

Web Based Automated Smart House Management

Navya*¹, Ganesh Dumala²

VIT University Chennai, India

*Corresponding author, e-mail: rajareddigari.navya2013@vit.ac.in¹, ganeshdumala@gmail.com²

Abstract

A Home automation refers to control appliances around the home. These appliances can include lights, fans and other electronic devices. Instead of using GSM and ZIGBEE modules use a simple system to reduce complexity. Here the proposed system uses web server using microcontroller. The proposed system gives users an effective and easy way of controlling the various home appliances from a remote location i.e. without physically being present at home. This system can control the fans and lights. Microcontroller is used to acquire data from different types of sensors. It can monitor the appliances from anywhere with the help of web page.

Keywords: microcontroller, interfacing sensors, home appliances, web publishing tool

Copyright © 2015 Institute of Advanced Engineering and Science. All rights reserved.

1. Introduction

The purpose of the system is to provide an efficient web based system to control day by day home appliances. This system gives clients to a simple and effective means of monitoring their various home appliances from a remote location i.e. without physically being present at remote area. The system utilizes the internet to enable remote access to the different home appliances. It enables clients to control different parameters of their home appliances from the remote area through the web. It hence makes effective and powerful system which extends the mobility of clients by granting them total control over their home without the need of physical presence. The project layout is explained below along with the components required to build a system. The client interface will be designed as a part of the internet based application. The user can access this interface and control the home appliances from remote area. The information from this application will be passed to the local server that is the home PC. This home PC will pass on the signals to the microcontroller. The microcontroller can be programmed in an appropriate way to understand this signal and thus convert it to an electrical signal and transmitted to the switch controlling the home appliance. The end result will be a simple action like switching on a light.

The Web server basic functionality is to enable the client programs and browsers to fetch the web pages and display them. In industries it is required to check of the parameters often. For this we require the man power. Instead of using man power this proposed system gives the details about industrial parameters using LabVIEW remote front panel. The proposed system consists of a micro controller with analog to digital converter, sensors, and a pc with LabVIEW. While creating a remote control front panel it gives one URL, based on that clients will access the server.

2. Research Method

Previous approach is, to control the various home appliances from a remote location, with using a local server, using ethernet. This system is accomplished by personal computers, interface cards, microcontroller, along with window-type software and microcontroller control software. The system is intended to control home appliances on and off, to regulate their output power, and to set their utilization timing. This is more cost effective because of the Ethernet cables and to acquire the data from sensors daq cards are used. The various aspect of the system which can be controlled are:

- a) Status of appliances (ON/OFF)
- b) The output power of the appliance

c) The time for which the appliance is running

This section discuss about the hard ware present in the system those are temperature sensor LM 35 and Light Dependent Resistor, micro controller P89V51RD2.

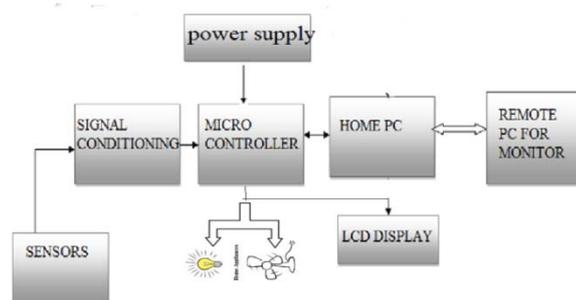


Figure 1. Block diagram of proposed system

2.1. Sensors

This proposed system consists of LM35 sensor i.e. temperature sensor. This temperature sensor contains three pins that are supply voltage, analog output and ground pins. Here LM35 series is using to measure the temperature which is an integrated-circuit, whose output voltage is linearly proportional to the Centigrade temperature. The operating temperature range is from -55°C to 150°C .



Figure 2. LM 35 temperature sensor

An LDR is a sensor which has a resistance that changes with the light intensity that falls upon it. The resistor behaves as per amount of light and its output directly varies with it. Generally, LDR resistance is minimum (ideally zero) when it receives maximum amount of light and goes to maximum (ideally infinite)voltage, when there is no light falling on it, it shows comparatively very low voltage. They have resistance that falls with an increment in the light intensity falling upon the device. The resistance of LDR in the daylight its resistance is 5000 ohms and in the dark its resistance is 20000K ohms. The most used application for an LDR is to automatically turn on a light at certain light level. An example of this could be a street light.



Figure 3. LDR(light dependent resistor) sensor

2.2. Signal Conditioning

External ADC is required to connect the sensor with MC because the output of the sensor is in the form of analog, to convert the analog data into digital form ADC is required. it

has four channels for interfacing different sensors. The programming part starts with ADC to read the data from sensor and it will be displayed on the LCD and sent to the LabVIEW. An ADC can take maximum of four sensor inputs. In this application two sensor inputs are taken and it will be displayed on the GUI and LCD display. The program read the data from sensor through the ADC and it will be display on LCD. Microcontroller communicates to the LabVIEW with the help of serial port. The sensor measures the current parameters of the LabVIEW by using serial port.

2.3. Micro Controller with LabVIEW

Here Philips Micro controller is used for this system. P89V51RD2 is a micro controller belonging to the family of 8051. It has 1024 bytes of RAM. It has four ADC channels. To monitor and control one value is given from the remote location based on the requirement. Here the main role of the LabVIEW is to interface the microcontroller with internet. For monitoring, all controlling phenomenon is done with the help of control circuitry.

