

Automatic Attendance with Face Recognition and SMS Alert

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Abstract—Belonging this Paper includes the student attendance. The student attendance will be clearly noticeable by face recognition. For face detection and face recognition the raspberry pi is used. If the camera is into contact with Raspberry pi USB port then only picture would express the student who are present in the class for face detection. The input images recognises with existing images then in that picture we will recognize the faces of every student in the class. Coherent to that attendance will be given to that present class. This phenomenon will carried out for each class and each students are specified attendance appropriately.

Keywords— Student Attendance, Raspberry Pi, Camera, Face Detection, Face Recognition.

1. INTRODUCTION:

This is evolved to give the attendance for students without any human intervention. That develops very functional for institutions and schools to spot the attendance easily. This arrangement would help the people by reducing the time. They can be known the attendance academic participation anywhere by enrolling the student registration in web browser which has been developed in this paper. At present we are in industrial revolution 4.0, which is digitizing the every sector of the industry. This can be achieved using artificial intelligence in every aspect of this sector. We can observe from past few years there is a lot of research and innovations are going on in the fields of real time control, detect the faces and alert will be used without any human

intervention.

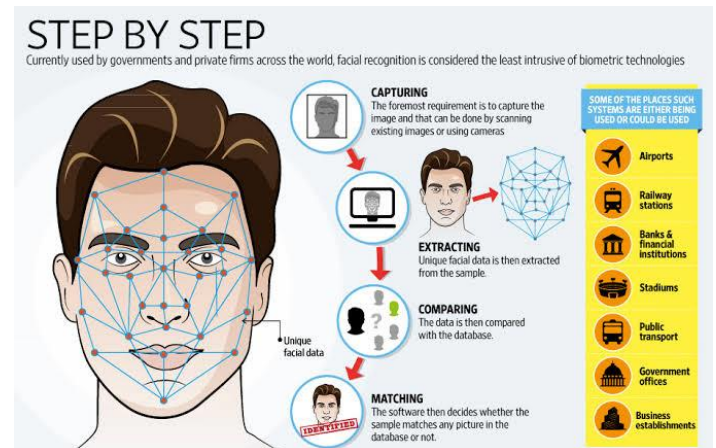


Fig.1. Basic idea of Face recognition process

With the motivation of above, in this project we are intended to develop automatic face detection based on the attendance to mark the attendance of every student by using face detection process or algorithm which is also called viola jones algorithm.

2. SYSTEM ARCHITECTURE:

From fig.1 the USB Camera will be attached to the raspberry pi camera slot. Present video processing of students is taken the photo who are present in the class with USB1 camera, Raspberry pi gets those pictures as captured images and transferred to the AWS cloud platform and we make sure of using of face considering work will perform the comparison between the captured images with stored images. Clear images will be detected and attendance will be marked with date and time for every students who are present in class which uses MYSQL COMMAND. This procedure could be taken out for all the periods and students will be taken attendance significantly. This occurs due to taking the open CV libraries at the first stage to develop the system.

The web application is will be designated for the exact purpose to mark the number of students who are, available and absent for every period in the class. Admin finds the attendance of the every student manually or whenever possible by the administration and tracks the result. The result will be show on the perfect screen. Student attendance will be scanned and if the student found to be absent for specific class then the alert will be automatically send to the HOD and parents.

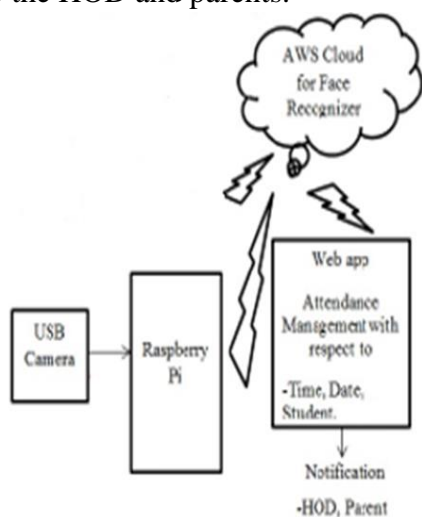


Fig 2: Block Diagram.

