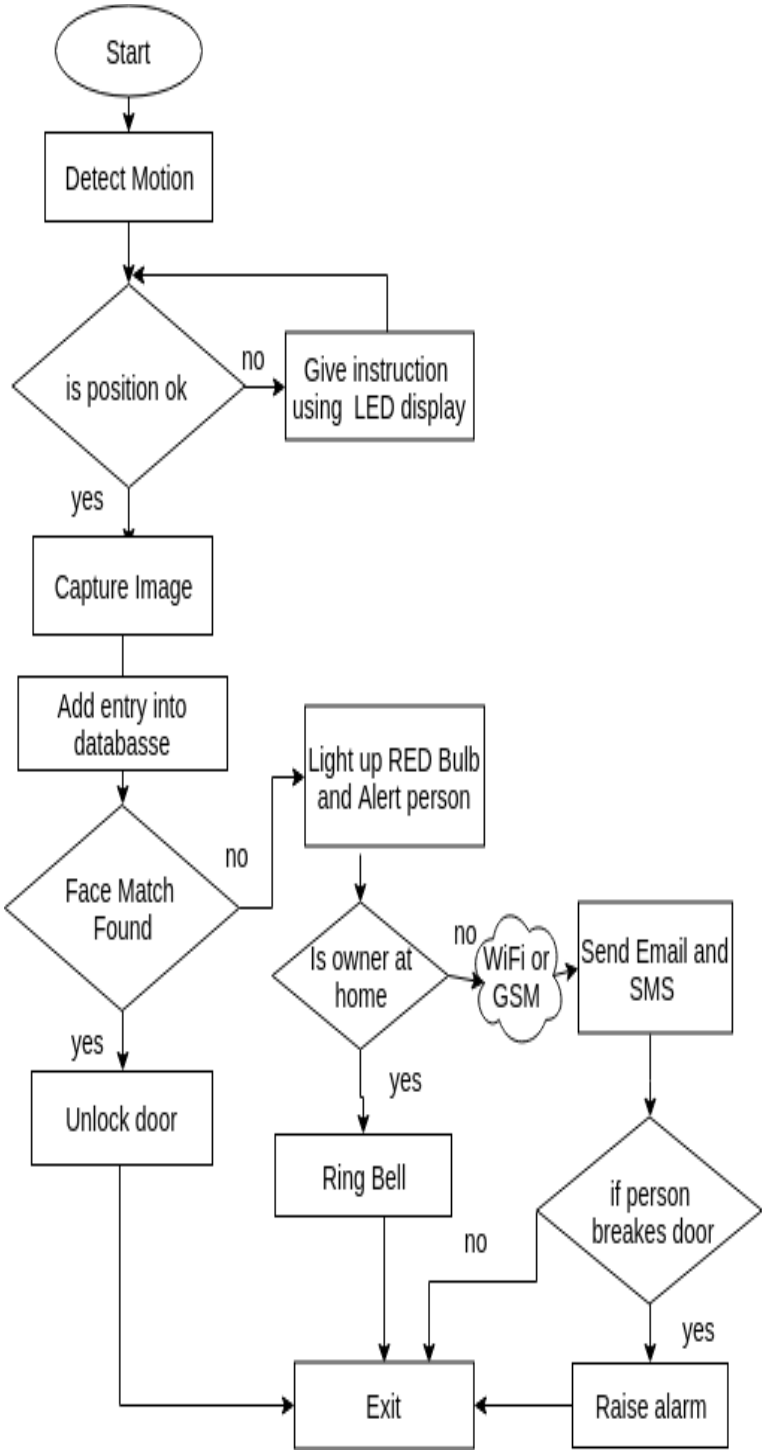
Use-Case for Smart Home Security

Flowchart



Steps involved in proposed system are discussed in detail-

1) System will work if there is some motion detected using Pir sensor else it will go into the hibernation to save energy.

2) After detecting motion, the system will check for the position of person ie., the distance between person and camera (at most 240cm) here ultrasonic sensor will be used, lighting condition. In order to satisfy this conditions system will give instructions to the person present in front of the camera.

3) Image will be captured and face recognition will be performed. if face match found door will open else red color bulb will light up, if the owner is at home(specified in android application) then bell will ring else notification will be sent ie., someone is waiting outside your home. All these activities are stored in the database which is in microSD card in raspberry pi and maximum size of SD card is 32GB. These activities can be accessible using android or web application.

4) If intruder breaks locked door then system will raise high volume alarm and indicate same to the homeowner via email and sms.

Existing System

In the present situation of the modern digitizing world, everything is equipped with modern technology and internet to ease our work and gain more efficiency. But the current system lacks it, the major problems with security that our system targets are:

- ➔ Today's security system is from 90's that is, key-lock based.
- ➔ In case of power failure security system stops working.
- ➔ High-level security system comes with high cost and maintenance.
- ➔ Homeowners are not aware of their own security system, how does it work because of their complex nature.

Why Our solution is Unique

- ➔ Our model has much **less cost** and than what is available in Market. We can use these models in schools, colleges, business, offices, and many more with Limited expense and less equipments.
- ➔ Raspberry pi has **4 Port** so, four webcams can be added to it which means if working environment has four entry doors then only one Raspberry pi is enough. Furthermore, if Buy in Huge amount sensors and Raspberry pi will be cost cheaper as compared to original cost.
- ➔ **Sends mail and text messages** to owner of the home as soon as the intruder detected.
- ➔ In case of **power failure**, battery power of 5V is enough for Raspberry pi to work and additional GSM module will be used to send text messages.
- ➔ **Two layer security** as user have to pass two stage authentication ie., Face recognition and Passcode.
- ➔ All data will be encrypted and backup will be taken to cloud storage in case of technical failure.
- ➔ Use of Both WiFi and GSM.
- ➔ Two stage authentication ie., Face recognition and passcode.
- ➔ Save energy ie., will work if there is any motion else will go into hibernation.

