INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

A PATH FOR HORIZING YOUR INNOVATIVE WORK

HUMAN BODY PARAMETER MONITORING SYSTEM USING MICROCONTROLLER

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Accepted Date: 05/03/2015; Published Date: 01/05/2015

Abstract: Now a day's with the innovation of new technologies, there is also increases in the number of disorders, which causes a severe harm to a human being. Sometimes it is required to hospitalize a patient in a complete observatory atmosphere. One person must require to stay with patient twenty four hours. But it is very difficult for a person to stay continuously with their near ones how has been suffering from disease of physical disorder. In some critical situation, the patient suffer from many up and down, because of changing a parameters such as body temperature, pulse rate, blood pressure etc. And also to observe the saline bottle and urine bag at every movement, to change it. To remove the requirement of human, by using this methodology, we increase the efficiency and accurate readings and also we reduces the burden of doctor's head.

Keywords: Human Body Parameter Monitoring System, VLSI, GSM.

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PAPER-QR CODE

Access Online On:

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How to Cite This Article:

Mohammad Faizan, IJPRET, 2015; Volume 3 (9): 906-914

INTRODUCTION

Recently, the health care sensors are playing a vital role in hospitals. The human body parameter monitoring system is one of the major improvements because of its advanced technology. So we are here, just connecting the temperature sensor and heartbeat sensor so that simultaneously we can monitor the patient's condition and hence ruling out the use of the thermometer and other devices to check the condition of the patient.

This project describes the design of a simple, microcontroller based heart rate & body temperature measuring device with LCD output. Heart rate of the subject is measured from the index finger using IRD (Infra Red Device sensors and the rate is then averaged and displayed on a text based LCD). Also Saline Level is measured continuously for different levels as well urine bag level. The device alarms when the heart beat & the body temperature exceed the provided threshold value. This threshold value is defined by the programmer at the time of programming the microcontroller. The threshold value given for the project is as 20 to 120 pulses per minute for heart beat indication & 18°C to 38°C for temperature. This information i.e. the Heart Rate & the Body Temperature and saline level is then transmitted wirelessly to the doctor which in not in the vicinity of the patient through GSM technique. The sensors measure the information and transmit it through GSM Modem on the same frequency as on which cell phones work.

Variables are sensed by different types of sensors and converted into digital form. These variables are compared with desired values stored in the processor and displayed on the LCD display. If these are not within the safe limit then message is send to the surgeon through GSM mobile phone. This number is stored in the controller.

BLOCK DIAGRAM

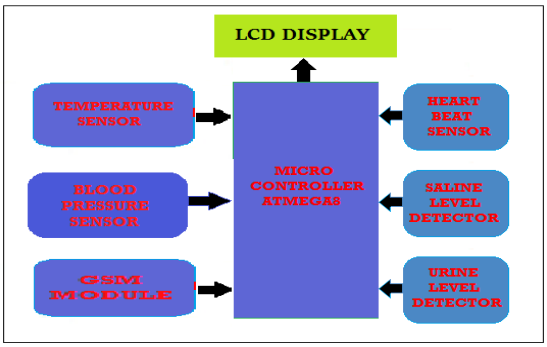

Fig. 1 block diagram

Above figure shows the block diagram of human body parameter monitoring system using GSM technology. It consists of Atmega8 microcontroller, and other four sensors are interface with it. The four sensors we are using here are LM35 use temperature measurement, heart rate sensor which is the combination of LED and LDR, another sensor are Saline level detector and urine bag level detector which is based on the conductivity technique. And GSM module is used to send the text message to the doctors which are in the vicinity of hospital and LCD display is used to display the measured readings.

PARAMETER OF HUMAN BODY MONITORING SYSTEM

1. LM35 Temperature sensor

The LM35 is three pin IC is used for measuring the temperature. The temperature is one form of energy which must be converted into voltage form and then to its equivalent digital form so that microcontroller understand and takes the action on desired temperature. Hence we can use temperature sensor LM35 to sense the temperature. For change in 10mV there is a change of 1 degree celsius. In our Project we have set the temperature range from 18 to 38 degree celsius.

