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Voice Controlled Apartment Automation Using IOT

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ABSTRACT: Apartment automation is one of the major growing industries that can change the way people live. Some of these apartment automation systems target those seeking luxury and sophisticated apartment automation platforms; others target those with special needs like the elderly and the disabled. Mainly in this project voice controlled apartment automation we use IoT because it is less cheaper compared with other techniques. Typical wireless apartment automation system allows one to control house hold appliances from a centralized control unit which is wireless. These appliances usually have to be specially designed to be compatible with each other and with the control unit for most commercially available apartment automation systems. The developed system can be integrated as a single portable unit and allows one to 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. The system is portable and constructed in a way that is easy to install, configure, run, and maintain. The perfect user interface still does not exist at present and to build a good interface requires knowledge of both sociology and technology fields. 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. The problem lies with the situation of the elderly or disabled people, who cannot usually help themselves to move around, and might require external assistance. People who live alone might also need a helping hand at home. Therefore a voice controlled apartment automation system is designed, so that the users can perform certain tasks by just the use of their voice.

KEYWORDS: Internet of Things(IoT).

I. INTRODUCTION

Voice controlled Apartment Automation System deploys the use of voice to control devices. The advantages of using voice as an interfacing medium are multifold. First we would do away with or significantly decrease the need of training for operating technology. Secondly, the simplification of services would entail a wider adoption of existing technology and would help people with varied disabilities access the same technology. Apartment Automation in India is creating big opportunities, not only for Indian automation companies, but also for foreign companies. Voice controlled Apartment Automation System leverages the power of NodeMCU to provide a holistic voice controlled automation system. Using Natural Language Processing and the available hardware in smart phones, it translates voice to be used for controlling electrical devices. Apartment Automation system lies in the fact that the settings are manageable from your smart phones and other remote-control devices. A smart apartment IoT device helps to reduce the costs and conserve energy. The Apartment Automation segment includes smart lighting, smart TVs and other appliances. Wearable's (Smart Watch, fitness brands, smart headphones, smart clothing) are also expected to witness the growth in the future. IoT is really the secret that makes this whole system work.

II. LITERATURE SURVEY

Bluetooth based home automation system using cell phone:

In Bluetooth based home automation system the home appliances are connected to the Arduino BT board at input output ports using relay. The program of Arduino BT board is based on high level interactive C language of microcontrollers; the connection is made via Bluetooth. The password protection is provided so only authorized user is allowed to access the appliances. The Bluetooth connection is established between Arduino BT board and phone for wireless communication. In this system the python script is used and it can install on any of the Symbian OS environment, it is portable. One circuit is designed and implemented for receiving the feedback from the

phone, which indicate the status of the device.

Zigbee based home automation system using cell phone:

To monitor and control the home appliances the system is designed and implemented using Zigbee. The device performance is record and store by network coordinators. For this the Wi-Fi network is used, which uses the four switches port standard wireless ADSL modern router. The network SSID and security Wi-Fi parameter are preconfigured. The message for security purpose first process by the virtual home algorithm and when it is declared safe it is re- encrypted and forward to the real network device of the home. Over Zigbee network, Zigbee controller sent messages to the end. The safety and security of all messages that are received by the virtual home algorithm. To reduce the expense of the system and the intrusiveness of respective installation of the system Zigbee communication is helpful.

GSM based home automation system using cell phone:

Because of the mobile phone and GSM technology, the GSM based home automation is lure to research. The SMS based home automation, GPRS based home automation and dual tone multi frequency (DTMF) based home automation, these options we considered mainly for communication in GSM. In figure shows the logical diagram the work of it shows how the home sensors and devices interact with the home network and communicates through GSM and SIM (subscriber identity module). The system use transducer which convert machine function into electrical signals which goes into microcontroller. The sensors of system convert the physical qualities like sound, temperature and humidity into some other quantity like voltage. The microcontroller analysis all signal and convert them into command to understand by GSM module. Select appropriate communication method among SMS, GPRS and DTFC based on the command which received GSM module.

