Real Time Smart Supervision System Using Internet of Things

Submitted in partial fulfillment of the requirements
of the degree of
Bachelor of Engineering
By

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(2016-2017)

CERTIFICATE

This is to certify that the project entitled **"Real Time Smart Supervision System Using Internet Of Things"** is the bonafide work carried out by

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B.E EXTC students of Anjuman-I-Islam Kalsekar Technical Campus , Panvel ,during the year 2016-17, in partial fulfillment of the requirements for the Bachelor of engineering in Electronics and telecommunication engineering and is submitted to the Mumbai University. The project has been approved.

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(H.O.D)	**(Examiner)**	**(Guide)**
Prof. Mujib Tamboli		**Prof.Mazhar Malagi**

APPROVAL SHEET

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Project Report Approval for B. E.
This project report entitled (**Real Time *Smart supervision system using IoT***) by

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Examiners

1.----------

2.----------

Supervisors

1.----------

2.----------

Chairman

Date:

Place: New Panvel

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DECLARATION

I declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Date:

ACKNOWLEDGEMENT

We appreciate the beauty of a rainbow, but never do we think that we need both the sun and the rain to make its colors appear. Similarly, this project work is the fruit of many such unseen hands. It's those small inputs from different people that have lent a helping to our project. It is a matter of great privilege for our team to present this project on "Real time smart supervision system using Internet Of things".

I also take this opportunity to express a deep sense of gratitude to Asst.Prof. **Mr. Mujib Tamboli,** HOD of EXTC department for his cordial support, valuable information and guidance, which helped us in completing this task through various stages.

I take this opportunity to express my profound gratitude and deep regards to our guide Asst.Prof**.Mazhar Malagi** for his exemplary guidance, monitoring and constant encouragement throughout the course of this project work. We also take this opportunity to thank our Lab Assistant Mr. **Shaikh Ismail** of Signal processing lab and Supportive incharge Mr. **Vikash Chauhan** for providing access to the lab and support.

I am obliged to the staff member of AIKTC, for the valuable information provided by them in the respective fields. I am grateful for their cooperation during the period of my project work.

ABSTRACT

Nowadays, the Closed-Circuit Television (CCTV) surveillance system is being utilized in order to keep peace and provide security to people. There are several defects in the video surveillance system, such as: picture is indistinct, anomalies cannot be identified automatically, a lot of storage spaces are needed to save the surveillance information, and prices remain relatively high. The project deals with the design and implementation of a low-cost system monitoring based on Raspberry Pi, a single board computer which follows Motion Detection algorithm written in Python as a default programming environment. In addition, the system uses the motion detection algorithm to significantly decrease storage usage and save investment costs. The algorithm for motion detection is being implemented on Raspberry Pi, which enables live streaming camera along with detection of motion. The live images can be viewed from any web browser even from mobile in real-time.

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Chapter-1
Introduction

A significant number of secure systems are concerned with monitoring the environment. The most obvious example is the burglar alarm. Then there are meters for measuring consumption of utilities such as gas and electricity. At the top end of the scale, there are systems used to verify nuclear nonproliferation treaties, where a number of sensors (seismometers,closed-circuit TV, and so on) are emplaced in a state's nuclear facilities by the International Atomic Energy Authority (IAEA) to create an immediate, indelible, and remote log of all movements of fissile substances. There are also vehicle systems, such as missile telemetry, taximeters, and tachographs (devices used in Europe to record the speed and working hours of truck and bus drivers). These have a number of interesting features in common. For example, to defeat a burglar alarm it is sufficient to make it stop working, or—in many cases—to persuade its operators that it has become unreliable. This raises the specter of denial of service attacks, which are increasingly important yet often difficult to deal with. Just as we have seen military messaging systems designed to enforce confidentiality, and bookkeeping systems whose goal is to preserve record authenticity, monitoring applications give us the classic example of systems designed to be dependably available. If there is a burglar in my bank vault, then I do not care very much who else finds out who it was who told me; but I do care very much that an attempt to tell me is not thwarted. An alarm in a bank vault is very well protected from tampering (at least by outsiders), so it provides the simplest case study. We are largely concerned with size of the data stored .But many other monitoring systems are very exposed physically. Utility meters are usually on the premises of the 208 consumer, who has a motive to cause them to make incorrect readings. Much the same goes with taximeters: the taxi driver (or owner) may want the meter to read more miles or more minutes than were actually worked. With tachographs, it's the reverse. The truck driver usually wants to drive above the speed limit, or work dangerously long hours, so both types of attack are found. The driver can either cause the tachograph to fail, or to make false readings of time and distance. These devices, too, are very exposed to tampering. In both metering and monitoring systems (and especially with nuclear verification) we are also concerned with evidence. An opponent could get an advantage not just by manipulating communications (such as by replaying old messages) but by falsely claiming that someone else had done so.

Monitoring systems are also important because they have quite a lot in common with systems designed to enforce the copyright of software and other digital media. They also provide a gentle introduction to the wider problem of service denial attacks, which dominate the business of electronic warfare, and are starting to be of grave concern to electronic commerce.

It is crucial to take security seriously in this day and age. It is not just businesses and commercial properties that need good security but it is our homes too. With crime increasing and burglaries very common place, it is very important to consider the available security options and choose one that is the best fit for you. One of the most popular and cost effective ways of providing security in the home and place of work is with CCTV cameras and equipment. CCTV cameras can act as a very successful deterrent to thieves and burglars, certainly making them think twice at the very least. The technology behind security equipment these days is incredib advanced, and it is even possible to hook the cameras up to an ordinary television or computer to watch the footage.

Chapter-2

Problem Statement

Closed-circuit television (CCTV) or video surveillance is the most useful technology mostly used in the field of security purposes. CCTVs can be found at many places ranging from public to private places. One of the most challenging problems in installing the CCTV cameras at large scale is storage space occupied by the footage. Footage is mostly stored in secondary storage devices like hard disk drives. So, to reduce the storage space, different techniques are used. The main aim of our project is to minimize the data storage requirement of CCTV cameras. Let's see this table which shows the daily storage requirement of CCTV camera all around the world depending upon the quality of video.

Video	Storage requirement/day(Gb)
CIF	4-5
D1	8-10
720P	20-22
1024P	31-33
1080P	43-45

The problem with the above data is that the videos recorded by CCTV cameras; most of the time does not contain any information. For e.g. suppose a CCTV camera is installed in the library of a college and the camera is recording continuously even though there is nothing going in front of it(during recess). That means the data which is stored during this period does not contain any information but it is taking a lot of storage which can be used for storing proper information.

One of the other problem with a traditional CCTV is if a person wants to view the recorded videos he/she have to be in the same location as the CCTV camera that means he has to be physically present where the CCTV is installed. This is also a serious problem. Suppose a personhas installed CCTV camera in his office and he wants to see the recorded videos when he is at his home. It is not possible with the present CCTV system.

Chapter-3
Review of Literature

1. A Progress Review of Intelligent CCTV Surveillance Systems:

CCTV based surveillance has developed from simple systems comprising a camera connected directly to a viewing screen with an observer in a control room, watching for incidents of crime or vandalism or searching for targeted individuals, to complex multi camera systems with many computers.

The project Smart CCTV camera surveillance system is to enhance the CCTV camera based security systems, which presently exist in different places. The Project Security System by using CCTV Camera is designed using wireless technology. For the object detection no need of multiple camera only single camera cover large area. As the number of camera increases also the cost increases therefore in this project single camera is used for cost effectiveness.

2. Webcam Based Intelligent Surveillance System

The objective of this project is to develop a system that monitors the area in which it is being implemented. An Intelligent Monitoring Sensor is applicable in the area where no one is permissible to enter, also where we need to detect if any motion has been done. Camera used here is not movable. it is fixed in the monitoring area also the camera is continuously on.

In this project in automatic mode PIR sensor will detect person movement and will give signal to the microcontroller to start the CCTV camera by using Relay. IR sensor will track the person movement and give the signal to micro controller. Accordingly stepper motor will be actuated to rotate the CCTV assembly.

3. Design and Implementation of an Embedded Home Surveillance System:

Web camera is used to capture the images and this capture images upload on wed server for this internet connection is required. But in Smart CCTV camera surveillance system no need of internet connection.

4. Raspberry pi Based Supervision System

This paper implemented in a real-time digital video monitoring system with data control and acquisition. Based on the ARM - Linux embedded platform, the real-time video monitoring system fulfills the following functions: to collect video with USB camera, to encode video based on ARM - Linux platform; to transmit video through LAN or internet; to receive, to decode, and

to display the H.264 video data in real-time. In order to fulfill the functions above, the chipset BCM2835 from Broadcom is chosen as MCU which has powerful ARM11 application.

