© 2018 IJSRST | Volume 4 | Issue 3 | Print ISSN : 2395-6011 | Online ISSN: 2395-602X

National Conference on Advances in Engineering and Applied Science (NCAEAS)
29th January 2018
Organized by : Anjuman College of Engineering and Technology (ACET) Nagpur, Maharashtra, India, In association with
International Journal of Scientific Research in Science and Technology

IOT Based Health Monitoring System

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ABSTRACT

As we all know that in our day to day life health is playing an important role, so it is important to keep oneself fit and one should know about the fitness level of how fit the person Our project aim is that to tell the people about the fitness level of a person..Our project name is IOT Based Health Monitoring System as the name gives us the idea that we are using a software named IOT(Internet Of Things) which is very popular and has been widely used.Here we are using 8051 microcontroller which is the heart of our project, Infrared Red Device (IRD), LCD display, Power Supply, Voltage Regulator, Array Switch.Our project will detect the heart rate, body temperature of the person according to their age.This project describes the design of a simple, low-cost controller based patient health monitoring system. Heart rate of the subject is measured from the thumb finger using IRD (Infra Red) and displayed on a 16 X 2 LCD display). This instrument employs a simple Opto electronic sensor, conveniently strapped on the finger, to give continuous indication of the pulse digits. The Pulse monitor works both on battery or mains supply. It is ideal for continuous monitoring in operation theatres, I.C.units, biomedical/human engineering studies and sports medicine. This project uses 8051 MCU as its controller. By reading all the values of temperature and heart rate will be displayed on PC/Phone.This project uses 8051 Microcontroller as heart of the project. We are using switch array to select the age of human being. It starts from children to elders. project uses regulated 5V, 750mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer. Temperature, Heart beat, will be displayed on the LCD display which is connected to the Microcontroller.

Keywords: Security, FPGA, Video Surveillance, PIR Sensor

I. INTRODUCTION

Recent report says chronic diseases are the leading cause of deaths in India. People who have suffered from chronic diseases are monitored their vital signs continuously. Vital signs include the measurement of temperature, pulse rate, blood pressure and blood oxygen saturation. It provides information about a patient's state of health. They can identify the existence of any medical problem, illness and person's body physiological stress. In hospitals both in ICU ward and general ward nurses

take care of chronic disease patients. In home also, we can monitor vital signs of a patients with the help of nurses. They cannot go to hospital regularly and also hospitalization cost also increases. In hospital, the nurse's ratio is low compared to patients. For checking the vital signs data to be healthy or unhealthy, we need nurse or doctor advice and again cost is increased. In healthcare, able to collect patient data over long time that can be used to help enable preventive care.IOT related healthcare systems are based on the Internet of Things as a network of devices that connect directly with each other to capture andshare vital data through a wirelesscommunication and store the data in server. And also it provide facility to access the information through our mobile phone using Bluetooth. IOT systems are making to reduce costs and improve health by increasing the availability and quality of care.

II. IMPLEMENTATION OF HEALTH MONITORING SYSTEM

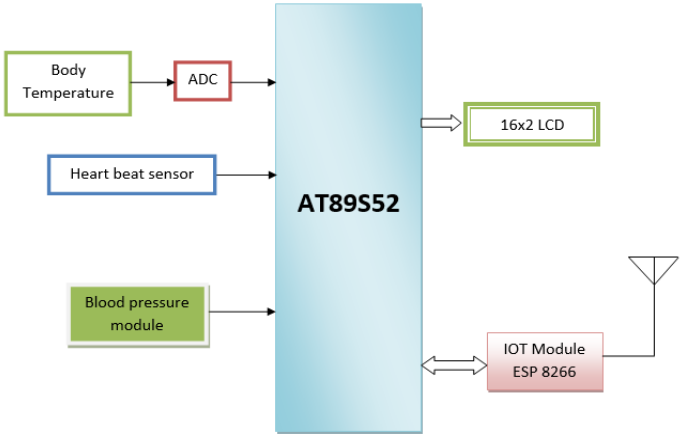

Figure 1

Chronic Disease monitoring system captured vital signs data via medical sensors, data mining algorithms to analyze the data and medical professionals can wirelessly access the information and make diagnoses and treatment recommendations based on the data. These applications generate huge amount of data. This vital data from the sensor is mined through data mining techniques and from this model patient automatically know the vital signs data be healthy or unhealthy.

