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Voice recognized Smart Home Automation System using Arduino

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ABSTRACT: Voice recognized smart home automation system, is designed to assist and provide support in order to fulfil the needs of elderly and disabled people at home. It has been designed for mobile phones having android platform,to automate Bluetooth interfaced microcontroller which controls home appliances like lights, fans. It presents the automated approach of controlling the devices in a household that could ease the task of using the traditional method of the switch. The most famous and efficient technology for short range wireless communication- Bluetooth,is used here to automate the system. In this project, a voice controlled wireless smart home system has been presented for elderly and disabled people.
Keywords: Bluetooth, motor, android, arduino , microcontroller

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I. INTRODUCTION

In our project, a voice recognized smart home automation system is been presented for elderly and disabled people to make their purposes and needs easy. This proposed system has two main components namely (a) voice recognition system (b) wireless system. Android application has been used for voice recognition system. On the other hand, Bluetooth wireless modules have been used to implement the wireless system. The main goal of this system is to control electronic home appliances through voice commands. It can recognize the input voice commands from a user, convert them into a required data format, and send the data through the wireless transmitter. Based on the data received at the wireless receiver associated with the gadgets, desired switching operations are performed. The proposed system is a low cost and low power voice recognized home automation system since Bluetooth is used. In addition, this smart system needs to be operated by voice Commands just once. Thereafter, the system can recognize the voice commands independent of vocabulary size, noise, and speaker characteristics Voice recognized home automation system has been around for more than a decade. The main concept is to form a network connecting the electrical and electronic appliances in a house. This is a growing technology, which has changed the way people live. There have been several commercial and research versions of smart home system introduced and built. But, none of the versions has broken through the main stream yet other than security systems. Smart home systems have captured many desperate technologies so far and products have been in the market for more than one decade.

Wireless communication reduces the complexity related to the installation and maintenance compared to its wired counterpart. A typical wireless home automation system comprises of battery operated and low power wireless sensors and actuators. Bluetooth, WI- Fi and Zigbee are the popular choices for the backbone of such systems. Wireless network based smart ome systems have become very popular as they provide comfort, security and safety. The availability of cheap wireless sensors and actuators and modules has reduced the gap between the luxury and mass market segmentation of home automation technologies.

Voice recognized home automation system has drawn considerable attentions in the recent years. Considering all the above mentioned advantages we have selected Bluetooth. Initially, home automation system were designed for the people seeking luxury and sophisticated home. But there was always a need to develop home automation system for the people with special needs like elderly and disabled. One of the experimental works on the android and Bluetooth based home automation system was presented here. Voice control system for Bluetooth based home automation has been introduced. In this system, Bluetooth device receives voice commands as input to the Renesas microcontroller, which converts the data into a required format to be used in the microcontroller. Finally the system generates some

control factors to switch on/off the home appliances. A client-server based voice control system for home automation has been presented. Voice command is captured by the client. The server system converts the voice commands into a form that is used to control the home appliances. We use Bluetooth and android application here. The user interface is easier to design and implement. The system can be remotely controlled by a mobile or a computer and it can easily be extended to include more appliances. The system is easy to install and configurable. Unlike other related systems, no expertise skills are required to install and configure this system. Android_s voice recognition library has been included in our work. The system can recognize the voice commands independent of vocabulary size, noise, speaker characteristics or accent.

II. LITERATURE REVIEW

–Voice Controlled Home Automation Systems for Disabled people‖, by Aqeel-ur Rehman, Royda Arif, Hira Khursheed, Home automation is one of the major growing industries that can change the way people live.. Typical wireless home automation system allows one to control house hold appliances from a centralized control unit which is wireless. The developed system can be integrated as a single portable unit and allows one to wirelessly control lights, fans, air conditioners, television sets, security cameras, electronic doors, computer systems, audio/visual equipment‘s etc. and turn ON or OFF any appliance that is plugged into a wall outlet, get the status of different sensors and take decision accordingly. According to major companies that are involved in speech recognition researches, voice will be the primary interface between humans and machines in the near future..

–Voice recognition based Wireless Home Automation Systems‖, by Humaid AlShu'eili, Gourab Sen Gupta, , S.C. Mukhopadhyay, Home Automation industry is growing rapidly; this is fuelled by the need to provide supporting systems for the elderly and the disabled, especially those who live alone. This paper details the overall design of a wireless home automation system (WHAS) which has been built and implemented. The automation centres on recognition of voice commands and uses low-power RF ZigBee wireless communication modules which are relatively cheap. The home automation system is intended to control all lights and electrical appliances in a home or office using voice commands.

–Android and Bluetooth Based Voice Controlled Wireless Smart Home System‖, by R Manisha1 , Namitha S N2 , Nethravathy S 3 , Nethra Priyadarshini S4 , Mrs Meenakshi5, Now-a-days we use many electrical devices at homes, industries, offices, institutions that are controlled manually. To control all electrical devices we need a lot of ―MAN POWER‖. If manpower increases maintenance cost also rises. This causes a disbenefit to the industry. So to avoid these kind of drawbacks we need some wireless controlling systems. One such wireless communication system to be used is Bluetooth communication system.

