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VOICE CONTROL HOME AUTOMATION USING WI-FI MODULE

Aiman Shahapuri ,
Electronics and Telecommunication Department, Theem College Of Engineering,Boisar
Bhagyashri Jagtap
Electronics and Telecommunication Department, Theem College Of Engineering,Boisar
Jyoti Chari
Electronics and Telecommunication Department, Theem College Of Engineering,Boisar
Asst.Prof. Rajesh Patil
Assistant Prof. Electronics and Telecommunication Department, Theem College Of Engineering,Boisar

***Abstract*— With advancement of Automation technology, life is getting simpler and easier in all aspects. In today's world Automatic systems are being preferred over manual system. With the rapid increase in the number of users of internet over the past decade has made Internet a part and parcel of life, and IoT is the latest and emerging internet technology. Internet of things is a growing network of everyday object, from industrial machine to consumer goods that can share information and complete tasks while you are busy with other activities. Wireless Home Automation system(WHAS) using IoT is a system that uses computers or mobile devices to control basic home functions and features automatically through internet from anywhere around the world, an automated home is sometimes called a smart home. It is meant to save the electric power and human energy. The home automation system differs from other system by allowing the user to operate the system from anywhere around the world through internet connection and voice command. In this project will present a Home Automation system (HAS) using Wi-Fi module that allows wireless communication, to provide the user with remote control of various lights, fans, and appliances within their home and storing data on web server. The system will automatically change on the basis of sensors data. This system is designed to be low cost and expandable allowing a variety of devices to be controlled.**

Keywords- *IOT, Wi-Fi module , android, sensors, relay*

I. INTRODUCTION

Homes of the 21st century will become more and more self-controlled and automated due to the comfort it provides, especially when employed in a private home. A home automation system is a means that allow users to control electric appliances of varying kind.

Many existing, well-established home automation systems are based on wired communication. This does not pose a problem until the system is planned well in advance and installed during the physical construction of the building.But for already existing buildings the implementation cost goes very high. In contrast, Wireless systems can be of great help for automation systems. With the advancement of wireless technologies such as Wi-Fi, cloud networks in the recent past, wireless systems are used every day and everywhere.

II. OBJECTIVE OF PROJECT

Main objective of project to design and implement home automation system using components which are easily available in market. To make home automation application easy and manageable, design of web interface for user to run Home Automation System. Minimize the power consumption. The devices can be switched ON/OFF using a personal computer, tablets or smart phones through Wi-Fi and voice command

III. LITERATURE SURVEY

As per survey on this project, there exist many systems that can control home appliances. Each system has its unique features. Following models describes the work being performed by others. Sriskanthan explained the model for home automation using Bluetooth via PC. But unfortunately the system N lacks to support mobile technology. Muhammad Izhar Ramli designed a prototype electrical device control system using Web. They also set the server with auto restart if the server condition is currently down. Hasan has developed a telephone and PIC remote controlled device for controlling the devices pin check algorithm has been introduced where it was with cable network but not wireless communication. Amul Jadhav developed an application in a universal XML format which can be easily ported to any other mobile devices rather than targeting a single platform .

IV. EXISTING SYSTEM

The literature related to the project topic has been reviewed for last twenty years in order to find out work carried out by various researchers. There are many systems for remote monitoring and control designed as commercial products or experimental research platforms. It is noticed that most of the research carried out belongs to the following categories. Internet based Monitoring using Servers, GPRS modems, etc. with different approaches. GSM-SMS protocols using GSM module individually or in combination with Internet Technologies. Monitoring using Wireless Sensor Networks. Wireless Monitoring using Bluetooth, Wi-Fi, Zigbee and RF.

V. DISADVANTAGE OF EXISTING SYSTEM

- Systems based on internet monitoring require higher operational cost based on bandwidth/data speed requirements and hence is justified only in industrial applications.
- Development and deployment cost of wireless sensor networks is very high due to need of motors, sensors, radio transceivers, etc. spread over a large area.
- It is difficult to upgrade existing conventional control systems with remote control capabilities.
- The GSM modem used in cellular based remote monitoring system increases the cost of system.
- The long term operational cost of internet and cellular monitoring systems is relatively high due to usage charges incurred in each message transaction.

