
SMART BOT: HOME AUTOMATION SYSTEM USING IOT AND ANDROID

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ABSTRACT

Smartbot is a device which is a Smart Assistant that helps the user with immediate actions to user queries. Home security and automation is the future of every household. With the advent of new technology, it is now possible to make a reliable IOT project with cost-effective manner. Raspberry Pi is pocket size CPU having 1GB RAM and 1.2ghz of processing power which is 50% faster than the previous version is best suitable for the home automation system. This embedded system comes with the Linux Operating System which is suitable to get the advantage of integrating with the normal computers and devices. In this paper, particularly we aimed to the class of people who have access to necessary technology, to reduce the wastage of electricity and increase the grip and control over the house. This paper has a dedicated Android app which can be installed on almost on all the android devices to control the Automation process, and we use RF communication to have long-range connectivity to the devices.

Keywords: Smart bot, Internet of thing, raspberry, home automation, android app.

1. INTRODUCTION

Artificial Intelligence is a branch which aims to develop tools and techniques for solving complex problems that people are good at [1]. Machine learning is a sub division of artificial intelligence, worried about the plan and advancement of calculations that enables the PCs to advance its practices in view of consistent information. The growth of internet of things (IoT) [2] is based on the continuous growth that has been witnessed in the last couple of years in the fields of microelectronics, information technology and communications and it is evident this trend will continue. There are four technical communications implementation models for internet of Thing (IoT) as defined by the Internet Architecture Board [3]. These models are: “Device-to-Device (D2D), Device-to-Cloud, Device-to-Gateway/Server (D2S) and Back-End Data Sharing”.

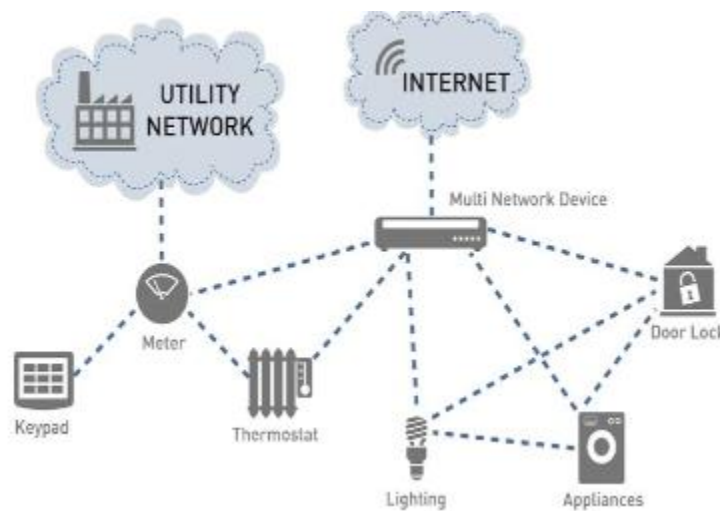


Fig.1. Home Appliances connected to Network

Home automation is the way toward controlling electrical gadgets in our home or office. There are diverse sorts of home computerization accessible like remote control, program based, hand motion, voice controlled home mechanization. In the web world, individuals are for the most part investing their energy with applications so we don't have

to move to another applications to control the apparatuses in our homes. We can control the gadgets at home from anyplace with these applications [4]. It gives an intuitive and easy to understand interface on the customer side, and the gadgets can be controlled and observed simple. Prior days the web has been generally utilized for procedures, for example, surfing website pages, data seek, talking, downloading records. By the progression of new advances, controlling and checking administrations have been begun to send once again the web which furnishes cooperation with gadgets and hardware [5]. This framework can be introduced in a few spots like healing centers, labs, banks and different enterprises, which extensively decreases the cost and time alongside keeping up security and comfort. Any physical parameters from this present reality like temperature, mugginess, weight and so on can be observed using sensors associated with the Internet from any coveted area on the planet. Home apparatuses associated with the system is given in the figure 1.

