“Raspberry Pi Home Automation Hub Internet of Things(IoT)”

Project report submitted in partial fulfilment of the requirement for the degree of Bachelor of Technology

In

Computer Science and Engineering/Information Technology

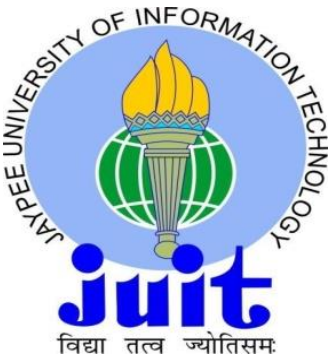
By

Mehak (141376)

Under the supervision of

Dr.Vivek Sehgal

To



Department of Computer Science & Engineering and Information Technology

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Candidate's Declaration

I hereby declare that the work presented in this report entitled "Home Automation through Internet of Things(IoT)" in fulfilment of the requirements for the award of the degree of Bachelor of Technology in Computer Science and Engineering/ Information Technology submitted in the department of Computer Science & Engineering and Information Technology, Jaypee University of Information Technology Waknaghat is an authentic record of my own work carried out over a period from August 2017 to May 2018 under the supervision of Dr. Vivek Sehgal (Associate Professor, Computer science and Engineering).The matter embodied in the report has not been submitted for the award of any other degree or diploma.

Mehak (141376).....

This is to certify that the above statement made by the candidates is true to the best of my knowledge.

Dr. Vivek Sehgal
Associate Professor
Computer Science & Engineering
Dated:

ACKNOWLEDGEMENT

We would like to express our special thanks of gratitude to our project guide Dr. Vivek Sehgal who helped us in conceptualizing the project and actual building of procedures used to complete the project. We would also like to thank our Head of department for providing us this golden opportunity to work on a project like this, which helped us in doing a lot of research and we came to know about so many things.

Secondly we would like to thank our family and friends who guided us throughout the project so as to complete our project on time.

Thanking you,

Mehak (141376)

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LIST OF ABBREVIATIONS

S No.	Abbreviations	Description
1	D2D	Device to Device
2	D2S	Device to Server
3	MQTT	Message Queue Telemetry Transport
4	XMPP	Extensible Messaging and Presence
5	DDS	Data Distribution Service
6	AMQP	Advanced Message Queuing Protocol
7	PIR	Passive Infrared Sensor

ABSTRACT

Nowadays, the utilize of domestic mechanization has expanded and it is in tall request due to carelessness of family individuals additionally due to expanding robbery cases. Mechanizing a domestic is developing field. Domestic robotizing is essentially controlling diverse exercises of domestic with the progressed innovations. In this extend we are creating a model illustrating different viewpoints of Domestic Robotization, like controlling electronic gadgets, utilizing as it were when required agreeing to the outside conditions, exchanging on/off electrical machines with cellular gadgets from a different location or we will say that from farther areas. It permits the client to perform different activity of domestic from a farther put. Domestic security could be a field of domestic computerization. It concentrates on the security viewpoints of homes and offices. This may be accomplished by nearby organizing or by inaccessible control. With the assistance of fair one click we are able control our house and able to spare our domestic from cheats. These frameworks protect homes from gatecrashers.

INTRODUCTION

Beginning from exchanging on/off the lights to controlling the entryways of your house domestic mechanization framework made a difference us a part. This concept was begun in 1934 in World's Reasonable in Chicago where "the future home" is displayed. Within the final 80 a long time, in any case, the robotized domestic has been made indistinguishable to savvy domestic, cordiality to the Web, sensors, network and other developing advances. The present day robotized domestic frameworks can do more than exchanging on our warming and our lights—it can really think for us. Security and innovation are quickly advertising domestic robotization arrangements and building out the Savvy Domestic of associated gadgets and applications. As cameras, cautions, as well as, indoor regulators and other apparatuses have gotten to be controllable and programmable utilizing Internet-enabled keen phones utilizing android or ios, they are getting to be portion of a endless web called the Web of Things (IoT). As gadgets have gotten to be associated to the web, they connect others on a two-way road. Fair as commands are needed.

1.1 Smart Home

"Home Automation," "Connected Devices" and "Internet of Things" are the phrases which are connected together and common people mix these phrases to innovate a smart home automation system.it is also true that these three are totally inseparable.

Home automation: It refers to all the electronic devices which are connected to central system and being automated by using smart devices. Take an instance, you push a button and your shades go up, or you give a voice command and your lights turn on.

- **Connected devices:** They are electrical devices that are intelligent, courtesy to the connection to the Internet as well as the sensors. These devices know and/or are able to guess what a user needs. Firstly, the intelligence comes from user programming, but with time the device may learn and adapt to patterns and interact with the users.

- **Internet of Things:** IoT is the magical wand that turns the automated homes into the smart homes. With combination of sensors, smart systems, IoT connects everyday

usable objects to a network, enabling these objects to complete tasks and communicate with each other, with no input contribution from the user.

When the Home Automation, various sensors,connected devices and iot are blended together then concept of home automation arises. A modern smart home can be easily managed through a Smartphone, tablet and/or computer.

- **Why do we need Smart homes?**

  - **Reduction in price**: As all the electric appliances are associated with central skeleton as well as water storage are associated so individuals can turn off their additional lights fans and other gadgets which causes wastage of vitality.

Figure 1: Smart home [15]

  - **Regulation:** Numerous things in a domestic, from stoves and coolers to deadbolts and discuss conditioners, can be overseen remotely through

applications in savvy phones and tablets. In most cases, the control works once you are out of the domestic as well, meaning you'll near the entryway from the air terminal, check on the puppy from Australia, or affirm simply exchanged off your stove from the showcase**.**

- **Comfort:** Having your living room lights exchanged on as you reach domestic, the domestic theatre framework playing your top pick tune and the front entryway opening as you approach with a hands full of shopping packs, is maybe the extreme extravagance of the keen domestic. Be that as it may, comfort isn't all almost extravagance. Savvy locks can permit you to allow get to specific people at specific times, so merely don't need to remain domestic and/or deliver out a key. Additionally, a sensor tells you when your fridge is out of drain, and a Wi-Fi empowered doorbell lets you "answer" your entryway from anyplace within the universe.

- **Reliability:** There are numerous simple, associated arrangements for security for the keen domestic that are cheap choices to 24X7 observed security frameworks. Wi-Fi-enabled CCTV cameras, associated movement sensors as well as shrewd smoke alerts can be observed from interior or exterior a domestic through a live video, email and content cautions.

- **Safety:** Savvy sensors that can discover out water spills, levels of mugginess, carbon di oxide, development, warm and each natural concern that can be envisioned offer assistance avoid mishaps from turning into tragedies as they can communicate with proprietor specifically, wherever you're , whenever you would like.

- **Senior independence:** There are automated audio and voice reminders which help people to spend life safely and independently. Moreover, all the electronic devices and camera is connected to smart devices through Wi-Fi .which help people to take care their senior members of family while being themselves at remote places.

1.2 Internet of things

The Web of Things (IoT) is that the organize of objects or "things" implanted with physical science, program, sensors, and arrange property that allow these objects to accumulate and trade an curiously large amount of data. The internet of Things licenses objects to be recognized however as controlled remotely over existing foundation of systems, creating openings for coordinate integration between the physical world and computer-based frameworks, coming about in made strides strength, exactness however as financial preferences. Each issue is put able unambiguously through its inserted ADPS but is prepared to work at interims the show web framework. Various employments and applications of IoT are:

o Monitoring the setting
o Managing the infrastructure
o Manufacturing method
o Management of energy resources
o Medical yet as health care systems
o Automating homes and buildings

Figure 2: Iot Applications

- **Benefits of IOT-**

Omnipresent systems: Individual Wi-Fi on your sensible phones and on a few of the inverse gadgets. Everyone and everything needs encourage as has got to be associated.

Associated computing: We require all of the gadgets, sensible phones, tvs (coloured or dark and white), optical disk players, vehicles etc. to remain record of what we tend to do, seeing, perusing, and/or taking note of as we tend to influence through the day, from one put to a diverse – the handoffs from gadget to gadget is going on as of now going on as of now on as of now.

Insights at the periphery of the arrange: Jim grey, the visionary data learned from Microsoft, conceived sensible sensors carrying on as a small-database with implanted machine learning calculations and pseudo codes. Here is in any case he said it (10 a long time back): "Intelligence is influencing to the boundary of the systems. Each of the disk frameworks and each detecting component portion are going.

Promoting computerization: Sensible phone client engagement, geological-location, Apple's iBeacon etc. square measure all creating a arrange of information and information concerning customers' areas, eagerly, inclinations, encourage as shopping for designs. Clearly, the degree of soil science location-based information needs to keep up the right adjust between client protection assist since the opportune conveyance of imperative and imperative stock and administrations to the real time administrations to the real client.

Supply Chain Analytics: Delivering the just-in-time merchandise at the time of want (inclusive of the utilization of RFID-based tracking). Considerably, everything could be a client (inclusive of machines, cars, producing plants, ATM machines, banks, offices etc.) however further because the IoT is observance, watching, further as anticipating the merchandise has to arise.

1.3 Objective

- To create a model for an mechanized domestic controlled utilizing Raspberry Pi, as well as relays.
- The point is to both spare power and give its full utilize to the owner. The aim is to both save electricity and provide its full use to the owner.
- To develop a prototype for monitoring the user geographical area that will help the user in securing the domestic or industrial area.
- To give the genuine time data of the trespassing within the area/home and overhaul the client by any source of notification.
- To provide the real time information of the trespassing in the area/home and update the user by any source of notification.

1.4 Methodology

Savvy domestic, which can be characterized as a domestic that can distinguish and distinguish the proprietor, consequently alters the lighting of the house to your predefined and pre-mentioned taste, opens the entryways consequently, plays your top choice music, waters your cultivate within the morning or as characterized, turns on the security lights at night and turns them off within the morning, warms the water for bathe and plans tea agreeing to the characterized formula, streams to you anyplace within the world through the web live video of what is happening in and around your house. It makes it conceivable to associate lighting, excitement, security, broadcast communications, warming, as well as discuss conditioning into one centrally-controlled framework. This grants you to change over your house into a dynamic that make a different life.

