International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 06, 2020
ISSN: 1475-7192

INTERNET OF THINGS BASED SENSIBLE AND SECURE HOME AUTOMATION SYSTEM

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ABSTRACT— *In the past few years, along with the advances in technology, the home automation systems have begun to provide additional functions and been additional subtle. Compared to the past, remotely governable home automation systems became less expensive and aren't luxurious anymore; thence additional and additional individuals today use home automation systems to form their lives easier. This is precisely what this project will, victimization Associate in Nursing app on our phone we are able to management all electrical instrumentality in our home. This can be an easy project created with the aim to regulate electrical appliances without switches, and incorporating a smart app to accomplish this, the medium are going to be the web. The setup incorporates a Raspberry Pi. The top result is going to be a system wherever you'll be able to operate the appliances via phone. The core objective of this work is to develop sensible and secure home (SSH) victimization Internet of Things (IoT) devices which might be controlled and monitored victimization automation smart phone.*

Keywords *– Raspberry Pi, IoT, Home Automation, Energy Saving, Secuirty, Voice Automation*

I. INTRODUCTION

With the advancement in technology, additional and additional individuals like everything to be in their management simply via their smartphones. From business a cab to buying one thing on-line, every finish everything may be done simply with our hands. Therefore why not use the technology to automatize our homes victimization our phone.

This is precisely what this project will, victimization Associate in Nursing app on our phone we are able to management all electrical instrumentality in our home. This can be an easy project created with the aim to regulate electrical appliances without switches, and incorporating a smart app to accomplish this, the medium are going to be the web. The setup incorporates a Raspberry Pi. The final result is going to be a system wherever you'll be able to operate the appliances via phone.

A few of the more and extremely necessary options of the merchandise are going to be a rise within the security employing a fingerprint lock and excluding mobile app, the appliances may be operated via voice. Another unique feature of the proposed model is that it also employs a timer, where in if the appliance is on for more than 3 hours the person gets a notification, thereby promoting energy saving as well.

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Received: 22 Feb 2020 | Revised: 13 Mar 2020 | Accepted: 05 Apr 2020

II. LITERATURE SURVEY

An inter-connection of physical devices embedded with one or more sensors and software package to control the home appliances is called as home automation. The network property is employed to gather and exchange the information. The Home automation system refers to the automated and electronic management of house options, activity and appliances. Numerous management systems area unit are used during this residential extension of building automation. Home automation can also be called as domestics or demoniac trendy system. This system typically encompass switches and sensors connected to a central "gateway" from that the system is controlled with a program that's interacted either with a wall-mounted terminal, portable software package, pill pc or internet interface, typically however not continuously via web cloud services.[1]

In recent days home automation system is being wide accustomed management devices round the home. A range of home devices or appliances are controlled with the assistance of a home automation system. All types of home appliances like doors, lights, fan, electric fire, police investigation systems, and shopper physical science belong to the house automation system devices. Home automation system is adopted by exploitation the technology out there for the aim of dominant the devices likewise because the systems employed in the house mechanically.[5]

This paper presents associate degree intelligent home automation to regulate the house appliances and electrical and equipment by exploitation smartphone. It'll activate or OFF the house appliances and electrical instrumentation by exploitation relay circuits with the conception of IoT. This is often enforced by exploitation Raspberry Pi.[3]

In home automation several new inventions and lots of standardized efforts are created, therefore the conception of home automation continues to be young. The design incorporate a wireless local area network, relay circuits, sensors, robot application and raspberry pi that is tiny size pc that's used for the aim to manage the network and for remote access.[2]With the assistance of wireless local area network the user will communicate through raspberry pi and it may be designed in keeping with our home system. The wireless local area network signal ought to be robust and therefore the system is scalable and versatile. The wireless local area network is that the medium to speak with the devices. It's conjointly designed and builds services secured. Network/interfaces area unit used for configuring wireless local area network with raspberry pi. The serial information is connected to raspberry pi circuit that is returning from the wireless local area network.[4] The most a part of the house automation is that the raspberry pi circuit that may be a MasterCard size pc and performs several functions, for each home appliances, the raspberry pi is designed and therefore the corresponding relay can get turn on and therefore the device can operate.[6] Home automation is needed to possess a really straightforward installation.

As per our survey, there exist several systems that may management home appliances exploitation robot primarily based phones/tablets. Every system has its distinctive options. Several corporations' area unit providing an advanced and higher home automation system. The distinctive feature which can be following during this project is Voice Automation and Security.

Most of the present systems today have a lot of unique features such as voice recognition, security, etc. There are various modes through which the home appliances are connected to us, namely Bluetooth, Wi-Fi, SMS, etc.

Energy Saving – You can switch off the lights from outside if by chance you forget to switch them off.

Ease – It makes the lifestyle of everyone a lot easier especially disabled.

Security – It is a very secure object as only the owner of the Smartphone and the people he wants can operate the home appliance using this system.

Most of the present system have similar unique features while our project contains multiple unique features integrated into a single module which helps in increasing the scope of the project and makes it a little easier and provide with a lot of options.[3]

Since the proposed system contains multiple features integrated into a single system the hardware used (Raspberry pi) costs a bit more than the hardware used by present systems.

