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# Web Server Based Home Automation System Using Internet of Things

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**ABSTRACT:** With advancement of Automation technology, life is getting simpler and easier in all aspects. In today's world automatic systems are being preferred over manual system. With the rapid increase in the number of users of internet over the past decade has made Internet a part and parcel of life, and IoT is the latest and emerging internet technology. Internet of things is a growing network of everyday object-from industrial machine to consumer goods that can share information and complete tasks while you are busy with other activities.

Wireless Home Automation system (WHAS) using IoT is a system that uses computers or mobile devices to control basic home functions and features automatically through internet from anywhere around the world, an automated home is sometimes called a smart home. It is meant to save the electric power and human energy. The home automation system differs from other system by allowing the user to operate the system from anywhere around the world through internet connection.

**KEYWORDS:** IoT (Internet of Things), Wireless Home Automation system (WHAS), Smart Home

## I. INTRODUCTION

In recent years, wireless systems like Wi-Fi have become more and more common in home networking. Also in home and building automation systems, the use of wireless technologies gives several advantages that could not be achieved using a wired network only. Many existing, well-established home automation systems are based on wired communication. This does not pose a problem until the system is planned well in advance and installed during the physical construction of the building. But for already existing buildings the implementation cost goes very high.

Our project in here is to make some of these tasks easy and seamless, the most basic things that we do in our household or our workplace is to turn on/off the lights and fans or any other appliance that is essential. We are going to make it happen by a Web Server based open-source electronics platform using ARDUINO ESP32. This microcontroller is inexpensive, easy to use and has a generous number of digital I/O ports, and a few analog inputs as well. Homes of the 21st century will become more and more self-controlled and automated due to the comfort it provides, especially when employed in a private home. A home automation system is a means that allow users to control electric appliances of varying kind. Connectivity with storage and real-time data feedback are few things if attached to any technology makes it very easy to control and gives easy accessibility to any manual work, that is where this Web server based home automation stands and IOT with cloud connection creates an interconnected environment where the appliances and sensors can be controlled from anywhere. For all these reasons, wireless technology is not only an attractive choice in renovation and refurbishment, but also for new installations.

## II. RELATED WORK

### 1. Sirsath N. S, Dhole P. S, Mohire N. P, Naik S. C & Ratnaparkhi N.S

This project proposes a Home Automation system that employs the integration of multi-touch mobile devices, cloud networking, wireless communication, and power-line communication to provide the user with remote control of various lights and appliances within their home. This system uses a consolidation of a mobile phone application, handheld wireless remote, and PC based program to provide a means of user interface to the consumer.

### 2. Basil Hamed

The main objective of this Paper is to design and implement a control and monitor system for smart house. Smart house system consists of many systems that controlled by LabVIEW software as the main controlling system in this paper. Also, the smart house system was supported by remote control system as a sub controlling system. The system also is connected to the internet to monitor and control the house equipment's from anywhere in the world using LabVIEW.

### 3. Deepali Javale, Mohd. Mohsin, Shreerang Nandanwar

The prime objective of this paper is to assist handicapped/old aged people. It gives basic idea of how to control various home appliances and provide a security using Android phone/tab. The design consists of Android phone with home automation application, Arduino Mega ADK. User can interact with the android phone and send control signal to the Arduino ADK which in turn will control other embedded devices/sensors.

### 4. Mamata Khatu, Neethu Kaimal, Pratik Jadhav and Syedali Adnan Rizvi

They presented a paper on the implementation of Internet of things for home automation. This paper mainly focused on IoT coverage that connects all the variety of objects like smart phone, tablets, digital cameras and sensors in the internet and thus provides many services and huge amount of data and information. They also focused on Cloud computing, Cloud based platform help to connect the things that surrounds as so that we can easily access anything at any time and in any place. They have illustrated sensing as a service on cloud by using certain application like Augmented Reality, Agriculture, Environment monitoring etc. and finally they have proposed a prototype model for providing sensing as a service on cloud.

## III. METHODOLOGY

Automation of a device has a wide scope for this Generation as well as in forthcoming generation. In this wide scope, Mobile communication technology is playing a major role in the world of automation. This article is fully based on low cost and reliable home control monitoring system for accessing and controlling devices and appliances remotely using Android based Smart phone application.

While using this technology the system improves: The living standard at home ,Reduces human effort ,Energy efficient, Time saving. Thus make a smart home and also it was very helpful for providing support to disabled people and fulfil their needs in home and thus they lead a normal life. The proposed systems consist of android mobile, Arduino Uno board, Wi-Fi module and a relay circuit. We are using Wi-Fi technology to monitor the device because of its accuracy, high range and instant connectivity. This module controls the home appliances with a very ease of installation and it is user friendly.

#### IV. EXPERIMENTAL RESULTS

Implementation is the stage of the project when the theoretical design is turned out into a working system. Thus, it can be considered to be the most critical stage in achieving a successful new system and in giving the user, confidence that the new system will work and be effective. The implementation stage involves careful planning, investigation of the existing system and its constraints on implementation, designing of methods to achieve changeover and evaluation of changeover methods.

