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# A Survey on Facial Recognition Attendance System for Students

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**ABSTRACT**: The face is the identity of a person. The methods to exploit this physical feature have seen a great change since the advent of image processing techniques. The accurate recognition of a person is the sole aim of a face recognition system and this identification maybe used for further processing. Traditional face recognition systems employ methods to identify a face from the given input but the results are not usually accurate and precise as desired. The system described in this paper aims to deviate from such traditional systems and introduce a new approach to identify a student using a face recognition system i.e., the generation of a 3D Facial Model. This paper describes the working of the face recognition system that will be deployed as an Automated Attendance System in a classroom environment. Present strategies for taking attendance are tedious and time-consuming. Attendance records can be easily manipulated by manual recording. The traditional process of making attendance and present biometric systems are vulnerable to proxies. This paper is therefore proposed to tackle all these problems. The proposed system makes the use of Haar classifiers, KNN, CNN, SVM, Generative adversarial networks, and Gabor filters. After face recognition attendance reports will be generated and stored in excel format. The system is tested under various conditions like illumination, head movements, the variation of distance between the student and cameras. After vigorous testing overall complexity and accuracy are calculated. The Proposed system proved to be an efficient and robust device for taking attendance in a classroom without any time consumption and manual work. The system developed is cost-efficient and need less installation.

**KEYWORDS**: Facial Recognition, Haar Cascade algorithm, Attendance Management, Pattern Recognition; Identification.

## I. INTRODUCTION

As we have seen in many schools and colleges, faculty members are facing the problem of proxy attendance, maintaining a handwritten record of student attendance of each class every day which is also very time consuming. So, it is a very difficult task for them. And here our project comes into the Picture. Biometric Identification solves the above-mentioned problem, as it cannot be manipulated easily and is done in a small amount of time. Face recognition technology is the least intrusive and one of the fastest biometric technologies invented so far. The purpose of developing attendance management systems is to computerize the traditional way of taking attendance. Automated Attendance Management System performs the daily activities of attendance marking and analysis with reduced human intervention. The prevalent techniques and methodologies for detecting and recognizing faces fail to overcome issues such as illumination, variations, rotation, and occlusions. The system integrates techniques such as image contrasts, integral images, colour features and cascading classifiers for feature detection. The system provides an increased accuracy due to use of a large number of features of the face. We use the python modules namely Face Recognition and OpenCV in our system. The Python Module Face recognition Recognize and manipulate faces from Python or from the command line with the world's simplest face recognition library. Built using dlib's state-of-the-art face recognition built with deep learning. The model has an accuracy of 99.38% on the Labelled Faces in the Wild benchmark. This also provides a simple face recognition command line tool that lets you do face recognition on a folder of images from the command line. Initially, the algorithm needs a lot of positive images (images of faces) and negative images (images without faces) to train the classifier. Then we need to extract features from it. But we do not need to do that since OpenCV(a python module) has a trainer and detector built in it using which you can create your own classifier. But if