They are collect and encode video, device operation at a time it is necessary to apply multiple threads to real-time video monitoring system to ensure its real-time performance. The real-time embedded video monitoring system sends video in child thread captures video and encodes it in main thread, and they interact through a circular buffer queue in order to reduce influence between data sending and encoding.

Chapter-4
Present Project

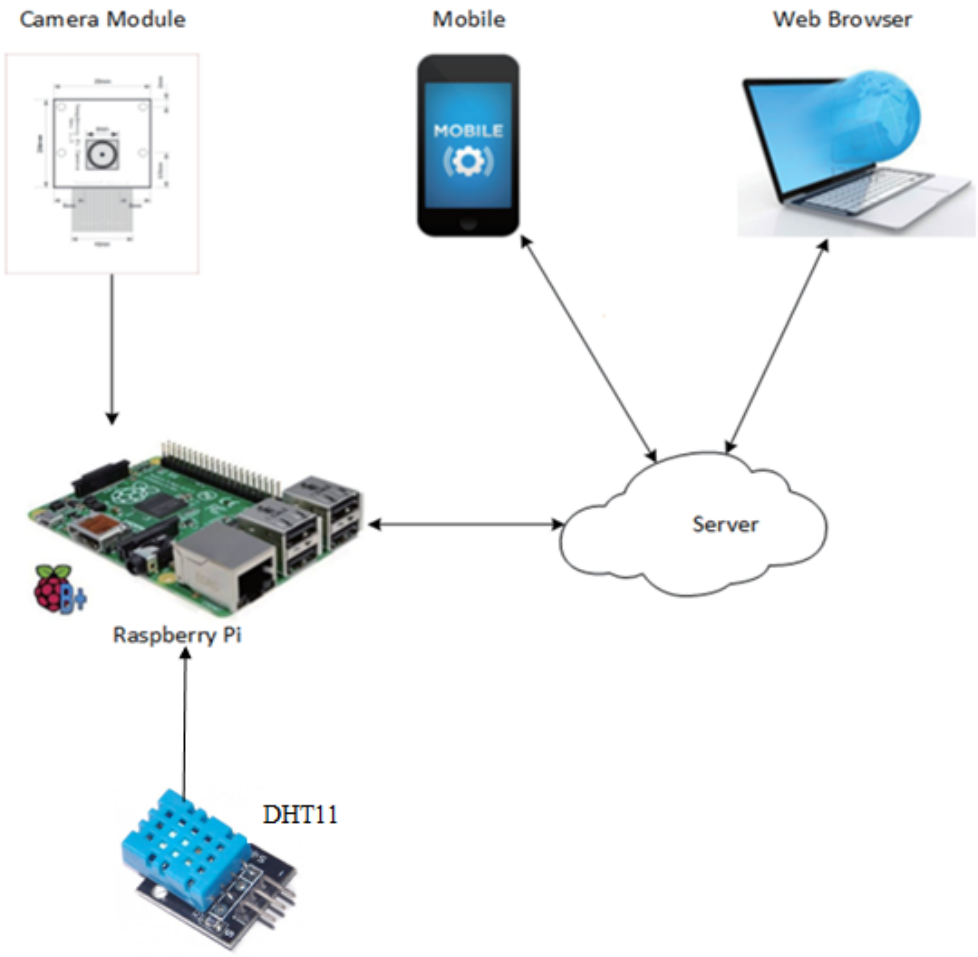
The proposed work is Smart CCTV camera surveillance system. Smart CCTV camera surveillance system is to enhance the CCTV camera based security systems, which presently exist in different places. The major disadvantage with the above mentioned reviews are that the CCTV camera will record continuously or will detect the motion when someone is in the particular sensor range but it won't send any notification to the authenticated person so the person won't know if someone is present in the restricted area or not.

To overcome this we are proposing a system which will capture images only in the presence of someone or if it detects a motion along with that it will notify the authorized person that someone is in the area. Also the stored images can be viewed from any web client with access to internete. This will result in major reduction in data storage as today's CCTV camera has high video quality which requires large data storage space.

The image can be seen from web server or from mobile application which only the authorized person can access it. Thus it will result in universal access of the surveillance image. In addition to camera, we are also using temperature and humidity sensor. So these sensors data will be also uploaded to the web server. The Proposed system is capable of monitoring indefinitely without any delay and without putting any harm's way.

Chapter-5

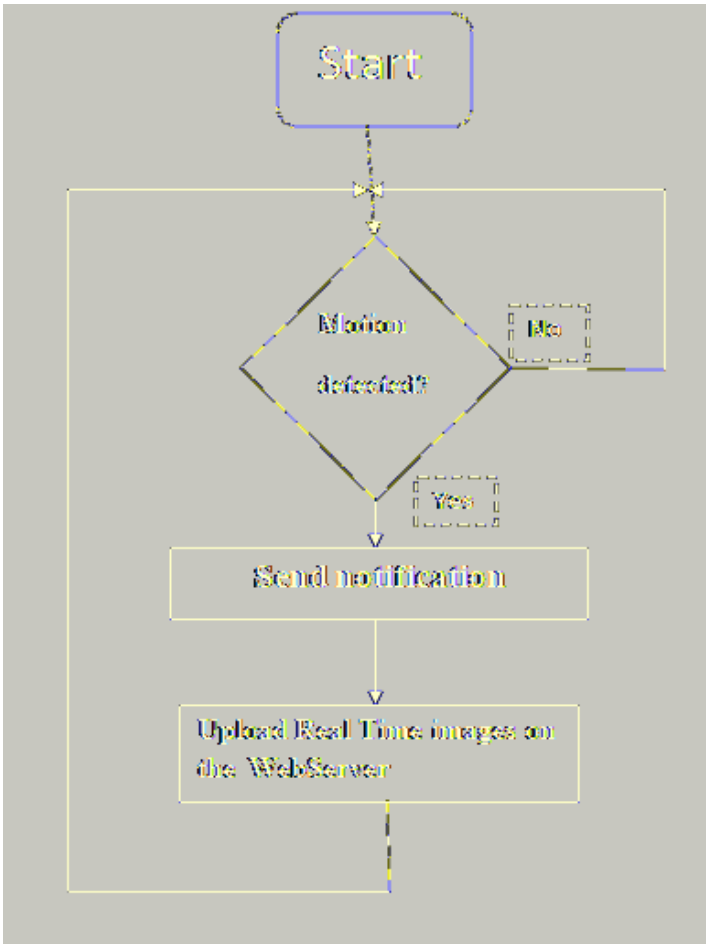
Block Diagram



5.1 Working Principle

The system architecture is shown in Figure 1.It consist of few devices like Raspberry Pi,Camera Module and DHT11. The camera module is connected to the Raspberry Pi board can be used to take high definition video, as well as stills photographs. The camera module work on the principle of motion detection algorithm, motion detection algorithm work on the basis of frame difference meaning comparing how pixels change location after each frame. The method looks for object change in the image. The motion detection algorithm would used to help to minimize the recorded data storing capacity .The camera module will first click an image and use it as a reference frame. The camera module is continuously on and if there is no motion detected the program will not save the images otherwise if motion is detected the current frame of the detected motion will be processed by motion detection algorithm. The camera will now start capturing the images and at the same time raspberry pi sends notification message to the authenticated user using pushbullet this notification contains a message that the motion is detected and also show the link or address from where we can see the captured images . Users will be able to view the Real Time data from server on any device that has a webbrowser and access to internet. This includes the IPad/iPhone and Android devices.The other part is temperature and humidity monitoring system using DHT11 module in this system the raspberry pi read temperature and humidity data from the DHT11 module and upload this data to the webpage in every 30 seconds. The user will be able to watch the real time temperature and humidity data graphically from the thingspeak webpage .The working principle will be more clear through the flowchart.

5.2: Motion Detection Flowchart



This is the flowchart of motion detection section.

When the program on the raspberry pi is started .The camera module will load the required libraries that it will need for capturing frame and calculating the difference between the frames.First, the camera module will take a picture and store it in the raspberry pi and it will use that stored picture as reference frame.The camera will take another picture and calculate the frame difference between the stored frame and the newly taken frame. If the difference between the frames are larger than some threshold that means that there have been some motion in front of it. So the camera will capture the image and store it on the raspberry pi.

