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# FACE RECOGNITION USING RASPBERRY Pi WITHOUT USING GSM

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## ABSTRACT:

Nowadays, people face security issues in every aspect. So someone should resolve these issues by using updated technology. During this project, the Face recognition module technology is employed to capture human images and to match with stored database images. The foremost important feature of any home security system is to detect the those that enter or leave the house. Rather than monitoring that through passwords or pins, unique faces may be made use of as they're one's biometric trait. The aim is to form a sensible door, which secures the gateway on the premise of who one's are.

This system is developed supported Raspberry-pi 3, to create the house only accessible when your face is recognized by the popularity algorithms from Open CV library and meanwhile you're allowed in by the house owner, who could monitor entrance remotely. Whenever the person comes before of the door, it recognizes the face and if it's registered then it unlocks the door, if the face isn't registered it'll raise an alarm within the mobile and clicks an image and send it on the registered email. This is often how the system works.

## KEYWORDS:

Raspberry Pi 3, Camera, SD Card, Buzzer, Power supply.

# INTRODUCTION:

The Face is usually used biometric to acknowledge people. Face recognition has received substantial attention from guard due to human activities found in various applications of security like forensic, airport, face tracking, criminal detection, etc. Compared to other biometric traits like palm print, finger print, palm print etc. they'll be taken even without visitor knowledge and further are often used for security based applications like criminal detection, face tracking, airport security, and forensic etc.

Face recognition involves capturing face image from a from a web camera. They capture image of visitor and compared image with the stored database. Classify them with known classes so they're stored within the database. Face biometrics can be a challenging field for researchers with various limitations imposed for machine face recognition like variations in change in illumination, head poses, countenance, occlusion, aging etc. Various approaches were suggested by researchers in overcoming the stated. Automatic face recognition involves feature extraction and face recognition, face detection. Face recognition algorithms are classified into two classes as geometric feature based and image template based.
The template based methods compute correlation between one or more model templates and face to hunt out the face identity. Principal component analysis, kernel methods, linear discriminate analysis etc. are accustomed create face templates. The geometric feature based methods are used to analyse explicit local features and their geometric relations .Multi resolution tools like ridge lets were found to be useful for analysing information content of images and located its application in pattern recognition, and computer vision, image processing.

# WORKING:

In this system, we are using Local Binary Pattern Histogram (LBPH) for face recognition. Open CV is an open source computer vision library that has three built-in face recognition algorithms, (i) Eigenfaces, (ii) Fishersface, (iii) Local Binary Pattern Histogram (LBPH). Compared with the 2 algorithms, the LBPH cannot only recognize the front face, but also recognize the side face, which is more flexible. Therefore, the face recognition algorithms used here is Local Binary Pattern Histogram (LBPH). It's a straightforward yet very efficient texture operator which labels the pixels of a picture by thresholding the neighbourhood of every pixel and considers the result as a binary number. So it converts the binary number into a decimal number, which decimal number is that the new value of the centrepixel.

A. Face detection:

Open CV uses a face detection method developed in 2001 by Paul Viola and Michael Jones, commonly remarked because the Viola-Jones method which provides competitive object detection rates

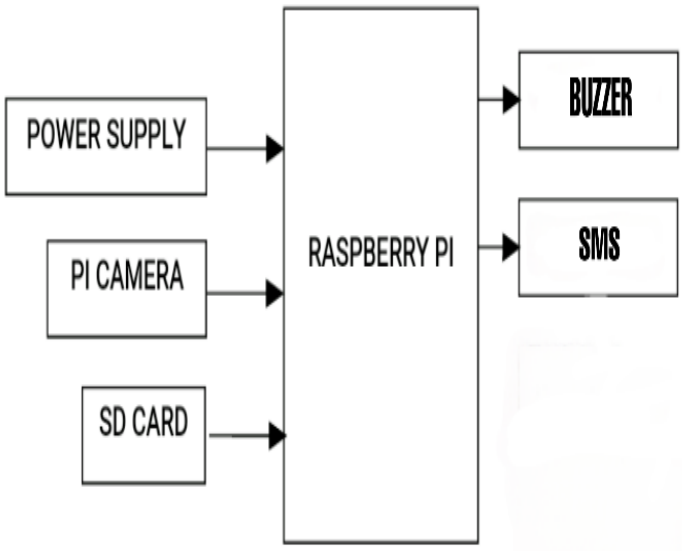
in real-time. This method is usually employed in the face detection but also can be used for other object detections. There are four main components of Viola-Jones method for face detection framework.

1. Simple rectangular features, called Haar features.
2. An Integral Image for quick feature detection.
3. Feature selection using Adobos.
4. Cascaded Classifier for rapid detection.

