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# IOT Based Web Controlled Home Automation Using Raspberry PI

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## ABSTRACT

The work is mainly concentrated on IOT based home automation using raspberry PI wireless home automation system using IOT helps us to control basic home appliances automatically through internet from anywhere around the world by using computers or mobiles. Now coming to this project the main objective is presenting a proposed system for smart home automation technique with Raspberry Pi using IOT and it is done by integrating cameras and motion sensors into a web application. To design this system, we are using a Raspberry Pi module with computer vision techniques.

Keywords : Internet of Things, Raspberry pi, Sensors, Relay.

## I. INTRODUCTION

Wireless home automation system using IOT helps us to control basic home appliances automatically through internet from anywhere around the world by using computers or mobiles. To design this system, we are using a Raspberry Pi module with computer vision techniques. Raspberry Pi operates and controls motion sensors and video cameras for sensing and surveillance. For instance, it captures intruder's identity and detects its presence using simple computer vision technique (CVT).

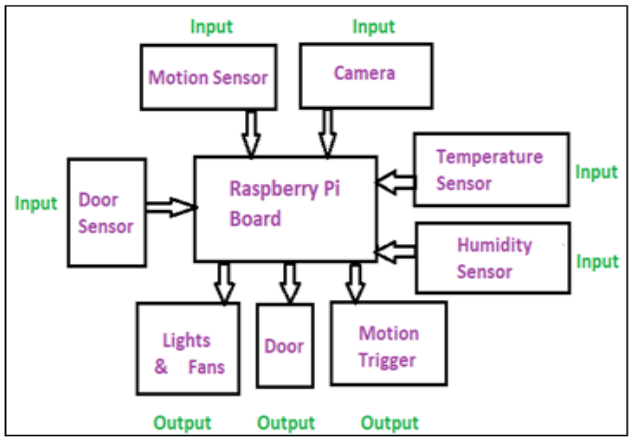


**Fig.1** Block Diagram of Home Automation

Whenever motion is detected, the cameras will start recording and Raspberry Pi device alerts the owner through an SMS and alarm call.This project provide user with remote control of various fans, lights, AC's, other appliances and security system within their home.

## II. DESCRIPTION

We have several parts in this home automation system to explain. We can look at them one by one. Firstly, we take

### A. RASPBERRY PI BOARD (MODEL B):

The Raspberry Pi 3 is the third generation Raspberry Pi. It replaced the Raspberry Pi 2 Model B in February 2016. Compared to the Raspberry Pi 2 it has:

- A 1.2GHz 64-bit quad-core ARMv8 CPU
- 802.11n Wireless LAN • Bluetooth 4.1
- Bluetooth Low Energy (BLE)
- Like the Pi 2, it also has:
- 1GB RAM
- 4 USB ports
- 40 GPIO pins

- Full HDMI port
- Ethernet port
- Combined 3.5mm audio jack and composite video
- Camera interface (CSI)
- Display interface (DSI)
- Micro SD card slot (now push-pull rather than push-push)
- VideoCore IV 3D graphics core The Raspberry Pi 3 has an identical form factor to the previous Pi 2 (and Pi 1 Model B+) and has complete compatibility with Raspberry Pi 1 and 2. We recommend the Raspberry Pi 3 Model B for use in schools, or for any general use. Those wishing to embed their Pi in a project may prefer the Pi Zero or Model A+, which are more useful for embedded projects, and projects which require very low power.

**Voltages:**
Two 5V pins and two 3V3 pins are present on the board, as well as a number of ground pins (0V), which are un configurable. The remaining pins are all general purpose 3V3 pins, meaning outputs are set to 3V3 and inputs are 3V3-tolerant.

**Outputs:**
A GPIO pin designated as an output pin can be set to high (3V3) or low (0V).

**Inputs:**
A GPIO pin designated as an input pin can be read as high (3V3) or low (0V). This is made easier with the use of internal pull-up or pull-down resistors. Pins GPIO2 and GPIO3 have fixed pull-up resistors, but for other pins this can be configured in software.

