



# Smart Attendance System Using Face Recognition

**Prof.N.P. Mohod<sup>1</sup>, Abhishek Tidke<sup>2</sup>, Prasad Ghuge<sup>3</sup>, Prafulla Rahane<sup>4</sup>, Rahul Ambala<sup>5</sup>,  
Raksha Kakde<sup>6</sup>**

Assistant Professor, Department of Computer Science and Engineering, Sipna COEAT, Amravati, India<sup>1</sup>

Student, Department of Computer Science and Engineering, Sipna COEAT, Amravati, India<sup>2-6</sup>

**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.

**Keywords:** Face Recognition, Attendance System, Face detection, PCA, Database.

## I. INTRODUCTION

Face recognition is crucial in daily life in order to identify family, friends or someone we are familiar with. We might not perceive that several steps have actually taken in order to identify human faces. Human intelligence allows us to receive information and interpret the information in the recognition process. We receive information through the image projected into our eyes, by specifically retina in the form of light. Light is a form of electromagnetic waves which are radiated from a source onto an object and projected to human vision. Robinson-Riegler, G., & Robinson-Riegler, B. (2008) mentioned that after visual processing done by the human visual system, we actually classify shape, size, contour and the texture of the object in order to analyse the information. The analysed information will be compared to other representations of objects or face that exist in our memory to recognize. In fact, it is a hard challenge to build an automated system to have the same capability as a human to recognize faces. However, we need large memory to recognize different faces, for example, in the Universities, there are a lot of students with different race and gender, it is impossible to remember every face of the individual without making mistakes. In order to overcome human limitations, computers with almost limitless memory, high processing speed and power are used in face recognition systems.

## II. LITERATURE REVIEW

This literature review chapter covers all the literature and book's information which are referred for the dissertation work.

Arun Katara et al. (2017) mentioned disadvantages of RFID (Radio Frequency Identification) card system, fingerprint system and iris recognition system. RFID card system is implemented due to its simplicity. However, the user tends to help their friends to check in as long as they have their friend's ID card. The fingerprint system is indeed effective but not efficient because it takes time for the verification process so the user has to line up and perform the verification one by one. However for face recognition, the human face is always exposed and contain less information compared to iris. Iris recognition system which contains more detail might invade the privacy of the user. Voice recognition is available, but it is less accurate compared to other methods. Hence, face recognition system is suggested to be implemented in the student attendance system.

The human face is a unique representation of individual identity. Thus, face recognition is defined as a biometric method in which identification of an individual is performed by comparing real-time capture image with stored images in the database of that person (Margaret Rouse, 2012).

Nowadays, face recognition system is prevalent due to its simplicity and awesome performance. For instance, airport protection systems and FBI use face recognition for criminal investigations by tracking suspects, missing children and drug activities (Robert Silk, 2017). Apart from that, Facebook which is a popular social networking website implement



face recognition to allow the users to tag their friends in the photo for entertainment purposes (Sidney Fussell, 2018). Furthermore, Intel Company allows the users to use face recognition to get access to their online account (Reichert, C., 2017). Apple allows the users to unlock their mobile phone, iPhone X by using face recognition (deAgonia, M., 2017).

The work on face recognition began in 1960. Woody Bledsoe, Helen Chan Wolf and Charles Bisson had introduced a system which required the administrator to locate eyes, ears, nose and mouth from images. The distance and ratios between the located features and the common reference points are then calculated and compared. The studies are further enhanced by Goldstein, Harmon, and Lesk in 1970 by using other features such as hair colour and lip thickness to automate the recognition. In 1988, Kirby and Sirovich first suggested principle component analysis (PCA) to solve face recognition problem. Many studies on face recognition were then conducted continuously until today (Ashley DuVal, 2012).

### III. EXISTING SYSTEM

Traditional student attendance marking technique is often facing a lot of trouble. The face recognition student attendance system emphasizes its simplicity by eliminating classical student attendance marking technique such as calling student names or checking respective identification cards. There are not only disturbing the teaching process but also causes distraction for students during exam sessions. Apart from calling names, attendance sheet is passed around the classroom during the lecture sessions. The lecture class especially the class with a large number of students might find it difficult to have the attendance sheet being passed around the class. Thus, face recognition student attendance system is proposed in order to replace the manual signing of the presence of students which are burdensome and causes students get distracted in order to sign for their attendance. Furthermore, the face recognition based automated student attendance system able to overcome the problem of fraudulent approach and lecturers does not have to count the number of students several times to ensure the presence of the students.

### IV. PROPOSED SYSTEM

#### A. FACE DETECTION SYSTEM:

By implementing the real-time face recognition attendance monitoring system, the attendance can be recorded more efficiently. The proposed system updates the attendance automatically once the student face is match with the template database. The proposed system is able to identify the user and reject the student if they try to enter the wrong class or not in the correct time. Face recognition for attendance monitoring system is developed by extraction image from the webcam. Implementing real-time face recognition for monitoring student attendance involving three phases, which include face region detection, template extraction and face recognition using genetic algorithms. In the first phase, face region detection itself is divided into four sub-phases, including image acquisition, face detection, straightening of face and cropping of face. This system is using Principle Component Analysis approach to recognize face characteristic. PCA is used because of its simplicity. The system generates eigenface and does matching process by comparing the eigenface from the captured image with the image from the template database.

#### B. Principal Component Analysis (PCA):

PCA was invented by Karl Pearson. It involves the mathematical method to transforms an amount of probably interrelated variables into a numeral of unorganized variables is called the principal components, related to original variables by an orthogonal transformation. The transformation can be defined as that the first principal component has as high variance as it is possible and for every succeeding component thus has the highest variance conceivable under the imperative that it be orthogonal to the former components.

