Real Time Healthcare Multipara Monitoring System Using ARM LPC-2148

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Abstract: *Real Time Healthcare multipara monitoring using ARM PC 2148 is used for measuring heart rate and temperature. In this system parameters, can be continuously monitor and real time data transmitted on doctors mobile through GSM modem. Using this system doctor can continuously monitor critical patient from any remote location. The aim of this project is to use embedded technology for patient care. In India particularly in rural area are found to struggling to receive timely medical treatment. There is lack of expert physician in certain sector of the health service. Telemedicine originally emerged to serve rural population where time and cost of travel to make it difficult to receive the medical care so telemedicine is forming a new structure in medical field. By using telecommunication and information technology Healthcare multipara monitoring system using ARM7 includes the aspects of acquisition of biological parameters like body temperature heart rate spo2 etc. The processing of collected data using ARM LPC 2148 processor and processed data is then displayed on doctor's mobile phone through GSM. Also the data can be displayed on the LCD display. In this system utilizing low cost component transmit data.*

***Keywords:* Body temperature, heart rate, GSM modem, mobile phone.**

1. INTRODUCTION:

In the Hospital many patients are in critical condition. They require continuously monitoring biological parameter like bodytemperature, Heart rate, SPO2. In Intensive care Unit doctor are not available for 24 hours critical parameters are observed continuously. In this case our system is useful because system can send Real time data on doctors mobile. When patient in critical condition and their parameters drops below threshold value of abnormal condition then system sends SMS to doctors in real time patient data will be send for every three minutes. Heart rate for every one minute.

When patient is normal system will continuously monitor the patient parameters and save the records. The regular body temperature of patient is 37 C and heart rate is 72BPM. For startup GSM model and ARM7 2148 80 commands are necessary. Programming is done in embedded c language.

2. SYSTEM ARCHITECTURE:

In this paper we present a system temperature, heart rate, SPO2 sensor and GSM, temperature sensor are used to measure body temperature of patient. Heart rate sensor is used to measure heart beat rate of patient and SPO2 is used to measure oxygen saturation in the blood, ARM controller get the information from devices it sends information to doctor as well as any family member using ARM LPC 2148 and developing for patient. Main advantage of this system is reducing unnecessary wastageof memory stage and save power. At receiving end mobile to be used to receive all data of patient as wellAs information continuously display on LCD display.
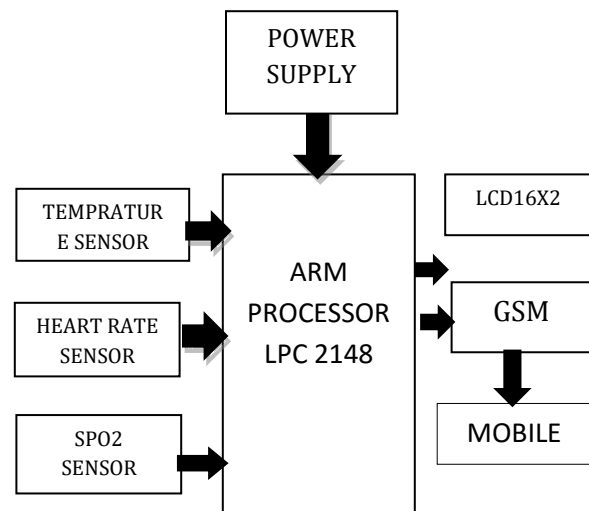

Fig.1 Block Diagram of Real Time Healthcare Multipara monitoring System Using ARM LPC-2148.

A.Hardware Used

1. SENSORS

2. ARM PROCESSOR

3. GSM module

4. LCD display

1. SENSORS

In this project we used three types of sensors that are temperature sensor, heart beat sensor and spo2 sensor. For temperature measurement we used LM 35 temperature sensor. To measurement of heart beat we used IC LM 358. We used spo2 sensor for measuring the oxygen saturation in our body.

