

REAL TIME FACE RECOGNITION AUTOMATIC STUDENTS ATTENDANCE MANAGEMENT

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ABSTRACT

Within the time of quick adoption of cutting edge innovation, there's no reason why vital exercises within the field of instruction, such as participation and participation, ought to be exhausted the ancient, boring and conventional way.

Attendance following framework spares a part of time and vitality for understudies and classroom instructors. Participation is followed by a facial acknowledgment calculation by distinguishing as it were the student's confront from other objects and checking them as participants. When the framework sends the data, an calculation identifies who is show and compares the components with already put away pictures within the database. Faces are one of the least demanding ways to recognize other people's individual data. Confront acknowledgment could be a individual distinguishing proof framework that employments individual characteristics of individuals to recognize a individual. The human confront acknowledgment prepare essentially comprises of two steps. One is confront acknowledgment, and this prepare is exceptionally quick for people but when the question is at a near separate. Another is the premise that recognizes faces as individuals. The scope of this extend is confront acknowledgment framework utilizing confront acknowledgment, picture preparing. The program required for this extend is Visual Studio Code.

Keywords—*Face Recognition, Face Detection, PCA, Haar Cascade, LBPH Algorithm.*

INTRODUCTION

The reason of the participation checking framework utilizing confront acknowledgment is to ease the participation prepare which expends parcel of time and endeavors, it could be a helpful and simple way for understudies and educator. The framework will capture the pictures of the understudies and using face acknowledgment calculation check the participation within the sheet. This way the class-teacher will get their participation checked without really investing time in conventional participation checking.

The recognizable proof prepare to decide the nearness of a individual in a room or building is right now one of the schedule security exercises. Each individual who will enter a room or building must go through a few verification forms to begin with, that later these information's can be utilized to screen each single activity within the room for a security reason. Confirmation

prepare that's being utilized to recognize the nearness of a person in a room or building still shift. The method changes from composing a title and marks within the participation list, utilizing an character card, or utilizing biometric strategies confirmation as unique mark or confront scanner.

1.1 Confront RECOGNIZATION:

DIFFERENT APPROACHES OF Confront Acknowledgment:

There are two overwhelming approaches to the confront acknowledgment issue: Geometric (include based) and photometric (see based). As analyst intrigued in confront acknowledgment proceeded, numerous distinctive calculations were created, three of which have been well examined in confront acknowledgment writing.

Recognition calculations can be isolated into two fundamental approaches:

- 1. Geometric:** Is based on geometrical relationship between facial points of interest, or in other words the spatial setup of facial highlights. Meaning that the most geometrical highlights of the confront such as the eyes, nose and mouth are to begin with found and after that faces are classified on the premise of different geometrical separations and points between features.
- 2. Photometric stereo:** Utilized to recuperate the shape of an protest from a number of pictures taken beneath diverse lighting conditions. The shape of the recuperated protest is characterized by a slope outline, which is made up of an cluster of surface normals.

Popular acknowledgment calculations include:

- 1.Principal Component Investigation utilizing Eigen faces, (PCA)
- 2.Linear Separate Examination,
- 3.Elastic Bunch Chart Coordinating utilizing the Fisher face calculation,