In this paper, we use mobile apps like MQTT dashboard which connect to the servers and control the appliances and read the status of the sensors using MQTT protocol which is a machine to machine protocol especially used for device to device communication [8]. This app is utilized to impart between the general population yet in addition, we can control the gadgets which likewise read the status from sensors and are logged to twitter and Gmail. Smartphones are used widely all over the world by many people.so just by chatting with the bot we can control any device at our home or office from any part of the world. The voice recognition technology is evolving and many applications such as google assistant, apple Siri, Microsoft cortana use voice recognition and responds to the user queries. we use voice recognition service to control the home appliances directly through our voice.

2. RELATED WORK

Smart home isn't another term for “science society, it is been utilized from decades. As electronic advances are propelling, the field of home robotization is extending fastly”. There were different “savvy frameworks have been proposed where the control is by

means of Bluetooth [6], web and so forth”. Bluetooth capacities are great and the greater part of current PC/work areas, tablets, note pads and mobile phones have worked in connector that will in a roundabout way decrease the cost of the framework. In any case, it restricts the control to inside the Bluetooth scope of the earth while most different frameworks are not all that attainable to be executed as minimal effort arrangement. In “Wi-Fi based home robotization framework is displayed. It utilizes a PC (with worked in Wi-Fi card) based web server that deals with the associated home gadgets”. The framework bolsters an extensive variety of home robotization gadgets like fans, lights, other home machines. A comparative engineering is proposed in where the activities are facilitated by the home operator running on a PC. Different papers, for example, likewise introduced “web controlled frameworks comprising of a web server, database and a page of sites for interconnecting and dealing with the gadgets”.

Double Tone Multiple Frequency (DTMF) innovation which centers around the keypad use of a telephone for information correspondence. It makes a flag on squeezing a key on a keypad. At least “two recurrence is blended [7] and the tone we get is called Dual tone”. A phone is associated utilizing aux wire to a DTMF decoder MT8890 IC. Sripath Roy et.al, [9] proposed control of apparatuses utilizing voice indoor, when in outside control utilizing App MQTT. Likewise, the gadgets can collaborate and status can be checked and controlled utilizing an informing administration called Telegram. We utilize open source equipment, for example, raspberry pi which is a palm PC to interface the machines in the home.

Suraj Bhatia [10] proposed “the security and to screen the stream of water utilizing raspberry pi sensors MSP430 microcontroller”. Raspberry pi assumes a part to deal with the execution of code and to process it. The Raspberry pi here is associated with web through a Modulator Demodulator (MODEM) to deal with or get to different messages sent to the client. The gadget (home machines) to control is been incorporated with the circuit utilizing a Relay channel because of high voltage appraisals of home apparatuses. To see the updates this task make utilization of show associated with the Raspberry pi. Sharon Panth [11] proposed the Bluetooth innovation. It is utilized generally over the

globe due to its protected and solid information transmission strategy Bluetooth utilizes a short-extend proportion to transmit information over a speed of up to 2.4GHz. Undertaking's primary concentration is to control home apparatuses utilizing Bluetooth. An “AVR ATMEGA8 microcontroller is utilized for taking care of the procedure which is of 28 stick design”. The Advantage of utilizing Bluetooth is it is quick dependable modest and simple to utilize and handle and has low vitality utilization rate.

3. SYSTEM ARCHITECTURE

The product starts with the voice or instructions through mobile application as the source of input from the user. The product fulfills all the actions that the user instructs within the minimum possible time. It provides control over all the electronic products. It provides necessary support system to the user. This product enables the user to access the equipment even when the user is away from the home. It provides necessary security support to the user. So in the absence of the user, If any intruders enter the house this product detects it through the motion detection sensors & cameras which in turn notifies it to the user at the earliest and starts alarming, and by which the user can take immediate necessary actions pertaining minimum damage to the his/her property. The system architecture is given in the figure 1.

