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Motion Based Message Conveyor for Patient Using Arduino System and Zigbee

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Abstract: ***It is critical task to attending the patients in remote places in conditions of emergency is very critical task therefore real time and continuous to check system is essential for doctors to treat the patients when they are in need. This system implementing the prototype model for covey message as well as real-time patient monitoring system by using Arduino microcontroller and ZigBee.***
We have patient monitoring of multiple patients. Each patient's multiple physical parameters like body temperature, heart beat rate, blood pressure are measured at their respective sensor. When the motion is occurs the physical parameters to bee measure. If the parameters value of any sensor value exceeds the threshold value, emergency alarm is on. We are implement the system by taking the advantage of network technology and sensors.
Key Words: Temperature Sensor, Arduino-uno board, Heartbeat sensor temperature, blood pressure Atmega16 Board ZigBee

I. INTRODUCTION

In today's world population is increasing rapidly. So there is a need for proper health care centers which need to be well maintained and developed. It not only reduced mobility of patients from one ward to other but also increased burden on patients.
Also it consumes more space and has more power consumption. Moreover in hospitals bedside patient monitoring is done which allows multiple patients in one room.
This not only causes disturbance but also lays the foundation of patient monitoring system. Patient monitoring is done at individual level. In one room one patient is there and multiple patient physiological parameters are measured individually. If there seems to be an emergency, an alarm system informs the nurse and the doctor. Monitoring systems make it easier for doctors to collect and observe a patient's vitals; there aren't many options for actual verbal communication for patients.

II. LITERATURE SURVAY

We studied the papers related to our topic. We got the information about different project which are related to our topic that is following:
In paper of ZigBee Based Centralized Patient Monitoring System which is developed by the Sakshi Sharma, Rashmi Vashisth in 2015.The main objective of this paper is to make centralized patient monitoring system using wireless transmission mesh network. ZigBee is a wireless transmission technology is adopted.
In the system, Real Time Health Monitoring System using Arduino which is developed by Rajalakhshmi .S, S Nikilla,The method is to implement a prototype model for the real time patient monitoring system. The proposed method is used to measure the physical parameters like body temperature, heart beat rate, and oxygen level monitoring with the help of biosensors.
By the paper of Hand Gesture Recognition Application for Physically Disabled People which is developed by D. Vishnu Vardhan, P. Penchala Prasad we get the information that is a communication system which converts signal languages, used by dumb people, It is done based on a narrative hand gesture recognition technique. The solution approach consists of a hardware module and software module.

III. BLOCK DIAGRAM

A. Transmitter Block Diagram

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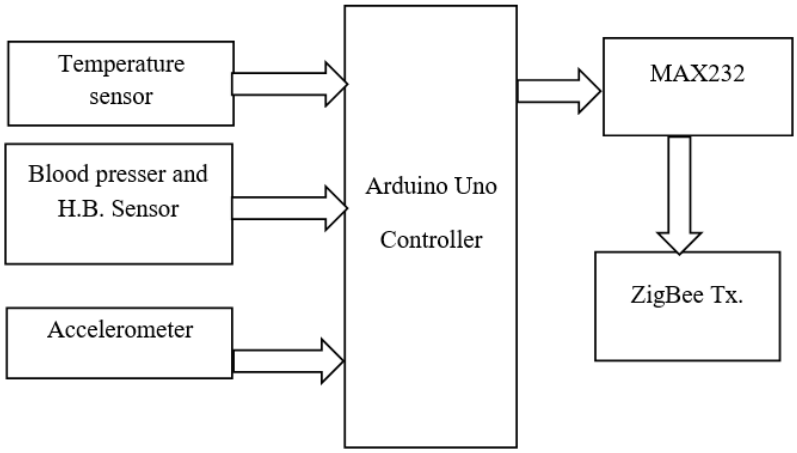


Fig: Transmitter block dig

B. Receiver Block Diagram

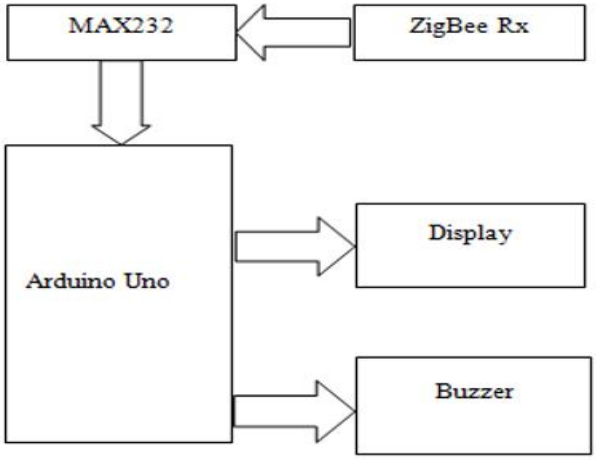


Fig :Receiver block dig

In this system, we establish the direct communication between patient and doctor or nurse by sending a message based on the motion. The main part of this project is Arduino Uno, In that we used Arduino Uno at the transmitter and receiver side. We used ZigBee module for the transmission and reception of the signal and we measure the physical parameter of the patient.