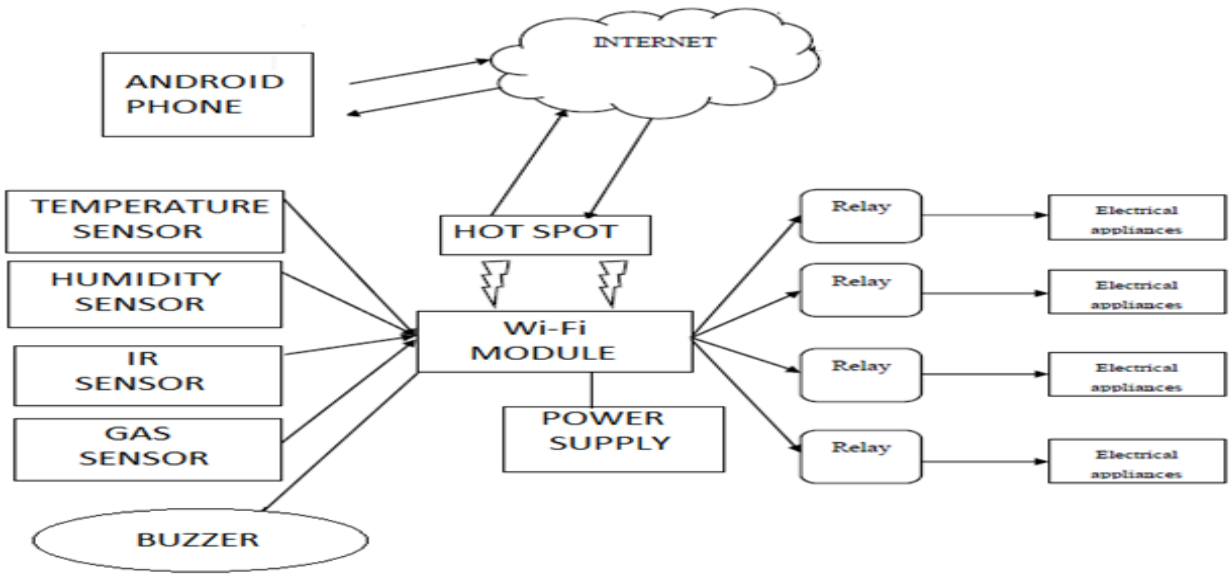
VI. PROPOSED SYSTEM

The proposed system is based on Wi-Fi with the help of ATMEGA328p as it is compatible with arduino uno and nano. And using ardino the project cost simply gets cheaper and efficient. For receiving and transmission ESP8266 Wi-Fi module used and it is open source and community supports and its has some dedicated websites for any kind of help or support. This system used a web server which can be accessed by any device which has Wi-Fi connectivity. Different types of sensor can be interfaced to get various information like motion, light intensity, temperature etc. The server which is design for this system will update periodically.

VII. SUMMARY

The literature reviewed in this section outlines potential methods, techniques and technologies that can be used to build a home automation system which is low-cost, easy to deploy and maintain. The use of Wi-Fi protocols seems to be popular among WSN .Researchers have also attempted to build Wi-Fi based home automation systems that integrate with internet. Gateway based centralized architecture appears to be most common and most favorable approach. Allowing other systems to integrate using web services offer potential scalability and easy way of handling data formats generated by various WSN standards.