**More:**
As well as simple input and output devices, the GPIO pins can be used with a variety of alternative functions, some are available on all pins, others on specific pins.
>PWM (pulse-width modulation)
>Software PWM available on all pins
>Hardware PWM available on GPIO12, GPIO13, GPIO18, GPIO19

**SPI:**
>SPI0: MOSI (GPIO10); MISO (GPIO9);
SCLK (GPIO11); CE0 (GPIO8), CE1 (GPIO7)
>SPI1: MOSI (GPIO20); MISO (GPIO19);
SCLK (GPIO21); CE0 (GPIO18); CE1 (GPIO17);
CE2 (GPIO16)

**I2C:**
>Data: (GPIO2); Clock (GPIO3)
>EEPROM Data: (GPIO0); EEPROM Clock (GPIO1)

**Serial:**
>TX (GPIO14); RX (GPIO15)

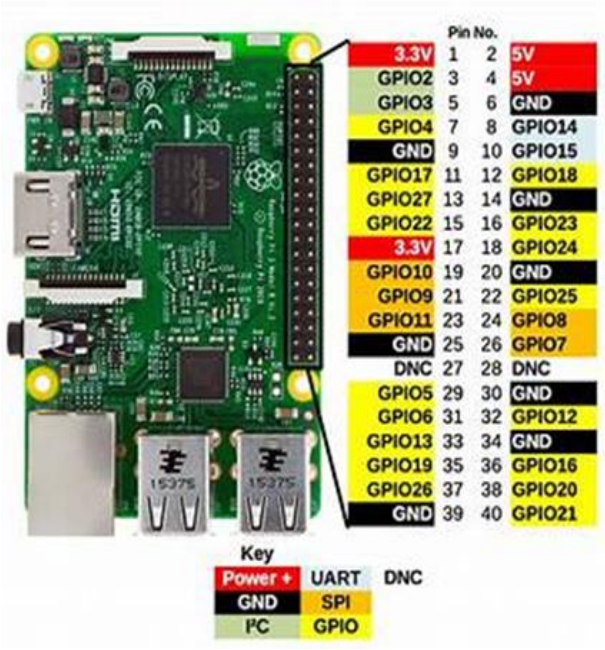


Fig.2 Raspberry pin diagram.

**B. CAMERA**

**Fig.3** Raspberry Camera.

## C. HARDWARE SPECIFICATION

| | Camera Module v1 |
|---|---|
| Net price | $25 |
| Size | Around 25 × 24 × 9 mm |
| Weight | 3g |
| Still resolution | 5 Megapixels |
| Video modes | 1080p30, 720p60 and 640 × 480p60/90 |
| Linux integration | V4L2 driver available |
| C programming API | OpenMAX IL and others available |
| Sensor | OmniVision OV5647 |
| Sensor resolution | 2592 × 1944 pixels |
| Sensor image area | 3.76 × 2.74 mm |
| Pixel size | 1.4 µm × 1.4 µm |
| Optical size | 1/4" |
| Full-frame SLR lens equivalent | 35 mm |
| S/N ratio | 36 dB |
| Dynamic range | 67 dB @ 8x gain |
| Sensitivity | 680 mV/lux-sec |
| Dark current | 16 mV/sec @ 60 C |
| Well capacity | 4.3 Ke- |
| Fixed focus | 1 m to infinity |
| Focal length | 3.60 mm +/- 0.01 |
| Horizontal field of view | 53.50 +/- 0.13 degrees |
| Vertical field of view | 41.41 +/- 0.11 degrees |
| Focal ratio (F-Stop) | 2.9 |

## D. PIR SENSOR

The term PIR is the short form of the Passive Infra Red. The term "passive" indicates that the sensor does not actively take part in the process, which means, it does not emit the referred IR signals itself, rather passively detects the infrared radiations coming from the human body in the surrounding area.

The detected radiations are converted into an electrical charge, which is proportional to the detected level of the radiation. Then this charge is further improved by a built in FET and fed to the output pin of the device which becomes applicable to an external circuit for further triggering and amplification of the alarm stages. The PIR sensor range is up to 10 meters at an angle of +15o or -15o.LCD.As we take read mode, we can take R/W pin as ground that is shown in the figure.

Fig.4 PIR Sensor

## E. RELAY MODULE:

Fig.5 4-relay module.

This is a 5V 4-channel relay interface board, and each channel needs a 15-20mAdriver current .It can be used to control various appliances and equipment with large current. It is equipped with high-current relays that work under AC250V 10A or DC30V 10A.It has a standard interface that can be controlled directly by microcontroller.

