



# Real Time Temperature Monitoring Using LABVIEW and Arduino

Vaibhav M. Davande<sup>1</sup>, Pradeep C. Dhanawade<sup>2</sup>, Vinayak B. Sutar<sup>3</sup>

Assistant Professor, Dept. of E. & T. C., D.K.T.E.s Textile and Engineering Institute, Ichalkaranji, Maharashtra,  
India<sup>1,2,3</sup>

**ABSTRACT:** This paper provides the information about how to use the Labview for real time data acquisition and monitoring through the board. Arduino is a simple microcontroller board which has user defined I/O pins as well as an analog input pins. So this paper proposes a system in which LabView has been interfaced to the thermistor (temperature sensor) through Arduino board. Through this system it is possible to monitor the real time temperature. Because of this system it is possible to automate the different appliances such as fans, high temperature alarms for the appropriate actions to be taken to avoid hazardous events. In proposed system thermistor continuously provides the temperature in terms of voltage that is directly connected to Arduino board to monitor the real time temperature and it has been plotted on the graph as well in the front panel. Based on the threshold values which has set the system control the LED on as well as a DC motor is turned if the temperature goes above threshold value. An entire programming has been done in LabView. Arduino interfaced to LabView done through the Arduino support palette available in the LabView.

**KEYWORDS:** LabView, Arduino UNO board.

## I. INTRODUCTION

In many fields there is a need of monitoring some physical parameters such as temperature, pressure, humidity, flow rate, etc. With respect to the quantities, distribution and detected frequency of monitored objects, there are different monitoring methods to get capture the measurements [2]. It's a decision of the management whether to have a monitoring based on manual or automated basis [1]. There are two types of temperature sensors viz. Positive Temperature Coefficient of Resistivity (PTC), and Negative Temperature Coefficient of Resistivity (NTC). The proposed system uses a sensor thermistor and it is a negative temperature coefficient of resistivity (NTC) type. So as temperature increases its resistance goes on decreasing. This sensor is a passive type of transducer so it needs an external power supply for its working. Therefore it has to be connected in Kelvin's bridge. To convert the temperature into the corresponding electrical signal that is voltage. Then it is connected to Labview through Arduino board.

Requirements:-

The proposed system requires both hardware as well as software as follows

### Hardware:-

- Arduino Development Board
- Temperature sensor thermistor
- Kelvin's Bridge

### Software:-

- LabView 2013
- Arduino software

In the implemented system, thermistor provides the sensed temperature which is connected to LabView through Arduino. Based on the sensed temperature LabView shows the variations in it on the graph as well as on the thermometer scale. As the temperature exceeds above the set threshold value LabView gives commands to the Arduino board and turns the LED as well as the DC motor connected to the board also on LabViews front panels LED indication becomes on. When the temperature goes below this threshold value LabViews front panel LED, LED and DC motor connected to Arduino gets turned off.

# International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 3, March 2016

## II. RELATED WORK

The system was developed to produce a prototype product of a Web Based Temperature Monitoring system that allows the user to continuously monitor the temperature condition of a room [1]. An active Server Page (ASP) scripting language is used as server side scripting to publish the current temperature at the web browser. In paper [2] author introduces a remote wireless temperature monitoring system which can be applied in real-time and with multi-regional access to information without geographical restriction by short message service (SMS). Real time data is collected by wireless sensor nodes and transmitted to base station using ZigBee. Data is received, saved and displayed at base station to achieve soil temperature, soil moisture and humidity monitoring [3]. A real time field monitoring and controlling system is implemented using ARM controller in the present study. Experiments were carried out at lab scale to sense temperature, nature of the land and pressure. All these parameters will be uploaded to the server and field information can be monitored [4].

## III. SYSTEM IMPLEMENTATION

The block diagram of the proposed prototype system is as shown in below figure 1.