3. HARDWARE DESCRIPTION:

A. Raspberry Pi 3 Model B:

Raspberry Pi 3 Model B is an controller Built-on the latest Broadcom2837 chipset, 1.2GHz, 64-bitquad-core processor, 40 pin extended GPIO, 802.11bgn wireless LAN, WIFI, Bluetooth 4.1 connectivity, 1GB RAM, 4USB Ports, CSI camera port, Micro SD port, full size HDMI, and Micro USB Power source. In this project Keyboard, Mouse, Camera cables are attached to the 3 USB ports. HDMI cable is joint to the HDMI output, 1GB micro SD card with installed NOOBS.

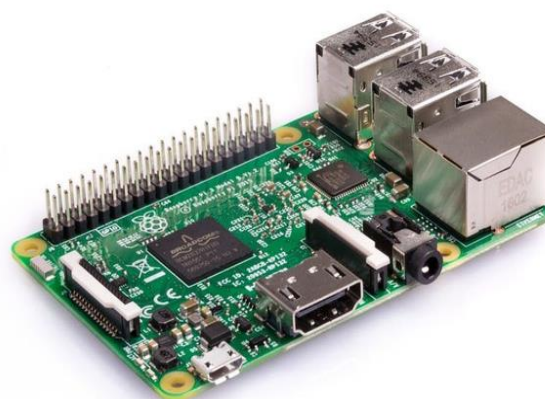


Fig 3:Raspberry pi 3 Model B

B. USB Camera:

USB camera is used to take and scan the images for taking the student attendance.. In this project ,the Logitech C110 camera is used. The USB camera is fixed to the Raspberry Pi USB port.



Fig 4: VX800 CAMERA

C. ESP8266:

Esp8266 (espressif) is an controller and has 32pins inbuilt Wi-Fi module with 32-bit processor, one core, CPU frequency of 80mhz, RAM of 160kb, flash of 16mb, one ADC pin, 4 busses (SPI, I2C, UART, I2S), GPIO pins of 17. Esp8266 setup is fixed at the coridoor of the class were OLED are integrated with esp8266 and coupled to cloud.

D. OLED:

OLED is explained as organic light-emitting diode the use of OLED is to scan the correct information. It is having 4 pins all are jointed to esp8266. 1st pin (clock) attached to D1, 2nd pin (data) to D2, GND to GND and VCC to VCC of esp8266 (3.3v).

4. SOFTWARE DESCRIPTION:

A. Python IDLE:

IDLE is integrated development environment for changing and running python2.x or python 3 programs. Where we can mark or get the exact output.

B. Raspbian O.S:

Raspbian is a free operating system which is used to run the operation. To have the running of our applications install the Raspbian OS. Raspbian OS is best for Ras-pi 3 controller for excluding our system.

C. NOOBS:

NOOBS -New Out Of Box Software is exact fitting manager for the Raspberry Pi. Then we have to install the existing manager in SD card of Raspberry pi.

D. Python:

Python is a programming language. Which are having simple and easy syntaxes to go through the language that allows very low lines of code to the programmers. The language is also important factor for other personalised applications.

E. Arduino IDE:

Arduino IDE is an open source software where we could fix,write, execute and design to the board. It would be developrd in any PC's like windows, Linux etc. In Arduino IDE we can establish different languages like C, C++, embedded C. we have written the program in embedded C and established the hardware board by fixing USB.

F. Embedded C:

Embedded c is preferred language compare to other because it is an clear code which is used for microcontroller and embedded based applications. The embedded c programs were very little and clear and they must be influenced for for size and speed.

G. PHP:

PHP (Hypertext Pre-processor), It is backend language used for the establishment of Web Application.

