

# Using Raspberry Pi IOT Home Automation

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**Abstract**-Internet of things is a technology of the future that has already started to touch our homes. The proposed system consists of a microcontroller-based circuit that has lights and fan connected to it along with Wi-Fi connector interfaced with our system. The user gives input commands through the smart phone which is interfaced with Wi-Fi connector in the circuit which is interconnected to microcontroller and Loads are operated remotely. This microcontroller is raspberry pi which is programmed to do switching operation of load. Thus we automate home appliances over internet using raspberry pi.

**Keywords**-Internet of things, Home Appliances Control, raspberry pi, Automation

## I. INTRODUCTION

With the development of Technology and continuous improvement of people's living standard, people are in pursuit of automated, intelligent and convenient home control systems. At present, PC is used as the remote control terminal for most home control systems; however, there are some problems in the PC monitor terminal, such as its great bulk, inconvenience to carry, high cost, limited monitoring range and so on. Therefore, it's a good choice to design a terminal based on phone. With the popularity of smart phones, particularly, the phone based on Android system is rapidly developed.

At its I/O developer conference, Google showed a sneak preview of its Android Home project, which will extend the Android platform into household objects. It means that the remote control based on Android phone will become a mainstream way. After logging into the control interface, users can easily control the lights, TVs and air conditionings anytime, anywhere, which brings great convenience to people and improves the quality of life.

## II. RELATED WORK

Smart Home System for Disabled People Via Wireless Bluetooth gives moneywise concept by using GPRS as the medium to control and monitor home appliances. Design and Realization of Home Appliances Control System Based on The Android Smartphone present the information about the remote appliances control system based on the Android smart phone is designed and realized. A user logs into the smart phone interface, and clicks the buttons gently to send message commands which will be transmitted to home information Centre through the communication network. Then the Raspberry pi microcontroller recognizes the specified command, and controls the home appliance switches in the wireless radio frequency manner to achieve remote control of appliances ultimately.

Exploiting Bluetooth on android mobile devices for home security application present the information about mobile device has been integrated into our everyday life. Home automation and security are becoming increasingly prominent features on mobile devices the mobile device and security system communicates via Bluetooth because a short -range-only communication system was desired. With the help of android mobile we can control task such as locking the doors, turning on/off lights remotely. According to kaue, home automation can be useful to those who need to access home appliances while away from their home and can improve the lives of the disabled.

## III. HARDWARE DESCRIPTION

The Raspberry Pi is known as a single-board computer, which means exactly what it sounds like: it's a computer, just like a desktop, laptop, or smartphone, but built on a single printed circuit board. Like most single-board computers, the Raspberry Pi is small – roughly the same footprint as a credit card – but that doesn't mean it's not powerful: a Raspberry Pi can do anything a bigger and more power-hungry computer can do, though not necessarily as quickly.

The Raspberry Pi family was born from a desire to encourage more hands-on computer education around the world. Its creators, who joined together to form the non-profit Raspberry Pi Foundation, had little idea that it would prove so popular: the few thousand built in 2012 to test the waters were immediately sold out, and millions have been shipped all over the world in the years since. These boards have found their ways into homes, classrooms, offices, data centres, factories, and even self-piloting boats and spacefaring balloons.

Various models of Raspberry Pi have been released since the original Model B, each bringing either improved specifications or features specific to a particular use-case. The Raspberry Pi Zero family, for example, is a tiny version of the full-size Raspberry Pi which drops a few

features – in particular the multiple USB ports and wired network port – in favour of a significantly smaller layout and lowered power needs.

## IV. FIGURES AND TABLES

### 1. Block diagram

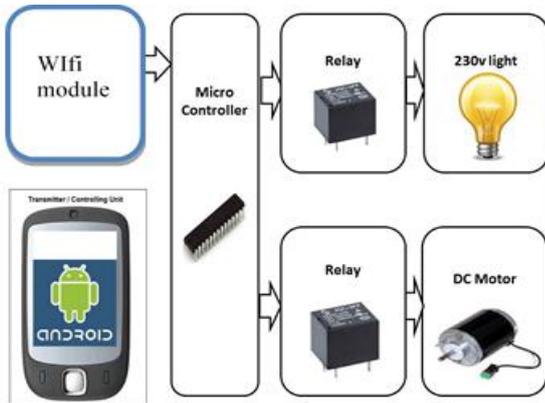
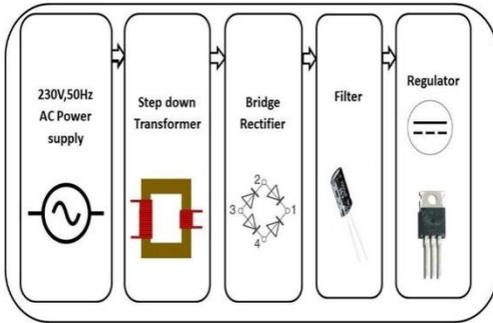


Fig. 1 Block Diagram.

### 2. Power Supply

A 5V regulated power supply system as shown below:

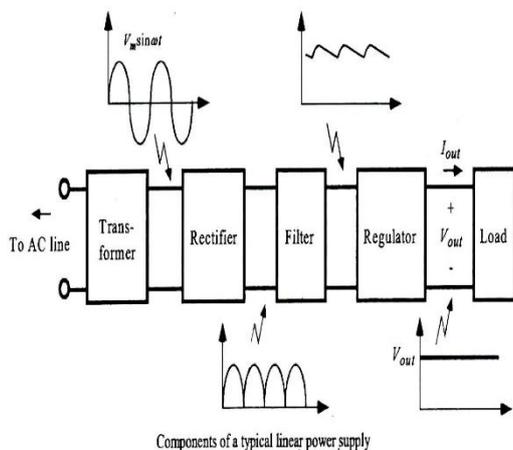


Fig. 2 ESP8266EX WiFi Module.