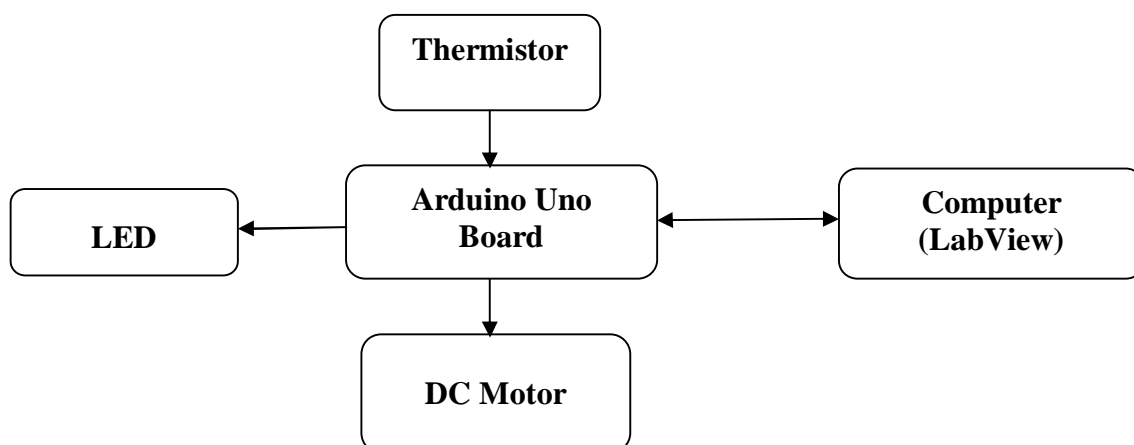


Figure 1. Block diagram of proposed prototype model.

### 2.1 Hardware Implementation

#### 2.1.1 Thermistor



Figure 2. Thermistor

Thermistor is a temperature sensor which is of NTC type, means its resistance decreases as there is increase in temperature and vice versa. 102 mean a 1k $\Omega$  resistance thermistor. The temperature sensitivity coefficient is about five times greater than that of silicon temperature sensors (silistors) and about ten times greater than those of resistance temperature detectors (RTDs). NTC sensors are typically used in a range from

# International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 3, March 2016

-55°C to 200°C. Thermal time constant is about 20 seconds. Maximum allowable power is 550mW.

## 2.1.2 Arduino Uno

The Arduino Uno board is a microcontroller based on the ATmega328. It consists of 14 digital input/output pins out of which there are 6 pins that can be used as PWM outputs, a 16 MHz ceramic resonator, an ICSP header, a USB connection, there are 6 analog inputs pins, a power jack and a reset button. This contains all the required support needed for microcontroller. For the connecting to a computer it uses a USB cable. Also with an AC-to-DC adapter or battery it can be powered on. Arduino Uno Board varies from all other boards and they will not use the FTDI USB-to-serial driver chip in them. It is featured by the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.



Figure 3. Arduino Uno Board

## 2.1.3 DC Motor



Figure 4. DC motor

The DC motor has speed of revolution as 1500rpm. It operates at 5-9V.

## 2.1.4 LED

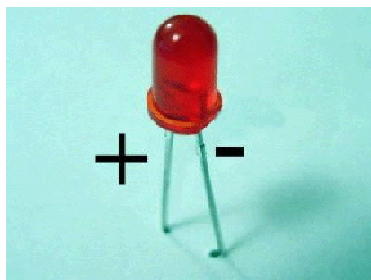


Figure 5. Light Emitting Diode (LED)

A **light-emitting diode (LED)** is a two-terminal semiconductor light source. It is a p-n junction diode, which emits light when activated [4]. When a suitable voltage is applied to the leads, electrons are able to recombine with

# International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 3, March 2016

electron holes within the device, releasing energy in the form of photons. This effect is called electroluminescence, and the color of the light (corresponding to the energy of the photon) is determined by the energy band gap of the semiconductor.

## IV. SOFTWARE IMPLEMENTATION

In the system implemented, the programming is done in LabView is in the form of block schematic or it's a graphical type of programming which has connections between the different blocks representing certain tasks. Through this programming it is possible to monitor the real time temperature along with the hardware system.

From the inception of an idea to the commercialization of a widget, National Instruments unique platform-based approach to engineering and science applications has driven progress across a wide variety of industries. Central to this approach is LabVIEW, a development environment designed specifically to accelerate the productivity of engineers and scientists. With a graphical programming syntax that makes it simple to visualize, create, and code engineering systems, LabVIEW is unmatched in helping engineers translate their ideas into reality, reduce test times, and deliver business insights based on collected data. From building smart machines to ensuring the quality of connected devices, LabVIEW has been the preferred solution to create, deploy, and test the Internet of Things for decades. Combine the power of LabVIEW software with modular, reconfigurable hardware to overcome the ever-increasing complexity involved in delivering measurement and control systems on time and under budget.