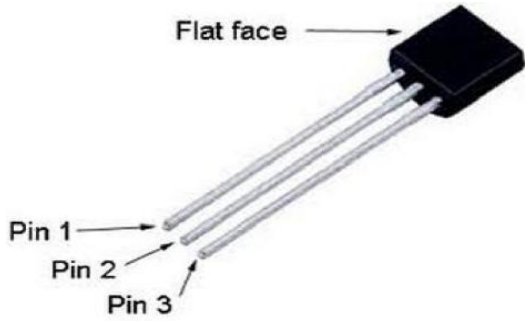

Fig. 2 LM 35

2 Heart Rate Sensor

The heart sounds are the noises a physician listens by using a stethoscope over the heart. They are the noises of the heart valves shutting. These noises are not the same as the pulse or the artery turbulence noises listen to when taking blood pressure. There are two distinct heart sounds called a lub and a dub. Heart is an amazing organ which continuously pumps oxygen and nutrient rich blood throughout the body to sustain life.

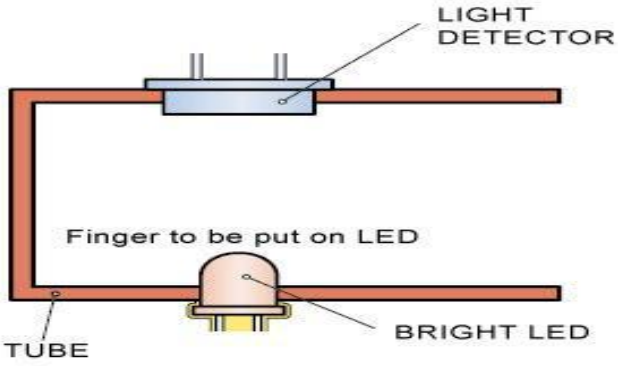

Fig. 3 heart rate sensor

Heart beat is sensed by using a high intensity type LED and LDR. The finger is placed between the LED and LDR. As Sensor a photo diode or a photo transistor can be used. When the heart pumps blood through the blood vessels the finger becomes slightly more opaque and so less light reached the detector. With each heart pulse the detector signal varies. The variation is converted to electrical pulse. This signal is amplified with the help of op amp.

3 Saline Level Detector

In saline level detector we use conductivity technique to measure the level of liquid in the saline bottle. In this technique we use two probes. When this are dipped in the liquid then it is in conduction mode as liquid level decreases below the probe then the circuit will stop conducting.

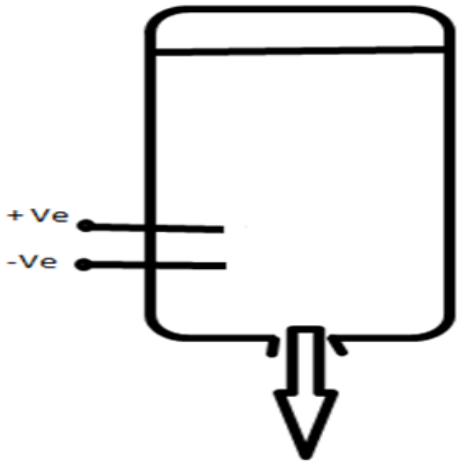

Fig. 3 Saline Level Detector

4 Urine Level Detector

This is the fourth parameter we are dealing with microcontroller. A patient who is in very critical situation, or a patient who is unable to walk, for such kind of patient, doctor needed to connect a urine bag to patient.

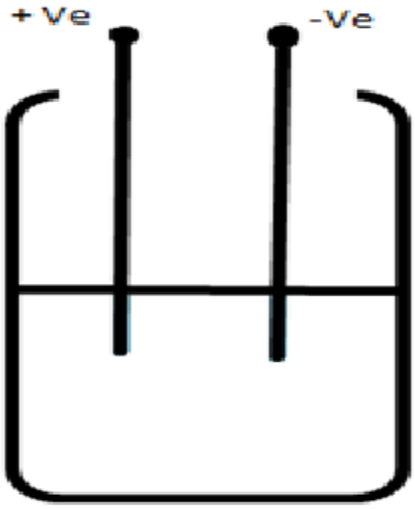

Fig. 4 urine level detector

In urine level detector the working is exactly opposite to the working of saline level. In urine level detector two probe are inserted into urine bag. When the level of urine in the bag increases, the probes are dipped in urine and it circuit starts conducting. And microcontroller will generate message and send to doctor.