There are 5 main modules of this project:-

- With Internet Function
- Real-time Feedback
- Without Internet Function
- Application Module(Includes Cloud)
- Voice Assistant Module

##### 4.1 With Internet Function

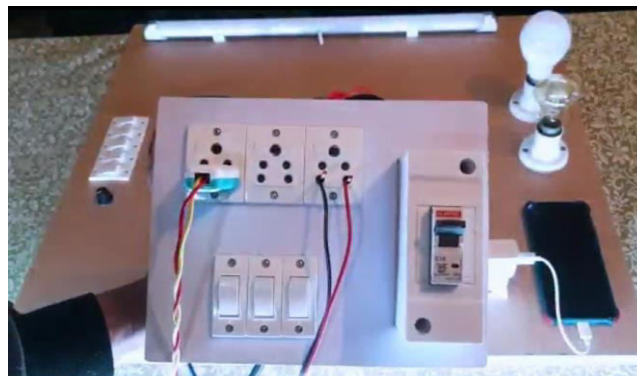


Fig4.1.1: Switching the main circuit on.

Now since we switched on the main circuit and switched on the Wi-Fi router the project microcontroller i.e. ESP32 will connect to the internet and cloud connection will establish. After establishing the connection the with internet function will execute and following process will begin:-

**A. Switching on tube light [LOAD 1]**

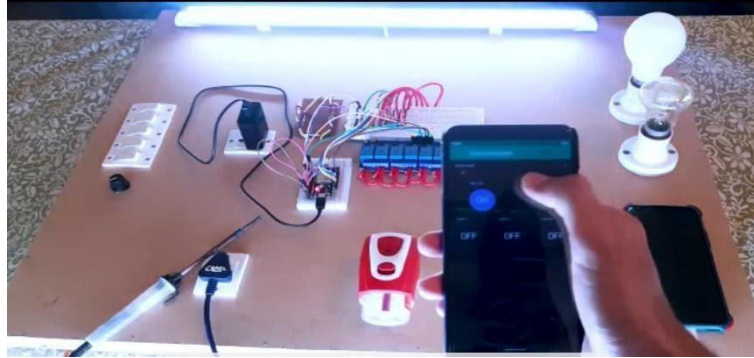


Fig4.1.2: Switching the tube light on.

The Blynk app is used to switch on the tube light and at the same time it is connected to the cloud so it switch ons the Tube light after user clicks on tube light switch. Here the relay number 1 is in use.

**B. Switching on light bulb [LOAD 2]**

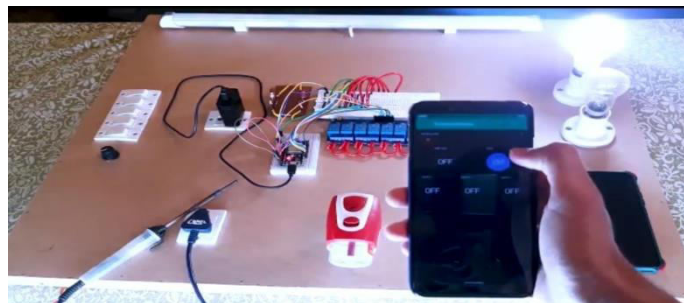


Fig 4.1.3: Switching the light bulb on.

The Blynk app is used to switch on the light bulb and at the same time it is connected to the cloud so it switch ons the light bulb after user clicks on light bulb switch. Here relay no 2 is in use.

**C. Switching on Socket 1 [LOAD 3]**

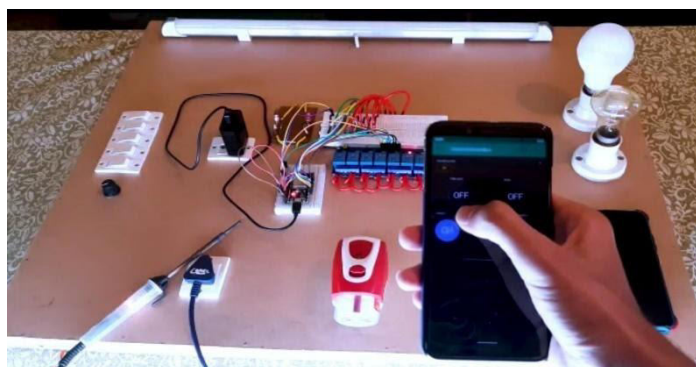


Fig4.1.4: Switching the Socket 1 on.

The Blynk app is used to switch on the Socket 1 and at the same time it is connected to the cloud so it switch ons the Socket 1 after user clicks on Socket 1 switch. Here relay no 3 is in use.