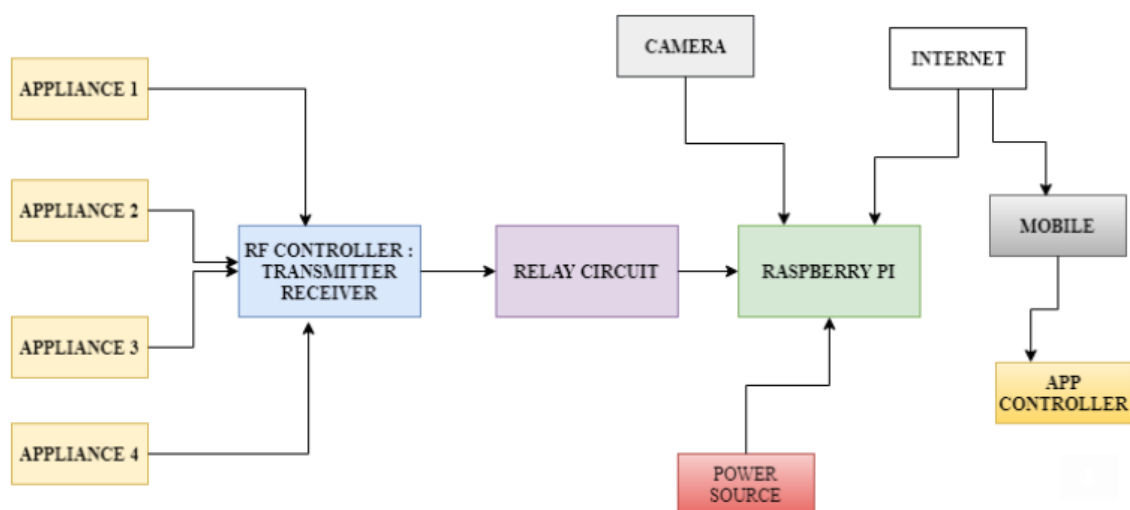


Fig.1. System Architecture

The raspberry pi controls the electronic appliances with the help of the commands issued by the user in the Android app, it also has the capacity to recognize the users according to the facial features and labels the unknown persons with the unique token and it will give the user a chance to name the unknown persons in the app. Automation did use rf communication for better range and security. Functionality that may have if time permits are an offline alert system (via SMS).

Use cases:

A User can come to know the happenings at his home every moment while he is away just by using his SmartPhone. Home's support and security in the User's hand. It sends continuous nearby climate conjectures. The reports can be customized and User can get push warnings in light of climate conditions changes. Answers wellbeing related inquiries, and gives proposals from authorize specialists. So also to a web crawler, gives answers to all the client inquiries.