Fig.2
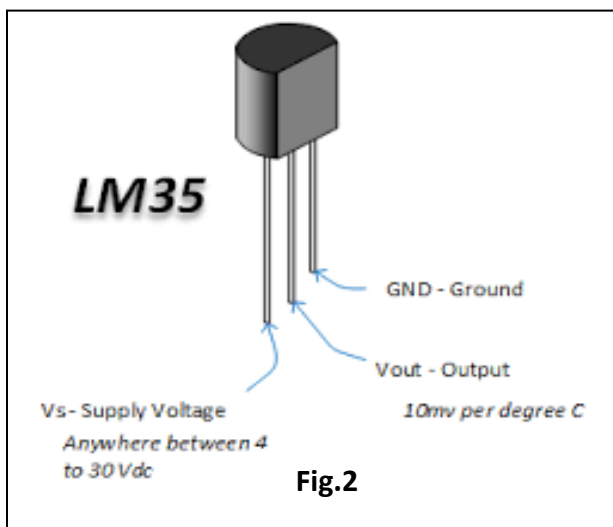
a) LM35:

LM35 is an integrated-circuit temperature sensor, whose output voltage is linearly proportional to Celsius. It advantage is it is calibrated in Kelvin. It does not required external calibration or trimming.LM35 is operated over -55° to +150° C temperature range. With LM35, temperature can be measured more accurately than with a thermistor. It also process low self heating and does not cause more than 0.1^oC temperature rise in still air.
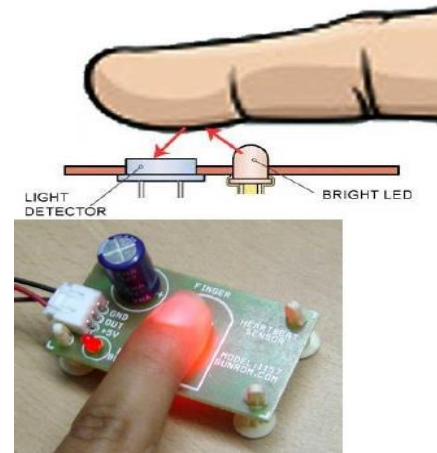
b) Heart Beat Sensor:

Fig.3

Medical heart sensors are capable of monitoring vascular tissue through the tipoff the figure or the ear lobe. It is sensed by using LED and LDR.Fingure is placed between them. Photo diode and photo transistor used as sensor.

c) SPO2 Sensor:

Pulse oxymetry is fast, non-invasive, easy to use and continuous method for measuring the SPO2.It works on principle of spectrophotometry.
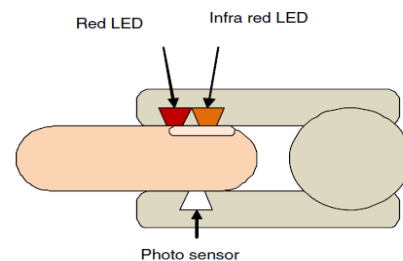

Fig.4

2. ARM processor

We used ARM LPC 2148. It is general purpose 32 –bit microprocessor with low power consumption.ARM7 is a simple, elegant, fully static design is suitable for cost and power sensitive applications.

Features of ARM7

- ➢ General purpose 32-bit microprocessor.
- ➢ Low power consumption.
- ➢ Fast interrupt response.
- ➢ Fully static operation.

3. GSM SIM 900

GSM modem is built with quad band GSM engine, works on 900 MHz.The GSM modem interface with RS232 as well as PC.It is suitable for SMS, voice as well as data transfer.

4. LCD module

This is 16X2 matrix LCD display. The values of biological parameter are displayed on LCD at transmitter side.

B. Software Description

This system includes the coding of ARM7 processor and coding for downloading of data. The software requirement is embedded c using keil software for ARM7.The project has been designed and implemented in steps which are shown with the help of a flowchart. In the system physiological parameter such as heart rate temperature SPO2 are obtained processed using ARM7 LPC 2148 processor. If any vital parameter goes out of normal range then alert sums will be sent to doctor mobile.

