

# Smart Home Automation Using Voice Recognition

Sapna Yadav<sup>1\*</sup>, Samridhi Srivastava<sup>2</sup>, Megh Singhal<sup>3</sup>

<sup>1,2,3</sup>Computer Science and Engineering, ABES Institute of Technology, Ghaziabad, India

\*Corresponding Author: [sapna30yadav@gmail.com](mailto:sapna30yadav@gmail.com), Contact No.:8318804469

DOI: <https://doi.org/10.26438/ijcse/v7i2.560563> | Available online at: [www.ijcseonline.org](http://www.ijcseonline.org)

Accepted: 23/Feb/2018, Published: 28/Feb/2019

**Abstract**— Automation is the art that reduces human or any other entities labour its time and the cost. The sole objecting of designing this project is inventing a system for the people who are less privileged to power and use household by sitting in their chair and using their voice to improvise commands. This asset is functionally designed in a way to be helpful to them which hasn't been profoundly implemented till date. The motivation to design this voice based home automation system especially the people suffering from disabilities like quadriplegia (who cannot move their limbs but can speak and listen) to managed household appliances to their convenience. An implementation of texting concept has also been applied for the verbally challenged. The concept of this is whenever the person needs help he/she can pronounce help and a text message would be sent to their immediate family members. This system is very useful in the case of any emergencies concerning the person.

**Keywords**— Home Automation System, Node MCU, Voice Recognition Module, Realy Circuit.

## I. INTRODUCTION

The luxuries of automatic subsequent systems for every field of human toil have led to the increasing popularity of automated systems. On addition of voice features like voice recognitions, the system proves just the perfect combination for the people who are physically challenged. Thus for some people automated households holds a value of a luxurious lifestyle while for the physically challenged people, it is a means of survival.

There have been tremendous researches in this context to make it as optimized as possible. In an example of voice recognition centred automation system a Node MCU controller, a wheel chair and a navigation module would be the main components. The Node MCU extracts information from the server which have been provided using voice from the voice recognition module and move the person's chair the way he wants without any assistance.

The use of voice recognition module v3, a microcontroller and relay module are used for the monitoring functions from switching fans on and off to controlling actual door locks and wheelchairs. Trans-receivers remove the need additional wirings in the system. Our functionality is developed to control automation by the use of two procedures- using voice commands or by using android mobile as a remote controller. Voice functionality also serves on android devices providing additional options to the users. Remote controller contains a key, which when pressed, leads the commands via Bluetooth function to the receiver and appropriate action is taken on the server side.

## II. SYSTEM DESIGN

The home automation system which we plan is a technique to control home appliances that are by using the voice commands. When the given command is acknowledged, this data is shifted to the control circuit through controller serial port and the corresponding device is turned on or off accordingly. By using GSM Module we send the messages or signals of help to the people. The voice recognition based home automation system is an unified system to facilitate the aged and physically challenged people with an effortlessly operated home automation system that functions fully on voice commands. The functional block diagram of the proposed system is shown in the block diagram mentioned. It consists of all hypothetical background and literature reviews of voice recognition.

In addition, an evaluation of past method and features of system voice recognition is also included. The speech input from microphone is transferred to the voice recognition module where the speech signal is matched with the previously stored taught voice samples.

Upon successful recognition of voice command the NODE MCU microcontroller activates corresponding electrical device by means of a the relay module like turning on lights using the relay module and it also directs the robotic wheel chair through driver module. The info from the illumination sensor is managed in NODE MCU controller and based on a set point value the automatic control action is taken to switch off the lights to save energy. The buzzer sound when it is

disabled, the person required is called for help or when he needs somebody's assistance.

### III. HARDWARE DESIGN

#### 1) NODE MCU:

It is a platform for IOT which facilitates to the write the code on a 5mm\*5mm in NodeJs style. It is a open source firmware which is based on ESP-12 module and ESP8266 Wi Fi SOC. Node MCU is very useful for both software and hardware purpose . NodeJs is the java-script that is used for backend technology and used as a microcontroller.

#### 2) RASPBERRY PI3:

The Raspberry Pi 3 board model B has a processor of 1.2 GHz 64-bit quad-core ARMv8 CPU and 1 GB RAM which almost behaves like a tiny computer . Raspberry pi-3 boards have 802.11n wireless LAN and Bluetooth 4.1. We installed Raspbian Jessie in the memory card which is used for the board. Raspberry Pi 3 has a LINUX centred operating system call Raspbian. There are also 40 GPIO pins which can be utilized as both digital input, digital output to control and interface with several other devices in the real world. 1HDMI PORT, 1 ETHERNET PORT, 4 USB ports, 3.5mm Audio jack, micro USB power supply. This board also has serial connections for linking a camera (CSI) and a display (DSI). While maintaining the popular layout the Raspberry Pi 3 Model B brings a more powerful processor , 10x faster than the first generation Raspberry Pi. Additionally, it adds wireless LAN and Bluetooth connectivity causing it to be the ideal solution powerful connected design.



