

Smart Home Automation Using RPI & IoT

Priyanka B. Kadam¹, Durga B. Bhutekar², Prajakta R. Kunde³, Prof. D. A. Ansari⁴

B.E. Student, Department of Electronics & Telecommunication, Pravara Rural Engineering College, Loni, India^{1,2,3}

Associate Professor, Department of Electronics & Telecommunication, Pravara Rural Engineering College,
Loni, India⁴

ABSTRACT: In recent years, the house environment has seen a rapid introduction of network enabled digital technology. This technology offers new and exciting opportunities to extend the connectivity of devices within the house for the aim of home automation. Mobile devices are ideal in providing interface during a home automation system, thanks to their portability and their wide selection of capabilities. Automation is that the use of control systems and knowledge technologies to scale back the necessity for human add the assembly of products and services. Automation plays a crucial role within the world economy and in lifestyle. During this we describe the planning and development of a home appliance system using raspberry pi and android mobile. We'll be ready to control any appliance in home from anywhere throughout the world, once you have through with this Raspberry Pi home automation. It's necessary to control the house from any area or location. The project presents a low cost home automation system developed using Raspberry Pi, and wifi and android application.

KEYWORDS: Raspberry pi, Android application, Relay, Home appliances.

I. INTRODUCTION

Today the technological worlds centralize principle is to automate each conceivable thing for simplicity in life, providing security, saving electricity and time. Therein home automation is one among the prior things to automatically on and off the house appliances. Home automation are often characterized as a way for doing something without human inclusion. It's going to incorporate brought together to regulate of lighting, machines, heating, ventilation, air-conditioning, and security door locking and different systems, to supply improved convenience, comfort, energy efficiency and security. The thought of automating each appliance within the house is done from a few years ago, it started with connecting two electric wires to the battery and shut the circuit by connecting load as a light-weight. Later it are often developed by different organizations, which creates its own automation systems with different devices like sensors, controllers, actuators, buses, and interfaces. In present days most of the automation systems utilize the mixture of hardwired and wireless systems for controlling the appliances. It should have both equipment and programming found out for proficient systems. The recognition of home automation has been expanding incredibly due to much higher reasonableness and simplicity through Smartphones and wireless networks. Internet of Things is interlinked through these networks; due to the recognition of the house automation is improved by the standard of service provided by the devices. Different home automation systems are developed by different authors for automatically on and off the appliances with different applications.

Home automation is that the control of any electrical devices in our home or office. There are many various types home automation systems are available. These systems are typically designed for various purposes. In fact, one among the main problems within the area is that these different systems are neither interoperable nor interconnected. There are number of issues where designing a home automation system. It should also provide a user friendly interface on the host side, in order that the devices are often easily setup, monitored and controlled. In smart home systems, the web is additionally use to make sure remote. For years, the web has been widely use for the processes like surfing on the pages, searching information, downloading chatting, and installation. The system are often use in several places like banks, labs, hospital and other sophisticated automated system, which reduces the hazards of unauthorized entry. The most reason to develop this technique is to save lots of time and man power alongside security and convenience.

II. RELATED WORK

Homera Durani, Mitul Sheth, Madhuri Vaghasia, Shyam Kotech[1] in their paper “Smart Automated Home Application using Iot with Blynk Application” published in 2nd International Conference on Inventive Communication and Computational Technologies (978-1-5386-1974-2/18 c 2018 IEEE) had proposed a system where basic house facility are often handled by device from anywhere like ON and Off of light, fan, AC, pump , gardening of water. One can handle all this things with help of device node MCU esp8266, android application, internet connection. This paper contains functionality of node esp8266 are connected with either of the given house application like fan, light, pump , gardening with help of coding and hosting online with web server.

Pavithra.D, Ranjith Balakrishnan [2] in their paper “IoT based Monitoring and Control System for Home Automation” published in 2015 Global Conference on Communication Technologies (GCCT) had proposed a system suitable for real time home safety monitoring and for remotely controlling the home appliances and protection from fire accidents with immediate solutions. In the system, the user can move directly with the system through a web-based interface over the online , whereas home appliances like lights, fan and door lock are remotely controlled through easy website. The communication with server allows the user to select the appropriate device and permits the user to pick out the acceptable device. The server had been interfaced with relay hardware circuits that control at home.

