# Controlling a Terminal via Internet

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***Abstract-*** *Advancement in Automation technology, life is getting very simple and easier in all aspects. In today's world Automatic systems are mostly 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 Internet of Things (IoT) is the latest and emerging Internet technology. IoT 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. 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.It's meant to save the electricity and human energy. This home automation system differs from other system by allowing the user's to operate the system from anywhere around the world through Internet. In this project we control a terminal using Arduino to provide the user with wireless control of various lights, fans, and appliances within home. This system is designed to be cost efficient and expandable allowing a variety of devices to be controlled.*

***Keywords***- Automation Technology, Internet of Things,Arduino, Computers, Mobile devices

## I. INTRODUCTION

Home automation refers to handling and controlling home appliances by using Android application and web services. If user is far away from home, he can access and change status of appliances i.e. switches it on/off. User can use PC or Android smartphone. This paper will describe the approach of controlling home appliances by using web server.The main objective of the project is to develop a Home Automation system using Android application and web server using Internet. In recent times, houses are also getting smarter (i.e.) Modern houses shifted from traditional switches to centralized control system, involving wireless controlled switches.

Presently, Traditional wall switches present in different places of the house makes it difficult for the user to operate them. It becomes more difficult for the physically impaired people to do so. Proposed System will provide a simpler solution by use of Android application and web server.

Android application and web services are achieved by any smart-phone/Tablet etc., with Android OS, the system provides a Graphical User Interface (GUI) based touch screen operation. In order to achieve this, Android application act as transmitter, which sends ON/OFF data to the receiver where loads are connected. By operating the specified remote switch, the loads can be turned ON/OFF remotely through Internet.

## II. DESCRIPTION

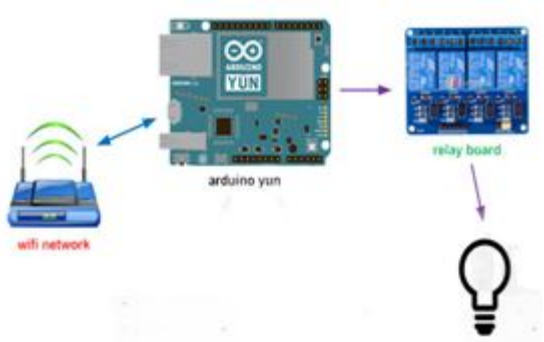


Fig.1 Home Automation System

The Arduino Yun is either connected via Wi-Fi or it's connected via Ethernet to provide internet supply for the board. A relay board is connected with Arduino Yun to control the output devices. The electrical appliances are triggered using the relay board. The relay board connected with phase through its com port and load is connected with either normally open (NO) or normally closed (NC) port.

## III. OVERALL ARCHITECTURE

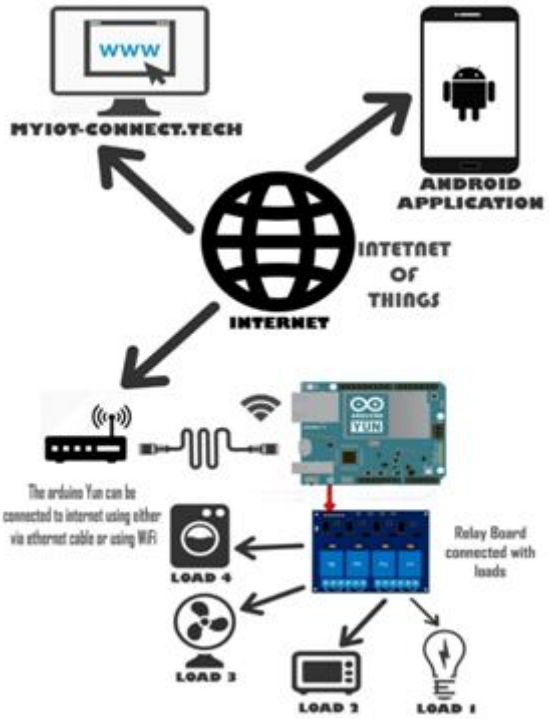


Fig. 2 Core Architecture

The above figure Fig.2 represents the Core Architecture. It shows entire working of the system and its modules. Using the Internet, we can control devices through Android application or Website. Any of the above two (Android application or Website) based on our choice, sends the data through the Internet which is received by the Arduino board. It is connected to the Internet by using either Ethernet Cable or Wi-Fi.The Arduino is an open source development board and which is used to control the devices connected to it.The devices are connected with the help of relay. The relay is an electrically operated switch which is used to turn ON/OFF the electrical appliances. The Arduino triggers the relay based on the information fetched from the web server. To fetch the data from the web server the Arduino use a PHP (Hypertext Preprocessor) which is an open source scripting language.