## F. DHT 11 (DIGITAL HUMIDITY AND TEMPERATURE SENSOR)

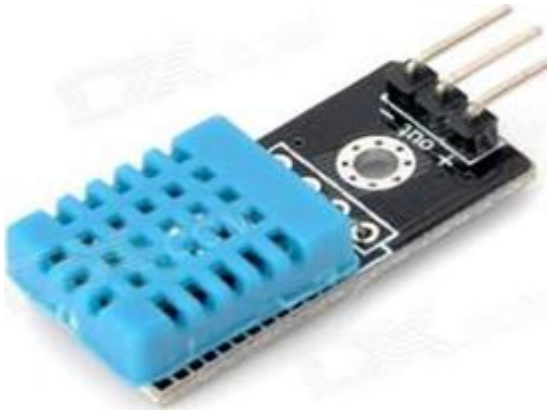

**Fig.6** DHT 11.

A humidity sensor senses, measures and regularly reports the relative humidity in the air. It measures both moisture and air temperature. Relative humidity, expressed as a percent, is the ratioofactualmoistureintheairtothehighestamountofmoistureairatthattemperaturecan hold. The warmer the air is, the more moisture it can hold, so relative humidity changes with fluctuations in temperature. Humiditysensorsdetecttherelativehumidityoftheimmediateenvironmentsinwhichtheyare placed.Theymeasurebothtemoistureandtemperatureintheairandexpressrelative humidityasapercentageoftheratioofmoistureintheairtothemaximumamountthatcanbe held in the air at the current temperature. As air becomes hotter, it holds more moisture, so the relative humidity changes with the temperature.

## F.DOOR SENSOR

Fig.7 Door Sensor.

An electromagnetic clock, magnetic clock, is a locking device that consists of an electromagnetandanarmatureplate.Therearetwomaintypesofelectriclockingdevices. Lockingdevicescanbeeither"failsafe"or"failsecure".Afail-securelockingdeviceremains lockedwhenpowerislost.Fail-safelockingdevicesareunlockedwhende-energized.Direct pull electromagnetic locks are inherently fail-safe. Typically the electromagnet portion of the lock is attachedtothedoorframeandamatingarmatureplateisattachedtothedoor.Thetwocomponentsareincontactwhenthedoorisclosed.Whentheelectromagnetisenergized, a currentpassingthroughtheelectromagnetcreatesamagneticfluxthatcausesthearmature platetoattracttotheelectromagnet,creatingalockingaction.Becausethematingareaofthe electromagnetandarmatureisrelativelylarge,theforcecreatedbythemagneticfluxisstrong enough to keep the door locked even under stress.

## III.WORKING PRINCIPLE

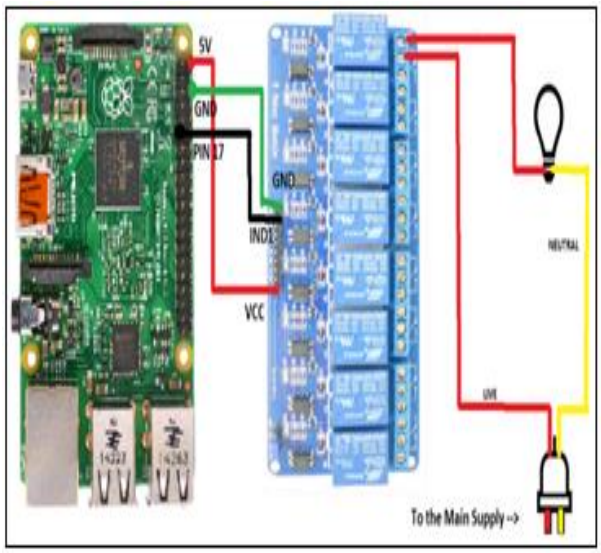


Fig.8 Circuit Diagram.

Firstly the program is dumped in raspberry pi board, then the supply is given through adaptor. Aconnectionset-upisgivenbetweenraspberrypiboardandmobilethroughwi-fi,usingURLa ashboardpageisopenedinmobile.Abulbandfanusedinthesysteminsteadofconnecting

homeappliancesandforsecuritypurposeacameraisfixedtodoor.Inthissystem,wi-fi Is used in order to control the devices in small coverage area. Raspberry Pi issue dashboard controller to connect the appliances via input and output port. Mobile phone and Raspberry Pi are connected through wi-Fi. Light, fan and camera are connected with Raspberrypi. The voltage of homeappliancesis230VbuttheRaspberryPivoltage Is5V.Sointhissystem, relay circuitous to cover the high voltage to low voltage, low voltage to high voltage which is also actasaswitch. Here four way relay are used in order to connect zero watts bulb in 230V. Next device is DC motor. DC motor needs the two 5V supply. But the Raspberry Pi board has only for three5V pins .So the male header pins are used to connect the motor.

