Wireless Smart Home Automation Using Smart Phone

Mr. R. Karthikeyan[1], Mr.S. Balamurugan[2], Mr.P. Kavinkumar[3], Mr.K. Kuppuraj[4], Mr.V.Anand Kumar[5]
[1, 2, 3, 4, 5] Department of ECE
[1, 2, 3, 4, 5]Sri Eshwar College of Engineering, Coimbatore, India

Abstract- *In this project a wireless smart home system has been proposed for elderly and disabled people. The main goal of this system is to control home appliances by using wifi and this also can intimate you when there is some leakage of gas in your home. Based on the received data at the wireless receiver associated with the appliances desired switching operations are performed.We can control home appliances using any android device with the help of wifiWe can control and monitor the home appliances through the wifi wirelessly. Wifi is being used in industry for machine-to-machine communications and other long-range wireless applications. It can be used to develop home automation system for the people with special needs like the elderly and the disabled*

I. INTRODUCTION

Automation is the most frequently spelled term in the field of electronics. The hunger for automation brought many revolutions in the existing technologies. These had greater importance than any order technologies due to its user-friendly nature. These can be used as replacement of the existing switches in home which produces spark and also result in the fire accidents in few situations.Wi-Fi is a wireless technology that uses radio frequency to transmit the data through air. Wi-Fi has initial speeds of 1mbps to 2mbps. Wi-Fi transmits data in the frequency band of 2.4 GHz. It implements the concept of frequency division multiplexing technology. Range of Wi-Fi technology is 40 to 300 feet. Home automation can be defined as a system implemented at a residential place whereby the intention is to make the place intelligent so that energy is conserved and security is maintained. It makes the life of the residents flexible, healthy and comfortable. Initially systems were developed in this regard but those systems had to be deployed on Internet and heavy machineries like a big Personal Computer. Our system will be free from all this giant components, which, indirectly suggests that our system has a good quality of portability.

Most systems would exchange data or would communicate with the help of Bluetooth, ZigBee and GSM. These systems have their own disadvantages. For example, system-implementing ZigBee has too low bandwidth for the data communication whereas the GSM implementing system has too large bandwidth for the data communication. Thus, there is wastage of the essential bandwidth, which goes without being used. The other systems, which were in use, are, for example Java Based Systems and SMS based systems. Java Based Systems still use web pages, which is a disadvantage if data intranet or Internet is off. SMS based system is more costly since it requires data transfer from the real time service provider. This Wi-Fi protocol has some upper hand benefits like its range is in the radius of 150-200m.The mobile application can also extend the security of the system via an implementation of the password protected application.

II. WORKING PRINCIPLE

Microcontroller MSP430 which is used to control the home appliances to do this “N” number of programs is dumped in to the microcontroller which responds separately to all the appliances.

Microcontroller is connected to a wi-fi module which acts as a wireless connection for all the devices which is likely to access the microcontroller msp430. MSP430 which is connected to the server through Wi-Fi module where the same device which is going to access the controller must be connect to the same server. Microcontroller programmed with unique id separately to make the connection fast. As microcontroller msp430 is low power device it operates at operating voltage 3.3 DC supply as power conception will be less even though connected to the Wi-Fi module esp8266.

III. BLOCK DIAGRAM

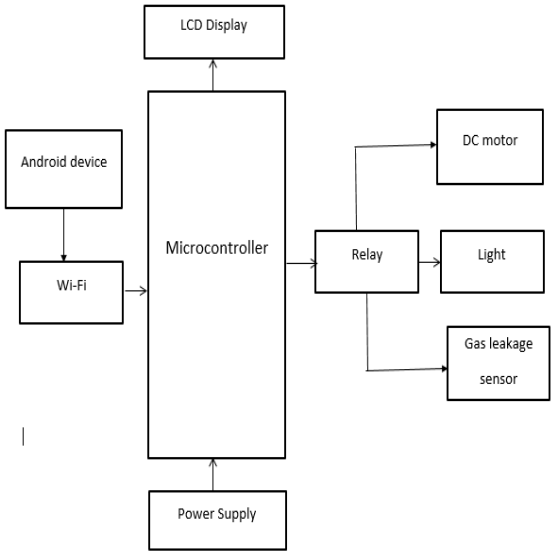

Figure 1. Block Diagram

As the microcontroller receives command from the any devices from its server it recognises the devices and response separately using relay. Relay gives the time delay between on and off of a appliances. In addition to that gas leakage sensor is added to micro controller which is use to detect the leakage gas in the surrounding, as the micro controller consists 40 booster pins.

IV. HARDWARE AND SOFTWARE DESCRIPTION

Power Supply

The ac voltage, typically 220V rms, is connected to a transformer, which steps that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation.