III. OBJECTIVE

1. This project describes the design of a simple, low-cost controller based patient health monitoringsystem. Heart rate of the subject is measured from the thumb finger using IRD (Infra Red Device sensors and the rate is then averaged and displayed on a 16 X 2 LCD display).
2. This instrument employs a simple Opto electronic sensor, conveniently strapped on the finger, to give continuous indication of the pulse digits.
3. This project uses 8051 MCU as its controller. By reading all the values of temperatureand heart rate will be displayed on PC/Phone.
4. Reduce cost of health monitoring system which are previously available for people.

IV. EMMBEDED SYSTEM

A.µc 8051 INTERNAL RCHITECTURE

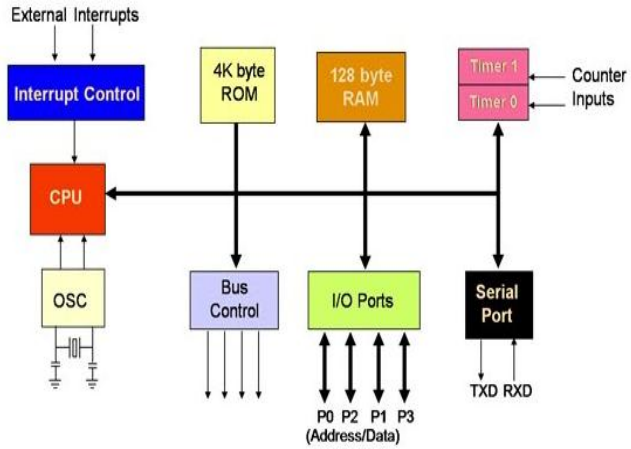

Figure 2

An embedded system is a system which is going to do a predefined specified task is the embedded system and is even defined as combination of both software and hardware. A general-purpose definition of embedded systems is that they are devices used to control, monitor or assist the operation of equipment, machinery or plant. "Embedded" reflects the fact that they are an integral part of the system. At the other extreme a general-purpose computer may be used to control the operation of a large complex processing plant, and its presence will be obvious. All embedded systems are including computers or microprocessors. Some of these computers are however very simple systems as compared with a personal computer.The Intel 8051 is an 8-bit microcontroller which means that most available operations are limited to 8 bits. There are 3 basic "sizes" of the 8051: Short, Standard, and Extended. The Short and Standard chips are often available in DIP (dual in-line package) form, but the Extended 8051 models often have a different form factor, and are not "drop-in compatible".All these things are called 8051 because they can all be programmed using 8051 assembly language, and they all share certain features (although the different models all have their own special features).

B. SOFTWARE DESCRIPTION

Java ,Python, processing are used on the pc to run communications with the arduino, they are not languages for the arduino. One limitation for them is that they do not run on the arduino. So we stick with the C++ derived Arduino language(or we can use raw C/C++). It is ideally suited to microcontrollers .

EXAMPLE:-

```
include<LiquidCrystal.h>`
LiquidCrystal lcd(12,11,5,4,3,2);
const int sensor=A1; // Assigning analog pin A1 to variable 'sensor'
float tempc; // Variable to store temperature in degree Celsius
float tempf; // Variable to store temperature in Fahreinheit
float vout; // Temporary variable to hold sensor reading
void setup()
{
pinMode(sensor, INPUT); // Configuring pin A1 as input
        Serial.begin(9600);
        lcd.begin(16,2);
        delay(500);
}
Void loop()
{
        vout=analogRead(sensor);
        vout=(vout*500)/1023;
        temp=vout; // storing value in Degree Celsius
        tempf=(vout*1.8)+32;      //converting to Fahrenheit
        lcd.setCursor(0,0);
        lcd.print("in Degree = ");
        lcd.print(tempc);
        lcd.setCursor(0,1);
        lcd.print("in Fahrenheit= ");
```

```
lcd.print(tempf);
delay(1000); // Delay of 1 second
```