Sensors gives the analog input to the signal conditioning unit which filters and amplifies the signal and that will be sent to ADC which converts the signal into digital and further processing is done with the help of micro controller. Other role of the controller is to send the data and receive the data from the LabVIEW. LabVIEW uses VISA communication protocols for reading and writing the data to the serial port. Using web publishing tool, all parameters can be monitored and controlled.

Remote controlling is done with the help of LabVIEW using the web publishing tool. This system alone can act as a server. In web publishing tool after selecting the program the tool generates some URL that will help for controlling from other location, URL is used to access the page from the browser.



Figure 4. interfacing of sensors with the micro controller

3. Software Requirements

Keil is used for programming the Micro controller and Graphical programming is required to communicate with LabVIEW. The first thing in the program is to read the values of sensor with the help of ADC and displays on the LCD. These values are sent to the LabVIEW. If the IP address (172.16.18.48:8000) of the PC enter into web then it gives the page based on front panel. Remote controlling is done by LabVIEW front panel by accessing the web server this system is control by using web publishing tool. This tool converts the front panel into HTML web page based on the parameters given in the program.

3.1. Limitations

a) *Dependence on the internet*- The most considerable limitation of the system is that it is completely reliant on the web for the remote access. In few cases like miss fortune of web connectivity, the client will any case have the capacity to control the home appliances directly from the local server using the GUI created for it.

b) *Dependence on power supply* – For the system to work properly, all appliances must be connected to the main power supply at all times. If appliances are disconnected from the main supply, they can no longer be controlled by the client.

4. Results and Conclusion

Thus by using the web, the parameters involved in home automation are monitored and controlled by interfacing the microcontroller and remote front panel.

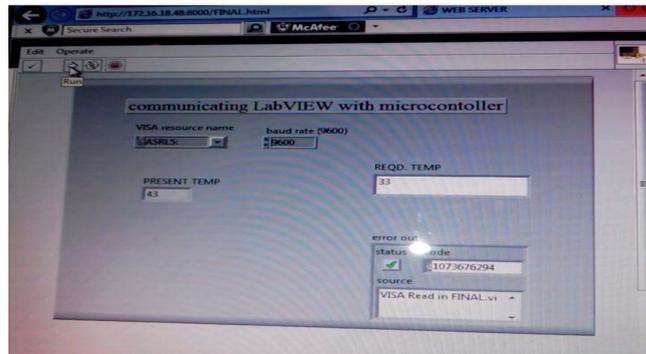


Figure 5. Output from the web server

The system for the “Home Automation” has an endless scope & almost limitless application in today’s technology driven market. The proposed system has a wide variety of Industrial applications such as interfacing of multiple sensors, remote monitoring and controlling etc. This system reduces the operational cost and complexity with the hardware design. This web server is multi tasking system it can monitor various parameters at a time. In this proposed system a low cost internet based system has been designed and implemented using keil software. In this system data acquisition is possible by web server for the home applications.

References

- [1] Mr Abhishek Vichare, Ms Shilpa Verma. *Embedded Web Server for Home Appliances*. international journal of engineering research and applications (IJERA). 2012; 2248-9622
- [2] Rajesh R Karhe, CS Patil, Mahesh S Patil. *Real time data acquisition and home parameters monitoring using labview*. International journal of advanced research in computer engineering and technology (IJARCET). 2013; 2(3): 2278-1323
- [3] Masato Shimano, Futoshi Okazaki, Yoshihiro Saito, Akiya Fukui, Takako Nonaka, Tomohiro Hase; *Small, Embedded Web Server for Home Appliances with Embedded MPU and Real-time Operating System*. 2007; 1-3
- [4] Kyu Hwang, Dae-Sung Lee, Jin-Wook Baek. Home network configuring scheme for all electric appliances using zigbee-based integrated remote controller. *IEEE Transactions on Consumer Electronics*. 2009 ; 55: 1300-1307
- [5] Hyung-bong Lee, Lae-Jeong Park, Sung wook Par, Tae-yun Chung, Jung-ho Moon. Interactive remote control of legacy home appliances through a virtually wired sensor network. *IEEE Transactions on Consumer Electronics*. 2010; 56: 2241-2248
- [6] Dr Basil Hamed. *The Design and Implementation of Smart House Control Using Lab VIEW*. International Journal of Soft Computing and Engineering (IJSCE). 2012; 1(6).
- [7] Peizhao Hu, N Symons, J Indulska, M Portmann. Wireless Multi-Hop Video Streaming using Android Phones. *IEEE International Conference on Pervasive Computing and Communications Workshops (PERCOM Workshops)*. 2012: 782-787
- [8] Elmurod Talipov, Yohan Chon, Hojung Cha. Content Sharing Over Smartphone-based Delay-tolerant Networks. *IEEE Transaction on Mobile Computing*. 2012; 1-14.
- [9] TGC Kooh, Qin Lv, S Mishra. Attribute Based Content Sharing in Mobile Adhoc Networks of Smartphones over Wifi. *IEEE 21st International Conference on Computer Communications and Networks (ICCCN)*. 2012 : 1-9.
- [10] NK Suryadevara, SC Mukhopadhyay. Wireless sensors network based safe home to care elderly people: A realistic approach. *Proc. IEEE Recent Adv. Intell. Comput. Syst.*, 2011; 1–5.