The devices connected with the Arduino which can be controlled by website. The website is implemented using HTML 5, CSS and Java Script. The HTML is used to display the web contents and the CSS is used to apply styles for the web page. A PHP file is used to fetch the values from the web page and then writes the value to a text file. The text file which holds the device information such as which device is need to be turned ON and which is to be OFF. Finally the designed web page is hosted to a public domain so that the website is visible throughout the internet.

An android application is developed to control the devices connected to the Arduino. This application uses a concept called 'webview'. By using this application it allows the user to control the devices from the smartphone. Simply the application needs the internet connection to control the connected device.

## IV. IMPLEMENTATION

### A. Selection of Relay

The selection of the relay depends upon the number of devices to control. If it is going to control only one device, then single-channel relay is well enough. But if the output devices need to be controlled is going to be more than one means then use 4 channel relay, 8 channel relay or 16 channel relay. So the selection of the relay is depends upon the requirements of devices to be controlled. Proposed system uses 4 channel relay board to control 4 different devices.

### B. Preparing the Arduino Yun

To control the output devices (electrical appliances) the Arduino Yun requires the support of relay board. The Yun simply triggers the relay using dc (direct current) supply to turn on/off the output devices that are connected with the relay. For that purpose, the proposed system uses 4 GPIO (general purpose input output) pin in the YUN to connect with relay and chosen pins are 2, 4, 7 and 8.

### C. Connecting Arduino Yun with Relay

| Arduino Yun | Relay |
|---|---|
| Pin no 2 | IN1 |
| Pin no 4 | IN2 |
| Pin no 7 | IN3 |
| Pin no 8 | IN4 |
| +5v | vcc |
| Gnd | Gnd |

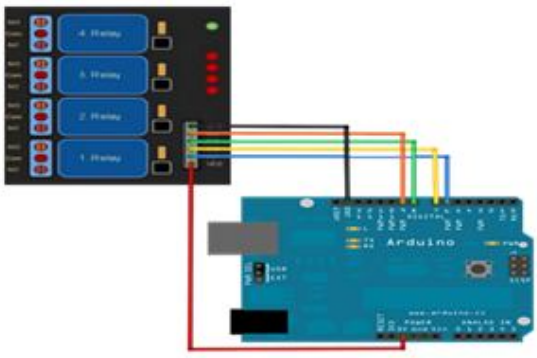

Fig. 3Arduino connected with Relay

**D. Uploading the code to Arduino**

The code consists of 3 parts:

- Connect with web server.
- Set selected GPIO as output pins.
- Fetch data from web server and process according to it.

To upload the code the requirements are, Arduino IDE, USB cable to connect the board with system.


Fig. 4 Arduino IDE

**E. Connecting the electrical devices with relay and two - way switch**

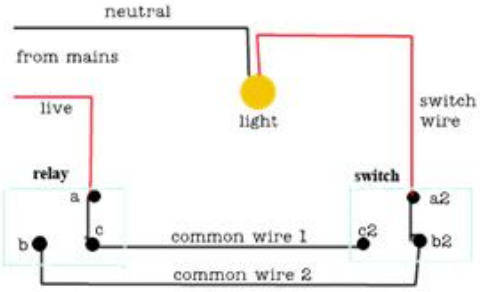


Fig. 5Relay with 2 way switch connection

In case of internet failure and to control the output devices manually the 2-way switch is given. With help of the switch we can do the normal turn on/off operation to the output device.

**F. Creation of website to control the devices**

To control the devices, the system consist of a simple user friendly Website. It is designed by using HTML, CSS, JavaScript and PHP. Finally the website is uploaded in public domain by getting domain space from GODADDY web service provider. The Developed Website runs on the Linux server which is capable of executing apache which is must in order to run PHP services. Tools Used to develop the Website are Brackets Editor and XAMPP (which will run our system as a Local Server).

**G. Creation of android application**

To control the devices in other way, A Simple Android Application which resembles developed Website is done by using a concept called WEBVIEW. Through simple interface, users can either Turn ON/OFF the devices easily. Based on the user selection the Data is sent to the Web Server which is running 24*7 from where the Arduino board will read data and send signals (based on the data received) to relay which will practically Turn ON/OFF the connected devices.

## V.CONCLUSION

Home automation is not a new industry anymore, but it is still an emerging industry in developing countries. The huge potential market leads many electronics corporation into home automation. Sony, Siemens and even Apple Company are trying to share a market of home automation.The automation using Internet has been proven to work satisfactorily by connecting appliances to it and the appliances were successfully controlled remotely through the internet. Even if the Internet is not there and if users are at home, we also provide an option to Turn ON/OFF the devices directly through Switch.

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