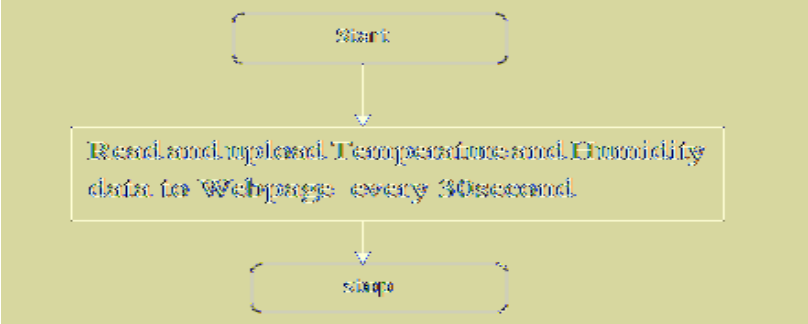
The above process will be repeated continuously whenever there is motion.

Also the raspberry pi will send notification to the person on subscribed to the channel mentioned in the program of raspberry pi of PushBullet.This will happen every time a motion is detected.

If the frame difference is very less that means that there is no motion and the pi will keep on capturing frames and calculating the difference but will stored the frames only if there is motion.

The image stored on the Raspberry pi can be viewed from a webbrowser with internet connectivity. The folder containing the images are hosted on a server using Raspberry pi. For accessing the image , a person should have the IP address of the server.

5.3 DHT11 Flowchart



This is the flowchart of DHT11

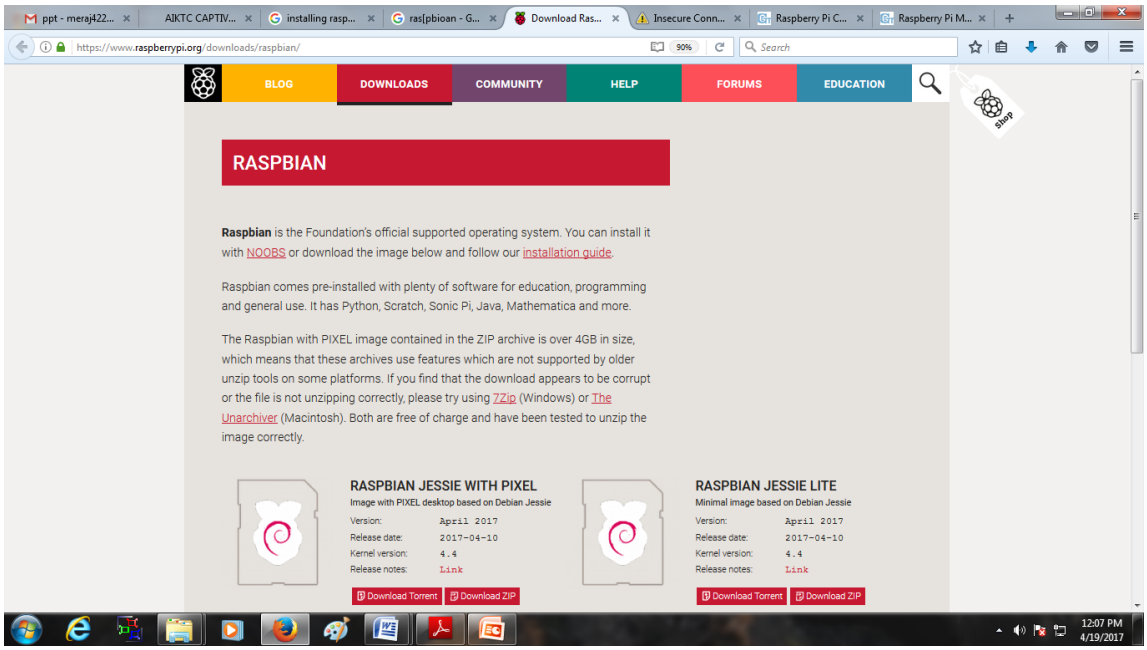
in this flowchart first will start the raspberrypi and DHT11 module the raspberrypi read the temperature and humidity data from DHT11 module and upload the data in every 30 seconds to the things peak website. The user will be able to watch the real time data graphically from the things peak webpage .This cycle will be repeated

Chapter-06

Making of project

6.1 Installing OS

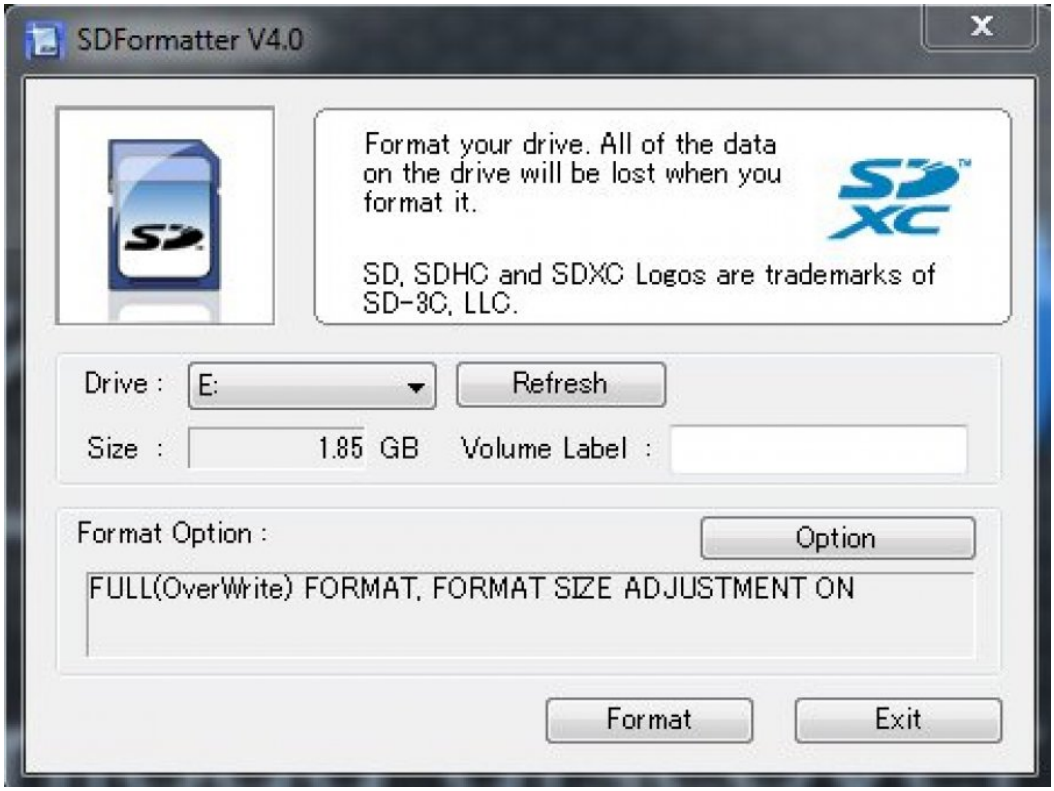
Download the latest version of Raspbian



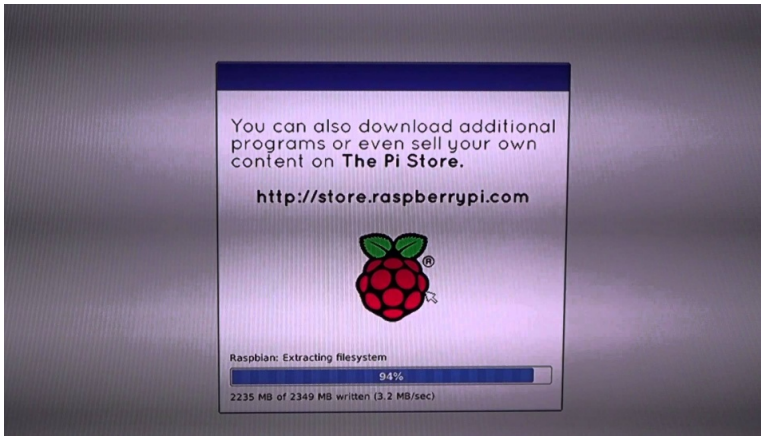
Selecting SD card

For installation of raspbian, the minimum recommended card size is 8GB. For image installations we recommend a minimum of 4GB. The card class determines the sustained write speed for the card; a class 4 card will be able to write at 4MB/s, whereas a class 10 should be able to attain 10 MB/s. However, it should be noted that this does not mean a class 10 card will outperform a class 4 card for general usage, because often this write speed is achieved at the cost of read speed and increased seek times.