Future Scope

- ➔ Improve face recognition accuracy
- ➔ Develop android application
- ➔ Add Digital Assistance to make system more interactive by converting text to speech(NLP).

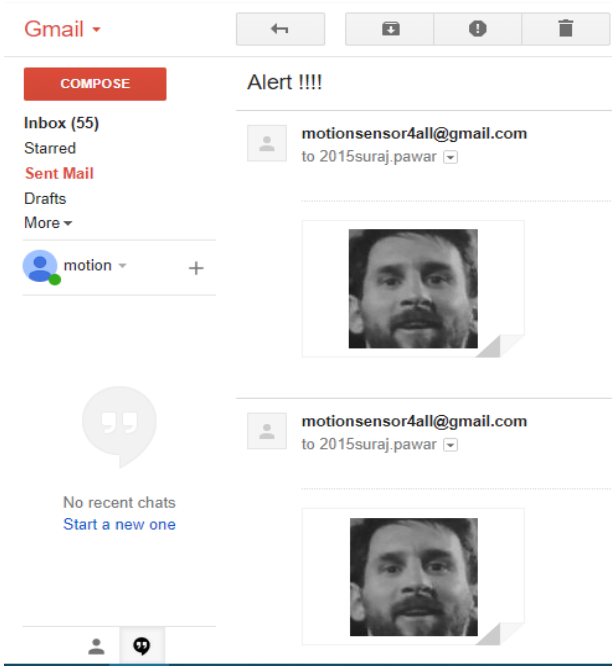
Our complete solution for Smart Home Security is explained in detail ie., in our Research paper which has been accepted for IEEE journal.

Research PaperLlink-
https://drive.google.com/file/d/1PF2uOviDD0_f2iRtbv63OmOF9EJukvKI/view?usp=sharing

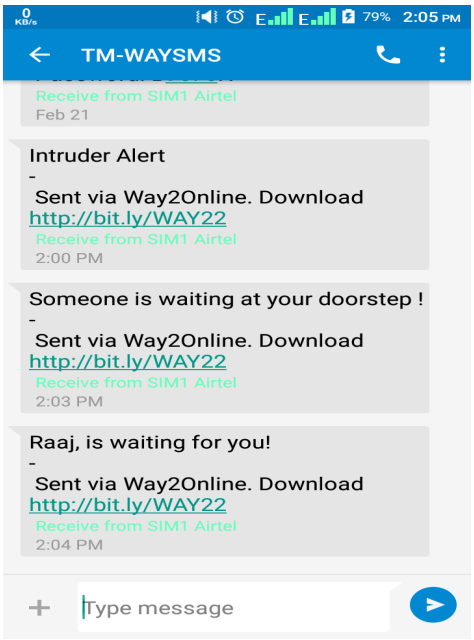
Powerpoint Link-
https://drive.google.com/file/d/1NnMpKUmBWaFCpCAQPC0APiC2am5AHDLR/view?usp=sharing

We have implemented approximately 60% of Idea mentioned in research paper modules, Modules have been implemented and successfully working are as follow-

- Motion Detection
- Image Capture on Raspberry Pi
- Face Detection and Recognition
- After verification, If user is Unauthorized then Email and SMS will be send to the Homeowner which will be there in database.



Email with attachment



SMS

Working Prototype

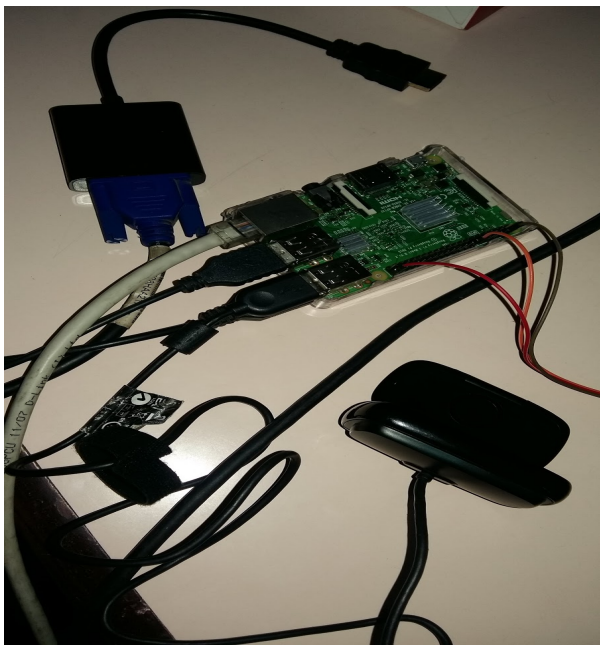
Prototype link -

1. Motion Sensor
   https://drive.google.com/file/d/10-OK5hDDXLy_GZ2ydXbL6BNbgaW5tAXC/view?usp=sharing
2. Face Recognition
   https://drive.google.com/file/d/1wXNpD-pnUqkOaQvaxJJBhgF4ZfVnE49K/view?usp=sharing

Cost of Our Prototype(60% of our idea):

Component	**Cost**
Raspberry PI Model 3B	2500
Pir sensor	100
Webcam	500
Jumper Wires	100
Total	**3200**

VGA
To
HDMI
Converter -->



Raspberry Pi

Webcam

Contact Details

We all four are available after 6pm

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