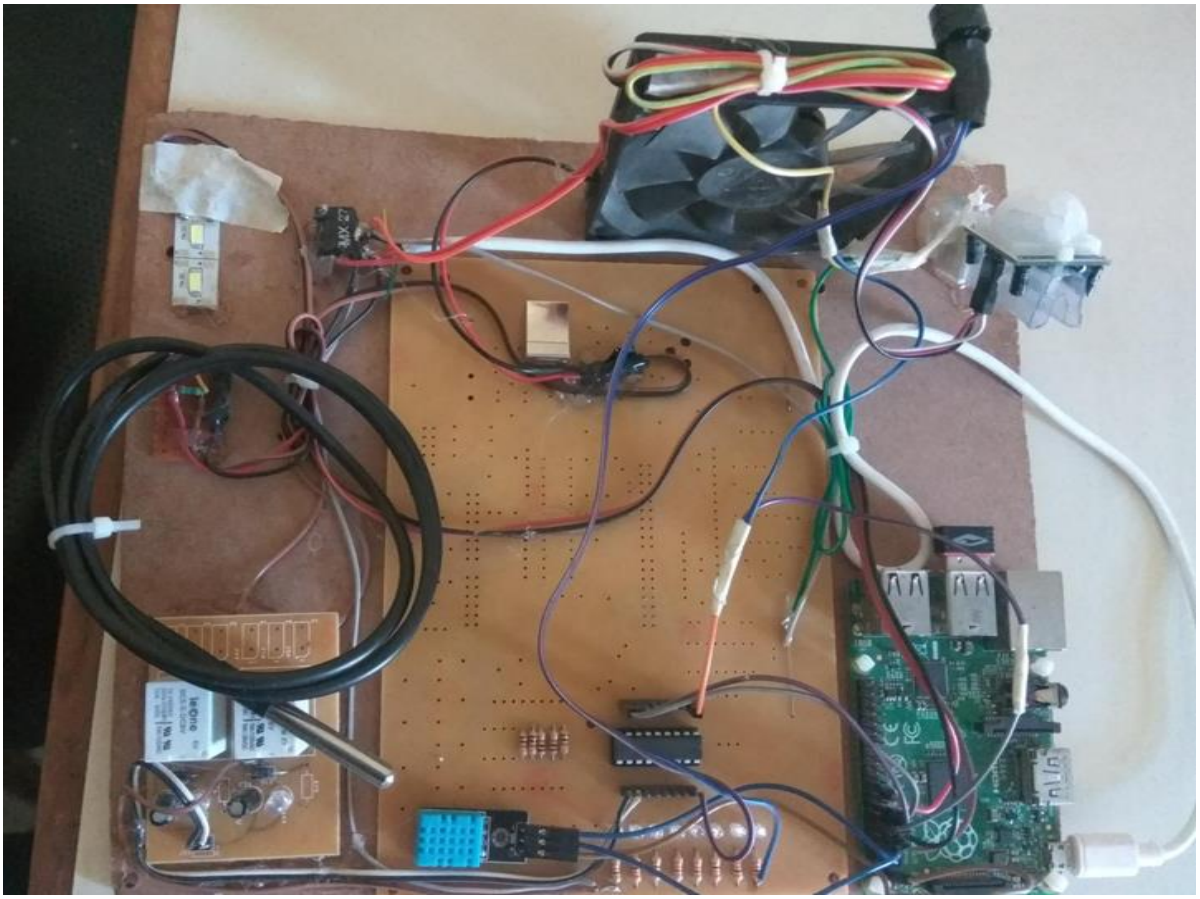


Figure 3: Method

Our own could be a least difficult of easiest, domestic robotization framework model which ranges from the burglar alert, hi-tech security entryways, light location and an mechanized discuss conditioning framework that records the temperature at a predefined and pre-mentioned value. A hand-off could be a sort of an electromagnetic switch. The one we have utilized in this venture has essentially two parts. The primary portion which is the coil, is the low-power portion of the circuit, and should be overseen by the

Raspberry Pi. The moment portion of the transfer gadget is the switch that can maintain higher powers. This portion is really the mechanical on the transfer we have utilized, so one must listen a “click” sound when the hand-off is switching from one state to another state. Enacting the low-power portion includes applying 5V on the coil which is able actuate the switch and changes the state of the hand-off. To discover in which state the hand-off is, the producers have utilized one Driven on one portion of the switch. As anticipated, the Driven may moreover be supplanted by any of transfer.

2 LITERATURE REVIEW

2.1 RASPBERRY PI HOME AUTOMATION WITH WIRELESS SENSORS USING SMART PHONE: P BHASKAR RAO, S.K. UMA

The above stated paper presents a low cost as well as flexible home automation and monitoring system making use of an embedded microprocessor and/or microcontroller, along with IP connectivity for getting access to and controlling devices as well as appliances remotely using Smart phone application. The system which is described here does not need a dedicated personal machine but only a communication pathway to communicate among the different devices. To establish the feasibility as well as the effectiveness of this system, devices, for instance, light switches, power plug, temperature sensor, current sensor etc. may be integrated with the home automation system.

2.2 ANDROID BASED HOME AUTOMATION USING RASPBERRY Pi: T. ANITHA1, T. UPPALAIAH2

Over a long time, the domestic environment has seen an awfully quick presentation of organize empowered advanced innovation that has made strides our lives for great. These modern innovations offer new and energizing openings to extend the network of gadgets inside the house for the rationale and the reason of domestic mechanization. Gadgets that are portable are perfect in giving an client interface in such a domestic computerization framework, due to their capacities that incorporate transportability and their wide run of capabilities. They may communicate with the home mechanization arrange through an Online portal; be that as it may they cannot specifically communicate with the gadgets

within the organize, as these gadgets ordinarily actualize low-power communication conventions, for case, ZigBee, Wi-Fi etc. In this paper the creators point at controlling and managing the Domestic machines through Android gadget utilizing Wi-Fi as the communication convention together with Raspberry Pi as server framework. They have made a client neighbourly interface for the android.

2.3 Home Automation through IOT : Vinay Sagar, KN. Kusuma, SM. (2013)

On One side domestic robotization framework picking up notoriety but on the other side it is confronting numerous challenges like reasonability, security, proprietorship and adaptability. The most goals of this extend is to plan and actualize a domestic mechanization framework utilizing Internet of things innovation, that's able of controlling and robotizing most of the machines within the house through a straightforward and reasonable web interface. The framework proposed in this paper, features a great flexibility of utilizing Wi-Fi innovation to interconnect the conveyed sensors to domestic computerization framework server. This will eventually diminish the sending fetched at the side expanding the capacity of updating and framework reconfiguration.

1. Ramani, R. Olatunbosun , A. (2010) Internet of Things (IoT)

Now a day's internet of things (IoT) is the buzzword in the field of information technology. It is gaining popularity day by day as internet of things is able to convert physical system into intelligent tacit things. The IoT aims to segregate things in one umbrella not only helps us to control everything but also give information about the things happening in remote places. In this present research article there is a deep discussion on definitions, commencement, requirements, characteristics and aliases of Internet of Things. The main aim of this paper is to provide the basic overview of IoT its architecture and design and how it is used in day to day life. Moreover, this beautifully written paper will give a good base for those who want to explore the field of internet of things.

The most profound technologies are those who disappear. They convert themselves into the material of lifestyle till they're indistinguishable from. Mark Weiser's gave the statement in his research paper in Scientific Yankee in 1991. There's a transmutation in human's existence moreover as in operating conditions in organizations when the arrival of IT and ITeS technologies. This can be changing into well-known thought across several horizontal and vertical markets together with a typical man's lifestyle within the society, because it has many applications. The event of the net of Things (IoT) has been primarily driven by desires of huge companies that stand to profit greatly from the foresight and foregone conclusion afforded by the flexibility to follow all objects through the trade goods chains during which they're embedded. the flexibility to code and track objects has allowed corporations to become additional economical, speed up processes, cut back error, forestall thieving, and incorporate complicated and versatile structure systems through IoT. The IoT may be a industrial revolution that represents the long run of computing and communications, and its development depends on dynamic technical innovation in an exceedingly variety of vital fields, from wireless sensors to technology.

2. Reza, K. Ahsanuzzaman, S. (2010) Advanced Research in Computer Science and Software Engineering

This paper bargains with the plan of an brilliantly domestic get to control skeleton based control framework based on visual verification. It permits the client to allow section to any guest to his/her house remotely after seeing the visitor's picture. The plan employments the Arduino Uno as the framework processor. The entire framework was executed utilizing remote webcam through pop up message by Arduino and the Smartphone gets the picture from ip camera (webcam as ip camera here).When the guest arrives and wishes to enter the domestic, the webcam ceaselessly keeps on following any changes in its see and it takes the picture of the guest. There will be a pop up message on the owner's phone inquiring around whether he needs to see the image or not, once he/she chooses yes, it'll get the picture from ip address of the webcam by means of Bluetooth blending. Encourage after around 5 millisecond delay a message will be shown to inquire around proprietor needs to open the entryway or not. In the event that proprietor wishes to open the entryway a flag will be sent to paper.

3 SYSTEM DEVELOPMENT

3.1 Tools and Technologies used

3.1.1 Hardware Used

1. Raspberry Pi

Raspberry pi establishment plans the little on boards' computer in London to instruct understudies of computer science in different schools and colleges. It doesn't epitomize peripherals .Be that as it may; a few adornments are encased in numerous official and informal bundles. The Broadcom BCM2835 SoC utilized in beginning the essential} era Raspberry Pi is to some degree taking after the chip utilized in to begin with in vogue era smartphones (its central handling unit is Relate in Nursing more seasoned ARMv6 design), which joins a 700 megacycle ARM11 76JZF-S processor; Video Centre IV of sixteen kilobyte and review a match of (L2) cache of 128 kilobyte. The sum a match of cache is utilized essentially by the GPU. The SoC is stacked underneath the Smash chip. The prior V1.1 demonstrate of the Raspberry Pi a combine of utilized a Broadcom BCM2836 SoC with a 900 megacycle 32-bit quad-core ARM Cortex-A7 processor, with 256 kilobyte shared L2 cache. The Raspberry Pi a combine of V1.2 was updated to a Broadcom BCM2837 SoC with a 512 Kbytes shared l2 cache.

