

HEART RATE AND BODY TEMPERATURE MONITORING SYSTEM USING IOT

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Abstract— Healthcare monitoring programs have emerged as one of the most important programs and have become the focus of technology for the past decade. People are facing the problem of untimely death due to various diseases caused by a lack of timely medical care of patients. The ultimate goal was to develop a reliable patient monitoring system using IoT so that health care professionals could monitor their patients, who may be hospitalized or at home using an integrated IoT health system with a view to ensuring better patient care. A mobile device has been developed based on a wireless health care system that can provide real-time online information about a patient's physical condition, especially those involving nerves, data acquisition unit, i.e., Arduino, and software (Arduino IDE). The patient's temperature, heart rate is monitored, and is maintained by the system and sent to the doctor's cellphone containing the request. Therefore, an IoT-based patient monitoring system effectively monitors the patient's health status and saves lives in time.

Keywords—IoT, Arduino, IDE (Integrated Development Environment), Physiological.

I. INTRODUCTION

The heart is one of the most important organs in the human body. It acts as a pump for oxygen and blood circulation throughout the body, thus keeping the body's immune system strong. A heartbeat can be defined as a two-part heartbeat that occurs in about a second. It is produced due to heart failure. When blood collects in the upper chambers, the SA (Sino Atrial) node sends an electrical signal that causes the atria to narrow. This shortening then pumps blood through the tricuspid and mitral valves; this phase of the pumping system is called diastole. The next stage begins when the ventricles are completely filled with blood. Electrical signals from the SA node reach the ventricle and cause them to reach. In today's world, heart problems are far more common. Heart disease is one of the leading causes of death for both men and women. It costs about 1 million deaths every year. Heart rate is an important parameter of heart function. Monitoring of heart rate is therefore important in studying heart function and thus maintaining cardiovascular health. This paper proposes a heart rate monitoring system using IoT. Today the treatment of many heart-related ailments requires continuous and long-term monitoring. IoT is very useful in this regard as it replaces conventional monitoring systems with an efficient system, by providing sensitive information about the patient's condition to the physician. In addition, nurses or a physician who is available at the hospital can monitor the patient's heart rate on a serial monitor using a real-time monitoring system.

PHOTOPLETHYSMOGRAPHY: photoplethysmography (PPG) is an inexpensive visual technique that can detect changes in the volume of blood flowing through the capillaries from the surface of the skin. Photoplethysmography was developed in the late 1800's when scientists observed real-time blood flow using light bulbs. It was not until the late 1930's that the word "photoplethysmography" was coined by scientists. With the advancement of technology, the development of PPG is now focused on programs for consumers using portable devices. These wearable devices are usually connected to a connecting device to explain the results obtained. Today, those mobile devices have been replaced by smart phones to deliver data to consumers in a more user-friendly way. Interaction with smart phones is done using Bluetooth technology. Bluetooth is a low-power wireless communication technology that allows users to connect, transmit, and receive data over the air between two compatible devices. Photoplethysmography is based on plethysmography techniques, where with a simple optical setting can help detect volume changes in peripheral blood circulation. This procedure is non-invasive because it makes measurements in the area of the skin. The technology uses optoelectronic elements, such as a red or near infrared light source, to illuminate the skin and the image detector to detect variations in intensity of light within a given area. Usually, red or near infrared light is used to lighten the skin. This light travels through the tissues and is absorbed by the pigment, bones and blood. PPG sensors detect changes in blood flow volume by detecting changes in light intensity

II. LITERATURE REVIEW

Microcontroller based on spontaneous heart rate calculator from Mamun AL finger, Ahmed N, ALQahtani (JATIT) Journal of Theory and Applied technology ISSN 1992-8645: In this study paper heartbeat signals collected on the finger or ear using IR TX- RX (Infrared Transmitter and Receiver Module) expanded to be converted to visual scale. The ground filter is used to filter the natural sound. These signals are calculated with a microcontroller module (ATmega8L) and displayed on an LCD. Microcontroller is programmed with the algorithm to use the proposed heart rate calculator. Results obtained using this procedure compared with those obtained from manual tests involving calculating heart rate were found satisfactory. The proposed plan applies to family, hospital, community health, sports health care and other medical purposes. Also, it is suitable for adults and children. However, this approach to the advanced system requires further research and requires

further implementation, which may be helpful in anticipating future research.

Hearing heartbeat and finding heart attack Through the Internet of Things: Io Aboobackersidheeque, Arith Kumar, K. Sathish, (IJESCE) International Journal Of Engineering Science and Computing, April 2007: In this research paper the introduction of heart rate monitoring and cardiovascular diagnostics -net material is displayed. These days we have seen an increase in heart rate and heart disease. The sensor is connected to a small controller that allows you to check the heart rate with an ad that you send online. User can Set heart rate limit. After setting these limits, the system begins to monitor and as soon as the patient's heartbeat exceeds a certain limit, the system sends a warning to the controller who then transmits this online and notifies physicians and affected users. Also, the system warns of low heart rate. Whenever a user logs in to be monitored, the system also shows the patient's heart rate. Thus, anxious patients may monitor the heartbeat and receive notification of a heart attack immediately in any patient and the person may be rescued in time.

