**HOME SECURITY SYSTEM**

**A Project Report**

Submitted in Partial fulfillment of the

Requirements for the award of the Degree of

**BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)**

**By**

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***(Affiliated to University of Mumbai)***

**MUMBAI-400050**

**MAHARASHTRA**

**2018-19**

**PROFORMA FOR THE APPROVAL PROJECT PROPOSAL**

**PNR No.: ……………….. Roll No.: ……………….**

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1. **Teaching Experience of the Guide**  3 years
2. **Is this your first submission? Yes No**

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**CERTIFICATE**

This is to certify that the project entitled, **“Home Security System”**, is bonafied work of **HRISHIKESH P. MESTRY** bearing **Seat No.: 27** submitted in partial fulfillment of the requirments for the award of degree of BACHELOR OF SCIENCE in INFORMATION TECHNOLOGY from University of Mumbai.

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**ABSTRACT**

The project presents a versatile security system. The idea behind this project is to provide its users with a simple, fast and reliable way to get help during emergency situations. The device can be placed at any location which can be easily accessed by the user. It uses a Raspberry Pi, PIR sensor for motion sensing, RFID reader for scanning cards and camera for capturing pictures and videos which sends SMS containing the emergency message. The project consists one Android applications namely Telegram for user interface with the hardware. It can be used anywhere irrespective of the place of deployment provided Internet connectivity is available.

**ACKNOWLEDGEMENT**

The success and final outcome of this project required a lot of guidance and assistance from many people and I am extremely privileged to have got this all along the completion of my project. All that I have done is only due to such supervision and assistance and I would not forget to thank them.

I respect and thank **Mr. Javed Pathan** and **Ms. Hina Mahmood** for providing me an opportunity to do this project and giving us all support and guidance which made me complete the project duly. I thank the Coordinator and Head of the Department **Professor Arif Patel** for providing us the required facilities and guidance throughout the course which culminated into this thesis. I thank the Principal, **Professor Anjum Ara** for his leadership and management.

I am thankful to and fortunate enough to get constant encouragement, support and guidance from all Teaching staffs of IT Department which helped me in successfully completing my project work. Also, I would like to extend our sincere esteems to all staff in laboratory for their timely support.

**Hrishikesh P. Mestry**

**DECLARATION**

I hereby declare that the project entitled, **“Home Security System”** done at **place where the project is done,** has not been in any case duplicated to submit to any other university for the award of any degree. To the best of my knowledge other than me, no one has submitted to any other university.

The project is done in partial fulfillment of the requirements for the award of degree of **BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)** to be submitted as final semester project as part of our curriculum.

**Name and Signature of the Student**

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# Chapter 1: Introduction

## 1.1 Background

The most basic definition of any security system is found in its name. It is literally a means or method by which something is secured through a system of interworking components and devices. Home security systems are the networks of integrated electronic devices working together with a central control panel to protect against burglars and other potential home intruders.

When you look at your family, and your home, you know you want them to be safe, always out of harm’s way. When you leave for work, you expect to come back to a smiling family, and to a home that is secure. But as they say, hope is not a strategy. The growing crime rates across cities reflect the bitter reality. Many people overlook, ignore, and underestimate the need of taking appropriate home security measures. A burglary or theft can lead to devastating consequences, both emotionally and financially.  While the financial loss may be recoverable, the trauma inflicted on your family and yourself may last forever.

Home/ Bank/ Office security has been a major issue where crime is increasing and everybody wants to take proper measures to prevent intrusion.

In addition there was a need to automate home so that user can take advantage of the technological advancement.[1]

## 1.2 Objective/Aim

* This project aims at developing security of home against intruders.
* This home security system will be beneficial for the above case while you are out of your home.
* Unlike CCTV, this system will take pictures of the people when scanning the RFID card then send it to the user along with the message i.e valid or invalid card detection via internet on real time basis.
* Homes without security systems are high on their list. The advantage is the ability to remotely manage your house.
* With this, you can typically arm and disarm your security system from anywhere in the world via a web-enabled device, monitor who arrives and leaves your home.

## 1.3 Purpose and Scope

* **How does a security system works?**

Home security systems work on the simple concept of securing entry points into a home with sensors that communicate with a control panel or command center installed in a convenient location somewhere in the home.

The sensors and RFID reader are typically placed in doors that lead to and from a house as well as easily accessible windows, particularly any that open, especially those at ground level. Open spaces inside of homes can be secured with motion sensors.

* **What happens when an intrusion happens?**

Whenever an intruder or an unknown person visits your home, this home security system will take pictures as they come close to the door within certain range while scanning the RFID card.

Those pictures will be sending directly to the user on the telegram on their mobile devices which can be viewed by the user.

If the card is valid the door will be open and entry will be gained.

If the intruder tries to get inside the house with invalid card, a buzzer will ring and alert message will be sent to the user so that the user can contact the police. [2]

## 1.4 Risk and Safety

There are several safety issues that might arise during the design process of the project and in the applications. They are as follows,

**1. No Monitoring, No Automatic Emergency Calls**

When you avoid the monthly fees of a home security monitoring company, you also avoid the benefits of their services. Chief among them: Monitoring companies can contact the police, fire department or other first responders in the event of an emergency. With a DIY system, you can get an alert on your phone so you know to check the video surveillance and decide whether to call 100. However, what if you are actually in danger and are unable to make the call?