Figure 1: A Raspberry Pi3 Board

#### 3) RELAY DRIVER CIRCUIT:

Relays are used basically for control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal. In our structure the output from raspberry pi 3 is directly given to a relay circuit. If GPIO pin is high then equivalent relay will turn on and makes it's device state working. We are using a NPN transistor in relay and it works based on concept of EMF(Electromotive Force).



Figure2. Circuit Board

#### 4) LCD SCREEN:

Liquid-crystal display (LCD) is a flat-panel display or other electronically curbed optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not release light directly, instead using a backlight or reflector to create images in color or monochrome. LCDs screen are developed to show random images ( like as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as predetermined words, digits, and 7-segment displays, as in a digital clock. They use the similar basic technology, except that arbitrary images are made up of an enormous number of small pixels, while other displays have larger elements.

##### LCD FEATURES:

- Built-in controller (KS 0066 or Equivalent)
- +5V power supply (Also available for + 3V)
- 1/16 duty cycle
- N.V. optional for + 3V power supply.

#### 7) RF TRANSMITTER AND RECIVIER:

An RF Module is a minor electronic circuit which is used to receive, transmit or transceiver radio waves on one of a number of transporter frequencies. A wireless radio frequency (RF) transmitter and receiver can be effortlessly made using HT12D Decoder, HT12E Encoder and ASK RF Module. Wireless transmission can be completed by using 433 MHz or 315MHz ASK RF Transmitter and Receiver modules. A transceiver is a device that comprises of a transmitter and a receiver which is together combined and share common circuitry.

### IV. SOFTWARE IMPLEMENTATION

#### Steven hickson Voice command software :

This software works on all linux system with a microphone attached. It is a crude program, which uses elementary comparisons to define if your voice command fits a format specified in a config file; it does, then it runs the corresponding linux command. It provisions auto-completion

and variables as well as command verification a continuous mode, and other options.

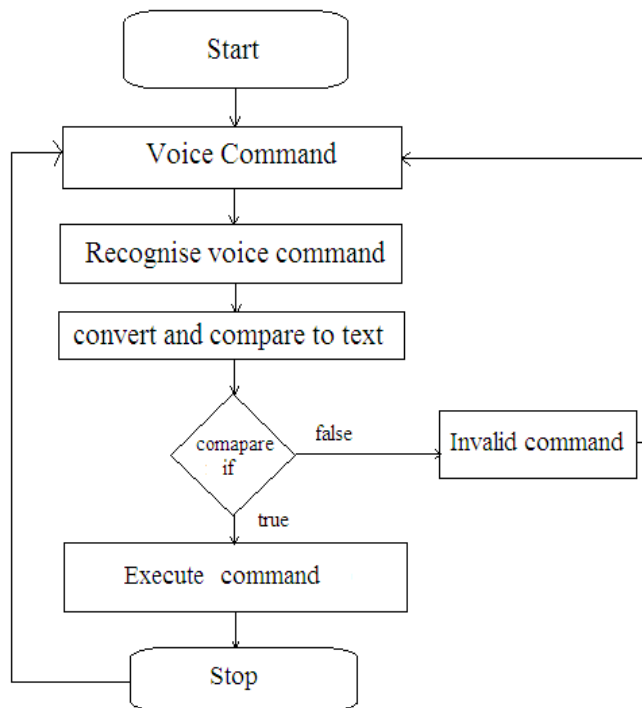


Figure 3: FLOWCHART FOR PROGRAMMING

## V. LITERATURE SURVEY

Saito and others developed a home doorway system for interconnecting home network consisting of IEEE 1394 AV network and X10 power line home automation network with Internet. This provided remote entree functions from Internet for digital AV appliances like Digital Video Camera, Digital VCR connected to IEEE 1394 network and home appliances like TV, desk lamp, electric fan connected to X10 controller. Al-Ali and Al-Rousan developed, in 2004 a Java based home automation system through the World Wide Web. The home appliances were managed from ports of embedded system board connected to PC based server at home.

Alkar and Buhur implemented, in 2005 Internet based wireless elastic solution where home appliances are linked to slave node. The slave nodes connect with master node via RF and master node has serial RS232 link with PC server. The nodes are built on PIC 16F877 $\mu$ c. PC server is designed of a user interface component, the database and the web server components. An Internet page has been arranged which is running on a Web server. The user interface and the Internet front end are linked to a backend data base server. The controlling of all devices is established and their condition is watched through the Internet.