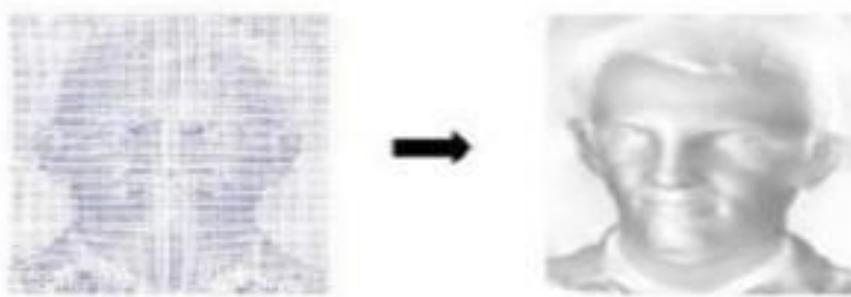


Fig 1. Photometric stereo image

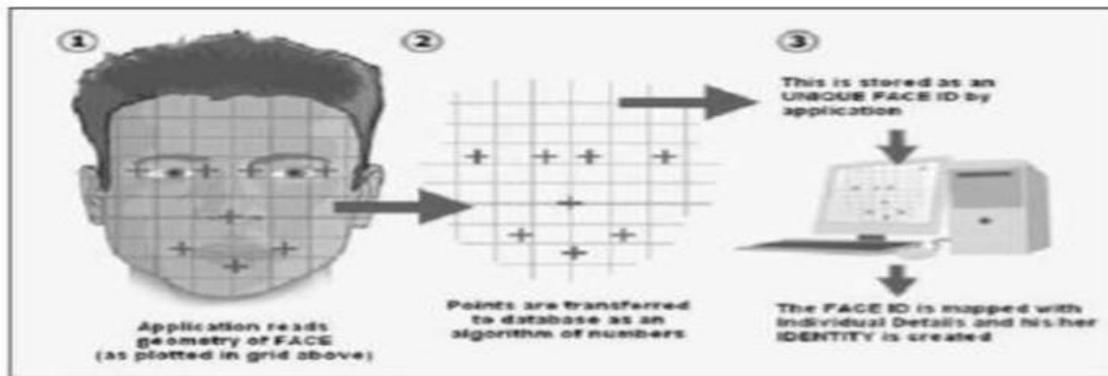


Fig 2. Geometric facial recognition

1.2 Confront Discovery:

Confront discovery includes isolating picture windows into two classes; one containing faces (tarning the foundation (clutter). It is troublesome since in spite of the fact that commonalities exist between faces, they can change significantly in terms of age, skin colour and facial expression. The issue is encourage complicated by varying lighting conditions, picture qualities and geometries, as well as the plausibility of halfway impediment and camouflage. An perfect confront finder would hence be able to distinguish the nearness of any confront beneath any set of lighting conditions, upon any foundation. The confront discovery assignment can be broken down into two steps. The primary step could be a classification errand that takes a few self- assertive picture as input and yields a twofold esteem of yes or no, demonstrating whether there are any faces show within the picture. The moment step is the confront localization errand that points to require an picture as input and yield the area of any confront or faces inside that picture as a few bounding box with (x, y, width, stature).

The confront discovery framework can be partitioned into the taking after steps:-

- 1. Pre-Processing:** To diminish the variability within the faces, the pictures are prepared some time recently they are nourished into the arrange. All positive illustrations that's the confront pictures are gotten by trimming pictures with frontal faces to incorporate as it were the front see. All the trimmed pictures are at that point redressed for lighting through standard calculations.
- 2. Classification:** Neural systems are executed to classify the pictures as faces or non faces by preparing on these cases. We utilize both our usage of the neural organize and the Matlab neural organize tool stash for this assignment. Diverse arrange setups are tested with to optimize the comes about.

3. Localization: The prepared neural organize is at that point utilized to hunt for faces in an picture and in the event that show localize them in a bounding box. Different Highlight of Confront on which the work has done on:- Position Scale Orientation Illumination.

1.3 HAAR CASCADE ALGORITHM

The core basis for Haar classifier object detection is the Haar-like features. These features, rather than using the intensity values of a pixel, use the change in contrast values between adjacent rectangular groups of pixels. The contrast variances between the pixel groups are used to determine relative light and dark areas. Two or three adjacent groups with a relative contrast variance form a Haar-like feature. Haar-like features as shown in figure are used to detect an image. Haar features can easily be scaled by increasing or decreasing the size of the pixel group being examined. This allows features to be used to detect objects of various sizes. The cascading of the classifiers allows only the sub-images with the highest probability to be analyzed for all Haar-features that distinguish an object. It also allows one to vary the accuracy of a classifier.