**2. Vulnerable Security Systems**

Experts know how to install home security systems with the proper layout and design. This includes the camera positioning for video surveillance and the locations of motion sensors. Smarter layouts and precise installations give you better security.

Many people install a home management security system for the simple benefits of controlling the thermostat — and assume that this system is actually providing good security. However, criminals know what they are doing and will find any vulnerable spots to avoid detection.

**3. Power and Internet Outages**

Many DIY smart home systems will not work if the power or internet goes out. Between bad weather, utility problems, and burglars disconnecting your modem, there are lots of ways that your system can be utterly useless when you need it most. Professional home security systems can be hard-wired so they work much, much closer to 100% of the time.

**4. False Alarms**

The pros can give you the best performance thanks to premium features like “pet-immune” motion sensors. Frankly, the equipment that comes with DIY kits cannot compare to the quality of professional systems. In some cases you can get all the premium features, but the cost ends up being hundreds more than the advertised low price making it even more expensive than a lot of professional, monitored solutions.

**5. You’ll also have to Repair and Upgrade the System Yourself**

The DIY route does not just apply to installation. We are generally responsible for maintaining and troubleshooting our own DIY home management security system. When parts break or the app doesn’t seem to work. Support from professional security companies offers more than just a convenient perk; it means that you can count on the system to work more reliably over time because repairs and upgrades can be done easily. As a result, we need to make sure the all the risks and safety issues has to be minimized while building a security system and it will not cause any hazardous situation while testing. All these safety analysis and precaution/prevention efforts align with the IEEE Code of Ethics.[3]

# Chapter 2: Survey of Technologies

The number of smart things is growing exponentially. By 2020, tens of billions of things will be deployed worldwide, collecting a wealth of diverse data. Traditional computing models collect in-field data and then transmit it to a central data center where analytics are applied to it, but this is no longer a sustainable model. New approaches and new technologies are required to transform enormous amounts of collected data into meaningful information. Technology also will enable the interconnection around things in the IoT ecosystem but further research is required in the development, convergence and interoperability of the different IoT elements. In this paper, we provide a picture of the main technological components needed to enable the interconnection among things in order to realize IoT concepts and applications.

## 2.1 What is Raspberry Pi?

The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote the teaching of basic computer science in schools and in developing countries. The original model became far more popular than anticipated, selling outside its target market for uses such as robotics. It does not include peripherals (such as keyboards and mice) and cases.

It is a fully functional computer or full-fledged credit card sized. It has all the trappings of a computer, with a dedicated memory, processor, and a graphics card for output through HDMI. It even runs a specially designed version of the Linux operating system and it is easy to install in most Linux software, and used the Raspberry Pi as a functioning video game emulator or media streamer with a bit of effort.

Though the Raspberry Pi doesn’t offer internal storage, we can use SD cards as the flash memory in the total system, allowing you to quickly swap out different versions of the operating system or software updates to debug. Because of this device is independent network connectivity, you can also set it up to access via SSH, or transfer files to it using FTP. It is having 512 MB RAM, 700 MHz microprocessor and hardware support for SPI, I2C and Serial.[4]

### 2.1.1Advantages (Pros)

Following are some of the main advantages of Raspberry Pi

* It is very easy to connect to the internet
* Entire [Linux software](https://www.elprocus.com/linux-operating-system/) stack is available
* Can be programmed using a variety of programming languages

### 2.1.2Disadvantages (Cons)

Following are some of the main limitations of Raspberry Pi

* Accessing hardware is not a real-time. If the CPU is busy, then interfacing with the hardware can be delayed
* Does not have enough power to drive inductive loads
* There is no inbuilt Analog to Digital converter available.
* The hardware design is not open source. Even though it is not a big deal, for some people it might a deal breaker.

## 2.2 What is Arduino?

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing. They don’t run a full operating system, but simply write the code and execute as their firmware interprets it.

The main purpose of the Arduino board is to interface with the devices and sensors, so it’s great for hardware projects in which you simply want things to respond various sensor readings and manual input. This may not seem to be a lot, but it is actually a very sophisticated system that allows you to better manage your devices. It is great for interfacing with other devices and actuators, where a full operating system would be overload for handling simple read and response actions. It has 8-bit AVR microcontroller and hardware support for SPI, I2C and Serial.[4]

### 2.2.1Advantages (Pros)

Following are some of the main advantages of Arduino.

* Very easy to get started.
* Can be used for real-time applications for hardware, software and IDE is open source.
* Not much programming knowledge needed to do basic stuff.
* It is very easy to extend and has tons of user contributed shields and libraries. Shields are available to do attractive much anything.

### 2.2.2Disadvantages (Cons)

Following are some of the main limitations of Arduino.

* It is not very powerful when compared with Raspberry Pi
* You need to program using either Arduino or C/C++
* Connecting to the internet is slightly difficult, but not impossible. Parsing of Arduino with YQL and JSON is possible.

