Remote Patient Health Monitoring using IoT

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Abstract:- The motive of our project is to measure two parameters of patient .We have measured body temperature and heart rate using arduino and GSM module. Heart rate can be measured using pulse sensor and body temperature can be measured using LM35 sensor. The pulse sensor is basically used to show the readings in BPM (Beat Per Minute) and the body temperature will be displayed on the connected LCD along with BPM readings. And the displayed output will be sent to the registered mobile number using GSM module. With the implementation of this project we can measure body temperature and heart rate using GSM module and arduino and send the output to the registered mobile number of doctor by indicating whether the temperature and BPM is high, normal or low.

Keywords:- Pulse Sensor , Arduino, LM 35 Sensor, LCD Display, GSM Module.

I. INTRODUCTION

In today's world, now-a-days the maximum use of resources is always beneficial. So, the use of wireless technology is important to meet the need of remote control and monitoring. Remote patient health monitoring using Iot is a technology which helps us to monitor patients health even when the patient is not in the hospital or clinic. This device basically saves time of both patient and doctor and hence helps in increasing efficiency of health services.

The human health is one of the most important concern in the world. Everything becomes meaningless when one falls sick and dies due to improper medical. If we take early precautions on time then lots of patients can be saved. Among human health body temperature and heart rate plays the major role. In the medical field, the patients in the wards are usually the patients who need critical care due to acute, life-threatening illness or injury this device will be very helpful. The system efficiently updates doctor about health of patients as well as accurately calculates the heart rate and temperature of patient.

II. COMPONENT SPECIFICATIONS

The system consists of the sensors, whose individual specifications are mentioned below:

A. Pulse sensor

[1]Pulse sensor is a uncomplicated sensor which has many applications. It is made up of three pins : Vcc ,ground and the input signal. The led which is present at the center of the pulse sensor is basically used to detect heartbeat. The nature of this sensor is a heart shape. The advantage of using this sensor is that there is a noise elimination circuit below the led which will help to keep away the surrounding noise from affecting the readings. When we connect a pulse sensor with Arduino or GSM Module the LED which is present on the center of the pulse sensor will be turned ON. The pulse sensor will only work when the Vcc is connected in 3v or 5v with the help of any internet connection.

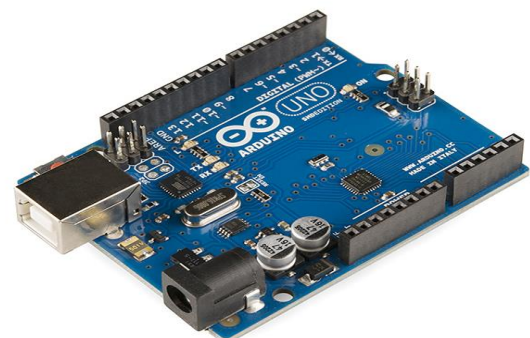Fig. 1: Pulse sensor

B. Arduino

Fig. 2: ARDUINO UNO

[6]The Arduino Uno is nothing but a microcontroller board based on the microchip ATmega328 and is developed by arduino.cc .The board is made up of 14 digital pins, 6
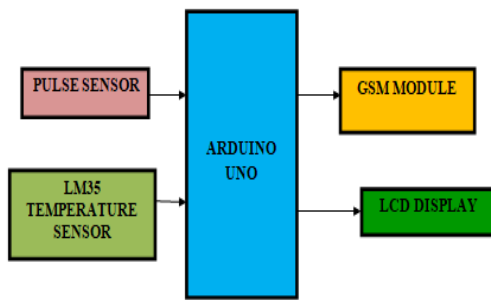
analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It is programmable with arduino IDE. It simply works by connecting it to a computer/laptop using a USB cable or power it with a AC-to-DC adapter or battery.