H. HTML:

HTML stands for Hypertext Mark-up Language. HTML is used for fixing web applications With Cascading Style Sheets and Java Script. *I. AWS Cloud:* In the Amazon Web Service Cloud "S3"(simple storage service) could be used to store the scan the images ,those input images would be determined and comprehending AWS"Rekognition" service and results are Taken out to web application.

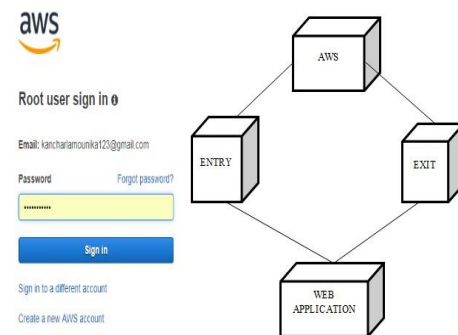


Fig 5: Deployment Diagram

5. PROPOSED SYSTEM:

In our developed system the student attendance will be taken by face recognition. For face perception and face observation the raspberry pi is used. If the camera or video streaming is connected to Raspberry pi USB port then only images will scan thoroughly of the students who are present in the class for face noticing. The input images recognises with existing images then in that photo, we will be known the faces of every student and according to that attendance will be given to that present class. This phenomenon is carried out for every class and students are given attendance appropriately.

5.1. Proposed System Flowchart:

From the Fig 4 Camera will scan the images in the video processing, while the face detection remoulds that scanned image up to extent point. The scanned image will be compared with the present data sets and faces will be considered and recognised. Admin tapes the attendance if the particular student was present and gives the report. The result would placed in the monitor.

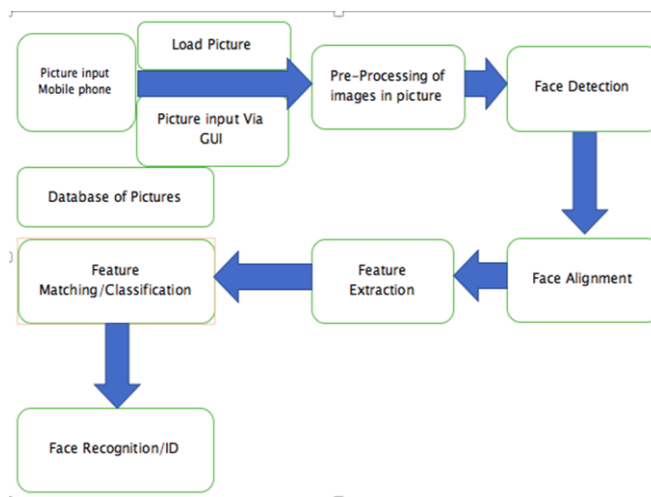


Fig 6: Flow diagram of proposed face recognition system model

5.2 Proposed System Algorithm:

The Algorithm of influenced system is as follows.

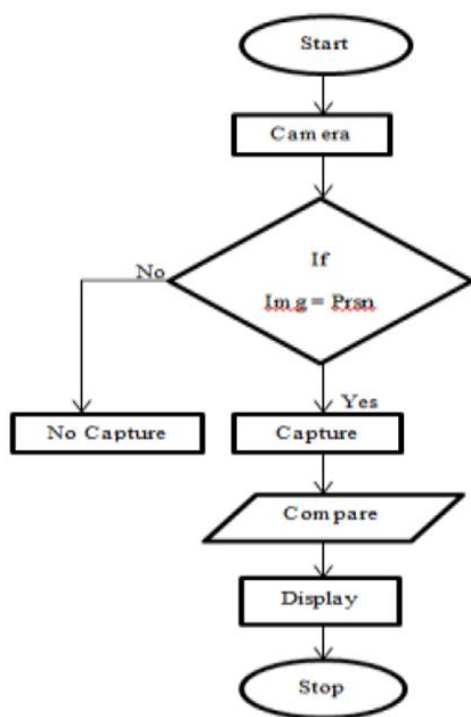


Fig.7 :Flow chart of proposed system

Take Raspbian OS and write it in to the SD card and place the card in the SD slot .