III. PROPOSED SYSTEM

Most of the present systems today have a lot of unique features such as voice recognition, security, etc. There are various modes through which the home appliances are connected to us, namely Bluetooth, wi-fi, SMS, etc. Most of the present working system works around single feature and even a sudden failure in that feature may lead to the entire malfunctioning of system. They are very expensive and mostly depend on the internet.

This is exactly what this project does, using an app, microphone and fingerprint sensor on our phone we can control our home appliances.

This is a simple project made with the aim to control a door lock without keys, and using a smartphone to accomplish this. The setup incorporates a Raspberry Pi, a Solenoid Lock (12 volt), a Relay Module, 12V-2A Adaptor, Wires (Normal, Jumper). The end result will be a system where you can open the lock by using on and off button on the app. The major advantage the proposed project has over other systems is that the mobile app has a timer with it which sends a notification to the user after 4 hours that the appliance has been on for a long time and the user can close it if he/she wishes to.

3.1 MODULE

3.1.2 Raspberry Pi

The Raspberry Pi is a series of tiny distinct-board workstations developed within the UK by the Raspberry Pi Grounds. As it could be a terribly tiny in size nonetheless powerful and low-priced pc. It's warmly tailored to AI and completely different embedded system project. It's a Linux base pc and with Raspbian OS, it supports technologies like Apache, MySql, PHP, and principally all backend servers.[1] Actually, our designed system required to host into a backend internet server in a very efficient means and conjointly to store the previous states of the devices. Raspberry Pi is chosen as a result of it will serve all.[9]

3.1.2 VNC

Sometimes it's not convenient to work directly on the Raspberry Pi. Perhaps you'd wish to work thereon from another device by remote. You will see the desktop of the Raspberry Pi within a window on your pc or mobile device. You will be able to management it like you were performing on the Raspberry Pi itself.[4]

Received: 22 Feb 2020 | Revised: 13 Mar 2020 | Accepted: 05 Apr 2020

3.1.3 Firebase Server

The application on base of operations is maintained even the interruption of net association. Once the information square measure writes to the cloud, it'll be store at the native info of base of operations. Once the web is reconnected, client's activities are going to be updated straightaway and synchronous the server promptly.[7]

3.1.4 Mobile Application

We have a mobile app related to the project that is employed to regulate the house automation. The app employs the use of buttons to control as well as have the voice controlled feature in it. The app also incorporates the time feature.

3.1.5 Connection between Hardware and Application

The association between Raspberry pi, [8] and therefore the application is finished via the base of operations server. The user uses the appliance to regulate the appliances. All the inputs received within the application square measure sent to the base of operations server, and as presently because the raspberry pi software system detects a modification within the Firebase Server it detects that so changes the controls mechanically.

