

# **Advance Face Recognition Attendance System**

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Abstract— In this digital era, face recognition system plays a vital role in almost every sector. Face recognition is one of the mostly used biometrics. It can used for security, authentication, identification, and has got many more advantages. Despite of having low accuracy when compared to iris recognition and fingerprint recognition, it is being widely used due to its contactless and non-invasive process. Furthermore, face recognition system can also be used for attendance marking in schools, colleges, offices, etc. This system 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. And there may be chances of proxy attendance. Thus, the need for this system increases. This system consists of four phasesdatabase 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.

Keywords—Face Recognition; Face Detection; Haar-Cascade;

Opency :library are used in face recognition system.

## I. INTRODUCTION

Organizations of all sizes use attendance systems to record when student or employees start and stop work, and the department where the work is performed. Some organizations also keep detailed records of attendance issues such as who calls in sick and who comes in late. An attendance system provides many benefits to organizations. There was a time when the attendance of the students and employees was marked on registers. However, those who have been a part of the classes when attendance registers were used know how easy it was to abuse such a method of attendance and mark bogus attendances for each other. Of course, technology had to play its role in this field just as well as it has done in other fields. The attendance monitoring system was created and it changed the way attendances were marked.

The attendance monitoring system has made the lives of teachers and employers easier by making attendance marking procedure a piece of cake When it comes to schools and universities, the attendance monitoring system is a great help for parents and teachers both. Parents are never uninformed of the dependability of their children in the class if the university is using an attendance monitoring system. The registers could easily be exploited by students and if information was mailed to the parents, there were high chances that mails could be made to disappear before parents even saw them. With the monitoring system in place, the information can easily be printed or a soft copy can be sent directly to parents in their personal email accounts. The system started with two basic processes - Manual processes and Automatic processes. Manual processes are eliminated as the staff needed to maintain them. It is often difficult to comply with regulation, but an automated attendance system is valuable for ensuring compliance with regulations regarding proof of attendance.

Face recognition has set an important biometric feature, which can be easily acquirable and is non-intrusive. Face recognition based systems are relatively oblivious to various facial expression. Face recognition system consists of two categories: verification and face identification. Face verification is an 1:1 matching process, it compares face image against the template face images and whereas is an 1:N problems that compares a

query face images.

The purpose of this system is to build a attendance system which is based on face recognition techniques. Here face of an individual will be considered for marking attendance. Nowadays, face recognition is gaining more popularity and has been widely used. In this paper, we proposed a system which detects the faces of students from live streaming video of classroom and attendance will be marked if the detected face is found in the database. This new system will consume less time than compared to traditional methods.

# II. LITERATURE SURVEY

Authors in proposed a model of an automated attendance system. The model focuses on how face recognition incorporated with Radio Frequency Identification (RFID) detect the authorized students and counts as they get in and get out form the classroom. The system keeps the authentic record of every registered student. The system also keeps the data of every student registered for a particular course in the attendance log and provides necessary information according to the need.

In this paper, authors have designed and implemented an attendance system which uses iris biometrics. Initially, the attendees were asked to register their details along with their unique iris template. At the time of attendance, the system automatically took class attendance by capturing the eye image of each attendee, recognizing their iris, and searching for a match in the created database. The prototype was web based.

Authors proposed an attendance system based on facial recognition. The algorithms like

# Face Detection using Cascade Classifier using OpenCV – Python:

Face detection is a important task in computer vision and Haar Cascade classifiers play an important role in making this process fast and efficient. Haar Cascades are used for detecting faces and other objects by training a classifier on positive and negative

images.

1. Positive Images: These images contain the objects

that the classifier is trained to detect.

2. Negative Images: These images contain everything

else which do not contain the object we want to detect.

In this article, we will learn how to perform face detection using Haar Cascades classifier for detecting faces and

eyes using OpenCV.

Face Detection using Cascade Classifier Implementation

We will go through the step-by-step procedure to implement object detection using Haar Cascades.

1. Importing required Libraries

Here, we will use<u>Numpy,OpenCV</u>.

Import cv2

import numpy as np

2.Loading Haar Cascade Classifiers:

Next we will load the pre-trained Haar Cascade classifiers for detecting faces and eyes.

face\_cascade

cv2.CascadeClassifier("haarcascade\_frontalface\_default.xml")
eye\_cascade = cv2.CascadeClassifier('haarcascade\_eye.xml')

3. Creating Function to Detect Faces

Now we'll create a function adjusted\_detect\_face() to detect faces in an image. This function uses the face cascade classifier to identify face rectangles and draws rectangles around the detected faces.