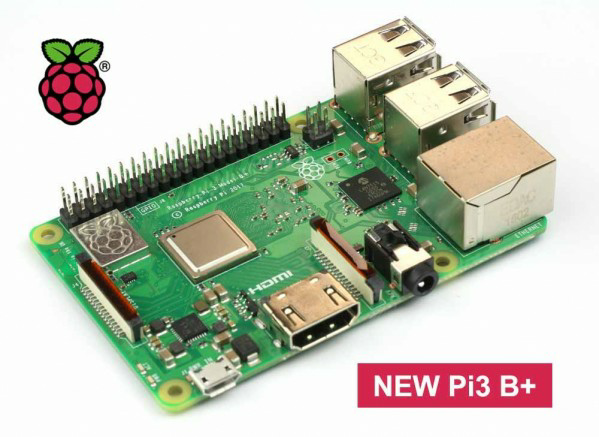
## 2.3 Difference between Raspberry Pi and Arduino

Choosing which board you want depends on the type of project you want to make, and your experience in programming. If you have no experience in programming or electronics, you will find the Arduino a steeper learning curve than the Raspberry Pi as you will have to learn them both at the same time. The Arduino has been around for a while though, and there are tons of useful tutorials around to get you started. If you have experience in programming, you won’t be having problem in getting to grips with the Arduino straight away.

If you want to make a hardware project, then the Arduino is the best choice. The input is given analog and get output is PWM and a whole spectrum of compatibility the Raspberry Pi cannot do natively. Plus the large I/O pins let you to connect the multiple sensors and feedback components. The Arduino however, is not as powerful as the Raspberry Pi, so there’s no proper video, audio, or internet out of the box. The Arduino can send data to your PC or Raspberry Pi, over serial, and you can then create a program to read this data and do something.

If you want to make a software project, then the Raspberry Pi is the way to go. The video, audio, and internet capabilities make it the winner in this aspect. There’s no need to attach external components, so there’s no real need to learn electronics.

## 2.4 Raspberry Pi 3 Model B+



The Raspberry Pi 3 Model B+ is the latest product in the Raspberry Pi 3 range, boasting an updated 64-bit quad core processor running at 1.4GHz with built-in metal heatsink, dual-band 2.4GHz and 5GHz wireless LAN, faster (300 mbps) Ethernet, and PoE capability via a separate PoE HAT.

The Raspberry Pi 3 Model B+ maintains the same mechanical footprint as both the Raspberry Pi 2 Model B and the Raspberry Pi 3 Model B.

There are many applications for Raspberry Pi it's used heavily in education (in schools and in coding clubs), in the home and in industry. Many people use Pi’s for media centers and home automation projects or just for learning about code and building hardware projects. You can do physical computing and camera projects.[4]

### 2.4.1 Features

The latest Raspberry Pi 3 Model B+ has a faster 64-bit 1.4GHz quad core processor, 1GB of RAM, faster dual-band 802.11 b/g/n/ac wireless LAN, Bluetooth 4.2, and significantly faster 300Mbit/s ethernet.

* 1.4GHz 64-bit quad-core ARM Cortex-A53 CPU (BCM2837)
* 1GB RAM (LPDDR2 SDRAM)
* On-board wireless LAN - dual-band 802.11 b/g/n/ac (CYW43455)
* On-board Bluetooth 4.2 HS low-energy (BLE) (CYW43455)
* 4 x USB 2.0 ports
* 300Mbit/s ethernet
* 40 GPIO pins
* Full size HDMI 1.3a port
* Combined 3.5mm analog audio and composite video jack
* Camera interface (CSI)
* Display interface (DSI)
* microSD slot
* Video Core IV multimedia/3D graphics core @ 400MHz/300MHz

# Chapter 3: System Requirements and Analysis

## System Analysis

Need for home security system?

Protect Your Home and Family from Intruders

The biggest reason a home owner should consider installing a home security system is that it offers protection to family members from intruders. According to “Securing Home and Business” by Simon Hakim/Erwin Blackstone**,** homes without security systems are 2.7 times more likely to be targeted by a burglar. This indicates that the mere presence of an alarm system is enough in most cases to protect the home and its occupants from break-in.

## 3.1 Existing Systems

**Types of home security systems:**

The market is flooded with many types of security systems for households and businesses.  Typically, you will find major components such as a control panel, alarm, sensors, and detectors in a security system. Each component is integral to the system. You can opt for a wired security system or a wireless one, depending on your preference and budget.

**DIY home security systems**

In case of DIY security systems, all you have to do is follow the instructions that come with the kit. Most DIY security systems are wireless and easy to install. You can place sensors and detectors at main entry points such as doors, and windows.[1]

## 3.2 Proposed System

IoT or Internet Things refers to the network of connected physical objects that can communicate and exchange data among themselves without the need of any human intervention. It has been formally defined as an “Infrastructure of Information Society”, because IoT allows us to collect information from all kind of mediums such as humans, animals, vehicles, kitchen appliances. Thus any object in the physical world which can be provided with an IP address to enable data transmission over a network can be made part of IoT system by embedding them with electronic hardware such as sensors, software and networking gear. The IoT infrastructure has helped by providing real time information gathering and analysis using accurate sensors and seamless connectivity, which help in making efficient decisions. With the advent of IoT both manufacturers and consumers have benefited. Manufacturers have gained insight into how their products are used and how they perform out in the real world and increase their revenues by providing value added services which enhances and elongates the lifecycle of their products or services. Consumers on the other hand have the ability to integrate and control more than one device for a more customized and improved user experience.