4. EXPERIMENTAL RESULTS



Fig.2. Raspberry Pi accessing the router to act as a server for the Android app

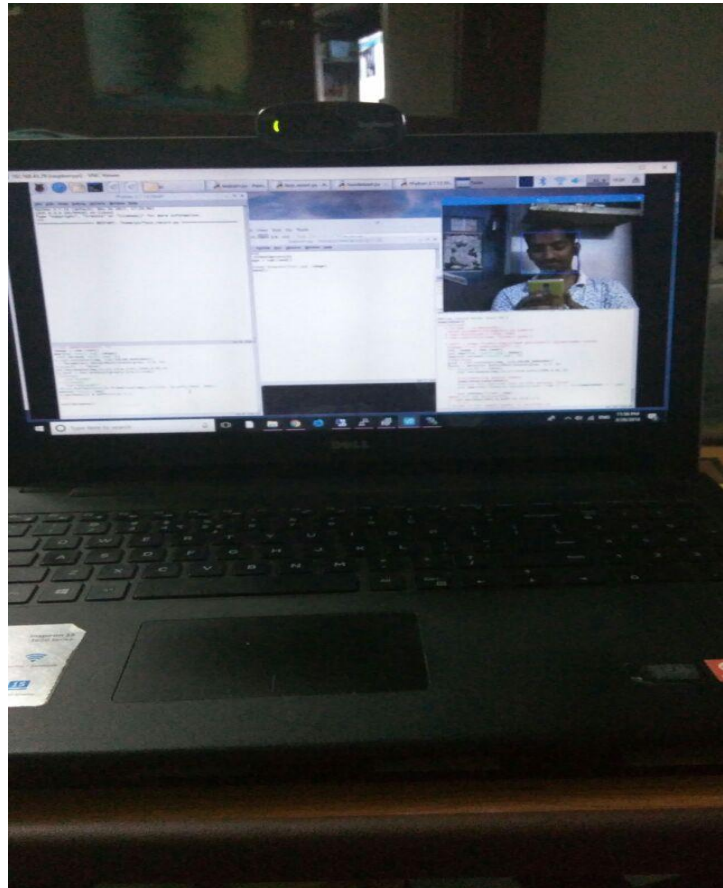


Fig.3. OpenCV image processing recognising the face with a square on the detected face and here the raspberry pi is accessed through the laptop via VNC viewer