B. Banalization:

Banalization is that the opening move to localize the eyes within the picture. Banalization is converting the image to a binary image. A binary image is a picture within which each pixel is converted into a binary value which is „0" or „1". The brilliant pixel are going to be represented with the worth „1" whereas a dark pixel are represented with „0". Such banalization makes it easy to figure on the image under detection. The grayscale image is converting to a binary image via thresholding. Thresholds are often determined supported surrounding lighting conditions, and also the complexion of the driving force.

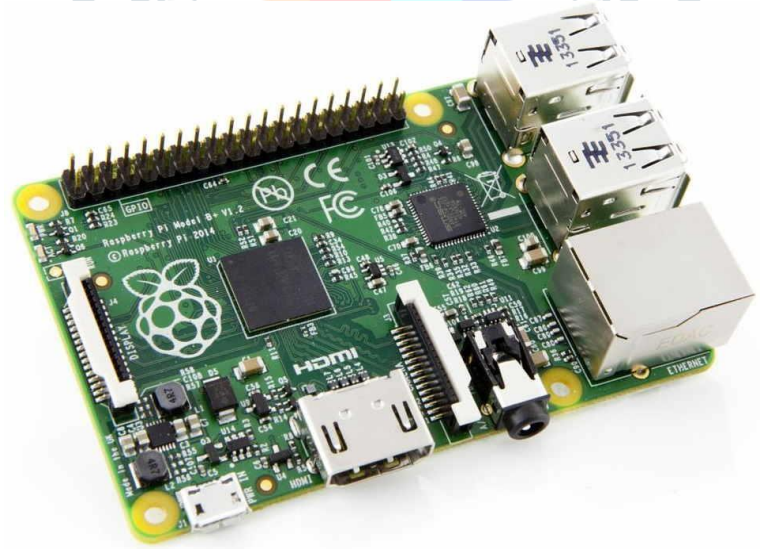
## BLOCK DIAGRAM:



# MODULES OF THE PROJECT:

## RASPBERRY Pi 3:

The Raspberry Pi 3 is provided with a quad-core 64-bit Broadcom BCM2837 ARM Cortex-A53 SoC processor running at 1.2 GHz, making it about 50% more powerful than the Pi 2. Which suggests the new Raspberry Pi 3 will be used for office applications and web browsing.
The great innovation during this third version is undoubtedly the addition of a WiFi chip and Bluetooth Low Energy. This not only saves space (you not have to connect WiFi and Bluetooth dongles), but also frees up more USB ports for connecting other devices.
By adding these two features, Raspberry Pi has made it clear that this new edition is geared to the web of Things (IoT) and residential automation. The Raspberry Pi 3 is additionally compatible with Windows 10 IoT Core, a software package designed for creating and developing applications destined for home automation, robotics and connected objects.
The Raspberry Pi 3 board is that the same size because the Raspberry Pi 2 and has an almost identical connector and component configuration. “All that’s changed is that the position of the LEDs, which are moved to the opposite side of the SD card to form room for the WiFi antenna. All the connectors are within the same place and have the identical functionalities.” So you'll also use your Pi 2 and B+ accessories with the RasPi 3.



## CAMERA:

A webcam may be a small digital video camera directly or indirectly connected to a computer or an electronic network.

Webcams include software that has to be installed on the pc to assist user’s record video on or stream it from the online. Webcams are capable of taking pictures still as high-definition videos, although the video quality will be lower compared to other camera models.
Webcams are called Web cameras.

## SD CARD:

A Secure Digital (SD) card could be a tiny non-volatile storage card designed for high-capacity memory and various portable devices, like car navigation systems, cellular phones, e-books, PDAs, smartphones, digital cameras, music players, digital video camcorders and private computers.

In 1999, SanDisk Corp., Panasonic Corp. (formerly called Matsushita Electric Industrial Co. Ltd.) and Toshiba Corp. agreed to develop and market the Secure Digital card standard, their improvement to the Multi Media Card (MMC). The businesses formed SD-3C LLC to license and enforce the property rights for SD memory cards and other products. In January 2000, the three formed the non-profit SD Association to develop and promote SD technology.
A Secure Digital card is about the dimensions of a stamp and weighs approximately two grams. It's similar in size to an MMC, but smaller than older memory card types, like a Smart Media card or CompactFlash card. An SD card features a high data transfer rate and low battery consumption, which are both primary considerations for portable devices. An SD card uses non-volatile storage to supply non-volatile storage, which implies an influence source isn't required to retain stored data.

Both MMC and SD cards provide encryption capabilities for protected content to confirm secure distribution of copyrighted material, like digital music, video and e-books. SD cards are available with storage capacities as high as 4 GB.

This translates to a drop to the ground from 10 feet, as compared to one foot for a mechanical drive. MMC and SD cards both use metal connector contacts, rather than the normal pins and plugs, so that they aren't as at risk of damage during handling.

