Wireless Data Transmission and Acquisition for Alive detection

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Abstract: *Wireless sensor network have a broad range of application in the category of detection and monitoring. Data acquisition plays an important role in the field of modern industry control .In any cases remote data should be transferred to monitor center which is far away from the manufacturing field .Traditional data acquisition system by means of wires could not satisfy the requirements, as there is rapid development of embedded system, wireless communication technology and depend on 3G as wireless data transmit terminals will be in use widely in industry. This paper presents a new data acquisition and analyzing system based on 3G technology .In this paper the problem of soldiers is alive or not is considered and a comprehensive framework is proposed for the use of wireless sensor network for real-time jawan's detection and monitoring .This paper presents a development platform of pulse sensor ,capable of transmitting pulse rate via wireless technology to the control room where the set up has been made to receive these pulse rate data .The device would make the acquisition of pulse data through pulse sensor/heartbeat sensor ,easy to obtain and sent. The goal of work reported in this paper was to build a system to benefit and facilitate relative detection wirelessly.*
Keywords: *Arduino, Heart Beat Sensor, RF Module*

I. Introduction

Today is the age of automation and centralized control of processes ,where emphasis is more and more towards coalescing of techniques to form a unified entity that can support itself without much intervention from external agents .Automation eliminates human errors, while achieving better productivity and optimum utilization of resources with lesser requirement of time. With innovative and creative bent of mind, man comes out with solution for every problem. The use of wireless data transmission provided by wearable system is also interesting to avoid wires that could limit the movement of subjects in studies .In order to evaluate applicability of such type of system, a survey has been undertaken regarding commercial availability ,costs whether or not technologies were open source. Among possibilities available, we choose Arduino family of products to address this issue due to the fact that is an open hardware project .The goal of work reported in this paper was to build a system to detect and monitor .without much human efforts by using our circuit we can monitor the generating units in alive detection and control the performance automatically.

The device would be useful in hospital premises too to efficiently monitor any serious patient without compromising any mobility due to wires. An electrocardiogram is the measurement of electrical activity of heart muscle as obtained from surface of the skin. as heart performs its function of pumping blood through circulatory system, the result of the action potentials responsible for mechanical events within the heart is the generation of a certain sequence of electrical events .The transmitter node acquires sensors information process data and transmit it to the receiver node .The receiver node receives data from sensors node which is implemented on arduino ,process it and retransmits the controlling signal information and also displays the sensor information on display. Wireless communication is implemented so that information can be transmitted to a centralized monitoring station through RF transmitter and RF receiver the pulse rate data from Jawan up to the Control room.LCD display is also use to display the output.

II. Introduction To Ardunio

The Arduino is different from the traditional data acquisition system and need special programming skills. Arduino is a single board microcontroller intended to make the application of interactive objects or environment more accessible. The Arduino platform was designed to provide an inexpensive and easy way for hobbyists, students and professionals to create devices that interact with their environment using sensors and actuators . A program or code written for Arduino is called a "sketch". Here we are using two arduino boards. The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software. These sketches are written in the text editor. Sketches are saved with the file extension .ino. It has features for cutting/pasting and for searching/replacing text. It works on IDE (Integrated development environment) and required basic knowledge of embedded C. Acquiring real time sensor data is a critical task or to configure the three sensors, one digital and two analog and calibration required a high skill of

programming. For this wireless transmission of sensors data Arduino IDE is used for programming the controller board. Embedded C is used for programming with some dedicated commands for Arduino. Arduino provide the facility of variable baud rate, here we use the standard baud rate of 9600 and COM5 or 9600 and COM1 is configured for the initial configuration of Arduino and then for wireless Transmission hyper terminal is used which act as virtual port. Initialization process starts with the CT command.

Fig. Block diagram of Transmitter
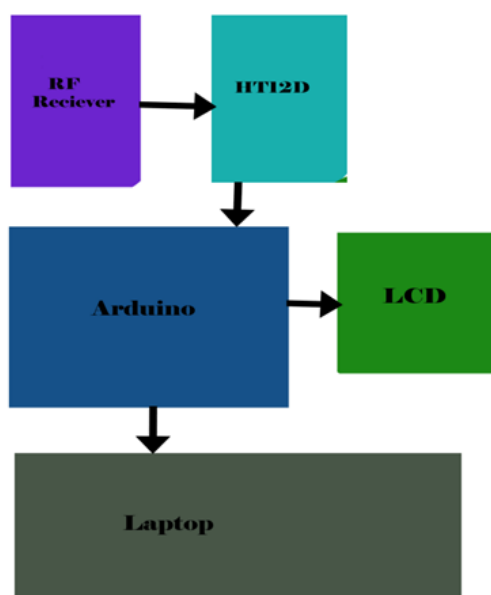

Fig. Block diagram for Receiver

III.   Introduction To Data Acquisition

Data acquisition systems measure, store, display, and analyze information collected from a variety of devices. Most measurements require a transducer or a sensor, a device that converts a measurable physical quantity into an electrical signal. Data acquisition systems are used by most of engineers and scientists for laboratory research, industrial control, test and measurement to input and output data to and from computer. Data acquisition involves measuring signals (from a real-world physical system) from different sensors, and digitizing the signals for storage, analysis and presentation. Analog input channels can vary in number from one to several hundred or even thousands. The activity of soldier is encoded as an input and transmitted to the receiver or control room panel. Data acquired from soldier is decoded at the receiver.

IV.   Fuzzy Logic

Fuzzy logic is nothing but the combination of small modules which are generated as per our requirement. The modules are nothing but the sensors. Here the sensors which we are using are PIR sensor, LM35 sensor, Heartbeat sensor.

