**M S Ramaiah Institute of Technology**

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**INTERNET OF THEORY**

**HOME SECURITY EMAIL ALERT**

**SYSTEM**

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*in partial fulfillment for the award of the degree of*

# *Bachelor of Engineering in Computer Science & Engineering*



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**ABSTRACT**

With advancement of technology things are becoming simpler and easier for us. Automatic systems are being preferred over manual system. This unit talks about the basic definitions needed to understand the Project better and further defines the

technical criteria to be implemented as a part of this project. Home/office automation is the control of any or all electrical devices in our home or office, whether we are there

or away. Home/office automation is one of the most exciting developments in technology for the home that has come along in decades. There are hundreds of products available today that allow us control over the devices automatically, either by remote control; or even by voice command.

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3. **INTRODUCTION**
   1. General Introduction

With advancement of technology things are becoming simpler and easier for us. Automation is the use of control systems and information technologies to reduce the need for human work in the production of goods and services. In the scope of industrialization, automation is a step beyond mechanization. Whereas mechanization provided human operators with machinery to assist them with the muscular requirements of work, automation greatly decreases the need for human sensory and mental requirements as well. Automation plays an increasingly important role in the world economy and in daily experience.

Automatic systems are being preferred over manual system. Through this project we have tried to show automatic control of a house as a result of which power is saved to some extent.

Home automation (also called domotics) is the residential extension of "building automation". It is automation of the home, housework or household activity. Home automation may include centralized control of lighting, HVAC (heating, ventilation and air conditioning), appliances, and other systems,

to provide improved convenience, comfort, energy efficiency and security. Disabled can provide increased quality of life for persons who might otherwise require caregivers or institutional care.

* 1. **Statement of the Problem**

The problem is to develop a prototype of silent home security system, which do not create a loud blast sound which is noticeable to the intruder (s) or create disturbance to the neighborhood, instead it notify the user or home owner through the email message/alert.

Technology has advanced so much in the last decade or two that it has made life more efficient and comfortable .The comfort of being able to control of devices from one particular location has become imperative as it saves a lot of time and effort.

The system we have proposed is an extended approach to automating a control system.

* 1. **Objectives of the project**
* To provide a prototype of low cost home security system which homeowner do not need to pay for monthly fee for company that offers Central Monitoring Service for home security.
* To develop a prototype of a silent home security system, it did not create a loud blast sound which is noticeable to the intruder(s) or create disturbance to the neighborhood.
* To notify the user or home owner through the text message of a GSM system and notify direct to police station.
  1. **Project deliverables**
* To deliver a simple ,fast and reliable product to automate the environment
* To deliver a product which enables real-time monitoring of the home
* To deliver a low cost platform for interconnecting electrical/electronic devices and various sensors in a home via internet(Inexpensive)
  1. **Current Scope**

An automated device can replace good amount of human working force, moreover humans are more prone to errors and in intensive conditions the probability of error increases whereas, an automated device can work with diligence, versatility and with almost zero error. Replacing human operators in tasks that involve hard physical or monotonous work and also replacing humans in tasks done in dangerous environments (i.e fire, space, volcanoes, nuclear facilities, underwater, etc).Performing tasks that are beyond human capabilities of size, weight, speed, endurance, etc

For example, when an enterprise that has invested in automation technology recovers its investment, or when a state or country increases its income due to automation like Germany or Japan in the 20th Century. This is why this project looks into construction and implementation of a system involving hardware to control a variety of electrical and electronics system

Home Secutity system is an ideal solution for smaller home, apartment and condominium. Small business office, small factories or home often neglect the security requirement. Even in isolated location of the government agencies mostly neglected the security requirement. For example schools nowadays equipped with multimedia equipment. These are often locked in the lab or in the locked stores which is unsecured. The lost of this equipment is far more expensive than the simple security system. TNB stores for example, are often intruded by the irresponsible individual for cables this can be avoided by this system.

* 1. **Future Scope**

A home automation system integrates electrical devices in a house with each other. The techniques employed in home automation include those in building automation as well as the control of domestic activities, such as home entertainment systems, houseplant and yard watering, pet feeding, changing the ambiance "scenes" for different events (such as dinners or parties), and the use of domestic robots. Devices may be connected through a computer network to allow control by a personal computer, and may allow remote access from the internet.

1. **PROJECT ORGANIZATION**
   1. **Software Process Models**

Software Process Model is a splitting of software development work into distinct phases(stages) containing activities with the intent of better planning and management. It is often considered a subset of Software development life cycle. The methodology may include the predefinition of specific deliverables and artifacts that are created and completed by a project team to develop or maintain n application.

Common Methodologies include waterfall,protyping,iterativeand incremental development, spiral development, extreme programming and various agile methodology.

* 1. **Roles and Responsibilities**
* Monitor and audit the serve

All the logs present in a web server, should be stored in a segregated area. Also network services logs, website access logs ,database server logs and operating system logs should be monitored and checked frequently

* Unused default user accounts created during a operating system install should be disabled.
* Remove unnecessary Services

Operating system installations and configurations are not sure and switch off all unnecessary services and disable them, so next time the server is rebooted, they are not started automatically

1. **LITERATURE SURVEY**

**3.1….Introduction**

Home Security has been a major issue where crime is increasing and everybody wants to take proper measures to prevent intrusion. In addition , there is used to automate home to that the user can take the advantage to their home, office or cabin etc via Email technology.Keeping in view the rapid growth of wireless communication we are inspired to work on this project.

The idea behind this project is to meet the upcoming challenges of the modern practical applications of wireless communications and to facilitate our successors with such splendid ideas that should clear their concept about wireless communication and control system.

The application of Home Security is quite diverse. There are many real life situation that require control of different devices remotely and to provide security. There will be instances where a wired connection between a remote appliance/device and the control a unit might not be feasible due to structural problems .In such cases a wireless connection is a better option.

Basic idea of our project is to provide Email based Home security even if the owner is away from the restricted areas. For this, we adopted wireless mode of transmission .Beside this, there are many methods of wireless communication but we selected email based in our project because as compared to other techniques, this is efficient and cheap solution also.

**3.2…Main Body**

The researchers gathered information from different sources which give appropriate ideas or what parts to be used in every circuitry involved in this project. Keypad interfacing to microcontroller using embedded C was the hardest part ever encountered during the development stage. From a step by step process, researchers started from writing simple code to more complex. After everythinh is fixed and tested in virtual simlutaion,the researchers soldered everything for implementation stage. Researchers faced many problems on hardware such as fine tuning every sensor to work simultaneouslywith the burnt program inside the microncontroller.By eliminating those problems gives good and accurate anticipated result.

