



# FACE RECOGNITION BASED ATTENDANCE MARKING SYSTEM

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## **Abstract:**

Automatic face recognition (AFR) technologies have seen dramatic improvements in performance over the past years, and such systems are now widely used for security and commercial applications. An automated system for human face recognition in a real time background for a college to mark the attendance of their employees. So Smart Attendance using Real Time Face Recognition is a real world solution which comes with day to day activities of handling employees. The task is very difficult as the real time background subtraction in an image is still a challenge (6). To detect real time human face are used and a simple fast Principal Component Analysis has used to recognize the faces detected with a high accuracy rate. The matched face is used to mark attendance of the employee. Our system maintains the attendance records of employees automatically. Manual entering of attendance

in logbooks becomes a difficult task and it also wastes the time. So we designed an efficient module that comprises of face recognition to manage the attendance records of employees. Our module enrolls the staff's face (3). This enrolling is a onetime process and their face will be stored in the database. During enrolling of face we require a system since it is a onetime process. You can have your own roll number as your employee id which will be unique for each employee. The presence of each employee will be updated in a database. The results showed improved performance over manual attendance management system. Attendance is marked after employee identification. This product gives much more solutions with accurate results in user interactive manner rather than existing attendance and leave management systems.

## 1. INTRODUCTION

Maintaining the attendance is very important in all the institutes for checking the performance of employees (4). 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 employees have to wait for long time in making a queue at time they enter the office. Many biometric systems are available but the key authentications are same is all the techniques. Every biometric system consists of enrolment process in which unique features of a person is stored in the database and then there are processes of identification and verification. These two processes 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 employees in the office room environment without employees' intervention (2). 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. A number of methods have been proposed for face detection i.e. Ada Boost algorithm, the Float Boost algorithm, the S-Ada Boost algorithm Support Vector Machines (SVM), and the Bayes classifier. The efficiency of face recognition algorithm can be increased with the fast face detection algorithm. In all the above methods SURF is most efficient. Our system utilized this algorithm for the detection of faces in the office room image. Face recognition techniques can be Divided into two types Appearance based which use texture features that is applied to whole face or some specific Regions, other is Feature

based which uses geometric features like mouth, nose, eyes, eye brows, cheeks and Relation between them. Statistical tools such as Linear Discriminant Analysis (LDA), Principal Component Analysis (PCA), Kernel Methods, and Neural Networks, Eigen-faces have been used for construction of face templates. Illumination invariant algorithm is utilized for removing the lighting effect inside the office room.

## 2. SYSTEM DESCRIPTION

The system consists of a camera that captures the images of the employee and sends it to the image enhancement module. After enhancement the image comes in the Face Detection and Recognition modules and then the attendance is marked on the database server. This is shown in the experimental setup in Figure(4). At the time of enrolment, templates of face images of individual employees are stored in the Face database. Here all the faces are detected from the input image and the algorithm compares them one by one with the face database.

If any face is recognized the attendance is marked on the server from where anyone can access and use it for different purposes.

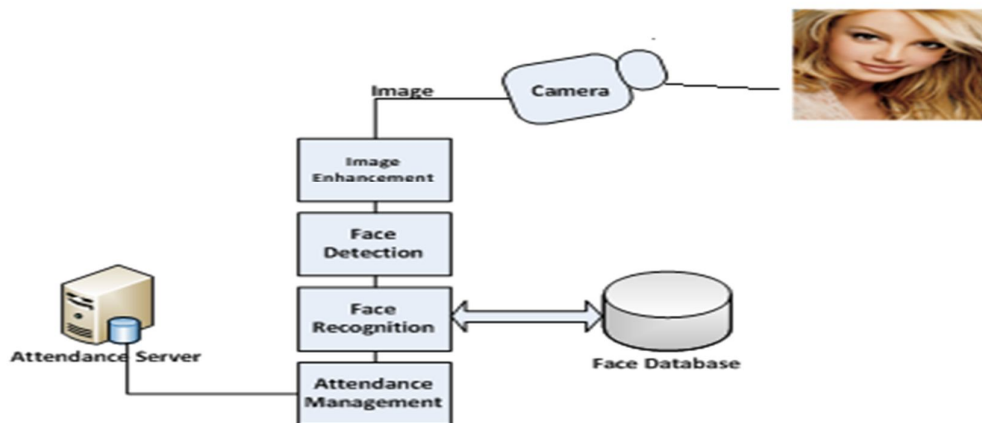


Fig. 1 Experimental Setup

In this way a lot of time is saved and this is highly secure process no one can mark the attendance of other. Attendance is maintained on the server so anyone can access it for purposes like administration, employees themselves(7). In order to avoid the false detection

we are using the skin classification technique. Using this technique enhance the efficiency and accuracy of the detection process.