Cardiopulmonary Measurement and Temperature Remote Monitoring Using the Wireless Body Network Network Mohammad WajihAlam, Tanin Sultana and Mohammad Sami Alam International Journal of BioScience and Bio-Technology Vol.8, No.1 (2016): In this research paper , design and development of microcontroller based on heart rate and body temperature monitor using finger tip and temperature sensor are shown. The device combines the use of visual technology to detect blood flow with a finger and provides portable benefit over conventional recording systems. A wireless physical area network supported by remote patient monitoring systems has been given many problems including effective data extraction and powerful data processing to maintain data transfer quality. Examination of the device at real signals shows accuracy in heart rate, even under strenuous physical activity. This paper introduces these challenges and solutions to these problems by proposing an architecture that allows for the building of a network between patient and physician in order to enable remote patient monitoring by analyzing patient data. This system contains sensors used to measure heart rate and body temperature and is controlled by the central unit. The readings from these sensors are then processed and transmitted via a GSM module to a remote location where it is displayed on a cell phone. The optical heart rate calculator calculates the heart rate per minute and the temperature sensor measures the temperature from the body and both measured data are finally sent using wireless technology when the data is displayed on the cell phone for further patient monitoring and care. This device is shown to be better compared to traditional systems

SMS Heartbeat Monitor Warning 2009 IEEE Symposium on Industrial Electronics and Applications October 4-6, 2009, Kuala Lumpur, Malaysia. Warsuzarina Mat Jubadi, SitiFaridatulAisyahMohdSahak Department of Electronics Engineering University Tun Hussein Onn Malaysia BatuPahat, Johor, Malaysia: In this study paper, it

is shown that heart rate can be measured by monitoring a person's heart rate using special medical devices such as electrocardiograph (ECG).), portable wrist band, and any other heart rate monitor. Despite its accuracy, it is somewhat expensive, involving many clinical settings and the patient must be visited by a medical professional for regular monitoring. In a patient who has been diagnosed with a life-threatening heart condition, his or her heart rate should be monitored regularly. This paper has proposed a warning system that can monitor a patient's heart rate. Heart rate is determined using a photo plethysmograph (PPG) procedure. This signal is processed using a small PIC16F87 controller to determine the heart rate per minute. Then, send an SMS notification to the cell phone of medical professionals or family members of the patient, or their relatives via SMS. This will also alert family members to rush patients.

I. EXISTING SYSTEM

- In social insurance framework for patients who stays in home during post operational days checking is done either via overseer/ medical caretaker. Ceaseless observing may not be accomplished by this system, on the grounds that anything can change in wellbeing parameter inside of part of seconds and amid that time if guardian/attendant is not in the premises causes more noteworthy harm. So with this innovation created period where web administers the world gives a thought to add to another keen health awareness framework where time to time constant checking of the patient is accomplished.
- Drawbacks:
- Patient Data is not exchanged continuously.
- Patient needs to attend for every checkup.
- Critical condition is unknown.

II. PROPOSED SYSTEM

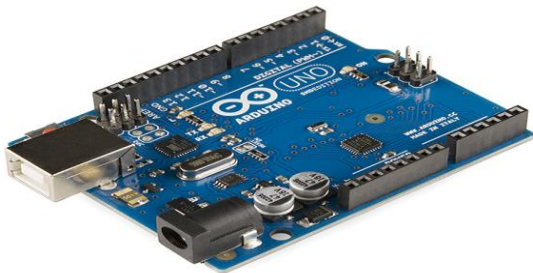
Regular monitoring and monitoring of health parameters such as temperature, heart rate, and more can be very difficult these days. It requires human alertness. If incase a person is negligent or has shared one-of-a-kind drawings or fatigue they can be cautious. So in this case death is also possible. In this case embedded technology is used. Fitness parameters are measured using different types of sensors. The temperature sensor and heart hear information from either male or female, then the sensor reading data will be sent to the cloud via GSM / GPRS and monitor the values in the cloud, and send a message when the sensory data exceeds the limit level. It will appear on the LCD to display sensor data. Here we use Arduino as a microcontroller.

Components Used:

1) Arduino UNO

The Uno with Cable is a small control board on the ATmega328. Contains 14 digital input / output pins (6 of which can be used as PWM effects); 6 analog input, 16 MHz ceramic resonator, USB connection, power jug, ICSP header, and reset button.

It contains everything needed to support a microcontroller; just connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.



