MULTIPLE FACE ATTENDANCE SYSTEM

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***Abstrac*t-Students attendance in the classroom is very important task and iftaken manually wastes a lot of time. There are many automaticmethods available for this purpose i.e. biometric attendance. Allthese methods also waste time because students have to make aqueue to touch their thumb on the scanning device. This workdescribes the efficient algorithm that automatically marks the attendance without human intervention. This attendance is recorded by using a camera attached in front of classroom that is continuously capturing images of students, detect the faces in images and compare the detected faces with the database and mark the attendance. The paper review the related work in the field of attendance system then describes the system architecture, software algorithm and results.**

Keywords: Automatic Attendance; Face Detection, Face Recognition, Image Enhancement, Verification

1. INTRODUCTION

Maintaining the attendance is very important in all the
institutes for checking the performance of students. Every
institute has its own method in this regard. Some are taking
attendance manually using the old paper or file based
approach and some have adopted methods of automatic
attendance using some biometric techniques. But in these
methods students have to wait for long time in making a queue at time they enter the classroom.Many biometric systems are available but the key authenticationare same is all the techniques. Every biometric systemconsists of enrolment process in which unique features of aperson is stored in the database and then there are processesof identification and verification . These twoprocesses compare the biometric feature of a person with
previously stored template captured at the time of enrollment. Biometric templates can be of many types like
Fingerprints, Eye Iris, Face, Hand Geometry, Signature,
Gait and voice. Our system uses the face recognition
approach for the automatic attendance of students in the
classroom environment without students' intervention. Face
recognition consists of two steps, in first step faces are
detected in the image and then these detected faces are
compared with the database for verification.
Open CV is popular computer vision library started by intel in 1999. The cross platform library sets its focus on real-time image processing and includes patent free implementation of the latest computer visions algorithm.

2. RELATED WORK

In 2001, the Tampa Police Department installed police cameras equipped with facial recognition technology in their Ybor City nightlife district in an attempt to cut down on crime in the area. The system failed to do the job, and it was scrapped in 2003 due to ineffectiveness. People in the area were seen wearing masks and making obscene gestures, prohibiting the cameras from getting a clear enough shot to identify anyone.

Boston's Logan Airport also ran two separate tests of facial recognition systems at its security checkpoints using volunteers. Over a three month period, the results were disappointing. According to the Electronic Privacy Information Center, the system only had a 61.4 percent accuracy rate, leading airport officials to pursue other security options.

3. PROPOSED WORK

First step in every biometric system is the enrollment ofpersons using general data and their unique biometricfeatures as templates. This work uses the enrollment

- **Capture**
- **Image**
- **Enhancement**
- **Feature**
- **Extraction**
- **Data base**

Image is captured from the camera and then it is enhance dusing histogram equalization and noise filtering. In the second step face is detected (8) in the image and features are extracted from it. These unique features are then stored in
the face database with certain id of that person.

3.1 PROPOSED ARCHITECTURE

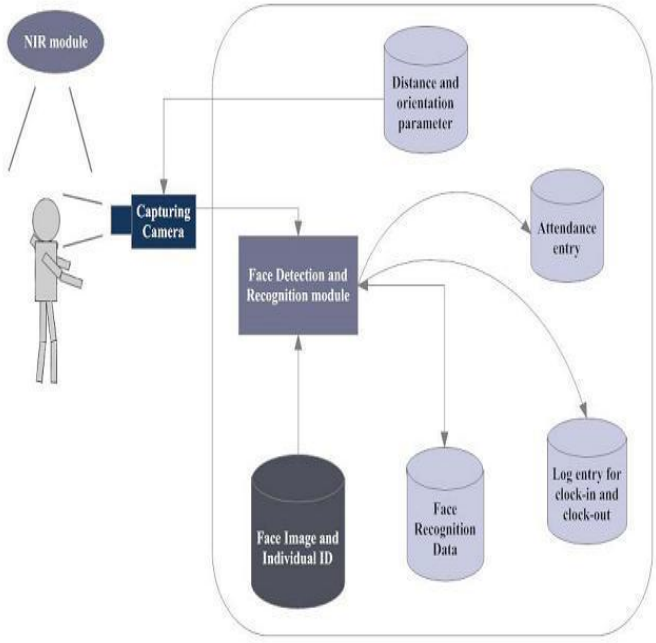


Fig: Identifying/ Adding new person

The two main components used in the implementation approach are open source computer vision library (OpenCV)
and Light Tool Kit (FLTK).

- One of OpenCV's goals is to

provide a simple-to-use computer vision infrastructure that
helps people build fairly sophisticated vision applications
quickly.

- OpenCV library contains over 500 functions that

span many areas in vision. The primary technology behind
Face recognition is OpenCV; the interface is designed using
FLTK.

- The user stands in front of the camera keeping a

minimum distance of 50cm and his image is taken as an
input. The frontal face is extracted from the image then
converted to gray scale and stored.