Wi-Fi based home automation system using cell phone:

Wi-Fi based home automation system mainly consist three modules, the server, the hardware interface module, and the software package. The figure shows the system model layout. Wi-Fi technology is used by server, and hardware Interface module to communicate with each other. The same technology uses to login to the server web portal application. The server is connected to the internet, so remote users can access server web portal application through the internet using compatible web browser. Software of the latest home automation system is split to server application software, and Microcontroller (Arduino) firmware. The Arduino software, built using C language, using IDE comes with the microcontroller itself. Arduino software is culpable for gathering events from connected sensors, then applies action to actuators and preprogramed in the server. Another job is to report the and record the history in the server DB. The server application software package for the proposed home automation system, is a web portal application built using asp.net. The server application software can be accessed from internal network or from internet if the server has real IP on the internet using any internet navigator supports asp.net technology. Server application software is culpable of, maintain the whole home automation system, setup, configuration. Server use database to keep log of home automation system components, we choose to use XML files to save system log.

Home automation using RF module:

The important goal of Home Automation System is to build a home automation system using a RF controlled remote. Now technology is accelerating so homes are also getting smarter. Modern homes are deliberately relocating from current l switches to centralized control system, containing RF controlled switches. Today the traditional wall switches situated in various parts of the home makes it laborious t for the end user to go near them to control and operate. Even further more problematic for the old persons or physically handicapped people to do so. Home Automation using remote implements an easier solution with RF technology. In order to accomplish this, a RF remote is combined to the microcontroller on transmitter side that sends ON/OFF signals to the receiver where devices are connected. By operating the stated remote switch on the transmitter, the loads can be turned ON/OFF globally using wireless technology.

Home automation using Android ADK:

The devices of home are associate to the ADK and the Connection is established between the Android device and ADK. The devices of house are link to the input/output ports of the board (EMBEDDED SYSTEM) and their current situation will have passed to the ADK. The microcontroller board (Arduino ADK) is based on the ATmega2560. It has a USB host connection to associate with Android based phones, and that is based on the MAX3421e IC. The two important features of Android Open Accessory Protocol 2.0(AOAP) are as follows: It has audio output that is from the Android device to the component and it also support for the component serves as one

or more Human Interface Devices (HID) to the Android device. This paper depends upon Android and Arduino platform in which both are FOSS (Free Open Source Software). Including motion sensors for safety systems will detect an unauthorized action and it will automatically notice the user through cell phone or the security system.

Cloud Based home automation system:

Home Automation using cloud based system focuses on design and implementation of home gateway to collect data about data from home appliances and then send to the cloud- based data server to get store on Hadoop Distributed File System, it is process using MapReduce and use to implement a monitoring tasks to Remote user Presently home Automation System is persistently developing its resilience by assimilating the current characteristics which gratify the rising interest of the people. This paper presents the design and development of home automation system that use the cloud computing as service. The current system consists of three important units: the first part is cloud server, handle and controls the data and information of client and users and the status of devices The hardware interface module is the second part which implement the relevant connection to the actuators and sensing devices which give the physical service. Last part is Home Server, which construct the hardware device and gives the user interface. This paper focus to build the web services using cloud which is need for security and storage and availability of the data. The current system is cost efficient, reliable and comfortable which also gives a secured home automation system for entire family. The system is made up of various client modules for various platforms. 1. Cloud server Cloud Server is a central server aims on implementing services to the other sub modules. Central server serves as the data respiratory system and brain It implements connections to the three sub modules home system, web configuration tool and mobile. The server evaluates data it takes from the house, send current status to the mobile device and vice versa. A database is managing by the server and it is status gets updated as per the changes done at home end. 2. Embedded Program for Hardware Circuit Microcontroller, and. 3. Internet Client for any desktop or mobile phones.

Raspberry pie home automation with wireless sensors using smart phone :

Home Automation System has been developed with Raspberry Pi by reading the algorithm and subject of Email. Raspberry Pi guarantees to be an efficient platform for implementation powerful, and economic smart home automation. home automation using Raspberry pi is better than any other home automation methods in several ways. For example, DTMF (dual tone multi-frequency) using home automation, the call tariff is a big demerit, which is not the problem in their proposed method. In Home Automation using web server, the design of web server and the memory space required is dismiss by this method, because it just uses the already established web server service given by G-mail. LEDs were used to identify the switching action. This System is efficient and flexible interactive. Sending Commands to the Raspberry Pi The script running on server side of our laptop or on a web server receives the input commands from the user and appropriately sends it to the client (Raspberry Pi). Ethics, we will be using those input commands to turn a light ON/OFF. When we give the command to turn ON a light by the server side script, the data and information gets relayed to the Raspberry Pi and its GPIO pin will turns ON a relay. The system can send current updates to the server to detect whether the light is ON/OFF. Using PIR motion sensor we can send the data signal to the Raspberry Pi, we just run a script which can reads the sensor by a GPIO pin and transmit the data to overall system through the IoT platform. This can then be look by the IoT console.

