

# Attendance Management System Using Facial Recognition

Anuj Jagtap<sup>1</sup>, Nikhil Nair<sup>2</sup>, Sarang Varma<sup>3</sup>, Sahil Kalgutkar<sup>4</sup>, Prof. Deepti Lawand<sup>5</sup>

<sup>1, 2, 3, 4, 5</sup> Dept of Computer Engineering

<sup>1, 2, 3, 4, 5</sup> Navi Mumbai, India - 410206

**Abstract-** *the attendance management system proposes login for both students and faculty. Student has to register first using his personal information such as name, contact details, Admission number(unique)branch and semester in which he/she is attending lectures . The unique ID(Admission number) which is recorded by students is used by the faculty for identification. The student's facial features are then recorded in the database with the help of a camera . These recorded facial features are then used for allowing students to easily login without any extra credentials . The model will be created using OpenCV. It detects the faces in the image and compares it with the recognized faces in the database.Facial recognition technique for automated attendance management system is implemented by using deep learning. This face of a student is captured and stored in a database and later on compared while giving attendance. This model will be a successful technique to manage the attendance and records of students as faculty will get the names and information of students present in an Microsoft excel sheet too which can be further uploaded directly by faculty wherever necessary.*

**Keywords-** Attendance system, OpenCV, face recognition.

## I. INTRODUCTION

Facial Recognition helps in matching human face that are taken in real time through image or live video feed. This real time image or video frame is then compared with the image stored in the database. Image or video frames are the only input for facial recognition systems. The images in the database and the real time image or video frame are compared with each other using various algorithms which are used for facial recognition. Facial detection algorithms are used to detect a person's face. These detection algorithms detect faces by using specific details about a person's eyes, lips, nose etc.

## II. LITERATURE SURVEY

**A. Real Time Attendance System Using Face Recognition Technique** Authors in [1] proposed a method to automate the attendance system by integrating face recognition technology with open source computer vision (OpenCV) algorithm. This software will facilitate the attendance automaton process and

enable faculties to enquire student's data by just maintaining a log for clock-in and clock-out time.

**B. Face Recognition based Attendance Management System** *International Journal of Engineering Research & Technology* In this paper [2], the authors have included five phases in the following order, Image Acquisition, Image Pre-Processing, Face Detection, Face Recognition, Attendance Management. For image Acquisition this system uses LabVIEW which is a vision development module which is used to set up image acquisition systems and acquire images. The acquired image is passed to vision Assistant, which creates, edits, and runs vision algorithms for image processing. For face

**C. Attendance Management System using Face Recognition, M. Sujatha, International Journal of Innovative Technology and Exploring Engineering** The Author in [3] aims to build a class attendance system which uses the concept of face recognition as existing manual attendance system is time consuming and cumbersome to maintain.This system consists of four phases-database creation, face detection, face recognition, attendance updation. Database is created by the images of the students in class.Face detection and recognition is performed using Haar-Cascade classifier and Local Binary Pattern Histogram algorithm respectively. Faces are detected and recognized from live streaming video of the classroom. Attendance will be mailed to the respective faculty at the end of the session.

**D. Class Attendance Management System Using Face Recognition, Omar Salim, 2018 7th International Conference on Computer and Communication Engineering** Authors in [4] developed an automated attendance system to be used in educational institutions, which can produce more accurate results than the manual attendance sheet. The system is based onRaspberry Pi as the hardware. The system is programmed using both Python for face recognition system and PHP for attendance management system website.The attendance is stored in MySQL Database.Raspberry Pi is chosen for its small size and affordable price. The facial recognition is done by implementing Local Binary Patterns (LBP).BPs algorithm has light sensitivity. Since it deals with the value of each pixel in the original image, these pixels

change their values with different lighting. For the future work, there are some promises to improve and enhance the performance of the system. First, replacing RASPBERRY PI 3 MODEL B with ODROID-XU4 Portable Computer. This Computer has Cortex-A7 Octa core CPUs and 2Gbyte LPDDR 3 RAM which is more advanced than Raspberry Pi 3 hardware. Since the face recognition algorithms are heavy, the performance can be improved rapidly using ODROID-XU4. Second, enhancing the Attendance Management System website by generating automated warning letters for the students who do not attend their classes.

