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ZIGBEE BASED MULTIPLE-PATIENT MONITORING IN INDOOR OPTICAL WIRELESS HEALTHCARE SYSTEMS

Prof. Muhammadu Sathik Raja[1],Vijayasalini.J[2],Dharsni.K[3],Manimekalai.K[4],Maheswari.S[5]
Assistant Professor, Sengunthar College of Engineering, Tiruchengode[1], UG Scholar [2],[3],[4],[5],
Department of Medical Electronics Engineering,
Sengunthar College of Engineering, Tiruchengode. Tamil Nadu, INDIA
scewsadik@gmail.com[1] , vijijeevi1402@gmail.com[2], dharshusabi@gmail.com[3] ,manigowshi493@gmail.com[4], harinisendil98@gmail.com[5]

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Abstract: This study paper includes a design of Arduino based system for wireless patient's health parameters which consists of Heart beat, ECG and Temperature. Now a day's many human beings in India suffers from diseases like heart attack , Transmitting diseases, cancer and reason behind that, they are not getting proper and timely monitoring in hospitals. Also this system will give indication for taking medicine and diet in proper time to the patient. This problem generally occurs in multispecialty hospitals where numbers of patients are in diagnosis process. So in this paper we developed system which transmit the data from patient to doctor's PC.

Keywords: ECG (Electro Cardio Gram); LCD (Liquid Crystal Display); ADC (analogue to digital converter); LDR (Light Dependent Resistor);

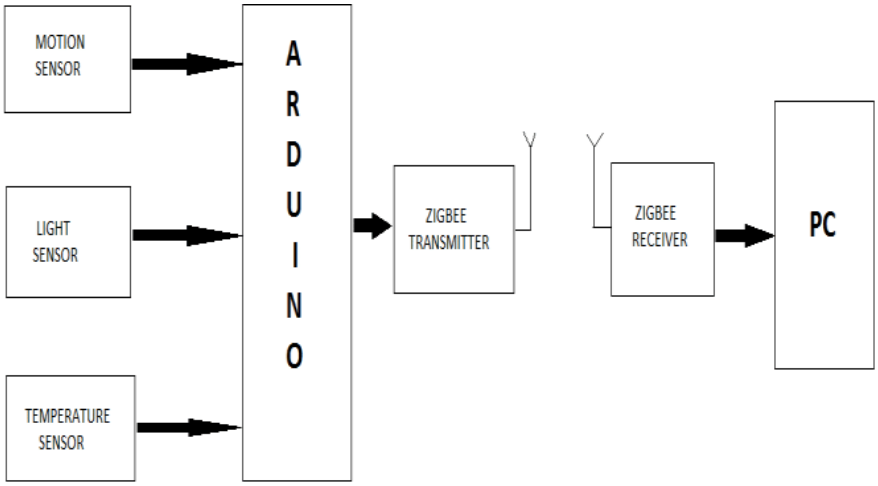
INTRODUCTION

Wireless patient monitoring system became vital in day to day life because of fast growing diseases in human life and this reflects in rapidly increasing demands in hospitals. This whole system measure the physical parameter of the patient's body and this real time data transmit to the central PC, which is kept at doctors cabin. Recently there are two methods in practice that is wireless ECG monitoring and alarm system using ZigBee and other is heartbeat monitoring alert via SMS. This paper includes physical parameter monitoring sensor circuits with ZigBee module as transmitter at bed and as receiver at central PC. To ensure the successful transmission of all health parameters, there is visual basic software used on central PC.

Overall system consist of mainly two parts i.e. hardware and software. Whereas hardware part consist of two sections i.e. transmitter and receiver, in which transmitter developed by four sensors, Master and Slave type combination. In master circuit four input sensors viz. ECG signal, temperature, heartbeat and saline level are connected to the controller ATmega328. This controller will give the output on the LCD and also on doctor's PC via Zigbee transmitter, whereas there is a Zigbee receiver model at doctor'sPC. Range of this Zigbee module is 100mtrs. The status of all the slaves is checked by the master circuit. System gives continuous data which is coming from four input sensors to doctor. The transmission signal is shown on both master and slave circuit. In the request frame the master shows the slave ID. The request frame is received by the slave, which are in range and stored to the RAM memory. If the incoming slave ID matches with their own slave ID then they accept the frame and send the parameter back to the master. When slave goes out of range then the communication fails. The slave should be placed in such way that they will be always in range of the PC master. The slave is under the PC based masters supervision. Therefore the PC master will communicate to the slave via Wireless Zigbee module.