III. METHODOLOGY

Real Time clock based apartment automation in an advance project to control the devices in timely and systematic manner. The devices can be controlled wirelessly from other places using wireless technology. RTC with EEPROM can record all the working parameters in the devices or appliances. Basically this project is a concept that brings automation in the industry or apartment. All the home appliances will be controlled by mobile app. The appliances in the industry or apartment will be interfaced with centralized microcontroller NODEMCU for the systematic working. The inbuilt RTC and EEPROM present in the controller will be activated for the operation. The controller also interfaced with WIFI to receive the control commands from Wi-Fi shield (Wi-Fi hotspot). The operator will be provided with Mobile app having Wi-Fi in that. If operator wants to switch the Light to turn on or off he needs to switch control button provided in app. Once he switched the Wi-Fi will send the data to Wi-Fi present at microcontroller. As and when the request is received the microcontroller activates the RTC and EEPROM and as per request received the operation will be done. In the same way all other appliances can be controlled.
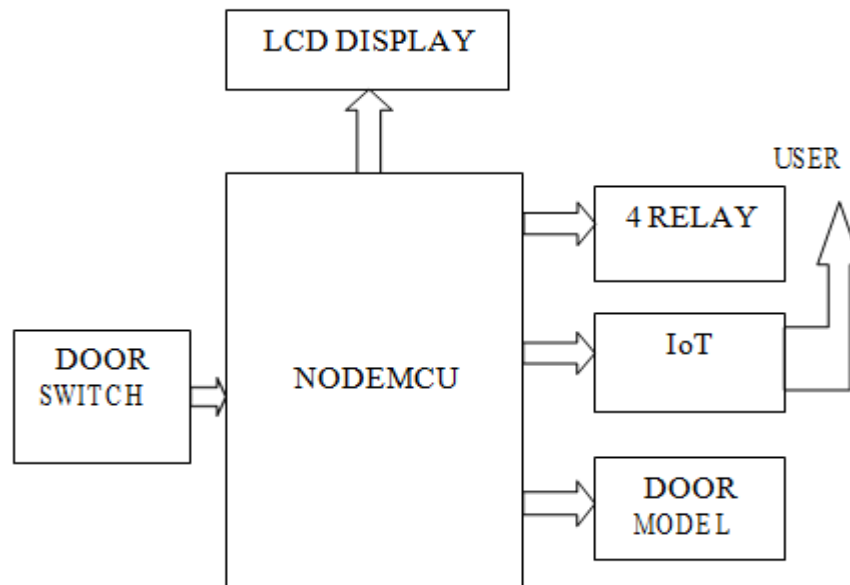
FIGURE 1: BLOCK DIAGRAM OF VOICE CONTROLLED APARTMENT AUTOMATION USING IOT

RELAY

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first.

LCD DISPLAY

A liquid crystal display is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals (LCs).LCs do not emit light directly. These are available in a wider range of screen sizes than CRT and plasma displays, and since they do not use phosphors, they cannot suffer image burn-in. LCDs are more energy efficient and offer safer disposal than CRTs. Its low electrical power consumption enables it to be used in battery-powered electronic equipment. It is an electronically-modulated optical device made up of any number of pixels filled with liquid crystals and arrayed in front of a light source (backlight) or reflector to produce images in color or monochrome.

WIFI

A Wi-Fi-enabled device, such as a personal computer video game console, Smartphone or digital audio player, can connect to the Internet when within range of a wireless network connected to the Internet. The coverage of one or more (interconnected)access points called hotspots comprises an area as small as a few rooms or as large as many square miles. Coverage in the larger area may depend on a group of access points with overlapping coverage.

NODEMCU

The NodeMCU is an open source programming and rigging advancement condition that is worked around an incredibly unobtrusive System-on-a-Chip called the ESP8266. It contains every single basic piece of the front line PC. It operates at a voltage of 3.3V. It is a development board which is compatible with the Arduino IDE. Many existing Arduino shields can be plugged directly into the board as it includes standard Arduino headers.