Same project could have been designed with:

1. 8051 microcontroller
2. ARDUINO
3. Raspberry Pi

We are using Raspberry Pi to realize this project because:

Using an raspberry, simplifies the amount of hardware and software development

you need to do in order to get a system running.

The raspberry hardware platform is an ultra-low cost,free,versatile and highly

developer friendly Linux/Raspbian Operating system.

**3.3 Conclusion of Survey**

After receiving the possible solutions, my team decided to use Raspberry Pi to make this project.Accoding to the advantage of Raspberry over other microcontrollers, we made this decision.

1. **SOFTWARE REQUIREMENT SPECIFICATIONS**

**4.1 Product Overview**

Home Security has been a major issue where crime is increasing and everybody wants to take proper measures to prevent intrusion. In addition , there is used to automate home to that the user can take the advantage to their home, office or cabin etc via Email technology.Keeping in view the rapid growth of wireless communication we are inspired to work on this project.

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**4.2 External Interface Requirements**

**4.2.1 User Interfaces**

The first interface is the login-in screen. This is where the user has a

specific Username and Password to login to email id so that they can

gain access to the database. The user can change his/her profile

**4.2.2 Hardware Interfaces**

* **Raspberry Pi Os:**

The raspberry pi operates on a LINUX based open source operating system called Raspbian OS.

* **Raspberry Pi Camera**

This device captures the images of the intruders and sends the particular images to the registered mail address.

* **SSMTP and Mpack:**

ssmtp is used to configure the emai address in the system and MNpack is used to send email with attachment to the configured email address

**4.2.3 Software Interfaces**

**LINUX OS:**

LINUX is a Unix-like and mostly POSIX complaint

computer operating system(OS) assembled under the model of free

and open source software development and distribution

**4.2.4 Communication Interfaces**

The system uses a Wi-Fi or GPRS connection to send the information

to the registered mail address.

**4.3 Functional Requirements**

**5.3.1 Functional Requirement 1.1**

* **Alert Security Company**

Alerts the security company on intrusion,fire or emergency.In fact,the system can summon police,fire or ambulance via a call to the security company.Once again a user-defined delay should be used

* **Control optional electrical appliances(lights etc.)**

The system will be able to toggle external electrical appliances such as lights or an additional audible alarm to further deter intruders.This feature is necessary for vacationers as well as those who leave their home vacant from time to time.

* **Remote access**

The user must be able to check the status of the system through a remote link

**4.4 Software System Attributes**

**4.4.1 Reliability**

Connection to the power supply and links must be secure. The

housing for the actual security system and sensors must also be

secure enough to withstand tampering

**4.4.2 Availability**

The system uses a Wi-Fi or GPRS connection to the database. User

must be aware to have connection inorder to get email alerts incase

of theft or intruder detection

**4.4.3 Security**

* Secutiry system has the ability to range from a simple motion sensor that truns on a light or an alarm to an entire suite of detectors- motion,door/window sensors,glass-break,cameras-setting off the most advanced applications employing cutting edge technology
* No only can your highly developed system activate lights ,but also it has the capability of notifying the proper emergency response team.
* You can also program your system to notify you about an intrusion or emergency via email,cellular phone,instant message or other online notification.

**4.4.4 Portability**

This includes all of the home’s common entry ways,bedrooms and

frequently used rooms.If the system interface is not readily

accessible,then it will not be as easy to control and will offer little

convenience.

**4.4.5 Maintainability**

* **Interface and system must be properly connected to the sensors.**

It is essential to have secure wiring,preferably inside the walls,for reliable sensor information to guard against alert and tampering

* **System must be connected to a device that can contact authorities**

The system should be directly wired into the raspberry Pi,preferably in such a way that will not cut off link from inside the home.

**4.5 Performance Requirements**

* **Alert Security Company**

Alerts the security company on intrusion,fire or emergency.In fact,the system can summon police,fire or ambulance via a call to the security company.Once again a user-defined delay should be used

* **Control optional electrical appliances(lights etc.)**

The system will be able to toggle external electrical appliances such as lights or an additional audible alarm to further deter intruders.This feature is necessary for vacationers as well as those who leave their home vacant from time to time.

* **Remote access**

The user must be able to check the status of the system through a remote link

**4.6 Database Requirement**

* **SQL-Server**

SQL server released in October 2005,is the successor to SQL server 2000.

It included native support for managing XML data, in addition to relational data. for this purpose ,it defined an xml data type that could be used either as a data type in database columns or as literals in queries.

XML columns can be associated with XSD scheme.XML data being stored is verified against the schema.XML is converted to an internal binary data type before being store in the database

Specialized indexing methods were made available for XML data ,XML data is queried using XQuery ; Common Language Runtime(CLR) integration was a main feature ,enabling one to write SQL code to Managed Code by the CLR.

* **SQL light**

A high level overview of what SQLlite is and why you might be interested in using it.

**4.7 Design Constraints**

* Internet Access with high speed
* LINUX OS
* Configured Email account to get alert
* Pi Camera to capture images

**4.8 Other Requirements(Safety Requirements)**

* **Keyless entry to front door**

The card is integrated to ahome security system which activates entry.there is no need to fumble with cumbersome sets of keys

* **Infrared motion Sensor**

Thses can be a welcoming beacon of light for family and friends and a simple yet effective deterrent for intruders

* **Security Camera**

These should be installed at the front door in conjunction with a videophone that allows you to communicate and see who is outside.You can now see who is at the door without leaving the comfort of your seat.

* **Motion Detector**

Installing motion detector lights in the surroundings of your house is a total relief from the fear of theft,intruders,lousy animals etc. These lights not only help you see thought the darkness,but come on with an alarming bang in caes of hunches.On the off chance if these lights are malfunctioning,you need to troubleshoot the problems at your ear

1. **DESIGN**
   1. **Introduction**
   2. **Architecture Design**

Software architectural design is an high level structure of a softare system,the discipline of creating such structures, and the documentation of these structures.These structures are needed to reason about the software system

* 1. **Graphical User Interface**
  2. **Class Diagram and Classes**

Home

Input

Photo\_Capture()

Output

Receive Notification()

Server

Buffer()

Python

Send Image()

Sensor

Detect()

Allow()

Dis-Allow()

Email\_Alert

Yes()

No()

USB Camera

Detect\_Object()

* 1. **Sequence Diagram**

:Output

:Server

:input

Sensor senses the object

Capture the picture

Notify the User

Reply back to the Server

Inform to the Input

* 1. **Data flow diagram**

Display Image

Photo Capture

Output

Input

1. Send Information

Receive Notification

**Level :1**

Update server

Buffer

Display the object

Photo Capture

Send Information

Input

Sensor

1. **IMPLEMENTATION**
2. **IMPLEMENTATION**
   1. **Tools Introduction**

**PuTTY** is a popular SSH and **Telnet client** that helps you establish secure connections over the Internet and doesn't even require installation.

