

Development of Smart Health Monitoring System for patient using IoT Network

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Abstract— *This paper includes the branch of Biomedical Engineering. The proposed system is designed to enhance speedy communication between the patients and doctor using an Internet of things (IOT). The most of human beings are losing their lives for not getting proper treatment in the right situations. Statistics reveal that in India for every minute four people are losing his/her life due heart attacks mainly. In view this, we described a real time patient monitoring system using IOT for expanding the health monitoring over wide areas such as town, villages and hilly terrains. During the travelling period patient's health can become worse or loss of life can occur.*

This paper aims at monitoring the patient's health conditions continuously using IOT. The parameters like the body temperature, heart beat in the body are to be monitored continuously using sensors. The microcontroller performs the predefined task of displaying the corresponding data on the LCD. By monitoring the LCD and the doctor can take the immediate action if necessary. Using this technology doctor can monitor and give suggestions for more number of people without physical presence. The projected technique was mainly designed for rural areas where the infrastructure services such as medical equipment, transportation are available.

Keywords— *IOT, Biomedical, Sensors, LCD, Microcontroller*

I. INTRODUCTION

Mostly the people aged from 40 and above users are playing a vital role in health monitoring system. These users are showing more concern towards their health when compared to people aged below 35. Ring-type pulse is used to monitor the sensors displays the Observed data on LCD but it is not capable of transmitting data out of regions of ring. So, it became difficult to supervise the important readings such as temperature and pressure continuously from far places. Mostly, in hospitals the physician's registered nurse should supervise the health condition of each and every patient after which becomes hard to examine their situation constantly. Therefore, emergency situation recognized only by the personal check-up of patient at that instance of time.

Doctors feel stress in their work because they should examine a group of daily. In such cases a continuous health monitoring system with a certain transmission capacity to internet services increased the achievement rate in health care systems. Consecutively to keep traces cm emergency health conditions, a real time health monitoring system was projected and developed using LPC2148 wearable sensors and IOT technology. Wireless Ad-hoc Network (WSN) is group of networks used for sensing, communicating, processing and transmitting group of parameters in infrastructure-less terrain. This network has a plenty of nodes which super-vies and collect the information of each individual's health conditions and controls a set of parameters. Generally patient monitoring system plays a major role for monitoring the patients in intensive Care Units (ICU) and other in-patients ward in hospitals. These systems are available only in emergency situations and patients on bed. But disadvantage of tire 'stems was they are not capable of transmitting data continuously to long distances.

A sensor is defined as equipment that senses the physical factors as input signal and converts those into general electrical signal as output. Body sensor network system can help the patient's to provide a better health care services like supervising user health, memory enhancement, accessing health records of patient's and also communicating by the care takers during, critical conditions through internet. The constant monitoring of health using wearable sensors or embedding sensors to clothes and attached to body will reduce the risk of patients during critical situations. The wearable sensors are good example of internet of things. Also these schemes provide a remotely accessible and monitoring the physical signs without any disturbance in patient's usual life and also bettering life excellence.

II. PROBLEM STATEMENT

Now-a-days a various number of health monitoring systems were available for the ICU patients and old age people at home. But some problems were observed in those systems. The first problem was these can only monitor the health condition of patient when he is at home itself, i.e. not mobile and also false detections are detected a number of times. So, clinicians should verify the past data and present data to determine the false activities. Due to this false recognition wastage of time occurs. The second problem was these systems can't transmit the data for every second over long distance because different wireless transmission technologies operate with diverse frequencies. Therefore, we developed systems which continuously measures the significant readings from the patient' body and updates the information to personal doctor through cloud. Hence, there is no scope of obtaining any false data values from sensors. And also doctor can give medications or precautions to be taken by patient from anywhere in the world. This health monitoring system actually provides speedy service and be advantageous in saving the life's of patient's.