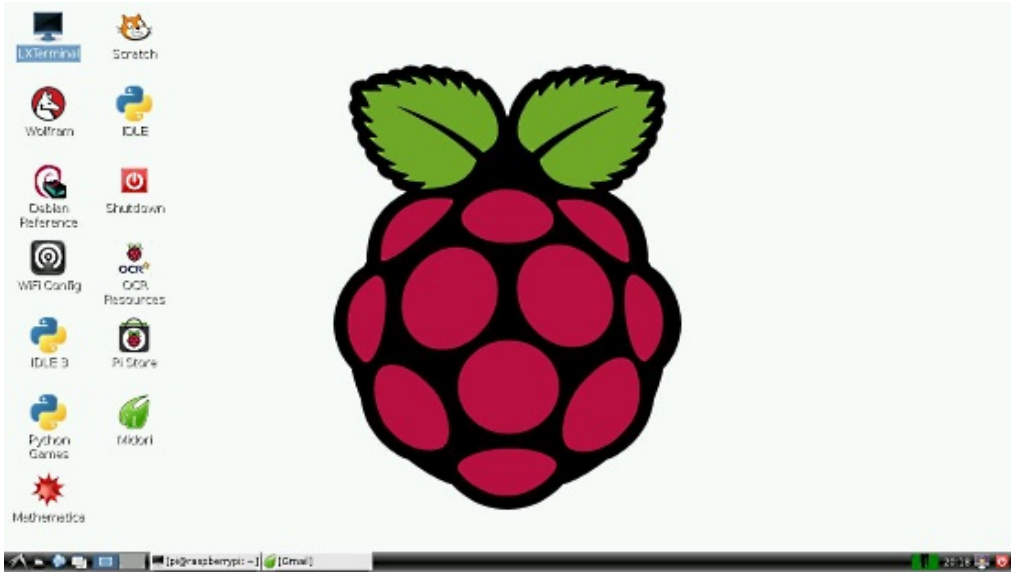
Formatting SD card



6.2 Booting the Raspberry pi

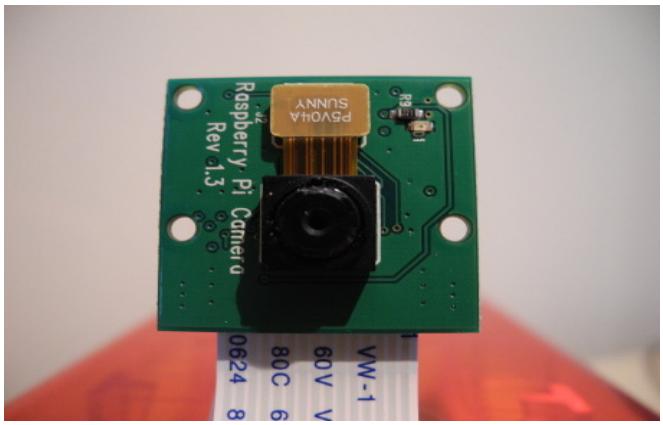


Updating the firmware



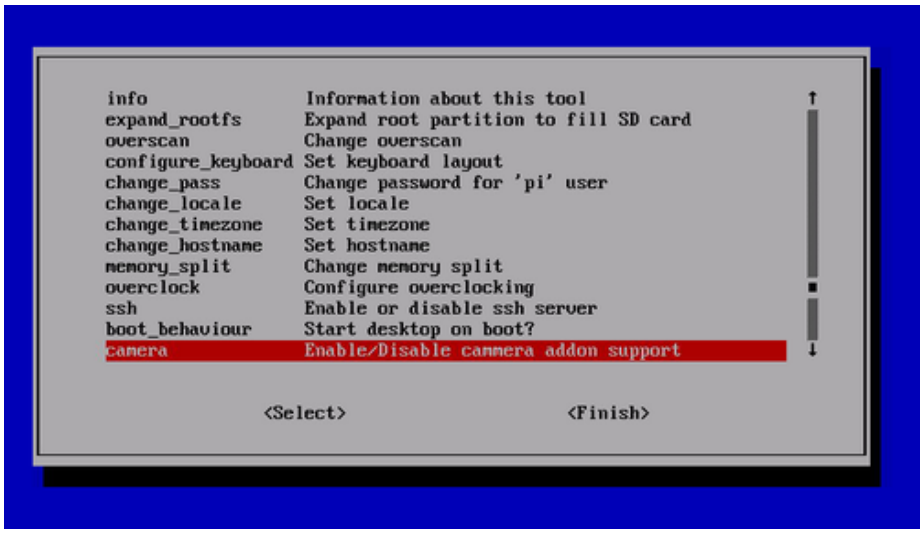
After the reboot from the previous step, if everything went right, then you will end up on the desktop which looks like the image below. Once you are on the desktop, open a terminal and enter the following command to update the firmware of the Pi:sudo rpi-update .Updating the firmware is necessary because certain models of the Pi might not have all the required dependencies to run smoothly or it may have some bug. The latest firmware might have the fix to those bugs, thus its very important to update it in the beginning itself.

6.3Enabling and Interfacing Camera

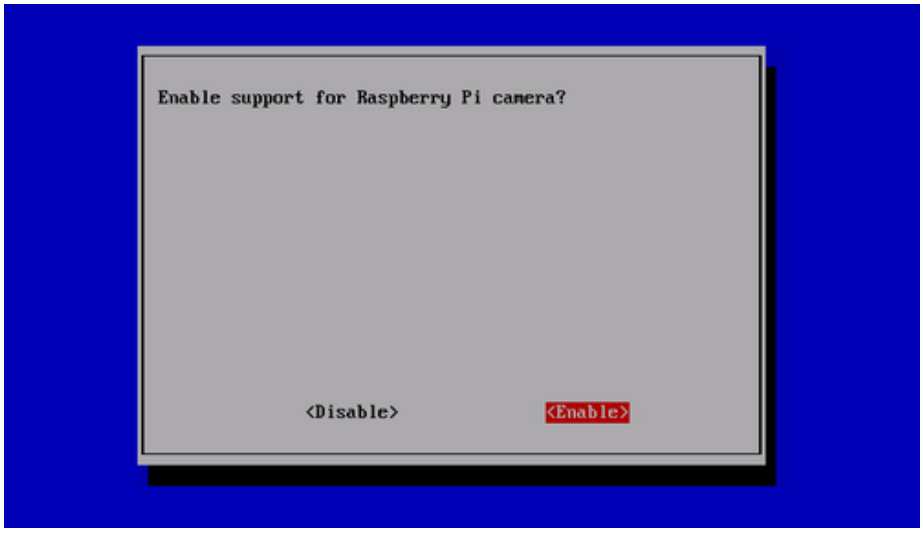


The camera consists of a small (25mm by 20mm by 9mm) circuit board, which connects to the Raspberry Pi's Camera Serial Interface (CSI) bus connector via a flexible ribbon cable. Installation involves connecting the ribbon cable to the CSI connector on the Raspberry Pi board. This can be a little tricky; otherwise you can damage the camera.

Enabling the camera



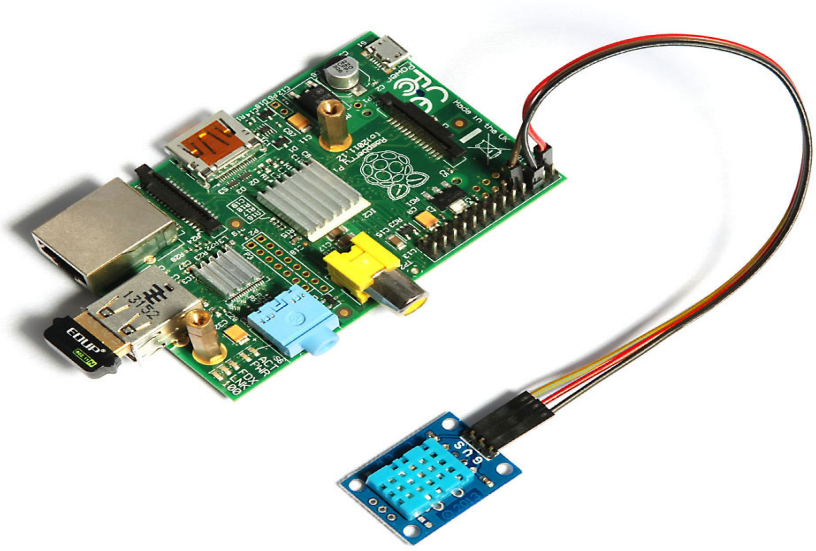
Enable camera in raspi-config settings



Select “Enable” and press “Enter”.