NODEMCU (ESP8266)

NODE MCU (esp8266) has been selected as the controller for this system due to its compact size, compatibility, easy interfacing over several other type of controller including Programmable Integrated Circuit (PIC), Programmable Logic Controller (PLC) and others. ESP8266 is an open source firmware that is built on top of the

chip manufacturer's proprietary SDK.

FIGURE 2: NODEMCU ESP8266

The firmware provides a simple programming environment, which is a very simple and fast scripting language The ESP8266 chip incorporates on a standard circuit board. The board has a built-in USB port that is already wired up with the chip, a hardware reset button, Wi-Fi antenna, LED lights, and standard-sized GPIO (General Purpose Input Output) pins that can plug into a bread board..Figure-3 shows the diagram of NODEMCU (ESP8266).It has Processor called L106 32bit RISC microprocessor core based on the Ten silica Xtensa Diamond Standard 106Micro running at 80 MHz and has a memory of 32 Kbit instruction RAM ,32 Kbit instruction cache RAM, 80 Kbit user data RAM&16 K bit ETS system data RAM. It has inbuilt Wi-Fi module of IEEE 802.11 b/g/n Wi-Fi.
& OFF based on commands. The load status (ON or OFF) will be displayed on the web page and app.

IV. RESULT AND DISCUSSION

The main purpose of this apartment automation using IoT design is to control the electronic appliances in home like fans, lights, AC and forth remotely using smart phone. By using android app one can control the electronic appliances in home from anywhere and from any distance. All the persons in that family can share the android app so that, when one person switches a device either fan or light etc., remaining persons will get this information and are aware of usage of the respective equipment. The experimental setup and output setup of voice controlled apartment automation using IoT is shown below. The load can be controlled and monitored using an android app with user configurable front end. The user can send commands through the app and these commands are fed to Wi-Fi module.'
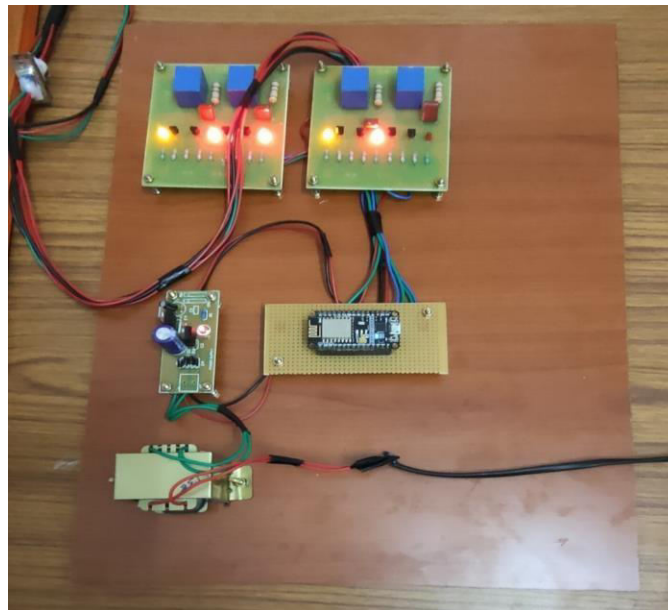
(a)

The Wi-Fi module is configured to access internet using any nearby wireless modem. The commands received by a Wi-Fi module are executed by a program within a Wi-Fi module. The Wi-Fi module interfaced through the loads are turned ON
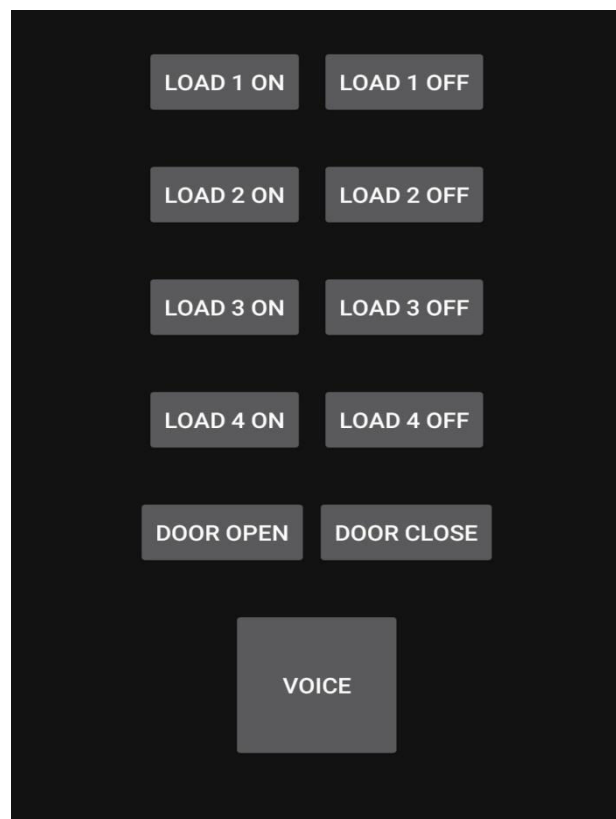
(b)