### 3.1 Flow Chart

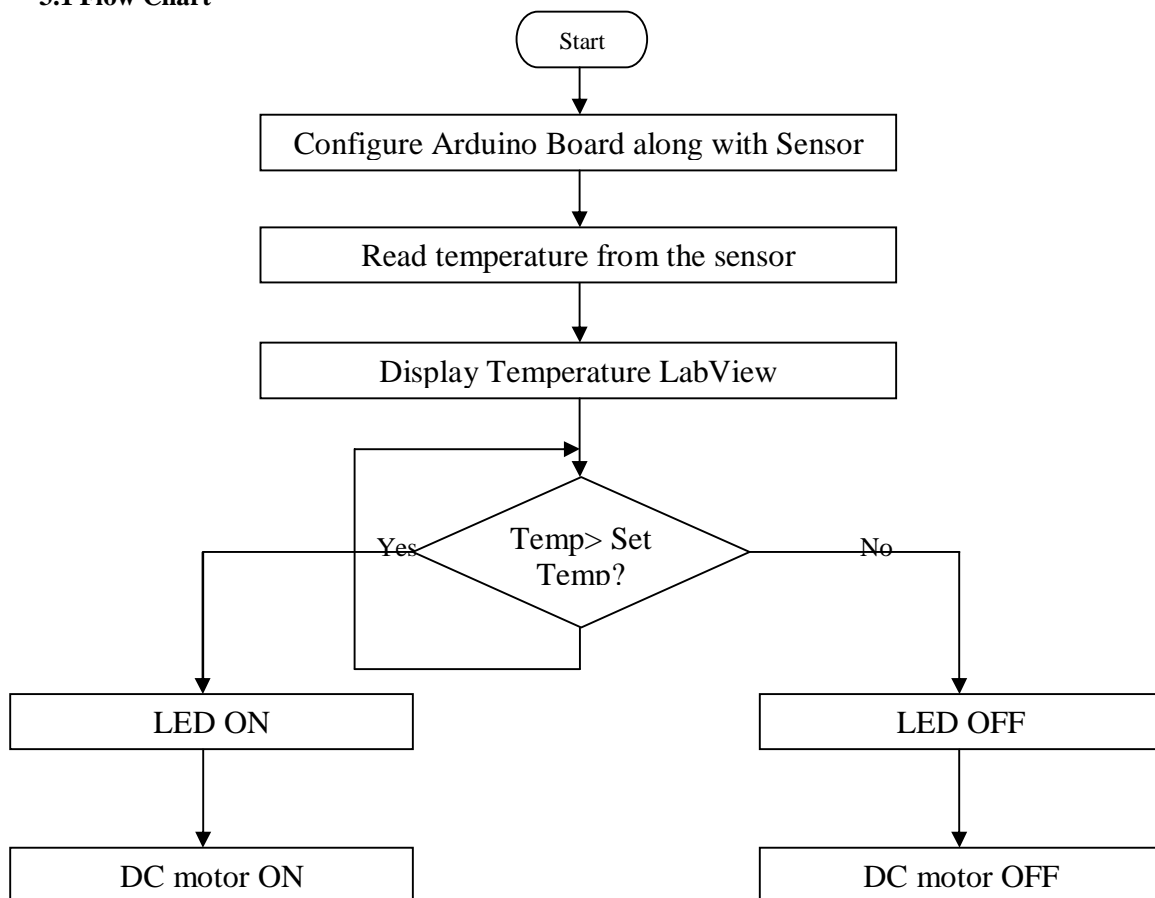


Figure 6. Flow Chart of the implemented system

Prototype Design of the implemented system is shown in figure 7.

