# Smart Attendance System Using Deep Learning Technique

**E. Aishwarya[a], K.Kumaravel[b], R.MohamedSuthesh[c], S. Poornima[d]and R.Poonguzhali [e]**

PeriyarManiammai Institute of Science & Technology, Student, CSE, Thanjavur/India
[b]PeriyarManiammai Institute of Science & Technology, Student,CSE, Thanjavur/India
[c]PeriyarManiammai Institute of Science & Technology, Student, CSE, Thanjavur/India
[d]PeriyarManiammai Institute of Science & Technology, Student,CSE, Thanjavur/India
[e]PeriyarManiammai Institute of Science & Technology, Faculty, CSE, Thanjavur/India

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**Abstract:** Appearance is a compulsory necessity of every organization and preserving attendance register daily is a tough and time-consuming duty. All organization has sanctioned their own technique of enchanting attendance i.e., calling the names or by passing the sheets. Several popular automatic attendance systems currently in use are RFID, IRIS, BIOMETRIC etc. Conversely, constructioncrocodile is needed in these cases thus requires more time and it is indiscreet in flora. If proximate is any damage to RFID card, it may result in an improper attendance. Positioning these organisms on large scale are not cost efficient and also takes lot of time to post attendance. Detection and recognition of faces has been on the rise worldwide owing the requirement for security for economic transactions, authorization, national safety and security and other important factors like fake attendance, high cost, and time consumption are avoided.In this paper, the smart machine learning based face recognition approach has been proposed. The database has beencreated by capturing the faces of the ratified students. The face is perceived using deep learning-based slant. The collectedimageries then stored as a database with respective labels. The features are extracted using Haar-like features and Deep Learning Algorithm. The proposed approach achieves the recognition rate of 98% for CNN and 92% for the Haar-like features and Deep Learning Algorithm.

**Keywords:** RFID, IRIS, BIOMETRIC, Haar, Deep Learning algorithm

## 1. Introduction

Face exposure using anelectronic technology aims to determine the presence of the face(s) in a given digital image or video. The process may proceed to identify the face(s)detected depending on the area of application. Face exposure by automaticstructures has been leveraged by private and government establishments to enhance the efficacy of a wide range of solicitations in our day-to-day activities, security, and businesses. This technology's attractiveness lies in its non-invasive and discreet nature [1], ease of application, rapid predictiveness, sensitivity to confounding features, and potentially low cost. Both of these are feasible because of machine and hardware advancements like GPUs [2], multicamera systems [3], and new algorithms for facial recognition. The new algorithms which reflect the technology's software aspect are divided into various categories, including characteristics, learning and hybrid (i.e., feature and learning-based). This classification depends therefore on the identification of faces by the system. In our view, their best application areas have been granted little or no comparison.In addition, the restricted and uncomplicated conditions which result in the performance restriction of this algorithm do not gain their areas of use[4]. Most face recognition algorithms, such as unwieldy lighting, atmospheric conditions, camera distance and Context variance can be extremely computational [5], which may minimize problems caused by uneventful environmental conditions. Therefore, in real time applications, particularly in the electronic and sensors with low power, they are largely unemployed.In order to apply face recognition to education, applications including a student attendance system in schools, students and staff identification verification, laboratories and accessibility management in classroom are mostly needed. Testing the capabilities of detecting certain algorithms allows the best possible algorithm to be determined in the educational setting. The literature has identified many approaches to face detection algorithms. Viola and Jones' face recognition work[6] used a cascade classificator to select hair-like characteristics.The haar-like characteristics of viola and jones have been changed by Leinhart and Maydt[7]. Li et al.[8] proposed to use the Viola–Jones algorithm to learn how to detect faces inside an image. Oja et al. [9] have used local binary patterns (LBP) in place of haar-like features used by Viola and Jones and related features from the local community, Ahonen et al. [10] have used facial recognition LBP. Levi and Weiss [7] have employed the histogram of edge orientation (EOH) to include image features. In addition, some scholars have made attempts to compare these methods.The results of three face descriptors (i.e.,LBPH) and Oriented Gradent Histogram (HOG)) were contrasted by Kortliet al.[11] using the FERET data collection. Kadir et al. [12] compared hair-like cascade and LBP output in three face databases with still images (i.e., Colour FERET [13], Taarlab [14], and MIT CBCL [15] databases). The haar like cascade and the LBP methods used by Guennouni et al [16] to detect ears, moves and football. This study has been undertaken to examine the comparative efficiency of the two embedded system approaches. In comparison to LBP, haar-like cascade accuracy (96.24%) was higher (i.e., 94.75 percent)A systematic analysis of three approaches to facial recognition was carried out by Adouani et al (Haar-like cascade, LBP, and HOG with Support Vector Machine). The programme was checked on the video series of the general database. Most of these methods conducted comparative studies on general datasets of facial recognition without showing the output index of a particular implementation field. Furthermore, the effect on the output of the algorithms of the false alarm rate and number of training stages was not expressly stated. Most face sensing algorithms with OpenCV and Dlib are implemented successfully with Python or C programming or with MATLAB with computer vision.Fore.g., with a MATLAB toolbox computer vision, Alionte and Lazar [18] have developed a hair-like face detector based on the Viola–