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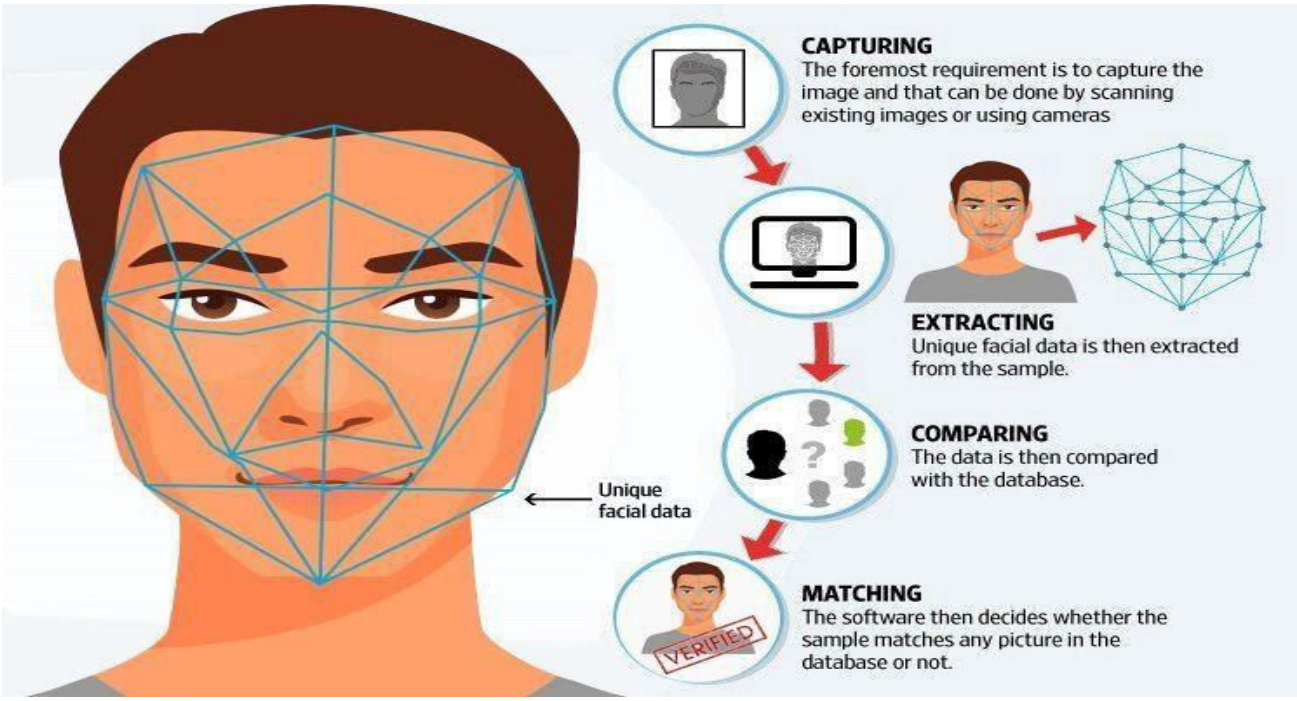
you do not want to do that then OpenCV already contains many pre-trained classifiers for face, eyes, smile, etc. Those XML files can be downloaded from the haarcascades directory. So using these Modules we have created a system which gives us an increased accuracy (nearly 100%) in most of the cases considered.




## II. LITERATURE SURVEY

This section basically shows the various systems based on similar technologies which we used as inspiration for the development of our proposed system. These papers describing this are discussed here. The Table gives an overall summary of the referred systems and also gives a remark on their performance.

**A. Dhanush Gowda H.L, K Vishal, Keertiraj B. R, Neha Kumari Dubey, Pooja M. R. (JULY 2019)**

Smart attendance management system is designed to solve the issues of existing manual systems. We have used face recognition concept to mark the attendance of students and make the system better. The system performs satisfactory in different poses and variations. In future this system needs to be improved because these systems sometimes fail to recognize students from some distance, also we have some processing limitations, working with a system of high processing may result in even better performance of this system.

**B. Nandhini R, Duraimurugan N, S.P.Chokkalingam (MAY 2018)**

In this paper, we have engineered an automated attendance system for lecturers to record student's attendance during lecturing and laboratory sections using face detecting concepts. Automated attendance systems based on image processing techniques have been envisioned for the purpose of reducing the drawbacks in the traditional (manual) systems. Here, the camera detects and recognizes the student who ever enters the door and sends their personal information to the host to generate 3D Facial Model,the proposed system will update the attendance once the student's face is matched with the template database. In addition to this the system is programmed in such a way that it will send the absentees information to the corresponding student house through message. This system can improve the goodwill of any institution.

**C. Aziza Ahmedi , Dr Suvarna Nandyal (OCT 2015)**

Our proposed project, ―An 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 camera plays a crucial role in the working of the system hence the image quality and performance of the camera in real-time scenario must be tested thoroughly before actual implementation.