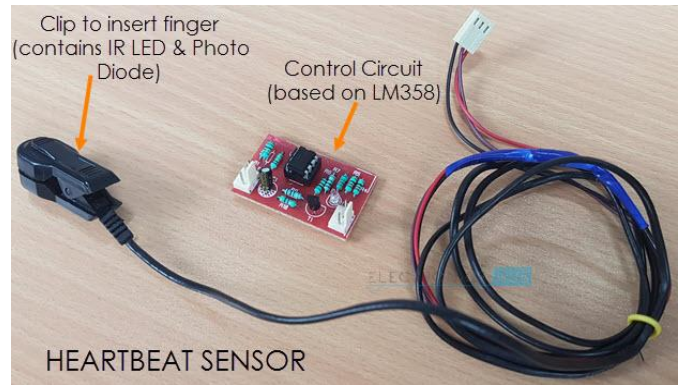
2) DS18B20 Temp Sensor

The DS18B20 is a unique type of temperature sensor and offers 9-bit to 12-bit temperature readings. These figures represent the temperature of a particular machine. The connection to this sensor can be made via a single-wire bus protocol using a single data line to communicate with the internal microprocessor. Additionally, this sensor receives the power supply directly to the data line so that the external power supply need is eliminated. DS18B20 temperature sensor applications include industrial systems, consumer products, thermal sensitive systems, thermostatic controls, and thermometers.



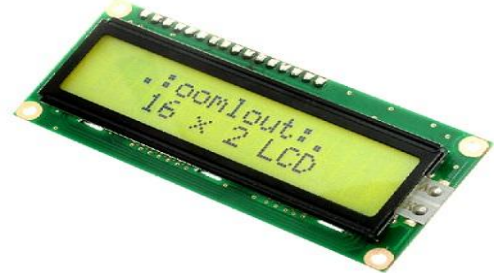
3) Heartbeat Sensor

- Monitoring of heart rate is very important for athletes, patients as it determines heart condition (mere heartbeat). There are many ways to measure heart rate and it is very accurate to use Electrocardiography
- But the easiest way to monitor your heart rate is to use a Heartbeat Sensor. It comes in a variety of shapes and sizes and allows for a faster way to measure heart rate.



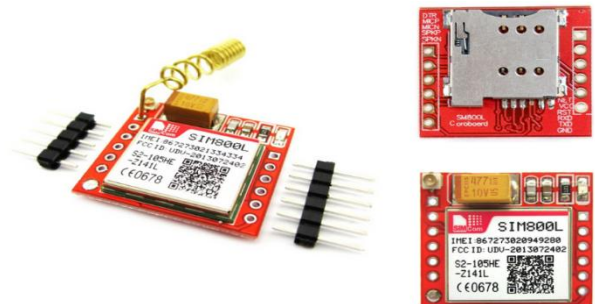
4) LCD

The word LCD stands for liquid crystal display. It is a single type of electronic display module used in a wide range of applications such as various circuits and devices such as mobile phones, calculators, computers, TV sets, etc. These indicators are best selected for multi-segment diode emissions with seven segments. The main benefits of using this module are inexpensive; easy to set, animation, and no limitations for displaying custom characters, specials and even animation, etc.



5) GSM Module

A GSM modem is a mobile device or modem that can be used to make a computer or any other processor network. The GSM modem requires the SIM card to be operated on and operates over a network range registered by the network operator. It can be connected to a computer via a serial connection, USB or Bluetooth.



Arduino IDE

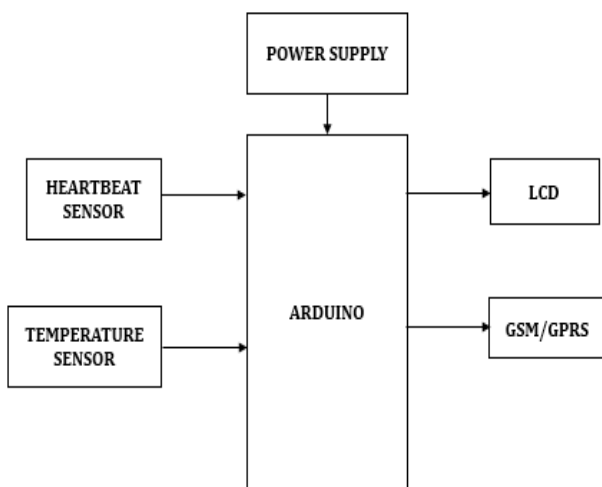
Arduino IDE (Integrated Development Environment) is used to write computer code and upload this code to the physical board. Arduino IDE is very simple and this simplicity is probably one of the main reasons why Arduino is so popular. We can safely say that compliance with the

Arduino IDE is now one of the key requirements of the new microcontroller board.



III. RESULT AND DISCUSSION

One of the growing social ills is human health. Anything else becomes useless when a person is sick or dead. For this reason, people spend a lot of money to maintain good health. Unfortunately, people often find that it is too late to get critical health care when things do not change. If measures are not taken early, many patients can be cured. However, access to many medical devices is not easy and expensive. Heart rate and body temperature are among the most important indicators of human health, and they have the advantage of easy access. In addition, unlike X-rays, measuring heart rate and body temperature has no effect on a person's health. There are other devices on the market right now that can provide medical measurement data to patients and physicians, but patients may not translate medical dosage into a reasonable diagnosis as they have a limited medical background. On the other hand, when raw medical data is brought to the doctor, it kills a lot of time and may cause problems, but in emergencies time will never be wasted. It is difficult to share data in a large area in a short period of time. Most of the products available in the current market have these major barriers to flexibility and portability.



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