It's especially aimed for programmers and network administrators, which means that newcomers won't find it easy to use. The program features a simple, straightforward interface with no included documentation.

Despite its apparent simplicity, PuTTY is highly configurable and includes many options to tweak connections, sessions, SSH security features and even the window's appearance.

* 1. **Technology Introduction**

**Raspberry Pi**

The Raspberry Pi hardware has evolved through several versions that feature variations in memory capacity, and peripheral device support.

**Python (programming language)**

**Python** is a widely used [general-purpose](https://en.wikipedia.org/wiki/General-purpose_programming_language), [high-level programming language](https://en.wikipedia.org/wiki/High-level_programming_language) Its design philosophy emphasizes code [readability](https://en.wikipedia.org/wiki/Readability), and its syntax allows programmers to express concepts in fewer [lines of code](https://en.wikipedia.org/wiki/Lines_of_code) than would be possible in languages such as [C++](https://en.wikipedia.org/wiki/C%2B%2B) or [Java](https://en.wikipedia.org/wiki/Java_%28programming_language%29). The language provides constructs intended to enable clear programs on both a small and large scale.

Python's developers strive to avoid [premature optimization](https://en.wikipedia.org/wiki/Premature_optimization), and moreover, reject patches to non-critical parts of CPython that would offer a marginal increase in speed at the cost of clarity.When speed is important, Python programmers use [PyPy](https://en.wikipedia.org/wiki/PyPy), a [just-in-time compiler](https://en.wikipedia.org/wiki/Just-in-time_compilation), or move time-critical functions to extension modules written in languages such as C. [Cython](https://en.wikipedia.org/wiki/Cython) is also available, which translates a Python script into C and makes direct C-level API calls into the Python interpreter.

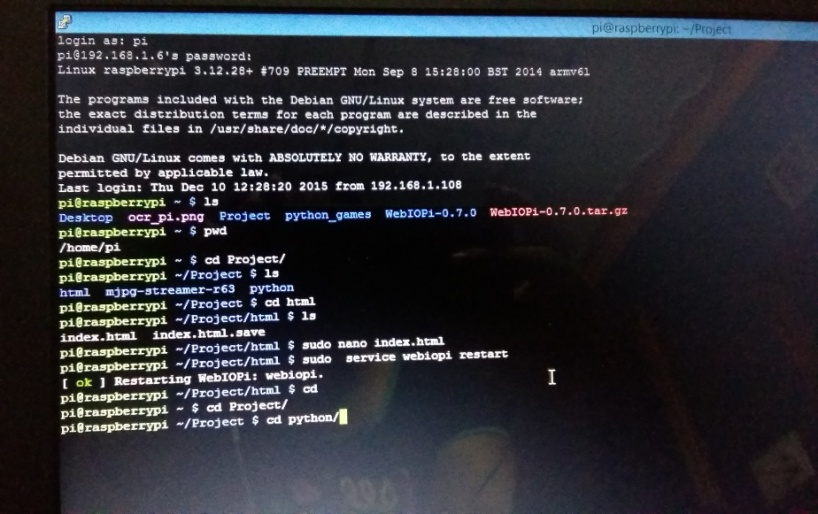
An important goal of the Python developers is making Python fun to use. This is reflected in the origin of the name, which comes from [Monty Python](https://en.wikipedia.org/wiki/Monty_Python), and in an occasionally playful approach to tutorials and reference materials, such as using examples that refer to spam and eggs instead of the standard [foo and bar](https://en.wikipedia.org/wiki/Foobar).

A common [neologism](https://en.wikipedia.org/wiki/Neologism) in the Python community is *pythonic*, which can have a wide range of meanings related to program style. To say that code is pythonic is to say that it uses Python idioms well, that it is natural or shows fluency in the language, that it conforms with Python's minimalist philosophy and emphasis on readability. In contrast, code that is difficult to understand or reads like a rough transcription from another programming language is called *unpythonic*.

Users and admirers of Python—especially those considered knowledgeable or experienced—are often referred to as *Pythonists*, *Pythonistas*, and *Pythoneers*.