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This method is secure enough, reliable and available for use. No need for specialized hardware for installing the system in the classroom. It can be constructed using a camera and computer.

**D. Dr. V Suresh, Srinivasa Chakravarthi Dumpa, Chiranjeevi Deepak Vankayala, HaneeshaAduri, Jayasree Rapa (NOV 13)**

Experimental results have shown that the proposed face recognition method was very sensitive to face background and head orientations. Changes in the illumination did not cause a major problem to the system. Besides, the presence of small detail such as dark glasses or masks was too far from being a real challenge to the system. There exists a trade-off between the correct recognition rate and the threshold value. As the threshold value increases, numbers of misses begin to decrease, possibly resulting in misclassifications. On the contrary, when the number of eigenfaces involved in the recognition process increases, misclassification rate begins to decrease, possibly resulting in misses.

**E. Khem Puthea, Rudy Hartanto and Risanuri Hidayat (JAN 2019)**

The attendance maintaining system is a difficult process if it is done manually. The smart and automated attendance system for managing the attendance can be implemented using the various ways of biometrics. Face recognition is one of them. By using this system, the issue of fake attendance and proxies can be solved. In the previous face recognition-based attendance system, there were some disadvantages like intensity of light problem and head pose problem. In this project, Dominant Rotated Local Binary Pattern is used.

**Table 1**. Summary of the referred systems

| NO | TITLE | Authors | Methodology used | Accuracy | Year Published |
|---|---|---|---|---|---|
| 1 | Face Recognition based Attendance System | Dhanush Gowda H.L, K Vishal, Keertiraj B. R, Neha Kumari Dubey, Pooja M. R. | Histogram of oriented gradient method is used to detect faces in images and deep learning method is used to compute and compare feature facials. | 84% | 2019 |
| 2 | Attendance Monitoring Using Face Recognition with Message Alert | Nandhini R, Duraimurugan N, S.P.Chokkalingam | The camera detects and recognizes the persons while they enter the door and then sends their personal | 69% | 2018 |

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|---|---|---|---|---|---|
| | | | information to the host to generate a 3D Facial Model. | | |
| 3 | An Automatic Attendance System Using Image processing | Aziza Ahmedi , Dr Suvarna Nandyal | Face detection techniques such as Ada-boost algorithm to detect the faces in frames/images. | 74.5% | 2015 |
| 4 | Facial Recognition Attendance System Using Python and OpenCv | Dr. V Suresh, Srinivasa Chakravarthi Dumpa, Chiranjeevi Deepak Vankayala, HaneeshaAduri, Jayasree Rapa | Face Recognition using Principal Component Analysis and Eigenfaces for Recognition. | 60% | 2013 |
| 5 | Attendance Marking System based on Face Recognition | Khem Puthea, Rudy Hartanto and Risanuri Hidayat | Multiple user faces are detected and recognized with the database trained multiple texture based notability. | 73% | 2019 |

## III. METHODOLOGY

In this proposed system, the system is initiated by user signals to a Tkinter Module. After the trigger is initiated the system starts processing the image seen and marks the attendance on the spreadsheet. So, the basic overview of our project is that as the person whose attendance has to be marked comes in front of the HD Camera, his name and Identification flashes on the screen. Following which his attendance is marked on the spreadsheet along with an ID. No. and the time at which the listing is added onto the spreadsheet. So, the first phase of the project is when the student/employee can be seen on the HD Camera. The prerequisites of this phase working is we need to have a HD Camera connected to a screen. The second phase is, after the student/employee comes in front of the HD camera, his name and ID. flashes on the screen connected to the HD Camera. The prerequisites of this phase is that we need to have a database with the images (preferably in jpg or png format ) of the students/employee. After which the actual Python

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modules Face_recognition and OpenCV works and matches the database with the face currently in front of the camera and identifies him based on multiple features.