Figure 4: Raspberry Pi

Table 1: Technical specifications

SoC	Broadcom BCM2837
CPU	4× ARM Cortex-A53, 1.2GHz
GPU	Broadcom Video Core IV
RAM	1GB LPDDR2 (900 MHz)
Networking	**:** 10/100 Ethernet, 2.4GHz 802.11n wirelessl I/O Pins
Storage	microSD
GPIO	40-pin header, populated

- **Power**

The power necessities of the Raspberry Pi increase as you create use of the assorted interfaces on the Raspberry Pi. The GPIO pins will draw 50mA safely, distributed across all the pins; a private GPIO pin will solely safely draw 16mA. 50mA power is used by HDMI port, 250mA is employed for camera module, and very small amount of power, that is, 100mA or over 1000mA is destitute by keyboard and mice.

The small Universal Serial Bus (USB) B, conjointly called small USB B, and Micro-B, is Associate in Nursing interface connecter for the needs of connecting cellular mobile phones and moveable devices to computers. It provides six electrical connections, consisting of 5 pins and a shell carrying the drain wire.

Pin 1: +5 V

Pin 2: Data-

Pin 3: Data+

Pin 4: ID

Pin 5: Ground

- **Memory**

It has 512MB Smash (as of Eminent 2016: prior models have 256MB), one USB harbour, 40 GPIO pins, and no Internet harbour. The Demonstrate B+ is the ultimate modification of the first Raspberry Pi. It has 512MB Smash, four USB ports, 40 GPIO pins, and an Ethernet port.

- **Input and Output**

Common reason input/output GPIO may be a nonspecific stick on a chip whose e laptops inside speakers or outside earphones jack. Conduct may be regulated by the client at run GPIO pins have not any predefined reason and go misused by default. The concept is that by and large the framework arrange meter which is building a full framework may need a hand of assist computerized administration lines—and had these realistic from a circuits dodges having to improve advance electronic gear to supply them. As a case the realtek alc260 circuits has eight GPIO pins that go unused by default. A few framework respectability utilize the essential GPIO gpio_0 on the alc260 to appear on the electronic equipment. This wing includes a non-latching sort transfer. You will switch up to 10a of resistive-load current at 120vac 5a at 240vac. with inductive hundreds with respect to 0.5 that. Check the datasheet for the transfer for the exact move capability since it depends on assortment of stack and voltage sort and size.

- 12C pins that allows you to connect hardware modules with two management pins.
- Two GPIO pins will show you glowing lights and fan.
- One GPIO pin is needed for the security purpose.

- **Output**

Flip a selected pin HIGH or LOW.

– Setting it HIGH sets it to three.3V; setting it LOW sets it to 0V.

Input: find the pin being at HIGH or LOW.

– We will connect switches and easy sensors to a pin and check whether

Pin#	NAME		NAME	Pin#
01	3.3v DC Power		DC Power 5v	02
03	GPIO02 (SDA1 , I2C)		DC Power 5v	04
05	GPIO03 (SCL1 , I2C)		Ground	06
07	GPIO04 (GPIO_GCLK)		(TXD0) GPIO14	08
09	Ground		(RXD0) GPIO15	10
11	GPIO17 (GPIO_GEN0)		(GPIO_GEN1) GPIO18	12
13	GPIO27 (GPIO_GEN2)		Ground	14
15	GPIO22 (GPIO_GEN3)		(GPIO_GEN4) GPIO23	16
17	3.3v DC Power		(GPIO_GEN5) GPIO24	18
19	GPIO10 (SPI_MOSI)		Ground	20
21	GPIO09 (SPI_MISO)		(GPIO_GEN6) GPIO25	22
23	GPIO11 (SPI_CLK)		(SPI_CE0_N) GPIO08	24
25	Ground		(SPI_CE1_N) GPIO07	26
27	ID_SD (I2C ID EEPROM)		(I2C ID EEPROM) ID_SC	28
29	GPIO05		Ground	30
31	GPIO06		GPIO12	32
33	GPIO13		Ground	34
35	GPIO19		GPIO16	36
37	GPIO26		GPIO20	38
39	Ground		GPIO21	40

Figure 5: Raspberry pi Pin out [8]

2. Sensors

- **Relay**

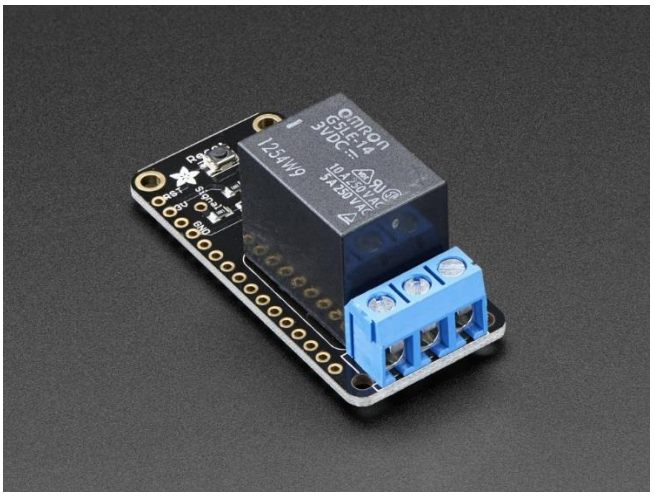
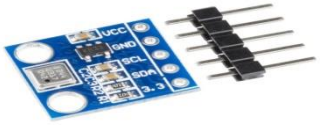


Figure 6: Relay

A Plume board whereas not desire may be a Plume board whereas not quill Wings! This may be the capacity Transfer Plume Wing. It offers you control to control and administration over control. Put essentially, you'll as of now actuate and off lights, fans, solenoids, and diverse small apparatuses that run on up to 250VAC or DC control misuse any Quill board. Compared to our littler Hand-off Plume Wings, this one will handle a burly 1200 Watts! Works with all/any of our Quill sheets, basically wire up the transfer administration stick to no matter GPIO you like! Abuse our Plume Stacking headers you'll interface a plume Wing on tall of your Plume board and let the board take to the woods This Wing envelops a non-latching sort transfer. You'll switch up to 10A of resistive-load current at 120VAC, 5A at 240VAC. With inductive hundreds, with respect to 0.5 that. Check the datasheet for the hand-off for the exact move capability, since it depends on assortment of stack and voltage sort and size.

- **Pressure Sensor(BMP180)**

Figure 7: Pressure sensor



This accuracy detecting component from Jerome bos is that the most excellent reasonable detecting reply for mensuration discussing weight and frigidness. Due to this outcome weight transforms with height we will be able to furthermore utilize it as an measurement detector. The detecting components are fastened on a PCB with a three.3v controller i2c level adjuster and pull-up resistors on the i2c pins. The bmp180 is that the one step next-generation of sensors from Jerome bos and tranforms the bmp085. The xclr stick is not actually blessing on the sensor hence on the off chance then you had like to get the handle on that information is ready you should i2c bus. This board is 5v compliant a three.3v controller and a i2c level shifter circuit is encased thus you will be able to utilize this detecting component securely with 5v rationale and control. for occasion in the event that you are victimization an raspberry pi simply interface the vin stick to the 5v voltage stick gnd to ground scl to i2c clock analog 5 and sda to i2c information analog 4 at that point exchange our bmp085/bmp180 raspberry pi library and example

Vin: 3 to 5VDC

Logic: 3 to 5V compliant

Pressure sensing range: 300-1100 hPa (9000m to -500m above sea level)

Up to 0.03hPa / 0.25m resolution

-40 to +85°C operational range, +-2°C temperature accuracy

This board/chip uses I2C 7-bit address 0x77.

- **Temperature Sensor**

DS18B20

Figure 8: Temperature Sensor

Typically the single-wired or rainproof form detecting element .This detector is completely helpful, easily available and you will indeed utilize it at damp states. Though detecting components are decent until 125°c the wires are covered in PVC cable therefore we are proposing to keep it underneath 100°c. As a result of they are computerized you are doing not get any flag debasement indeed over long separations. They are one-wire advanced frigidness detectors square measure reasonably exact ±0.5°cover the parcel at an extend or might quit the twelve bytes of precision over them on-board digital-analog transformer. They labour decent with any sensors utilizing a one advanced stick and we will be able at indeed interface different ones to identical pin all highlights a unmistakable32-bit id burned in at the fabricating plant to distinguish them. the as it were disadvantage is that they utilize the urban middle 1-wire convention that's at some degree progressed or needs a group of code dissect in somehow progressed and needs a bunch of code to dissect out the commute.

Passive Infrared Sensor (PIR)

PIR sensors are the class of sensors which is used to detect the motion of people whether a human body is moving outside of the range of these sensors. They are little piece of sensors which is easy to buy and use and even they do not tear out. Due to such easy availability these sensors are found in home appliances. They are sometimes called as PIR, "Passive Infrared", "Pyroelectric", or "IR motion" sensors.

WORKING

PIR detectors are a parcel of advanced then a few of the inverse as a result of they are different factors than have an impact on the detectors input and yield. The PIR detecting

component itself has 2 openings in it. Each aperture is made of a extraordinary fabric that's sensitive to IR. A focal point utilized here isn't exceptionally doing a part of and at that point we tend to see that the three spaces will 'see' out past distant .Once the detecting component is sit out of gear, each space discover a comparative amount of IR, the near amount transmitted from the space or dividers or outside. Once a warm body sort of a individual or creature passes by, it starting mediation one 1/2 the PIR detecting component, that causes a positive differential correction among the 2 parts. When the body takes off an extend of sensor at that point sensor will produce a driving force.

.

Figure 9: PIR Sensor

Software Used

Connecting Raspberry pi with putty

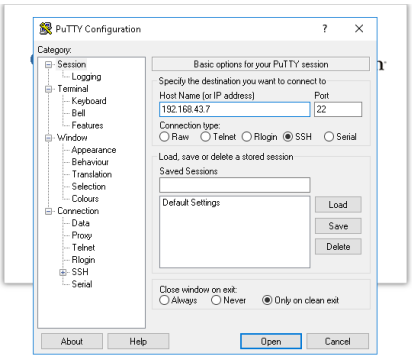
- In order to connect Raspberry Pi SSH should be enabled.