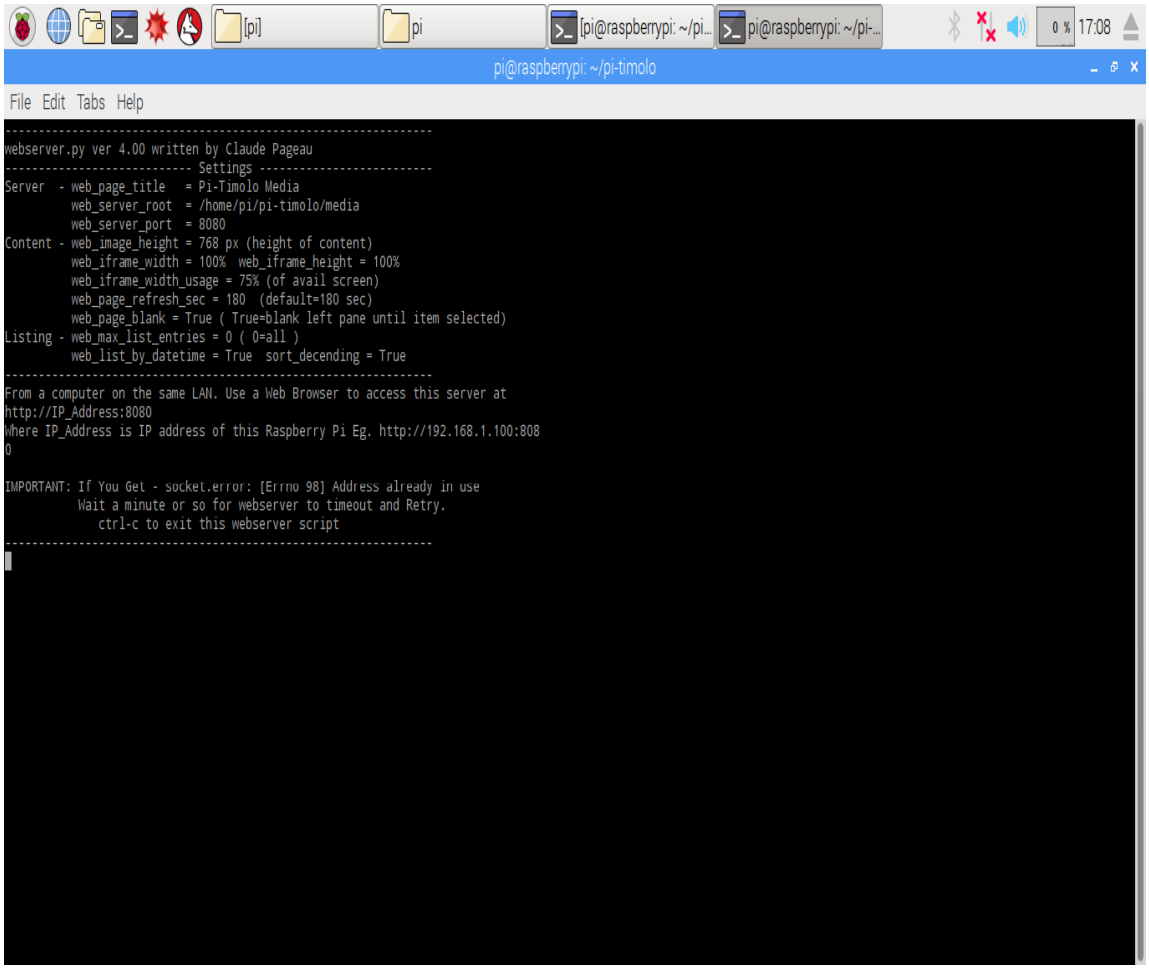
Select “Yes” and press “Enter”. Your Pi will reboot.