Apart from this main circuit there is another facility is provided to the patient gives the indication for food intake at respective meal timing. After half an hour of food intake weight of patient is checked on special weighing machine connected to the bed. If weight of patient get increased by at least just 200gm then signal is send to microcontroller and this gives output of food taken message to doctor's pc. After this message patient get message for medicine intake on LCD which is connected to the bed.

BLOCK DIAGRAM



COMPONENTS USED

Controller (ATMEGA328)

Controller is heart of our system. This controller following features: 32Kbytes of in- system programmable flash with read- while- write capabilities, two 8-bit Timer/Counters, 23 programmable I/O Lines, and operating Voltage is 1.8 - 5.5V, Temperature Range - 40°C to 105°C, three flexible Timer/Counters. Pin configuration of ATmega328 IC consists of 28 pins. There is Port B, Port C & Port D an 8-bit bi- directional I/O port with internal pull-up resistors.

Temperature sensor:

It allows us to measure the body temperature. Which holds importance for the patient? Having Sensor record of human's body temperature; the doctor can give effective treatment to the patient.

Heartbeat sensor:

This sensor is intended to send a digital output based on heart beat when a finger is placed on Heartbeat the device. This output is read by the arduino board, and it transfers the data to the pc. A pc Sensor application displays the instantaneous heart rate and also it provides alert to the individuals based on heart rate.

ECG sensor:

The electrocardiogram (ECG) is a investigative tool which is consistently used to review the electrical and muscular functions of the heart. The device uses a "Continuous telemetry electrocardiogram" for a extended monitoring of patient's health.

Zigbee Module Interfacing with Arduino: Now in this tutorial we will interface XBee module with Arduino Uno board. The XBee connected with Arduino board will act as a receiver and it will communicate wirelessly with other XBee module which is serially connected with the laptop using a Explorer Board. So lets explore further for Arduino wireless communication using XBee.

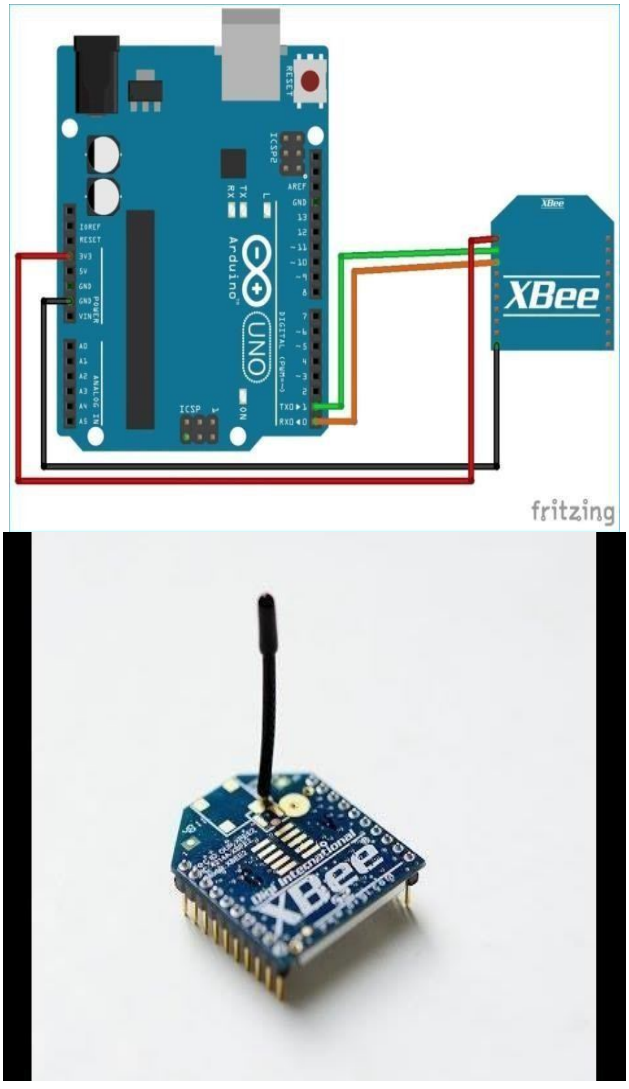


Fig: Zigbee Receiver

CONCLUSION

This designed system gives accurate result of human body parameters; also system gives indication of food and medicine intake it also checks whether the food is taken or not. System is more flexible to handle.

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