5. BLOOD PRESSURE SENSOR

The functionality of the oscillometric method is based on the measurement of the pressure variations in the arm cuff. Pressure in the cuff is measured by using the Freescale Pressure Sensor MP3V5050 which integrates on-chip, bipolar Op Amp circuitry and thin film resistor networks to provide a high output signal and temperature compensation. The normal range of blood pressure is 180-200mm hg. If the pressure increases above or decreases below the threshold value, at that time microcontroller will generate a message. And this message is send to the doctor with the help of GSM module.

CIRCUIT DESCRIPTION

1 Microcontroller ATMEGA8

A microcontroller is an entire computer manufactured on a single chip. Microcontrollers are usually dedicated devices embedded within an application. By executing powerful instructions in a single clock cycle, the ATMEGA achieves throughputs up to 16 MIPS. The ATMEGA is a low-power CMOS 8-bit microcontroller based on the AVR RISC architecture, approaching 1MIPS per MHz, allowing the system designer to optimize power consumption verses processing speed. This microcontroller works in 5 different modes which enhance its working.

The ATMEGA8 AVR is supported with a full suite of program and system development tools, including C compilers, macro assemblers, program debugger/stimulator, in-circuit emulators, and evolution kits. The AVR core combines a rich instruction set with 32 general purpose working registers.

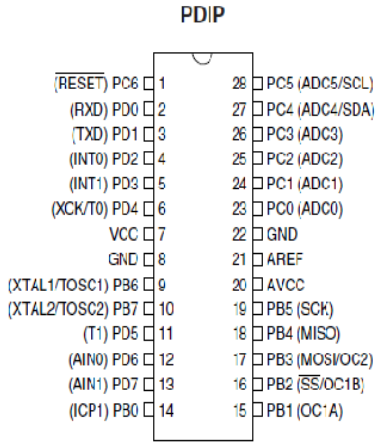

Fig. 5 pin diagram

2. OPERATIONAL AMPLIGIER

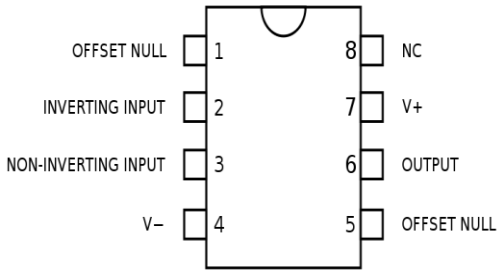

Fig. 6 operational amplifier

Operational amplifier is an eight pin IC741, an operational amplifier is a direct couple high gain amplifier usually consisting of one or more differentials amplifier and usually followed by a level transistor and an output stage.

Operational amplifier can perform operation such as addition, subtraction etc We are using amplifier to amplify the output voltage of heart rate sensor. The output voltage of heart rate sensor is very low, so it is necessary to amplify this signal.

3. GSM MODULE

GSM module is used to establish communication between a computer and a

GSM system. GSM module consists of a GSM modem assembled together with power supply circuit and communication interfaces (like RS- 232, USB, etc) for computer. GSM MODEM is a class of wireless MODEM devices that are designed for communication of a computer with the GSM network. It requires a SIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network. And also they 77have IMEI (International Mobile Equipment Identity) number similar to mobile phones for their identification. A GSM MODEM can perform the following operations:

1. Receive, send or delete SMS messages in a SIM.

2. Read, add, search phonebook entries of the SIM.

3. Make, Receive, or reject a voice call.

RESULT

The different physiological variables to be monitored & controlled remotely are sensed & converted into analogous form i.e. the digital form. Here microcontroller performs various operations & gives desired output. We have partially implemented the project to monitor the human body parameters such as temperature, heart rate, saline level and urine bag level remotely.

CONCLUSION

This paper reviews the product Human body parameter Monitoring System Using GSM which is innovated to enable remote monitoring of patients. The key objective of developing human body parameter monitoring systems is to reduce health care costs by reducing emergency room and physician office visits, hospitalizations, and diagnostic testing procedures. Many new wireless transmission protocols and technologies adapt easily to new applications.

Thus the human body parameter monitoring system is very much useful to monitor the patient continuously without any kind of visit.

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