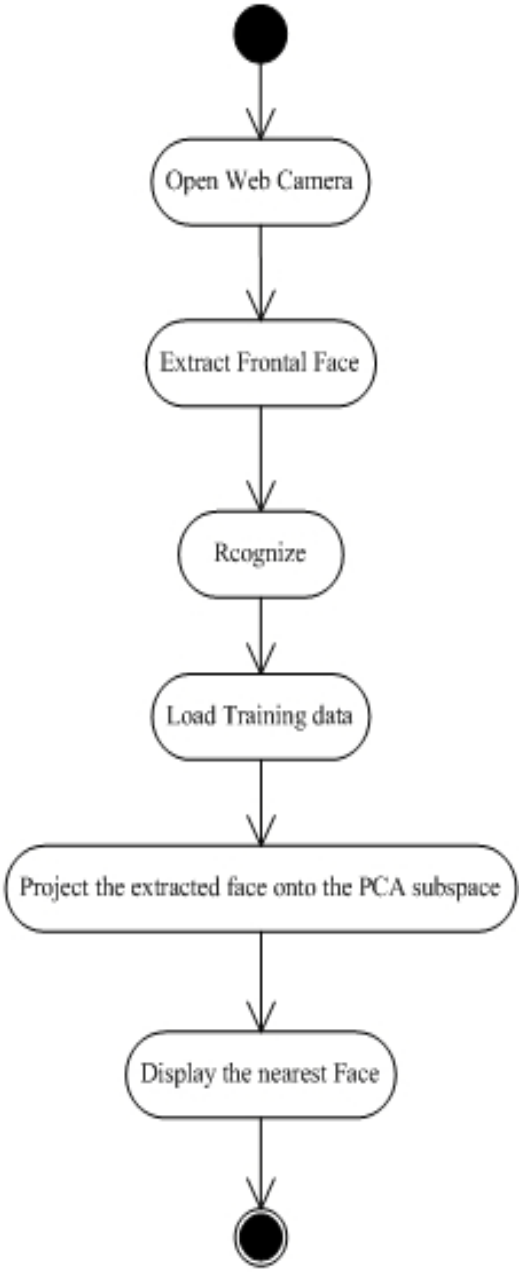
- The Principal component

Analysis (PCA) algorithm is performed on the images
and the eigen values are stored in an xml file.

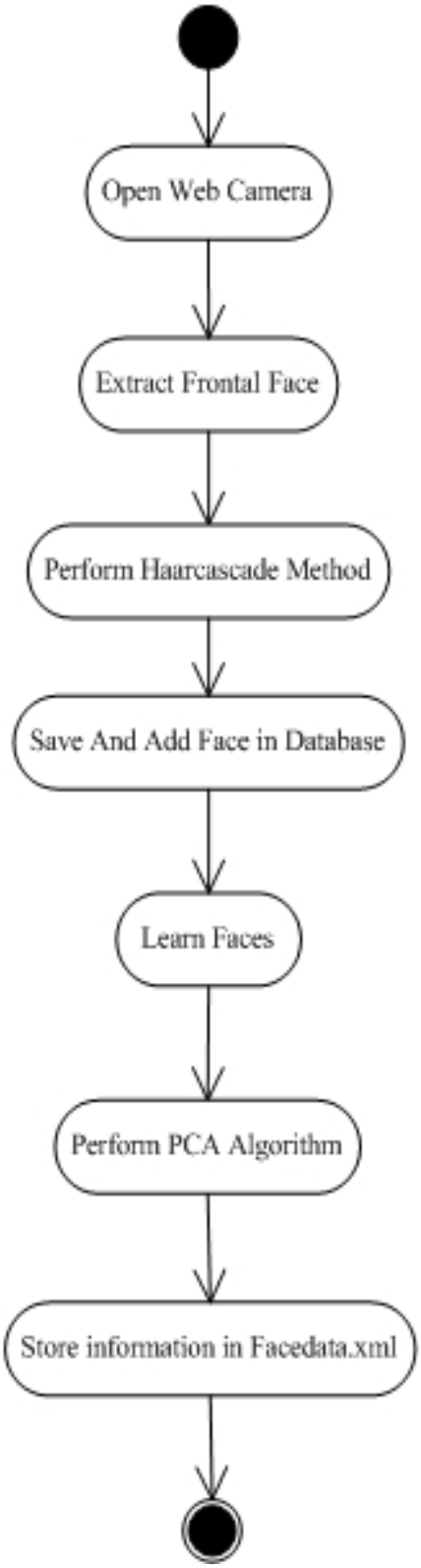
- When a user

requests for recognition the frontal face is extracted from the
captured frame through the camera. The eigen value is
re-calculated for the test face and it is matched with the
stored data for the closest neighbour.

Request Matching



Adding New Face to the Database



The above two diagrams shows the flow chart of the modules that are

- Adding the new face into the database
- Identifying the face which is present into the database.

1. On a request matching first the camera has been loaded for that openCAM_CB() is called to open the camera.
2. Next the frontal face is extracted from theCaptured frame by calling the function ExtractFace().
3. TheExtractFace() function uses the OpenCv library
4. Once the facial extraction done, search for the object in the whole image one can move the search window across the image and check every location using the classifier.
5. After matching the image with the database, related information is provided respectively

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6. For adding new into the database first two step are same but this time it will perform harrcascade method to save and add the data into database.
7. After storing the image, PCA algorithm will be applied on it and the stored in facedata.xml format.

