

# Face Recognition based Attendance System

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**Abstract:-** This article presents the creation of a system that utilises face recognition technology for attendance marking purposes in various settings.

While face recognition has the least accuracy in comparison to the other biometric methods such as fingerprint or iris identification, its non-invasive and contactless approach makes it a popular choice. This system aims to address the inefficiencies of traditional manual attendance systems that are time-consuming and prone to errors such as proxy attendance. It has four phases: Creating the database, detecting the face, recognition of it and bringing the attendance up to date. Database is made using pictures of the people in the class. detection of face and recognition are done by using the Facial Recognition python library which is very efficient and effective. The available system looks and recognises faces from video streaming live feeds of the classroom, and records of attendance are automatically forwarded to the available respective faculty members of the institute at the end of each particular session via mail.

**Keywords:-** Face Recognition; Face Detection; Classifier; Attendance System; Recognition Libraries.

## I. INTRODUCTION

The normal approach to marking attendance is often seen as a tiresome and time-consuming task in educational institutions. The process of physically calling out each of the names of the students can take a significant amount of time in the session, putting an additional responsibility on staff. Furthermore, there is a possibility of proxy attendance, adding to the inefficiencies of this approach. As a result, many educational institutions have turned to other methods of attendance tracking, such as Radio Frequency Identification (RFID), iris recognition, and fingerprint recognition. But, these methods can be single-file based, which may increase the time consumed.

In contrast, face recognition provides an easily acquirable and non-intrusive solution that can detect faces regardless of various facial expressions. Face recognition systems can be divided into these categories: facial identification and verification. Verification is a 1:1 matching process that matches a face image against a template face image, while identification is a one to many matching process that matches a fed face image to multiple template images.

The aim of this software is to develop an attendance system that uses facial recognition technology. The face of each person will be used to mark attendance, as facial recognition has become increasingly popular and widespread. We made a system that is able to detect the facial features of people from a live feed of the lecture hall and marks attendance if the faces are recognised by the software.

## II. LITERATURE SURVEY

The authors presented an automated attendance system that utilises both face recognition and Radio Frequency Identification (RFID) technology to detect and count authorised personnel as they come in and out of the hall. The system keeps an accurate record of registered students and their attendance for each course, providing necessary information as needed.

In their paper [4], the authors made and worked an attendance system which was derived from eye biometrics. Students made to catalogue their unique eye scan, which was used to directly capture their attendance by looking into their eye scan and looking for consistency in the data. The system is non net-based and bit user-friendly.

In their work, a system for recording attendance based on facial recognition was suggested by a group of researchers. The system employs the use of Viola-Jones and Histogram of Oriented Gradients (HOG) features algorithms, in addition to a Support Vector Machine (SVM) classifier, to achieve its purpose. This software was specifically designed to operate in real-time settings and was created through the use of a MATLAB GUI.

The jones-viola algorithm is a prevalent object detection algorithm that relies on a cascade of Python-features and an AdaBoost classifier to detect objects in images. HOG features, on the other hand, are an image descriptor that is popularly used in capturing edge orientation distributions in an image. Lastly, the SVM classifier is a machine learning algorithm that is often implemented in image classification tasks.

A research was done by a group of scholars in [6] to identify the optimal facial recognition algorithm given by Open CV 2.4.8. Two algorithms were compared using the Operating Receiver Characteristics (ROC) curve.

### III. PROPOSED SYSTEM

The proposed system requires all students to register by providing their personal info with images, that should be added in the system's dataset. During each class session, the system will stream video to detect faces and compare them with the images in the dataset. If a match is to be found somewhere, attendance of the student will be given. After the end of every class, the system will make a list of absent candidates and mail it to the respective teacher.

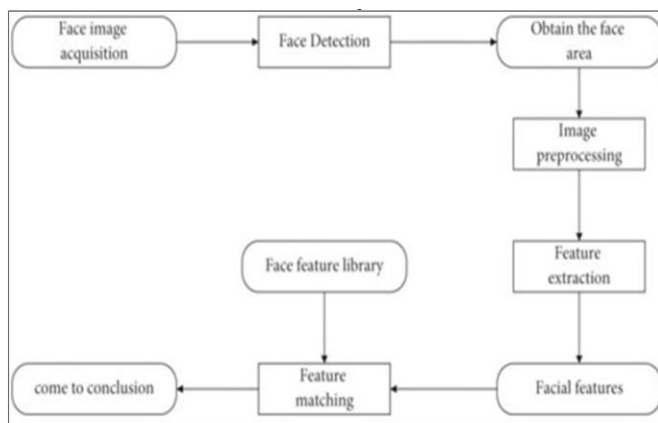


Fig.1. System Architecture

➤ *The Process can be Divided into Four Stages,*

- **Making a Dataset**

The process of creating an automated attendance system can be broken down into four key stages. The first stage involves creating a dataset of student images using a web camera. Multiple images of each student are captured from various angles and gestures. These found images are then processed by editing them to get the desired Region of Interest (ROI), which will beginning us recognition. The cropped images made into pixelated graph, converted from RGB to image grayscale, and saved to the name of the student present in the class.

- **Detection of Face**

In the second stage, the system utilises the face recognition Python library to perform face detection. This cutting-edge AI model is designed to scan and recognise human faces. The library is built on the foundations of deep learning and dlib's advanced face recognition technology. With the help of this technology, the system can accurately detect and recognise faces in the dataset, making it an essential component in the overall attendance system. The face\_recognition python library is been really popular lately due to its high accuracy in detecting and recognising human faces. This library uses deep learning algorithms to analyse and compare facial features, making it highly efficient in detecting even small variations in facial expressions and features. Overall, the face\_recognition library is a powerful tool for face detection and recognition, providing high accuracy and flexibility in a range of applications.