* 1. **Overall view of the project in terms of implementation**

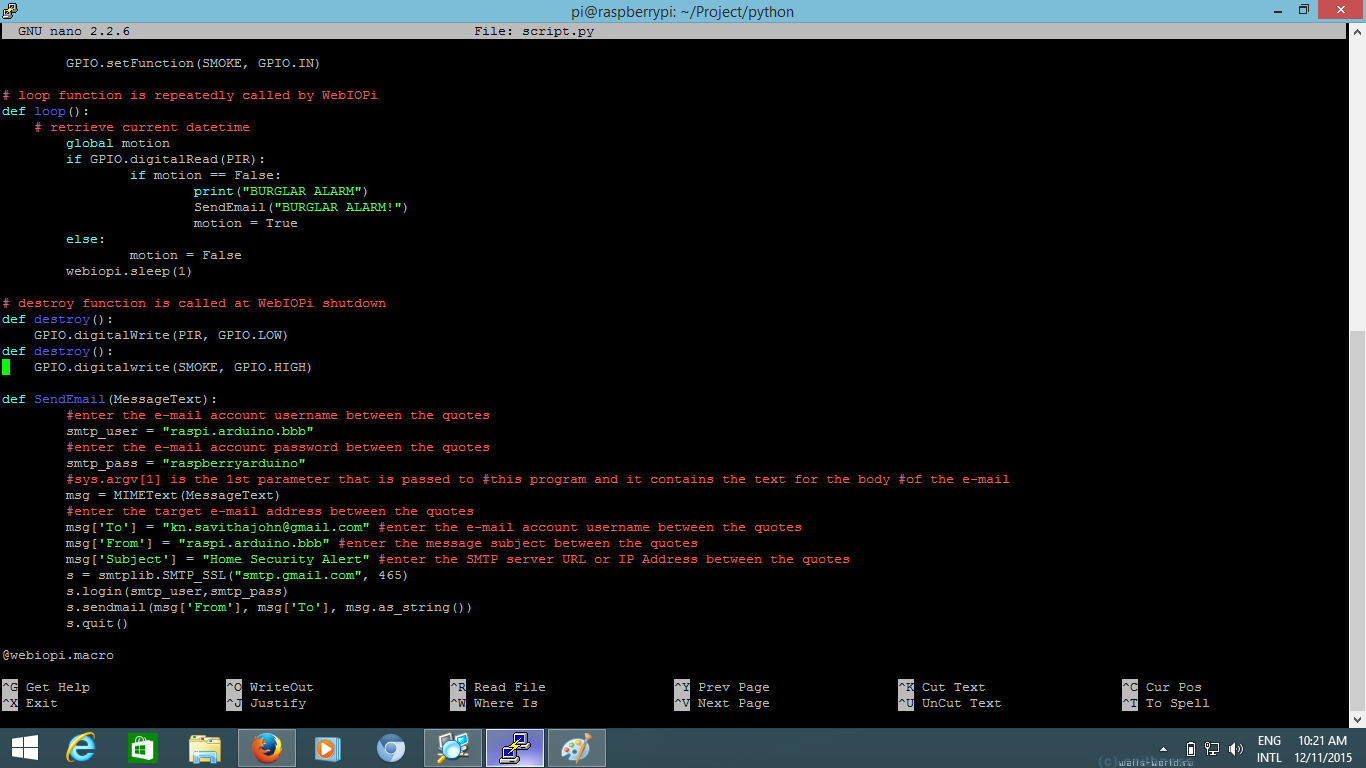
PuTTY Configuration

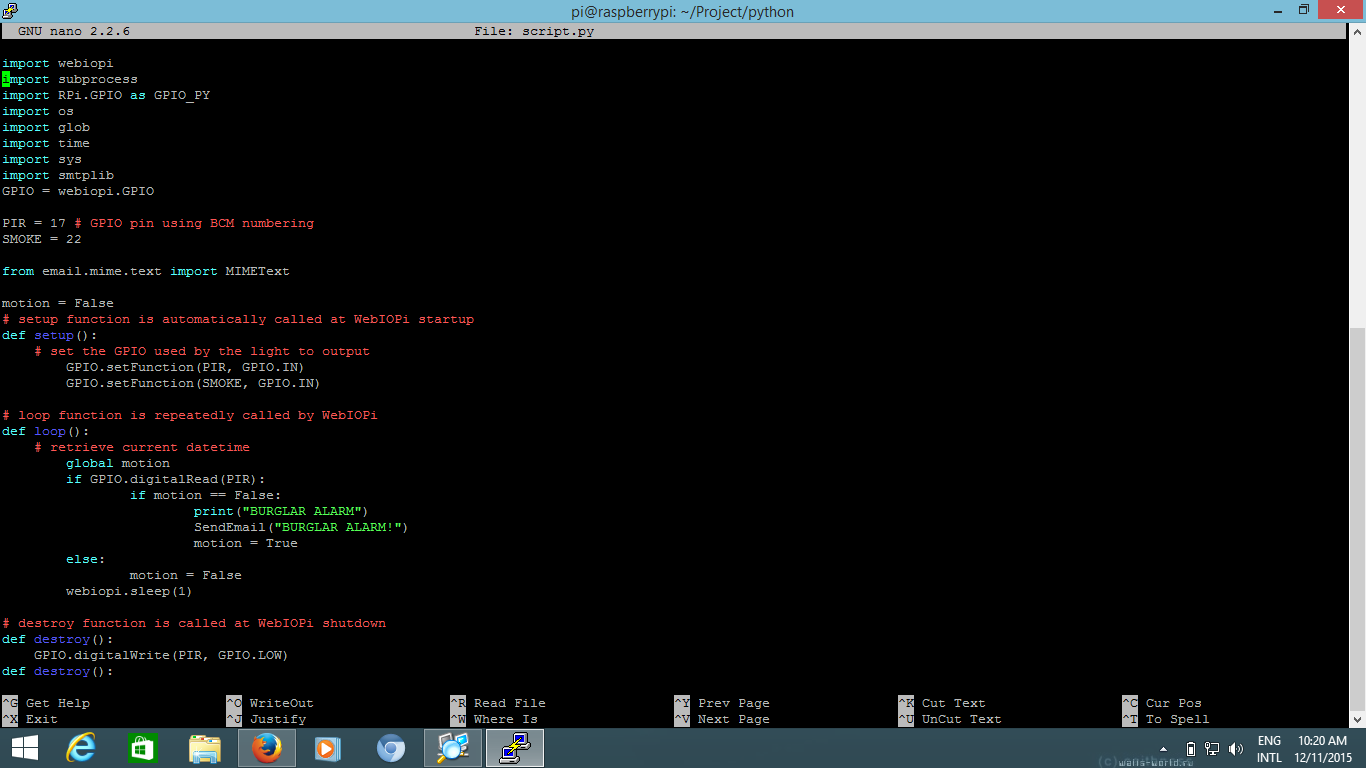


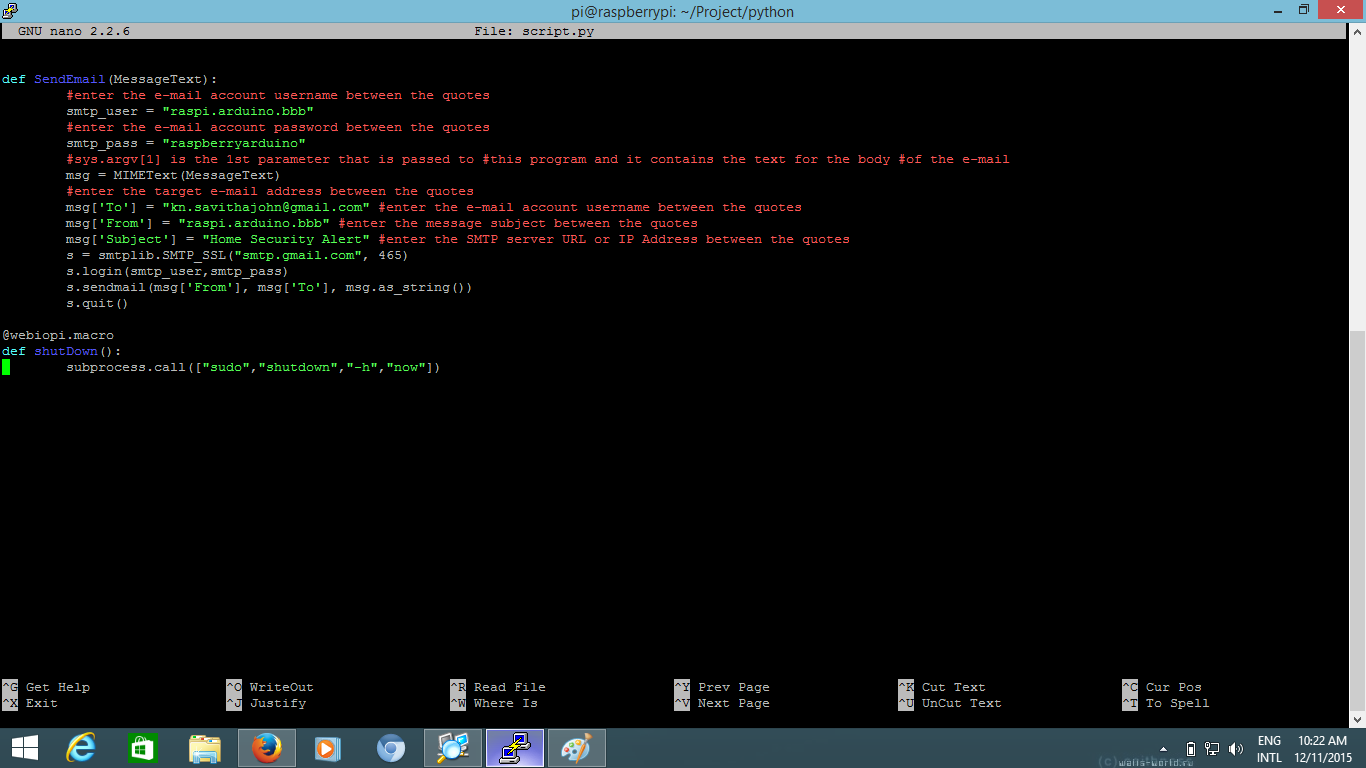
Raspbarry Module



Code Implementation







**Explanation of Algorithm and how it is been implemented**

import webiopi

import subprocess

import RPi.GPIO as GPIO\_PY

import os

import glob

import time

import sys

import smtplib

GPIO = webiopi.GPIO

PIR = 17 # GPIO pin using BCM numbering

from email.mime.text import MIMEText

motion = False

# setup function is automatically called at WebIOPi startup

def setup():

# set the GPIO used by the light to output

GPIO.setFunction(PIR, GPIO.IN)

# loop function is repeatedly called by WebIOPi

def loop():

# retrieve current datetime

global motion

if GPIO.digitalRead(PIR):

if motion == False:

print("Motion Detected")

SendEmail("Motion Detected!")

motion = True

else:

motion = False

webiopi.sleep(1)

# destroy function is called at WebIOPi shutdown

def destroy():

GPIO.digitalWrite(PIR, GPIO.LOW)

def SendEmail(MessageText):

#enter the e-mail account username between the quotes

smtp\_user = "raspi.arduino.bbb"

#enter the e-mail account password between the quotes

smtp\_pass = "raspberryarduino"

#sys.argv[1] is the 1st parameter that is passed to #this program and it contains the text for the body #of the e-mail

msg = MIMEText(MessageText)

#enter the target e-mail address between the quotes

msg['To'] = "captanwaar@gmail.com" #enter the e-mail account username between the quotes

msg['From'] = "raspi.arduino.bbb" #enter the message subject between the quotes

msg['Subject'] = "Motion Detection Alert" #enter the SMTP server URL or IP Address between the quotes

s = smtplib.SMTP\_SSL("smtp.gmail.com", 465)

s.login(smtp\_user,smtp\_pass)

s.sendmail(msg['From'], msg['To'], msg.as\_string())

s.quit()

@webiopi.macro

def shutDown():

**Information about the implementation of Modules**

**E-mail notification**

def SendEmail(MessageText):

#enter the e-mail account username between the quotes

smtp\_user = "raspi.arduino.bbb"

#enter the e-mail account password between the quotes

smtp\_pass = "raspberryarduino"

#sys.argv[1] is the 1st parameter that is passed to #this program and it contains the text for the body #of the e-mail

