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Human Body Temperature Monitoring System

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Abstract:

This paper indicates the method of monitoring human body temperature using embedded web server and LabVIEW technology. The hardware is developed on Arduino 2560 controller board. LabVIEW is used to provide GUI based environment to the user and Ethernet shield is used to generate embedded web server. It can be applied in internet through the website or network system so the patient's situation can be monitor worldwide. This electronic document represents a scheme of such low cost, low powered, simple and easy hardware as well as software.

Key words: *Arduino, Ethernet Shield, GUI, LabVIEW, VISA, Webpage, Web Server*

1. Introduction

This paper compiles the basic system for temperature monitoring implementation for a patient in hospitals or nursing home. Under the critical situation some patients need to be monitored carefully in time and also monitored their condition continuously.

This basic system includes a temperature monitoring implemented system by low cost hardware component as well as GUI platform in computer by LabVIEW. This live embedded human body temperature monitoring system may also be included internet website based transmission support by implementing using Arduino and Ethernet shield as base. This project covers live monitoring system for hospital or nursing home for patients under critical condition and need to be carefully checkup in time and their critical body temperature must be supervised in time. This system support live internet web transmission of patient's body temperature as well as GUI based platform in local hospital computers by LabVIEW interface with temperature sensor and hardware part.

1.1. Basic Requirement

This complete system requires basic hardware and software requirements as must and also covers low cost, less power consumption and low size.

1.2. Hardware Requirement

- Arduino Mega2560 Development Board
- Ethernet shield
- Temperature Sensor
- PC with LAN driver installed
- Prepare Your Paper Before Styling

1.3. Software Requirement

- Windows Operating System
- National Instruments Lab VIEW 2013
- Web Browser
- Arduino Sketch Software

2. Proposed Methodology

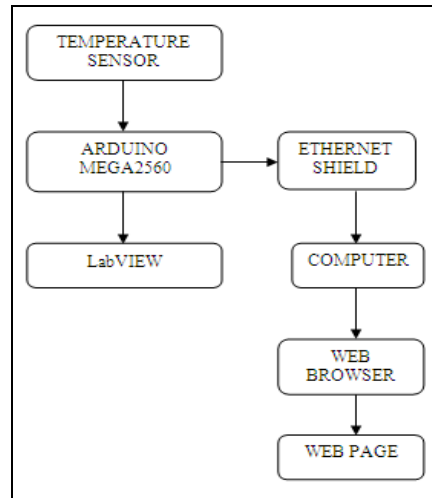


Figure 1: Architecture of Human Body Temperature Monitoring System

In this Architecture first stage is Temperature Sensor, which gives analog values according to current temperature, we generally measured in Celsius form. This analog value is given to Arduino Mega ADC channel for conversion. After conversion from A/D, the result will be stored into the memory. Temperature readings is converted into Fahrenheit and serially transmitted over serial port for LabVIEW GUI display. In LabVIEW live temperature readings will be displayed. To display current temperature readings in the web-page, web-based protocol HTTP is used and website is designed into simple HTML language.

Basically, we used Ethernet Shield for joining the web-server concept to this project. HTML based website is developed in Arduino programming and transmitted over a LAN or Internet via Ethernet Shield to the PC/Clients.

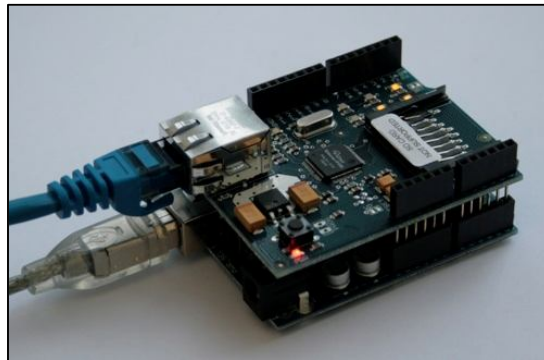


Figure 2: Arduino and Ethernet Shield

3. Programming Concept

In Arduino sketch Code is written and must require adding below Libraries.