## BUZZER:

There are many ways to speak between the user and a product. One amongst the most effective ways is audio communication employing a buzzer IC. So during the look process, understanding some technologies with configurations is extremely helpful. So, this text discusses a summary of an audio device sort of a beeper or a buzzer and its working with applications. An audio device sort of a beeper or buzzer is also electromechanical or piezoelectric or mechanical type. The most function of this is often to convert the signal from audio to sound. Generally, it's powered through DC voltage and employed in timers, alarm devices, printers, alarms, computers, etc. supported the varied designs, it can generate different seems like alarm, music, bell & siren.

Buzzer Pin Configuration:
The pin configuration of the buzzer is shown below. It includes two pins namely positive and negative. The positive terminal of this can be represented with the '+' symbol or a extended terminal. This terminal is powered through 6Volts whereas the negative terminal is represented with the '-'symbol or short terminal and it's connected to the GND terminal.

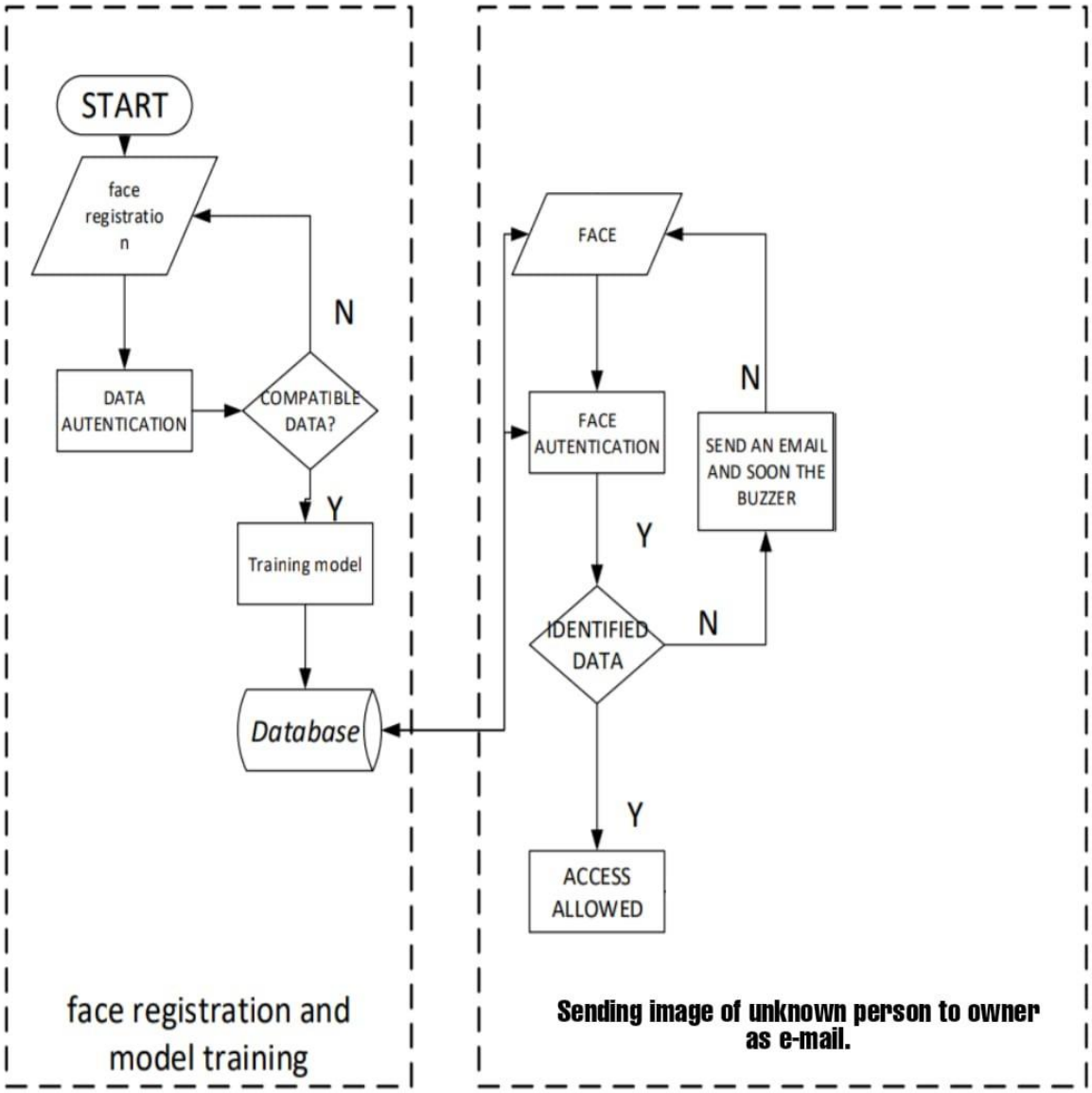
## EMAIL:

Electronic mail (email or e-mail) could be a method of exchanging messages ("mail") between people using electronic devices. Email was thus conceived because the electronic (digital) version of, or counterpart to, mail, at a time when "mail" meant only physical mail (hence e- + mail). Email later became a ubiquitous (very widely used) communication medium, to the purpose that in current use, an e-mail address is usually treated as a basic and necessary a part of many processes in business, commerce, government, education, entertainment, and other spheres of standard of living in most countries. Email is that the medium, and every message sent therewith is named an email (mass/count distinction).