## III. RESULTS & CONCLUSION

In this paper, a prototype smart home automation using IoT is presented. This work will be carriedforwardbyintegratingrelaystoRaspberrypiboardforcontrollinghomeappliancesfromaremotelocation a real scenario. As an extension, authors propose a generic IoT framework and use cloud computing in frastructure for connecting and managing. Expected to grow in popularity in the near future is the use of smart home products to in crease familysafety, specifically related to fire protection and carbonmonoxide monitoring. Nowwea reconnecting and controlling the few devices in home appliances.

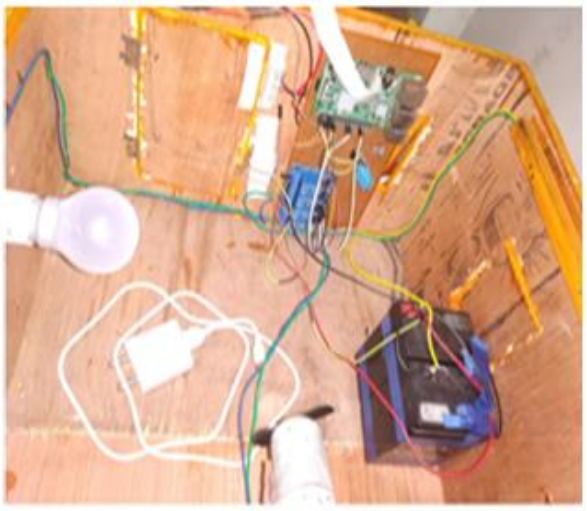

**Fig 7:** Implementati on of IOT based home automation sing Raspberry pi

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## V. REFERENCES

[1]. K. Bapuji Daniel,"AppletonInnovations" start-upbyallumini IITBombay.

[2]. A.R..C.Y..O.K.Withanage,C.,“Acomparisonofthe popular home automationtechnologies,”pp.1–11,may2014.

[3]. KumarMandulaet.al,”MobilebasedHome Automation using Internet of Things (IoT)”, 2015 International Conference on ControlInstrumentation,CommunicationandComputational Technologies(ICCICCT),2015.

[4]. Dhiraj sunehra, M.Veena, “Implementation of interactive home automation systems based on Email and Bluetooth technologies”, 2015 International Conference On Information Processing”, Vishwakarma InstituteofTechnology,Dec16-19,2015.

[5]. Jasmeet chhbra, Punita Gupta, “IoT based smart home design using power and security management system”,20161stInternational Conference on Innovation and challenges in cyber security(ICICCS)2016. [6].T.MingZhao,Chua,“Automaticfaceandgesturerecognition,2008. 8thieee international conferenceon,”pp.1–6,September2008.

[6]. E.A.Elkamchouchi,H.,“Design and prototype implementation of sms based home automation system,”pp.162–167,november2012.

[7]. G. Joga Rao, G. Satish, D. Abhinav, P. Mothi Manoj Nageswara Rao, P. Satish Ganesh,

"Temperature Controlled Fan using IOT", International Journal of Scientific Research in Science, Engineering and Technology(IJSRSET

[8]. M S R A P.Mallap, G. Joga Rao, B.Prasanna Vinod Kumar Sahu, J.Sudheer Kumar , Sai Krishna, " A Novel Approach for Home Automation ", International Journal of Scientific Research in Science, Engineering and Technology(IJSRSET), Print ISSN : 2395-1990, Online ISSN : 2394-4099, Volume 4 Issue 4, pp.799-801, March-April 2018

[9]. G. Joga Rao, S.Ganesh, A.GunaSekhar Mahesh B, E.Jayanth Rakesh K Smart Wi-Fi Controlled Lighting in ARJSET Vol. 5, Issue 3, pp.97-101 March 2018 DOI 10.17148/IARJSET.2018.5316

[10]. Vijay J, Saritha B, Priyadharshini B, Deepeka S, Laxmi R. Drunken Driven Protection System. International Journal of Scientific and Engineering Research. 2011; 2(12):1-4

[11]. K. Siva Shankar, G. Joga Rao, M. K. Sarat Sahithi, "Smart Solar Charging Meter", International Journal of Scientific Research in Science, Engineering and Technology(IJSRSET), Print ISSN : 2395-1990, Online ISSN : 2394-4099, Volume 4 Issue 4, pp.701-704, March-April 2018.

[12]. B.R.Pavithra,D.,"IOT based monitoring and control system for home automation,"pp.169–173,April2015.

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