Jones algorithm. Adouani et al. [17] has used Python programming to introduce face-detection in OpenCV, with hair-liken cascade, LBP and HOG with SVM. However, in some of the widely used methods to improved target identification, a custom cascade classification can be introduced in MATLAB[19-21].

### 1.1. Problem Statement

Facial recognition is a concept that enables a computer device to quickly and accurately identify human faces in photographs or videos. Deep learning algorithms and techniques for enhancing facial recognition accuracy have been developed. Deep learning systems has recently been extensively investigated. The mind can identify and remember several faces instinctively and immediately. Although, it is very hard to do all the challenging functions of the human brain when it comes to machine. An integral part of biometrics is facial detection. Basic human features are matched to current evidence in biometrics. A range of practical applications, including criminal recognition, protection systems and identification tests, may apply to computers which detect and recognize faces, such as the real time facial verification system on the mobility phone with advanced similarity filters.

### 1.2. Objective

The solutions suggested primarily improve the efficiency of current attendance control systems:

- The objective of this system is to present an automated system for human face recognition in a real time background for an organization to mark the attendance of their student.
- Reduce manual labor and demand on readers to make the attendance correct.
- Minimize the time needed for labeling attendance and maximize the time needed for an actual method of instruction.
- Build an automated system to increase the accuracy of existing system.

## 2. Algorithms and Methods

The purpose of thisdeveloped approach is to upload each student's face and store it in its attendance database. The student's face has to be depicted in a way which recognizes all the characteristics of the pupil face and also the student's

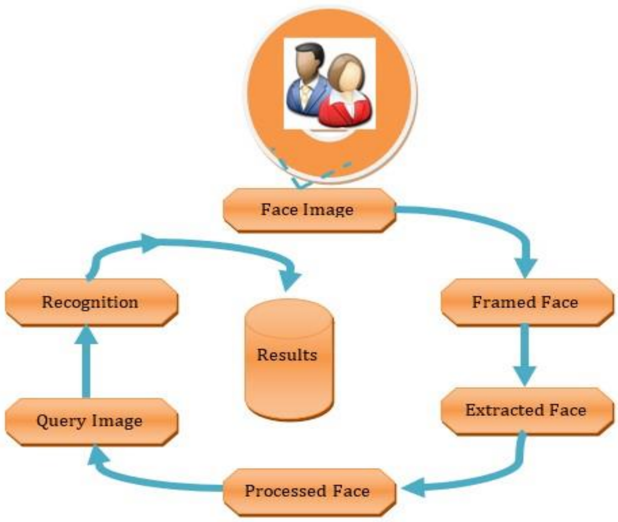



**Figure 1:** General Face Recognition Procedure

This paper provides a realistic classification of two methods for custom cascades (i.e., Haar-like and Deep Learning Algorithm). The rest of the document'sarias arranged in the following way. Section II Presents proposed system block diagram andIntelligent scheme has been incorporated in Section III.Section IV introduces the experimental discussionsand observations. Conclusion has been presented in Section V.