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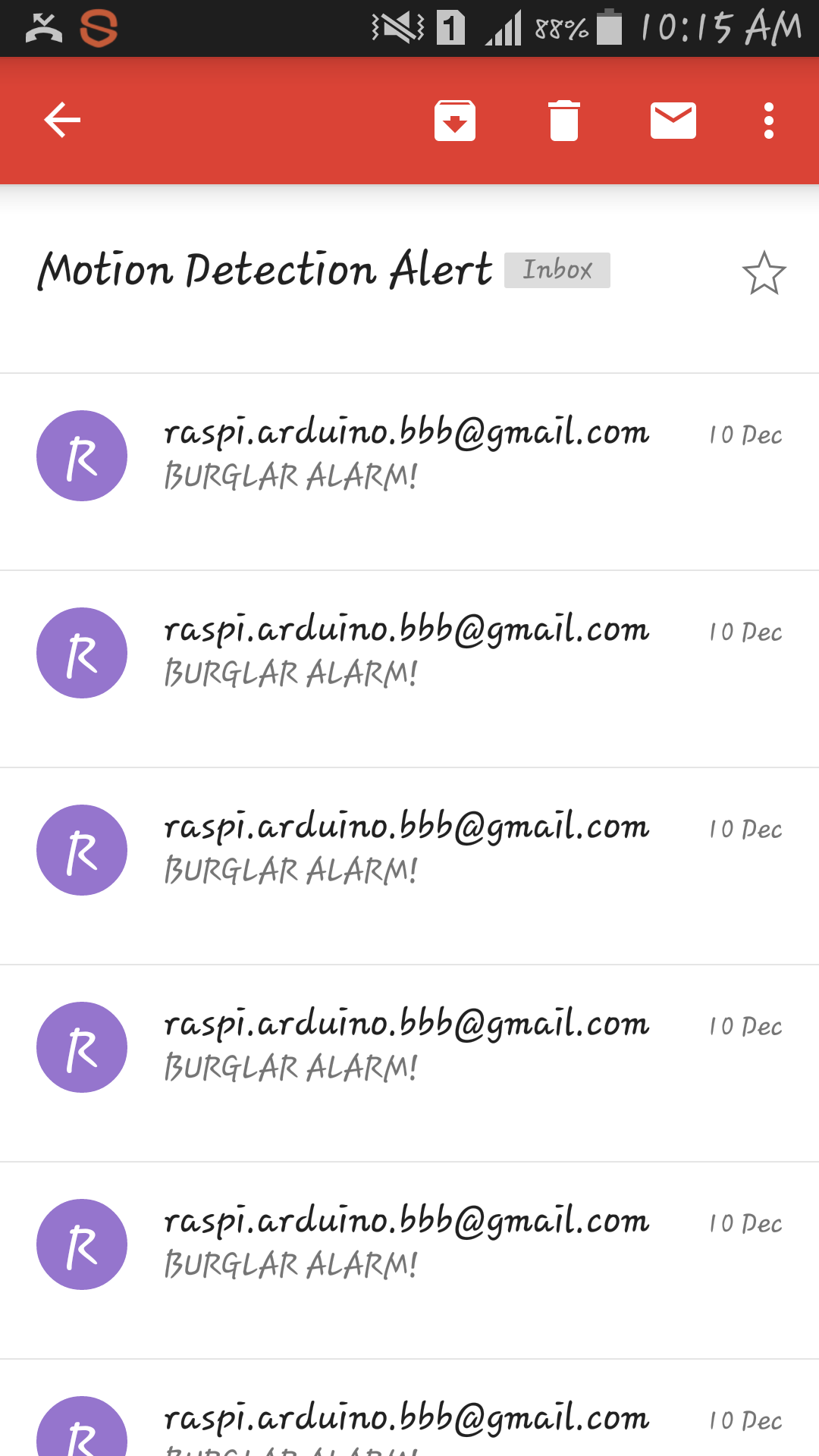
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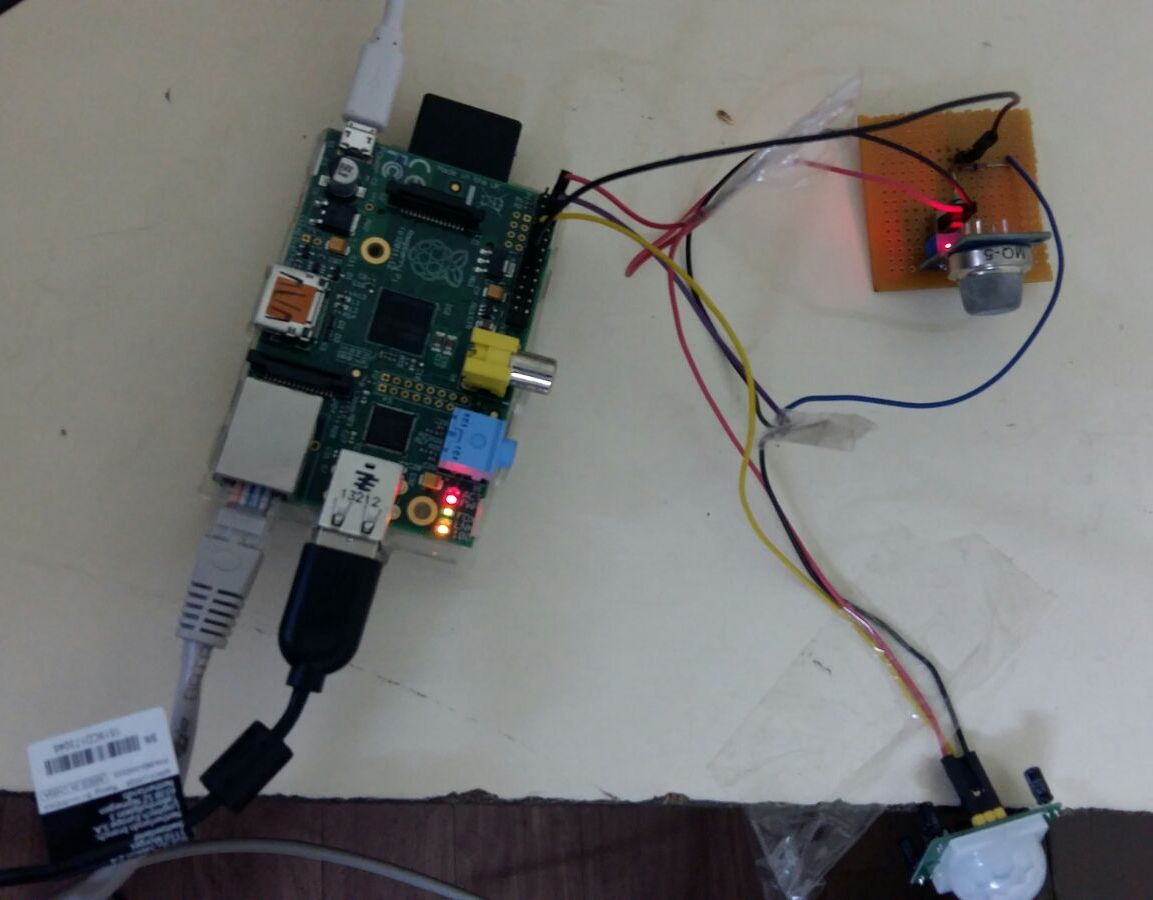
s.login(smtp\_user,smtp\_pass)

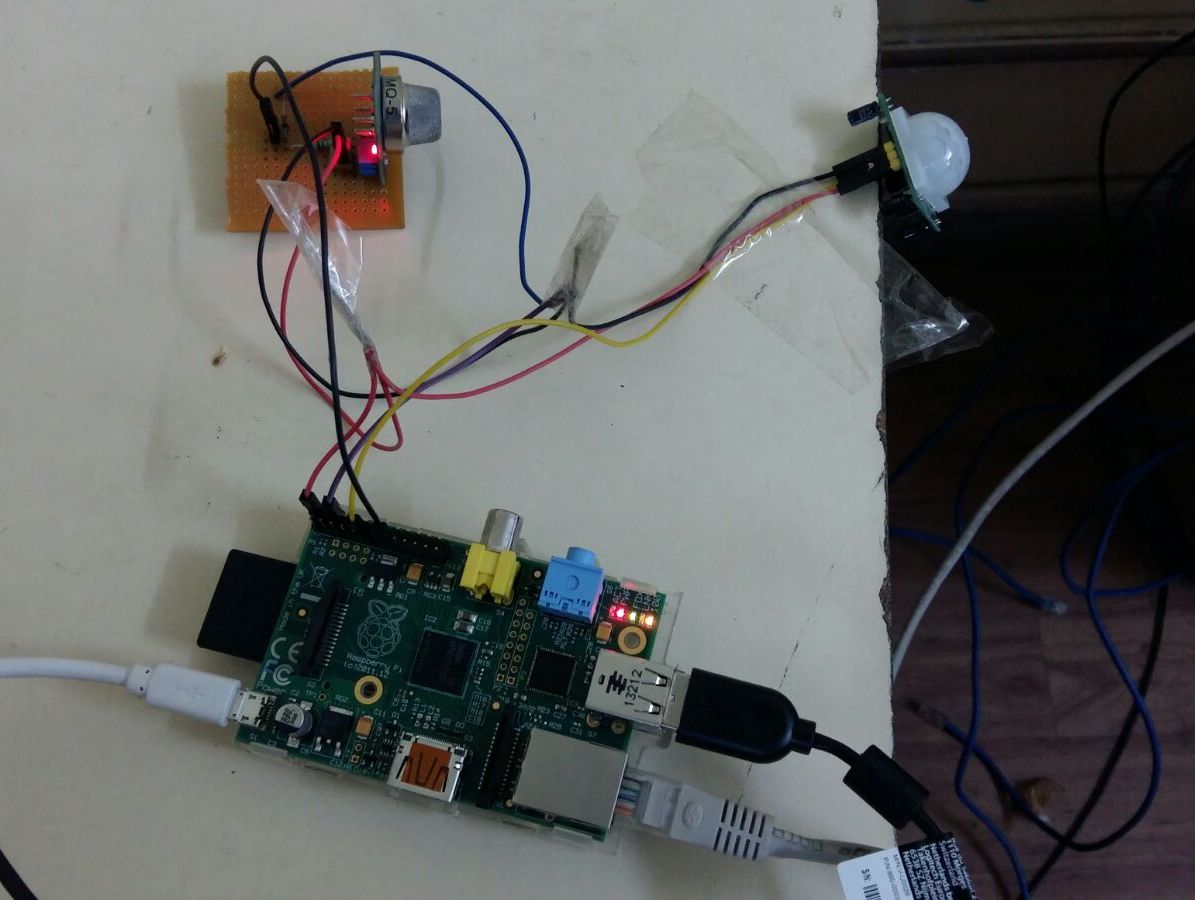
s.sendmail(msg['From'], msg['To'], msg.as\_string())