The screenshot image of the experiment is shown in the above figure (b). When we press the voice button and talk the Google will assist the voice and it controls the particular load that we suggested.

V. CONCLUSION

The purpose is to control some of the major household devices by voice. It is not only aimed at providing a healthy and comfortable lifestyle to the users, but also at aiding the sick or handicapped and people living alone, so that they can easily handle all their tasks at a convenience. Making the design sleeker and easier to handle, with a method to control more appliances at a time is the future requirement. We have so far achieved in controlling the same appliance, example, a light bulb, at the same time in two different rooms, and we have been able to control larger loads, for example, an air conditioner. The design of the voice controlled apartment automation system is both portable and ready to be installed in your main household circuit. We have introduced portability in the entire system, both the voice controlling remote, and the application end.

REFERENCES

1. SuZinZin Win, Zaw Min MinHtun, HlaMyoTun, (2016) "Smart Security System For Home Appliances Control Based On Internet Of Things" IJSTR, Volume-5, Issue6.
2. VinaySagar K and Kusuma S, (2015) "Home Automation Using Internet of Things", International Research
3. Journal of Engineering and Technology, Volume 2, Issue 3 on pp. 1965 – 1970.
4. S. Sen, S. Chakrabarty, R. Toshniwal, A. Bhaumik, (2015) "Design of an intelligent voice controlled home automation system", International Journal of Computer Applications, Vol. 121, no.15, pp.39-42.
5. S.D.T. Kelly, N.K. Suryadevara, S.C. Mukhopadhyay, (2013) "Towards the Implementation of IoT for Environmental Condition Monitoring in Homes", IEEE, Vol. 13, pp. 3846-3853.
6. P. S. Pandey, D.S. Chauhan, R. Singh, (2012) "The Real Time Hardware Design and simulation of moving message Display System Integrated with PLCC Modem" Innovative Systems Design and Engineering, ISSN 2222-1727 (Paper) ISSN 2222-2871 (Online), Vol. 3, No.10.
7. G.Kortuem, F. Kawsar,D. Fitton, and V. Sundramoorthy, (2010) "Smart objects as building blocks for the internet of things," Internet Computing, IEEE, vol. 14,pp.44-51.
8. Chan, M., Campo, E., Esteve, D., Fourniols, J.Y., (2009) "Smart homes- current features and future perspectives," Maturitas, vol. 64, issue 2, pp. 90-97.
9. J. Lertlakkhanakul, J.W.Choi and M. Y.Kim,(2008) "Building Data Model and Simulation Platform for Spatial Interaction Management in Smart Home", "Automation in Construction", Vol. 17, Issue 8, pp. 948- 957.
10. E. Yavuz, B. Hasan, I. Serkan and K. Duygu. (2007) "Safe and Secure PIC Based Remote Control Application for Intelligent Home". International Journal of Computer Science and Network Security, Vol. 7, No. 5.
11. D. H. Stefanov and Z. Bien, (2004) The Smart House for Older Persons and Persons with Physical Disabilities: Structure, Technology Arrangements, and Perspectives, IEEE Trans- actions On Neural Systems And Rehabilitation Engineering, Vol. 12, No. 2,pp. 228-250.
12. A R. Al-Ali and M. AL-Rousan, (2004) Java-based Home Automation System, IEEE Transactions on Consumer Electronics, Vol. 50, No. 2.
13. N. Sriskanthan and Tan Karand, (2002)"Bluetooth Based Home Automation System". Journal of Microprocessors and Microsystems, Vol.26, pp.281-289.
14. R. J. C. Nunes and J. C. M. Delgado, (2000) An Internet Application for Home Automation, 10th Mediterranean Eletro-technical Conference, MeleCon ,Vol. I. pp. 298-301.

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