

# Attendance Management System using Face Recognition

**Rohit Chavan**

*Department of Computer Engineering  
Padmabhushan Vasantdada Patil Pratishthan's College of  
Engineering, Mumbai University, India*

**Baburao Phad**

*Department of Computer Engineering  
Padmabhushan Vasantdada Patil Pratishthan's College of  
Engineering, Mumbai University, India*

**Sankalp Sawant**

*Department of Computer Engineering  
Padmabhushan Vasantdada Patil Pratishthan's College of  
Engineering, Mumbai University, India*

**Vinayak Futak**

*Department of Computer Engineering  
Padmabhushan Vasantdada Patil Pratishthan's College of  
Engineering, Mumbai University, India*

**Asha Rawat**

*Department of Computer Engineering  
Padmabhushan Vasantdada Patil Pratishthan's College of Engineering, Mumbai University, India*

## Abstract

Face recognition is the identification of humans by the unique characteristics of their Faces. Face recognition technology is the least intrusive and fastest bio-metric technology. It works with the most obvious individual identifier the human face. This research aims at providing a system to automatically record the students' attendance during lecture hours in a hall or room using facial recognition technology instead of the traditional manual methods. The objective behind this research is to thoroughly study the field of pattern recognition (facial recognition) which is very important and is used in various applications like identification and detection.

**Keywords: Image processing, Face recognition, PCA, Eigen Face, Microcontroller**

## I. INTRODUCTION

Face Recognition as it is often referred to as, analyses characteristics of a person's face image input through a camera. Facial recognition or face recognition as it is often referred to as, analyses characteristics of a person's face image input through a camera. Verification or identification can be accomplished from two feet away or more, without requiring the user to wait for long periods of time or do anything more than look at the camera. Traditionally student's attendance is taken manually by using attendance sheet, given by the faculty member in class. The Current attendance marking methods are monotonous & time consuming. Manually recorded attendance can be easily manipulated. Moreover, it is very difficult to verify one by one student in a large classroom environment with distributed branches whether the authenticated students are actually responding or not. Hence the paper is proposed to tackle all these issues. The proposed system consists of a high resolution digital camera put on gate to monitor the classroom or office room. The data or images obtained by the camera are sent to a computer programmed system for further analysis. The obtained images are then compared with a set of reference images of each of the employees or students & mark the corresponding attendance. The system also provides for continuous monitoring of the classroom by an operator if needed. The camera module can be a wireless or wired system.

## II. PROPOSED SYSTEM'S ARCHITECTURE

In the standalone application [1], face was captured by the webcam cameras and the detected faces are stored in desktop webcam folder.

The system designed is part of an in-house built learning management suite (Libri) [11]. It is constructed in many modules:

- Image capturing,
- Face Detector and
- Face recognizer.

The entire process is described in the pseudo code [Put the camera on the door. If it detects someone then capture the image and compare it with the stored database images If image matched then mark his/her attendance If not then ignore]

The required infrastructure in classroom that camera should be positioned centrally in the front of the classroom. Using this setup, the camera is capable to capture frontal images from students. A different approach would be to use a camera at the entrance of the classroom, which would individually detect faces for everyone entering the classroom.

Hardworking, aspirational and a correct attitude are the most important. The story of Michael Faraday, (the discoverer of electromagnetic induction) [4] is a fine example of our claim.

### III. SYSTEM IMPLEMENTATION

The proposed system has been implemented with the help of three basic steps: A. detect and extract face image and save the face information in an .txt file for future references. B. Learn and train the face image and calculate eigen value and eigen vector of that image. C. Recognise and match face images with existing face images information stored in xml