## 2.1 Summary of Related Work

The summary of methods used in literature is given in Table 1.

Table 1 Summary of literature survey

Literature	Harscade	LBP	Eigenf ace
Mayank Srivastava et al. 2020 [1]	Yes	No	Yes
Pavithra S Hegde et al. 2020 [2]	Yes	Yes	No
M. Sujatha et al. 2019 [3]	No	No	Yes
Omar Salim et al. 2018 [4]	No	Yes	No

## III. PROPOSED WORK

Our system is created using the OpenCV module and Django framework. OpenCV is used for the backend of the project which is responsible for face recognition and image processing. Django framework is used as a portal for the users to interact with the system. Our System should have better Confidence Score than Existing System because Existing System used EigenFace Algorithm for Facial Recognition and we are going to use Local Binary Pattern histogram algorithm that has better confidential score and result are invariant in different light condition.

### A. OpenCV

OpenCV [6] is an open source platform or library. It is aimed at real time computer vision. The library is cross platform and it can support various programming languages. Its is mainly used for implementing video detection, motion

detection, video recognition, face recognition or image recognition.

### B. Haar Cascade

Haar Cascade [7] is an algorithm which helps to detect objects in a particular image. For example in our attendance management system it is used to find face (objects) in the real time video frame provided by the student. It uses details such as the dark region below eyes, shape of nose and lips for detection of face.

Haar cascade has 4 number of levels :

Haar feature selection

Creating integral images

Adaboost Training

Cascading Classifiers

### C. Local Binary Patterns Histogram

Local Binary Patterns [8] Histogram algorithm is a widely used algorithm for facial recognition because of its simplicity and accuracy. First an image of  $m \times n$  dimension is divided in equal regions. Then a local binary operator is used for each region and the size of operator window is  $3 \times 3$ . Then a LBP value is calculated. After which the LBP values are used to create a histogram for each region. Then all the histograms are combined to form a single histogram known as feature vector of the image. After then the histogram of test images and database images are compared to find the closest possible histogram.

The four steps involved in LBPH algorithm are:

- creating a dataset
- face acquisition from camera
- extraction of features from captured image
- classification

## IV. SYSTEM ARCHITECTURE

### A. Camera

It is a necessary part for our system as it will mark the attendance using facial recognition. Pictures or the video taken from the same camera should be clear at least faces should be recognisable

### B. Frontend Website

Any frontend Gui is necessary for the interaction of the user. It provides the login/Register feature to give right

Authorization to the user. Our System has two different authorization for teacher and student.

- **Teacher-** Teacher has the Authorization to create the attendance session and view the attendance sheet and download the same in .csv format.
- **Student-** Student has to provide attendance to the system. First the student needs to register himself on the website where he has to provide his real time video frame for future matching of faces. After the signing up is done students can give attendance whenever required. Students have Authorization to upload/update their Real time Image and mark the attendance when the teacher creates the respective attendance session.

Camera module is an interface to initiate the camera and take the real time image when the backend sends the request for the image.

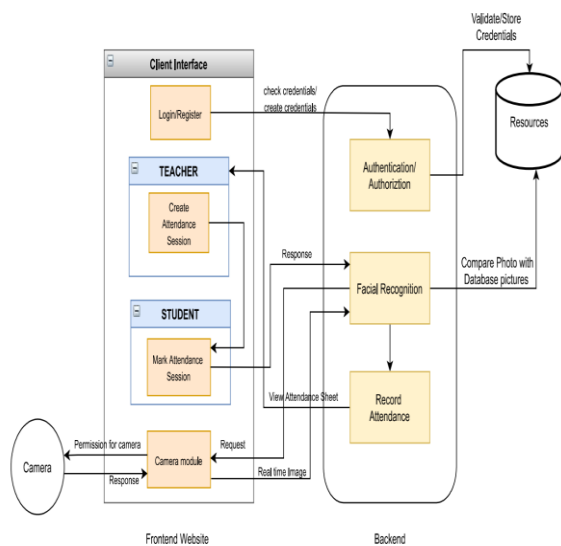


Fig 1: System Architecture

### C. Backend

Backend part checks or creates the credentials of the user when the user login or register and gives the appropriate Authorization. Facial recognition detects the face in real time and compares with the Images in uploaded files and gives the appropriate results. When facial recognition is completed the faces which are matched will be marked at present for the lecture and unmatched faces will be marked as absent. Mark sheets can be viewed when the attendance session is stopped by the respective teacher.