posing and disposition. The instructor is not required to visit the class manually, and the face is remembered and the attendance record checked by more processing steps. The method of face recognition can be split into three stages, which includespreparation of training data, face trainer and prediction.The photos in the dataset are the training data here. They are assigned the student to whom they belong with an integer dot. These pictures then are used to identify the face. The HAAR Cascade classifier is the facial recognizer used in this method. The set of aspects of the whole face is initially collected. These waterfalls will be translated to matrix numbers, and all decimal values will be determined. Finally, for each picture in the training data a histogram will be created. Later on the histogram of the face to be identified is determined during the step of identification and correlated with the histograms already computed.If the face has been detected and processed, the attendance of the students will be updated against the faces in the school database.

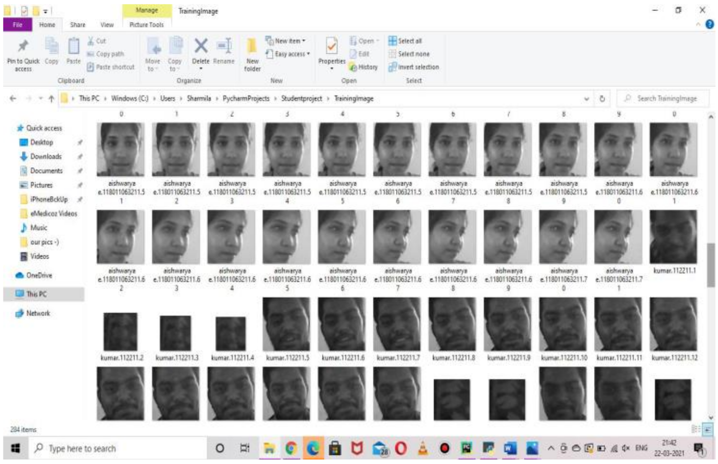
## 3. Methodology

The following steps have been taken in the same order to introduce the smart attendance system using the face recognition system. The following steps are:

Phase 1. Student registration.

Phase 2. Machine Train.

Phase 3.Picture test.



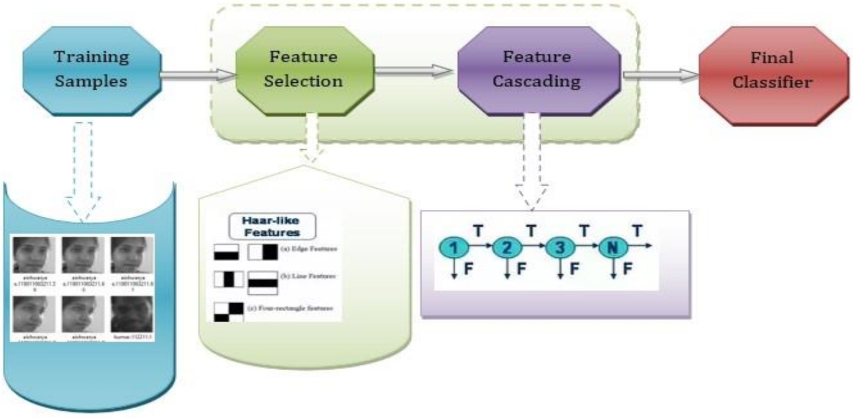



**Figure 2:** Proposed system structure

Phase 4. Sensing Face.

Phase 5. Line-Up.

Phase 6. Encoding Face.

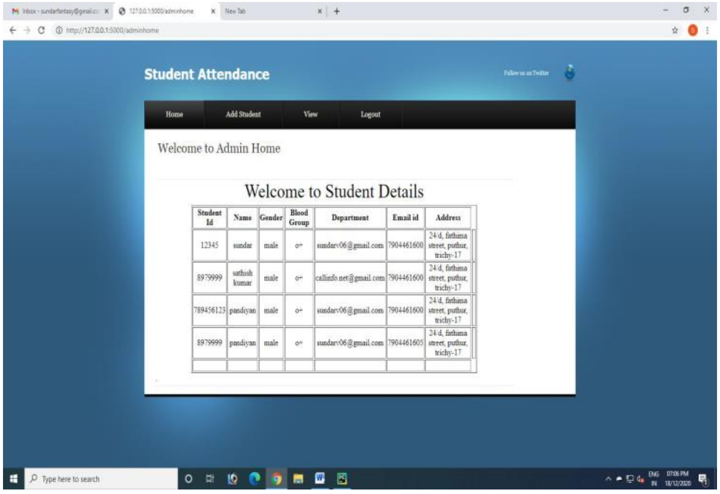
Phase 7. Acknowledgment.