6.4. Interfacing DHT11

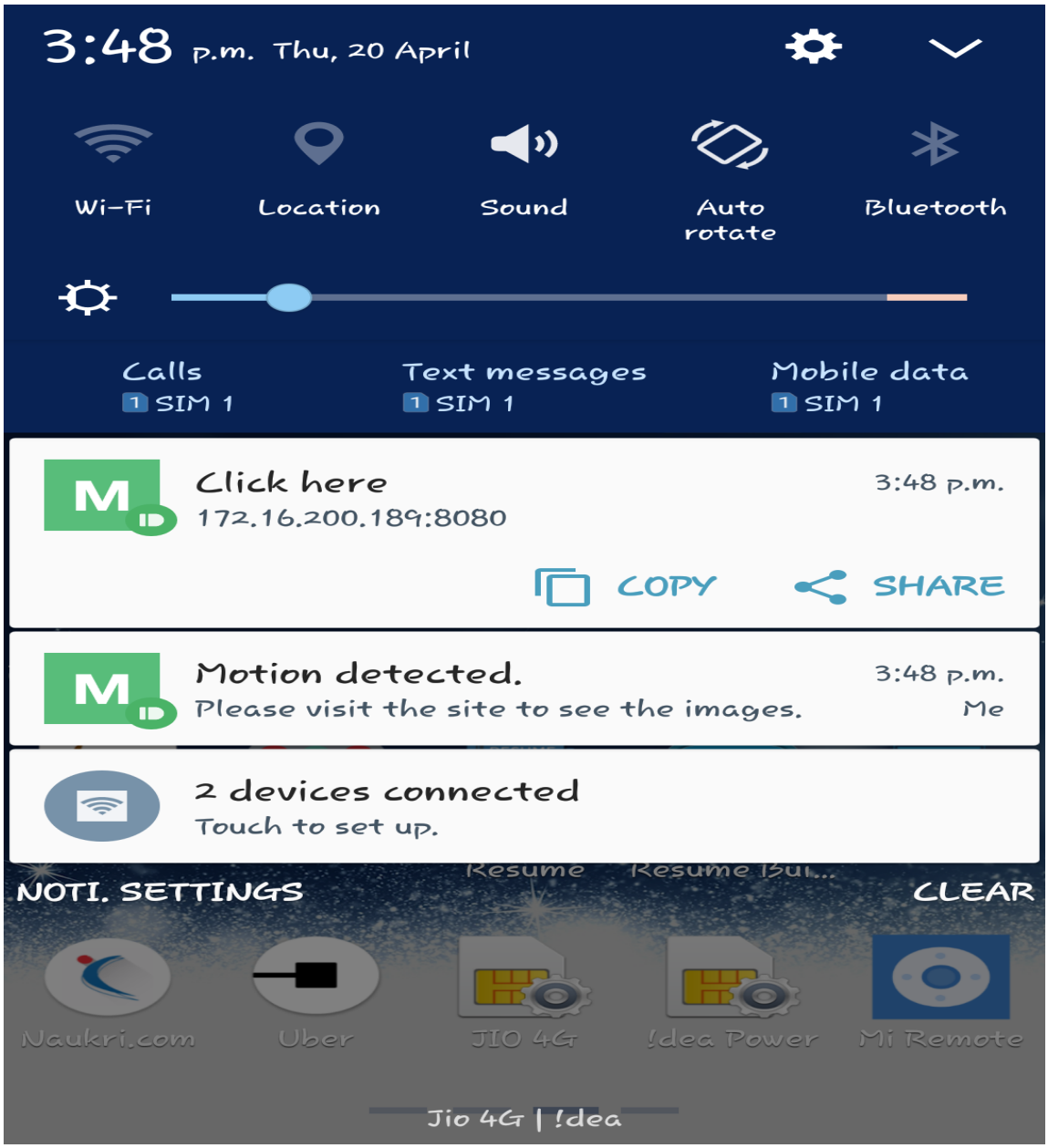


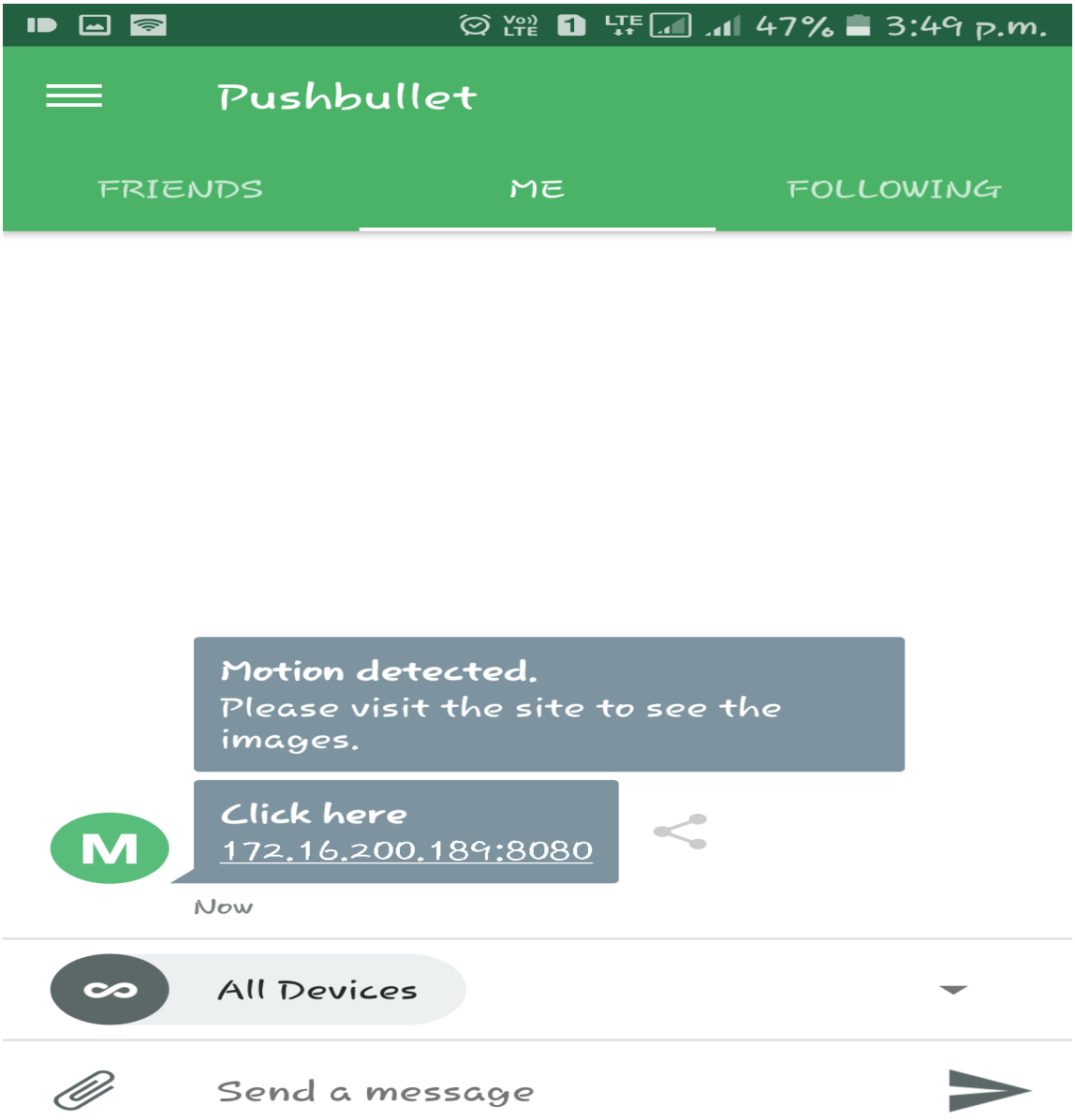
DHT11 is a 3 pin sensor which can measure temperatures ranging from 0-50°C & relative humidity ranging from 20-95%.The sensor uses its own proprietary 1-wire protocol to communicate with Raspberry Pi and runs from 3.3V-5V. The timings must be precise and according to the datasheet of the sensor. This is three terminal device named as Vcc,Ground and data .The Vcc connected to Pin number 2 of raspberry pi and ground is connected to the Pin number 7. The data Pin is connected to the GPIO 7 of raspberry pi.

6.5 Hosting server and reading data from server

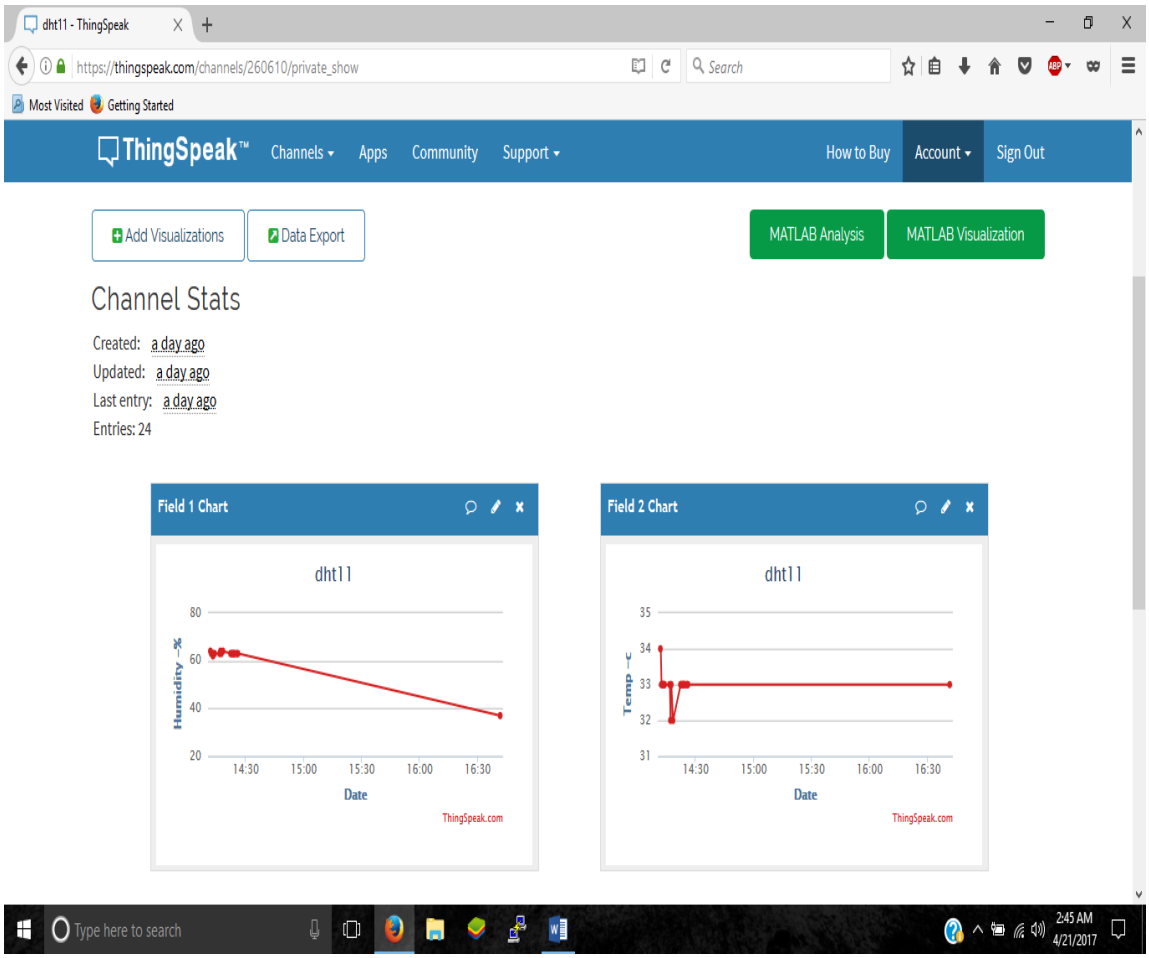


6.6 Notification




47% 3:49 p.m.
Pushbullet
FRIENDS
ME
FOLLOWING
Motion detected.
Please visit the site to see the images.
Click here
172.16.200.189:8080
M
Now
All Devices
Send a message

6.7 Output



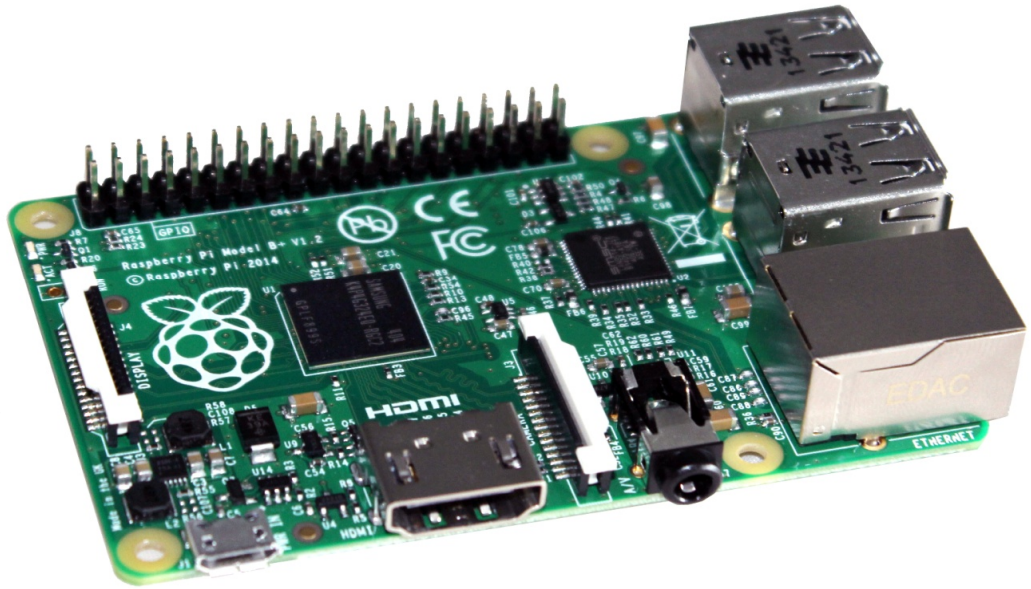
The data from the dht11 is uploaded to the thingspeak website. The user can login into his account to view the graph.

