WIRELESS INDUSTRIAL MONITORING

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Abstract

This paper presents the complete design of wireless industrial data monitoring system. Now days wireless technology can play an important role in human life. The main goal of this system is data transmission through wireless technology and display that data on monitor in graphical form. By seating at one place in front of the monitor and observe all the values of transmitted data. Representation of these values are in the form of graphical format. So because of this we can easily understand the conditions of sensor at what value it is exactly working. Bar graph is easy for indication.Processing software is good for graphical representation of data. And for transmitting and receiving the data, microcontroller is used, which is of AVR (atmega328) family. So the main and basic aim is representing the sensor data in graphical form which is being send through wireless technology.We have used RF module for wireless communication of data.

Keywords-

AVR atmega328, RF module (434MHz), Standard Firmata, processing software.

1.Introduction

We can do the connectivity by using wireless technology between the devices. The main aim of this system is send the data using wireless technology and represent in graph.In this project we have used RF (434 MHz) modules for transmission of data. RF module transmitter is directly attached to first AVR328 and then receiver is attached to another AVR328 microcontroller. We have attached one sensor to analog pin. Now at receiver side, we have attached RF receiver.The main purpose is,displaying all these received digital values on single monitor screen. We have used processing software to display the data values in graph format. This system is used at various places at industrial level as well as at that places where we doesn't need to go every

time and check is the system is properly working or not.This system is easy for handling and cost effective.

2.Block diagram

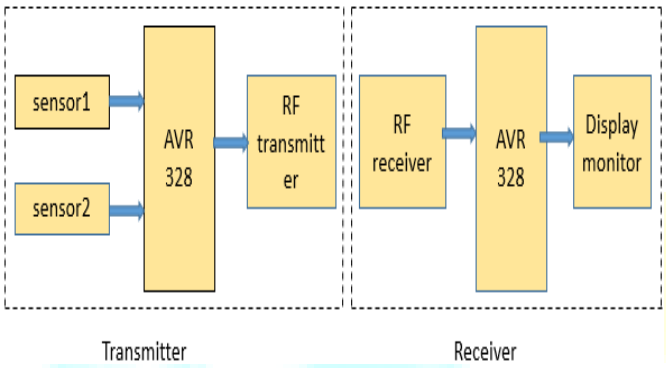

Fig.2 Block Diagram

In this block diagram there are two different sections i.e. transmitter and receiver.

3. Graphical representation

Graphical representation is the process of displaying the digital values in the form of bar graph or charts. So for that purpose we have done the programming in processing software to draw the bar graph or charts. Some knowledge of programming in processing software is required.

4. Hardware requirement

4.1 RF (434MHz) module:

RF is a wireless technology used for transfer or receive data over short distances. Its range is fixed.

Pin	Function
1	GND
2	Data in
3	Vcc
4	ANT

Fig.4.1RF Transmitter

Pin Assignment

Pin	Function
1	GND
2	Digital Output
3	Linear Out
4	VCC
5	VCC
6	GND
7	GND
8	ANT(About 13cm)

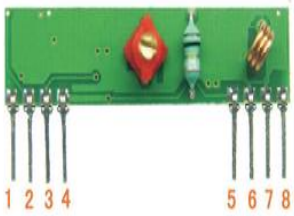

Fig.4.2 RF Receiver

4.2 AVR ATmega328

In this project we have used arduino uno board.It is a microcontroller Development board with microcontroller I ATmega328.

Fig. 4.2 atmega328

It has 14 digital input/output pins. Out of which 6 can be used for PWM signals, 6 analog inputs, and a 16 MHz crystal oscillator, a USB connection, a power jack, an UART and a reset button.

4.3 Display monitor screen:

For displaying the graphical representation we need of one monitor screen. It can be a desktop monitor screen or TV screen.