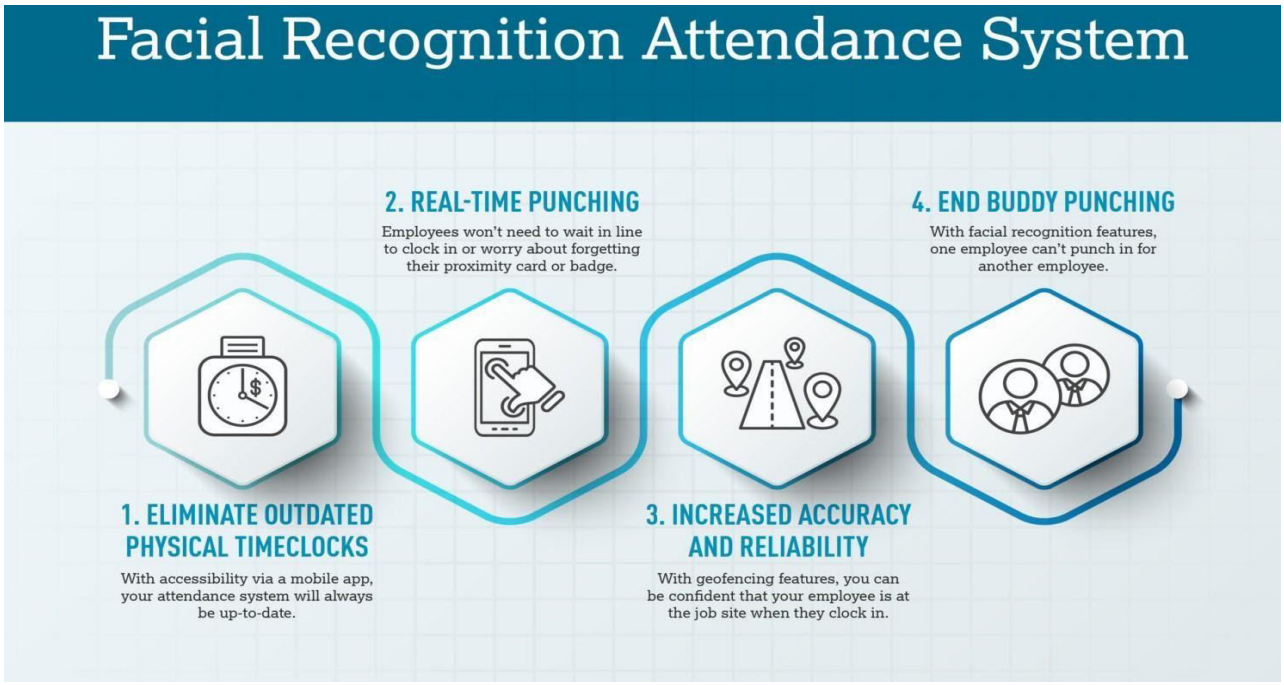


figure 2. Advantage

The third and the final phase of the system is when the proposed system actually marks the attendance onto the spreadsheet. The prerequisites of this phase is that we have already done phase two and we have recognized a face based on the database provided. So, which means as soon as the face is recognized it automatically enters the name along with the ID. no. of the student/employee onto the attendance spreadsheet along with the time he has marked his attendance at.