Tan and Soy developed, in 2002 a system for monitoring home electrical appliances over the Internet by using Bluetooth wireless technology to provide a connection from the appliances to the Wireless Application Protocol (WAP) to provide a data link between the Internet and a smart phone.

In addition, Reports are implemented without any restrictions on different kinds of device or OS because the mounting High charts are written in pure JavaScript. Lastly, Use of Cloud middleware based Web services, because the future is more easily mountable photovoltaic system monitoring, and When combining the Bluetooth, wireless network and 4G LTE device will be helpful in the new monitoring technology developed experimental associations become larger and more international, there is a growing need for web based tools that can allow collaborators to securely and reliably monitor and control their respective systems both on-site and remotely from their home institutes. Amplified adoption of mobile devices such as smartphones and tablets also opens new possibilities for system monitoring, plus push technologies to send notifications about important events or error conditions.

## VI. CONCLUSION AND FUTURE SCOPE

The home automation using Internet of Things has been experimentally proven to work by linking simple appliances to it. These appliances were successfully controlled distantly through the internet. The designed system initiates a process according to the user's requirements, for example switching on a fan when it gets hot. Sensors can be applied to store data which can later be used to analyse the system at hand. Home automation system will bring more handiness and comfort to people's life. The android-based smart home application connects with the Wi-Fi module ESP8266 which acts as an access point. Using android application user could regulate and monitor the smart home environment. NODE MCU provides an economic and effective platform to implement the smart home automation system. This system can be used to communicate with numerous numbers of devices. It minimizes the consumption of electricity and it consumes less time, also it helps the old aged and dis-abled people in doing the basic domestic works on their own.

The next phase for the Home automation market will occur grounded on a few key improvements in the technology available in Automation, such as upgrading in Wireless Automation solutions provides cutting of price points as the market begins to accept Smart Home automation usage in larger volumes. This kind of home automation systems are essential because a human can make mistakes and forget to switch off the applications when there is no use and In that case they are essential in order to utilize the power effectively and also in a secured manner. In future we expect to provide a wireless relay connection and wireless sensors

which can be portable and can be operated and which can be used in company and instates for Security to the whole building with one single sub-system. This provides a total security support for homes.

### REFERENCES

- [1] C. Perera *et al.*, "Context Aware Computing for The Internet of Things: A Survey," IEEE communications surveys & tutorials, vol. 16, no. 1, first quarter 2014, pp 414 – 417.
- [2] L.Tan *et al.*, "Future Internet: The Internet of Things" 2010 3rd International Conference on Advanced Computer Theory and Engineering (ICACTE), pp 376 – 380.
- [3] S. D'Oro, L. Galluccio, G. Morabito and S. Palazzo, "Exploiting Object Group Localization in the Internet of Things: Performance Analysis," in IEEE Transactions on Vehicular Technology, vol. 64, no. 8, pp. 3645-3656, Aug. 2015.
- [4] J. Huang, Y. Meng, X. Gong, Y. Liu and Q. Duan, "A Novel Deployment Scheme for Green Internet of Things," in IEEE Internet of Things Journal, vol. 1, no. 2, pp. 196-205, April 2014.
- [5] A. P. Castellani *et al.*, "Architecture and protocols for the Internet of Things: A case study," in Proc. 8th IEEE Int. Conf. Pervasive Comput. Commun. Workshops (PERCOM), 2010, pp. 678–683.
- [7] Rozita. T *et al.*, "Smart GSM Based Home Automation System," 2013 IEEE Conference on Systems, Process & Control (ICSPC2013), December 2013, Kuala Lumpur, Malaysia, pp 306 - 309.
- [8] Aronson, S. (1977), 'Bell's Electrical Toy: What's the Use? The Sociology of Early Telephone Use', in De Sola Pool, I.(ed.), *The Social Impact of the Telephone*, MIT Press, Cambridge.
- [9] Berg, A.(1990), 'He, She and I.T. Designing the Home of the Future', in Sorensen, K. and Berg, A. (eds.) *Technology and Everyday Life: Trajectories and Transformations*, Norwegian Research Council for Science and Humanities, Trondheim.

### Authors Profile

*Sapna Yadav* is pursuing Bachelor of Technology from AKTU, India. Her main research work focuses on Machine Learning, Internet of Things(IOT) , Cloud Security and Data Mining.



*Samridhi Srivastava* is pursuing Bachelor of Technology from AKTU, India. Her main research work focuses on Machine Learning, Internet of Things(IOT) , Cloud Security and Data Mining.



*Megh Singhal* has pursued Bachelor of Technology from AKTU, India in year 2015 and Master of Technology from Jaypee University, India in year 2017.

He is currently working as Assistant Professor in Department of CSE, ABESIT, India. His main research work focuses on Vehicle Adhoc Networks and Network Security. He has 2 year experience of Research area.

