



Efficient Monitoring of the Patient's Physiological Parameters Using Zigbee

Veeresh Bhairi and Siddarud Bannikoppa

*Department of Electronics and Communication Engineering,
Basaveshwar Engineering College, Bagalkot (Karnataka), India*

(Corresponding author: Siddarud Bannikoppa)

(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: This paper discuss about the monitoring of patient's physiological parameters using ZigBee. Different sensors are used to sense the physiological parameters of the patient and the same has to be transmitted using Zigbee when the parameters crosses the normal values. The receiving section consists of an LCD to display the transmitted data. The procedure of the system is that the sensors are used to measure the blood level in the bottle, Respiration rate of the patient, body temperature and sends the values of these parameters when they crosses the normal values. In addition to these, help switch is provided to the patient to call the doctor or nurse when patient needs help and timing is set when this time elapses the system alerts the doctor to check the patient condition.

Keywords: Sensors, Physiological parameters, Patient, Zigbee.

I. INTRODUCTION

In recent era the implementation of wireless networks has increased drastically in all the fields. The advantage of wireless network is that which reduces the hard wired connection complexity from the transmission section to the remote section. The patient monitoring system continuously checks the physiological parameters of the patient and transmits when parameters crosses the normal values. This system can be used in general wards of the hospital where doctors have to keep track of patient's parameters and also in homes for aged persons who cannot speak or cannot walk.

The author in [1-3] discuss about the Zigbee protocol stack, Specification, characteristics of the Zigbee and the Zigbee topology. The author in [4, 5] discuss about the architecture of the Bluetooth sensor network and it's issues in patient monitoring.

II. OBJECTIVES

- (i) Different sensors are connected to the patient's body at appropriate positions to collect real time data about his health.
- (ii) To monitor patient's respiration rate when it exceeds normal value.
- (iii) To monitor patient's blood level/glucose level in the saline bottle.

(iv) To monitor temperature of the body when it exceeds normal value.

(v) Providing a help switch to the patient to call the doctor whenever patient needs help.

III. SYSTEM MODEL

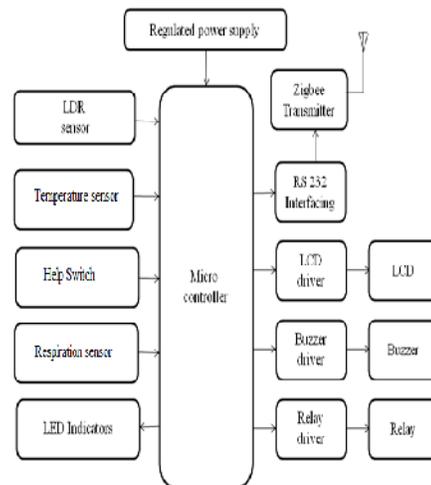


Fig. 1. Block diagram of transmitter.

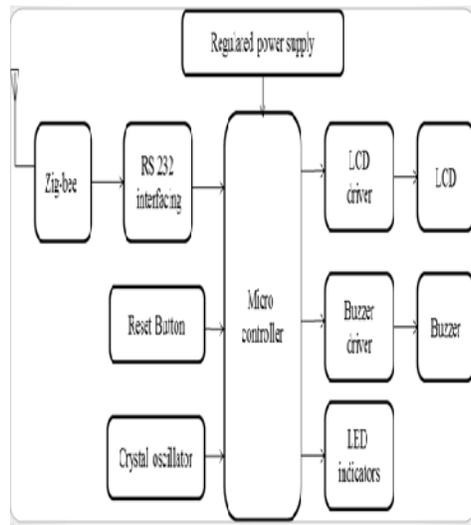


Fig. 2. Block diagram receiver.

IV. METHODOLOGY

A. Hardware description

Microcontroller (PIC16F72): This microcontroller is an 8 bit 28 pin IC. The parameters to be monitored are sensed by the sensors and given to this microcontroller.

Sensors: There are different sensors are used to check the status of the parameters. In this system three sensors are used to sense the blood level in the bottle, respiration rate of the patient and body temperature.

Blood level sensor: The arrangement consists of a blood level sensor and a motor. This sensor is used to sense the blood level in the blood bottle. When blood level in the bottle gets empty the sensor sends the signal to the microcontroller, intern the microcontroller sends the message to the remote section. At the same time a motor is turned on to block the space of the pipe to prevent the reverse flow of the blood from the patient’s body.

Respiration sensor: The sensors which sense the respiration rate of the patient when it exceeds the normal value, sends the signal to the microcontroller to send the message to the remote section.

Temperature sensor: Temperature sensor senses the body temperature when it exceeds the normal human body temperature the message will be sent to the remote section.



Fig. 3. Blood level sensor circuit.



Fig. 4. Respiration sensor circuit.

Timer circuit: Timer circuit is used to set the time by doctors, after elapsing this time the microcontroller sends the message to the doctor to check the patient’s condition.



Fig. 5. Timer circuit.

Zigbee: It is an IEEE 801.15.4 standard used for the wireless transmission of the data. The range of Zigbee is 75m to 100m. The advantage of the Zigbee is that which consumes less power. Both transmitter and receiving section consists of the Zigbee for transmitting and receiving respectively. This operates at 2.4GHz frequency.

V. RESULT AND DISCUSSION

The proposed system can be efficiently implemented in general wards of the hospital since the general wards usually have less number of nurses to monitor the patients. The system can be very efficiently implemented in homes for aged persons who cannot speak or cannot walk. Patients in ICU will get better treatment. But the disadvantage of this system is that the transmission range is limited hence the doctor or nurse lies outside of this range will not get any message about the status of the patient. This can be overcome by using GSM. The proposed system has the following advantages.

Easy and Reliable: The operation of the system is easy and the doctor or nurse needs not to go to check the patient's condition continuously.

Efficiency: It increases the efficiency by reducing the number of nurses to check the patient in the ICU.

Accuracy: This system is automated hence it reduces the errors while measuring the patient's parameters by humans.

VI. CONCLUSION

From the above discussion it concludes that the Zigbee protocol is efficiently used to transmit the data when patient's parameter exceeds normal value. The received data is displayed on the LCD. The Zigbee consumes

less power and transmission range is more than Bluetooth.

REFERENCES

- [1]. Dharmistha D. Vishwakarma, "IEEE 802.15.4 and ZigBee: A Conceptual Study" published in "International Journal of Advanced Research in Computer and Communication Engineering, Vol. 1, Issue 7, September 2012".
- [2]. Dr. S.S. Riaz Ahamed, "The Role of Zigbee Technology In Future Data Communication System" published in *Journal of Theoretical and Applied Information Technology*.
- [3]. P. Rohitha, P. Ranjeet Kumar, Prof. N. Adinarayana, Prof. T. Venkat Narayana Rao, Wireless Networking through Zigbee Technology, Volume 2, Issue 7, July 2012.
- [4]. Y. Zhang and H. Xiao, "Bluetooth-Based Sensor Network for Remotely Monitoring the Physiological Signals of Patient," in *IEEE Trans. On Information Technology in Biomedicine*, vol.13, no.6, pp.1040-1048, November 2009.
- [5]. H. Lee, S. Lee, K. Ha, H. Jang, W. Chung, J. Kim, Y. Chang, and D. Hoo, "Ubiquitous Healthcare Service Using ZigBee and Mobile for Elderly Patients," in *International Journal of Medical Informatics*, vol.78, no. 3, pp.193-198, March 2009.