

## Smart Attendance Monitoring For Multiple Application

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**Abstract** — Smart attendance system is a smart way of marking attendance. It replaces the old hectic and time consuming methods of marking attendance by a smart way which makes use of face recognition technique for marking attendance. Face recognition has a vital role in technical field especially in the field of security purpose. Human face recognition is an important field for verification purpose especially in the case of students attendance. This paper is aimed at implementing a digitized system for attendance recording.

**Keywords-** Smart Attendance Monitoring, Facial Authorization, Raspberry Pi.

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### I. INTRODUCTION

Smart Attendance system is a smart way of taking attendance. It is very necessary to maintain record of students, colleges and workers in industries. Calling particular person for attendance one by one is very time consuming process and create disturbances, for students, workers and teachers also. So to avoid this difficulties of daily time consuming attendance process, numbers of new techniques are proposed.

So here we proposed a system using IOT(Internet of Things) this system detects the faces of a folks which is captured by the raspberry pi camera and matches that images with the information such as students name, email id and image which is already stored in the database. If the captured image and the stored image get matched, their attendance will get record.

This one is financially cheap and provide more accurate results as compare to the other methods such as fingerprints, palm prints identifiers using RFID. So this system, identify several students one by one and provides flexibility to identify the number of students at the same time separately.

#### 1. About Raspberry pi

Raspberry pi is a series of small single board computer which is a credit card size kit. Operating system is needed to start raspberry pi. In raspberry pi, ARM cortex-A53 clocked at 1.2 GHz processor is used. It is design with 256MB of SD RAM. Raspberry pi system is a Broadcom BCM2835 system on chip multimedia processor. It operates on 5V, 1A power supply

provided micro USB ports. The BCM 2835 is the only reason that raspberry pi is able to operate only on the 5V supply. It is used for multiple applications. Raspberry pi includes graphics and central processing units which includes audio and communication hardware. If we used HDMI ports of raspberry pi which carries video and digital audio signal makes it easy. We need to flash an operating system on to the card for using SD card with Raspberry pi.



Fig. Raspberry PI

It may take extra time to complete, as dragging and dropping files on to the card is little complicated. This system don't show any heat sink because of chip low power which directly translate into little waste of heat even in complicated conditions also. On raspberry pi board, there is no onboard Wi-Fi networking hardware so to connect the Wi-Fi wirelessly, we will use USB Wi-Fi adapter. So, we need to connect adapter before using on Raspberry pi online.

In this system, Raspberry pi is connected with raspberry pi camera, personal computer and GSM. For image processing, MATLAB platform is used to find attendance system. At last, the attendance result will be send to the E-mail Id or on the mobile number of authorized person. The whole database of students is stored in SD card. In database, the same image of each and every students is stored to get perfect match at the output.

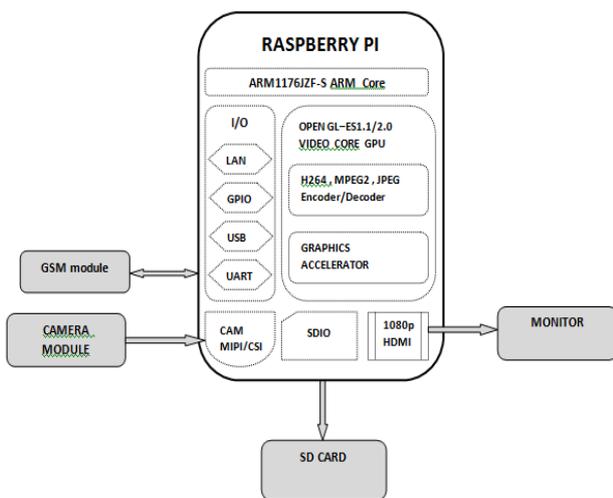


Fig. Block diagram

## 2. Enrollment of students

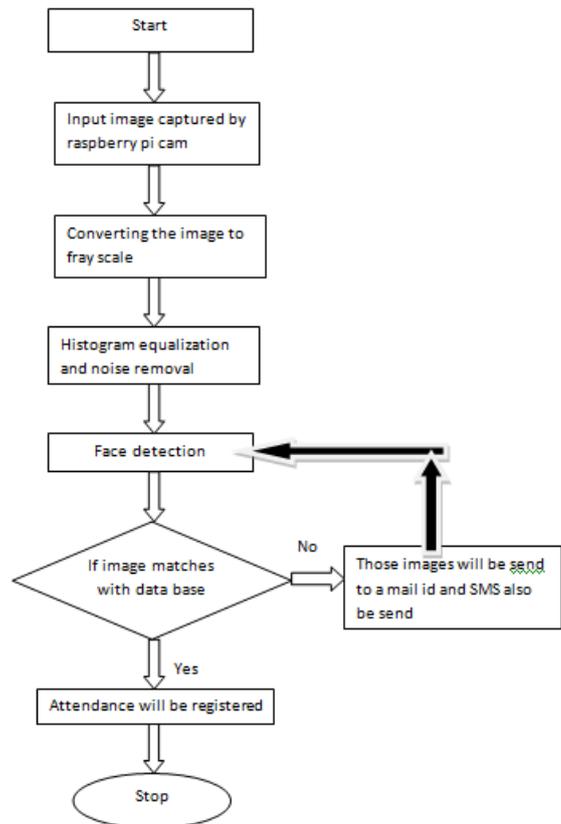
The personal information of students such as name, branch, E-mail Id, mobile numbers are required to maintain details. For further process of image detection, images of students are also stored in database. At the time of enrollment, if the images of student get match with the database images it will give total information of that student which is already stored in database and register them present. If the details of the student is not stored in the database, the system will show error message like 'give your details to the admin'.