- SPI
- WIRE
- Ethernet

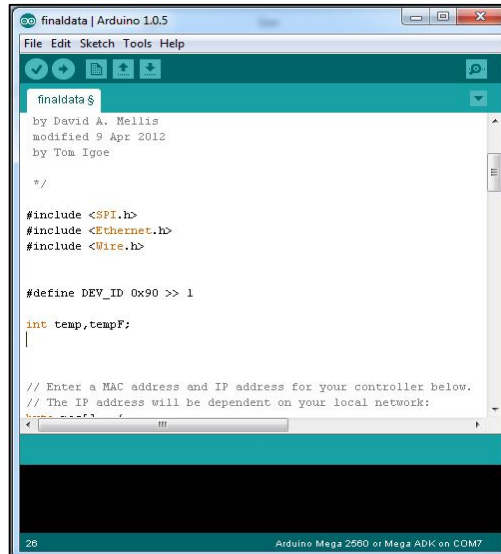


Figure 3: Screen Shot of Arduino

For Analog temperature sensor Wire library is not required, but we are using DS1621 IC as temperature sensor which supports I2C protocol, so we have used the Wire library for arduino. Ethernet & SPI library is used for Ethernet shield.

In the LabVIEW, to indicate the current temperature of the human body, temperature indicator is used as well as numeric indicator is used to display the current temperature.

Simple LabVIEW front panel is designed which looks like below. Serial communication is established by VISA(Virtual Instrument Software Architecture) drivers to be installed and then VISA controls is used in the block diagram, VISA Open, VISA Read, VISA close blocks is used for this purpose.

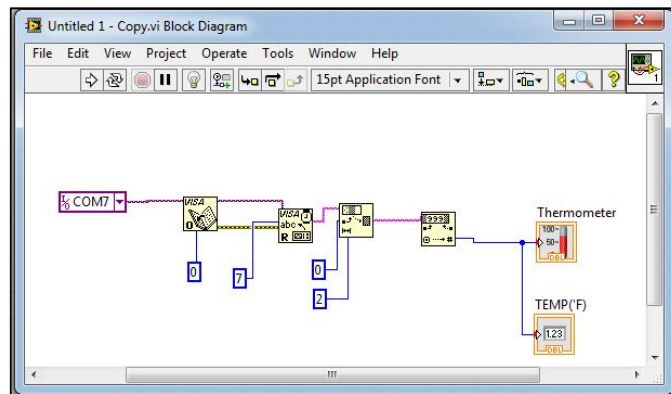


Figure 4: Block Diagram in Lab View

Web-browser will display also appropriate temperature readings from the arduino through Ethernet shield connected to the PC Ethernet port (RJ45), (LAN Driver must be installed), also IP configuration is required for this purpose,

- PC IP Address: 192.168.1.xxx
- PC Gateway IP: 192.168.1.1
- Arduino Ethernet IP: 192.168.1.1

Ethernet Server is established by arduino Ethernet and one or several PC will be connected through switch / hub. Internet explorer / google chrome browser is used to display website by browsing 192.168.1.1 IP in address bar. Also this webpage will be refreshed every particular interval say 1sec or 5sec, whichever is convenient for monitoring.

4. Results

After completing all hardware & software programming parts, also troubleshoot the connection between PC and arduino Ethernet shield successfully, and then open the web browser in the PC then type appropriate IP address of the server shield and webpage will be displayed.

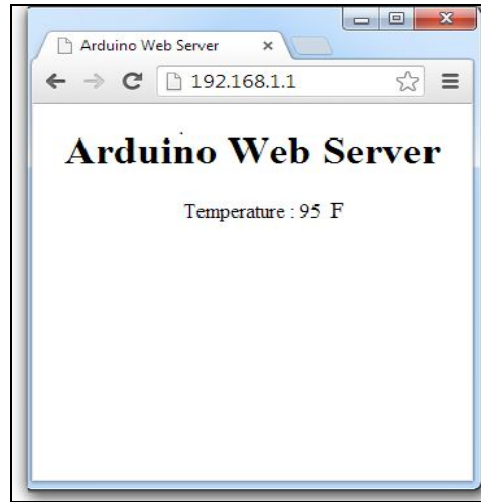


Figure 5: Result In Web Page

Also in the Lab VIEW select appropriate COMPORT and then start VI, arduino sending all temperature readings serially through serial COM port so Lab VIEW will accept this data and converted into numerical format and then will be displayed into indicators used.