- Next step is to find out the address of Raspberry Pi.It can be done using Fing through which we can traceroute the address of Raspberry pi.

- Then we need to install putty through which Raspberry pi will contact to your computer.

- The Putty window opens.

Figure 10: Putty Window



PuTTY (inactive)

```
login as: pi
pi@192.168.43.7's password:

The programs included with the Debian GNU/Linux system are free softwa
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Nov 13 17:17:20 2017
pi@aurish-mehak-jp-homeauto:~ $
pi@aurish-mehak-jp-homeauto:~ $
pi@aurish-mehak-jp-homeauto:~ $
pi@aurish-mehak-jp-homeauto:~ $ sudo su -
root@aurish-mehak-jp-homeauto:~#
root@aurish-mehak-jp-homeauto:~#
root@aurish-mehak-jp-homeauto:~# cd /home/pi
root@aurish-mehak-jp-homeauto:/home/pi# ./homecloudread.py
```

Figure 11: Command line

My Devices (cayenne)

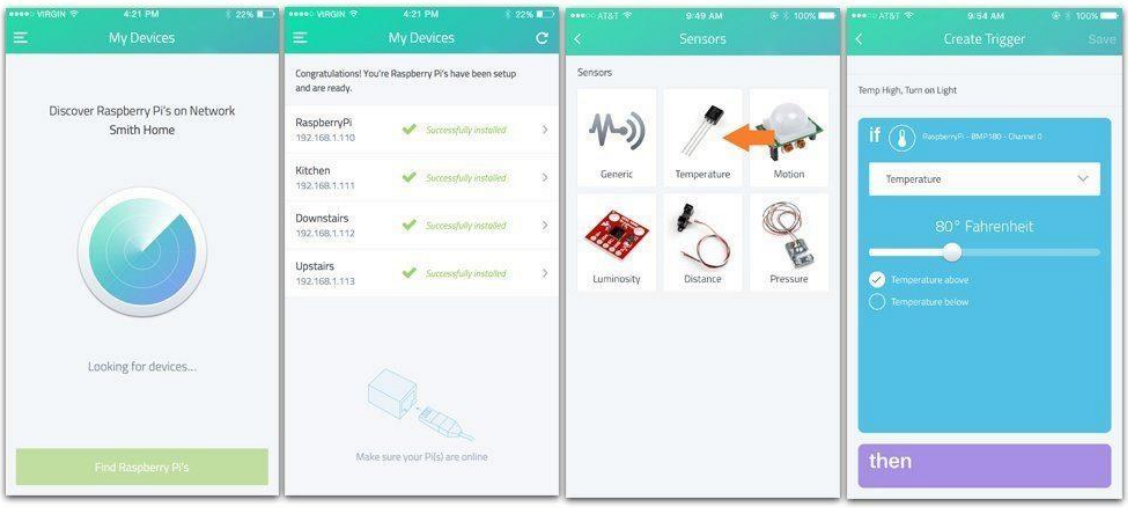


Figure 12: Interface to android

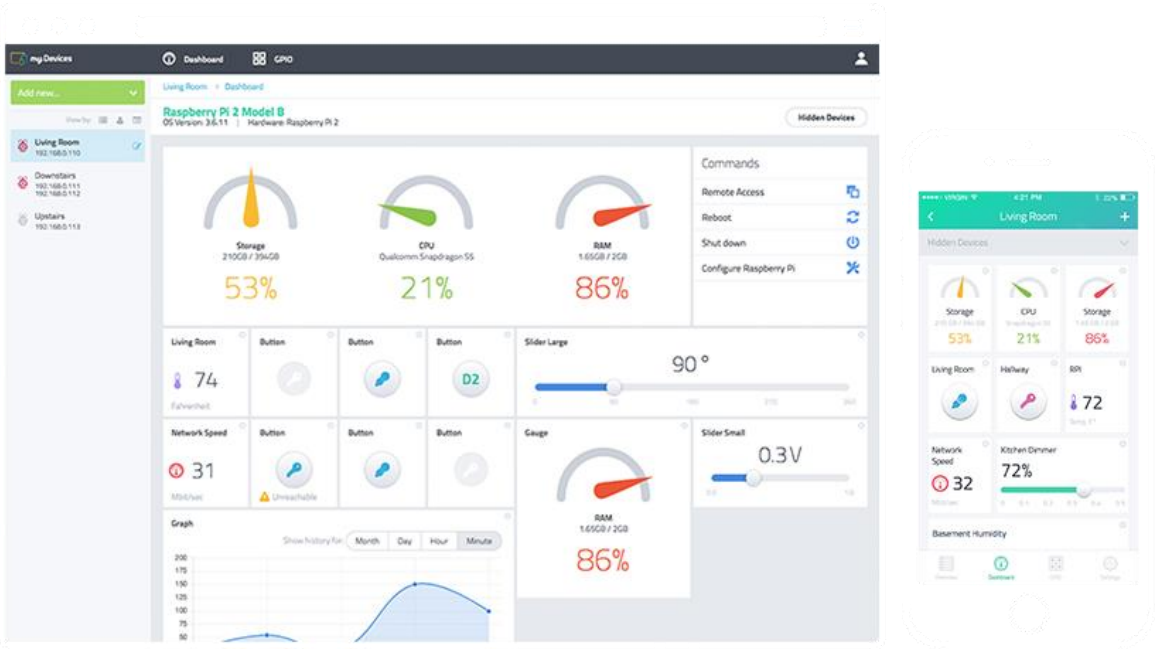


Figure 13: Display

Protocols

Gadgets should interact with one another (D2D). Gadget knowledge at that point ought to be collected and sent to the server framework (D2S). That server foundation must share gadget information (S2S), probably giving it back to gadgets, to investigation programs, or to people. From very large distance, the conventions are frequently portrayed amid this system as:

1. **MQTT**

MQTT the text line estimation convey targets gadget data combination. As its title states its fundamental reason is estimation or farther perception. Its objective is to accumulate data from a few gadgets and transfer that information to the IT infrastructure. It targets gigantic Methods of little gadgets that require be observing or controlling from the cloud.

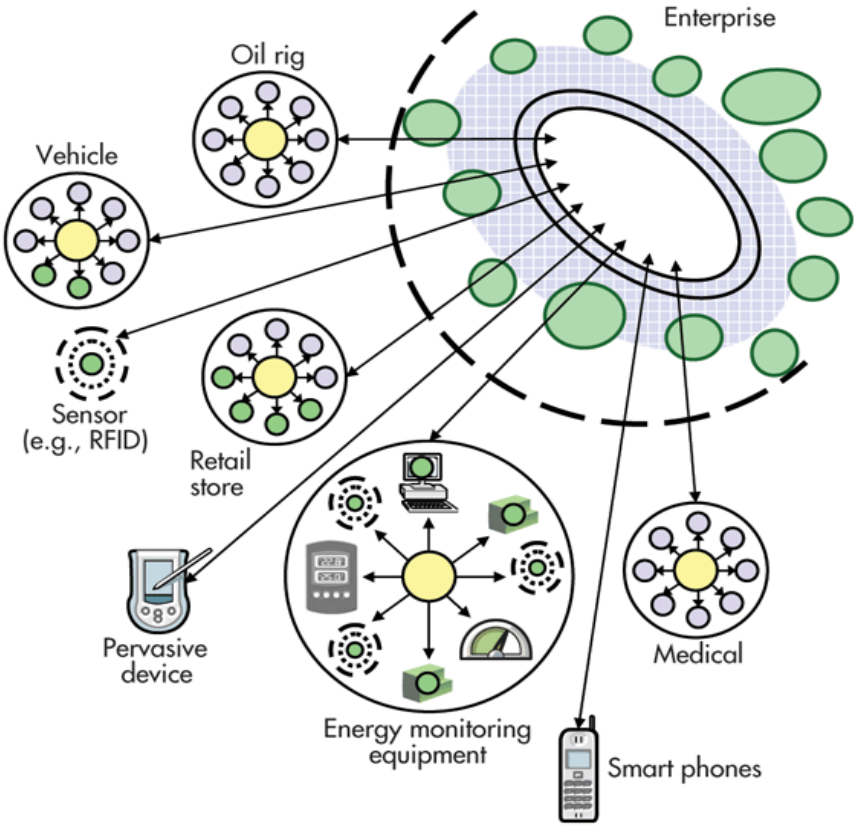


Figure 14: Message Queue Telemetry Transport [13]

Message Line estimation transfer (MQTT) executes. A discuss transportation framework. MQTT makes exceptionally small conceive to alter appliance-to-appliance exchange, nor to delete the information to a few beneficiaries. Since it's a straightforward,

forcing one result, MQTT is easy, giving some administration choices. It furthermore doesn't have to be eminently speedy. Amid this setting, "real time" is ordinarily measured in seconds that is in very less time.

The discuss transportation skeleton plan is characteristic for MQTT. All gadgets interface with a knowledge connector supplier, like IBM's unused text Locate equipment. We don't want lose paper that the concord labours on tall of convention works that gives an easy, but not in dependable flow.