# International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 3, March 2016

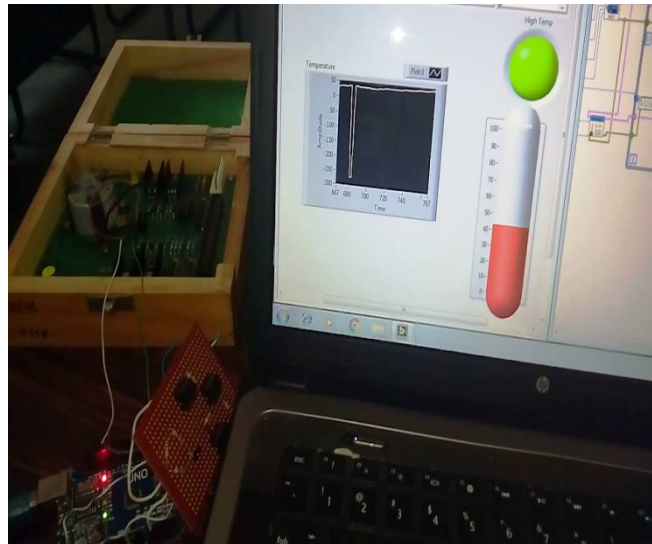


Figure 7. Hardware implementation of the proposed system.

Graphical programming implemented in LabView is shown in figure 8.

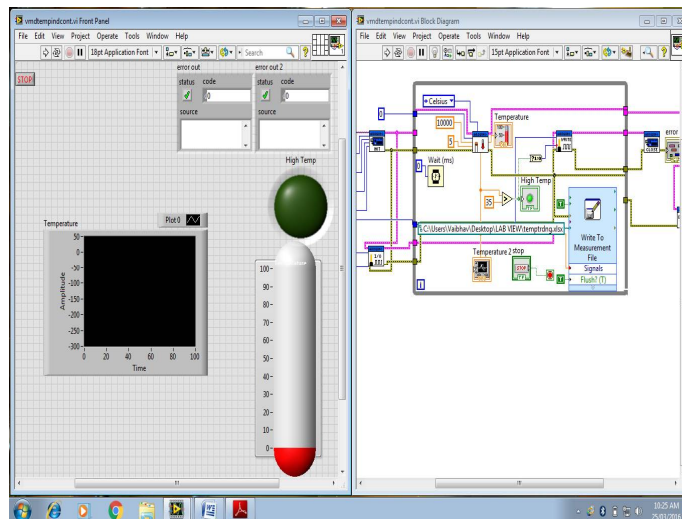


Figure 8. Software Implementation through LabView

## V. SIMULATION RESULTS

The following figures Figure 9a and 9b shows the system results of the system when the temperature is below the threshold value. In this situation the LED and the DC motor is in off condition. This indicates that the temperature is low as compared to the threshold temperature that has been set.

# International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 3, March 2016

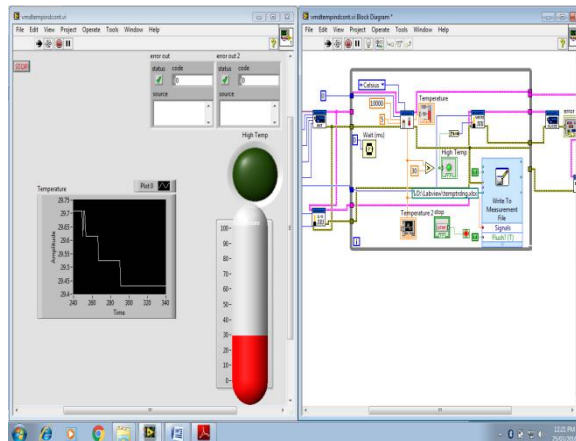


Figure 9a. System Result when temperature is below the threshold value on LabView simulator.

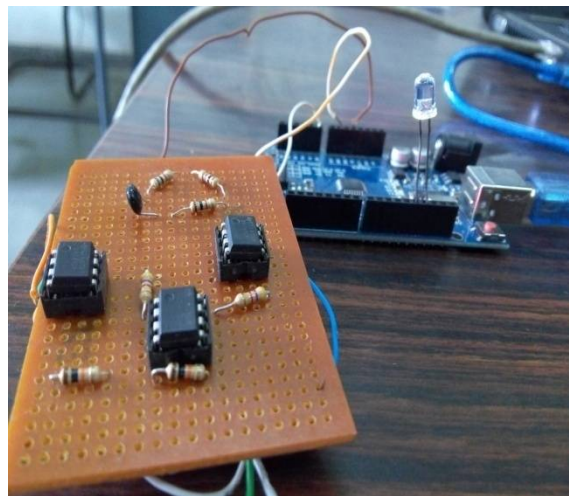


Figure 9b. System Result when temperature is below the threshold value on hardware.