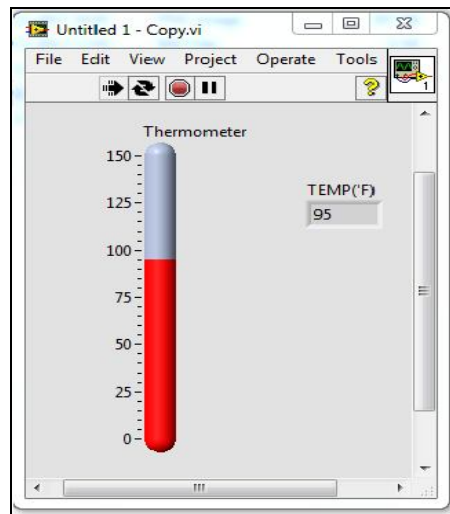


Figure 6: Result In Lab View

Arduino Programming in Sketch Software is easy to understand and for Ethernet programming, MAC address & IP address need to be configured separately in arduino. Also DS1621 is configured to giving continuous conversion of temperature, and then will be converted into Fahrenheit and/or Celsius format.

5. Conclusion

The main aspect of this system is user can control the hardware as well as monitor the sensor readings from area to the website or anywhere user moves. So, simply the goal of this system is to implement real-sense embedded web-server through Arduino with Ethernet shield readily available.

6. References

1. C. A. Boano, M. Lasagni, K. R'omer, and T. Lange "Accurate Temperature Measurements for Medical Research Using Body Sensor Networks".
2. C.R.Prabakaran,P.Vijayakumar,R.Suryaprakash "Web based Patient Monitoring System using ARM9 Processor" international journal of electrical, electronics and data communication,Vol- 1, issue- 7,pp. 49-53 sep-2013. , ISSN: 2320-2084
3. H. Sahoo and K.Biswal "Patient Monitoring System for Cardiovascular patient with body temperature using LabVIEW" International Journal of Engineering Research and Development, Vol 6, pp. 27-30, issue 8April 2013.
4. J.P. Tello, O. Manjarres, M.Quijano,A. Blanco,F. Varona,F.Manrique "Remote Monitoring System Of Ecg And Human Body Temperature Signals" IEEE transactions,Vol.11,pp.314-318, Feb. 2013. ISSN :1548-0992
5. Mr. B. Mehta, Ms.D. Rengarajan, Mr. A. Prasad "Real Time Patient Tele-monitoring System Using Lab VIEW"
6. International Journal of Scientific & Engineering Research, Vol 3, Issue 4, April-2012, ISSN 2229-5518.
7. M. Kassim, M.N. Ismail ,C.K.H. Che Ku Yahaya "A Web Based Temperature Monitoring System" International journal of multidisciplinary sciences and engineering, Vol. 2, no. 1, pp. 17-25, March 2011.ISSN: 2045-7057.
8. Mrs. R. Patil and M. Datta "On Line Real Time Health Monitoring of ICU Patients using ARM7" International Journal of Computer Science and Network (IJCSN) Volume 1, Issue 3, June 2012.ISSN 2277-5420.
9. O. Ratib, M. Dahlbom, J. M. Zucek, K. Kong, M. McCoy, and D. J. Valentino"Web-Based Video for Real-Time Monitoring of Radiological Procedures" IEEE transactions on information technology in biomedicine, Vol. 4, No. 2, pp. 108-115 June 2000.
10. P. Sundaram, "Patient Monitoring System Using Android Technology", International Journal of Computer Science and Mobile Computing, Vol. 2,pp 191-201. , May 2013.
11. T.B. lingaiah, D.H.Kumar, C.Nagaraja, S. Woldetsadik "Development of Humidity and Temperature Measurement Instrumentation System using LabVIEW" International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol. 2, Issue 10, December 2013