DESIGNING OF SMART SWITCH FOR HOME AUTOMATION

Abhijit Shejal[1], Amit Pethkar[2], Akash Zende[3], Pratyusha Awate[4,] Prof.Sudhir.G.Mane[5]

[1,2,3,4]*Department of Electrical Engineering, ZCOER Pune, Maharashtra, India*[1234]
[5]*Assistant Professor, Department of Electrical Engineering, ZCOER Pune, Maharashtra, India*[5]

---***---

Abstract:- *The aim of this project is to control our daily home appliances wirelessly to make life simpler using android devices and applications. We are using android device and applications to control the home appliances through manually and automatically. Ahead we will be using sensors and temperature sensors for making it more efficient and convenient. Sensors which are used has different values and algorithms which helps to save the power consumption. And this project is cost and manpower saving.*

Keywords:- Wi-Fi module, Ada-fruit, smart phone, ESP8266.

1. INTRODUCTION:-

The project leads to an enhancement of home automation by using Ada-fruit server and Wi-Fi technology. The home devices can be operated and sensors can be read through PC, tablets, mobiles or Wi-Fi. Automation is taking place in common day to day life as compared to older days of manual ON/OFF procedures. It also reduces the tragedies like electric sparks and short circuit. With the help of Wi-Fi technology automations adds the values and used for controlling the home appliances. Wi-Fi uses the radio frequency for signaling purpose to transfer its data wirelessly with the speed of 1 Mbps to 3 Mbps. It has 2.4 GHz frequency and range is 10-50 meter. Smart switch is master switch which controls the home appliances. End user can install and register the applications in their smart phone using Wi-Fi. Also switch can be operated through PC. Then they can manage their electric appliances in a convenient way. This switch operated by three methods:-

1. By using smart phone application.
2. by voice recognition.
3. by manual operation.

For the failure of operation of the smart phone application and voice recognition there is the option of the manual operation.

2. LITERATURE SURVEY:-

This project uses the android application which is directly associated with Ada-fruit sever and end user can control their home appliances like fans, lights etc. Smart home system for physically disabled people via Wi-Fi module as the medium to control and monitor home appliances [1]. User can give commands through smart phone and which will transmit the information through MQTT application. Then ESP8266 Wi-Fi module recognizes the specified command, and controls the home appliance switches in the wireless frequency manner to achieve remote control of appliances ultimately [2].

3. MOTIVATION:-

The best motivation this project reveals that a handicap user can also control all his/her home appliances without moving in any of the aspect. For handicapped people it is essential to develop home automation system which required less and easy user interaction. This project made a different platform for disable user as they are equally functioned as like a normal person. Home automation provide them a low cost and flexible environment.

4. METHODOLOGY:-

Through Android phone signals are send to Wi-Fi module in the same network. Android application has all the GUI (Graphical User Interface) buttons for each appliances. Wi-Fi module gets the signal from smart phone application each command is processed by Wi-Fi module and control the relay board for switching on/off the appliances. At the last end user can easily access the home appliances through command using Google assistance which is connected to ESP8266.

4. OBJECTIVES:-

The main aim of this project is to develop home automation system which provides the whole control to normal and disabled users to access the home appliances manually and wirelessly. The Smart Switch will have the ability to be controlled from a mobile, computer through the internet with an android mobile based application. And also manually. Those switches are operated via internet access or without internet access. [1]
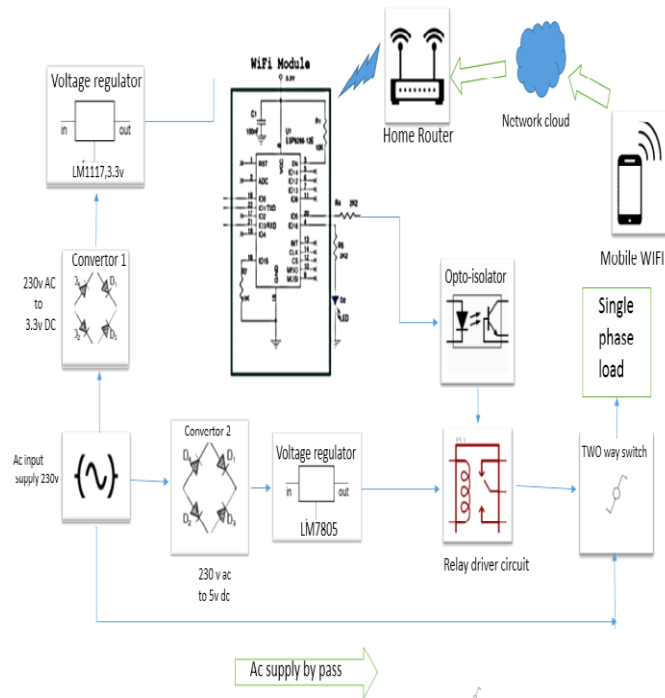
5. FUNCTIONAL DIAGRAM:-