- **Recognition of Face**

Face recognition is a complex system that has several steps. One of the crucial steps is the detection of facial features, such as the nose, eyes, ears, and chin, from the image of a given person. This is done using advanced computer vision techniques, such as the face\_recognition Python library, which is made by using dlib's state of art facial recognition algorithms. The library uses deep learning models to scan and recognise human faces from images, videos, and live streaming feeds. Once the facial features are detected, the library extracts relevant information, such as the location and outline of each feature, to create a facial descriptor or template. The facial template is a unique representation of the person's facial features that can be used for comparison and identification. The template is then compared with the templates of other faces stored in the system to determine if there is a match. If a match is found, the process returns the name and other relevant information of the person associated with the matched template.

- **Attendance Updation**

The last step of the attendance system involves marking the attendance of the students based on their recognised faces. Once the face recognition process is complete, the system will mark the recognised faces as present in the attendance record. The faces that were not recognised shall be given as absent in the attendance form. The attendance record will be stored in an Excel sheet that can be accessed by the respective faculties.

After each month, the process will generate a monthly attendance sheet for each faculty that contains the attendance record of all the students who attended their classes. This will provide the faculties with an overview of the attendance of each student and enable them to take appropriate actions for students who are consistently absent. Additionally, the system will automatically generate a list of absentees for each session and mail it to the respective faculty, ensuring that they are aware of the students who missed their classes.

### IV. RESULTS AND DISCUSSIONS

The proposed system has been designed to offer a user-friendly Graphical User Interface (GUI) it allows users to interconnect with the system. The GUI presents three primary options to the users: student enrolment, faculty enrolment, and attendance updation. When registering as a student, users are required to input all necessary details into the student enrolment form. After pressing on the unroll button, the system activates the webcam automatically and begins detecting faces in the frame. Users will be able to see the live camera feed displayed on the screen, and photos will be captured at least sixty samples have been updated or until the CTRL+Q keys are pressed. All pictures collected will undergo pre-processing before being stored in the training images folder. training pictures folder.

Whereas , teachers are required to login with their given codes for course and emails in the teacher registration desk. This registration is necessacary because the list of absents will be given to the Teachers in the end.

This ensures that the relevant faculties are informed of the attendance status of their students. By providing separate registration forms for students and faculties, the system aims to streamline the registration process and ensure that the necessary information is collected accurately and efficiently.

During each session, the faculty is required to enter their corresponding course code into the system. Once the code of course is submitted, the camera will start functioning directly. Upon completion of the attendance marking process, the faculty can close the window by pressing CTRL+Q. The data records of attendance is put into the system's excel sheet, and the absentee sheet is automatically made and sent by mail to the teacher. This process ensures that the attendance records are accurate and up-to-date, and helps to minimise the possibility of errors or omissions in attendance marking.

Moreover, the system has the capability to generate monthly attendance reports for both students and faculties. These reports can be downloaded in the form of an excel sheet and can be used for further analysis and record-keeping purposes.

For ensuring the security and privacy of data provided, the system employs various encryption techniques. The passwords of the users are stored in hashed format to prevent unauthorised access. Additionally, the system is equipped with a login system to restrict access to authorised users only.

## V. CONCLUSION

This system is designed to create a reliable and efficient method for taking attendance in class using facial recognition technology. By using face ID, the proposed system can accurately and efficiently mark attendance. The system utilises a webcam to detect faces in the classroom and then performs facial recognition on the captured images. Once a face is recognised, the system records attendance of corresponding student and updates record of attendance accordingly. This eliminates the need for manual attendance taking and reduces the possibility of errors. Overall, the use of facial recognition technology in attendance taking has the potential to save time and increase accuracy.

Moreover, the system reduces the workload on faculty members who would otherwise have to manually mark attendance and maintain attendance records. With the use of automated face recognition. Overall, this proposed system provides a reliable and efficient solution for class attendance management, improving accuracy and saving time for both students and teachers.

## REFERENCES

- [1]. D. Z. Ahmad, A. H. Mustapha, and S. A. Abdul Aziz, "Automated system using facial recognition with Raspberry Pi," 2019 IEEE 15th I Colloquium on Signal Processing and Its Applications (CSPA), Penang, . 39-243.//www.researchgate.net/publication/326261079\_Face\_detection\_system\_for\_attendance\_of\_class\_students.
- [2]. Hapani, Smit, et al. "Automated Attendance System Using Image Processing." 2018 Fourth International Conference on Computing Communication Control and Automation (ICCUBEA). IEEE, 2018.
- [3]. Akbar, Md Sajid, et al. "Face Recognition and RFID Verified Attendance System." 2018 International Conference on Computing, Electronics & Communications Engineering (iCCECE). IEEE, 2018.
- [4]. Lukas, Samuel, et al. "Student attendance system in classroom using face recognition technique." 2016 International Conference on Information and Communication Technology Convergence (ICTC). IEEE, 2016.
- [5]. Rathod, Hemantkumar, et al. "Automated attendance system using machine learning approach." 2017 International Conference on Nascent Technologies in Engineering (ICNTE). IEEE, 2017.
- [6]. Siswanto, Adrian Rhesa Septian, Anto Satriyo Nugroho, and Maulahikmah Galinium. "Implementation of face recognition algorithm for biometrics based time attendance system." 2014 International Conference on ICT For Smart Society (ICISS). IEEE, 2014.
- [7]. LR. Patil, A. Nain, and R. Chauhan, "An automated attendance system recognition," 2017 International Conference on Intelligent Computing a Control Systems (ICICCS), Madurai, 2017, pp. 353-1356.ukas,Samuel, "Student attendance system in classroom using.
- [8]. <https://becominghuman.ai/face-detection-using-opencv-with-haar-cascade-classifiers-941dbb25177>