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Real Time Attendance System using Face Recognition

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Abstract:- Uniqueness or individuality of an individual is his face. In this project face of an individual is used for the purpose of attendance making automatically. Attendance of the student is very important for every college, universities and school. Conventional methodology for taking attendance is by calling the name or roll number of the student and the attendance is recorded. Time consumption for this purpose is an important point of concern. Assume that the duration for one subject is around 60 minutes or 1 hour & to record attendance takes 5 to 10 minutes. For every tutor this is consumption of time. To stay away from these losses, an automatic process is used in this project which is based on image processing. In this project face detection and face recognition is used. Face detection is used to locate the position of face region and face recognition is used for marking the understudy's attendance. The database of all the students in the class is stored and when the face of the individual student matches with one of the faces stored in the database then the attendance is recorded.

This whole project consists of five modules such as:

1. Capturing the image.

2. Creating database.

3. Detecting faces.

4. Processing.

5. Face recognition and classification.

1. INTRODUCTION

This traditionally attendance is marked manually by teachers and they must make sure correct attendance is marked for respective student.

This whole process wastes some of lecture time and part of correct information is missed due to fraudulent and proxy cases.

The current systems that are used for updating attendance automatically are usually RFID based and Bio-metric based ,but it has some drawbacks such as there can be chances of proxies, they are time consuming and quite complex process.

By considering this drawback, here we proposed an attendance system which is based on face detection and recognition as the Face is the essential recognizable proof for any human.

It will increase accuracy and productivity of class. To make it possible for every platform we choose raspberry pi model. Camera will be interfaced with raspberry pi module for face detection.

This project can also used for different applications where face recognition is necessary for security purpose

In this proposed system we take the attendance using face recognition which recognizes the face of each student and according to this it will mark attendance of present students.

2. LITERATURE SURVEY

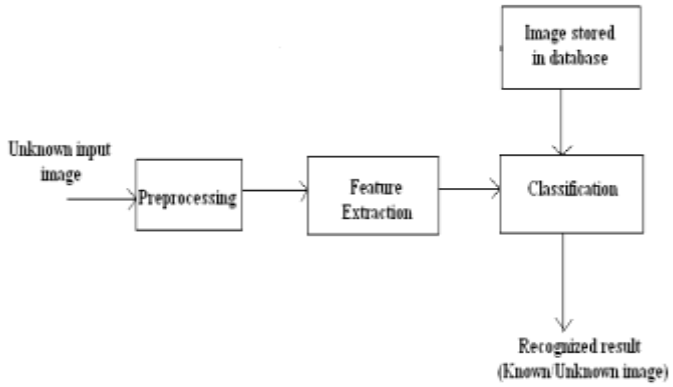
We all know that today's attendance marking system is completely manual where teacher calls student's name and relies on his/her reply to mark the attendance. This is very tedious task especially when there is large group of people. There are efforts by various researchers towards automating this task. Different technologies have been tried and implemented for implementing such an automated system which is highly efficient in terms of accuracy, speed and cost. Michael Dobson, Douglas Bernie Di Dario [1] proposed the concept of Automated Attendance System in 2006. The system includes identification tags, with wireless communication capabilities, for each potential attendee. There are scanners for detecting the attendees' tags as they enter a given room, at least one server in communication with the scanners. This study provided a way to get rid of tedious work for marking and recording attendance. Vishal Gahilot, Vijay Gupta [2] proposed the concept of Bluetooth Based Attendance Management System in 2013.Sumita Nainan, Romin Parekh, These systems tend to depend on external devices and tags which are to be externally possessed by students/attendees. One can easily handover these to others and hence there is high probability of fake attendances. For this, biometric based attendance is a good solution. O. Shoewu and O.A. Idowu [4] proposed the concept of Development of Attendance Management System using Biometrics in 2012. The system takes attendance electronically with the help of a finger print device and the records of the attendance are stored in a

database. Attendance is marked after student identification. Some system implementations have been tried based on face recognition techniques as well. Face is unique identity of a person and helps identify persons accurately. Face recognition has been widely studied subject from way long back in 1964. During 1964 and 1965, Bledsoe, along with Helen Chan and Charles worked on using computer to recognize human faces [5]. These operators could process about 40 pictures an hour. After Bledsoe, this work was continued at the Stanford Research Institute by Peter Hart. In experiments performed on a database of over 2000 photographs. The computer consistently outperformed humans when presented with the same recognition tasks [5]. This clearly indicates the face recognition capability of computers. Matthew Turk and Alex Pent land [6] proposed the concept of Face Recognition Using Eigen Face Method in 1991. This method tracks a subject's head and then recognizes the person by comparing it with database.

3. WORKING

The proposed system is used for taking attendance by using face recognition and managing the attendance in suitable environments such as colleges and offices. The system architecture is shown in Figure 1. Raspberry Pi Camera Module V2 attached to Raspberry Pi3 and it is placed where the people enter the office. Camera Module is used to capture

Block diagram:



Video from:

Which images of human faces is extracted. Then face Recognition takes place and it automatically verifies with the existing database through library files present in Open CV. Face Recognition is generally more advanced and efficient than other systems. The steps involved are given as follows.

Captured image:

A. Capturing the image

The camera module is placed in a region where the people enter into college or office and video is taken within the distance less than 5 meters. A camera is used for taking video which contains many frames from which any one of the frames can be used for face recognition and marking the attendance.

