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Design and Development of Wearable Medical Sensors for Health Monitoring System

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Abstract: The first and foremost importance of the proposed Work is to monitor the health condition of the person in ICU/Emergency Wards in a hospital. But,regarding the continuous patient monitoring may or may not possible for the doctor or the nurse who may be engaged with some other work. In such situations we may lose a life. In such case, an automatic health monitoring system is helped to sense and to monitor the patient continuously and if there is any abnormalities in the sensed data, then immediately an alarm will ring and a message will send to the doctor about the present situation of the patient. This system senses various health parameters of the patient and process the information using arduino UNO and sends the information to the authorities people using GSM module when any abnormal situations takes place.
Software Tool Used: Ardunio IDE
Language Used : Embedded C

Keywords: arduino, GSM module, temperatue ,heart beat.

I. INTRODUCTION

The word “Health” come from the field of health care field at first, and it is used mainly for describing the state of the biological organism. The word “monitor” means utilize a series of means to check and record the reason of the failure take place, evolution and elimination by the way on qualitative and quantitative. In India, near about 20% of the total population loses their lives due to interrupted health monitoring system.

What happens if patient's health becomes critical in between that interval or when a doctor is not available with a patient especially in the case of patients in ICU. A patient may lose her/his life in such situations. So to avoid this critical situation, a smart embedded system is required to monitor the health continuously. This system monitors heart rate, body temperature and saline liquid level of the patients in ICU.If any of the above parameters exceeds their threshold value, this smart device informs doctors or care taker and corrective actions to save patients life.

In this paper two parameters are taken for monitoring. Firstly Body temperature is also a general indication of body condition. Normal human body temperature is (98.4 F) and it varies activity of the person as well as place of measurement. When a person is Suffering from fever, the blood vessels in his/her skin expand to carry the excess heat to his/her skin’s surface. for this reason the person begins to sweat. Then the sweat evaporates and this process helps to cool his/her body. When a person is too cold, his/her blood vessels narrow so that blood flow to his/her skin gets reduced to conserve body heat. As a result he/she starts shivering and it is an involuntary rapid contractions of the muscles.

Finally Saline monitoring is one of the important aspect in case of health monitoring system. Ultrasonic sensor measures the level of saline. Whenever saline level reaches very low there may be chance that blood may flow backward into the bottle .To avoid such situation, a continuous monitoring is required.

II. EXISTING WORK

There was a conventional way of monitoring the health. It is that by monitoring by the hospital staff. Hospital staff or some respective persons monitors the patients in ICU.As the ICU patients requires continuous monitoring, which may be possible everytime. Because they may get involved in any other work or sometimes the staff may not be available all the time. In those situations the patient lives may be at risk. Sometimes lives may lost. For this purpose a continuous monitoring must be done, but must be monitored by a automatic system.

III. PROPOSED WORK

In this paper, various parameters of the patient are monitored. The patient monitoring system is based on the real-time parameters of patient's health and are sent to the respective responsible person via SMS whenever any abnormalities takes place. So that the patient can be saved immediately and thereby lives can be saved.

In GSM based patient monitoring, the health parameters are sent using GSM via SMS by programming using embedded C. This patient monitoring uses two sensors. First one is a temperature sensor and the second one is ultrasonic sensor. This paper provide the solution to above problem since the doctor need not monitor the patient health parameters everytime. So now the doctor or family members can monitor or track the patient health by this method.

The Arduino UNO board continuously reads input from these two sensors from the two sensors connected like temperature sensor and ultrasonic sensor. A threshold is maintained for each parameter of the sensors such that whenever any of the monitored health paramaters exceeds the considered threshold values, it intimates to the respective person. This system intimates to the respective person by sending alert messages along with the respective details about the abnormalities in the measured health parameters.

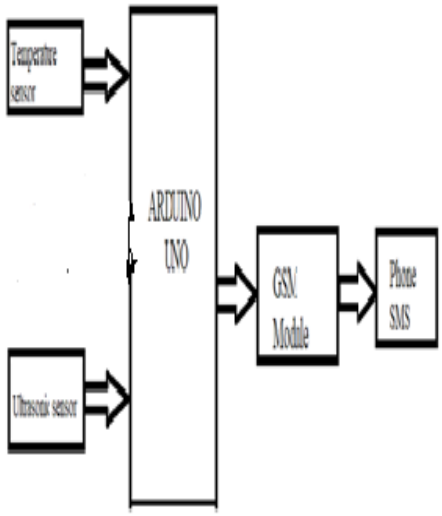

Fig.1 Block diagram

The block diagram clearly explains about the description of the work. The output of one block will decide the functioning of another block and this carries further leads to the completion of the entire function of the work. Arduino UNO is used in this work, which has a microcontroller as ATmega328p.GSM Module is of sim900A which provides signals to send message.