## 3. Flowcharts

The image captured by the raspberry pi camera is digital one but it is difficult to do processing on the colored images so first we convert that image into gray image which is of 256 values. For proper detection of individual face in a group, histogram is calculated to eliminate the effect of noise. Due to elimination of noise, the face will be detected individually.

The images of students should be stored in the database before starting of the process because of this the captured images show relation with the stored database images. If any image not get matched then that image will be send on the E-mail id of

authorized person. By using GSM module we can also send error message.



## 4. Image Accession

The image is access by using raspberry pi camera which is fixed in every classroom. The captured image is automatically send to the computer for further process.



Fig. Input image

### 5. Upgrade contrast

In this stage, we convert color image into gray image. For this process, the average value of each pixel of input color image is calculated. If the calculated value is more than 110 then that image will be replaced by white pixels and if the value is less than 110 then it is replaced by black pixels. By using this method, we are able to obtain a gray image from a color image. The images which are not recognizable will be made recognizable by using histogram normalization technique which does contrast enhancement in spatial domain. Hence images are easily recognizable.



Fig. Histogram Equalize image

### 6. Noise penetration

When an image is captured by using a camera, a large number of noise errors are present in the image. So to overcome that problem, many techniques are used. In our system, we are using median filtering which removes the noise from the image and provides a histogram-normalized image.

### 7. Face Detection /Reorganization:

After the noise filtering process, the detection of faces starts. Face detection shows a variety of faces with various positions of face and the brightening conditions of faces, which are further applied to detect the faces in real-time video.

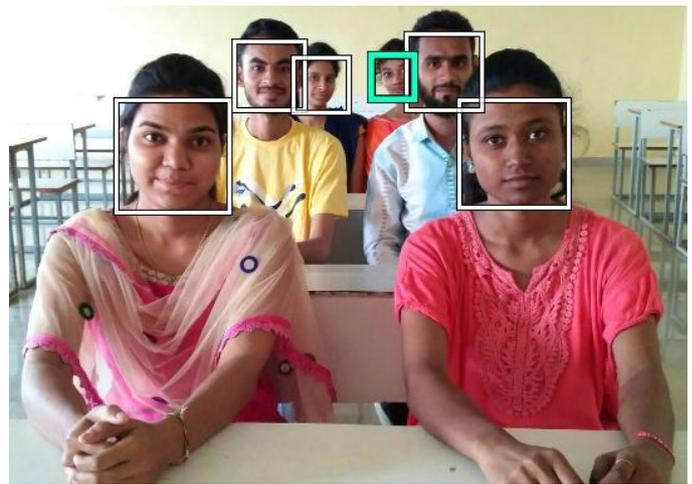


Fig. detection of faces

The process of image cropping takes place after image detection. Each detected face is cropped separately in a way that the face is recognizable.



Fig. recognizable face

Hardware required:-

- Raspberry pi
- SD card
- USB adapter
- Camera
- Monitor

A GSM/GPRS MODEM can perform the following operations:

1. Receive, send or delete SMS messages in a SIM.
2. Read, add, search phonebook entries of the SIM.

3. Make, Receive, or reject a voice call.

*Software:*

- *Open CV*
- *Wheezy Raspbian*

Open CV ( open source computer vision) is library of programming function mainly aimed at real time computer vision.It is a part of a series of projects including real time ray tracking and 3D display.It is a software for real time image and video processing. OpenCV can be programed by using different programming languages such as C,C++,JAVA etc.

In our system,we are using this software for removing background, filtering image, for detection of image and for pattern matching .Real time image analyze capabilities include recognition and tracking of objects such as folks, animals and any type of objects. It also recognized the facial features such as Faces, eyes,nose, skin,etc. Raspbian is a free operating system which is the set of basic programs and utilities that make your Raspberry Pi run.

Raspbian is an unofficial port of Debian wheezy with compilation settings adjusted to produce code that uses "hardware floating point", the "hard float" ABI and will run on the Raspberry Pi.

#### CONCLUSION

In this paper, we introduces the system of attendance which can avoid the difficulties of manual attendance .This system provides the more efficient, flexible and accurate attendance record. This system constructed by using camera in classroom and some other hardware and software are required for particular functions.

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