Phase 8. Database Store Assistance.

## 4.ExperimentalResults

The current work involves photographs of four separate students in the face collection for the assessment process. Model transitions such as random crops, random tweaks and face orientation are added to create different face pictures to get more face characteristics. Some facial characteristics can be derived from a small dataset using the above image transformations. “In this part, the work has been proposed in two classroom sessions and it has been referred as the "testsession 1" and the "testsession-2"Test session -1 takes 1 pupil into account while the 3 remaining are not present in the classroom. The test session-2 includes the participation of all 2 students.The testing picture in Figure 3 consists of four pupils, a component of the test dataset with various faces, visibility and lighting. Fig. 4 shows the face identified and recognized.

**(a)**




**(b)**

**Figure 3:**Updated Students Details (a) Image data (b) students details.

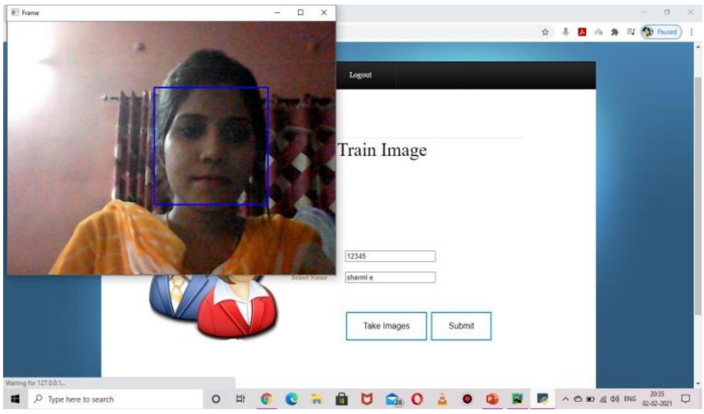


**Figure 4:** Test image for test session.

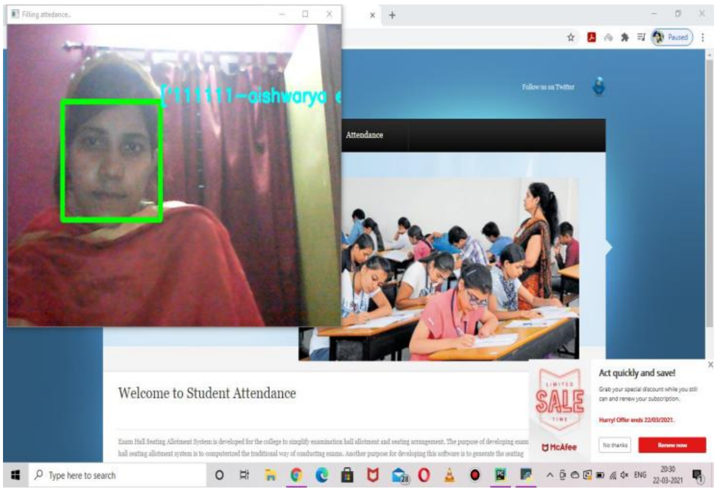
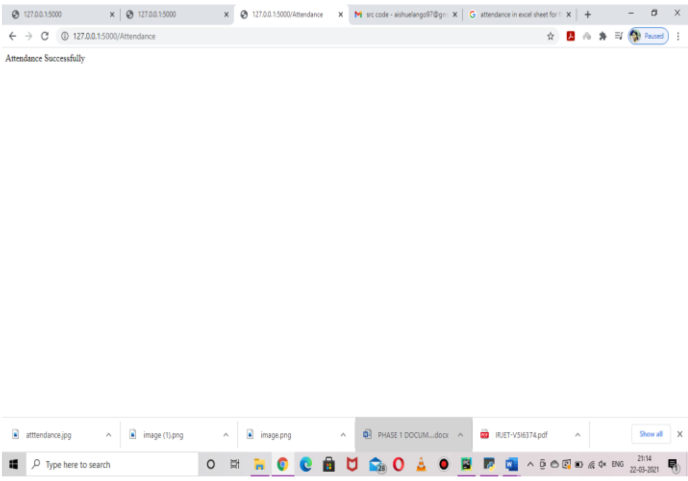
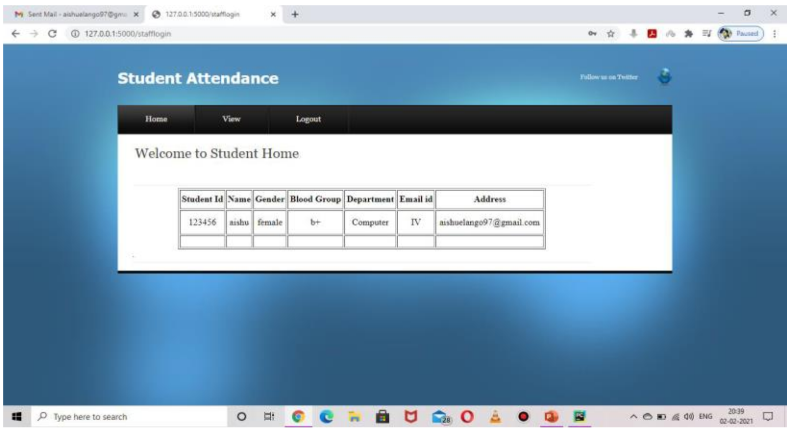