2. XMPP

XMPP was initially known as jabber. It had been created to quick electric interaction for join people too individuals through content texts. XMPP stands to extensile electric interaction and nearness convention. Once more the title gives a false representation of the focused on utilize: nearness meaning people are personally concerned. XMPP employments an xml content organize as theirs local sort performing person-to-person communication characteristic. Like mqtt it runs over tcp or possibly over hypertext exchange convention on tall of tcp. Its key quality may be a name@domain.com tending to subject that makes a difference interface the unnecessary

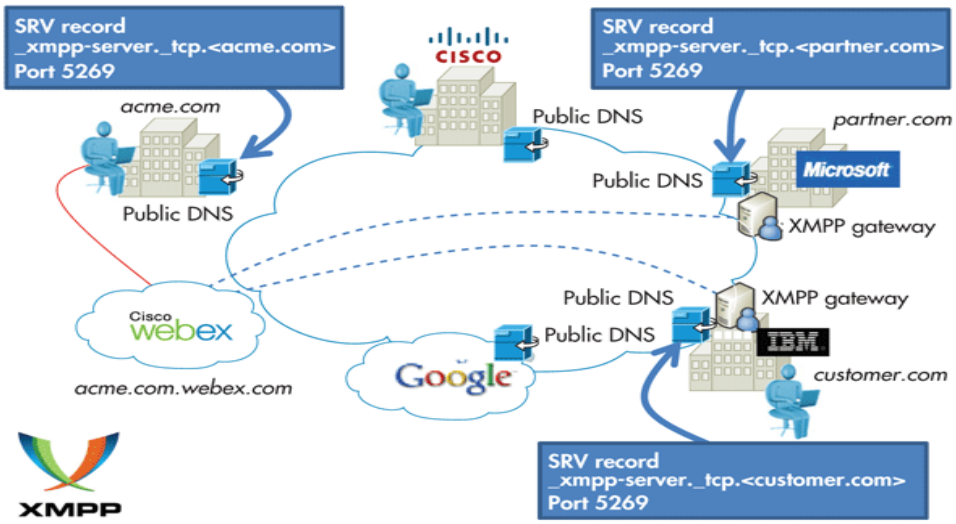


Figure 15: Extensible Messaging and Presence Protocol [13]l

3. DDS

In qualification to mqtt and xmpp knowledge the dissemination benefit dds targets instruments that specifically utilize device information utilize devices information. It disseminates information to elective appliances. Though meddle with the it foundation is backed ddss fundamental reason is to connect gadgets to elective gadgets.

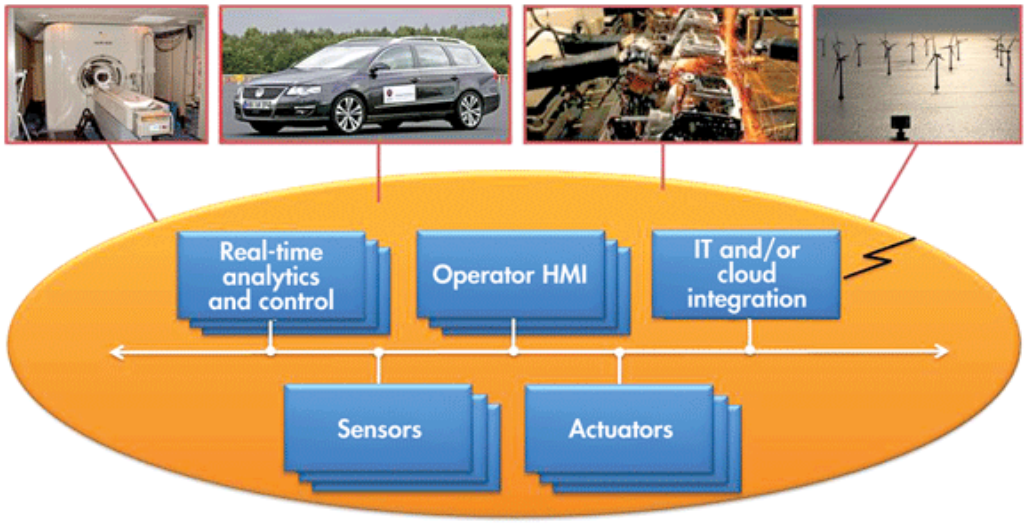


Figure 16: Data Distribution Service [13]

Gadgets request data appallingly something else than the It framework requests data. To begin with gadgets unit speedy. Real time is usually measured in microseconds. Gadgets got to be compelled to communicate with several distinctive gadgets in progressed ways in which hence tcps simple and solid point-to-point streams unit so much as well prohibitive. Instep dds offers explained quality-of-service qos administration multicast configurable configurable responsibleness and inescapable repetition. Moreover fan-out may be a key quality. DDS offers powerful ways in {which} to filter and select particularly which data goes wherever and where are thousands of coincidental goals. a few gadgets square measure small in this way there square measure light-weight adaptations of dds that run in strained situations.

4. Advanced Message Queuing Protocol

It long last a progressed text lining convention amqp is ordinarily thought of relate in nursing iot convention. Amqp are all concerning lines. It sends value-based texts between attendants. As a message-centric software glued that emerged from the managing an account framework it will strategy thousands of solid lined exchanges. Amqp is concentrated on not losing messages. Assist endpoints ought to recognize acknowledgment of each message. The quality moreover portrays relate in nursing no compulsory bunch activity mode with a legitimate point in time commit disposition. Loyal its roots inside the managing an account framework amqp software glued centers on chase all messages and making certain each is conveyed.

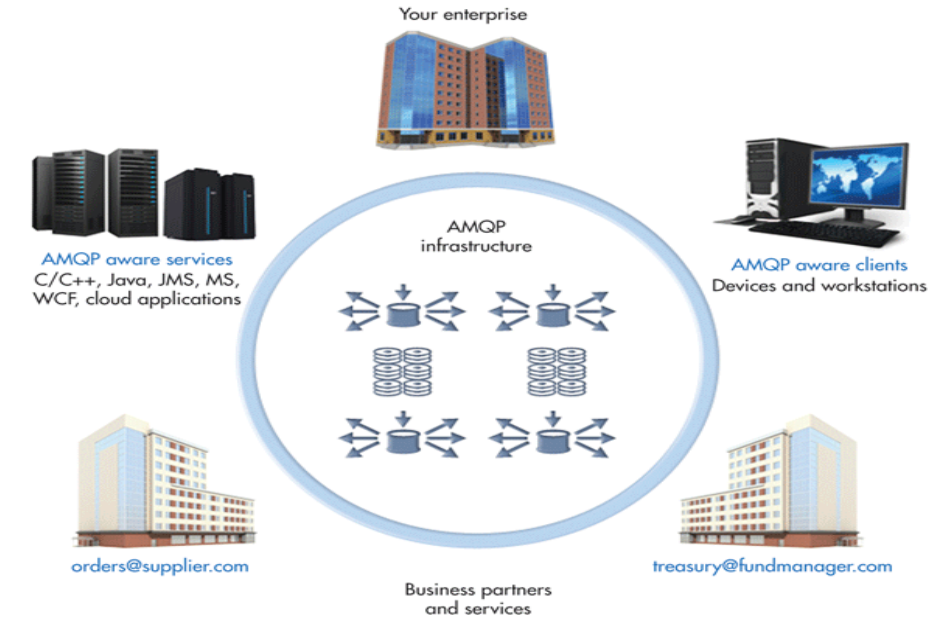


Figure 17: Advanced Message Queuing Protocol[13]

3.2 Design

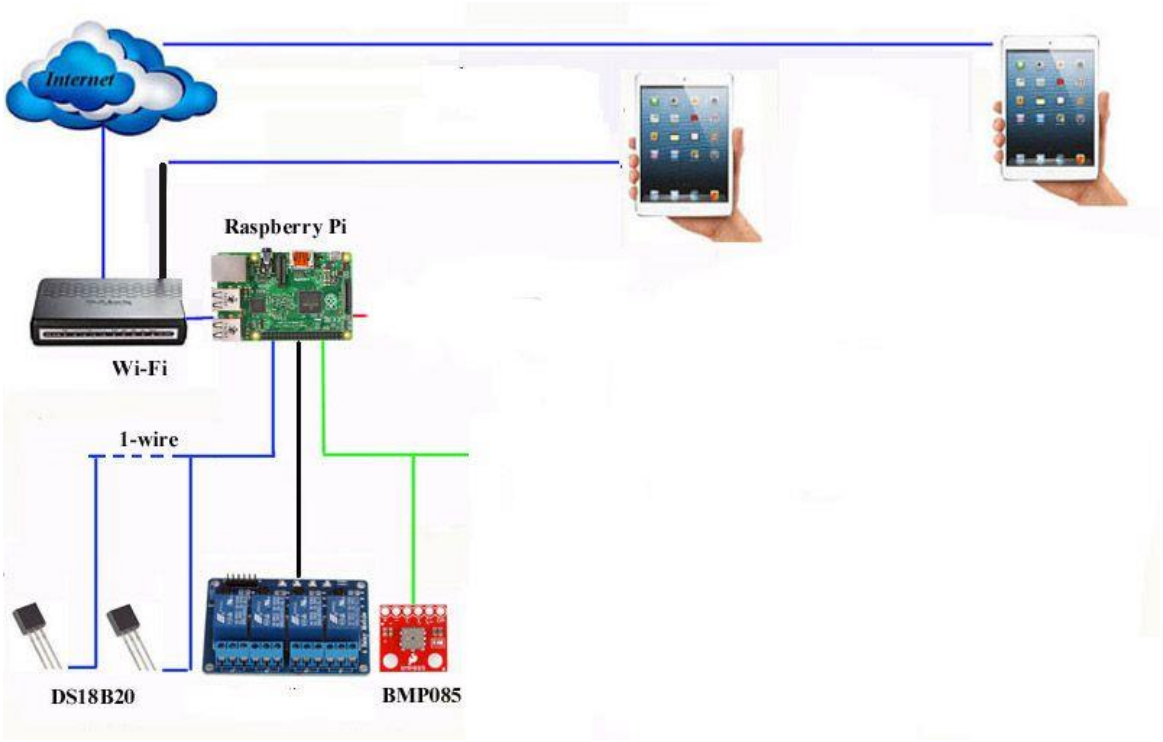
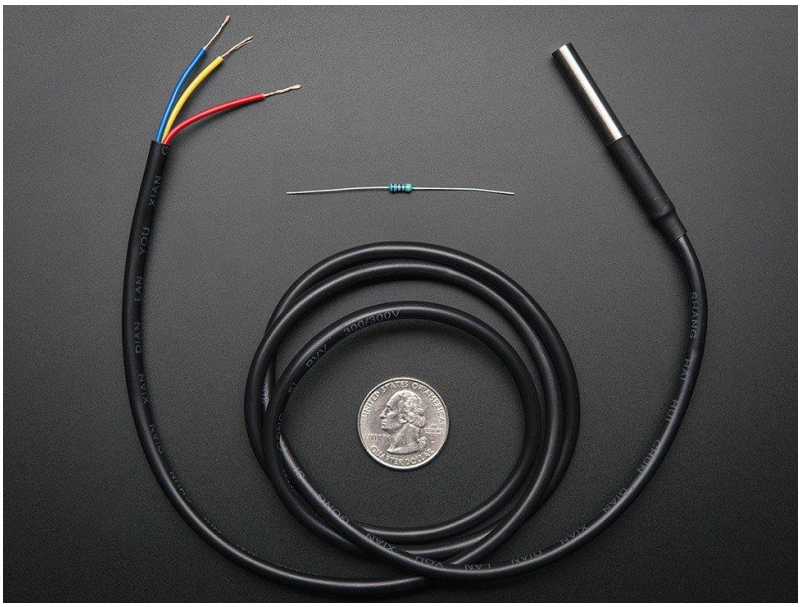