4. Creating Function to Detect Eyes

Similarly we create a function detect\_eyes() to detect eyes using the eye cascade classifier. def detect\_eyes(img): eye\_img = img.copy()

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eye\_rect = eye\_cascade.detectMultiScale(eye\_img, scaleFactor=1.2, minNeighbors=5) for (x, y, w, h) in eye\_rect: cv2.rectangle(eye\_img, (x, y), (x + w, y + h), (255, 255, 255), 10 return eye\_img

5. Loading a Image

Now let's load an image and apply both face and eye detection on it.

img\_copy2 = img.copy()

img\_copy3 = img.copy()
imshow(cv2.cvtColor(img, cv2.COLOR\_BGR2RGB))

Authors in researches to get best facial recognition algorithm (LBPH) provided by the Open CV 2.4.8 then implemented it in the attendance system. Based on the experiments carried out in this paper. System implemented using LBPH(Local Binary Pattern Histogram) algorithm achieved an accuracy rate of 70% to 90%.

In authors proposed a method for student attendance system in classroom using face recognition technique by LBPH. These algorithms were used to extract the features of student's face. This system achieved an accuracy rate of 82%.

#### III. PROPOSED SYSTEM

All the students of the class must register themselves by entering the required details and then their images will be captured and stored in the dataset. During each session, faces will be detected from live streaming video of classroom. The faces detected will be compared with images present in the dataset. If match found, attendance will be marked for the respective student. The system architecture of the proposed system is given below,



def adjusted\_detect\_face(img):

face\_img = img.copy()

face\_rect = face\_cascade.detectMultiScale(face\_img, scaleFactor=1.2, minNeighbors=5) for (x, y, w, h) in face\_rect: cv2.rectangle(face\_img, (x, y), (x + w, y + h), (255, 255, 255), 10) return face\_img

Fig.1. System Architecture

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Typically this process can be divided into four stages,

### 1. Dataset Creation

Images of students are captured using a web cam. Multiple images of single student will be acquired with varied gestures and angles. These images undergo pre-processing. The images are cropped to obtain the Region of Interest (ROI) which will be further used in recognition

process. Next step is to resize the cropped images to particular pixel position. Then these images will be converted from RGB to gray scale images. And then these images will be saved as the names of respective student in a folder.

#### 2. Face Detection

Face detection here is performed using Haar-Cascade Classifier with OpenCV. Haar Cascade algorithm needs to be trained to detect human faces before it can be used for face detection.

This is called feature extraction. The haar cascade training data used is an xml file- haarcascade\_frontalface\_default. The haar

features shown in Fig.2. will be used for feature extraction.



Fig.2. Haar Features

Here we are using detectMultiScale module from OpenCV. This

#### IV. RESULTS AND DISCUSSIONS

The users can interact with the system using a GUI. Here users will be mainly provided with three different options such as, student registration, face detector, train data, open photos, attendance and exit. The students are supposed to enter all the required details in the student registration form. After clicking on register button, the web cam starts automatically and window as shown in Fig.3. pops up and starts detecting the faces in the frame. Then it automatically starts clicking photos until 100 samples are collected or ENTER is pressed. These images then will be pre-processed and stored in training images folder.



Fig.3. Face Detection

is required to create a rectangle around the faces in an image. It has got three parameters to consider- scaleFactor, minNeighbors, minSize. scaleFactor is used to indicate how much an image must be reduced in each image scale. minNeighbors specifies how many neighbors each candidate rectangle must

have. Higher values usually detects less faces but detects high quality in image. minSize specifies the minimum object size. By default it is (30,30). The parameters used in this system is scaleFactor and minNeighbors with the values 1.3 and 5 respectively.

#### 3. Face Recognition

Face recognition process can be divided into three steps- prepare training data, train face recognizer, prediction. Here training data will be the images present in the dataset. They will be assigned with a integer label of the student it belongs to. These images are then used for face recognition. Face recognizer used in this system is Local Binary Pattern Histogram. Initially, the list of local binary patterns (LBP) of entire face is obtained. These LBPs are converted into decimal number and then histograms of all those decimal values are made. At the end, one histogram will be formed for each images in the training data. Later, during recognition process histogram of the face to be recognized is calculated and then compared with the already computed histograms and returns the best matched label associated with the student.

#### 4. Attendance Updation

After face recognition process, the recognized faces will be marked as present in the excel sheet and the rest will be marked as absent. Faculties will be update with monthly attendance sheet

at the end of every month.

In every session, The Fig.3. shows the face recognition window where registered students are recognized and if in case they were not registered it would have shown 'unknown'. By pressing ENTER, the window will be closed and attendance will be updated in the excel sheet.

The Fig.4. shows the attendance sheet updated after recognition process. Recognized students are marked as 'Present' and absent students are marked as 'Absent'.

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Fig.4. Attendance sheet

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## V. FUTURE SCOPE

For security reasons, we can use detection & recognition system. To identify culprits on bus stations, railway stations, other public places, we can use this system. This will be helping hand to the police. In this system, we will use GSM module. Suppose if culprit is detected, then detected signal can be transmitted using GSM module to the central control room of police station. With the help of ISDN number of GSM, culprit surviving area will be recognized.

### VI.CONCLUSION

This system aims to build an effective class attendance system using face recognition techniques. The proposed system will be able to mark the attendance via face Id. It will detect faces via webcam and then recognize the faces. After recognition, it will mark the attendance of the recognized student and update the attendance record.

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