

# Face recognition Attendance System Using Face Recognition Technique

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## **ABSTRACT :**

**The main purpose of this project is to build a human face recognition for an institute or organization to mark the attendance of their students or employees. It is a subdomain of Object Detection, where we try to observe the instance of semantic objects. This system is fully automated and easily deployable.**

**Index : Automated, Face Detection, Face Recognition, Voila and Jones Algorithm, Correlation, Attendance.**

## **I. INTRODUCTION :**

The applications of this sub-domain of computer vision are vast and businesses around the world are already reaping the benefits. The usage of face recognition models is only going to increase in the next few years Face recognition is as old as computer vision, both because of the practical importance of the topic and theoretical interest from cognitive scientists. Despite the fact that other methods of identification (such as fingerprints, or iris scans) can be more accurate, face recognition has always remains a major focus of research because of its noninvasive nature and because it is people's primary method of person identification. Face recognition technology is gradually evolving to a universal biometric solution since it requires virtually zero effort from the user end while compared with other biometric options. Biometric face recognition is basically used in three main domains: time attendance systems and employee management; visitor

management systems; and last but not the least of the authorization systems and access control systems. Traditionally, student's attendances are taken manually by using attendance sheet given by the faculty members in class, which is a time consuming event. Moreover, it is very difficult to verify one by one student in a large classroom environment with distributed branches whether the authenticated students are actually responding or not.

## **II. PROPOSED SYSTEM ARCHITECTURE :**

### **A. Application layer :**

Face detection is used in biometrics, often as a part of (or together with) a facial recognition system. It is also used in video surveillance, human computer interface and image database management. There is the capturing phase in this the user captures the frames and using a web app that runs on almost all platforms upload the file to the server. Authentication is provided to the users. This web app is used to

upload captured frames as well as to view the attendance.

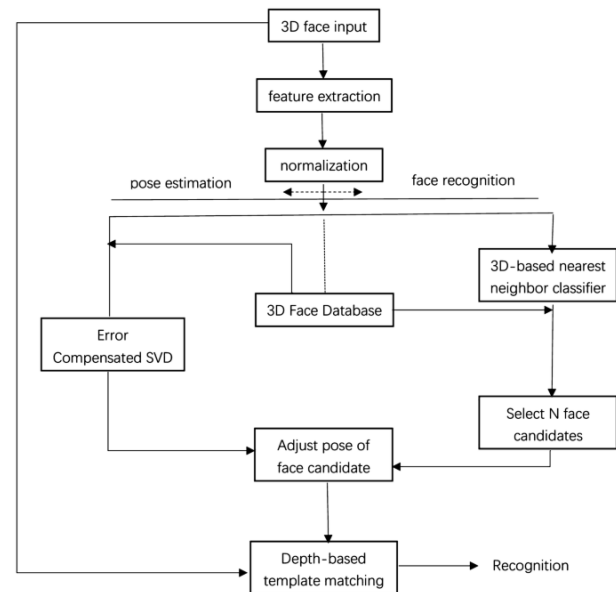
### **B. System layer :**

This is the layer where the processing is done that is the detection and recognition part at the server side. Viola and Jones algorithm is used to detect images from the frames. Initially an integral image is generated from the frame which simply assigns numbers to the pixels generated by summing up the values. Further to detect the objects from the frames the Haar-like feature is generated and as millions of features being generated Adaboost (boosting algorithm) is used to enhance the performance. The extracted features are passed through a trained classifier which detects the faces from the objects. These detected faces are cropped and passed through the recognition module which by applying correlation to the cropped images and the images in the databases recognizes the faces.

### **III. AND JONES ALGORITHM :**

The Viola-Jones algorithm first detects the face on the grayscale image and then finds the location on the colored image. Viola-Jones outlines a box (as you can see on the right) and searches for a face within the box. It is essentially searching for these haar-like features, which will be explained later.

### **CONCEPTUAL DIAGRAM**



### **IV. Eigenface :**

Eigenface is based on PCA that classify images to extract features using a set of images. It is important that the images are in the same lighting condition and the eyes match in each image. Also, images used in this method must contain the same number of pixels and in grayscale. For this example, consider an image with  $n \times n$  pixels as shown in figure 4. Each row is concatenated to create a vector,

resulting a  $1 \times n$  matrix. All the images in the dataset are stored in a single matrix resulting a matrix with columns corresponding the number of images. The matrix is averaged (normalised) to get an average human face. By subtracting the average face from each image vector unique features to each face are computed. In the resulting matrix, each column is a representation of the difference each face has to the average human face.

### **V. Cascade Training:**

After the initial algorithm, it was understood that training the cascade as a whole can be optimized, to achieve a desired true detection rate with minimal complexity. Examples of such algorithms are RCBoost, ECBoost or RCECBoost. This can be used for rapid object detection of more specific targets, including non-human

objects with Haar-like features. The process requires two sets of samples: negative and positive, where the negative samples correspond to arbitrary non-object images. The time constraint in training a cascade classifier can be circumvented using cloud-computing methods.

#### **VI. Cascade Detection:**

After dealing with training We have to take the face and also detect them. Cascade classifiers are available in OpenCV, with pre-trained cascades for frontal faces and upper body. When we add eye detect classifier(haarcascade\_eye.xml) then it detects the eye also.

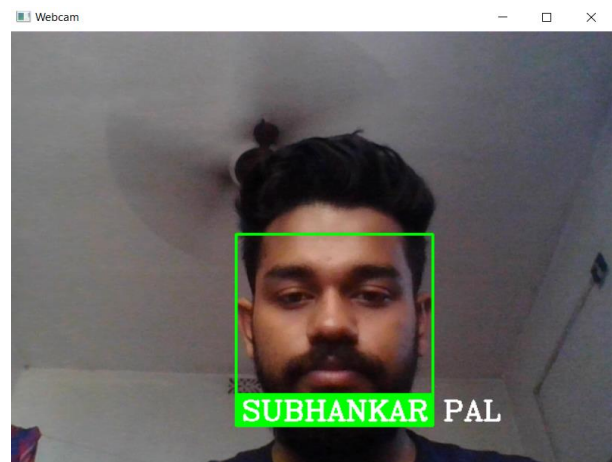
#### **VII. Tool Kits: Matplotlib:**

Matplotlib is a python 2D plotting library which produces publication quality figures in a variety of hard copy formats and interactive environments across platforms. Matplotlib can be used in Python scripts. Numpy: Numpy is a library for the Python Programming language, adding support for large multi-dimensional matrices and array, along with a large collection of high level mathematical function to operate on these arrays. It's a numerical python module.

#### **VIII OpenCV :**

OpenCV-Python is a library of Python bindings designed to solve computer vision problems. Python is a general purpose programming language started by Guido van Rossum that became very popular very quickly, mainly because of its simplicity and code readability. For open cv now the coding for the facial recognition is easier than ever in open cv there are three easy steps for the coding of facial recognition. That is similar to the how us brain used to recognize the face. Data Gathering: gather the facial data by useful algorithms. Train the recognizer: feed the facial data and unique id so that the recognizer can detect. Recognition: take the new faces and test it how recognizer can recognize the face or not.

#### **IX. OUTPUT :**



#### **X. CONCLUSION :**

In order to obtain the attendance of individual and to record their time of entry and exit, the authors proposed the attendance management system based on face recognition technology in the institutions/organizations. The system takes attendance of each student by continuous observation at the entry and exit points. The result of our preliminary experiment shows improved performance in the estimation of the attendance compared to the traditional black and white attendance systems. Current work is focused on the face detection algorithms from images or video frames.

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