



VOICE RECOGNITION BASED WIRELESS HOME AUTOMATION SYSTEM

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Abstract

Automation is a trending topic in the 21st century making it play an important role in our daily lives. The main attraction of any automated system is reducing human labour, effort, time and errors due to human negligence. With the development of modern technology, smart phones have become a necessity for every person on this planet. Applications are being developed on Android systems that are useful to us in various ways. Another upcoming technology is natural language processing which enables us to command and control things with our voice. Combining all of these, our paper presents a micro controller based voice controlled home automation system using smartphones. Such a system will enable users to have control over every appliance in his/her home with their voice. All that the user needs is an Android smartphone, which is present in almost everybodys hand nowadays, and a control circuit. The control circuit consists of an Arduino Uno microcontroller, which processes the user commands and controls the switching of devices. The connection between the microcontroller and the smart phone is established via Bluetooth, a widespread wireless technology used for sharing data.

Index Terms: Smart Home, Wireless Technology, Android, Home Automation System, Arduino Uno.

I. INTRODUCTION

Smart home is an emerging concept that attracts the synergy of several areas of science and engineering. A lot of research has been going on for more than a decade now in order to increase the power efficiency at the consumer

level of the power management systems. Smart Home is the term commonly used to define a residence that integrates technology and services through home networking to enhance power efficiency and improve the quality of living. Smart house is not a new term for science society but is still far more away from peoples vision and audition. This is because although recent various works has been done in designing the general overview of the possible remote access approaches for controlling devices or in cases simulating the smart house itself and designing the main server the design and implementation of an off-the-shelf smart house remote control application has been limited to simply the computer applications and just in cases mobile and web applications development.

The "smart house" technology is one realization of home automation ideals using a specific set of technologies. Its a house that has highly advanced automatic systems for lighting, temperature control, security, appliances, and many other functions. Coded signals are sent through the homes wiring to switches and outlets that are programmed to op-erate appliances and electronic devices in every part of the house. Smart home appears "intelligent" because its computer systems can monitor many aspects of daily living. Smart house can also provides a remote interface to home appliances or the automation system itself, via telephone line, wireless transmission or the internet and android application, to provide control and monitoring via a smart phone or web browser. The growing numbers of elderly population and increasing life expectancy have brought enormous challenges to many aspects of human.life, especially in health and healthcare.

A. Survey of Existing Systems

Mohamed Abd El-Latif Mowad, Ahmed Fathy, Ahmed Hafez Proposes The Home automation system that uses Wi-Fi technology . System consists of three main components; web server, which presents system core that controls, and monitors users home and hardware interface module(Arduino PCB (ready-made),Wi-Fi shield PCB, 3 input alarms PCB, and 3 output actuators PCB.), which provides appropriate interface to sensors and actuator of home automation system. The System is better from the scalability and flexibility point of view than the commercially available home automation systems. The User may use the same technology to login to the server web based application. .If server is connected to the internet, so remote users can access server web based application through the internet using compatible web browser.

Shih-Pang Tseng et al. proposed Smart House Monitor & Manager (SHMM), based on the ZigBee, all sensors and actuators are connected by a ZigBee wireless network. They designed a simple smart socket, which can remote control via ZigBee. PC host is used as a data collector and the motion sensing, all sensing data are transferred to the VM in the cloud. The user can use the PC or Android phone to monitor or control through the Internet to power-saving of the house.

Thoraya Obaid et.al. proposed system has two main components namely (a) voice recognition system, and wireless system. LabView software has been used to implement the voice recognition system. On the other hand, ZigBee wireless modules have been used to implement the wireless system. The main goal of this system is to control home appliances by using voice commands. The proposed system can recognize the voice commands, convert them into the required data format, and send the data through the wireless transmitter. Based on the received data at the wireless receiver associated with the appliances desired switching operations are performed.