- **PIR sensor :** PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. When soldier is at moving condition PIR will sense his motion and send this data to the Arduino pin no.4 from where this data is encoded through HT12E encoder IC and transmitted through RF transmitter. When soldier is at stable condition PIR will sense that soldier is stable. This moving and stable condition of soldier will be displayed on LCD and on PC or Laptop at receiver mode.

- **LM35 sensor:** The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly- proportional to the Centigrade temperature.LM35 sensor is used to detect the body temperature of soldier. It gives three possible condition of body temperature as low, normal and high. If the temperature of body is below 30° centigrade then the output displayed at lcd will be low. If the temperature of body is between the ranges of 30° to 40° then the output will be displayed as normal. If the temperature of body is above 40° then the output displayed will be high.

- **Heartbeat sensor:** Heart beat sensor is designed to give digital output of heat beat when a finger is placed on it. When the heart beat detector is working, the beat LED flashes in unison with each heart beat. This digital output can be connected to arduino directly to measure the Beats per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.

V.   Communications

The communication between transmitter and receiver is based on wireless technology. The RF434MHz transmitter and receiver module is used as a transmitter and receiver along with the encoder decoder IC HT12E and HT12D.Data pins of HT12E are connected to the digital data pin of the arduino. Whenever the activity of soldier is acquired through the fuzzy logic the HT12E encoder Ic is used as an encoder which encodes the data in machine friendly language i.e. binary and transmits this data through RF transmitter. The encoded data is received at receiver by RF receiver and HT12D decoder Ic decoded the data and convert it into text form which will going to be display on lcd and laptop.

VI.   Working

The simple fundamental of data acquisition and transmission system wirelessly is used here. The 5V power supply is given to the arduino. The data of soldier/jawan is being acquired at transmitter section. The parameters of soldier like body temperature, motion and heartbeat are acquired and transmitted to receiver for displaying the status of soldier/jawan.PIR sensor will detect the motion of the soldier whether he is moving or stable and LM35 sense the temperature range of the body and Heartbeat sensor will detect or sense the beats of soldier either he is alive or not. This acquired data is given to the arduino from where it is sent to the encoder Ic encoded by HT12E Ic and then transmitted through Rf transmitter. At receiver side the data received by RF receiver is first decoded by HT12D Ic then it will send the data to arduino where the compiler compare all the three parameters with the mentioned conditions and the output or the status of soldier will be displayed on lcd and laptop.
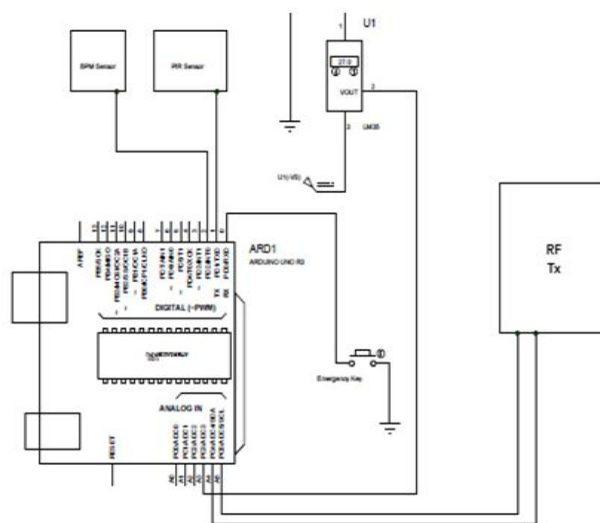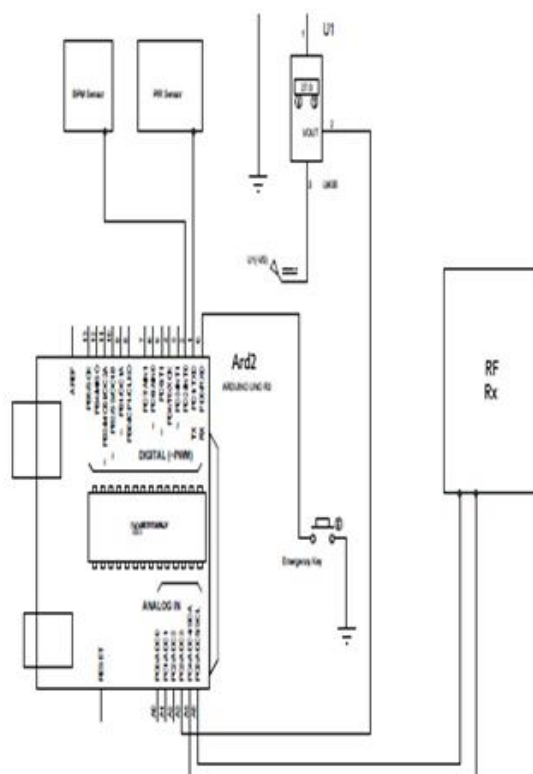

Fig. Schematic diagram of Transmitter

Fig. Schematic diagram or Receiver

VII. Conclusion

As per the proposed system and sensor nodes that have been designed, it is investigated that wireless sensor network can be effectively applied to detect human habitat monitoring. In addition, wireless sensor technology has a broad application in the field of real-time data acquisition and transmission. To monitor Temperature, motion and the heartbeat of soldier/human in the war in a more timely and precise way, this work pointed out unique advantages of safety in data transmission. Flexibility in building the network, low cost and inexpensive for alive detection monitoring system based on a arduino and RF technology that is designed here. The Network topology structure of the system is of RF module. In other words, here proposed system is as a first attempt and complement to alive human detection monitoring and prevention methods. It provides a solid basis in terms of hardware for the application of advanced wireless sensor network technology. Although it required the knowledge of network communication but once it implemented then it's easy to understand. Arduino as data acquisition board make the system more robust and facilitate the proper utilization of detecting parameters for monitoring.

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