Figure 18: Block Diagram

3.2.1 Temperature Sensing Module Design



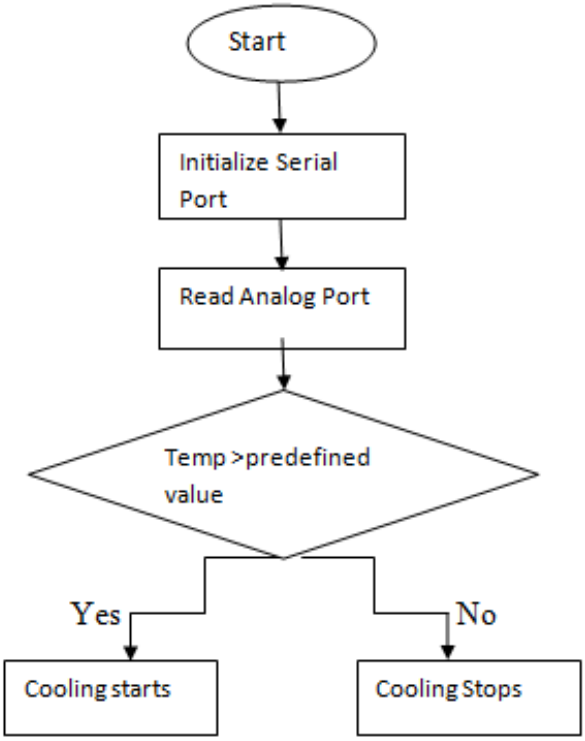
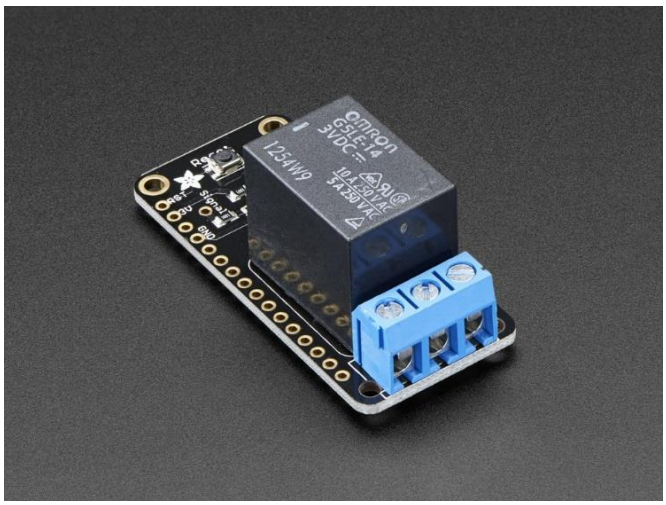


Figure 19: Temperature Sensing Module Design

Pressure Sensing Module



3.2.2 Motion Detection Module Design

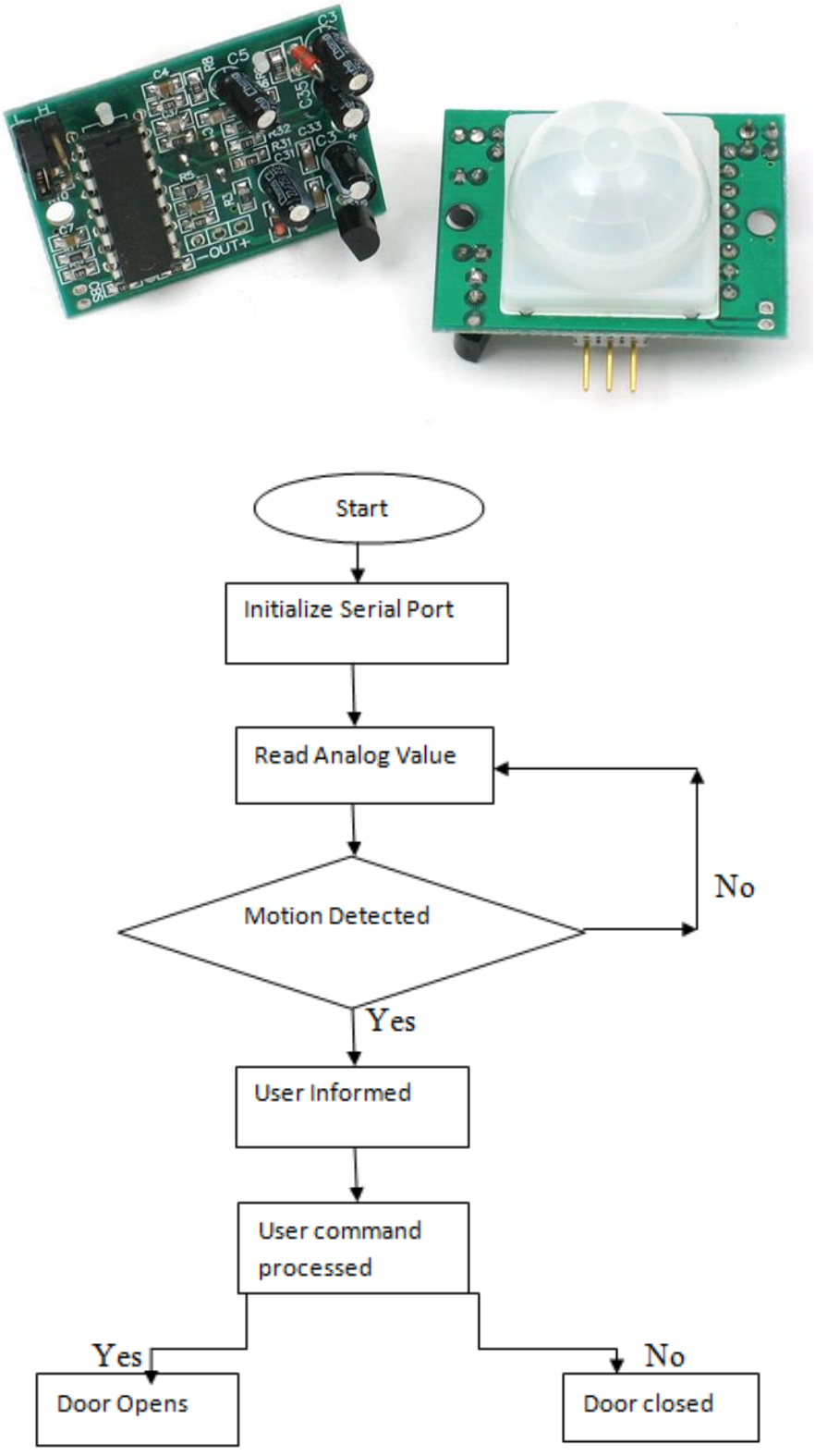


Figure 20: Motion Detection Module Design

3.3 Development:

1. Temperature Sensing Module:

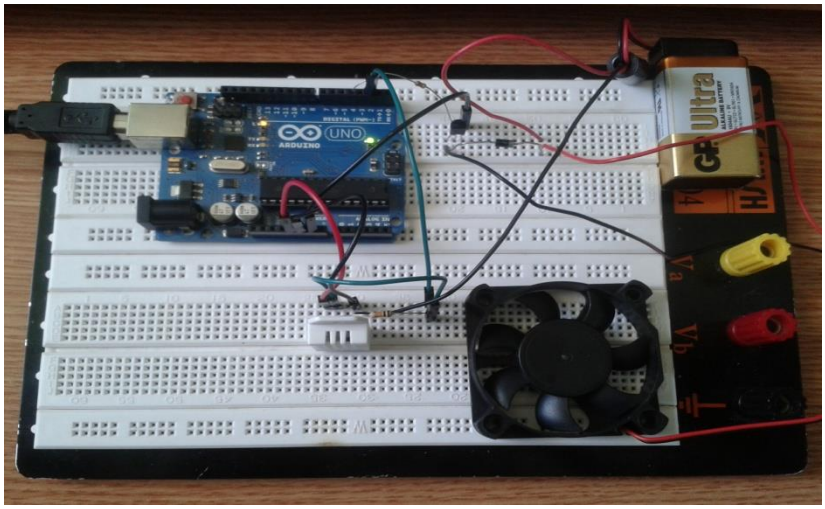


Figure 21: Temperature Sensing Circuit[9]

3.4 Algorithm:

```
#!/usr/bin/python

import json
import sys
import time
import datetime
import Adafruit_DHT
import gspread
from oauth2client.service_account import ServiceAccountCredentials
# Type of sensor, can be Adafruit_DHT.DHT11, Adafruit_DHT.DHT22, or Adafruit_DHT.AM2302.
DHT_TYPE = Adafruit_DHT.DHT11

# Example of sensor connected to Raspberry Pi pin 23
DHT_PIN  = 14
GDOCS_OAUTH_JSON       = 'myhomeiot.json'

# Google Docs spreadsheet name.
GDOCS_SPREADSHEET_NAME = 'Mehak  HomeAutomation Cloud IOT'

# How long to wait (in seconds) between measurements.
FREQUENCY_SECONDS      = 45


def login_open_sheet(oauth_key_file, spreadsheet):
    """Connect to Google Docs spreadsheet and return the first worksheet."""
    try:
        scope =  ['https://spreadsheets.google.com/feeds']
        credentials = ServiceAccountCredentials.from_json_keyfile_name(oauth_key_file, scope)
        gc = gspread.authorize(credentials)
        worksheet = gc.open(spreadsheet).sheet1
        return worksheet
    except Exception as ex:
        print('Unable to login and get spreadsheet.  Check OAuth credentials, spreadsheet name, and make sure spreadsheet is shared to the client_email a
        print('Google sheet login failed with error:', ex)
        sys.exit(1)


print('Logging sensor measurements to {0} every {1} seconds.'.format(GDOCS_SPREADSHEET_NAME, FREQUENCY_SECONDS))
print('Press Ctrl-C to quit.')
worksheet = None
while True:
```

```
worksheet = None
while True:
    # Login if necessary.
    if worksheet is None:
        worksheet = login_open_sheet(GDOCS_OAUTH_JSON, GDOCS_SPREADSHEET_NAME)

    # Attempt to get sensor reading.
    humidity, temp = Adafruit_DHT.read(DHT_TYPE, DHT_PIN)

    # Skip to the next reading if a valid measurement couldn't be taken.
    # This might happen if the CPU is under a lot of load and the sensor
    # can't be reliably read (timing is critical to read the sensor).
    if humidity is None or temp is None:
        time.sleep(2)
        continue

    print('Temperature: {0:0.1f} C'.format(temp))
    print('Humidity:    {0:0.1f} %'.format(humidity))

    # Append the data in the spreadsheet, including a timestamp
    try:
        worksheet.append_row((datetime.datetime.now(), temp, humidity))
    except:
        # Error appending data, most likely because credentials are stale.
        # Null out the worksheet so a login is performed at the top of the loop.
        print('Append error, logging in again')
        worksheet = None
        time.sleep(FREQUENCY_SECONDS)
        continue

    # Wait 30 seconds before continuing
    print('Wrote a row to {0}'.format(GDOCS_SPREADSHEET_NAME))
    time.sleep(FREQUENCY_SECONDS)
```