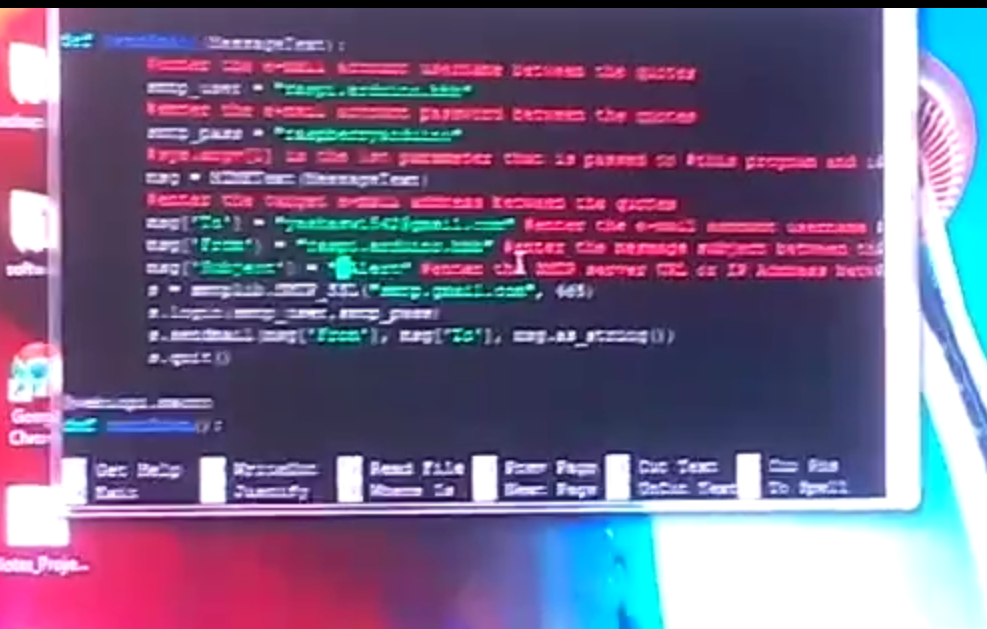
s.quit()