Email operates across computer networks, primarily the web, and also local area networks. Today's email systems are supported a store-and-forward model. Email servers accept, forward, deliver, and store messages. Neither the users nor their computers are required to be online simultaneously; they have to attach, typically to a mail server or a webmail interface to send or receive messages or download it.

Originally an ASCII text-only communications medium, Internet email was extended by Multipurpose Internet Mail Extensions (MIME) to hold text in other character sets and multimedia content attachments. International email, with internationalized email addresses using UTF-8, is standardized but not widely adopted.

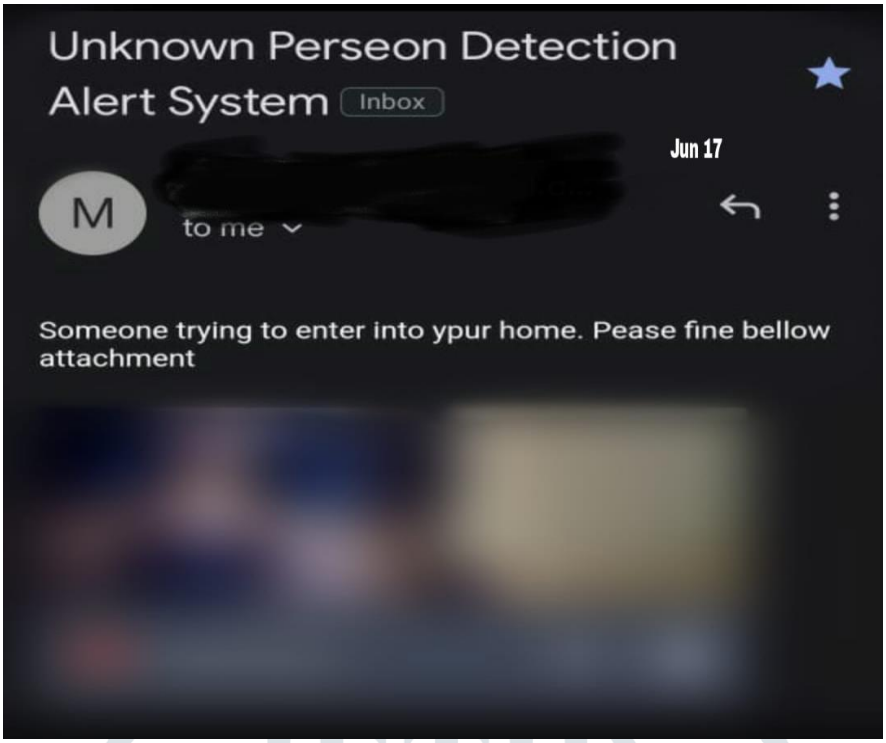
# FLOW CHART:




# RESULT:

When a person is detected by the camera, the person is compared to the database stored into the device. If the face matches with the data in the database, then the device don't object the entry of that person. If the data doesn't match the data stored in the database, buzz starts buzzing then a mail is send to the owner of the device informing there is an unknown person detected at the entry. The mail is send to the owner with the photo copy of the unknown person at entry.

In later stage, time limit is introduced. After 10:00 pm in the night, whoever might come, the photo of the person is send to the owner indicating someone is at the doorstep. The buzzer beeps. A mail is send to the owner informing there is someone at the doorstep with a photo attachment of the person.




## CONCLUSION:

In this work, automatic door access system by using face recognition and detected is presented. Automatic face recognition is completed by Neural Networks. Raspberry Pi controller controls the door access after successful output from the PC. Immediate responses from the door and monitor are observed. The door remains open for indefinite time and this is often not suitable for real time. So appropriate time should be set in real time environment. This technique are often employed in many places where need of security is maximum and security can not be compromised.

## FUTURE SCOPE:

If a blacklisted person tries to open the door, the system will send a message to the admin using GSM module regarding the identical. - a true time speaking assistant is deployed to create the system more user friendly and efficient. - Database is linked to cloud just in case of power failures and data loss. - Highly secure protocols like TLS are often deployed to confirm there's no security breach. there's lots of scope today within the field of home automation and thus we will later enable GSM and DTMF module during this giving more functionality. Also on larger scale instead of using ARM processor we will use x-86 processors to enable live feed.

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