Chapter-7

Components Used

- Raspberry Pi
- Raspberry Pi camera Module
- DHT11

7.1 Raspberry Pi



The Raspberry Pi is a series of credit card-sized single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in schools and developing countries .Several generations of Raspberry Pi have been released. The first generation (Raspberry Pi 1 Model B) was released in February 2012. It was followed by a simpler and inexpensive model Model A. In 2014, the foundation released a board with an improved design in Raspberry Pi 1 Model B+. These boards are approximately credit-card sized and represent the standard mainline form-factor. Improved A+ and B+ models were released a year later. A "compute module" was released in April 2014 for embedded applications, and a Raspberry Pi Zero with smaller size and reduced input/output (I/O) and general-purpose

input/output (GPIO) capabilities was released in November 2015 for US$5. The Raspberry Pi 2 which added more RAM was released in February 2015. Raspberry Pi 3 Model B released in February 2016, is bundled with on-board WiFi, Bluetooth and USB boot capabilities. As of January 2017, Raspberry Pi 3 Model B is the newest mainline Raspberry Pi. Raspberry Pi boards are priced between US$5–35. As of 28 February 2017, the Raspberry Pi Zero W was launched, which is identical to the Raspberry Pi Zero, but has the Wi-Fi and Bluetooth functionality of the Raspberry Pi 3 for US$10.

All models feature a Broadcom system on a chip (SoC), which includes an ARM compatible central processing unit (CPU) and an on-chip graphics processing unit (GPU, a Video Core IV). CPU speed ranges from 700 MHz to 1.2 GHz for the Pi 3 and on board memory range from 256 MB to 1 GB RAM. Secure Digital (SD) cards are used to store the operating system and program memory in either the SDHC or Micro SDHC sizes. Most boards have between one and four USB slots, HDMI and composite video output, and a 3.5 mm phone jack for audio. Lower level output is provided by a number of GPIO pins which support common protocols like I²C. The B-models have an 8P8C Ethernet port and the Pi 3 and Pi Zero W have on board Wi-Fi 802.11n and Bluetooth.

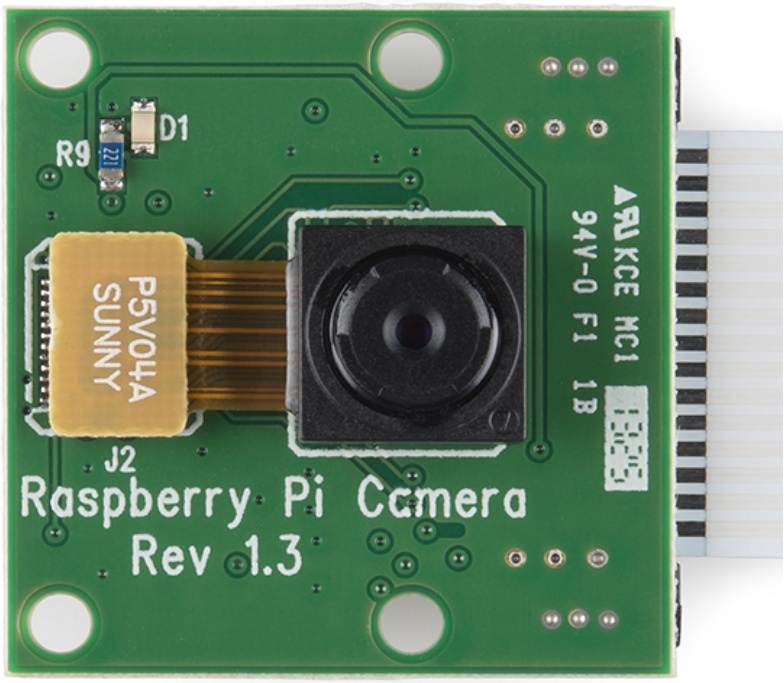
The Foundation provides Raspbian, a Debian-based Linux distribution for download, as well as third party Ubuntu,Windows 10 IOT Core, RISC OS, and specialized media center distributions. It promotes Python and Scratch as the main programming language, with support for many other languages. The default firmware is closed source, while an unofficial open source is available.

Raspberry pi is a portable, powerful and minicomputer. The board length is only 85mm and width is only 56mm.Its size only as big as a credit card but it is a capable little PC. It can be used for many of the things that your desktop PC does, like high-definition video, spreadsheets, word-processing, games and more. Raspberry Pi also has more wide application range, such as music machines, parent detectors to weather stations, tweeting birdhouses with infra-red cameras, lightweight web server, home automation server, etc. It enables people of all ages to explore computing, learn to program and understand how computers work. The Raspberry Pi Model B+ provides more GPIO, more USB than Model B. It also improves power consumption, audio circuit and SD card. It is more useful for embedded projects.

The Raspberry Pi Foundation recommends the use of Raspbian, a Debian-based Linux operating system. Other third party operating systems available via the official website include Ubuntu MATE, Snappy Ubuntu Core, Windows 10 IoT Core, RISC OS and specialized distributions for the Kodi media center and classroom management.

There are a number of developers and applications that are leveraging the Raspberry Pi for home automation. These programmers are making an effort to modify the Raspberry Pi into a cost-affordable solution in energy monitoring and power consumption. Because of the relatively low cost of the Raspberry Pi, this has become a popular and economical solution to the more expensive commercial alternatives. In June 2014, TECHBASE, Polish industrial automation manufacturer designed world's first industrial computer based on Rapberry Pi Compute Module, called ModBerry. The device has numerous interfaces, most notably RS-485/232 serial ports, digital and analog inputs/outputs, CAN and economical 1-Wire buses, all of which are widely used in automation industry. The design allows the use of Compute Module in harsh industrial environments, leading to conclusion, that Raspberry Pi is no longer limited to home and science projects only, but can be widely used as Industrial IoT solution and achieve goals of Industry 4.0

7.2 Raspberry PI camera module



The Raspberry Pi camera module can be used to take high-definition video, as well as stills photographs. It's easy to use for beginners, but has plenty to offer advanced users if you're looking to expand your knowledge. There are lots of examples online of people using it for time-lapse, slow-motion and other video cleverness. You can also use the libraries we bundle with the camera to create effects.

The module has a five megapixel fixed-focus camera that supports 1080p30, 720p60 and VGA90 video modes, as well as stills capture. It attaches via a 15cm ribbon cable to the CSI port on the Raspberry Pi. The camera works with all models of Raspberry Pi 1 and 2. It can be accessed through the MMAL and V4L APIs, and there are numerous third-party libraries built for it, including the Pi camera Python library. The camera module is very popular in home security applications, and in wildlife camera traps.

Features

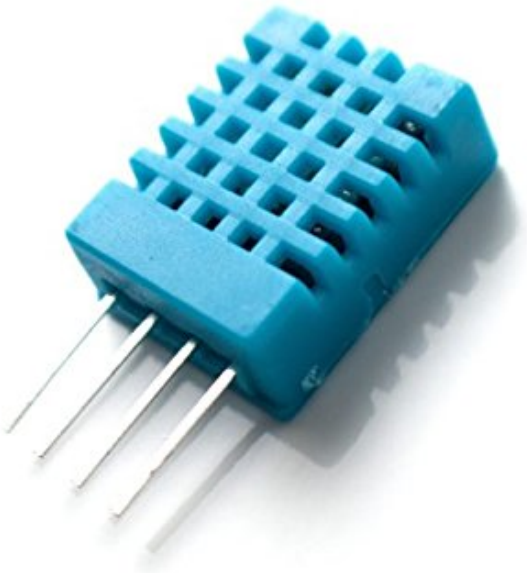
- 5MP sensor
- Wider image, capable of 2592x1944 stills, 1080p30 video
- 1080p video supported
- CSI
- Size: 25 x 20 x 9 mm

Camera Details

The camera consists of a small (25mm by 20mm by 9mm) circuit board, which connects to the Raspberry Pi's Camera Serial Interface (CSI) bus connector via a flexible ribbon cable. The camera's image sensor has a native resolution of five megapixels and has a fixed focus lens. The software for the camera supports full resolution still images up to 2592x1944 and video resolutions of 1080p30, 720p60 and 640x480p60/90. Installation involves connecting the ribbon cable to the CSI connector on the Raspberry Pi board. This can be a little tricky, but if you watch the videos that demonstrate how it is done, you shouldn't have any trouble.

When you purchase the camera, you will receive a small camera board and cable. You'll want to devise some method of supporting the camera in order to use it. Some camera stands and Raspberry Pi cases are now available. You can also rig up something simple yourself if you wish.