Figure 23 : Algorithm

4 PERFORMANCE ANALYSIS

3.1 Tabular and Graphical Analysis

1) Temperature Module Analysis

Table 2: Data for Temperature Module

Time	Temperature(°C)
2018-03-13 15:30:51	28
2018-03-13 15:31:42	28
2018-03-13 15:32:36	28
2018-03-13 15:33:25	29

2) Pressure Sensing Module

For pressure sensing

Table 3: Data for pressure sensing

Time	Humidity
2018-03-13 15:34:22	46
2018-03-13 15:34:22	44
2018-03-13 15:34:22	46
2018-03-13 15:34:22	44
2018-03-13 15:34:22	47

2.2 Output Screenshots

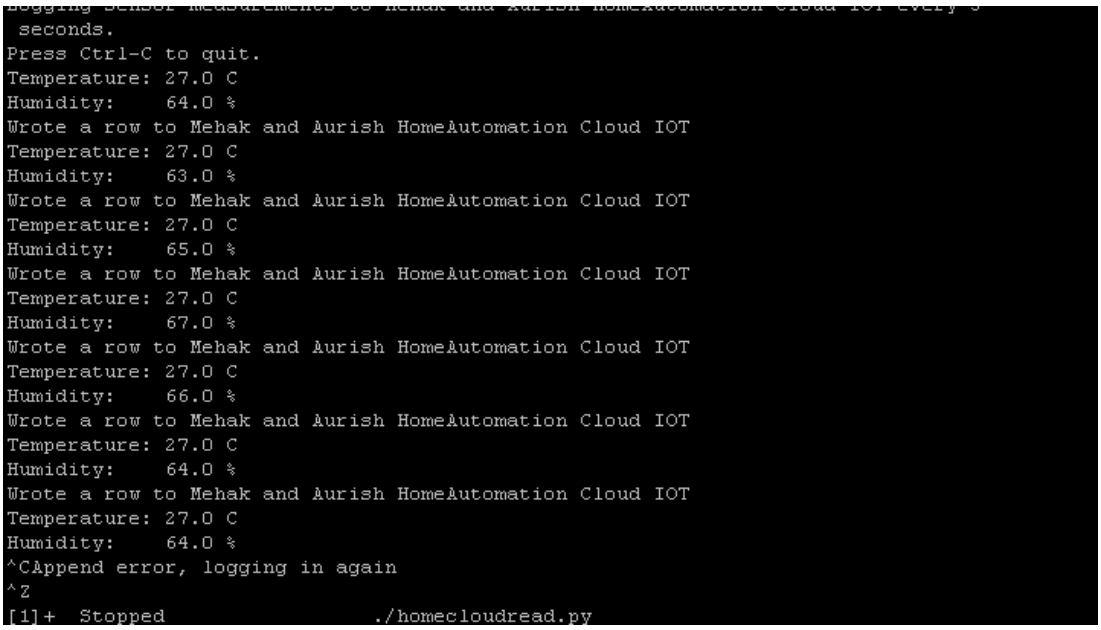
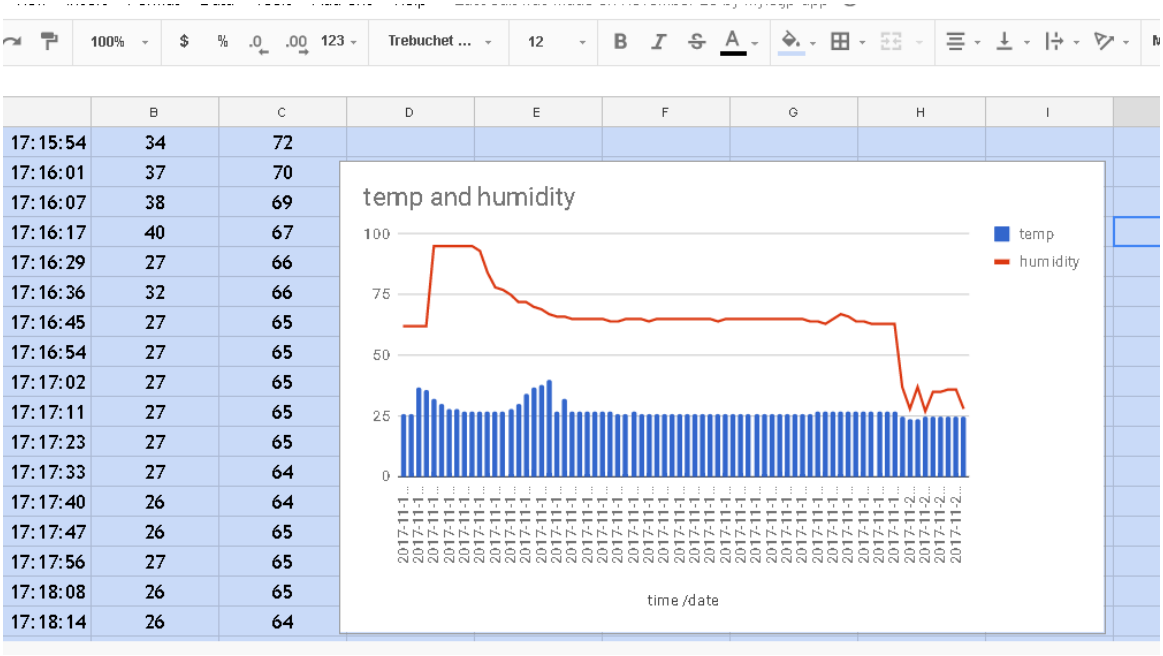
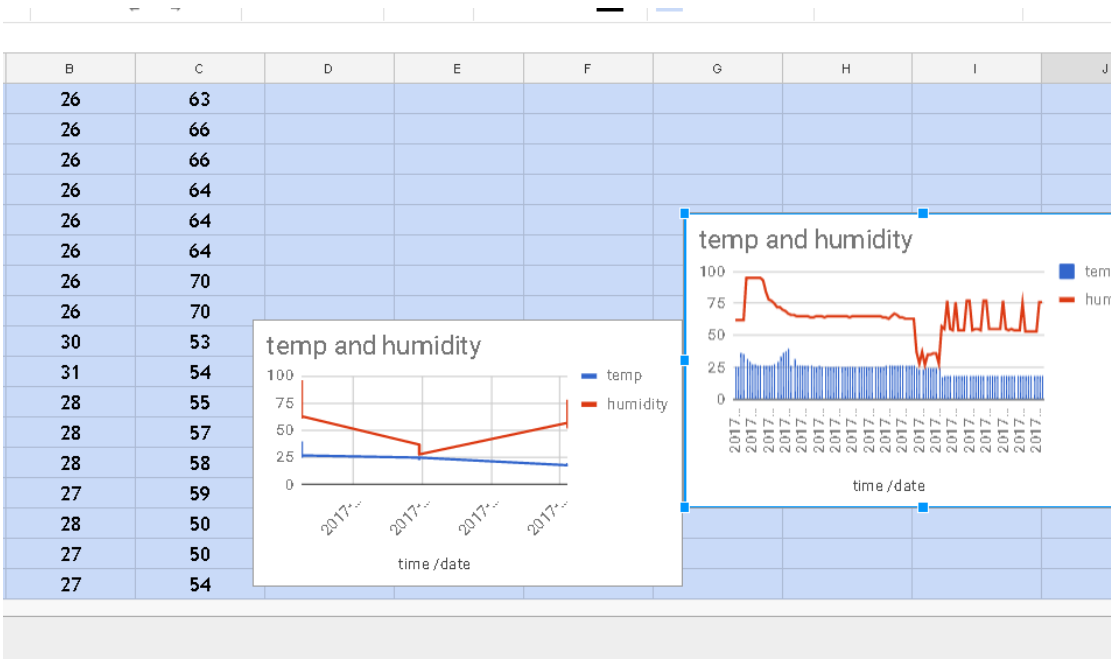


Figure 24 : Light and humidity output



	B	C
17:15:54	34	72
17:16:01	37	70
17:16:07	38	69
17:16:17	40	67
17:16:29	27	66
17:16:36	32	66
17:16:45	27	65
17:16:54	27	65
17:17:02	27	65
17:17:11	27	65
17:17:23	27	65
17:17:33	27	64
17:17:40	26	64
17:17:47	26	65
17:17:56	27	65
17:18:08	26	65
17:18:14	26	64