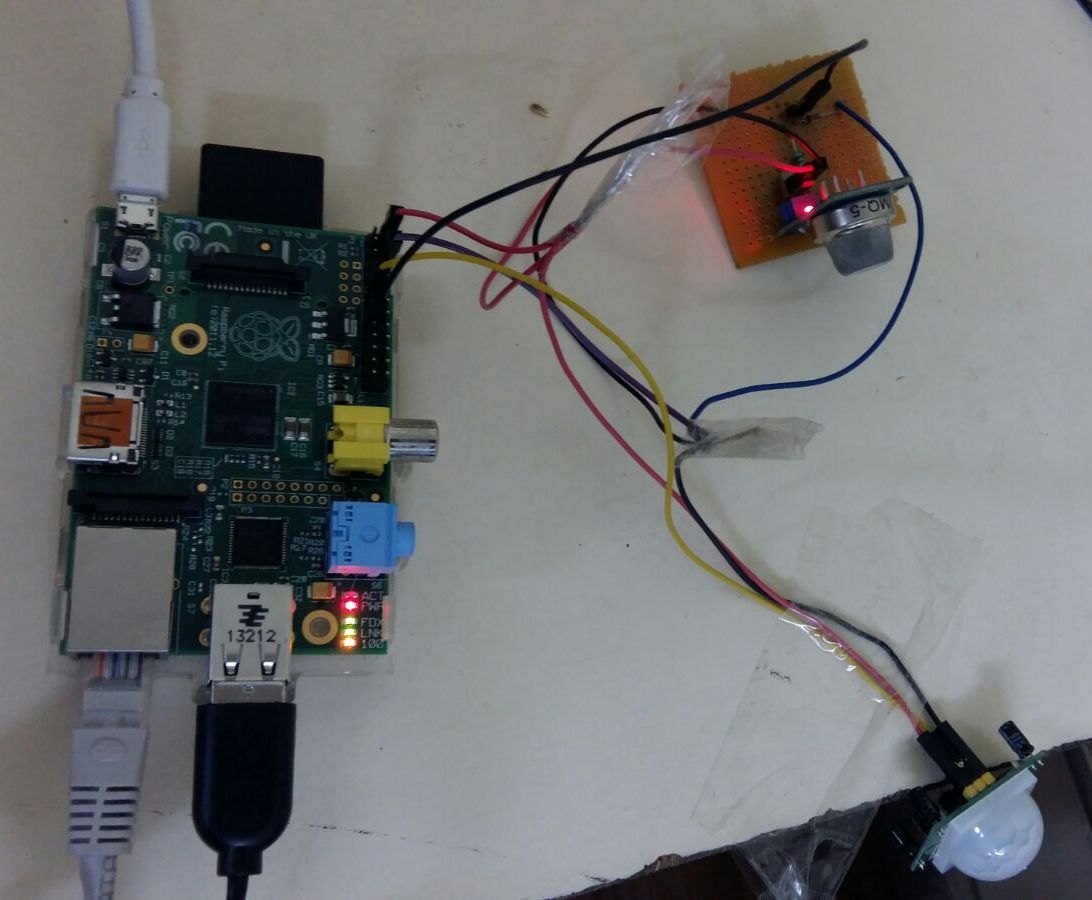


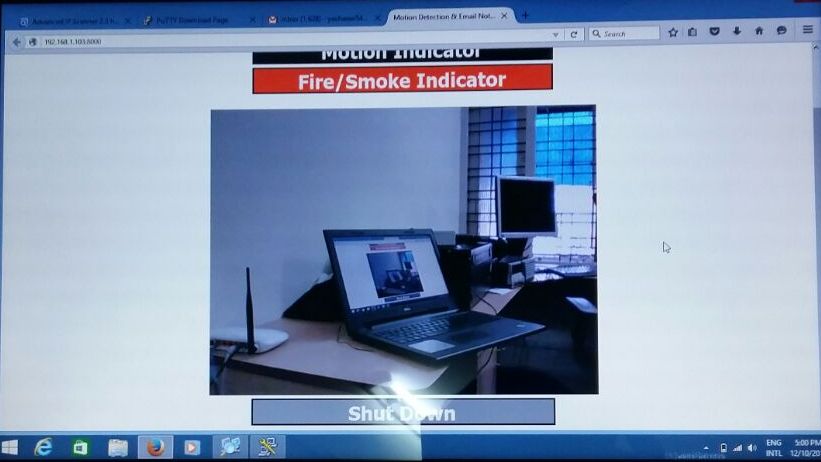
**Result**

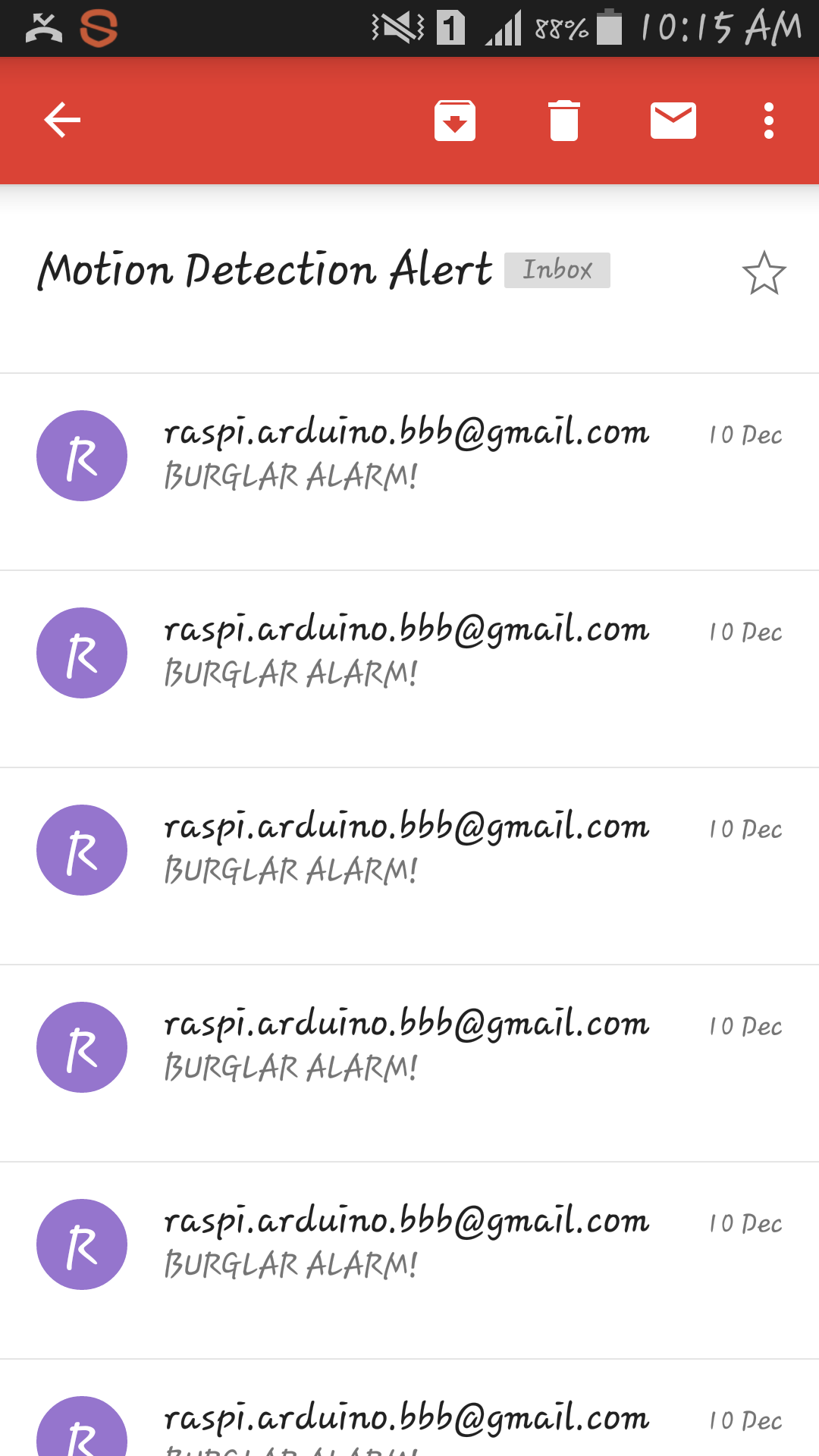
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* 1. **CONCLUSION & SCOPE FOR FUTURE WORK**

An automated home can be a very simple grouping of controls, or it can be heavily automated where any appliance that is plugged into electrical power is remotely controlled. Costs mainly include equipment, components, furniture, and custom installation.

Ongoing costs include electricity to run the control systems, maintenance costs for the control and networking systems, including troubleshooting, and eventual cost of upgrading as standards change. Increased complexity may also increase maintenance costs for networked devices

Learning to use a complex system effectively may take significant time and training. Control system security may be difficult and costly to maintain, especially if the control system extends beyond the

home, for instance by wireless or by connection to the internet or other networks.

**FUTURE WORK**:

Future will be of Automation of all products. Each and every product will be smart devices that we use daily and that will be controlled through a smart chipcalled microcontrollers. Each and Every home appliances will be controlled either by PC or hand held devices like PDA or mobile handsets. Some examples of it are when you want you can switch on/off Fan of your homebymobile handset or PC.

Smart Grid: Home automation technologies are viewed as integral additions to the Smart grid. The ability to control lighting, appliances, HVAC as well as Smart applications (load shedding, demand response, real

-time power usage and price reporting) will become vital asSmart Grid initiatives are rolled out.

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