–Arduino Based Voice Controlled Home Appliances Using Bluetooth‖, by Neha1 , Sonipriya2 , Md. Parvez3 , N.M.Fatima4 , Prof. Rakesh Marturkar5, In this paper a low cost and user friendly remote controlled home automation system is presented using Arduino board, Bluetooth module, smartphone, ultrasonic sensor and moisture sensor.A smartphone application is used in the suggested system which allows the users to control up to 18 devices including home appliances and sensors using Bluetooth technology.

III. BLOCK DIAGRAM :

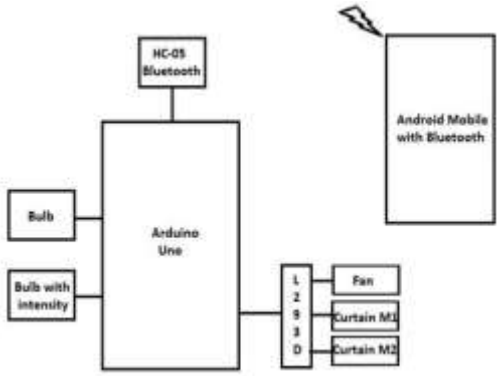

Fig 3.1 Block Diagram

In voice recognized home automation system, the main part of the system is microcontroller. in this project we have used ATMEGA328 microcontroller on Arduino Uno. Another important part of the system is Bluetooth. The HC-05 Bluetooth module is widely used . The normal 220V bulb is connected through the relay to the Arduino uno board. The bulb of which one can control intensity is also connected to the microcontroller. Other parts we required in this project are fan and curtain. The fan and curtain need a motor, we have used 12V DC motor to replicate fan here and two 12V DC motors to control the curtain of the window. We have used L293D motor dirver IC to control the motors in the project. An android mobile phone with Arduino Bluetooth app installed is required to control the appliance.

Flowchart

The flowchart shows the description of the hardware working. First there is need to start the system. Then connect the system to the mobile app through the Bluetooth. When Bluetooth is connected, the system is ready to receive the data. Now the system will continuously check for the data if the data is reciving or not. When any data from the app is received, the microcontroller will read it, analyise it, and then apply the respected operation on the appliances, and then the system will again continue to check for the data.

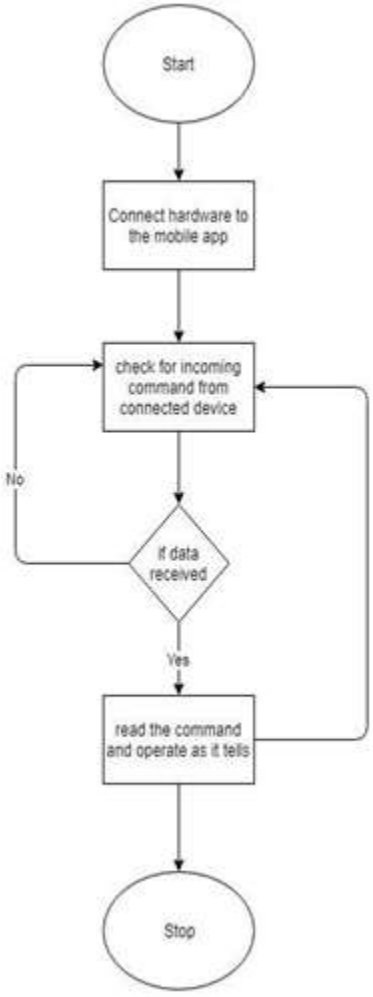

Fig3.2 Hardware Flowchart

The another part of the system is the mobile app. To connect mobile app, we need to start the app. The list of the Bluetooth devices will be shown on the screen. Connect to the HC-05 Bluetooth module which is on our hardware. Go into the voice command option, and start sending the commands to the system.

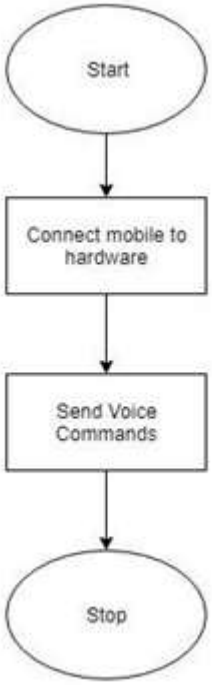

Fig 3.3 Software Flowchart

IV. WORKING

Using the above components we implement our system. The core component of this system is the Arduino Uno which has a microcontroller i.e Atmega 328. An adapter of 12V output power supply is used as an input to the voice controlled arduino system. Relays are connected to the output pins of Arduino Uno, these are used as switches to the loads. We prefer android platform because of its huge market globally and it is easy to use user interface.