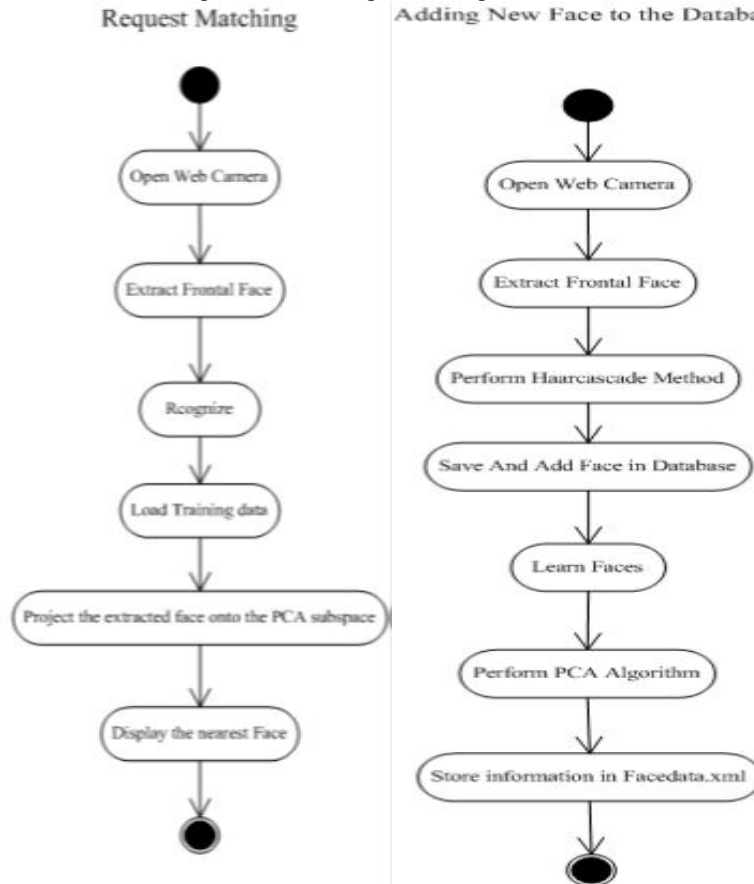


Fig. 1: (Face Recognition)

#### A. Face Detection and Extract:

At first, Emgu.cv() is called to open the camera for image capture. Next the frontal face is extracted from the video frame by calling the function ExtractFace(). The ExtractFace() function uses the OpenCv HaarCascade method to load the haarcascade\_trainedfaces.txt as the classifier. The classifier outputs a "1" if the region is likely to show the object (i.e., face), and "0" otherwise. To search for the object in the whole image one can move the search window across the image and check every location using the classifier. The classifier is designed such a manner that it can be easily "resized" in order to be able to find the objects of interest at different sizes, which is more efficient than resizing the image itself. So, to find an object of an unknown size in the image the scan procedure is done several times at different scales. After the face is detected it is clipped into a gray scale image of 50x50 pixels.

The [6] describes a Real Time System developed for Multi-face detection. As most of the system are based on software algorithms. This proposed system is based on hardware design (like a camera) to enhance the processing time. The different stages of this hardware design includes skin color detection, morphology, Fast connected-component labeling algorithm, Implementation of the Fast connected-component labeling algorithm, Lip feature extraction, Horizontal edge detection. Testing:-

1) The Steps of the Experiment Process Are:

- 1) Initiate capturing the images through the camera which is able to rotate in all direction in the class room.
- 2) Pre-process the captured images through and extract face image.
- 3) Calculate the eigen value of the captured face image and compared with that of the existing face images.
- 4) If the eigen value does not matches with the existing one,save it as a new face image.
- 5) If the eigen values matches, then the recognition process will start soon.
- 6) Using PCA algorithm the following steps would be followed
- 7) Find the face information of matched face image in the database.

- 8) Update the log table with corresponding face image and system time that makes completion of attendance for an individual students.
- 9) This section presents the results of the experiments.



Fig. 2:

#### IV. SOFTWARE APPLICATION

This section gives a description of a software application that implements the proposed idea. In the training the image is captured and saved in the data base. And from then the system is able to understand the face identity that is shown in the second image (Fig. 9) that is detection and recognition.