#### C. Steps used in PCA Algorithm:

Step1: Acquire training set of 'N' number of images at the initial stage. In this project the images are of 92\*112 pixels each. Training set is shown in the figure.

Step2: Calculation of the eigenface from the "N" training set images keeping only few M images that is correspond to that of the highest eigen values. The M images describe the "face space". When new faces encountered, the "eigenfaces" can be recalculated accordingly.

Step3: The corresponding distribution of the "M" dimensional weight space for every known individual is Calculated by projecting their respective face images onto "face space".

Step 4: Compute set of the weights anticipating or projecting the data picture or input image to M "eigen faces".

Step5: Determine if the given image is face image or not by checking to the closeness of given image or picture to "face space".



Step 6: If the image is sufficiently close enough, then classify the weight pattern as either an unknown or as a known person based on measured Euclidean distance. Step 7: If the image is sufficiently close enough then refer to the recognition is successful and give applicable information about recognized face from the database which hold data of faces.

## V. SYSTEM ARCHITECTURE

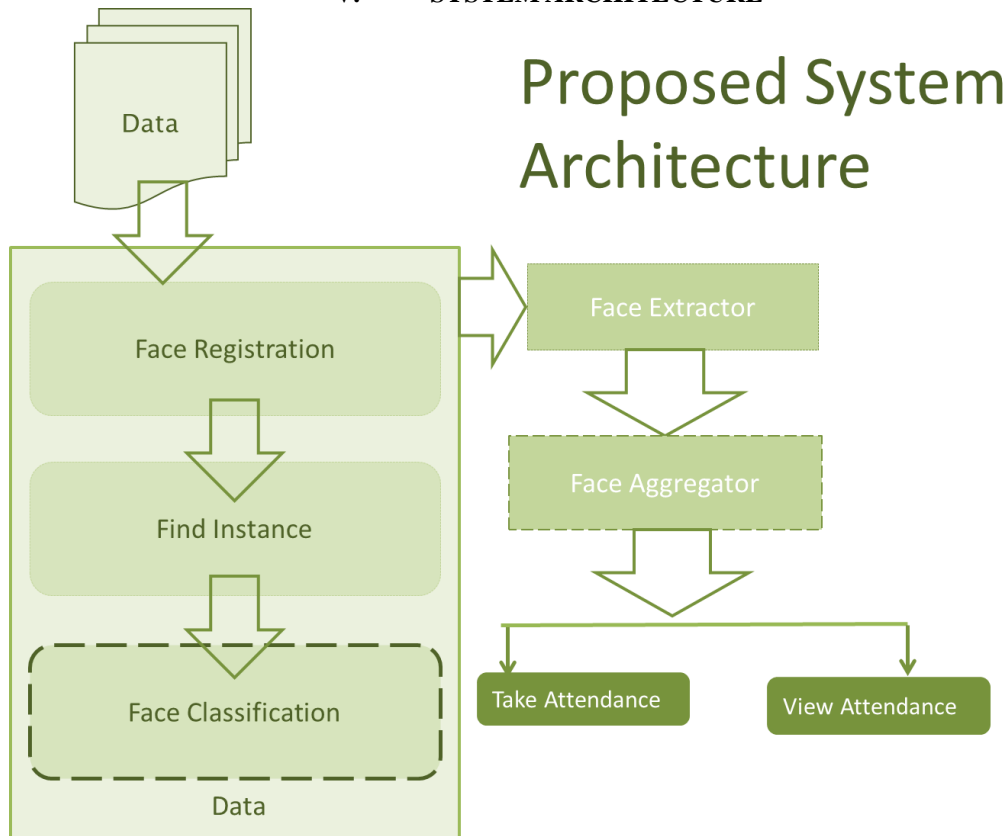


Fig 1. System Architecture

## VI. CONCLUSION

The face detection and recognition algorithms were studied thoroughly taking number of the test from different varying condition images. For face detection combination of RGB and HSV model algorithm is used. For face recognition principal component analysis method is used. Attendance of the student are marked using the recognized face of every individual student and the data is stored in an attendance sheet. The attendance of every student marked automatically by recognizing their face with the face present in the data base.

## REFERENCES

- [1] Bhumika G. Bhatt, Zankhana H. Shah "Face Feature Extraction Techniques: A Survey", National Conference on Recent Trends in Engineering & Technology, 13-14 May 2011.
- [2] G. Yang and T. S. Huang, "Human face detection in complex background," Pattern Recognition Letter, vol. 27, no.1, pp. 53-63, 1994.
- [3] C. Kotropoulos and I. Pitas, "Rule-based face detection in frontal views," Proc. Int'l Conf. Acoustics, Speech and Signal Processing, vol. 4, pp. 2537-2540, 1997.
- [4] E. Saber and A.M. Tekalp, "Frontal-view face detection and facial feature extraction using color, shape and symmetry based cost functions," Pattern Recognition Letters, vol. 17, no. 8, pp. 669-680, 1998.
- [5] M. Turk, A. Pentland, Eigenfaces for Recognition, Journal of Cognitive Neuroscience, Vol. 3, No. 1, Win. 1991, pp. 71-86
- [6] Discriminant analysis for recognition of human face images Kamran Etemad and Rama Chellappa
- [7] Sanjay singh et.al, "A robust skin color based face detection algorithm", Tamkang Journal of Science and Engineering vol.6, no.4, pp227-234, 2003
- [8] Jose M.Chaves-Gonzalez, Miguel A Vega-Rodriguez, Juan A.Gomez-Pulido, Juan M.Sanchez-perez, " Detecting skin in face recognition systems: A color spaces study", Digital signal processing, 20(2010) 806-823.