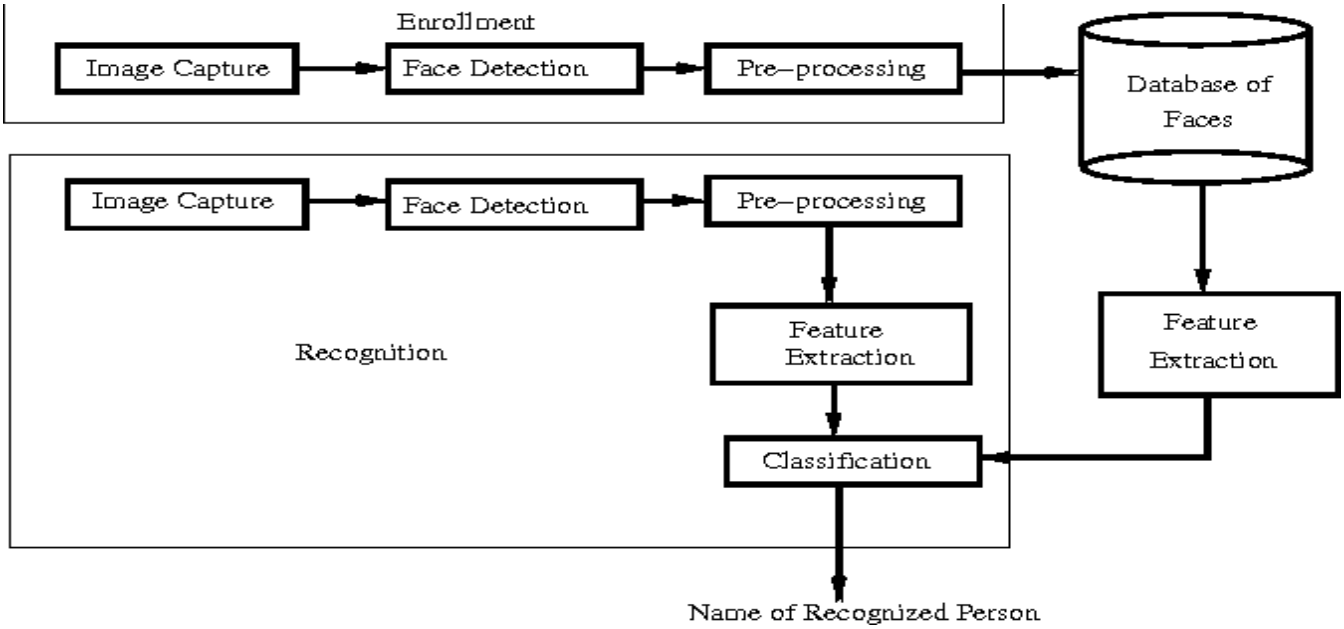


Figure 3. Architecture of the proposed system

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The above illustration, Figure 3 shows the overall architecture of the system in a simplified way, with all the necessary checkpoints and phases.

## IV. ISSUES IN THE PREVIOUS WORK

1. Faster recognition is low due to huge number of training data in system
2. Previous analysis cannot deal with:
   - Faces having wrinkles, beard, spectacles etc.
   - Faces with changes in skin colour.
3. Lack of light in the cameras surrounding. and similar problems
4. Some of the systems are highly sensitive to pose variations.
5. The training data of some systems show that the module can get confused between two similar face structures which can cause some irregularities/ inappropriate behaviour in the system.
6. In some of the systems due to lack of training data, unexplained irregularities such as display of wrong information etc. has occurred.

## V. PLAN OF ACTION

Keeping in mind of the issues surveyed by comparatively analysing through the papers studied in detail, we have chosen in our current work to overcome the following issues:

1. Currently, the system has reached the accuracy level up to 75% for the current training data. It can further be improved to obtain higher accuracy levels and faster recognition.
2. We are planning to make the system even more user friendly by making changes in the UI and make it easier to use as it is made for the use of supervisors, faculty, etc.
3. We also plan to train more data, to make sure that the errors are at a minimum.
4. We are also planning to develop a detailed report so that it could be easier to understand by students, teachers or employees.
5. We are planning to notify the individual via a mail about the attendance marked/reminding the individual.

## VI. CONCLUSION

After analysing various methods, this paper can achieve the goal of analysing each method such as overall system capacity, throughput as well as accuracy. Facial Recognition based attendance management system is designed to solve the issues of existing manual and monotonous systems. We have used face recognition concepts to mark the attendance of students and make the existing system even better. The proposed system will be able to mark the attendance via face ID. It will detect faces through the webcam and then recognize the faces. After recognition, it will mark the attendance of the recognized student and update the attendance record in database.

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