**D. Switching on Socket 2 [LOAD 4]**

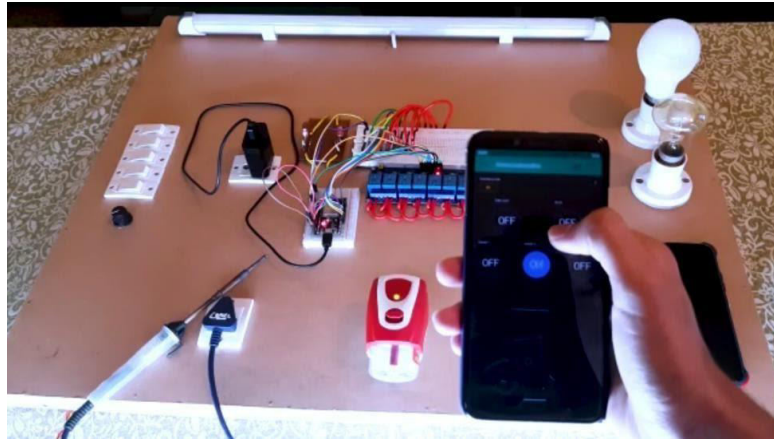


Fig4.1.5: Switching the Socket 2 on.

The Blynk app is used to switch on the Socket 2 and at the same time it is connected to the cloud so it switch ons the Socket 2 after user clicks on socket 2 switch. Here relay no 4 is in use.

**(E) Regulating Dimmer manually and Getting Real time Feedback**

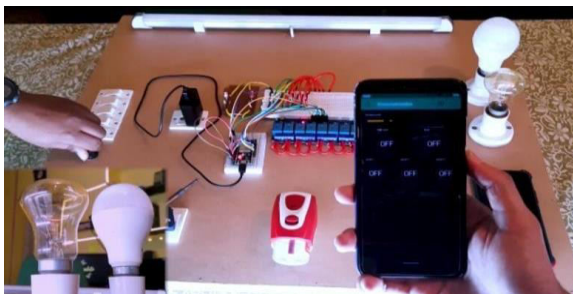


Fig 4.1.6 Power 1 on manual Dimmer with RTF

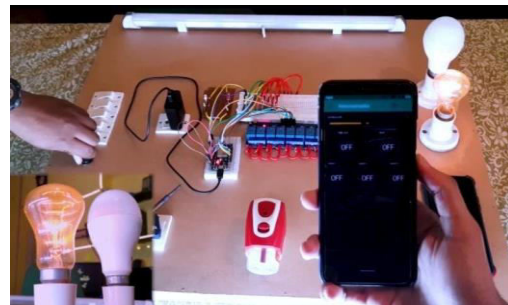


Fig 4.1.7 Power 2 manual Dimmer with RTF

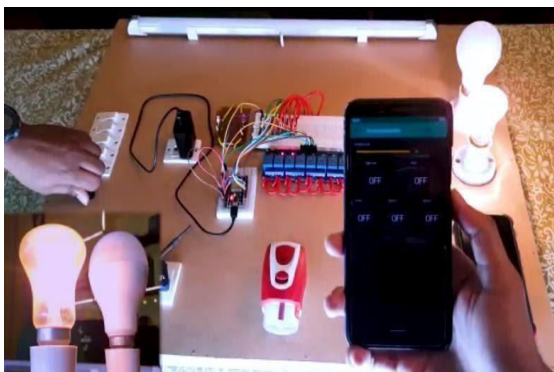


Fig 4.1.8 Power 3 on manual Dimmer with RTF

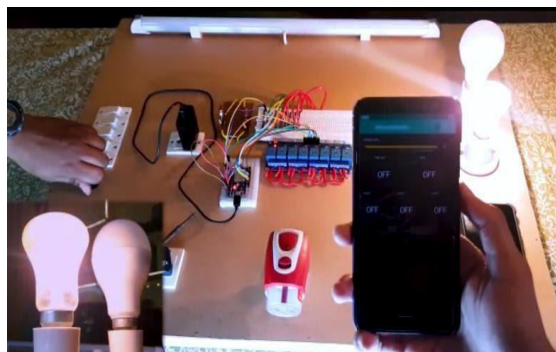


Fig 4.1.9 Power 4 manual Dimmer with RTF



In the project there is manual knob called as fan regulator is attached which controls dimmer manually and as the project microcontroller i.e. NODE MCU ESP 32 Wroom, is connected to the internet and cloud so as the knob is rotated in clockwise direction the dimmer starts getting power in ascending order and at the same time the cloud is also getting updated and showing real time feedback to the Blynk Application, as we can see in the given figures above.

#### IV. CONCLUSION

Today, Android is the world's powerful mobile platform open-source operating system to fit easily whatever the functionality we had in our mind. This article is about wireless home automation using Android mobile helps you to implement such a fantastic system in our home at a very reasonable price using cost-effective devices. Thus, it overcomes many problems like costs, inflexibility, security etc. In addition, will provide greater advantages like it decrease our energy costs, it improves home security. In addition, it is very convenient to use and will improve the comfort of our home.

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