advantages:

1. Automatic patient data monitoring.
2. server-based data updating to the doctor.
3. Life status display on the mobile screen.





VI. DISADVANTAGES

As we are using prototype fingertip probe and prototype temperature sensor the data values may vary slightly.

Applications-

- A. *Vehicle Security Applications.*
- B. *Ambulance tracking.*

VII. CONCLUSION

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

VIII. FUTURE SCOPE

Our project "human body temperature and heart rate monitoring on mobile screen over bluetooth wireless technology" is mainly intended to know the temperature and heartbeat directly with the help of technology and we can monitor with Bluetooth device.

This project can be extended using high-efficiency GPS receiver and a GSM module. The GSM module gives the intimation of the person with this system through SMS.

REFERENCES

The sites which were used while doing this project-

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- [2] www.microcontrollerslab.com

Books Referred-

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- B. *Embedded C –Michael.J.Pont.*