B. Creating database

As a biometric method has been chosen for implementation, it is crucial for enrolment of every individual whose attendance needs to be taken. Here face of every individual is captured and stored in a suitable database which includes the person's name and other credentials. Here multiple samples are taken for a single individual with different lighting conditions. A database of 5 students along with 10 images of each individual persons.

C. Detecting Faces

Choosing an efficient algorithm for face recognition is critical in this proposed work. There are many face detection algorithms available in Open CV such as Eigen faces, Fisher faces and Local Binary Pattern Histograms. Considering the need for the real-time recognition an algorithm which has-been opted is the viola Jones Algorithm [5] for face detection and recognition in which hologram technique is used. It is available in Open CV source library [6] and has proved to be robust[7].

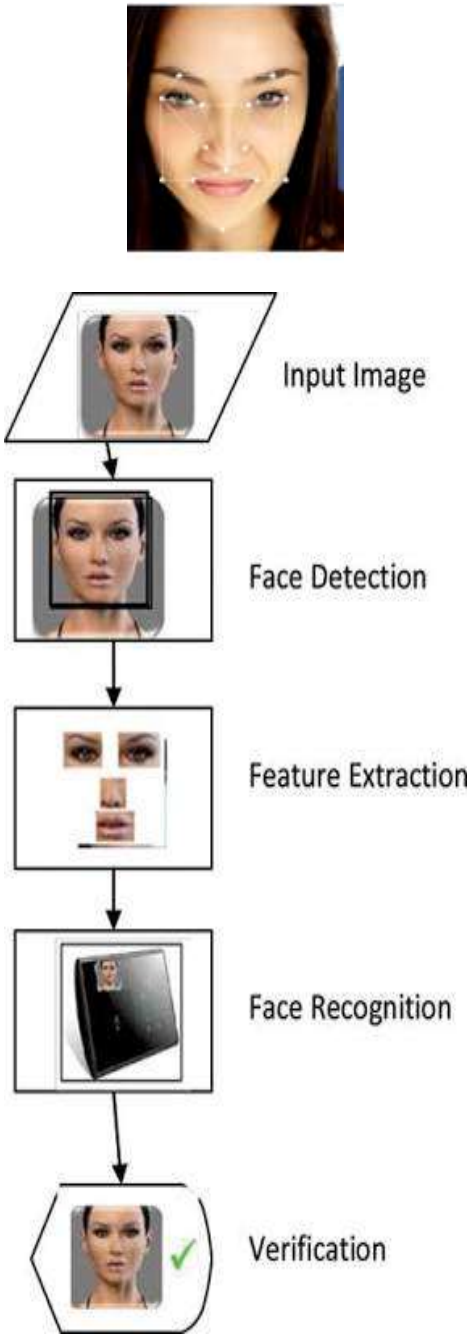
D. Preprocessing

Since an image may contain unnecessary background noises and elements other than faces it is important to remove those elements. Thus feature extraction is key for reducing the image to only a face available in the image. By this method, the image is reduced to a size of 150x150.

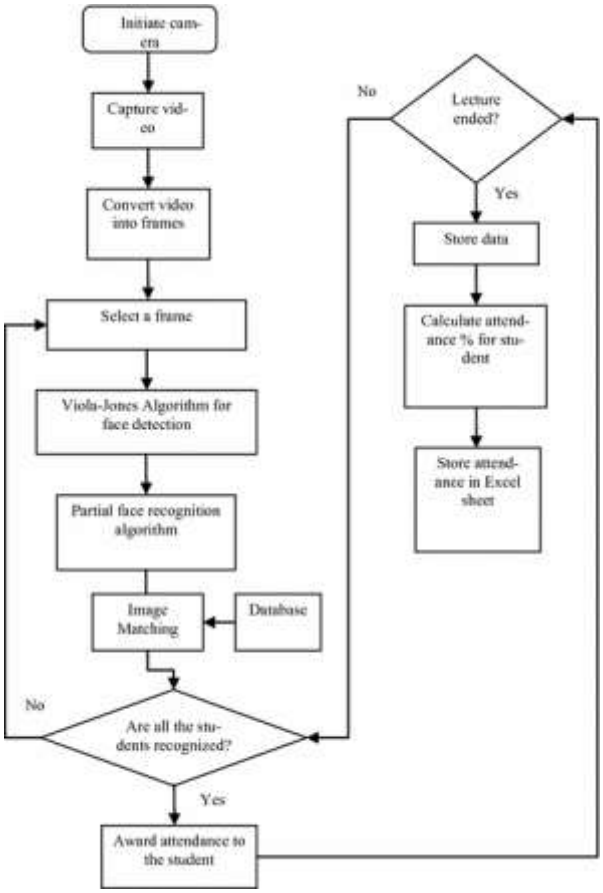
Histogram equalization is performed on the reduced image and thus the image becomes easier to process.

E. Face Recognition and Classification

This whole process is understood by following diagram



Flowchart:



4. Conclusion

We have to study face detection and recognition system on Raspberry Pi module. Face detection and recognition is currently a very active research area. Some of the more algorithms are still too computationally cheap to be applicable for real time processing. Other processors are costlier than Raspberry Pi along with large memory, accuracy and speed. Using Python and Open CV in Raspberry Pi, made our project flexible. But in future it can be used in Orange Pi and Banana Pi board. Which has more RAM as compared to Raspberry Pi?

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