5. Schematics

5.1. Transmitter schematics:

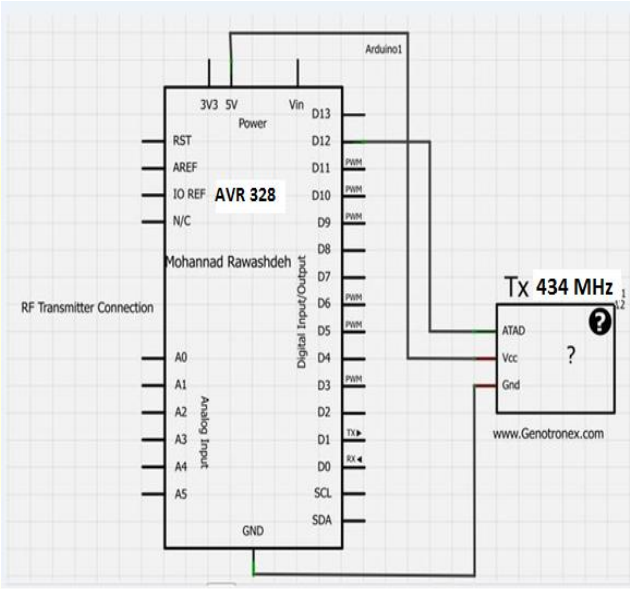

Fig.5.1 Schematics of transmitter interfacing

5.2 Receiver schematics:

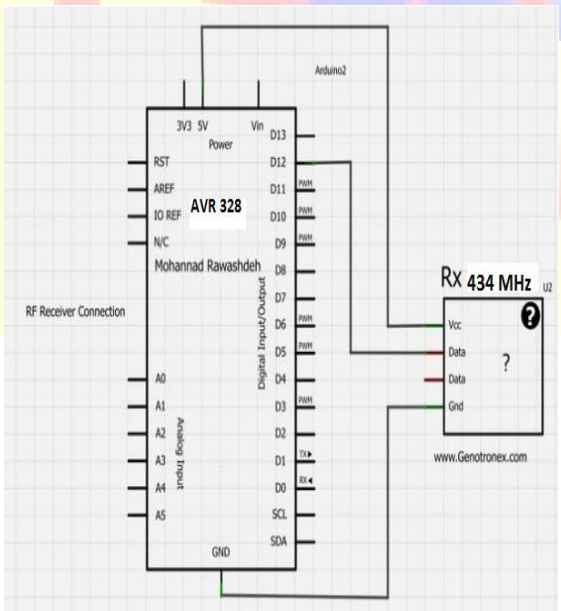

Fig.5.2 Schematics for receiver interfacing

6. Software design

Mainly it is divided into three sections:

1. Transmitter section designed with ATmega328
2. Receiver section designed with ATmega328
3. Bar graph designing in processing software

6.1 Programming for ATmega328:

Fig. 5.1 illustrates the control flow in Atmega32 microcontroller. The input to the main controlboard is detected by Atmega328 microcontroller. Any input to Atmega328 microcontroller will cause an interrupt to the main function loop of Atmega328. This will cause a change in the output peripherals connected to driver circuit.

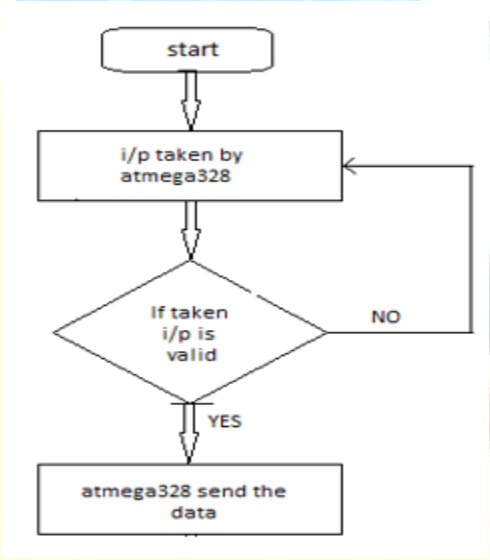

Fig. 6.1 Flow chart for transmitter

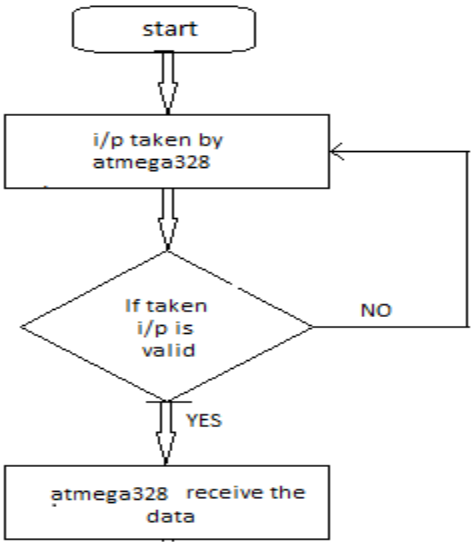

Fig.6.2 Flow chart for receiver

6.2 Processing software development:

In this software first need of drawing bar graph in its program by using void setup and void draw. After drawing this we need the processing software should communicate with AVR atmega328 IDE. For that purpose there is one firmware named Standard Firmata. Which is already included in the library of atmega328 IDE. So its need to upload that library in microcontroller and by doing this processing software will communicate with atmega328 IDE. Then by taking the values which were transmitted by wireless technology, processing software will display it according to our programming on screen monitor.