One can increase both the false alarm rate and positive hit rate by decreasing the number of stages. The inverse of this is also true. Viola and Jones were able to achieve a 90% accuracy rate for the detection of a human face using only 100 simple features. Detecting human facial features, such as the mouth, eyes, and nose require that Haar classifier cascades first are trained. In order to train the classifiers, this gentle AdaBoost algorithm and Haar feature algorithms must be implemented. Fortunately, Intel developed an open source library devoted to easing the implementation of computer vision related programs called Open Computer Vision Library (OpenCV). The OpenCV library is designed to be used in conjunction with applications that pertain to the field of HCI, robotics, biometrics, image processing, and other areas where visualization is important and includes an implementation of Haar classifier detection and training. Thus with help of this algorithm system will detect the person's face in the video. Face of the person gets Green Square as an indication of detection process. As soon as the face gets detected user can paused the video and enters the data of detected person such as person's name, address, profession, criminal record if any. If the detected person has criminal record then it can be defined as suspect. Check box option is given in the system where user can tick whether the person is suspect on not. This is the working of first module in which sample video is browsed and face is detected.

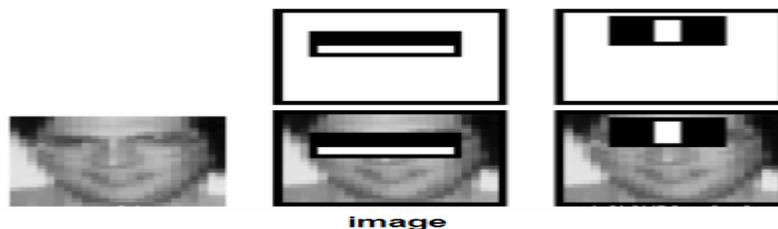


Fig 3. Haar Features

1.4 Local Binary Pattern Histogram (LBPH):

1.4.1 Introduction to LBPH algorithm

Local Binary Pattern (LBP) is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighborhood of each pixel and considers the result as a binary number.

The first computational step of the LBPH is to create an intermediate image that describes the original image in a better way, by highlighting the facial characteristics. To do so, the algorithm uses a concept of a sliding window, based on the parameters radius and neighbors.

1.4.2 Applying the LBP operation:

The first computational step of the LBPH is to create an intermediate image that describes the original image in a better way, by highlighting the facial characteristics. To do so, the algorithm uses a concept of a sliding window, based on the parameters radius and neighbors.

The image below shows this procedure:

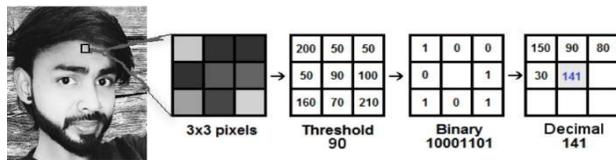


Fig 4. Applying the LBP operation

1.4.3 Performing the face recognition:

- In this step, the algorithm is already trained. Each histogram created is used to represent each image from the training dataset. So, given an input image, we perform the steps again for this new image and creates a histogram which represents the image.
- So to find the image that matches the input image we just need to compare two histograms and return the image with the closest histogram.
- We can use various approaches to compare the histograms (calculate the distance between two histograms), for example: Euclidean distance, chi-square, absolute value, etc. In this example, we can use the Euclidean distance (which is quite known) based on the following formula:

$$D = \sqrt{\sum_{i=1}^n (hist1_i - hist2_i)^2}$$

- So the algorithm output is the ID from the image with the closest histogram. The algorithm should also return the calculated distance, which can be used as a ‘confidence’ measurement. Note: don’t be fooled about the ‘confidence’ name, as lower confidences are better because it means the distance between the two histograms is closer.
- We can then use a threshold and the ‘confidence’ to automatically estimate if the algorithm has correctly recognized the image. We can assume that the algorithm has successfully recognized if the confidence is lower than the threshold defined.