### D. Resources

It mainly has 2 types of storage.

- Database- database stores the information about the user to give correct Authorization to the user.
- File storage-it stores the uploaded real time images of the user for the facial recognition in future.

The steps involved are:

1. First the user has to initiate the camera. Then perform the detection of faces and store it in the folder.
2. Pre-process the captured images by cropping the image to view only the face and converting it into Grayscale image for less Storage space.
3. Recognize the real time image of the student by matching it with the image stored in a database file.
4. After attendance is done update the excel sheet or table in which attendance of all students is stored.

## V. REQUIREMENT ANALYSIS

The implementation detail is given in this section.

### 5.1 Software

Any Operating System that supports web browsing can be used. Also any browser is compatible.

### 5.2 Hardware

The first step of this algorithm is to convert the input image into an integral image. This is done by camera.

Attendance page can be accessed using any computer or laptop with an active internet connection.

### 5.3 Dataset and Parameters

Any dataset provided by any institution or college can be used. Parameters such as size of nose, eyes, lips of the face to be recognized are used. These parameters are converted into matrices for further evaluation.

## VI. APPLICATIONS

There are various applications of this domain system. The application is listed here.

**6.1 Attendance Management System:** The ideal attendance management system in schools and colleges can be replaced

with the use of facial recognition. This can be applicable for both online and offline use. For online use, students need to get their own system with a working camera to have their faces recognized through which their attendance is marked and for offline use, a common system needs to be placed in each class where the students can get their faces recognized through which their attendance is marked.

**6.2 Face Identification:** Face identification is used widely by government agencies or private organizations to identify a person. Their faces are matched with their images in official documents. This is widely used to find missing people or find criminals by the police or government agencies.

**6.3 Access Control:** Access control is used mainly in offices, labs or banks where only a particular personnel are allowed in a certain room or facility. Only people whose faces are stored in the system already will be able to access the room or facility. This provides extreme security and high accuracy.

## VII. ACKNOWLEDGEMENT

We would like to express our special thanks to Prof. Deepti Lawand our project guide who guided us through the project and who helped us in applying the knowledge that we have acquired during the semester and learning new concepts. We would like to express our special thanks to Dr. Sharvari Govilkar the H.O.D of our Computer Engineering department who gave us the opportunity to do this project because of which we learned new concepts and their application. And finally we would like to express our special thanks to Principal Dr. Sandeep Joshi who gave us the opportunity to do this project on the Attendance Management System using Facial Recognition.

## REFERENCES

- [1] Real Time Attendance System Using Face Recognition Technique, *Mayank Srivastava*, GLA University India. Feb 28-29, 2020.
- [2] Attendance Management System using Face Recognition, *M. Sujatha*, IIJTEE: October, 2019.
- [3] Automated Student Attendance Management System Using Face Recognition, *Ofualagba Godswill*, Nigeria :September, 2018.
- [4] 7th ICCCE Class Attendance Management System Using Face Recognition, *Omar Salim*, Malaysia : November 2018
- [5] Face Recognition for Attendance System Detection, *Rudy Hartanto*, Indonesia November 2018

- [6] [https://www.tutorialspoint.com/opencv/opencv\\_overview.htm#:~:text=OpenCV%20is%20a%20cross%2Dplatform,face%20detection%20and%20object%20detection..](https://www.tutorialspoint.com/opencv/opencv_overview.htm#:~:text=OpenCV%20is%20a%20cross%2Dplatform,face%20detection%20and%20object%20detection..)
- [7] [https://docs.opencv.org/3.4/db/d28/tutorial\\_cascade\\_classifier.html](https://docs.opencv.org/3.4/db/d28/tutorial_cascade_classifier.html)
- [8] <https://towardsdatascience.com/face-recognition-how-lbph-works-90ec258c3d6b>