Satyendra K. Vishwakarma, Prashant Upadhyaya, Babita Kumari, Arun Kumar Mishra [3] in their paper “Smart Energy Efficient Home Automation System Using IoT” published in 2019 4th International Conference on Internet of Things: Smart Innovation and Usages (IoT-SIU) proposed a smart energy efficient home automation system that can access and control the home equipments from every corner of the world. Home automation is predicated on multimodal application which will be operated using voice recognition command of the user using the Google Assistant or through a web based application. Thus, main objective of this system was to make our home automation system more secure and intelligent with internet connectivity module that had been attached to the main supply unit of the home system which can be accessed through the Internet.

Vamsikrishna Patchava, Hari Babu Kandala, pRa vi Babu[4] in their paper “A Smart Home Automation Technique with Raspberry Pi using IoT” published in 2015 International Conference on Smart Sensors and Systems (IC-SSS-978-1-4673- 9328-7/15/c 2015 IEEE) proposed a system for Smart Home Automation technique with Raspberry Pi using IoT and it's done by integrating cameras and motion sensors into an internet application. To design this system, they had used a Raspberry Pi module with Computer Vision techniques. For the automation system, using a Raspberry Pi module with Computer Vision techniques, user can control home appliances connected through a monitor based internet. Raspberry Pi operates and controls motion sensors and video cameras for sensing and surveillance.

III. METHODOLOGY

Home Automation is required to be without new wiring and to be very easy installation. Field of home appliance network is still young, many initiatives and standardization efforts have already been made. This new system brought the android application and raspberry-pi into home automation implementation. The proposed system architecture generally incorporates a raspberry pi computer for the needs of network management and provision of remote access. The system allows the user to control home appliances from a smart phones with the help of Wi-Fi also can be controlled from anywhere in the world using an internet. This system has a capability to control our appliances within our home from an Android device. This paper presents the overall design of Home Automation System with low cost and wireless remote control. This system is designed to help and provide provision in order to fulfill the needs in home. This system implements wireless Home Automation System using Android technology to provide remote access from smart mobile. The design replaces the existing electrical switches and provides more safety control on the switches with low voltage activation method.

The block diagram of proposed model consist of following components:

- Raspberry Pi
- Relay
- Light
- Fan
- Camera
- Android Mobile

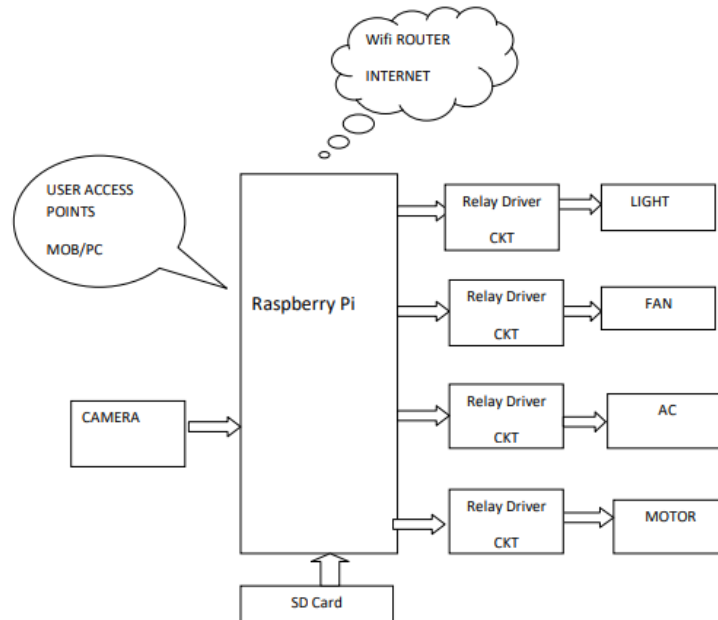


Fig 1: System Architecture

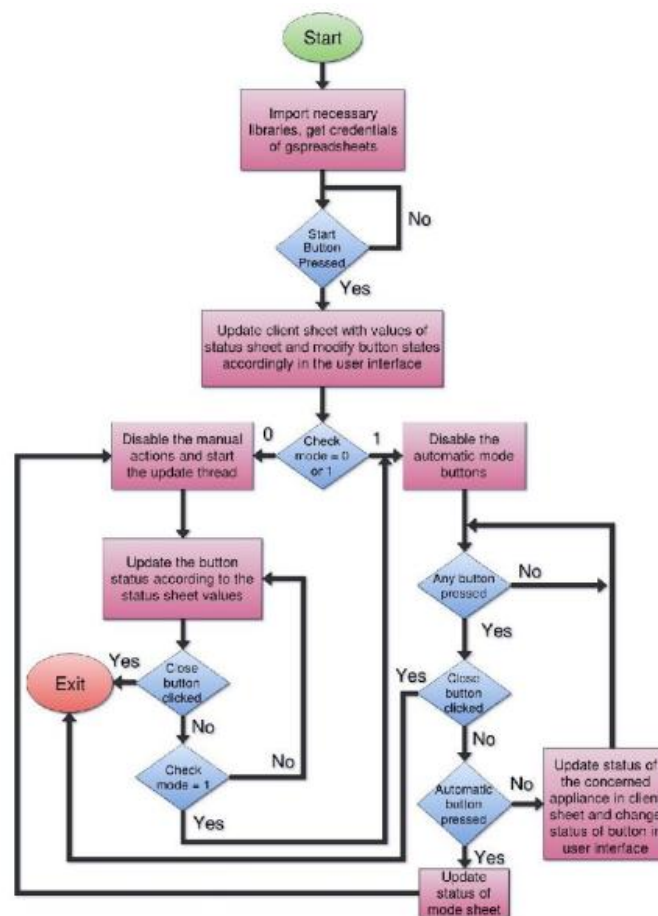


Fig 2:- Flowchart

IV. EXPERIMENTAL RESULTS

Following are some of snapshot of android app developed for Home Automation System using Rpi. That's it finally we are able to control the device, follow the steps:

1. Go to the IP address on a local device on same network, you will get the home page
2. Enter the username:admin and password:iot
3. You will get a controller page to switch device on and off along with current status of device
4. If you provide voice command like "lighton" then relay connected to gpio 5 will turn on and "lightoff" for switching off
5. For providing more command you can simply edit the python script to add you own command