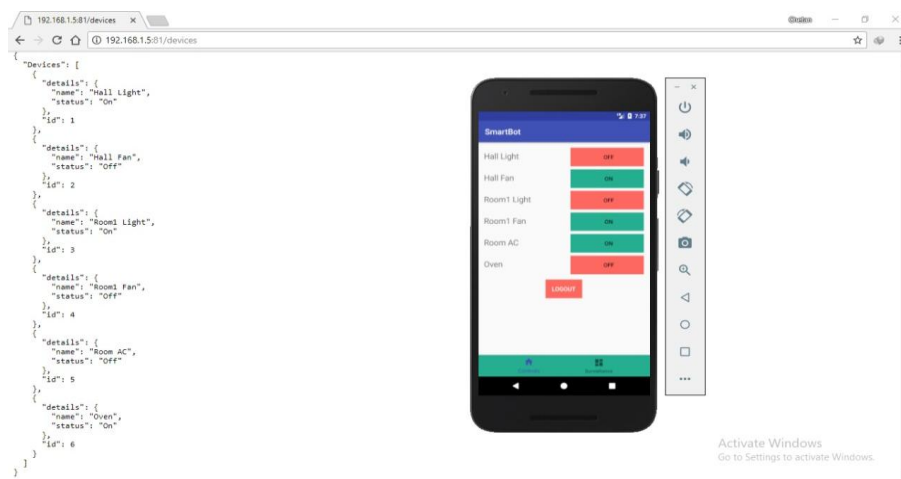


Fig.4. UI design of the Android app which the end user experience

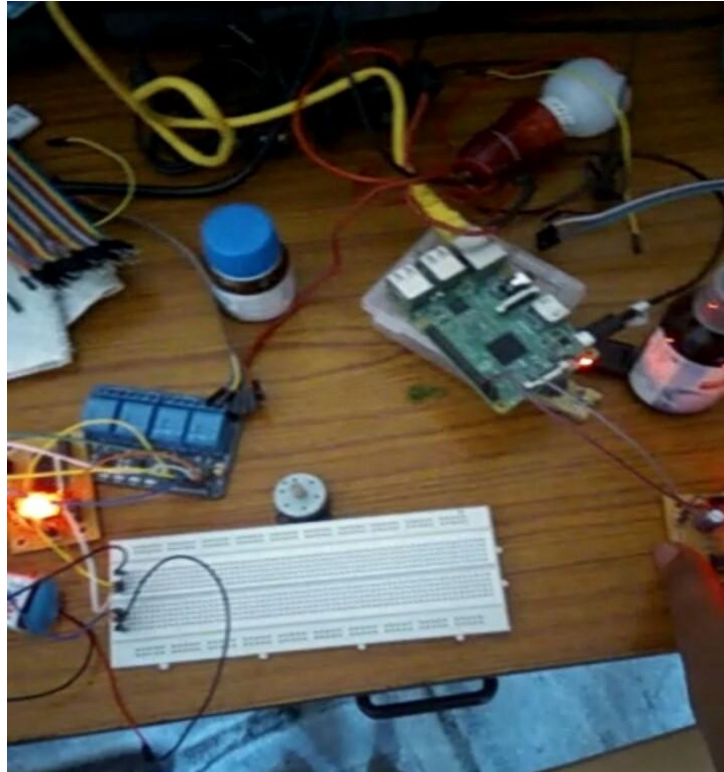


Fig.5. Raspberry Pi controls the electronic appliances with the help of 4-channel 5v relay circuit, Pi controls the relay with RF communication module (RF434 Rf Module 434-Mhz)

5. CONCLUSION

The main reason for this paper is its cost effective nature, the smart assistant in the market are either dumb or costly. We took the initiative to make every household to enter into the digital era of the world in most simple form. This device is reliable and designed to understand the surroundings. The device comes with an app to control and communicate with the household devices. We redefined the working of security cams and directly store the footage caught into the Web server in even remote conditions. The device is open source free to modify as we use the most popular and powerful programming language and we will make sure to add templates to access the features.

REFERENCES

- [1] Dr.S.Balakrishnan, Dr. A.Jebaraj Ratnakumar, J. Elumalai. "A Machine Learning Based Regression Techniques for E-Mail Prioritization", *Taga Journal of Graphic Technology*, Vol. 14, pp. 710-717, 2018.
- [2] Steven Uaturomuinjo Tjiraso, S. Balakrishnan "Designing A Peer-To-Peer Central-Registry Based Internet Of Things (IoT) Protocol". 2016 International Conference on Engineering and Technology (ICET), Dec, 2016. Volume-2, pp. 164- 168. ISBN 978-1-5090-3212-9.
- [3] S. Balakrishnan. "Peer-To-Peer Central Registry Based Internet of Everything (IoE) Protocol", *CSI Communications magazine*, Vol. 41, issue 4, pp. 26-29, 2017.
- [4] Khadke, S.K. "Home appliances control system based on android Smartphone". *IOSR J. Elect. Commun.Engg.* Vol. 9, issue 3, pp. 67-72. 2014.
- [5] Home security system website. [Cited 2010 14thOct].Available: <http://www.itechnews.net/2008/05/20/ucontrol-homesecurity- system/>
- [6] R. A. Ramlee, M. H. Leong, R. S. S. Singh, M. M. Ismail, M. A. Othman, H. A. Sulaiman, "Bluetooth remote Home Automation System Using Android Application," *The International Journal of Engineering And Science*, vol. 2, pp. 149-153, 11, January 2013.
- [7] Sharon Panth, "Designing Home Automation System using Java ME for Mobile Phone", *International Journal of Electronics and Computer Science Engineering*, Vol.2, No.2, pp. 798-807, April 2011.
- [8] Abinaya.M , Chandraleka.D , Kalaivani.V, "Zig-Bee Based Intelligent overcoat For Coal Miners", *International Innovative Research Journal of Engineering and Technology*, Vol. 1, No. 4, pp. 29-33. 2016.
- [9] K. Sripath Roy, Bhanu Prakash Doppalapudi, Rajashekar Reddy Vuyyuru, Lakshmi Radha Machiraju, Gaddi Dinesh Kumar, "Realization Of A Low Cost Smart Home System Using Telegram Messenger And Voice", *International Journal of Pure and Applied Mathematics*, Volume 116 No. 5 2017, 85-90.
- [10] Suraj Bhatia,"Technology, Sytems and Implementation of a Smart Home Automation System", *IJCTA-Suraj Bhatia et al, Int.J. Computer Technology and Applications*,Vol.5 no.5, pp.1690-1695, Oct 2014.
- [11] Sharon Panth, "Designing Home Automation System using Java ME for Mobile Phone", *International Journal of Electronics and Computer Science Engineering*, Vol.2, No.2, pp. 798-807, April 2011.