1. Install and influence all the open CV applications into the raspberry pi
2. place the total hardware setup.

3. In contact with the video data in that pictures of every individual and separate student from classroom camera
4. By the taking the influencing of viola Jones Algorithm Face Detection can be performed.
5. Initially first take the detected faces of each and every students.
- 6..And crop the detected image
- 7.The detecting faces of every students will be stored in existing folder..
- 8.The omparison will be performed between the features of input image and existing image.
- 9.Then take the Student’s Attendance which depends on clear faces.

5.3. Face Detection Algorithm:

It is nothing but viola jones algorithm.

For face detection in viola jones excludes 4 steps for developing they are:

- a) Selection of Haar features
- b) Integral images
- c) Adaboost
- d) Cascade Classifier

a) Selection of Haar features:

Haar features are same as convolution kernels which can be used to detect the images which make use of presence of that feature in the existing picture. Each feature of image results in a single value which is determined by decreasing the sum of pixels under white rectangle from the sum of pixels under black rectangle.

$$Val = \Sigma(\text{pixels in black region}) - \Sigma(\text{pixels in white region})$$

(1)

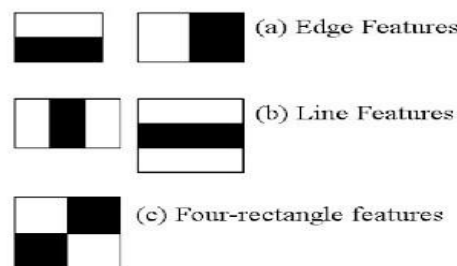


Fig 8: Types of Haar Features

b) Integral images:

For developing the sum of values in a rectangular subset of a grid in the picture processing domain it is called as integral image. In an integral image the

value at pixel (x,y) is the sum of pixels above and to the left (x, y) inclusive.

$$ii(x, y) = \sum_{x' \leq x, y' \leq y} i(x', y')$$

Eqn.2 combines neighbour pixel values for easy of calculation.

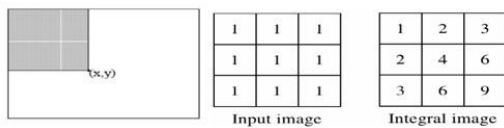


Fig.9: Integral image.

c) Adaboost:

As mentioned in Viola Jones algorithm have 160,000 features in that only small set of features will be utilised among all these features to identify a face. In adaboost we are having two classifiers named as strong and weak classifiers. The adaboost strongly uses a strong classifier than the linear combination of the weak classifier.

$$F(x) = \alpha_1 f_1(x) + \alpha_2 f_2(x) + \alpha_3 f_3(x) + \dots$$

F(x) = Strong classifier
 $\alpha f(x)$ = Weak classifier

d) Cascade Classifier:

The cascade classifier is used for influencing the number of stages. Each stage includes a strong classifier when all the features are joint together into unique stages in which where each stage is termed as number of features. That each stage can be performed for the determination of finding whether it's a face or not a face.

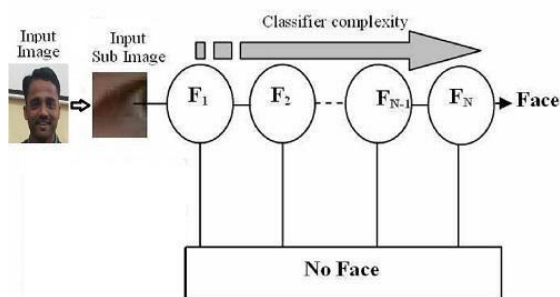


Fig.10: Cascading Classifier

6. RESULTS AND DISCUSSION:

Student Registration:

The following are the login terms provided to the student to login all the details of the student into the requested portal. Then student have to login with their username and password which is given to them.