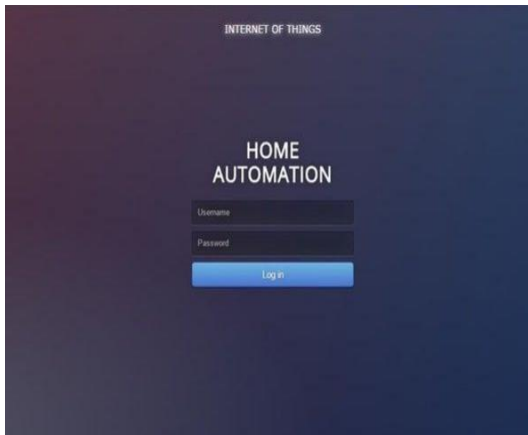


Fig 4:- Login Page



Fig 5:- Result of Home Automation

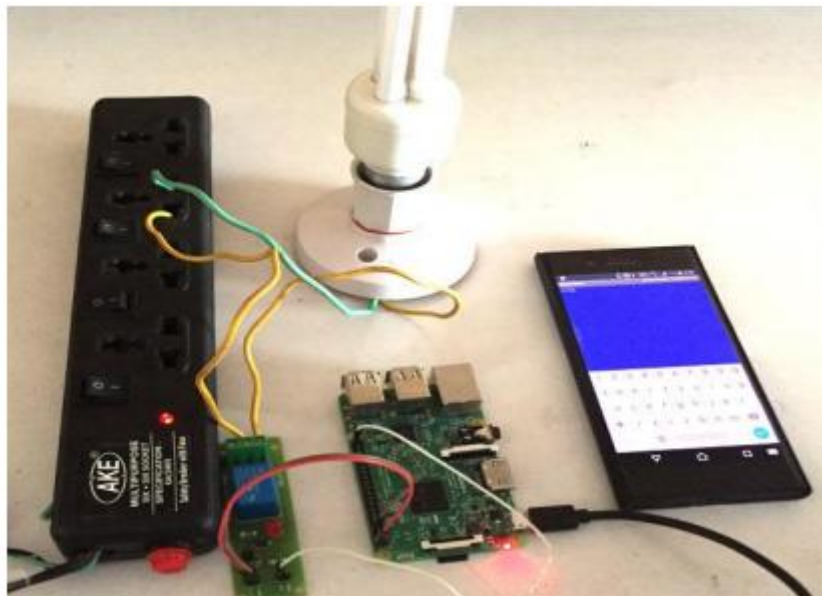


Fig 6:- Hardware Setup

V. CONCLUSION

The project focuses on helping hand to the needful people like handicapped and the patients in hospital and in home. Technology should be used in betterment of the people lifestyle. Lights and fans are the subjective elements in a common in low class or middle class room. Due to this maximum number of the people will get a good and a user-friendly environment with controls of light fans and any appliances in your smart phone or website. As smart phones, have become the crazy trending and fastest growing technology worldwide and there is a smart phone in each and

every pocket. Giving access of their home in their pockets or in their hands is a challenging task that completes our objective and motto of this project. By doing so the rate of internet access and IoT will increase, people will get a good exposure to the new emerging technology and will get a curiosity to know about what technology can change the lifestyle and the problems faced by the human.

REFERENCES

- [1] Homera Durani, Mitul Sheth, Madhuri Vagharia, Shyam Kotech, "Smart Automated Home Application using Iot with Blynk Application" published in 2nd
- [2] Satyendra K. Vishwakarma, Prashant Upadhyaya, Babita Kumari, Arun Kumar Mishra in their paper "Smart Energy Efficient Home Automation System Using IoT" published in 2019 4th International Conference on Internet of Things: Smart Innovation and Usages (IoT-SIU)
- [3] Vamsikrishna Patchava, Hari Babu Kandala, P Ravi Babu[4] in their paper "A Smart Home Automation Technique with Raspberry Pi using IoT" published in 2015 International Conference on Smart Sensors and Systems (IC-SSS- 978-1-4673- 9328-7/15/c 2015 IEEE)
- [4] Somani, S., Solunke, P., Oke, S., Medhi, P., & Laturkar, P. P. (2018). IoT Based SmartSecurity and Home Automation. 2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA). doi:10.1109/iccubea.2018
- [5] Teymourzadeh, R., Salah Addin Ahmed, Kok Wai Chan, & Mok Vee Hoong. (2013). Smart GSM based Home Automation System. 2013 IEEE Conference on Systems, Process & Control (ICSPC). doi:10.1109/spc.2013.6735152
- [6] Mtshali, P., & Khubisa, F. (2019). A Smart Home Appliance Control System for Physically Disabled People. 2019 Conference on Information Communications Technology and Society (ICTAS). doi:10.1109/ictas.2019.8703637
- [7] Lita, A. I., Visan, D. A., Mazare, A. G., & Ionescu, L. M. (2017). Door automation system for smart home implementation. 2017 IEEE 23rd International Symposium for Design and Technology in Electronic Packaging (SIITME)
- [8] Khan, M. F. S., Ahmed, T., Aziz, I., Alam, F. B., Bhuiya, M. S. U., Alam, M. Mahtab, S.S. (2019). PLC Based Energy-Efficient Home Automation System with Smart Task Scheduling. 2019IEEE Sustainable Power and Energy Conference (isPEC). doi:10.1109/ispec48194.2019.8975223
- [9] Kumar, S., Swetha, S., Kiran, V. T., & Johri, P. (2018). IoT based Smart Home Surveillance and Automation. 2018 International Conference on Computing, Power and Communication Technologies (GUCON). doi:10.1109/gucon.2018.8674999
- [10] Shinde, A., Kanade, S., Jugale, N., Gurav, A., Vatti, R. A., & Patwardhan, M. M. (2017). Smart Home automation system using IR, bluetooth, GSM and android. 2017 Fourth International Conference on Image Information Processing (ICIIP). doi:10.1109/iciip.2017.8313770