Previously home security systems meant having an alarm that would go off when somebody would break in but a smart secure home can do much more than that. Therefore the main objective of our work is to design a system which can alert the owner and others by sensing using PIR sensor and detecting RFID cards by which an intruder might break-in and then sending a notification and image of the intruder to their smart phones. This system will help the users to safeguard their homes by placing the system on the doors or windows and monitoring the activity through their smart phones.

An alarm system that sounds the buzzer is of no use when a user is not present in the home to take action. The IoT network consists of embedded electronics, sensors and software from their home, they want to be assured that their home is protected by intruders and thieves while they are gone. This is why the proposed system keeps the owner informed in the real time about the security status of their home. The designed system informs the user as there is a break-in so that the user can take necessary actions.

## 3.3 Requirement Analysis

### 3.3.1 Hardware Requirements

* **Raspberry Pi Model B+**



The Raspberry Pi 3 Model B+ is the latest product in the Raspberry Pi 3 range, boasting an updated 64-bit quad core processor running at 1.4GHz with built-in metal heatsink, dual-band 2.4GHz and 5GHz wireless LAN, faster (300 mbps) Ethernet, and PoE capability via a separate PoE HAT.

* **Raspberry Pi Camera Module v2**



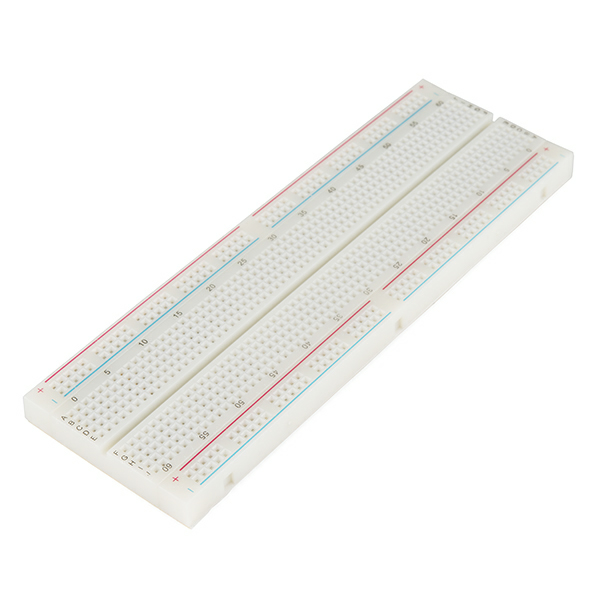
The 5MP Raspberry Pi 3 Model B Camera Module Rev 1.3 with Cable equips [flexible cable](https://robu.in/product/raspberry-pi-zero-v1-3-camera-cable/) for attaching with Raspberry Pi 3 Model B. The high-definition 5MP [camera](https://robu.in/product-category/camera/) delivers outstanding photos but can also shoot video, ideal for [drones](https://robu.in/product-category/multirotors/) or a CCTV project.

* **PIR Motion Sensor**



A passive infrared sensor is an electronic sensor that measures infrared light radiating from objects in its field of view. They are most often used in PIR-based motion detectors.

* **Breadboard**



A **breadboard** is a solderless device for temporary prototype with electronics and test circuit designs. Most electronic components in electronic circuits can be interconnected by inserting their leads or terminals into the holes and then making connections through wires where appropriate

.

* **Jumper wires**



Jumper wires are simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering.

* **RFID Reader/Writer RC522 SPI S50 CARD and KEYCHAIN**



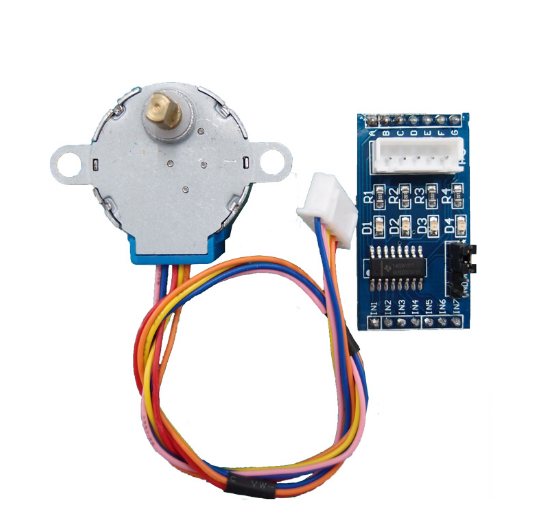
RFID Reader/Writer RC522 SPI S50 CARD AND KEYCHAIN which works on non-contact 13.56mhz communication, is designed by NXP as low power consumption, low cost and compact size read and write chip, is the best choice in the development of smart meters and portable hand-held devices.

* **Piezo electric buzzer**



The **piezo buzzer** produces sound based on reverse of the piezoelectric effect. The generation of pressure variation or strain by the application of electric potential across a piezoelectric material is the underlying principle. These buzzers can be used alert a user of an event corresponding to a switching action, counter signal or sensor input. They are also used in alarm circuits.