Fig.5.1.functional Diagram of Smart Switch

6. HARDWARE IMPLEMENTATION:-

Hardware setup will consist of ESP8266 Wi-Fi module. It has function with wireless communications for that we have used Wi-Fi module. We have loads that are bulbs and other home appliances. [2]

6.1 ESP8266 WI-FI module:-

Fig 6.1 ESP8266 WI-FI module

Fig 6.1 Shows the ESP8266 Wi-Fi Module. This module contained SOC and TCP/IP protocols that provide access through Wi-Fi network. And comes with preprogrammed and set firmware. ESP8266 is flexible and reliable, cost effective board.
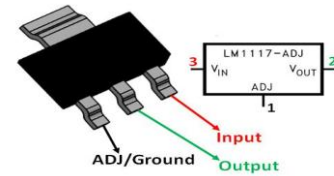
6.2 voltage regulator (LM1117):-

Fig 6.2.voltage regulator (LM1117)

Fig.6.2 shows the voltage regulator (LM1117)**.** It is used to regulate the output voltage.
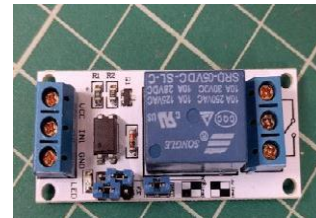
6.3 Relay Driver Circuit:-

Fig.6.3.relay driver circuit

Fig.6.3 shows internal structure of relay driver circuit. Relays are the device which has a pair of movable contact from an open position to a close position and it use the electromagnet. Relays consumes very less power, but the relay itself can be used to control motors, heaters, lamps or AC circuits which themselves can draw a lot more electrical power.
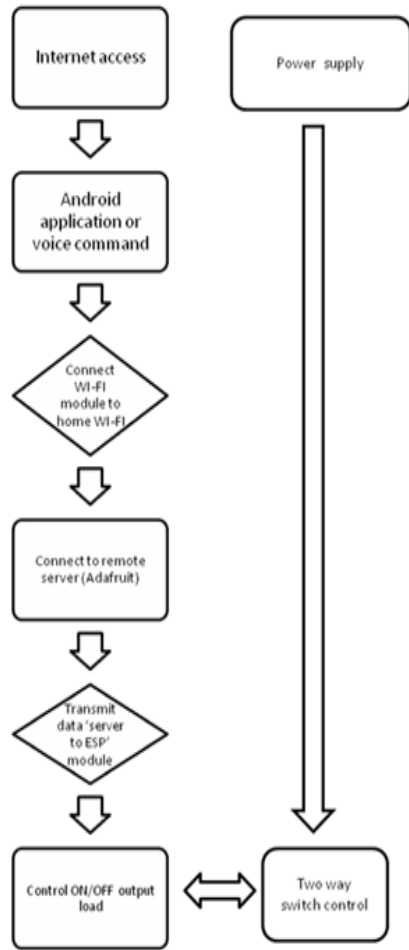
6.4 Converter Circuit:-

Fig6.4. SMPS power supply (230v AC-5VDC)

Fig .6.4 Shows, the transformer which is converting 230V AC to 5V DC. As the devices which are used in this project it requires less power than the SMPS power supply that is 5V DC that's why converter is used as it converts the 230V AC to 5V DC as required.