Mukesh Kumar r et.al. in their paper describes Home Automation system is controlled by Arduino with the main motive of providing an easier life for paralyzed people. It uses Voice Recognition module V3 and

microphone. The detected voice command makes system to switch the relay and change the direction of motor due to which jack lifts the bed up or bring back bed to lower elevation angle, turn on off the lights and sound the buzzer when disabled person need help.

Dechuan Chen and Meifang Wabg Proposed ZigBee based home automation system was presented in . This system was capable of monitoring door and window, smoke, gas leak, and water flooding in a home from remote location. Some simple control systems such as operating a valve and sending signal to security network have also been associated with this application.

In this work we also presented voice controlled based wireless home automation system for elderly and people with disability. Our work is different from other related works in the following ways.The Voice-operated Android and Arduino Home automation system uses an Android based Bluetooth enabled phone for its application and the Arduino Uno as the microcontroller is used for developing this system.The microcontroller device with the Bluetooth module and relay circuit needs to be attached with the switch board. Then we need to launch the android based application- "AutoHome" on our Smartphone. Through the application we can instruct the microcontroller to switch on/off an appliance. After getting the instruction through the Bluetooth module the microcontroller gives the signal to the relay board. The application first searches for the Bluetooth device. If it is available then it launches the voice recognizer. It reads the voice and converts the audio signal into a string. It produces a value for each appliance which will be given to the microcontroller device. The microcontroller uses the port in serial mode. After reading the data it decodes the input value and sends a signal to the parallel port through which the relay circuit will be activated.

1) **SYSTEM ARCHITECTURE:** This design details the overall design of a Wireless Home Automation System (WHAS). This is fuelled by the need to provide supporting systems for the elderly and the disabled, especially those who live alone. The automation Centres on recognition of voice commands and uses Bluetooth wireless communication

module. The home automation system is intended to control all lights and electrical appliances in a home or office using voice commands. In this system Bluetooth device receives voice command as input to a atmega controller, which converts the data into a required format to be used in the microcontroller where the devices are attached to it. Based on the message it received, it either turns ON/OFF the home appliances. The users can manipulate appliances anytime, anywhere, letting our houses become more and more automated and intelligent. Therefore, its a good choice to design a terminal based on phone.

connected to Arduino because receiver pin of hc -05 is 3.3v. An arduino relay of 5v is used to connect loads. The relay has two different types of electrical contacts inside normally open (NO) and normally closed (NC). The one you use will depend on whether you want the 5V signal to turn the switch on or turn the switch off. The 120- 240V supply current enters the relay at the common (C) terminal in both configurations. To use the normally open contacts, use the NO terminal. To use the normally closed contacts, use the NC terminal. The signal pins of relay is used to create connection with arduino. Loads are provided with a 220v supply.

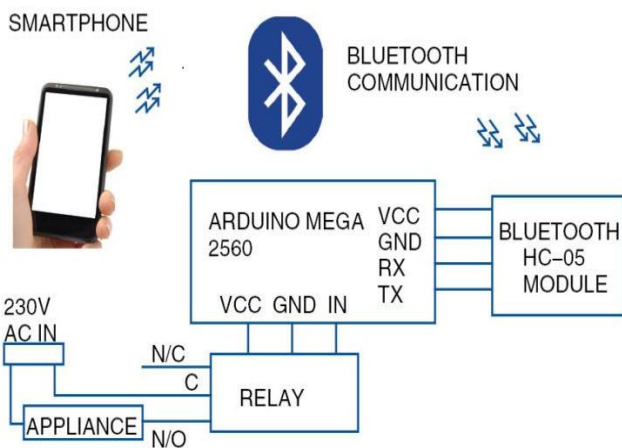


Fig. 1. Proposed Design

2) SYSTEM DESIGN AND WORKING: The circuit dia-gram for the proposed system is shown in Figure 2 below. The circuit is drawn using Proteus-ISIS Professional v7.7.