* **28BY J-48 – 5V Stepper motor and ULN2003 driver**



This 5V DC 28BYJ-48 [Stepper Motor](https://robu.in/product-category/stepper-motor-and-drivers/stepper-motor/) is small, inexpensive and high-quality geared step motor. The 28BYJ-48 Stepper Motor and ULN2003 Stepper Motor Driver is a widely popular combination of the stepper motor and stepper driver, because of the stability and reliability of the system. It is a unipolar stepper motor which has 5-wires. The main purpose of [ULN2003](https://robu.in/product/uln2003-driver-module-stepper-motor-driver/) is to amplify the control signals so as to drive the 28BYJ-48 Stepper Motor.[6]

## 3.4 Software Requirements

### 3.4.1 Python IDLE

The official programming language of Raspberry Pi is Python, which comes preloaded with the Raspbian operating system. IDLE is integrated development environment (IDE) for editing and running Python 2.x or Python 3 programs.

The IDLE GUI (graphical user interface) is automatically installed with the Python interpreter. IDLE was designed specifically for use with Python. IDLE has a number of features to help you develop your Python programs including powerful syntax highlighting.

The combination of Raspberry Pi and IDLE3 enables programmers to develop all sorts of Python based programs.

### 3.4.2 Telegram Application

Telegram is a cloud-based instant messaging and voice over IP service developed by Telegram Messenger LLP

It is used to send notifications when someone is within the range of sensor and scans card for entry into the room and to take a picture at the same time. It will save the picture and it allows remote access through same to take a look at it.

# Chapter 4: System Design

## 4.1 Planning and Scheduling

### 4.1.1 Gantt Chart

## 

## 4.2 Conceptual Models

### 4.2.1 Use Case Diagram

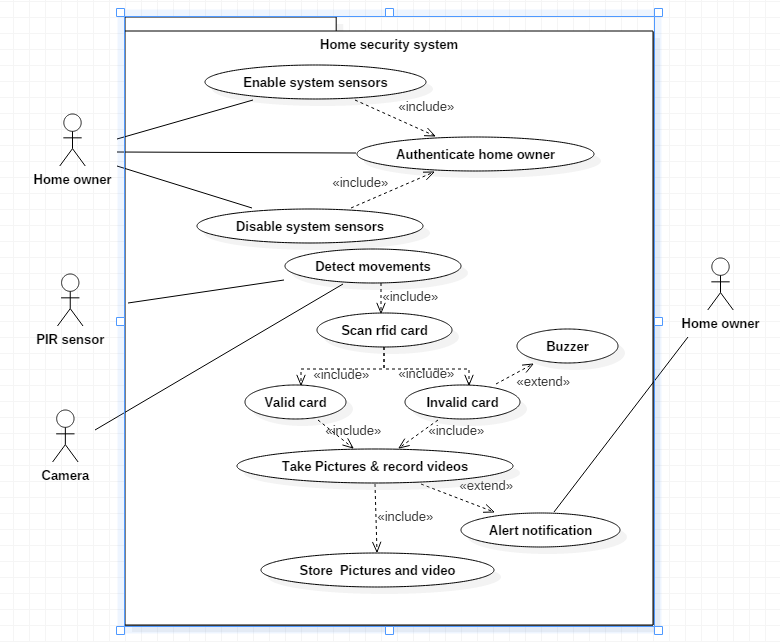


Figure: - 1

### 4.2.2 Class Diagram

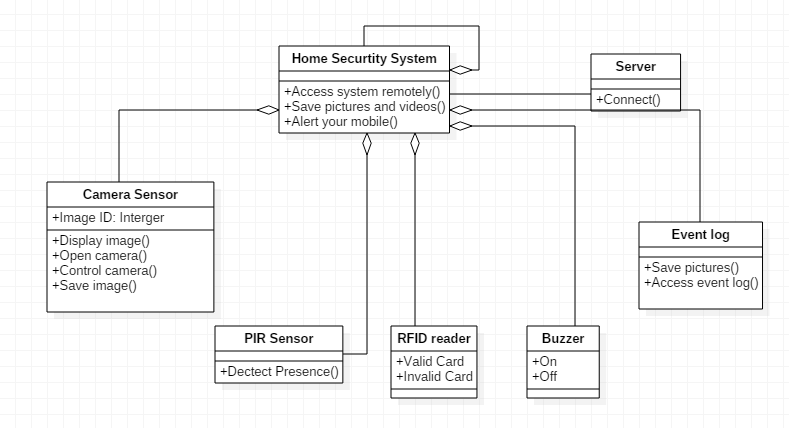
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Figure: - 2