At the transmitter, we connected the accelerometer to the Arduino which sense the motion of the patient, also there is the heart beat sensor and blood pressure sensor which measure the heart beat and blood pressure of patient. The temperature sensor is used to detect the body temperature of a patient.

At the receiver we connected the display and buzzer, when the motion from the patient then the signal detect at receiver. Also when the temperature, blood pressure and heart bit sensor exceeds its threshold values then also it sends the value to the doctor. This communication is done by the ZigBee module. This ZigBee module is connected to the Arduino Uno using MAX232. The buzzer is on and message is display on the LCD.

IV. ALGORITHM

A. The algorithm of our project is following:

The algorithm is the flow of the process of the system.A flowchart is a type of diagram that uses an algorithm, workflow or process, showing the steps as boxes of various kinds, and their order by connecting them with arrows.

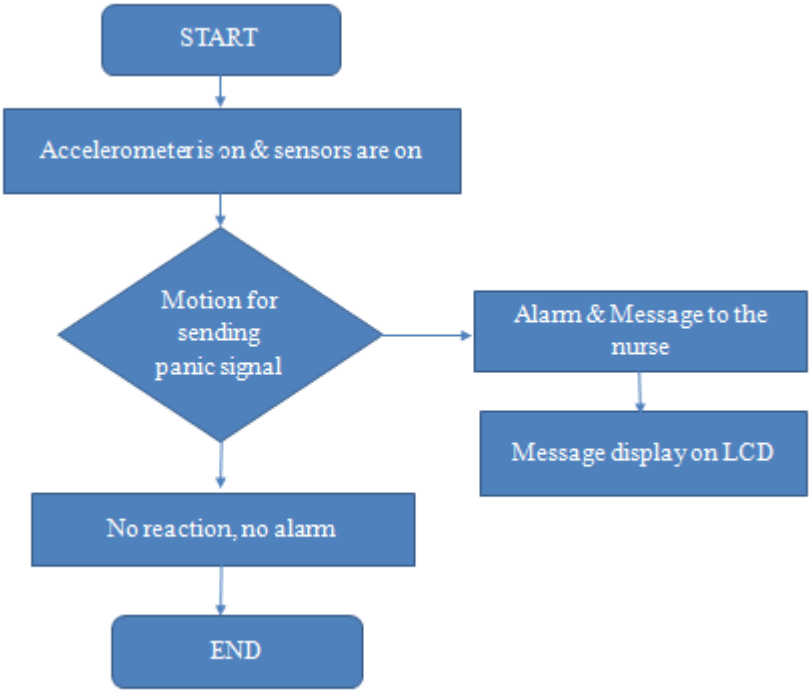
1) Start.
2) Switch on the Arduino Uno.

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3) Switch on the LCD and Sensors.
4) Initialize the Arduino Uno.
5) Initialize temperature sensor.
6) Initialize the blood pressure and heart bit sensor.
7) All the devices are ON.
8) Motion by a patient which send panic signal to the receiver.
9) Measured temperature value is send to the receiver.
10) Measured heartbeats and blood pressure value is send to the receiver.
11) If values of sensors exceeds threshold value.
12) Buzzer is ON and message display on LCD.
13) If there is no reaction from patient then no alarm is ON and message will not be display on LCD.
14) Stop.

V. FLOWCHART



VI. ADVANTAGES

A. *ICU section*

It is useful in hospital's ICU section. Our system is useable for the ICU ward in the many hospitals. In the case of emergency in the ICU section our system can operate easily. It is more applicable in the hospitals.

Helps to doctor for 24 hours monitoring:

It is help to doctor for 24 hours monitoring. Our system is very useful to the doctors. In this system we used temperature sensor, blood pressure sensor and heartbeat sensor which gives 24 hours monitoring of the patient's health to the doctor.

B. *In home applications*

It is useful in the home. This is system is also used for the single patient in house. Our system is useful in houses for the monitoring of the patient.

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VI. RESULTS

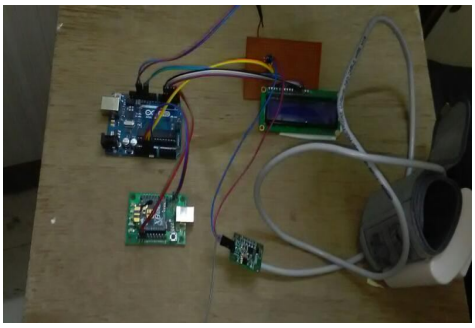


Fig:1

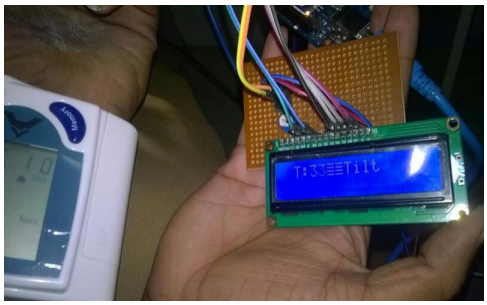


Fig:2



Fig: 3

Figures 1, 2 & 3 showed above related to our system. In fig.1, our experimental setup is shown in fig. 2, when the motion occurred 'Tilt' was displayed on the receiver side. In fig.3, the measured values of the patient's physical parameter such as temperature, blood pressure, heartbeat values are displayed.