For wireless communication system a Bluetooth module HC-05 is used as a remote which is connected to the control unit for sensing the signals sent by the android voice application. The microcontroller device with the Bluetooth module and relay circuit needs to be connected to the switch board. Then we need to launch the android based application –

‒Arduino Bluetooth‖ on our smart phone. Through the application we can instruct the microcontroller to switch ON/OFF an appliance by voice commands. After getting the instruction through the Bluetooth module, the microcontroller gives the signal to the respected applicances. 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 string. It provides a value for each appliance which will be fed to the microcontroller device. The microcontroller uses the

port in serial mode. After reading the data it codes the input value and sends a signal to the

parallel port through which the relay circuit will be activated.

Hardware Required

Arduino Uno

Fig4.1 Arduino Uno Board

Arduino is an open-source hardware and software company, project and user community that designs and manufactures single board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control both physically and digitally

HC-05 Bluetooth Module

Fig 4.2 HC-05

The HC-05 is a very cool module which can add two-way (full-duplex) wireless functionality to your projects. You can use this module to communicate between two microcontrollers like Arduino or communicate with any device with Bluetooth functionality like a Phone or Laptop

L293D Motor Driver IC

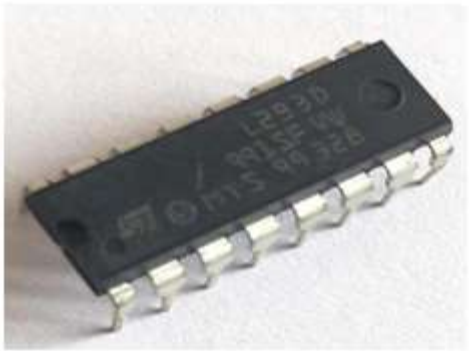

Fig 4.3 L293D

The L293D is a popular 16-Pin Motor Driver IC. As the name suggests it is mainly used to drive motors. A single L293D IC is capable of running two DC motors at the same time; also the direction of these two motors can be controlled independently. So if you have motors which has operating voltage less than 36V and operating current less than 600mA,

1Watt LED Bulb

Fig4.4 1 Watt LED

ONE WATT LED can be used as easily as other LED

SOFTWARE REQUIRED

Arduino IDE

The Arduino integrated development environment (IDE) is a cross- platform application (for Windows, macOS, Linux) that is written in the programming language Java. It is used to write and upload programs to Arduino board.

The source code for the IDE is released under the GNU General Public License, version 2.[3] The Arduino IDE supports the languages C and C++ using special rules of code structuring.[4]

V. CONCLUSION

In this project work a low cost and user friendly design for Voice recognized home automation system is presented. it provides a general approach for home automation which is not only suitable for elderly and handicapped people but it is also beneficial to reduce human labor and save energy with the help of sensors. Proposed system is analyzed and tested within the range of 10 meters and it achieved 100% accuracy. The system has many advantages and can be modified as user expectations.

VI. FUTURE SCOPE

In this project we have successfully implemented Voice recognized home automation system controlling relays using arduino with Bluetooth module HC-05. This project can be used for controlling _n' number of input controls i.e by

extending number of relays. Our implemented module is more reliable and flexible in order to control any loads and the coverage area for ireless control is 10 meters. Hence this project can be useful for a real time voice controlled home automation. Thus arduino based voice controlled home appliances proves to be a better remote controlled operation on home appliances using Bluetooth module HC-05. This project can be extended for many automation applications such as industrial automation, automotive, military, healthcare, transportation and so on. Further the coverage area can also be increased by the use of GSM modules or using IoT.

REFERENCES

[1]. Aqeel-ur Rehman, Royda Arif, Hira Khursheed, ―Voice Controlled Home Automation Systems for Disabled people‖, Jouranal of applied Environment and Biological sciences.

[2]. Muhammad Asadullah, Khalil Ullah, Smart home automation system using Bluetooth technology, 2017 International Conference on Innovations in Electrical Engineering and Computational Technologies (ICIEECT), At Karachi, Pakistan.

[3]. R Manisha1 , Namitha S N2 , Nethravathy S 3 , Nethra Priyadarshini S4 , Mrs Meenakshi5, ―Android and Bluetooth Based Voice Controlled Wireless Smart Home System‖, International Journal of Advanced Research in Computer and Communication Engineering.

[4]. Neha1 , Sonipriya2 , Md. Parvez3 , N.M.Fatima4 , Prof. Rakesh Marturkar5,―Arduino Based Voice Controlled Home Appliances Using Bluetooth‖, 2 nd National Conference on Recent Advances in Engineering and Technology.

[5]. Humaid AlShu'eili, Gourab Sen Gupta, , S.C. Mukhopadhyay, ―Voice recognition based Wireless Home Automation Systems‖,2011 4th International Conference on Mechatronics (ICOM), Kuala Lumpur, Malaysiya.

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