## 4.3 Circuit diagram

### 4.3.1 PIR and Buzzer connection

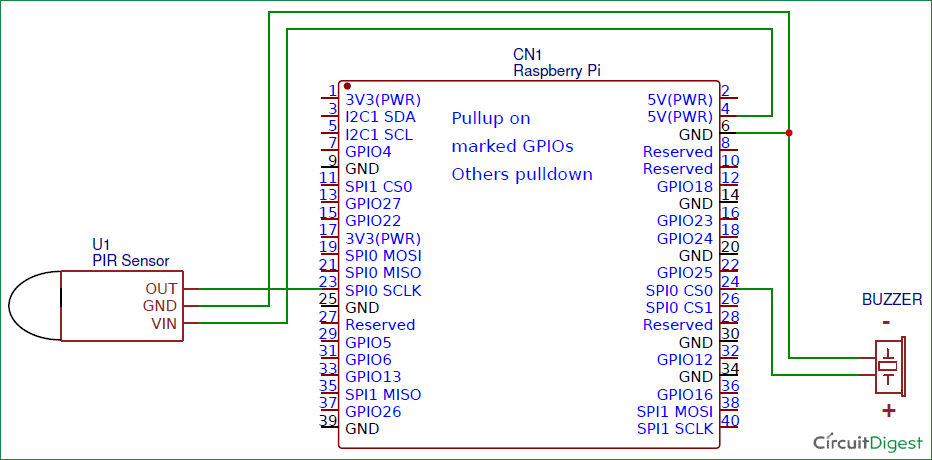


Figure: - 3

### 4.3.2 RFID connections

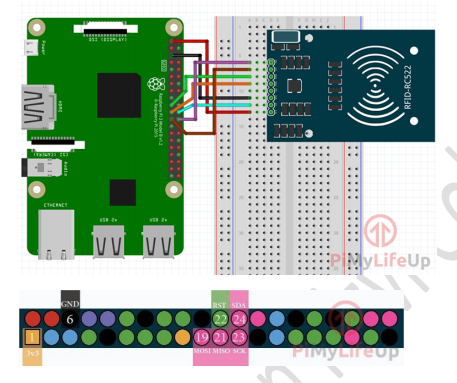


Figure: - 4

# Chapter 5: Implementation and Testing

## 5.1 Code

import SimpleMFRC522

import RPi.GPIO as GPIO

import time, datetime

import telegram

from picamera import PiCamera

from time import sleep

GPIO.setwarnings(False)

GPIO.setmode(GPIO.BCM)

camera = PiCamera()

def cap():

camera.rotation = 180

camera.resolution = (2592, 1944)

camera.framerate = 15

sleep(1)

camera.capture('/home/pi/Desktop/image.jpg')

coil\_A\_1\_pin = 27

coil\_A\_2\_pin = 22

coil\_B\_1\_pin = 5

coil\_B\_2\_pin = 6

StepCount = 8

Seq = range(0, StepCount)

Seq[0] = [1,0,0,0]

Seq[1] = [1,1,0,0]

Seq[2] = [0,1,0,0]

Seq[3] = [0,1,1,0]

Seq[4] = [0,0,1,0]

Seq[5] = [0,0,1,1]

Seq[6] = [0,0,0,1]

Seq[7] = [1,0,0,1]

#GPIO.setup(enable\_pin, GPIO.OUT)

GPIO.setup(coil\_A\_1\_pin, GPIO.OUT)

GPIO.setup(coil\_A\_2\_pin, GPIO.OUT)

GPIO.setup(coil\_B\_1\_pin, GPIO.OUT)

GPIO.setup(coil\_B\_2\_pin, GPIO.OUT)

#GPIO.output(enable\_pin, 1)

def setStep(w1, w2, w3, w4):

GPIO.output(coil\_A\_1\_pin, w1)

GPIO.output(coil\_A\_2\_pin, w2)

GPIO.output(coil\_B\_1\_pin, w3)

GPIO.output(coil\_B\_2\_pin, w4)

def forward(delay, steps):

for i in range(steps):

for j in range(StepCount):

setStep(Seq[j][0], Seq[j][1], Seq[j][2], Seq[j][3])

time.sleep(delay)

def backwards(delay, steps):

for i in range(steps):

for j in reversed(range(StepCount)):

setStep(Seq[j][0], Seq[j][1], Seq[j][2], Seq[j][3])

time.sleep(delay)

reader=SimpleMFRC522.SimpleMFRC522()

GPIO.setup(4, GPIO.IN)

GPIO.setup(17, GPIO.OUT)

def rfid():

id,text=reader.read()

chat\_id=669801266

now= datetime.datetime.now()

bot = telegram.Bot(token='719915683:AAFwnsG5a7AWNB5adqvp2uNRq8bkteGaIMU')

print (bot.getMe())

if id==626081541925:

print "Card is Valid"

print "Welcome"

print(text)

print 'Authentication Successfull'

bot.sendMessage (chat\_id=chat\_id, text= "Some activity detected")

if \_\_name\_\_ == '\_\_main\_\_':

delay = 3

while True:

steps = 128

forward(int(delay) / 1000.0, int(steps))

steps = 128

backwards(int(delay) / 1000.0, int(steps))

break

time.sleep(2)

bot.sendPhoto (chat\_id=chat\_id, photo=open('/home/pi/Desktop/image.jpg'))

elif id!=626081541925:

print "Card is invalid"

GPIO.output(17, True)

time.sleep(0.5)

GPIO.output(17, False)

print(text)

print 'Intruder!!!!!'