C. LM35 sensor

Fig. 3: LM35 sensor

[5]The LM35 sensor is a precision integrated-circuit temperature sensor whose output voltage fluctuate based on the temperature around it. The output voltage of LM35 is measured in the Celsius , while the other temperature sensors are measured in °Kelvin. The LM35 is cheap IC and used to measure temperature between -55 °C to 150°C.The LM35 sensor measures the body temperature and displays the temperature on LCD using arduino

D. LCD display

[7] The LCD used in this project is JHD 162A series with 16 characters x 2 rows LCD module. LCD is necessary in the project to display the measured heart rate and body temperature.LCD is nothing but liquid crystal display. Basically this LCD is connected to arduino. The role of LCD is to display all the messages coming from the controller.LCD module is used to provide interactive user interface.

[8]The 16×2 LCD pinout is shown below.

•Pin1 → VSS→used to connect the GND terminal
•Pin2 →VCC →used for power supply for logic circuit (+5V)
•Pin3 → V0→used to connect a changeable POT that can supply 0 to 5V.
•Pin4 →RS→ connected with D12 of Arduino Uno
•Pin5 →R/W→ used for read/write data

Fig. 4: LCD

•Pin 6 →Enable→ connected with D11 of Arduino Uno
•Pins 7-14 →Data pins
•Pin15→ LED+ →This pin is connected to +5V
•Pin16→ LED- →This pin is connected to GND

E. GSM module

A GSM is nothing but a (**Global System for Mobile Communications)** module which is used as a circuit or a chip to establish communication between a mobile network or a computing machine .It was developed by the European Telecommunications Standards Institute. It is used to describe the protocols for 2G cellular network used by mobile phones.GSM module is powered using power supply circuit and various communication interfaces. The functions of GSM module is to send SMS messages to the registered mobile number.

III. METHODOLOGY

The primary function of this project, is to designed a Remote Patient Health Monitoring System using IoT. The use of IoT device in this project is to read the heart rate using pulse sensor and read the body temperature using LM35 sensor. The Arduino Sketch implements the various functionalities of the project like reading sensor data and displaying measured pulse rate and temperature on LCD. Firstly we will assemble the circuit. Then upload the source code for the temperature and BPM using Arduino. Pulse Sensor measure BPM and LM35 Temperature Sensor measure body Temperature. The output of LM35 temperature sensor is given to analog pin of Arduino. The Arduino processes the code and displays it to 16*2 LCD Display. When you place your fingertip on the LM 35 sensor, the analog voltage will be converted to digital form in order to the process the reading of body temperature. When you place your fingertip on Pulse Sensor you can read the heart rate. The LED which is present at the center of the pulse sensor is basically used to detect heartbeat. Finally the displayed output of temperature and BPM on LCD is sent to the registered mobile number using GSM module. Basically GSM Module is used to send the data remotely to the registered mobile number and helps the doctor to check the status of patient. And the doctor will get to know whether the patient BPM and temperature is low, normal or high.

IV. BLOCK DIAGRAM

Fig. 5: Block diagram of the system

V. OUTCOMES

- The person will come to know about their heart rate in BPM (Beats Per Minute) by placing the finger in the pulse sensor and will get to know whether their heart beat is low, normal or high.

- When the LED will glow it will indicate that circuit is working properly and in this project we have used a LM35 temperature sensor which displays the body temperature on the LCD connected to it.

- This system describes the working of a very low cost remote patient health monitoring system which reads heart rate and body temperature and updates the report of the measured value as a text message to the doctor.

- This helps the people who are in remote areas and old people who has to visit the hospital on daily bases to check bpm and temperature.

VI. CONCLUSION

This device is established for home use by patients that are not in a life-threatening situation but need to be timely observed by doctor or family. So that we can effortlessly protect many lives by providing them speedy services. As per our title, remote patient health monitoring using Iot design is based on research idea that meets the patient's needs. The advantage of using this system is that it is very easy to use and handle individually. Also it take less than 1 minute for getting the exact result and sends the observed result to the doctor using GSM module.

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