3.2IMPLEMENTATION

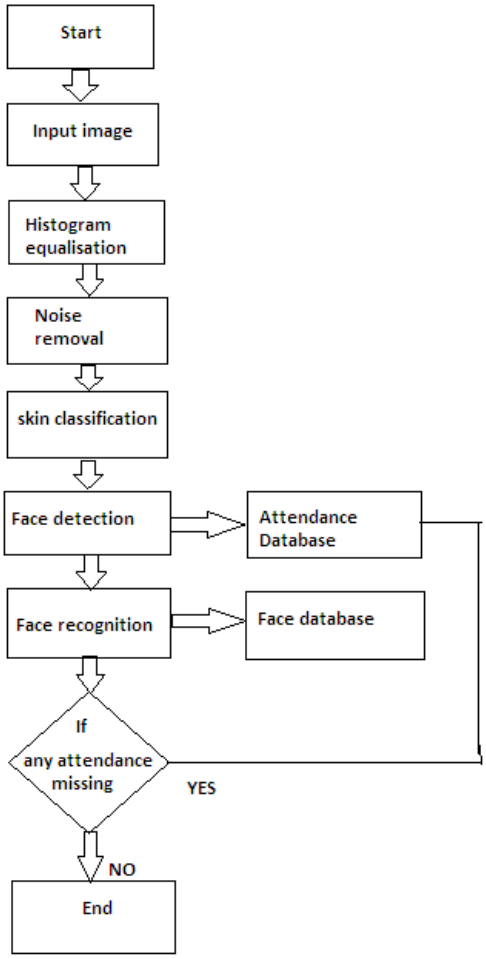

Fig:-face detection & recognition

1. **Histogram Normalization**

Captured image sometimes have brightness or darkness in it which should be removed for good results. First the RGB image is converted to the gray scale image for enhancement. Histogram normalization is good technique for contrast enhancement in the spatial domain.

2. **Noise Filtering**

Many sources of noise may exist in the input image when captured from the camera. There are many techniques for noise removal. Low pass filtering in the frequency domain may be a good choice but this also removes some important information in the image. In our system median filtering in is used for the purpose of noise removal in the histogram normalized image.

3. **Skin classification**

This is used to increase the efficiency of the face detection algorithm. Voila and Jones algorithm is used for detection..

the images of faces and then applied on the class room image for detection of multiple faces in the image.

4. **Face Detection**

Haar classifiers have been used for detection. Initially face detection algorithm was tested on variety of images with different face positions and lighting conditions and then algorithm was applied to detect faces in real time video. Algorithm is trained for the images of faces and then applied on the class room image for detection of multiple faces in the image.

5. **Face Recognition**

After the face detection step the next is face recognition. This can be achieved by cropping the first detected face from the image and compare it with the database. This is called the selection of region of interest. In this way faces of students are verified one by one with the face database using the Eigen Face method and attendance is marked on the server.

4. EXPERIMENTAL RESULTS

In order to obtain the attendance of individuals and to
record their time of entry and exit, we proposed the
attendance management system based on face recognition
technology in the institutions/organizations. The system
takes attendance of each student by continuous observation
at the entry and exit points.

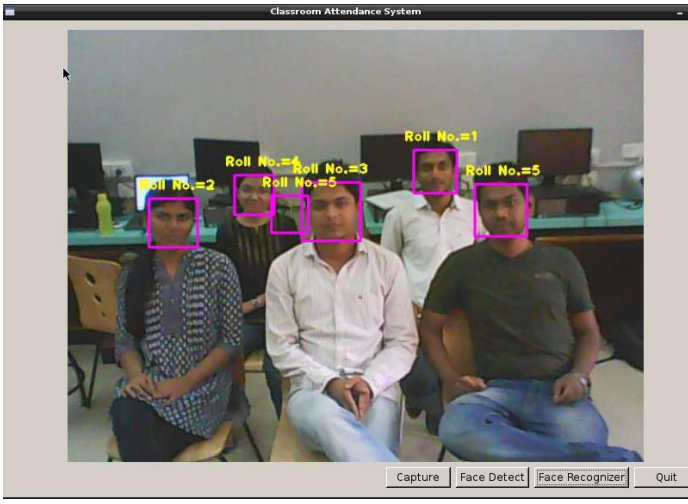

Figure 4: Face recognition System in Class

5. CONCLUSION AND FUTURE SCOPE

The result of our preliminary experiment shows improved performance in the estimation
of the attendance compared to the traditional black and
white attendance systems. Current work is focused on the
face detection algorithms from images or video frames.
In further work, we intend to improve facerecognition effectiveness by using the interaction among oursystem, the users and the algorithm. On the other hand, our system can be used in a completely new dimension of
face recognition application, mobile based face recognition,
which can be an aid for common people to know about any
person being photographed by cell phone camera including
proper authorization for accessing a centralized database

This project can be applied to any educational or corporate organization to keep track of their employees.

With further enhancement in this project , it can be very beneficial in the field of forensic in which the face of the victim can be captured and matched with this database images

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