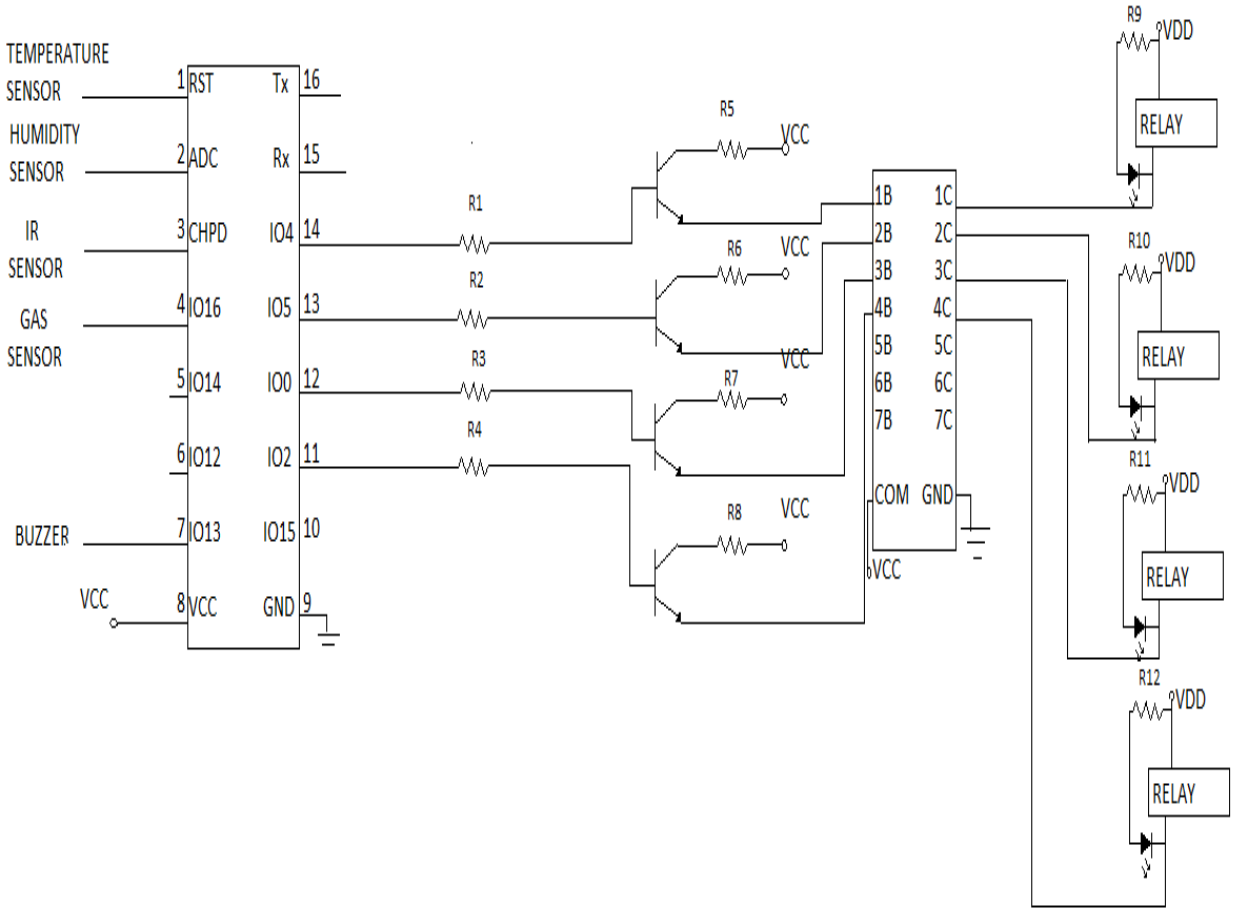
VIII. BLOCK DIAGRAM



IX. BLOCK DIAGRAM DESCRIPTION

In the above block diagram ,we use four sensors i.e temperature, humidity ,IR,GAS etc .this sensors with buzzer is given as input to the Wi-Fi module .power supply of 3.7V is applied to the Wi-Fi module hotspot is used to connect the Wi-Fi module with internet. Android phone is connected to internet to control the appliances. Output of Wi-Fi module is given to four relays the output of relays is then applied to the electrical appliances.

X. CIRCUIT DIAGRAM



XI. CIRCUIT WORKING PRINCIPLE

In the above circuit diagram we have used Wi-Fi module (ESP8266).It is a 16 pin module. Temperature sensor is given to pin1-RST,humidity sensor is given to pin2-ADC, IR sensor is given to pin3-CHPD,GAS sensor is given to pin4-io,pin 5 and 6 are not in used .Buzzer is applied to pin7.pin8 is VCC.pin9 is grounded.pin no. 11,12,13,and 14 is given to the four transistors .transistors are used for switching purpose only. The output of transistor is given to 1B,2B,3B,4B pins of relay drivers.VCC is given at pin COM. We get the output from pin no. 1C,2C,3C,4C, and this output is given as input to the relays.

XII. CIRCUIT DESCRIPTION

Power supply:

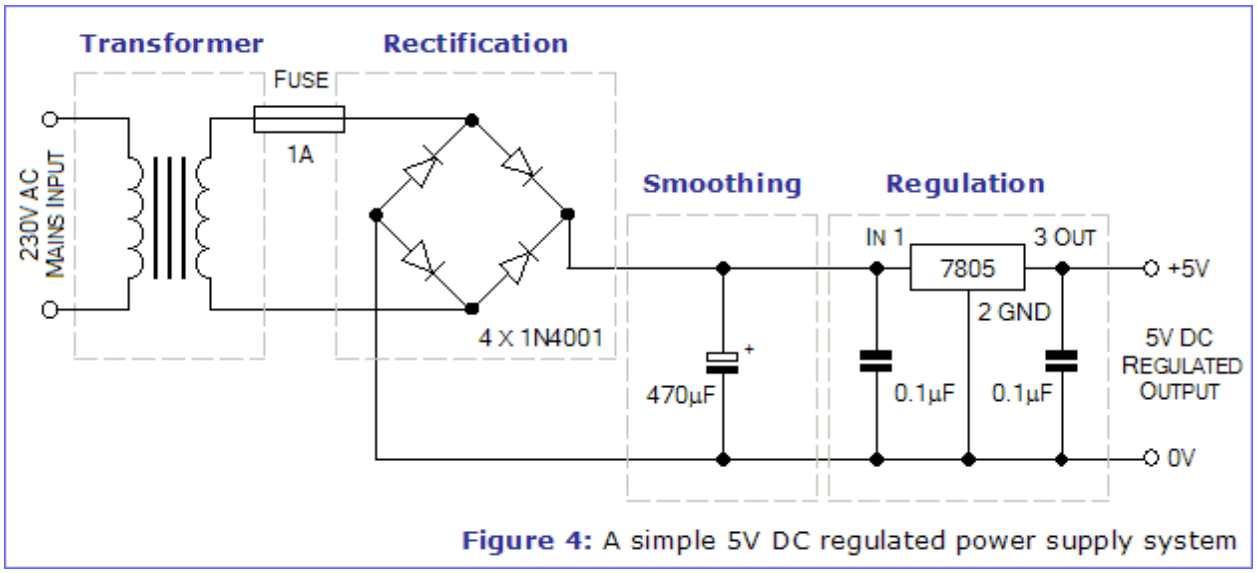


Figure 4: A simple 5V DC regulated power supply system

Power supply:

- Regulated power supply given to microcontroller as follows.
- It takes 230v A.C voltage from mains and then step down it to 5v A.C. using transformer.
- Then a bridge rectifier is use to convert A.C into D.C.
- Since bridge rectifier gives fluctuating D.C a filter capacitor is used to smooth the D.C output.
- During conversion of 5v A.C into D.C, output voltage slightly increases.
- Therefore a voltage regulator (LM7805) is used for linear 5v D.C output.

Wi-Fi:

- ESP88266 requires 3.3v power supply hence voltage regulator (LD1117v33) is used to get 3.3v supply for Wi-Fi module.

Controller:

- Main component of circuit diagram is ESP8266 module.
- This module operates on 3.3v.

XIII. FEATURES OF ESP8266

- 802.11 b/g/n
- Integrated low power 32-bit MCU
- Integrated 10-bit ADC
- Integrated TCP/IP protocol stack
- Integrated TR switch, LNA, power amplifier and matching network
- Integrated PLL, regulators, and power management units
- Supports antenna diversity
- Wi-Fi 2.4 GHz, support WPA/WPA2

- Support STA/AP/STA+AP operation modes
- Support Smart Link Function for both Android and iOS devices
- Support Smart Link Function for both Android and iOS devices
- SDIO 2.0, (H) SPI, UART, I2C, I2S, IRDA, PWM, GPIO
- STBC, 1x1 MIMO, 2x1 MIMO
- A-MPDU & A-MSDU aggregation and 0.4s guard interval

XIV. LIMITATIONS OF PROJECT

This project does not provide automatic detection of faults in appliances.

- This system cannot control large power appliances such as 3-phase motor.
- If the power is off this system shuts down.

XV. ADVANTAGES

Reduced installation costs: First and foremost, installation costs are significantly reduced since no cabling is necessary. Wired solutions require cabling, where material as well as the professional laying of cables (e.g. into walls) is expensive.

- **System scalability and easy extension:** Deploying a wireless network is especially advantageous when, due to new or changed requirements, extension of the network is necessary. In contrast to wired installations, in which cabling extension is tedious. This makes wireless installations a seminal investment.
- **Integration of mobile devices:** With wireless networks, associating mobile devices such as PDAs and smart phones with the automation system becomes possible everywhere and at any time, as a device's exact physical location is no longer crucial for a connection (as long as the device is in reach of the network).
- **Device flexibility:** this system work with any device which have Wi-Fi and browser.

XVI. DISADVANTAGES

- Standby power consumption is high due to use of transformer and relays.
- When Wi-Fi router is busy then system does not work properly.
- When power is off system will shut down.

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CONCLUSION

This paper proposes a low cost, secure, ubiquitously accessible, auto-configurable, remotely controlled solution. The approach discussed in the paper is novel and has achieved the target to control home appliances remotely using the Wi-Fi technology to connects system parts, satisfying user needs and requirements. Wi-Fi technology capable solution has proved to be controlled remotely, provide home security and is cost-effective as compared to the previously existing systems. Hence we can conclude that the required goals and objectives of home automation system have been achieved. The system design and architecture were discussed, and prototype presents the basic level of home appliance control and remote monitoring has been implemented. Finally, the proposed system is better from the scalability and flexibility point of view than the commercially available home automation systems.