VII. CONCLUSION

In this project, the monitoring of patient is successfully simulated and verified interfacing of I/O device like temperature sensor, blood pressure sensor, heartbeat sensor with Arduino Uno Microcontroller.

It is observed that Arduino Uno gives us more efficient I/O interfacing options. Consuming less power and occupying less space. It is also observed that the cost to the end customers is also less compare to other microcontroller and microprocessors.

VIII. FUTURE SCOPE

We will Interface the voice recording system. We will transfer voice message to the doctor. The related information is in the form of voice message directly sent to the doctor.

We will also use the Android Application, by using the Arduino application the real time patient's health status updates will give to the doctor. Then the doctor will give immediate solutions to the nurse or on the status of the patient's health.

We will use the Wi-Fi system for communication. By using Wi-Fi system we will expand the communication distance. We will transmit and receive message through the long distance.

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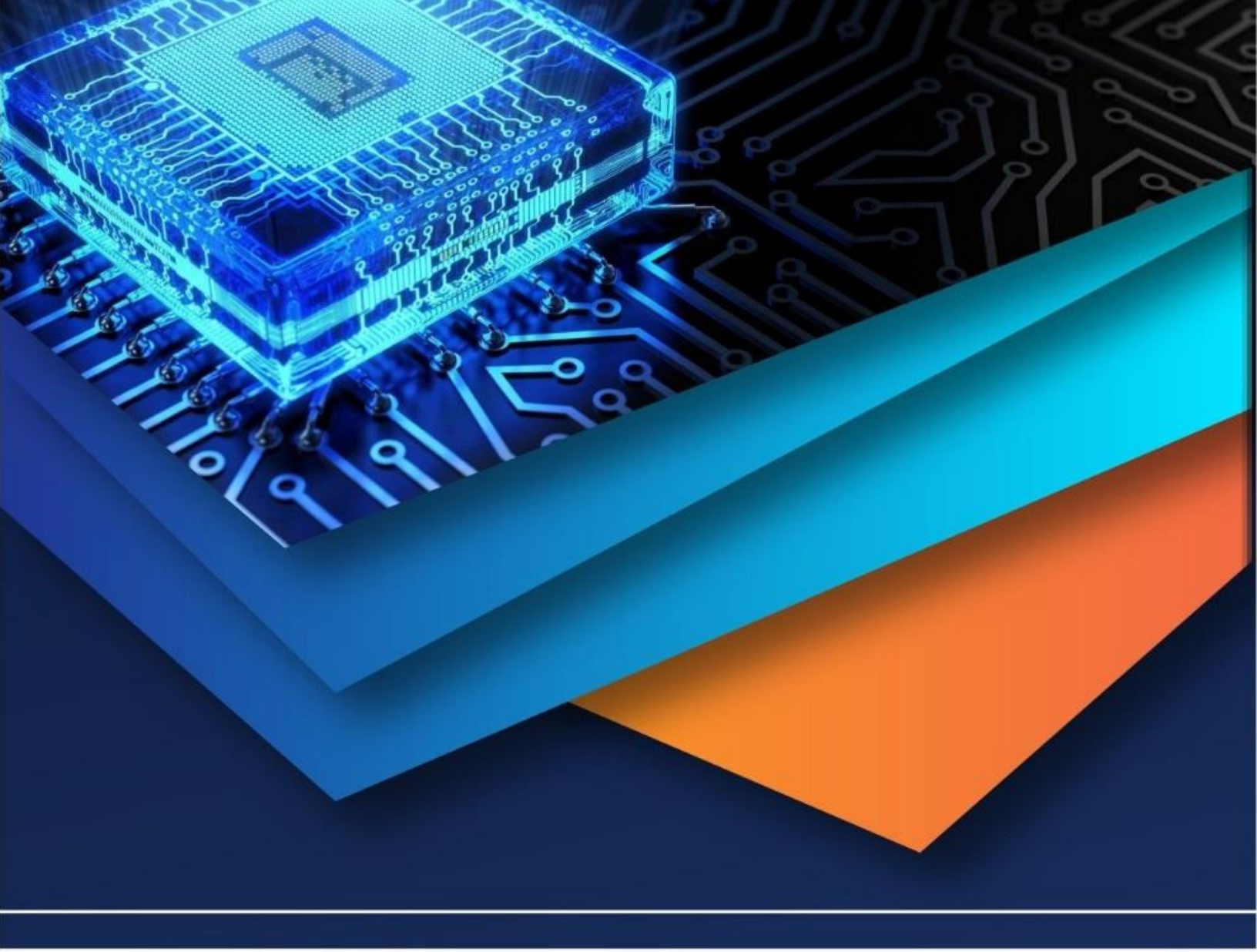
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