8. ALGORITHM:-

9. SYSTEM SNAPSHOT:-

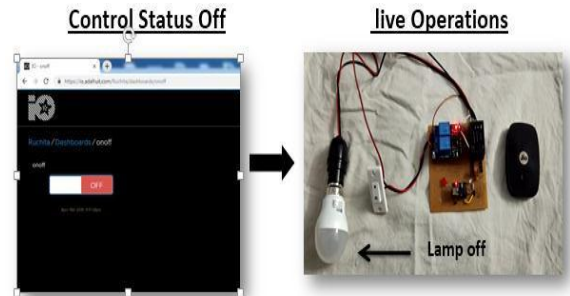9.1 Operation when system in off:-

Fig 9.1. Operation when system in off

Fig.9.1 shows the off position of the lamp for the command by the mobile application.
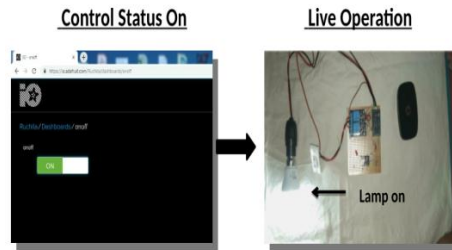
9.2. Operation when system in on:-

Fig 9.2. Operation when system in on

Fig.9.2 shows the on position of the lamp for the command by the mobile application.

10. SMART SWITCH DESIGN:-

Fig.10 Diagram of Smart Switch.

7. ADA-FRUIT:-

Ada-fruit is an open source prototype platform which provides easy uses of hardware and software. MQTT is a protocol for device transmission and receiving signals to that Ada-fruit I/O supports. With the help of MQTT client can subscribe to feed to send and receive the feed data with Ada-fruit I/O's. You can publish a new value for a feed to its topic, or you can subscribe to a feed's topic to be notified when the feed has anew value. Any one of the following topic forms is valid for a feed:-

- (username)/feeds/(feed name or key)
- (username)/f/(feed name or key)

Procedure to run Ada-fruit:-

1. Download Arduino IDE code, example Adafruit_MQTT_ESP8266.
2. Dashboard Settings.
3. Connection test ESP8266 and Adafruit.IO.
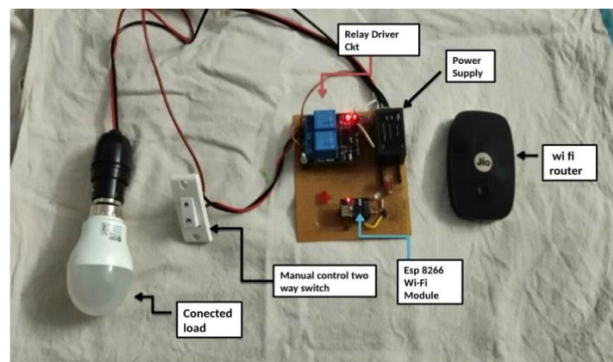
Fig.10 shows Diagram of Smart Switch. It shows various components are used is the system.

11. FUTURE SCOPE:-

Now a day's technology is blooming day by day and the demand of the user also increasing accordingly. This affects the response and time of the user so this home automation is an efficient system which change the area of function of usage. The project which is to be implemented is a home automation using easy IOT Web server and Wi-Fi and has very good future development. The web server are installed on the PC and home appliances can be operated by the device which has web server installed. Web server can also be install on cloud to easily access through our PC or tablets using Wi-Fi or internet. To visit the cloud server IPs need to actioned on browsers.

12. CONCLUSION:-

In proposed model the accuracy of Implementations meets the expectation. This home automation system works according to user needs and demands and also the modes of function works as desired during the implementation. User need to give respective commands through his/her smart phone and the system works according to assigned algorithm. This project is flexible and user friendly and easy to use. So it can be said that this system has higher accuracy with great efficiency.

13. REFERENCES:-

1. Z. Alkar and U. Buhur, "An Internet based wireless home automation system for multifunctional devices", Consumer Electronics, IEEE Transactions on, vol. 51, **(2005)**, pp. 1169-1174.
2. El Shafee and K.A.Hamed, "Design and Implementation of a Wi-Fi Based Home Automation System", World Academy of Science, Engineering and Technology, **(2012)**, pp. 2177-2180.
3. R. T. Fielding and R. N. Taylor, "Principled design of the modern web architecture", Software Engineering, Proceedings of the 2000 International Conference, **(2000)**, pp. 407-416.
4. B.Park," Mobile-IP based Architecture for Smart home," International Journal of Smart Home, vol 6 **(2012) 29-3.**