bot.sendMessage (chat\_id=chat\_id, text= "Intruder at the door!!! \nInvalid card entry")

time.sleep(2)

bot.sendPhoto (chat\_id=chat\_id, photo=open('/home/pi/Desktop/image.jpg'))

current\_state=0

try:

while True:

time.sleep(0.1)

current\_state = GPIO.input(4)

if current\_state == 1:

print "Motion Detected"

cap()

rfid()

time.sleep(5)

else:

print "No motion"

except KeyboardInterrupt:

pass

finally:

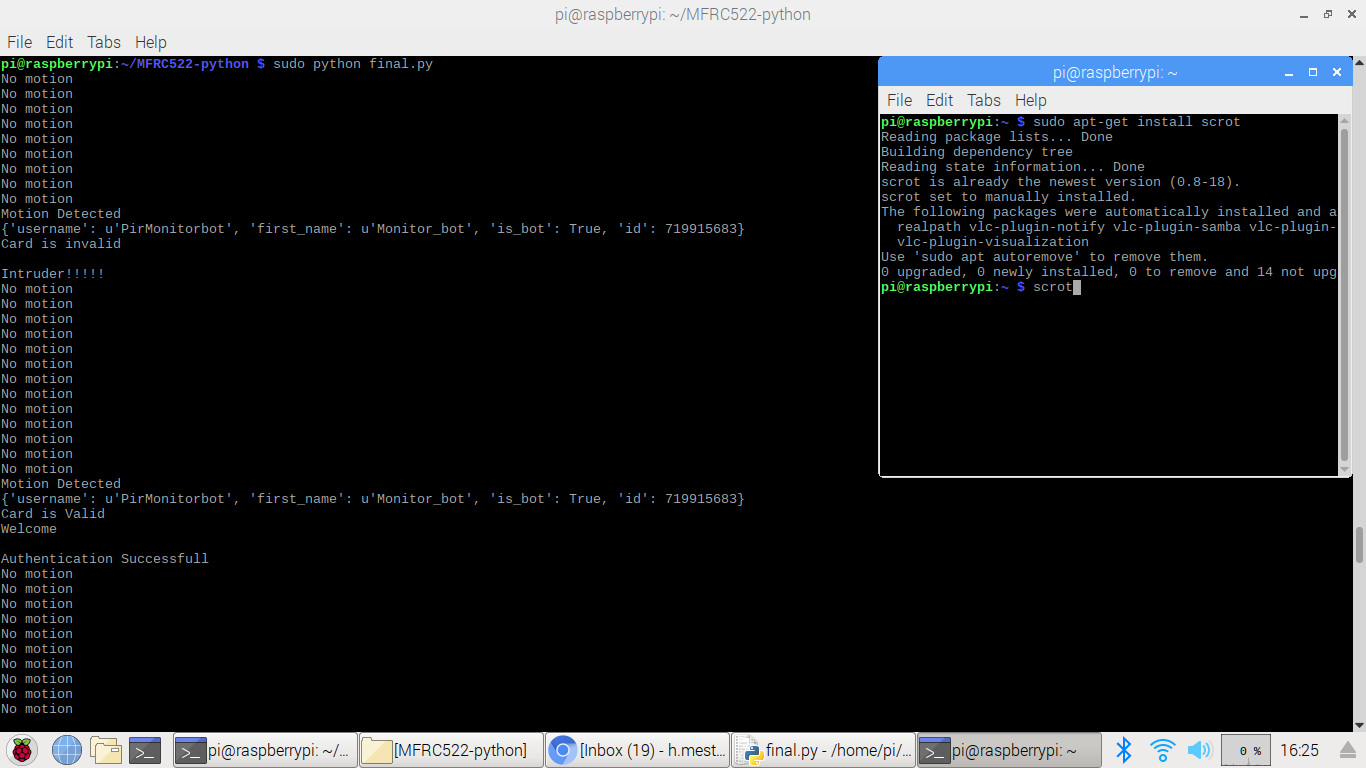
GPIO.cleanup()