Figure 25 : Graphical representation



B	C
26	63
26	66
26	66
26	64
26	64
26	64
26	70
26	70
30	53
31	54
28	55
28	57
28	58
27	59
28	50
27	50
27	54

Figure 26 : Graphical Representation

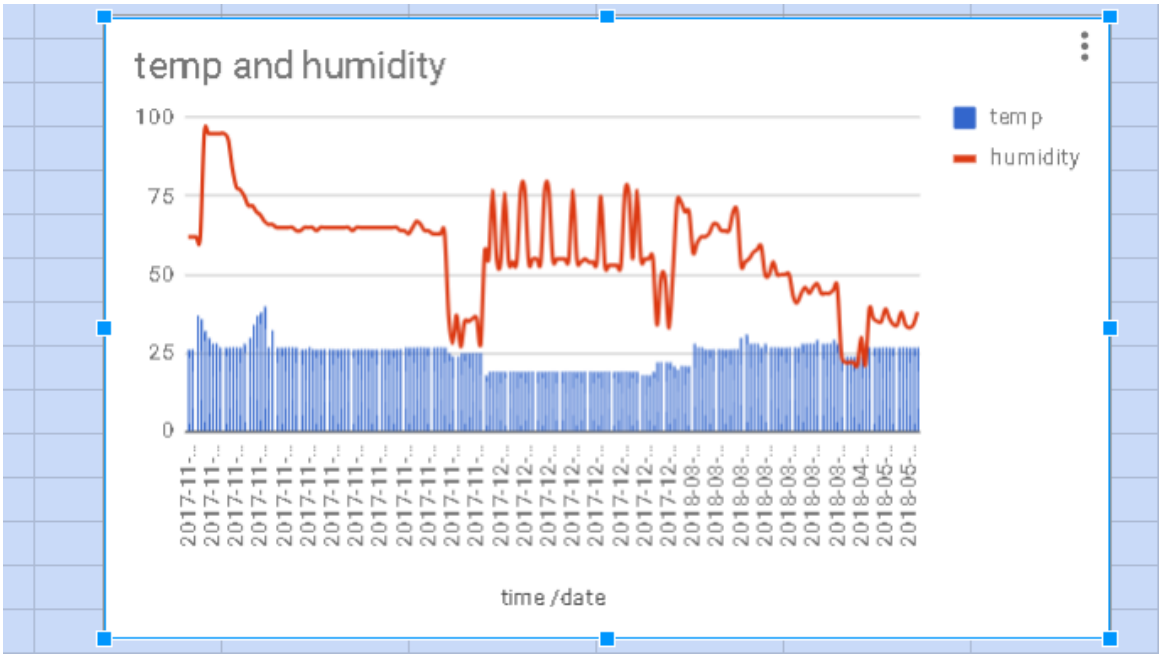


Figure 28 : Graphical Representation

Figure 29 : Android interface Output

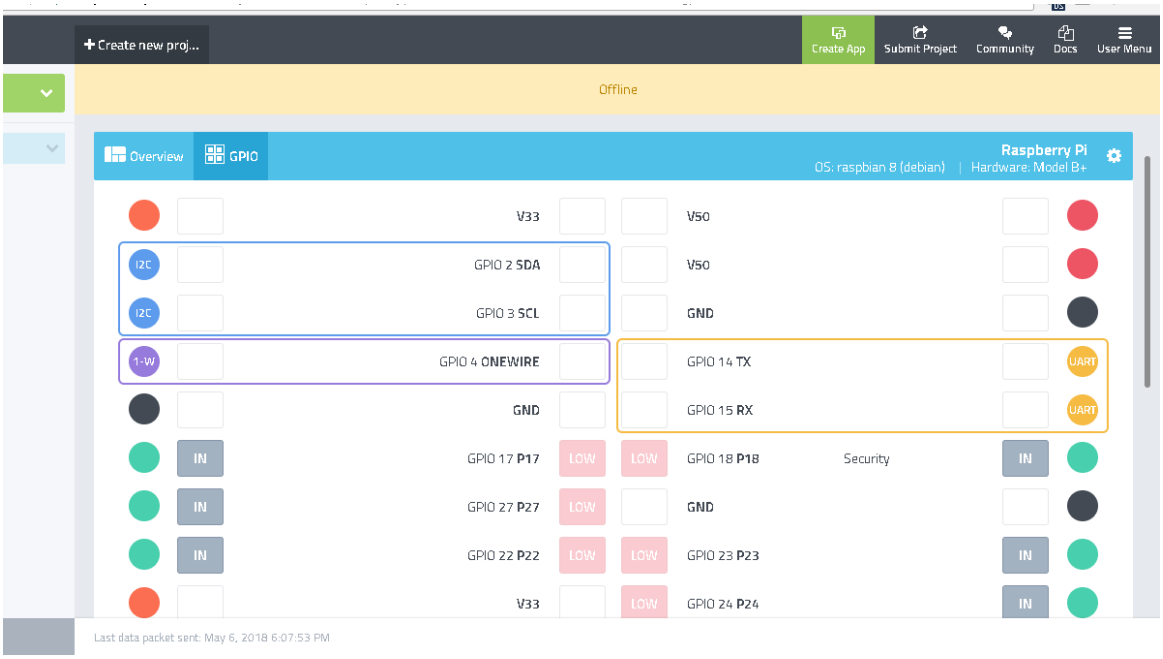


Figure 30 : GPIO Layout

5 CONCLUSION

The home automation victimization net of Things has been through an experiment tested to figure acceptably by coupling straightforward gadgets to that and also the instruments were with success regulated. The designed method not solely watchdog the detector knowledge, like frigidness, illumination, gesture detector, however conjointly trigger a method in keeping with the necessity, for instance switch on the sunshine once it gets dark. This can facilitate the user to investigate the state of varied guideline within the abode anytime.

FUTURE SCOPE:

Using this procedure as a skeleton , the system will be dilate embrace to incorporate numerous alternative choices that might encompass abode protection feature like apprehend the icon of an individual getting into and causing it to the owner through WhatsApp. This can increase the safety and change to stay a check on his house

from anywhere. The system will be expanded for automation of assorted alternative devices reception. This type of system with individual changes will be enforced within the sanatorium for incapacitated or in workshop wherever human annexation is not possible or treacherous. Thus, leading to a whole automatic and simple to use system.

5.1 ASTUTE DWELLING EXPANSIONS

Telecom connectedness: A Wi-Fi empowered centre that doesn't got to be physically associated to your switch could be a great wagered, as this gives you more alternatives as to where you put it in your domestic**.**

Enlargement potential: The largre the number of articles/gadgets it can support, the better will be the extension.

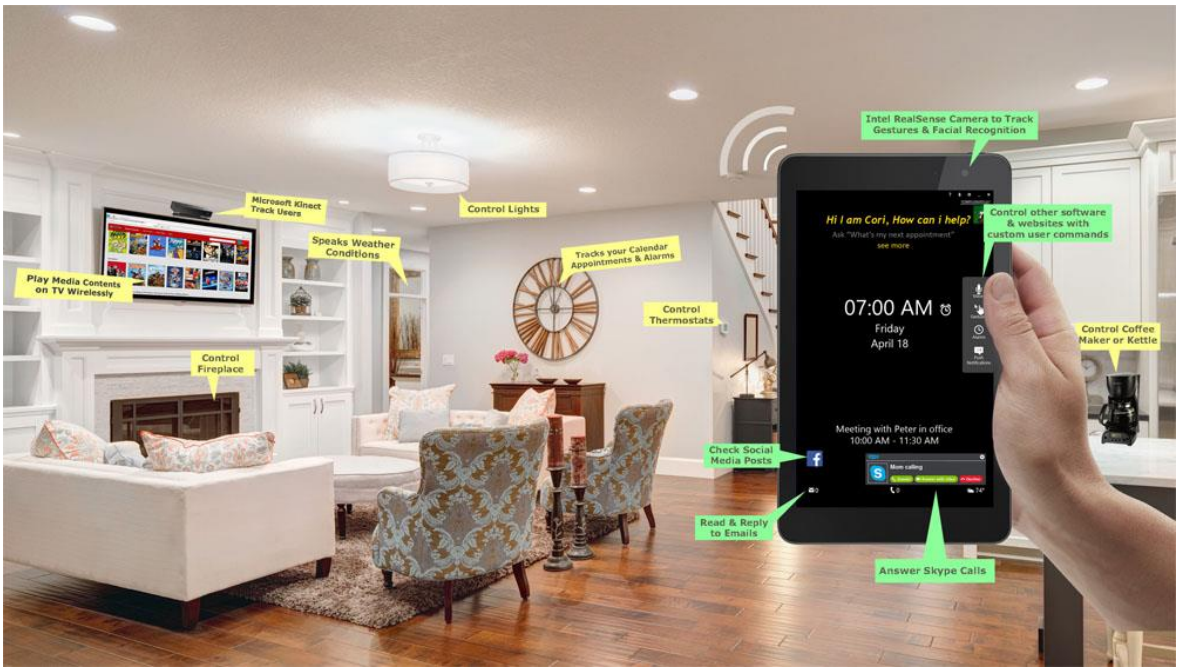


Figure 31: Smart Home [15]

Protocol compatibility: A axis which will interact with the main home automation protocols—Zigbee, Z-Wave, Wi-Fi and Bluetooth LE—is important, however what's a lot of necessary is ensuring it communicates with the devices you have already got in

App control: While the internet location unbiased ground is nice to have, collect certain your centre has Relate in nursing in nursing app that's like-minded beside your Smartphone. A programmed domestic works way more swimmingly from the crown of your hand.

Scheduling /Computerization System: The hub's software package got to be prepared to made plans for gadgets for your gadgets and make activities to connect completely distinctive gadgets, like Relate in Nursing activity that turns your lights off once you.

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7 APPENDICES

- Getting results in your google Drive

  In this project we are importing libraries from google into the python code s that one can connect his automated house with their google drive. This can be done by importing gspread and then authenticating the accounts credentials.
  Google offers you fifteen GB of house for Google Drive, Gmail, and Google+ Photos, utterly free. Any you'll browse and open your files on Windows, MAC, Android, iPhone/iPad, on Windows Phone and also the internet Interface.

  For Linux, there's no back from google there's no bolster from Google, be that as it may there's relate Open computer program known as Grive. Here I will be able to depict a way to Setup Grive on the Raspberry Pi and the way to line up a Filesystem Watcher which is able redress the Google Drive folder once a record is extra, erased or altered. Fortunately, you'll not get to store or perhaps enter your Google word on the RPi. Or maybe the verification is completed by means of get to tokens (see OAuth). Google issues a content token that authorizes Grive to get to your Google Drive. With the token the app will see your E-Mail address with fundamental account data and get to your Google Drive Records and Google Docs be that as it may it cannot get to your Gmail or Google+ account. You'll check and deny the rights at this URL.