Microcontroller

MSP430G2553 microcontroller is a low power device. It provides 3.3v DC supply. The microcontroller has below features

- 16kB Flash
- 512B RAM
- Interruptible GPIOs (capacitive sense-capable)
- 16-bit timers
- 8ch 10-bit ADC
- Comparator
- Serial Communication (USCI – I2C, SPI & UART) & more.

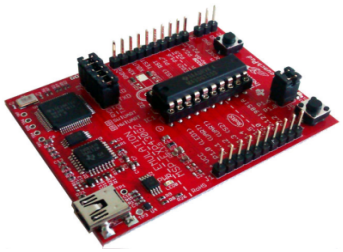

Figure 2. MSP430

Wi-Fi

WI-FI is a wireless technology that uses radio frequency to transmit the data through air. It has initial speeds of 1 mbps to 2 mbps. It transmits data in the frequency bands of 2.4Ghz. It implements the concept of frequency division multiplexing technology. Range of WIFI technology is 40-300 feet.The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre programmed with an AT command set firmware. The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

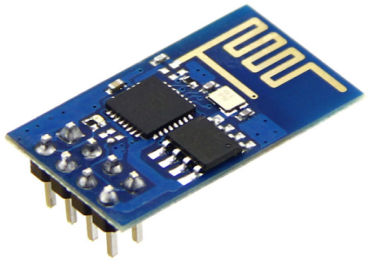

Figure 3. ESP8266

Gas Sensor (MQ-2)

Gas Sensor (MQ2) module is useful for gas leakage detection (in home and industry). It is suitable for detecting H2, LPG, CH4, CO, Alcohol, Smoke or Propane. Due to its high sensitivity and fast response time, measurements can be taken as soon as possible. The sensitivity of the sensor can be adjusted by using the potentiometer.

Figure 4. Gas sensor

Dc Motor

Motor that relies on magnet poles that repel and attract workings of a brushed electric motor with a two pole rotor (armature)and permanent magnet stator. ”N” and “S” designate polarities on the inside axis faces of the magnets; the outside faces have opposite polarities. The + and – signs shows where the dc current is applied to the commutate which supplies current to the armature coils.

Figure 5. DC motor

Relay

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch. Relays are used where it is necessary to control a circuit by a low-power signal. Relays control power circuits with no moving parts, instead using a semiconductor device to perform switching protect electrical circuits from overload or faults in modern electric power systems.

V. IMPLEMENTATION

The gas sensor used here helps to indicate the leakage of gas in LPG in houses, thereby reducing the loss of life and property. It is useful for physically challenged and elders, so they might be able to control home appliances themselves using their Android mobiles.

Figure 6.

VI. CONCLUSION

Updating Home information centre in Android smart phone, home appliances are controlled system by the Android phone. It has combined android client, network transmission, and wireless switch, home information centres to form a complete system. Identifying message commands and wireless encoding are the two major tasks for home information centres. Android phone have advantages such as humane interface, customizable and extendible applications and android phone is easy to carry so on. By constantly improving the control function, android phone allows us anytime, anywhere to control any device, and finally realizes the highly intelligent home.

VII. FUTURE CHALLENGES

This project can be further developed by integrating it with the internet to monitor your home while sitting in a remote area. By doing this, one can keep an eye on his or her home through an internet connected to the user’s mobile phone or PC or laptop. This will not only improve the security of your home in this modern day world but will also assist in conservation of energy like if you left any home appliance switched on by mistake, then you can check the status of the appliance on the graphical interface made on your mobile and can switch it off using the internet connectivity.

REFERENCES

[1] Jianjun Lv, Zhishu Li, Mingyi Mao. "A new USB home appliances based on PC and infrared remote control protocol".2010 International Conferences on Computer and Communication Technologies in Agriculture Engineering.2010, pp.572 -575.

[2] Shengwen Chen, Chunghuang Yang, Chung-Huang Yang.“Design and Implementation of Live SD Acquisition Tool in Android Smart Phone". 2011 Fifth International Conference on Genetic and Evolutionary Computing. 2011, pp. 157-162.

[3] Sachin Kishor Khadke, ”Home Appliances Control System Based On Android Smart phone”, Department of Electronics and Communication NBN Sinhgad School of Engineering, Pune, Maharashtra, India (May - Jun. 2014).

[4] Pooja Dhawade, “SMART HOME USING ANDRIOD APPLICATION “,International Journal of Research in Engineering and Technology, Pune, Maharashtra, India.

[5] Android Based Home Automation Using Raspberry Pi-ShaijuPaul, ”Smart Home Automated Control System Using Android”.

[6] “Application and Microcontroller”-Mohammad Abd Al Latif Mowad.