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DESIGN AND IMPLEMENTATION OF IOT BASED SMART HEALTH CARE MONITORING SYSTEM

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Abstract – *The Electronics has entered almost in all aspects of day-to-day life, The need for well-equipped hospitals and diagnostic centers is increasing day by day as the people are becoming more conscious about their health problems but due to time constraint people are not visiting hospitals which might lead to lot of health issues at one instant of time. In biomedical fields special units are used, such as intensive care unit. Now a day's healthcare industry is to provide a better health care to people anytime and anywhere in the world in a more economic and patient friendly manner. In the present paper the physiological parameters such as Heartbeat and Temperature are obtained, processed using Arduino UNO.*

Key Words: Heart Rate, Temperature, Internet of Things

1. INTRODUCTION

The "Smart Health" refers to accomplishment of different sensors that captures the human body parameters. And the data obtained by the sensors can be used to provide smart health. IOT has given rise to smart health and its focus is on improving the health care system. A recent health care system should provide better health care services to people at any time anywhere in an affordable and patient friendly manner.

As the technologies are advancing it has become feasible to design Horne based vital sign monitoring system to display, record and transmit signals from human body to any other location. In India, everyday lives are affected because the patients are not timely and properly treated. Currently, the health care system is going to change from a traditional approach to a modernized patient centered approach. In the traditional way the doctors play the major role. For necessary diagnosis and advising they need to visit the patients. There are some basic problems related to this approach.

Firstly, the health care professionals must be at place of the patients all the time and second, the patient remains admitted in the hospital, wired to bedside biomedical instruments, for a long period of time. Our system is designed to be used in hospitals, houses, urban and rural areas etc. for measuring and monitoring various parameters like temperature, heart beat etc.

The body parameters are processed by ARDUINO UNO processor; it will display to the patient on LCD. The same data can be viewed by mobile/PC using WI-FI module, same data can be viewed by relatives of the patients.

2. OBJECTIVE

The main aim of our project is to develop reliable patient monitoring system using Arduino UNO Microprocessor so that the health care professionals can monitor the patients, who are hospitalized and also the people who are executing their normal daily life activities without being physically present to the patient's bed.

3. PROBLEM STATEMENT

In the existing system, most of them are using a personal monitoring devices such as digital thermometer and blood glucose monitor are some of the types which are available in the market . These devices helps one to measure their own health parameters in terms of values. But the main disadvantage is that there is no chance of other persons (such as doctor, relatives) to track and monitor the medical information.

4. BRIEF DESCRIPTION OF THE PROJECT

4.1. PROPOSED SYSTEM

The proposed system is an IoT based smart health care monitoring system, where the system is associated with the Wi–Fi module and android application. This makes the doctor to monitor the medical information (heart beat and temperature) of the patient which was received and processed through the help of Wi-Fi module(ESP8266) and android application. Now the question might raise in your mind that why the doctor want to monitor patients medical information, consider the patient is physically disabled or not ready to visit hospital due time issues or he/her may go for work so in this case this system helps much efficiently because the person need not visit the hospital cause he can sit at home make use of the system and report the information to the doctor, the medical information (heart beat, pulse rate, temperature) can also be monitored by patient's relatives and guardian. In simple terms the proposed system is an IoT Based smart health care monitoring system where not only a particular person but also the doctor can monitor the condition of the patient without being physically present in

the hospital with the help of WI-FI module and android application. Other advantage is that the patient's relatives can also keep the track of the victim's health condition with the help of an LCD.

4.2. METHODOLOGY

SMART HEALTH CARE MONITORING SYSTEM using IoT is a system where not only a particular person but also the doctor can monitor the condition and medical information without being physically present in the hospital and it can also be used by patient's relatives or guardian to monitor the patient's health, this process is processed using Wi-Fi module, android application and Arduino UNO.

The entire project is divided into five major sections listed below:

- MICROCONTROLLER
- LIQUID CRYSTAL DISPLAY
- Wi-Fi MODULE
- HEART RATE SENSOR
- TEMPERATURE SENSOR

The above sections are briefly described as follows:

MICROCONTROLLER

Arduino UNO is the microcontroller used in this project, it is based on ATmega328. It is open source electronic platform based on easy to use software and hardware. It reads input-light on sensor, finger on a button, etc. it has 14 input/output and 6 analog pins. The software used in this microcontroller is ARDUINO IDE.

LIQUID CRYSTAL DISPLAY

Liquid Crystal Display or simply LCD is an electronic display module and find a wide range of applications. A 16*2 LCD display is a very basic module and is very commonly used in various devices and circuits.

Wi-Fi MODULE

ESP8266 Wi-Fi module gives access to Wi-Fi or internet. It can communicate with any microcontroller. We can directly program it by using a desktop. It is Wi-Fi enabled (system on chip). It is flexible in terms of programming, has inbuilt USB and is easily connected.