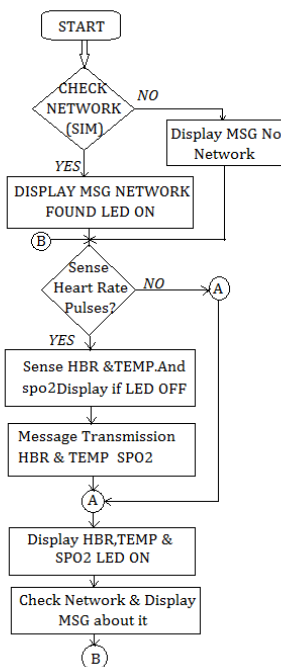The fig.5 shows flowchart of project design and implantation steps.
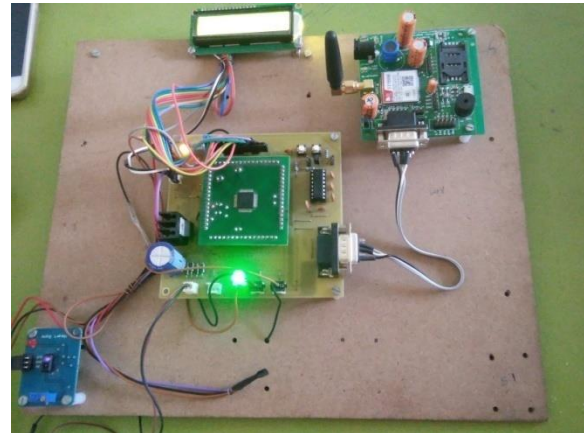

Fig.5 Flowchart Design

Fig.6 Implementation of project

3. RESULT:

The normal range of Heart beat per minute is 60 to 100.For the 25 year old younger people range 140 to 170 beats per minute for 60 years old people it is 115 to 140 beats per minute and body temperature is 37°C or 98.6 Fahrenheit. The Oxygen saturation of human blood based on red light is600-750 nm wavelength and infrared light is 850-1000nm wavelength.
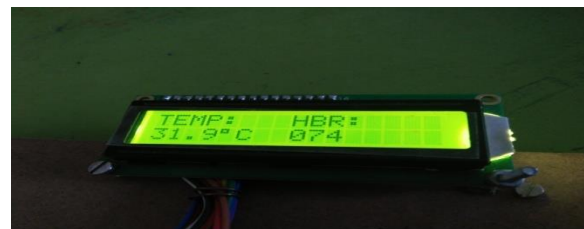

Fig.7 Result Display

Sr.No	Patient Name	Heart Rate (70-100bpm)	Temp (37°C)	SPO2 (85-100nm)	Status	Action
1	Pranav	74	37	88	Normal	MSG sent
2	Diksha	68	37	87	Abnormal	MSG sent
3	Shrikant	73	36	86	Normal	MSG sent
4	komal	72	38	89	Normal	MSG sent
5	Sonupriya	110	40	89	Abnormal	MSG sent

Table 1.Result

4. FUTURE SCOPE:

We can add more parameter such as ECG , MEMS sensor , gas level indicator , invasive & noninvasive BP monitor , respiration sensor etc. the home based health monitoring applications presented which allow doctor to view his patients medical parameter remotely and dynamically in a web page in real time and does not require any special requirement on his pc or mobile, all his needs in an internet access in future we can create and save database of patients ,in future if patients comes for routine checkup the doctor can check database and treat the patient as he knows the history of patient. For achievement of system we can develop android and IOS devices to alert doctors and patient relatives.

4. CONCLUSION:

Employing embedded technology based on ARM LPC 2148 microcontroller, portable system is designed to implementation of temperature, heart rate and spo2.

With this system we can detect biological parameter of the body such as heart rate, temperature, spo2 sensor. The advantage of this system is portable mobility, compact, low power consumption, storing the database is very simple application. This system is very powerful tool for doctor and nurse.

5. REFERANCES:

1) http://www.academia.edu/9312242/REAL_TIME_PATI
   ENT_MONITORING_SYSTEM_USING_ARM_AND_WIREL
   ESS_SENSOR_NETWORK
2) http://www.sensor-networks.org/
3) http://www.commsdesign.com/
4) http://www.armcontroller.com/

5) Prema Sundaram" *PATIENT MONITORING SYSTEM USING ANDROID TECHNOLOGY*"- IJCSMC, Vol. 2, Issue. 5, May 2013, pg.191 – 201
6) Sherin Sebastian, Neethu Rachel Jacob,"Remote Patient Monitoring System Using Android Technology", IJDPS, September 2012.

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