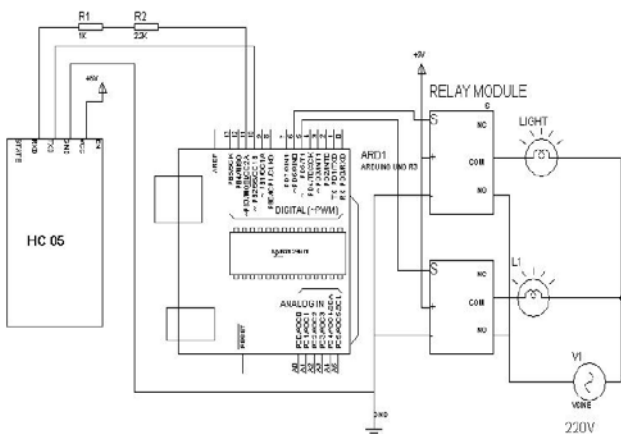


Fig. 2. Circuit Design

Figure showing circuit diagram of the system. Here uses a Arduino uno R3 and a Bluetooth module HC- 05. Receiver pin of HC-05 connected to voltage divider circuit and then

II. RESULTS OF IMPLEMENTATION

The proposed system is implemented as shown in Figure 3. The microcontroller device with the Bluetooth module and relay circuit needs to be attached with the switch board. Then we need to launch the android based application Through the application we can instruct the microcontroller to switch on/off an appliance. After getting the instruction through the Bluetooth module the microcontroller gives the signal to the relay board. The application first searches for the Bluetooth device. If it is available then it launches the voice recognizer. It reads the voice and converts the audio signal into a string. It produces a value for each appliance which will be given to the microcontroller device. The microcontroller uses the port in serial mode. After reading the data it decodes the input value and sends a signal to the parallel port through which the relay circuit will be activated.

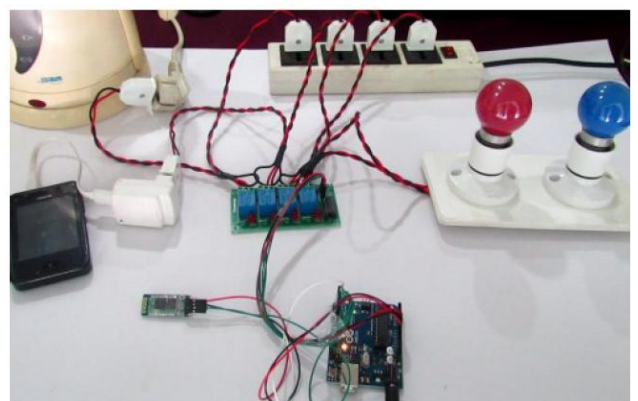


Fig. 3. Implemented Model

III. CONCLUSION

The proposed project undertakes a viable solution the need of automation at the very basic level, that is, in our homes. The project

will enable us to bring every appliance at every corner of our home under our control from a single point without having to get up and manually switch on or off the appliance. The use of a Bluetooth module assists the use of this system from various locations in our house. The system is further simplified by allowing appliances to be controlled by our voice. The user need not have to have to immense knowledge over the language of English. Just by saying the appliance name and the corresponding number assigned to that particular appliance, and telling it to switch on or off will enable the user to have complete control over any appliance without any effort.

IV. FURTHER SCOPE

Home automation has already become an extension of this. In the coming years, experts predict that voice activation will become second nature. Many consumers - particularly millennials - are already looking for this type of technology in the homes that they buy, and many builders are finding themselves behind the curve. we can build a system consists of cellphone apps, a server and smart elements. And the connection between all the parts is the real internet which means you can actually use the whole system anywhere. Whats more with the google voice, the voice recognition is pretty good and accurate. We know the voice control based home automation system should actually based on the real requirements of users. So we might need to do a survey to collect the real needs to peoples daily requirements. Then we can build more different smart elements to face the needs. Also, we can use some simple machine learn and statistics methods to extract the users habits by checking the activity records in the database. We should improve the algorithms here to make the system smarter and faster. Also we only build a very simple server with our laptop. In real use we need a real server and some security related algorithms should be added to the system.

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