FEATURES

1. 3.3V operated, can be USB powered.
2. Uses wireless protocol 802.11b/g/n.
3. Built-in-PCB antenna on the ESP-12E chip.
4. Uses CP2102 USB Serial communication interface module.

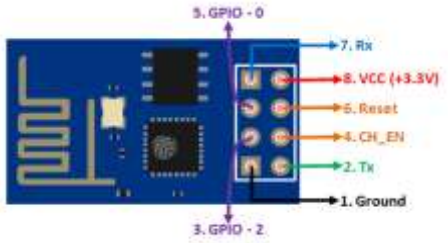


Fig-1: Wi-Fi MODULE

HEART RATE SENSOR

This project describes a technique of measuring the rate through a fingertip with an IR heart beat sensor (LM358) using Arduino board.

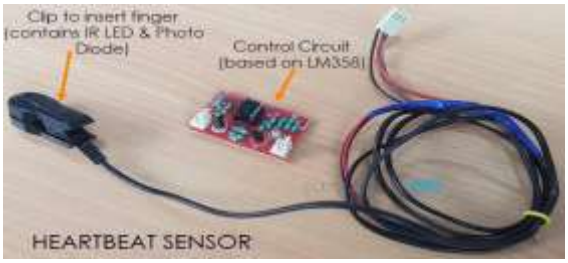


Fig-2: HEART RATE SENSOR

The three wires coming out of the sensor are:

1. Signal(S)
2. VCC(3-5V)
3. Ground

TEMPERATURE SENSOR

The LM35 is an integrated circuit sensor that can be used to measure temperature with an analog output proportional to the celsius temperature.

Fig-3: TEMPERATURE SENSOR

This sensor output is varied based on the temperature, output is also given to Arduino. This sensor circuitry is sealed and not subjected to oxidation, etc. Interfacing it to any type of circuit is extremely easy.

If the temperature readings are greater than normal body temperature the condition of the patient is abnormal, he should be under the guidance of doctor.

4.3. IMPLEMENTATION OF PROJECT

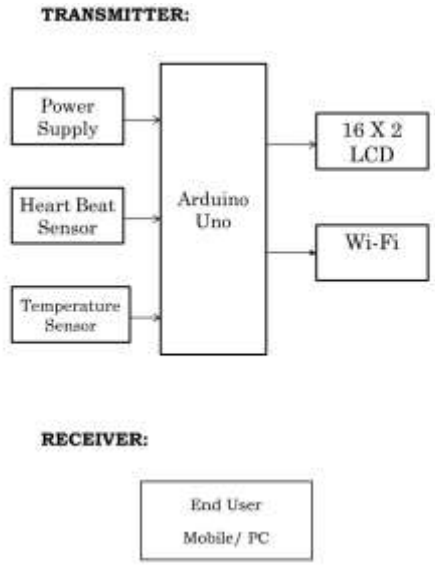
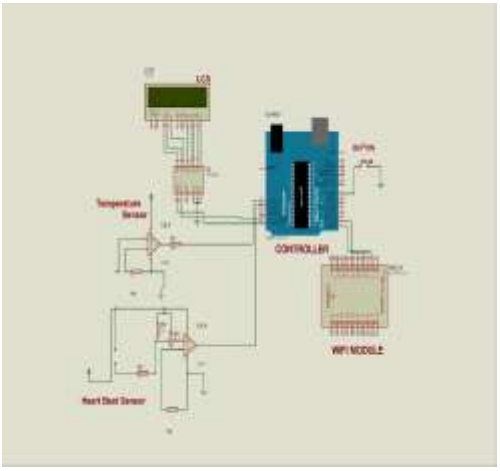


Fig-4: BLOCK DIAGRAM OF IMPLEMENTED PROJECT

The user finger is placed between the IR transmitter and IR Receiver. The skin may be illuminated with visible (red) using transmitted or reflected light for detection. While the heart is beating, it is actually pumping blood throughout the body and that makes the blood volume inside the finger artery to change too. For every pumping we get pulse from the sensor. Once the circuit senses the pulse a LED will start blinking along the pulse. This fluctuation of blood is detected through optical sensing mechanism placed around the finger tip. The signal can be amplified further for Arduino Board to count the rate of fluctuation, which is actually the heart beat rate in bpm. In the same way temperature sensor also detects the body temperature and processed by Arduino board. These temperature and heart beat values are displayed on LCD to the patient or relatives and with the help of Wi-Fi these values can also be viewed to doctor who is far to the patient.

CONNECTION DIAGRAM



5. RESULT

6. CONCLUSION

In the above mentioned system we have proposed a smart health monitoring system which is arduino based. It is user friendly and bridges gap between doctor and patients, system is simple and power efficient. Practical application of the system is superfine is rural areas as there would be no need for the patients to get their continuous follow-ups.

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