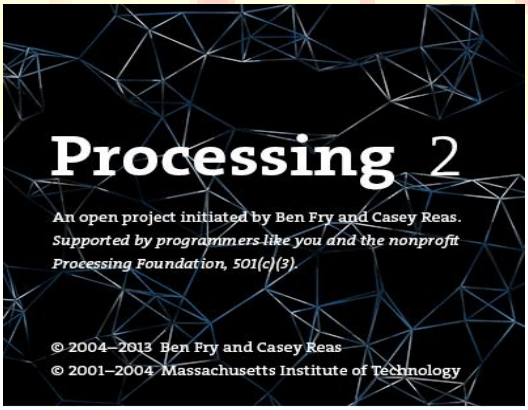

Fig.6.2 processing software window

7. Results

7.1 Transmitter implementation:

By observing the below fig.7.1 we have conclude that we have done with the implementation of transmitter part by using RF transmitter module.

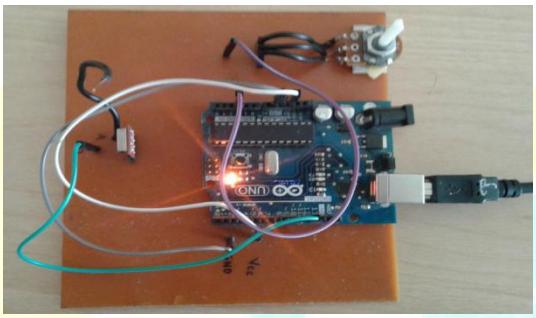

Fig .7.1 Implementation of Transmitter

7.2 receiver implementation:

Now by observing below it is concluded that we have done with receiver implementation also. We have used atmega328 for implementing this receiver circuit. RF receiver is attached to microcontroller and receives the values in the form of digital one.

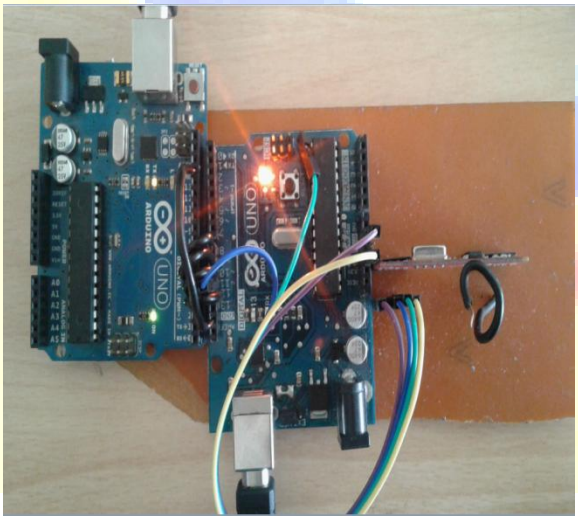

Fig. 7.2 Implementation of Receiver

7.3 Processing Software Implementation:

For the implementation of processing software we used another microcontroller for uploading the Standard Firmata. The pins which are high at receiver implementation are directly given to the microcontroller so that its digital values given by the processing software

through Firmata. It finally displayed on monitor in graphical format like bar graph. Observe its result in below fig.7.3

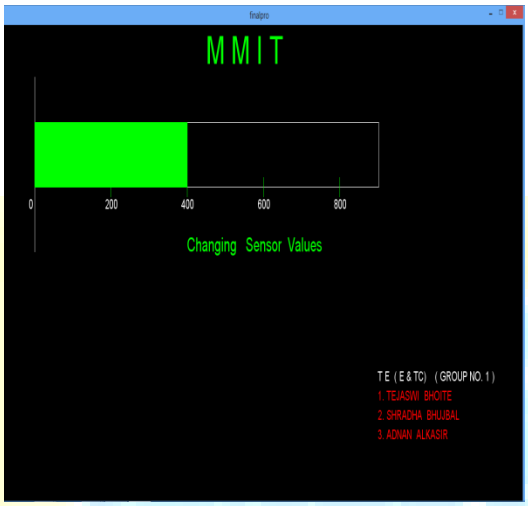

Fig.5.8 Processing Software Output

The user of this system will get the beneficial of reducing its time to go at every place and observe its values. No need to do that.

Fig. Hardware Implementation

8. Application and Advantages

1. Main advantage of this project is easy and sophisticate for understanding the parameter values because of its graphical representation.

2. System does not having so much complications like wired connections.

.3. This system mainly can used at industrial level

9. Future scope

1. In future scope whenever this system is going to implement at the large area the range of wireless modules can increases by using another device like XBee, GSM modules etc.

2. At critical conditions where human beings are not able to go, or predict its condition.

10. References

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