III IMPLEMENTATION OF HARDWARE

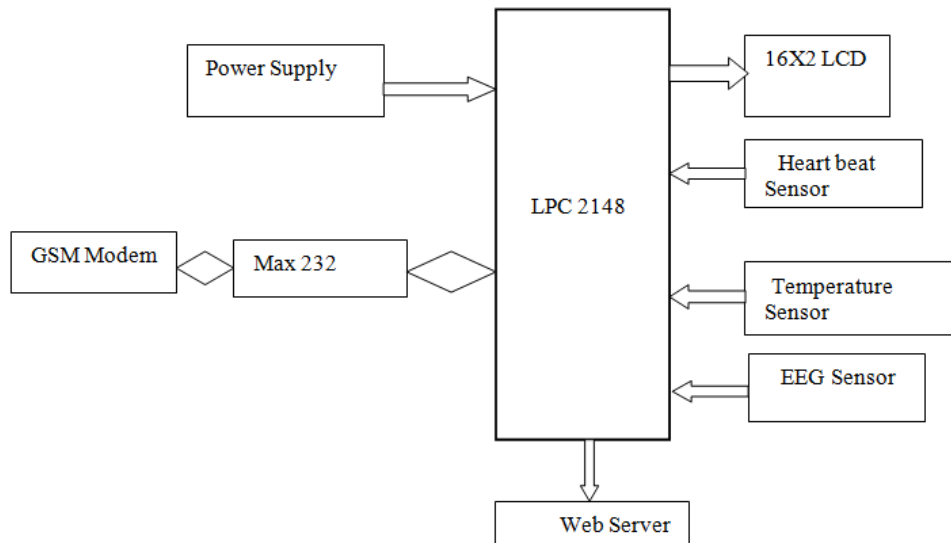


Fig.1 Block Diagram

A. Temperature sensor

The temperature sensor used in this system is NTC thermister. When the sensor detects values continually data will be communicated to ARM microcontroller.

B. Heart beat Sensor

Here human finger is placed on sensor of heart beat, it generates digital output signal. More over this signal which is generated is send to microcontroller measures the beat rate (BPM).The microcontroller will send data to end user via gsm.

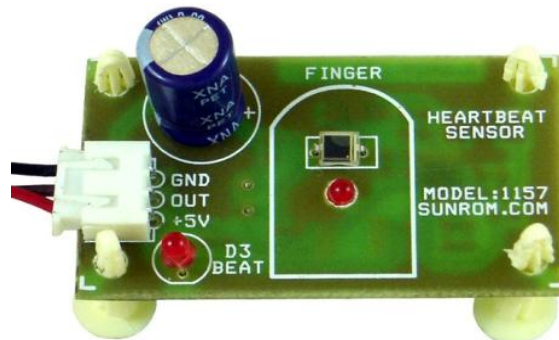


Fig.2 Heart beat sensor

C. LCD Display

LCD displays play key role in any in any embedded system in displaying sensor values. Here in this system we designed 1x16 lines display, which has standard characters of ASCII sets and symbols of mathematics. the power required for LCD is +5v.

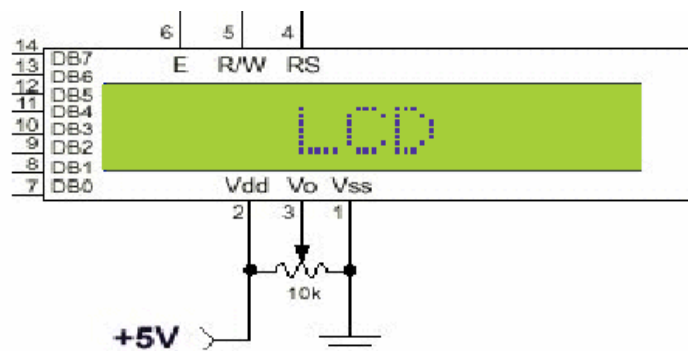


Fig.3 Pin diagram of 1x16 lines LCD

D. Global System for Mobile Communication

GSM is communication device where it uses frequency bands of 900MHz and 1800MHz. It broadcast signals over long frequency range. The data can be transmitted simultaneously using TDMA technique. In this project GSM play key role in transmission of information from ARM microcontroller to end users frequently.



Fig.4 GSM Modem

IV RESULTS AND DISCUSSION

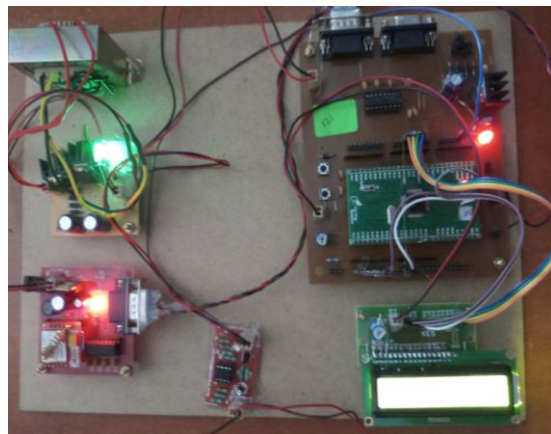


Fig. 5 Embedded system



Fig. 6 Output Display

A. Temperature Findings

The NC type thermistor used is programmed to display the value at room temperature for demo purposes with minimal error of + or – 5.

TABLE 1
TEMPERATURE OBSERVED VALUES

S.no	Testing	Normal Value	Observed Value	Error rate
1	Person 1	24	29	+5
2	Person 2	24	35	+11

B. EEG Findings

The EEG sensor is used with electrodes with error rate indicating the status as active or inactive.

TABLE 2
EEG OBSERVED VALUES

S.no	Testing	Normal Value	Observed Value	Status
1	Person 1	100-300	132	Active
2	Person 2	100-300	161	Active

V CONCLUSIONS

The proposed system of patient health monitoring can be highly used in emergency situations as it can be daily monitored, recorded and stored as a database. In future the IOT device can be combined with the cloud computing so that the database can be shared in all the hospitals for the intensive care and treatment.

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