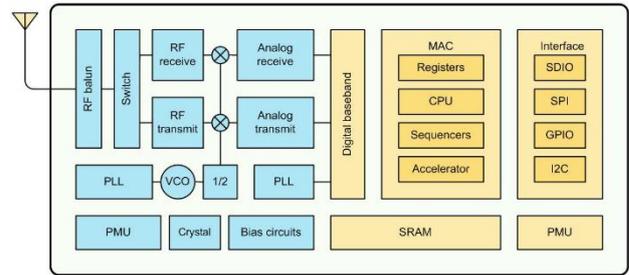


Fig. 3 LCD Pin Diagram



Fig.4 LED Display.

### 3. Pin Details

Pin Number	Name	Description
1.	Vss	Power Supply(GND)
2.	Vdd	Power Supply (+5V)
3.	Vee	Contrast adjust
4.	RS	0-Instruction Input1-Data Input
5.	R/W	Write data to LCDRead data from LCD
6.	E	Enable Signal
7.	D0-D7	Data bus line

### 4. Hardware Overview

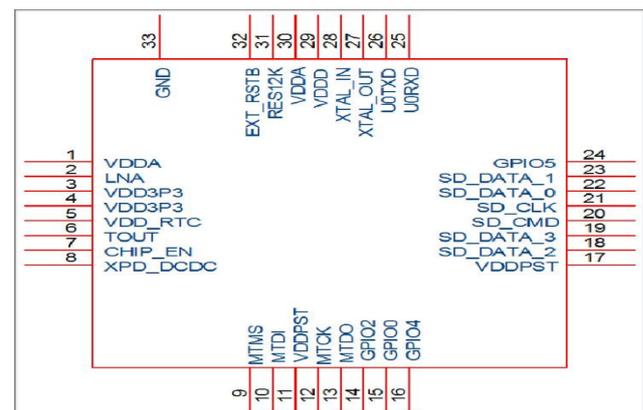


Fig. 5 Hardware Overview.

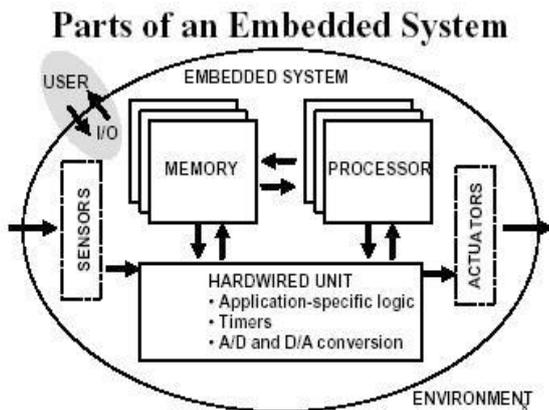
### 5. Embedded System

An Embedded System is a combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a specific function. A good example is the microwave oven. Almost

every household has one, and tens of millions of them are used every day, but very few people realize that a processor and software are involved in the preparation of their lunch or dinner.

If an embedded system is designed well, the existence of the processor and software could be completely unnoticed by the user of the device. Such is the case for a microwave oven, VCR, or alarm clock. In some cases, it would even be possible to build an equivalent device that does not contain the processor and software. This could be done by replacing the combination with a custom integrated circuit that performs the same functions in hardware. However, a lot of flexibility is lost when a design is hard-coded in this way. It is much easier, and cheaper, to change a few lines of software than to redesign a piece of custom hardware.

## 6. Overview of Embedded System Architecture



## 7. Android

Controlling a robot with a mobile device like smartphone or a tablet that runs Android OS must meet at least two conditions: to have an accelerometer and Bluetooth module. Almost all types and versions of mobile devices have included this type of sensors and communication technology. I said 'at least two conditions' because the imagination of users may exceed the boundaries of usually controlling methods in order to control robots in different ways like using sounds or using the visual robotic system. Even is used the accelerometer or the Bluetooth technology, an application has to be developed to run on the Android device. This application can be designed from scratch or using tools designed to build Android applications without any programming language skills. In the following are available kits and tutorials used for inspiration to build the application to control the robot.

## 8. Software description

Raspberry pi Studio 4 is a professional Integrated Development Environment (IDE) for writing and debugging Raspberry pi applications in Windows

9x/NT/2000/XP environments. This tutorial assumes that you have installed Raspberry pi Studio 4 on your computer. If you do not have Raspberry pi Studio yet, you may obtain a copy of Raspberry pi Studio 4 from one of 3 places:

- Atmel Corporation: <http://www.atmel.com>
- Raspberry pi Freaks: <http://www.raspberrypi.org/freaks>
- Borrow a CD from your instructor

## V. CONCLUSION

By designing the Android user interface and Home information Centre, home appliance control system based on the Android phone can be designed. It has combined android client, network transmission, and wireless switch, home information center to form a complete system, and the whole system works normally. Identifying message commands and wireless encoding are the two major tasks for home information center. Android phone have advantages such as humane interface, customizable and extendible applications and android phone is easy to carry so on. By constantly improving the control function, android phone allows us anytime, anywhere to control any device, and finally realizes the highly intelligent home.

## VI. FUTURE SCOPE

This project can be further developed by integrating it with the internet to monitor your home while sitting in a remote area. By doing this, one can keep an eye on his or her home through an internet connected to the user's mobile phone or PC or laptop. This will not only improve the security of your home in this modern day world but will also assist in conservation of energy like if you left any home appliance switched on by mistake, then you can check the status of the appliance on the graphical interface made on your mobile and can Switch it off using the internet connectivity.

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