I. TEMPERATURE SENSOR

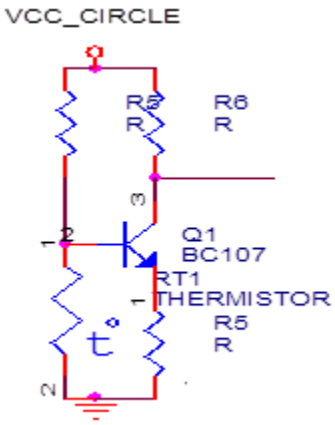

Figure 3

Temperature Sensor which converts temperature value into electrical signals. Weused IC called LM 35 astemperature sensor. LM35 series sensors are precisionintegrated-circuit temperature sensors whose output voltage is linearly proportionalto the Celsius temperature. The LM35 requires no external calibration since it isinternally calibrated. . The LM35 does not require any external calibration ortrimming to provide typical accuracies of ±1⁄4°C at room temperature and ±3⁄4°Cover a full –55 to +150°C temperature range.The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 µAfrom its supply, it has very low self-heating, less than 0.1°C in still air.

II. HEARTBEAT SENSOR(BLOOD PRESSURE)

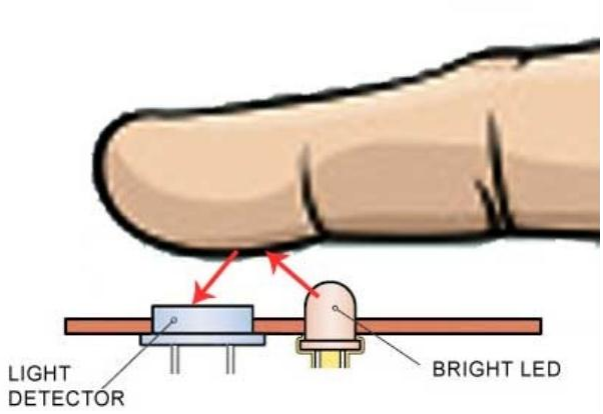

Figure 4

The active sensor in this unit is a Honeywell SSC Series pressure transducer. The sensor produces an output voltage that varies with the pressure measured in the cuff. It includes special circuitry to minimize errors caused by changes in temperature. We also provide a filtering circuit that conditions the signal from the pressure transducer. The output voltage from the Blood Pressure Sensor is linear with respect to pressure.The following is a partial list of activities and experiments that can be performed using this sensor.

1.Measure blood pressure before and after exercise. Measure blood pressure while sitting or standing.
2.Compare blood pressure after voluntary isometric contractions (weight lifting) and a rhythmic activity such as running or biking.
3.Investigate howdigestion affects blood pressure. Study the effect of caffeine on blood pressure.

ECG (AD8232 Sensor)

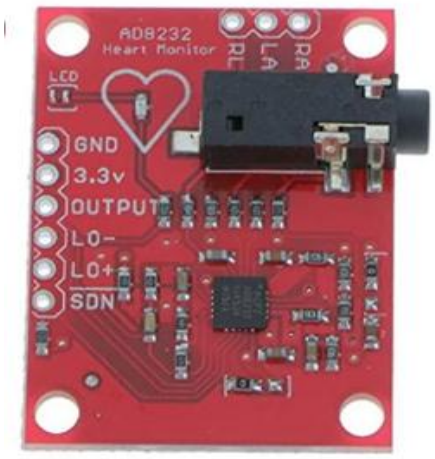

Figure 5

Figure 6

The AD8232 is an integrated signal conditioning block for ECG and other biopotential measurement applications. It is designed to extract, amplify, and filter small biopotential signals in the presence of noisy conditions, such as those created by motion or remote electrode placement.

The AD8232 module breaks out nine connections from the IC that you can solder pins, wires, or other connectors to. SDN, LO+, LO-, OUTPUT, 3.3V, GND provide essential pins for operating this monitor with an Arduino or other development board. Also provided on this board are RA (Right Arm), LA (Left Arm), and RL (Right Leg) pins to attach and use your own custom sensors. Additionally, there is an LED indicator light that will pulsate to the rhythm of a heart beat.

V. CONCLUSSION

In this paper, we have monitored the inpatient and outpatient vital signs using Healthcare sensor and wireless technologies. We have trained a model and the model is learned by supervised learning. Meta data is also maintained for finding the health condition of patients. The model returned the status for the given vital signs, the status will be either healthy or not. In future, data processing through cloud computing and remote access to store the data will improves the computing performance. Also the Healthcare sensors will produce enormous amount of data. So we move onto Big Data techniques. Map reduce algorithm can be used to find the health status.

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