## 5.2 Testing

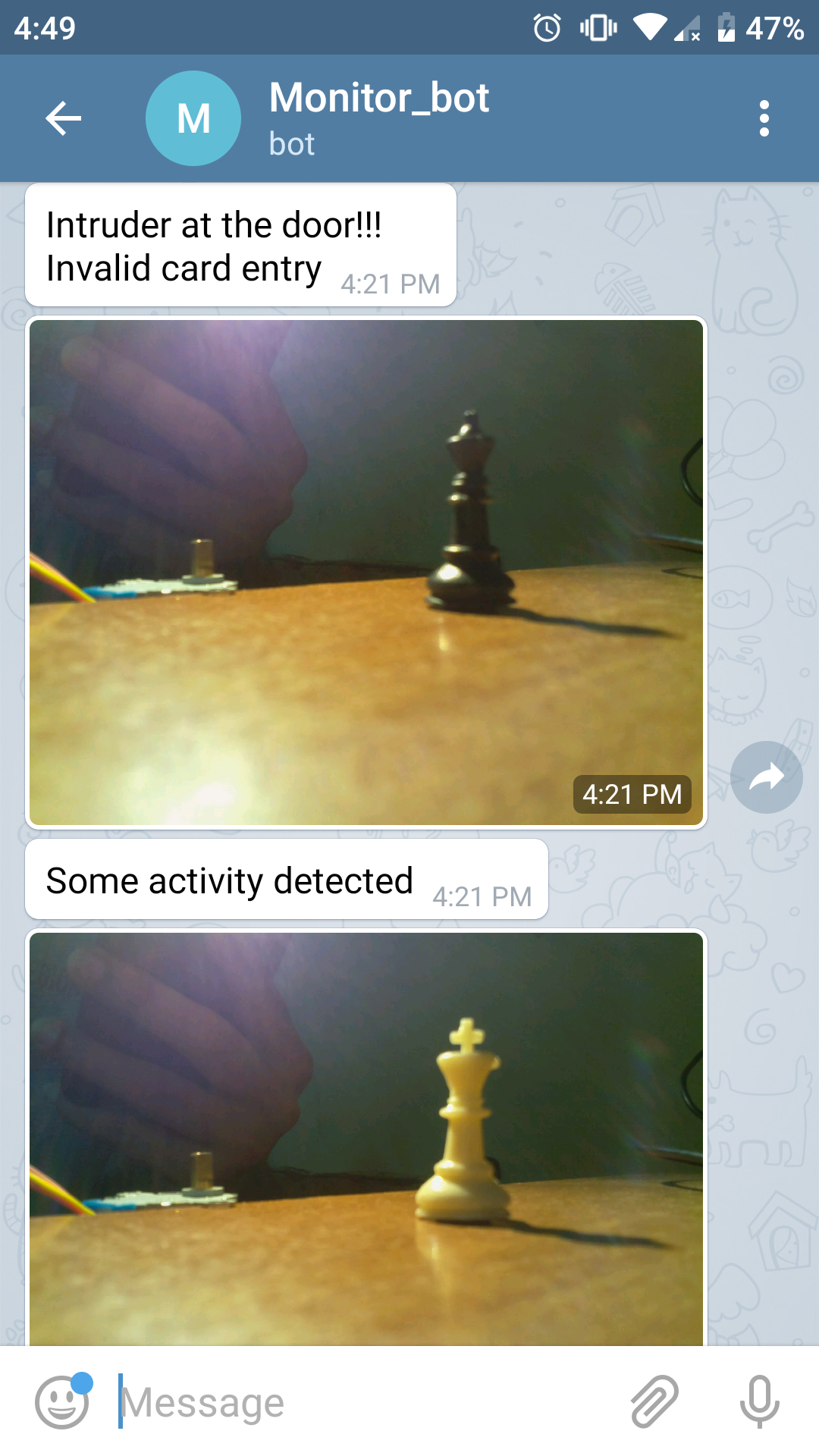
|  |  |  |  |
| --- | --- | --- | --- |
| Test Case | Test Case Name | Output | Test result |
| TC1 | PIR sensor detection | Triggers RFID reader for scanning and camera for capturing pictures | Pass |
| TC2 | RFID reader action for valid card | Grant access successfully and opens door | Pass |
| TC3 | RFID reader action for invalid card | Access denied and beep buzzer | Pass |
| TC4 | Motor rotation | Opens door at 90° and comes back to initial position | Pass |
| TC5 | Telegram | Receives alert message and captured image | Pass |

# Chapter 6: Result and Discussions

## 6.1 Code execution



## 6.2 Output



# Chapter 7: Conclusion and Future work

The future implications of the project are very great considering the amount of time and resources it saves. The project we have undertaken can be used as a reference or as a base for realizing a scheme to be implemented in other projects of greater level such as advanced home security system including face recognition, fingerprint scanning and many more.

The project itself can be modified to achieve a fully complete Home security System which will then create a platform for the user to interface between himself and his household.

Today, with advancement in science and technology, home automation has become one of the fastest developing application-based technologies in the world. The idea of comfortable living in home has since changed for the past decade as digital, vision and wireless technologies are integrated into it. Intelligent homes, in simple terms, can be described as homes that are fully automated in terms of carrying out a predetermined task, providing feedback to the users, and responding accordingly to situations. In other words, it simply allows many aspects of the home system such as temperature and lighting control, network and communications, entertainment system, emergency response and security monitoring systems to be automated and controlled, both near and at a distance.

Automated security systems play an important role of providing an extra layer of security through user authentication to prevent break-ins at entry points and also to track illegal intrusions or unsolicited activities within the vicinity of the home (indoors and outdoors).There has been much research done in the design of various types of automated security systems. Sensor-based systems that rely on contact or movement sensors or contact-based systems such as fingerprint and palm print scan or keypad activation that require substantial amount of contact with an input device.

Security systems are based on only a single system. In an event of system failure or intrusion of the user authentication, there is no backup system to monitor the home continually. This shortcoming can be dealt with using multiple security systems (ormulti-layered security systems). However, multi-system implementations will definitely bemore demanding in terms of computational cost and organization.

The extensive capabilities of this system are what make it so interesting. From the convenience of a mobile phone, a user is able to control and monitor virtually the security system. This makes it possible for users to rest assured that their belongings are secure when they left the house. The end product will have a simplistic design making it easy for users to interact with.[8]

# Chapter 8: References

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