**Figure 5:** Detected faces of the students

This really is the situation where only 1 student is among the 4 students in the class. The participation for such a lecture is accordingly identified and the csv file produced and sent to the faculty concerned is shown in Fig. 6. The appearance is labelled with the date and time of the lecture for all students detected in a column next to their names. Over the last tab, the average attendance is estimated, as photographs in additional lecture sessions are revised.




**(a)**



**(b)**

**Figure 6:** Attendance Details (a) Attendance (b) Student details.

The names of identified students from the facenet model are then saved in a csv file and sent to the respective professors, as done in the Test Session-1. Fig. 7 displays the csv file got as a mail from the intelligent attendance system.

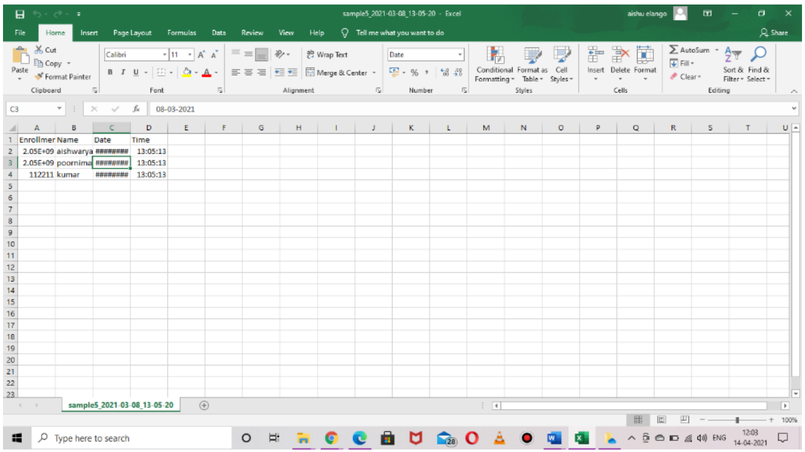



**Figure 7:** .csv file containing attendance status

## 5. Conclusion

The suggested participatory model condenses the total of additional hardware components required to participate. For about everybody today, all the equipment needed for this reason is already available. Coding scheme has been found to be very effective in the identification and recognition of faces. The current design demonstrated 100 percent specificity on the two test sessions as seen in the results table. The accuracy of the Haar-like features and Deep Learning Algorithm model also depends on how the picture in the classroom is taken from the smartphone camera. For efficient facial recognition it is best to have a 1080p camera or higher.A trustworthy structure needs to be built to participate. This has been successfully applied in a class room. Our device configuration is very basic and easy to use.

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