Username: kancharlamounika42@gmail.com
Password: 123456



Fig.10 :Face detection and capturing:

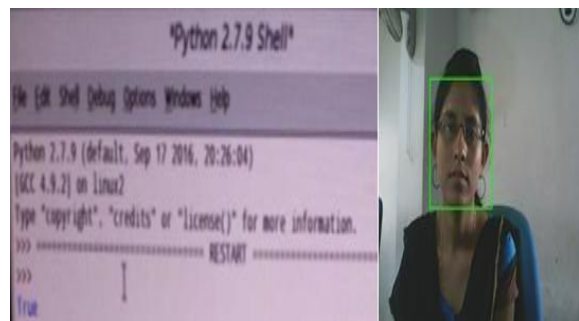


Fig.11: To mark the attendance of a student first it captures the image in the form of rectangular box.

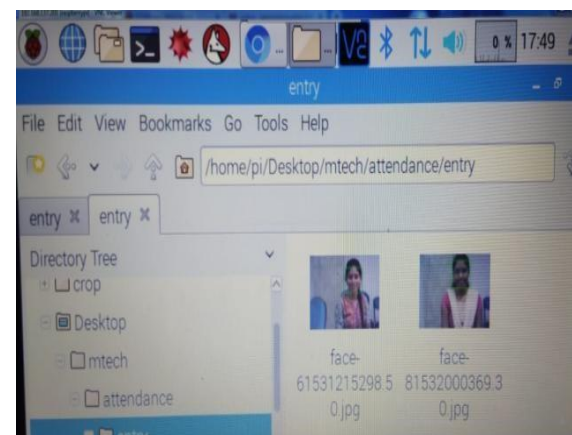


Fig.12: The detected face in the rectangular box will be cropped. Then Finally that cropped images will be stored in exit folder.

Face Recognition:

For the resulting of Face recognition first detect the face. Then the picture will be cropped then the region of developing and comparing them to affix the images in the face database. For the face recognition, the faces will be verified and done the total process one by one using the AWS face recognition system..



Fig.15:

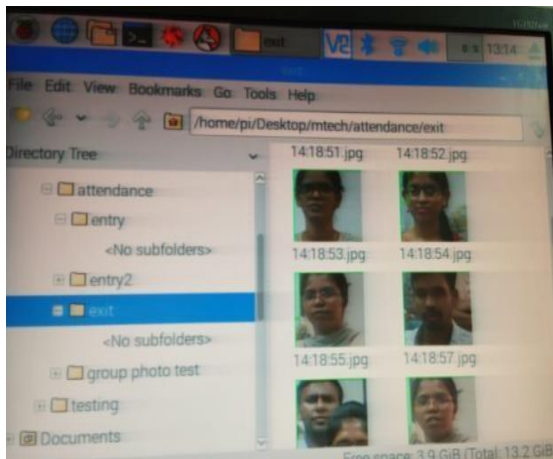


Fig.13: Faces acquired during face recognizing process. Store the cropped images in the existing folder.

Facial Comparison:

Frontal faces scanned and excluded and will be compared in the data base which is AWS. AWS provide the good service for face recognition and will captured pictures. It will compares total faces from top to bottom for each and every picture would be compared and the compared picture will be deleted from the AWS cloud.

Web Application:

following are the login credentials provided to the branch coordinator to login into the registration portal. Then coordinator needs to login with username and password provided to him. Then he needs to enter the ID of the

Student to enroll the student **Username:**

admin1@gmail.com

Password: 123456



Fig.16: SMS Sent to Corresponding Parent.

7. CONCLUSION:

In this proposed system few faces were observed and noticed, then thr attendance was given period wise and monthly wise percentage of each and every Student are developed in web app and SMS will be sent to Parents/HOD. In future, Raspberry Pi development board is a cost and highly effective fully systematically computational procedure can be used for many applicable programs, Camera modules are also highly preferable and can be used for most effective systems. Using Python and Open CV in Raspberry Pi our project has developed more flexible and adoptable and utilisable to any furtherly future changes.

8. ACKNOWLEDGMENT:

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