

# Internet Based Home Automation

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**Abstract**—*In this advanced world it's time to live free and secure by keeping all these things in mind we made a project named "internet based home automation"*

*In this project we use mainly two circuits one is raspberry pi and another one is relay. We design a webpage to control GPIO pins of Raspberry PI. When we press an ON/OFF button on webpage then corresponding GPIO pin goes HIGH or LOW and the relay connected to this GPIO pin turns ON/OFF. In this way the device which is connected to relay turns ON/OFF.*

*In this project we made a circuitry that allow you to control home electrical devices such as fan, Air Conditioner, light etc. from anywhere in the world .It means distance from home you are presently is does not matter.*

*The whole circuitry of my project consumes very low power (1-3 watt). It also provides us the facilities to monitor or watch your home from wherever you are present. The size of complete circuitry is very compact (15cm x15cm). It can withstand temperature ranges from -40 to 86 C. It means that this circuit works properly in all weather conditions. Cost of this project is around Rs2500-3000 which means you can convert your ordinary home into fully automated smart home in Rs3000 only.*

*In short this project provides us facility to control home devices remotely, home security, save electricity by avoiding wastage of electricity, remote door locking and remote monitoring of home in affordable price to everyone.*

## 1. INTRODUCTION

Home Automation is an automatic control and monitoring of household appliance. It may include centralized control of lighting, HVAC (heating, ventilation and air conditioning), appliances, security locks of gates and doors and other systems to provide improved convenience, comfort, energy efficiency and security. This project develops a system that allows user to control home appliances from wherever he is & wherever he wishes.

Home automation can also provide a remote interface to home appliances or the automation system itself, to provide control and monitoring on a smartphone or web browser.

The system could also call the home owner on their mobile phone to alert them, or call the fire department or alarm monitoring company.

## 2. HARDWARE DESCRIPTION:

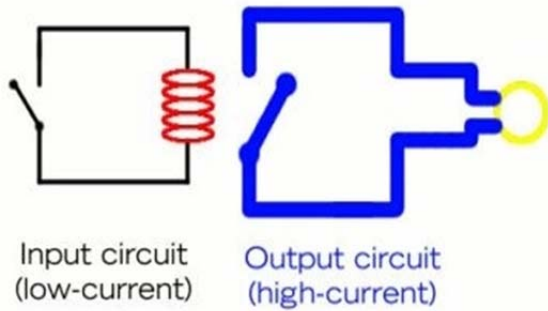
### 2.1 Raspberry Pi:

The Raspberry Pi is a credit card sized fully feature low cost minicomputer. It is a computer on a single low voltage chip. Python programming language is the default programming language of Raspberry Pi. In Raspberry PI 2 version has 40 GPIO pins which can be controllable by programmer of Raspberry PI. This circuit supports programming languages such as Python, C, C++, Java, Scratch, Ruby and all other programming language which will compile for ARMv7 for PI2 and ARMv6 for PI1. Raspberry PI takes very low power ranges from 1 watt to 3 watt. Voltage and current rating of Raspberry PI is 5V and 1Amp. Which we can easily provide with our mobile charger whose rating is same as required. In order to make our home page web server online we need working internet connection. There are 3 ways from which we can provide internet connectivity to our Raspberry PI circuit. First way is through MODEM second way is through WIFI and third way is through ETHERNET. Raspberry PI has 40 GPIO (General Purpose Input Output) pins which we can control through programmer. It consists of a SD card slot in which we can insert a SD card preloaded with Linux operating system. The program of Raspberry PI stores in SD card.

### 2.2 Relay circuit board:

A relay is an electrically operated switch. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits). In this project I prefer solid-state relay because Solid-state relays have fast switching speeds compared with electromechanical relays, and have no physical contacts to wear out.

A solid-state relay (SSR) is an electronic switching device that switches on or off when a small external voltage is applied across its control terminals. The relay may be designed to switch either AC or DC to the load. It serves the same function as an electromechanical relay, but has no moving parts.



Circuit diagram of RELAY

**3. SOFTWARE DESCRIPTION:**

**3.1 Programming:**

We have many choices in programming field to choose programming language. I prefer Python programming language in which I feel comfort to write a program. I choose Python programming language because the subscripts and debugging of this language is easy in comparison to other programming language.

**Example code** to ON/OFF of the relay connected to pin no. 40

```
sudo python
import RPi.GPIO as GPIO
GPIO.setmode(GPIO.BOARD)
GPIO.setup(40, GPIO.OUT)
GPIO.output(40, True)
GPIO.output(40, False)
```

**3.2 Webpage:**

For normal person it's nearly impossible to write a program line to ON/OFF the device. So there is a need of a webpage which can do the same job. In the page interface we provide ON/OFF button in front of every device name. When user click on the ON/OFF button on webpage then a command sends to the Raspberry PI circuit and corresponding device turns to ON/OFF.

**4. OPERATION:**

The operation of this project is mainly divided into two parts of operation. One is hardware and another one is software. At the hardware end the relay is connected to GPIO pins of Raspberry PI and device is connected to the relay circuit. In this project relay simply works as a switch which switches ON/OFF the connected device.

At the software end we have a webpage with security credentials to avoid hacking. Firstly when we enter webpage

address in internet browser of PC, mobile or any internet capable device then a login page open which ask for login detail and after entering right login information it opens a webpage which we design to control our home appliances. When we press ON/OFF button on this page then it sends a command signal to Raspberry PI circuit because webpage and Raspberry PI circuit are attached through a common server. After receiving a command signal the corresponding pin no. of Raspberry PI turns HIGH/LOW due to which relay connected to this pin no. also turns ON/OFF and at the last end the device connected to relay circuit also turns ON/OFF.

**5. ADVANTAGE:**

- Low cost-(2500-3000 Rupees).
- Ultra low power (1W-3W).
- Fan less and instant start up.
- Complete easy to programme.
- Qualified to stay under -40 degree centigrade to 86 degree centigrade.

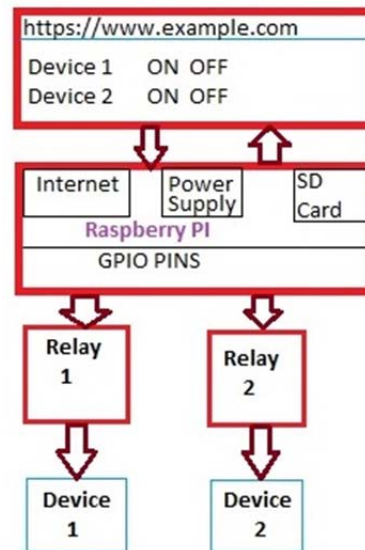
**6. DISADVANTAGE:**

Without having working internet it fails to control devices.

**7. APPLICATION**

- Home security system
- A fan or AC that turns on when the room gets too warm
- Facility to remote monitoring.
- Heater or blower that turns on when the room gets too cold
- You can recieve notifications through email or message, when your alarm has been armed/disarmed or tripped.

**8. BLOCK DIAGRAM**



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## 9. CONCLUSION

Home Automation is best solution to control and monitor home remotely. In home automation we can not only control home appliances instead of that we can program to control room lights and fans switched ON/OFF according to the presence of human in room with the help of sensors. Homeowners have complete control over the security of their homes, from programming sensors to alert them whenever a potentially dangerous event is about to occur to allowing them to ensure that every door has been locked. Through voice and sound recognition technology it provides facility for homeowners to control the electronic devices inside of their homes by merely uttering a sound or word.

## REFERENCE

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