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IV. OUTPUTS

Temperature sensor:

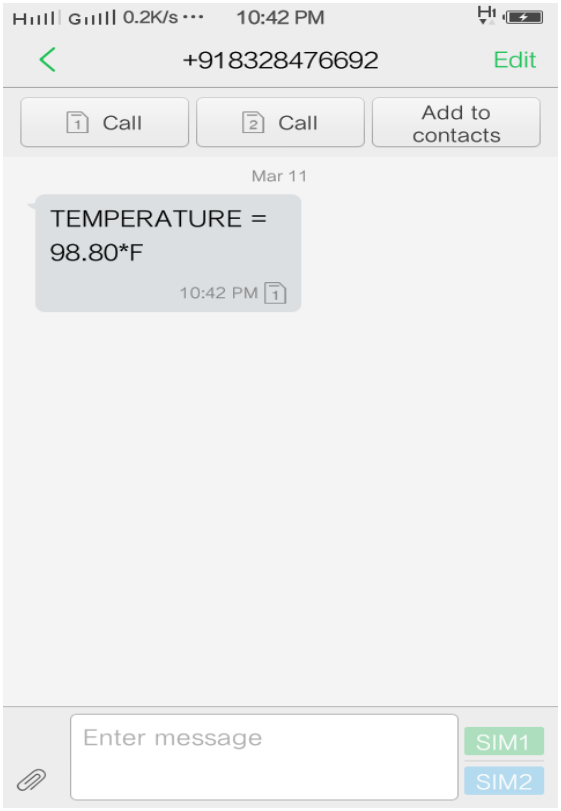

Fig.2 Temperature sensor

Fig.4 Alert message for temperature

Fig.3 Continuous Temperature monitoring

The above two figures represent the work of the temperature sensor. It monitors the temperature continuously. In the first figure it represents that temperature is monitored continuously based on the delay. This proposed method gives the temperature in fahrenheit .A threshold is considered so that necessary actions can be taken in case of emergency. The second figure represents the alert message which has sent to the respective person when temperature is 98.8F which is greater than considered threshold. The threshold considered for temperature in this case is 98.4F which is the normal human temperature.

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Ultrasonic sensor for saline monitoring:

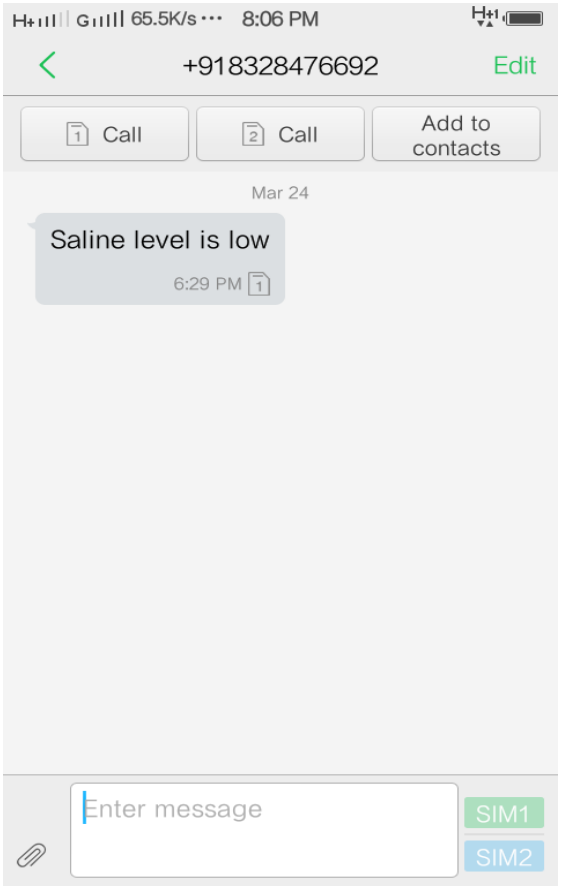

Fig.5 Ultrasonic sensor

Fig.7 Alert message for saline level

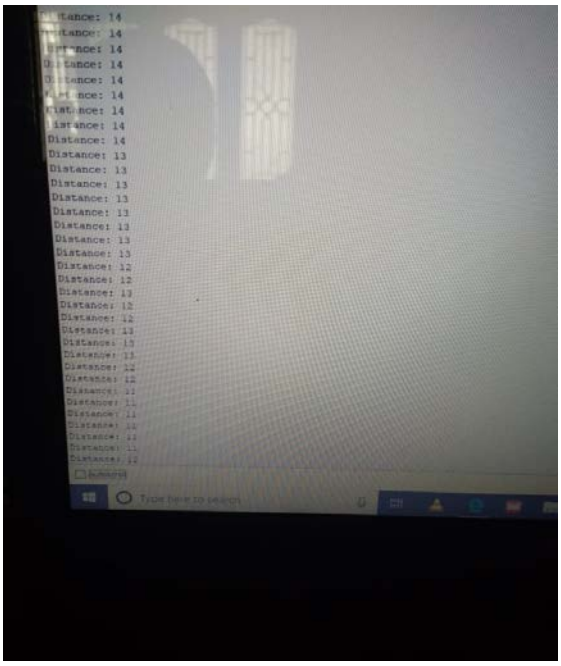

Fig.6 Continuous saline level monitoring

The above two figures represent the work of the ultrasonic sensor. In the first figure it is observed that the sensor monitors the saline level continuously. The second figure represents the alert message which has sent to the respective person when the saline level is very low.

VI. CONCLUSION

This proposed method monitor the health parameters like temperature,blood pressure and saline level indicator. The information is passed accurately to the respective person such that whenever any abnormalities takes place. It provides

accurate results compared to the conventional way.

VII.COMPARISON OF RESULTS

S.No.	Name of the sensor	Threshold	Message
1.	Temperature sensor	98.4F	Tempera-ture is high
2.	Ultrasonic sensor	Based on height of saline bottle	Saline level is very low

VIII. ADVANTAGES

1.Better access to healthcare

2.Improved quality of care

3.Peace of mind and daily assurance

4.No need of continous monitoring

There are tremendous advantages with this proposed method such that more concentration can be done on health.Proper and necessary care can be taken perfectly with easy accessing.No kind of worries regardin the health as it is monitored by a system which is continuous and is very much difficult practically.

VII. REFERENCES

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