

ONLINE HEALTH MONITORING SYSTEM USING ZIGBEE

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Abstract - An on-line health monitoring of physiological signals of humans such as temperature and pulse using Zigbee is produced in this paper, by which the temperature and pulse of humans can be monitored from a distant location and some abnormalities can be easily indicated via SMS .The physiological measurements obtained from the temperature sensor and heart beat sensor are transmitted to the programmed microcontroller to the PC through Zigbee. The PC collects the physiological measurements and also sends SMS, to the indicated mobile number through a GSM modem.

Key words- On-line monitoring, Zigbee, GSM, SMS, Temperature, Pulse.

I. INTRODUCTION

In the field of health monitoring the current most important user groups are those aged 40 and more. The group of 40+ users shows more diversity in their health conditions than younger people. There are ring-type pulses monitoring sensor available in the market in which the measured data are displayed in the LCD and cannot be transmitted out of the ring. Thus, it is not possible to continuously monitor the vital parameters such as temperature, pressure and pulse from a distant location. In a hospital either the nurse or the doctor has to move physically from one person to another for health check, which may not be possible to monitor their conditions continuously. Thus any critical situations cannot be found easily unless the nurse or doctor checks the person's health at that moment. This may be a strain for the doctors who have to take care of a lot number of people in the hospital. In order to keep in track of critical health conditions, an on-line health monitoring system of temperature and pulse based on Zigbee, GSM, SMS is studied and developed in this paper. In the next section, the proposed system is explained with needed block diagrams. In section III the hardware and software of the presented system is mentioned. Then results are demonstrated in section IV and conclusions are drawn at the end.

II. PROPOSED SYSTEM

This project proposes a system that provides a continuous health monitoring service for people. The on-line monitoring health system of temperature and pulse of humans based on Zigbee, GSM, and SMS is mainly composed of the patient section and the server section, the communication unit, and the expert software. The graphical user interface programs on the PC are coded using Visual Basic Assembly level language is used for programming the microcontroller. Temperature and pulse signals are measured from the temperature and heart beat sensors and are processed by a built-in microcontroller. The processed data are then transmitted by Zigbee wireless transmission. Finally the received data is sent to the PC. In the PC a coding is written using Visual basic for transmitting the information of any abnormal health conditions to the specified mobile number (of the doctor in charge) in the program through a GSM modem. It can facilitate doctors in diagnosis and improve the efficiency and quality of medical administration. Embedded C is used for programming the controller unit. Using GSM modem message is transmitted to the programmed mobile number to the doctor in charge. When the measured temperature exceeds the allowable value or if the pulse measured is abnormal, an alarm message can be send through GSM, SMS to the doctors in charge.

Patient Section:

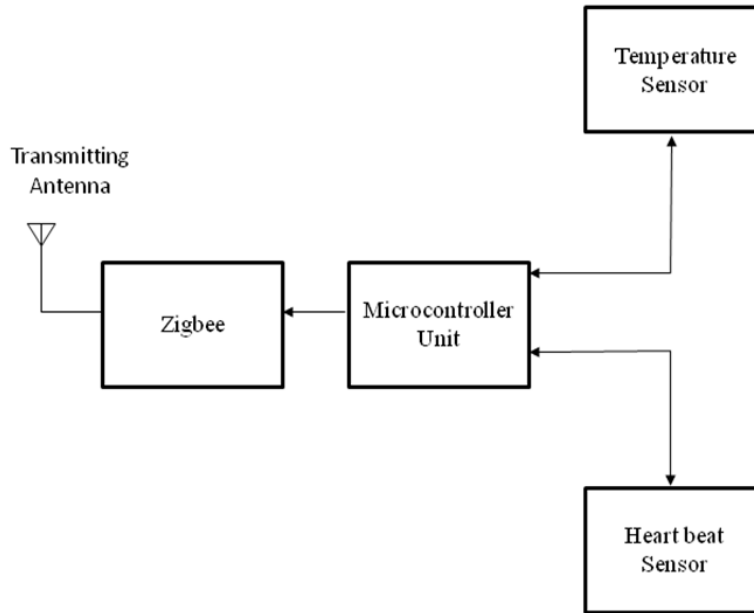


Fig . 1 Block diagram of patient section

Server Section:

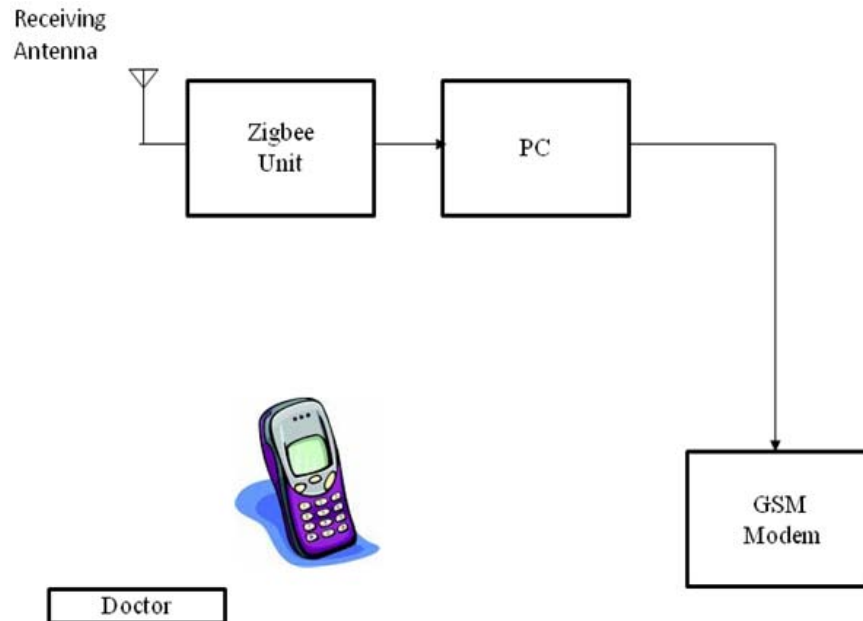


Fig . 2 Block diagram of server section

III. HARDWARE

A. Temperature Sensor

The temperature and heart beat sensors can measure temperature, pulse signals which are sent to the microcontroller. The data are then transmitted by Zigbee to the PC. The sensors are connected to the I/O port of the PIC microcontroller PIC16F877A. It is an electronic device which provides a voltage analogue of the temperature of the surface on which it is mounted. The LM35 series are precision integrated-circuit Temperature Sensors whose output voltage is linearly proportional to the Celsius temperature. The sensor circuitry is sealed and not subject to oxidation. The LM35 generates a higher output voltage than thermocouples and may not

communication between the person in the hospital ward and the distant monitoring room,(about 50-100m away) becomes easy under the control of the doctor in charge of that ward. There will be a Zigbee at the transmitting end for transfer of information and a receiving Zigbee at the receiving end for receiving the transmitted information. The processed information is transmitted using the transmitting Zigbee and the information is received using the receiving Zigbee and finally the received data is sent to the PC. In the PC a coding is written using Visual basic for transmitting the information of any abnormal health conditions to the specified mobile number in the program through a GSM modem.

E .GSM

GSM (Global System for Mobile Communications) is a global digital mobile communication system, whose coverage is the most widely and reliability is very high. SMS (Short Message Service) is a kind of short message service, by which the limited data or text message can be transmitted. A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. A GSM modem can be an external device.GSM is the most popular standard for mobile phones in the world. Typically, an external GSM modem is connected to a computer through a serial cable or a USB cable. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate.

IV. SOFTWARE

The program to be written on the PIC microcontroller is developed using Embedded C and compiled using on MPLAB IDE compiler. The program is dumped into the microcontroller using PICKIT 2.Mplab IDE is the tool used to compile the code written in embedded C and PICKIT 2 programmer is used to dump the code into the PIC microcontroller.

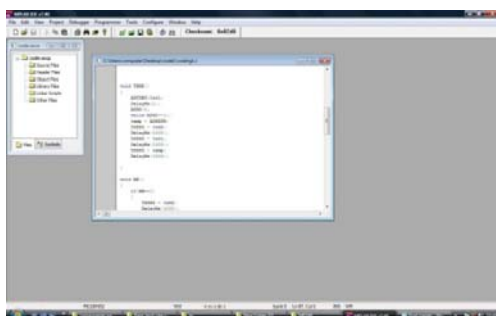


Fig . 5 Simulation using MPLAB

The GUI on the PC is developed using Visual basic. The form is created using Visual Basic 6 studio, to display the measured temperature and heart beat and the abnormalities are popped out on the window. The visual basic code is written in PC in visual basic 6 studio platform to determine the abnormalities of temperature and heart beat of a person.

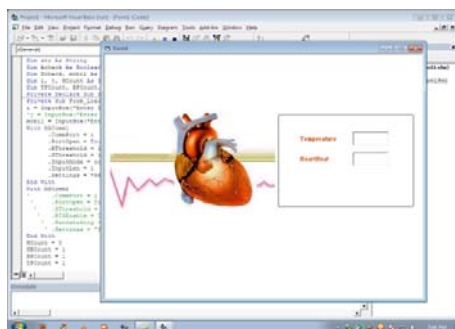
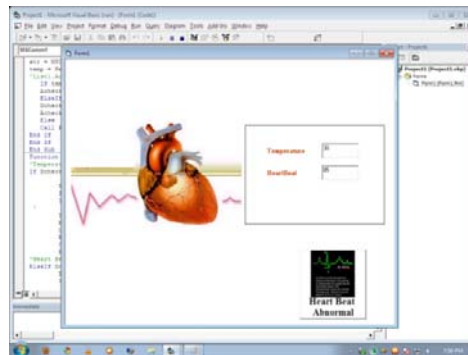
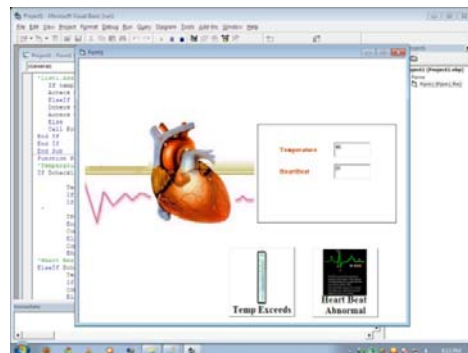


Fig . 6 Form developed using Visual Basic

At abnormal heart beat



At abnormal health conditions



VII. CONCLUSION

In this section, we have analyzed the on-line health monitoring system of temperature and pulse of humans using Zigbee, GSM, SMS. Any abnormalities in health conditions are informed via SMS to the indicated mobile number through GSM. The hardware is implemented and the output is studied.

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