7.3 DHT11



A temperature sensor measures temperature using four measurement scales that are divided into various degree units. The measurement scales use the metric Celsius scale, and they start at zero. The Rankin scale is the absolute scale that uses Fahrenheit temperature sensing. Temperature sensors determine absolute zero measurements as close to minus 460 degrees Fahrenheit. The Rankin scale measures absolute zero as 492 degrees Rankin.

A popular thermal measuring method is thermocouple, which is composed of two different metal alloy wires. Combining two different metals generates a strong voltage that has the same capacity as temperature. Thermocouples typically provide vast measurement ranges. They work using the See beck effect which involves changes in temperature in electrical circuits. The sensors read temperature by taking measurements of voltage outputs.

Thermostats are another type of temperature sensor, and they're mostly used in human thermometers and appliances. Their predictable resistance reacts to temperature change. When temperature changes, the electrical current or resistance will also changes.

Non-contact temperature sensors measure temperature without touching the object. They measure thermal radiation to determine temperature. Humidity is the presence of water in air. The amount of water vapor in air can affect human comfort as well as many manufacturing processes in industries. The presence of water vapor also influences various physical, chemical,

and biological processes. Humidity measurement in industries is critical because it may affect the business cost of the product and the health and safety of the personnel. Controlling or monitoring humidity is of paramount importance in many industrial & domestic applications. In semiconductor industry, humidity or moisture levels needs to be properly controlled & monitored during wafer processing. In medical applications, humidity control is required for respiratory equipments, sterilizers, incubators, pharmaceutical processing, and biological products. Humidity control is also necessary in chemical gas purification, dryers, ovens, film desiccation, paper and textile production, and food processing. In agriculture, measurement of humidity is important for plantation protection (dew prevention), soil moisture monitoring, etc. For domestic applications, humidity control is required for living environment in buildings, cooking control for microwave ovens, etc. In all such applications and many others, humidity sensors are employed to provide an indication of the moisture levels in the environment.

Chapter 8
Advantages and Limitations

Advantages

1. Deter Crime

The main advantage is used in security purpose only authenticate user will be able to view the data and it will provide privacy on both sides and cost of overall system is less. Whether you install the cameras in your home or at the workplace, you can prevent crime from occurring. The mere sight of the camera staring back at them, and the sheer thought of getting caught red-handed are intimidating enough for mischief-makers to be on their best behavior as they would know that their identity and illegal activity have been captured.

2. Monitor Scenarios and Activities

It is extremely easy to work with security camera systems as they can be placed anywhere as long as there is a power source close by. They come in all shapes and sizes; some are tiny enough to be hidden in plants, pictures, photo frames, etc. Depending on your needs you can buy either hidden cameras or mountable ones..

3. Gather Evidence

Having cameras installed in strategic places comes in handy when you need to monitor actions and words of people or during an event. Modern security cameras are not only equipped with high-quality video capabilities, but audio as well. The clear images coupled with flawless sound makes them more efficient than ever at recording a series of happenings.This is particularly helpful when dealing with a legal scenario, wherein the eye witness may have forgotten a certain important detail or may be providing with an accurate account of what really transpired. With a security camera, the legal authorities can see the series of events as they really unfolded.

4. Arrive at the Right Decisions

Footage from security cameras can help you make correct and fair decisions when settling disputes, both in domestic as well as professional scenarios. Whether it is dealing with a situation involving disagreements within your family, among your employees, or between a customer and your service staff, your doubts can be laid to rest with the help of your camera.

Incorrect, inappropriate or fabricated claims made by customers or other authorities can be sorted out when you make your security camera your ally.

5. Maintain Records

So you got to know of something that happened outside your home or office about a fortnight ago and curiosity is getting the better of you? You can douse it by simply looking up your security records. Cameras record and document everything they see systematically, i.e. as per the date and the time of the event.

Whether it is a crime or a minor tiff, your camera chronicles it, thereby making it easy for you to investigate the actual happenings.

Limitations

The problem with these motion detection methods is that neither detects slow moving objects, determined by the sensitivity of the threshold. But if the threshold is too sensitive, it will detect things like shadows and changes in sunlight. The backbone of real time application of our project depends on the network connectivity. If there is network disconnectivity then the raspberry pi will not be able to host the server that means the images cannot be seen from accessing internet. Also the device will not be able to send the notification. So in case of network disconnectivity the proposed system will work like a traditional CCTV system.

Chapter 9
Applications

Crime prevention

A 2009 analysis by Northeastern University and the University of Cambridge, "Public Area CCTV and Crime Prevention: An Updated Systematic Review and Meta-Analysis," examined 44 different studies that collectively surveyed areas from the United Kingdom to U.S. cities.

The analysis found that:

1. Surveillance systems were most effective in parking lots, where their use resulted in a 51% decrease in crime;
2. Public transportation areas saw a 23% decrease in crimes;
3. Systems in public settings were the least effective, with just a 7% decrease in crimes overall. When sorted by country, however, systems in the United Kingdom accounted for the majority of the decrease; the drop in other areas was insignificant

Industrial processes

Industrial processes that take place under conditions dangerous for humans are today often supervised by CCTV. These are mainly processes in the chemical industry, the interior of reactors or facilities for manufacture of nuclear fuel. Special cameras for some of these purposes include line-scan cameras and thermographic cameras which allow operators to measure the temperature of the processes. The usage of CCTV in such processes is sometimes required by law.

Traffic monitoring

Many cities and motorway networks have extensive traffic-monitoring systems, using closed-circuit television to detect congestion and notice accidents. Many of these cameras however, are owned by private companies and transmit data to drivers' GPS systems.

The UK Highways Agency has a publicly owned CCTV network of over 3000 Pan-Tilt-Zoom cameras covering the British motorway and trunk road network. These cameras are primarily used to monitor traffic conditions and are not used as speed cameras. With the addition of fixed cameras for the Active Traffic Management system, the number of cameras on the Highways Agency's CCTV network is likely to increase significantly over the next few years.

Transport safety

A CCTV system may be installed where any example, on a subway train, CCTV cameras may allow the operator to confirm that people are clear of doors before closing them and starting the train.

Sporting events

Many sporting events in the United States use CCTV inside the venue for fans to see the action while they are away from their seats. The cameras send the feed to a central control center where a producer selects feeds to send to the television monitors that fans can view. CCTV monitors for viewing the event by attendees are often placed in lounges, hallways, and restrooms. This use of CCTV is not used for surveillance purposes.

Monitor employees

Organizations use CCTV to monitor the actions of workers. Every action is recorded as an information block with subtitles that explain the performed operation. This helps to track the actions of workers, especially when they are making critical financial transactions, such as correcting or cancelling of a sale, withdrawing money or altering personal information.

Use in schools

CCTV is widely used in schools due to its success in preventing bullying, vandalism, monitoring visitors and maintaining a record of evidence in the event of a crime. There are some restrictions on installation, with cameras not being installed in an area where there is a "reasonable expectation of privacy", such as bathrooms, gym locker areas and private offices (unless consent by the office occupant is given).

Criminal use

Criminals may use surveillance cameras to monitor the public. For example, a hidden camera at an ATM can capture people's PINs as they are entered, without their knowledge. The devices are small enough not to be noticed, and are placed where they can monitor the keypad of the machine as people enter their PINs. Images may be transmitted wirelessly to the criminal.

Chapter 10
Results

The task required for the completion of project is accomplished by us. We had observed that, when motion is detected the raspberry pi is successfully capturing the image and also it is notifying the person that motion is detected using push notification using Pushbullet app. The notification contains a message and a link that will take the user to the website where the captured images are stored. The user can view the images from the website but cannot perform any modification operation such as deleting the files. We have also seen that the Images will be accessible only if the server is active on the raspberry pi. Also the data from the DHT11 is successfully uploaded to the thingspeak website which the user can monitor successfully. Thus, the project is accomplished by all the team member and with the corporation and guidance of our respected guide and staff members.

Chapter 11
Conclusion

Thus we have designed a smart supervisor system capable of capturing video/image and device operation like temperature, human motion; it is advantageous as it offers reliability and privacy on both sides. It is authenticated on the receiver side, hence it offers only the person concerned to view the details .Necessary action can be taken in short span of time in the case of emergency conditions such as elderly person enter the restricted area, military areas, smart home system, offices, industries, railway station, Banks etc., Future work is to locate the number of persons located exactly on that area and their position so that accurate information can be obtained on the receiver side.

The project had opened the door of the real world in the field of electronics for us. In the proposed project we came to know about many theoretical aspects and more than that the practical aspects of the electronics devices and the embedded system, which would rather not be possible just through the books without experience and practical performance. It just not increase our theoretical & practical knowledge about electronics, but also develops our management skills and team work and become the medium fore the little knowledge we acquired in this vast field of electronics.

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