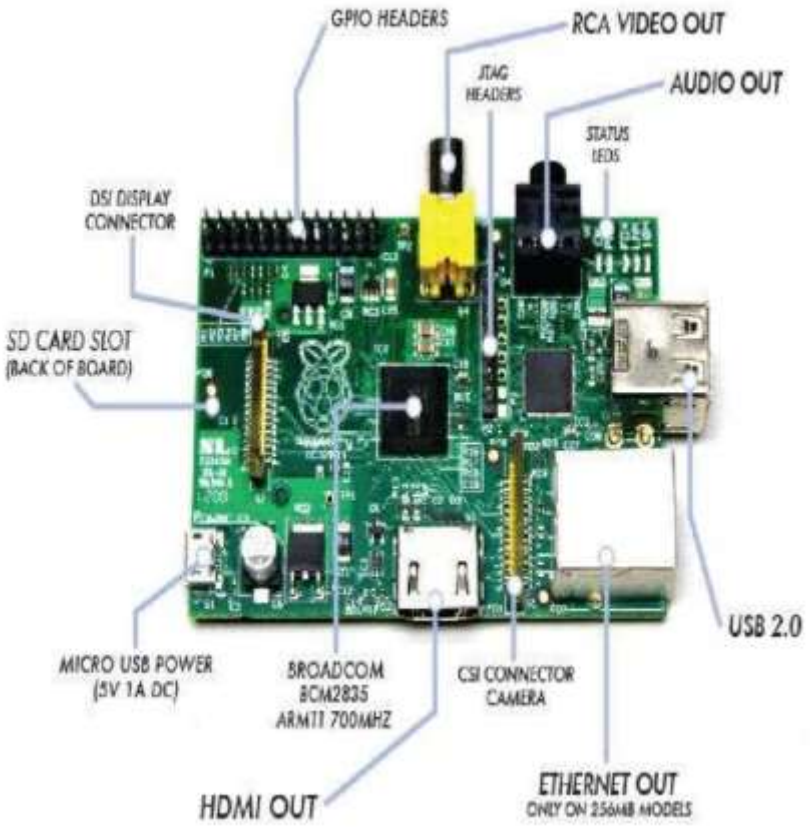

Figure 3.2: Raspberry Pi

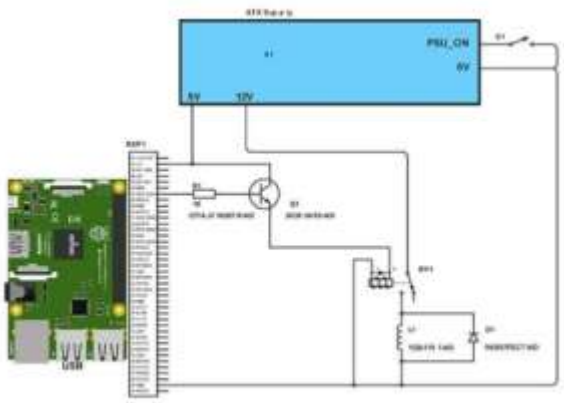

Figure 3.3: Architecture Diagram

1. RESULTS

Figure 4.1: App Screenshot 1 (Initial State)

The figure 4.1 shows the initial state of the home automation screen. The user can interact with the system through this module. By touching the button “switch on”, the user can switch on the system.

Figure 4.2: App Screenshot (On state)

The figure 4.2 shows the on state of the home automation system. Now the system is in on state. By touching the button "switch off", the user can switch off the system.

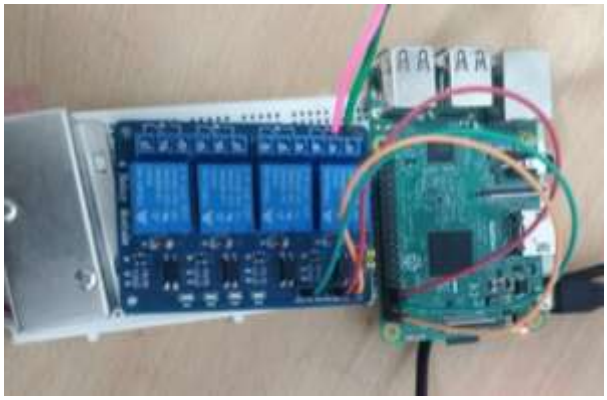

Figure 4.3 : Working Model

The figure 4.3 is the working model of the home automation system.

IV. CONCLUSION

The home automation system has been through associate degree experiment verified to work satisfactorily by connecting sample appliances to that and conjointly the appliances were successfully controlled from a wireless mobile device. We learned many skills such as soldering, wiring the circuit and other tools that we used for this project. Raspberry pi and the mobile app are connected using a VNC and raspberry pi performs the operation given to it by the mobile app and switch on and switch off the device respectively along with keeping in mind to save energy by the timer feature incorporated in the mobile app.

REFERENCES

1. Kalyani Pampattiwar, Mit Lakhani, Rinisha Marar and Rhea Menon, Home Automation using Raspberry Pi controlled via an Android Application, International Journal of Current Engineering and Technology, vol. 7, no. 3, pp. 962-967, 2017.
2. Kalyan Kumar Jena, Sourav Kumar Bhoi, Pabitra Kumar Maharana, Prabhas Ranjan Das and Prabin Kumar Senapati, A Smart and Secure Home Automation System Using IoT, Universal Review, vol. 8, no. 3, pp. 125-132, 2019.
3. Shaik Anwar and D. Kishore, IOT based Smart Home Security System with Alert and Door Access Control using Smart Phone, International Journal of Engineering Research and Technology, vol. 5, no. 12, pp. 504-509, 2016
4. Nareshkumar R. M., Apoorva Kamat andDnyaneshvari Shinde, Smart Door Security Control System Using Raspberry Pi, International Journal of Innovations & Advancement in Computer Science, vol. 6, no. 11, pp. 499-503, 2017
5. Chinmay Bepery, Sudipto Baral, Animesh Khashkel and Farhad Hossain, Advanced Home Automation System using Raspberry-PI and Auduino, International Journal of Computer Science and Engineering, vol. 8, no. 2, pp. 1-9, 2019.
6. Akshay Mewada, Ayush Mishra, Manoj Gupta, Rahul Dash ND Nilofer Mulla, Voice Controlled Home Automation, International Journal of Advanced Research in Computer Science and Software Engineering, vol. 6, no. 3, pp. 161-164, 2016.
7. Neha, Sonipriya, Md. Parvez, N.M.Fatima and Rakesh Marturkar, Arduino Based Voice Controlled Home Appliances Using Bluetooth, International Journal of Innovative Research in Computer and Communication Engineering, vol. 5, no. 4, pp. 459-462, 2017.
8. Sushant Kumar and S.S Solanki, Voice and touch control home automation, IEEE Proceedings of the 3rd International Conference on Recent Advances in Information Technology (RAIT), 2016.
9. Paul Jasmin Rani, Jason Bakthakumar, B. Praveen Kumaar, U. Praveen Kumaar amd S, anthosh Kum, Voice controlled home automation system using Natural Language Processing (NLP) and Internet of Things (IoT), IEEE Proceedings of the Third International Conference on Science Technology Engineering & Management (ICONSTEM), 2018.

Received: 22 Feb 2020 | Revised: 13 Mar 2020 | Accepted: 05 Apr 2020