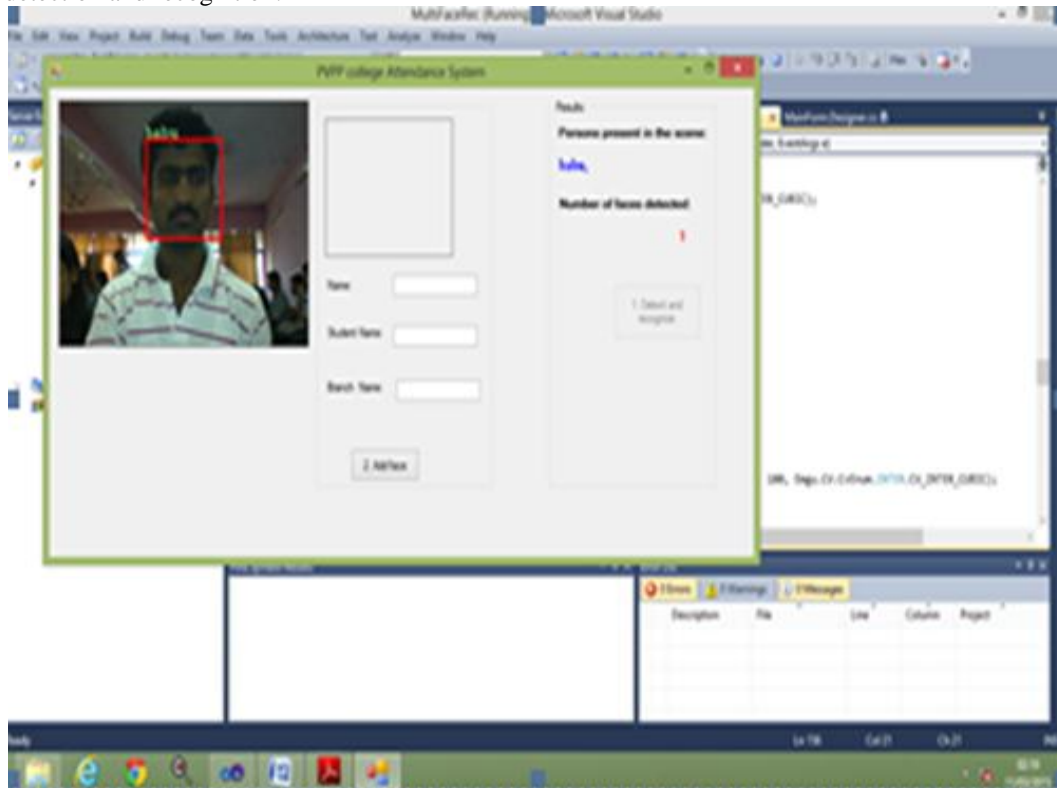


Fig. 9: Software Application

#### V. CONCLUSION

An automatic attendance management system is a necessary tool for any organization. Most of the existing systems are time consuming and require for a semi manual work from the teacher or students. This approach aims to solve the issues by integrating face recognition in the process. Even though this system still lacks the ability to identify each student present on class, there is still much more room for improvement. Since we implement a modular approach we can improve different

modules until we reach an acceptable detection and identification rate. Another issue that has to be taken in consideration in the future is a method to ensure users privacy. Whenever an image is stored on our servers, it must be impossible for a person to use that image. computational process of discovering patterns in large data sets involving methods at the intersection of artificial intelligence, machine learning, statistics, and database systems. The overall goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further use [5].

**A. Front End and Back End:**

We have used ASP.NET -C# as our front end. In order to store large data we would be using MySql Server as our back end.

**ACKNOWLEDGEMENTS**

We acknowledge the contributions directly made by several faculties at Padmabhushan Vasantdada Patil Pratishthan's College of engineering, Mumbai & various papers.

**REFERENCES**

- [1] Visar Shehu, Agni Dika, "Using Real Time Computer Vision Algorithms in Automatic Attendance Management Systems" ITI 2010 32nd Int. Conf. on Information Technology Interfaces, June 21-24, 2010, Cavtat, Croatia.
- [2] PAN Xiang, "Research and Implementation of Access Control System based on RFID and FNNFace, 2012 International Conference on Intelligent Systems Design and Engineering Application 12 2012 2012.400 Recognition", 978-0-7695-4608-7/11 \$26.00 © 2011 IEEE
- [3] Mr.Jitendra B. Jawale Ear Based Attendance Monitoring System Proceedings of ICETECT 2011, 978-1-4244-7926-9/11/\$26.00 ©2011 IEEE
- [4] Lejla Abazi-Bexheti. Development of a Learning Content Management System. WSEAS Transactions on Information Science and Applications
- [5] Nai-Jian Wang "A Real-time Multi-face Detection System Implemented on FPGA", 2012 IEEE International Symposium on Intelligent Signal Processing and Communication Systems (ISPACS 2012) November 4-7, 2012