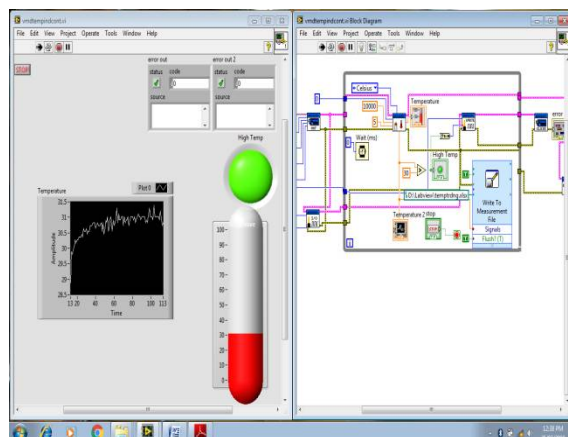


Figure 10a. System Result when temperature is above the threshold value on LabView simulator.



# International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 4, Issue 3, March 2016

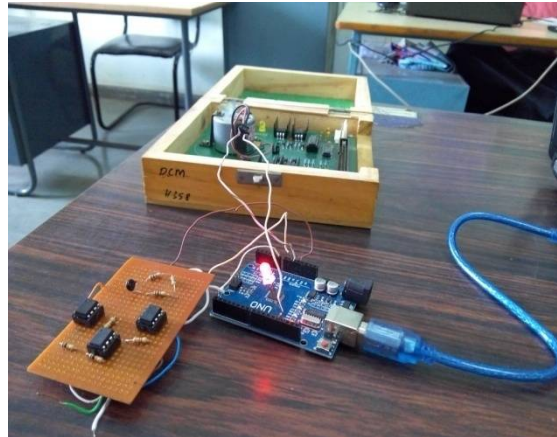


Figure 10b. System Result when temperature is above the threshold value on hardware.

The above figures Figure 10a and 10b Shows the results when the temperature goes above the threshold. In this case, the LED and the DC motor gets turned on to indicate that the temperature has risen above the threshold temperature.

## VI. CONCLUSION AND FUTURE WORK

The conclusion of this prototype systems experimentation result for the real time monitoring of the temperature using LabView and Arduino is as follows:

1. LabView has been interfaced to an Arduino board through the Arduino support palette available in the LabView for various real time monitoring activities.
2. The proposed design can be modified to display the High temperature on LCD display. Also it can be possible to send the SMS through the GSM modem to the monitoring authority.
3. The system is capable of doing the data logging in excel file which is already done in the proposed system.

## REFERENCES

1. M. Kassim, M.N. Ismail and C.K.H. Che Ku Yahaya, "A Web Based Temperature Monitoring System", *International Journal Of Multidisciplinary Sciences And Engineering*, ISSN: 2045-7057, Vol. 2, No. 1, pp.-17-25, March 2011.
2. S.L.Y. Youling, X. Weisheng, "Design of Remote Real-Time Temperature Monitoring System", *The Eighth International Conference on Electronic Measurement and Instruments ICEMI Proceeding 2007*.
3. Dr. R. K. Prasad, Mr. S. R. Madkar, "Design & Implementation of Wireless Transceiver for Data Acquisition in Wireless Sensor Network", *International Journal of Advanced Research in Computer Science and Software Engineering*, ISSN: 2277 128X, Volume 3, Issue 7, pp. 521-526, July 2013.
4. K. Chenna Kesava Reddy, P.Venkatrao, "Real Time Field Monitoring and Controlling System", *International Journal of Recent Technology and Engineering (IJRTE)*, ISSN: 2277-3878, Volume-2, Issue-4, pp.-98-100, September 2013.
5. Gunalan .M.C, Satheesh.A, "Implementation of Wireless Patient Body Monitoring System using RTOS", *International Journal of Engineering Research and General Science*, Volume 2, Issue 6, pp.-207-208, October-November, 2014.