In this process first the skin is classified and then only skin pixels remains and all other pixels in the image are set to black, this greatly enhance the accuracy of face detection process. Two databases are displayed in the experimental setup. Face Database is the collection of face images and extracted features at the time of enrolment process and the second attendance database contains the information about the employees and also uses to mark attendance.

## **2.1 Technical Requirements**

### **2.1.1 Hardware Requirements**

- A standalone computer needs to be installed in the office room where the system is to be deployed.
- Camera must be positioned in the office room to obtain the snapshots. Optimum Resolution: 512 by 512 pixels.
- Secondary memory to store all the images and database

### **2.1.2 Software requirements**

- MATLAB Version 7.6(R2008a) or higher
- Windows XP(Service Pack 2) or higher

### **2.1.3 Expenditure**

The cost of the entire project will depend simply on the expenditure incurred for the hardware requirements(5). The software requirements can be easily fulfilled without any cost.

Equipment: Cost:

Standalone PC : Rs. 30000/-

Camera : Rs. 3000 per camera

### 3. SYSTEM ALGORITHM

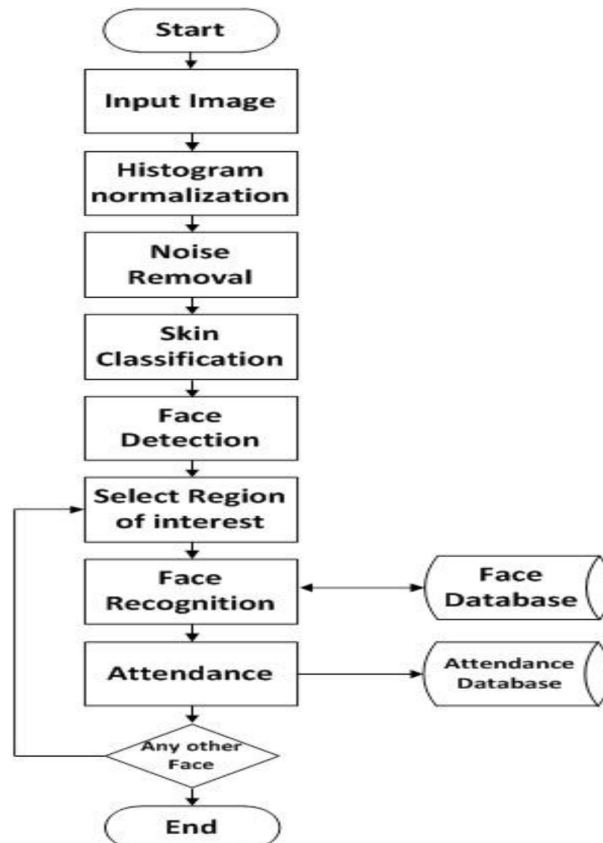
This section describes the software algorithm for the system.

The algorithm consists of the following steps

- ❖ Image acquisition
- ❖ Histogram normalization
- ❖ Noise removal
- ❖ Skin classification
- ❖ Face detection
- ❖ Face recognition
- ❖ Attendance

In the first step image is captured from the camera. There are illumination effects in the captured image because of different lighting conditions and some noise which is to be removed before going to the next steps(1). Histogram normalization is used for contrast enhancement in the spatial domain. Median filter is used for removal of noise in the image. There are other techniques like FFT and low pass filter for noise removal and smoothing of the images but median filter gives good results.

#### 3.1 Flow and Processing Of Algorithm



## CONCLUSION

Automated Attendance System has been envisioned for the purpose of reducing the errors that occur in the traditional (manual) attendance taking system. The aim is to automate and make a system that is useful to the organization such as an institute. The efficient and accurate method of attendance in the office environment that can replace the old manual methods. This method is secure enough, reliable and available for use. No need for specialized hardware for installing the system in the office. It can be constructed using a camera and computer.

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