1.4.4 TRAINING THE ALGORITHM:

we need to train the algorithm. To do so, we need to use a dataset with the facial images of the people we want to recognize. We need to also set an ID (it may be a number or the name of the person) for each image, so the algorithm will use this information to recognize an input image and give you an output.

Images of the same person must have the same ID. With the training set already constructed, let’s see the LBPH computational steps.

1.4.5 APPLYING LBH OPERATIONS

The first computational step of the LBPH is to create an intermediate image that describes the original image in a better way, by highlighting the facial characteristics. To do so, the algorithm uses a concept of a sliding window, based on the parameters radius and neighbors.

LITERATURE SURVEY

In[1] 2017 Samuel John displayed a Confront Acknowledgment Participation Framework with GSM Notice. This framework employs the Viola-Jones calculation. This calculation utilized for distinguish faces. Moreover, Fisher faces calculation was utilized to make designs of the faces which were caught. That made layouts put away within the database. This framework utilized library which is OpenCV and utilized Software Development Pack (SDK) to form the graphical client interface.

In[2] other paper, Jenif D Souza presents a Mechanized Participation Checking and Administration Framework by Facial Recognition. This system marked understudies participation consequently by the camera which captures the photo of understudy within the course. This system uses the calculation called Histogram. Histogram calculation utilized for confront identification purpose. In this calculation, The confront image is changed over to framework frame. Histogram are utilized for recognize of the precise faces. This framework overcome the issue of time consuming.

In[3] 2019 Nandhini R. introduced Participation Framework based on confront acknowledgment. This framework capture the video of the students, change over it into outlines and store it within

the database. Also, Convolution Neural Network (CNN) calculation is utilized to identify faces. This Framework makes a difference in moving forward the exactness and speed.

In[4] 2019, Shreyak Sawhney, karan kicker, Samyak jain presented Genuine Time Savvy Participation Administration Framework Using Face Acknowledgment Procedures. In this framework they utilize confront discovery and acknowledgment strategy utilizing convolution Neural Network and Vital Component Investigation (PCA) but utilizing two camera a few camera is utilized for the confront location and recognition at the entryway of classroom and the camera is utilized at interior the classroom for checking intermediary attendance.

In[5] 2016, E Vardharajan, R Dharani, S Jeevitha, S Hemalata presented Programmed Participation Administration Framework Using Face Acknowledgment. In this framework they utilize Eigen Faces, Eigen Weight strategy for confront discovery this framework the camera detention the picture and after that framework trim the faces of student and tie the faces with understudy database.

In[6] 2017, Poornima S, Sripriya N presented Participation Administration Framework utilizing Facial Acknowledgment with Sound Output and Sex Classification. In this framework they utilize Viola Jones calculation and Foremost Component Investigation (PCA) for the face recognition and they too utilize the sex classification and Voice change module. After the face detection and acknowledgment the framework utilize the Microsoft Speech API for declare the truant understudy names this can serve as a cross check.

In[7] 2018, Omkar Abdul Rhmansa Lim presented Lesson Attendance Management Framework Utilizing Confront Acknowledgment. The framework is based on Raspberry Pi. By facing the camera. It will capture the image. The Raspberry Pi is programmed to handle the face recognition by implement in the Binary Patterns algorithm BPs.

In[8] 2018, Kritika Shrivastava, Shweta Manda, Prof. P. S. Chavan introduced Automated Attendance System based on Face Recognition and Gender Classification using Haar-Cascade, LBPH Algorithm along with LDA Model.

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 task of the proposed system is to capture the face of each student and to store it in the database for their attendance. The face of the student needs

to be captured in such a manner that all the feature of the students' face needs to be detected, even the seating and the posture of the student need to be recognized. There is no need for the teacher to manually take attendance in the class because the system records a video and through further processing steps the face is being recognized and the attendance database is updated.

STUDENT:

Register

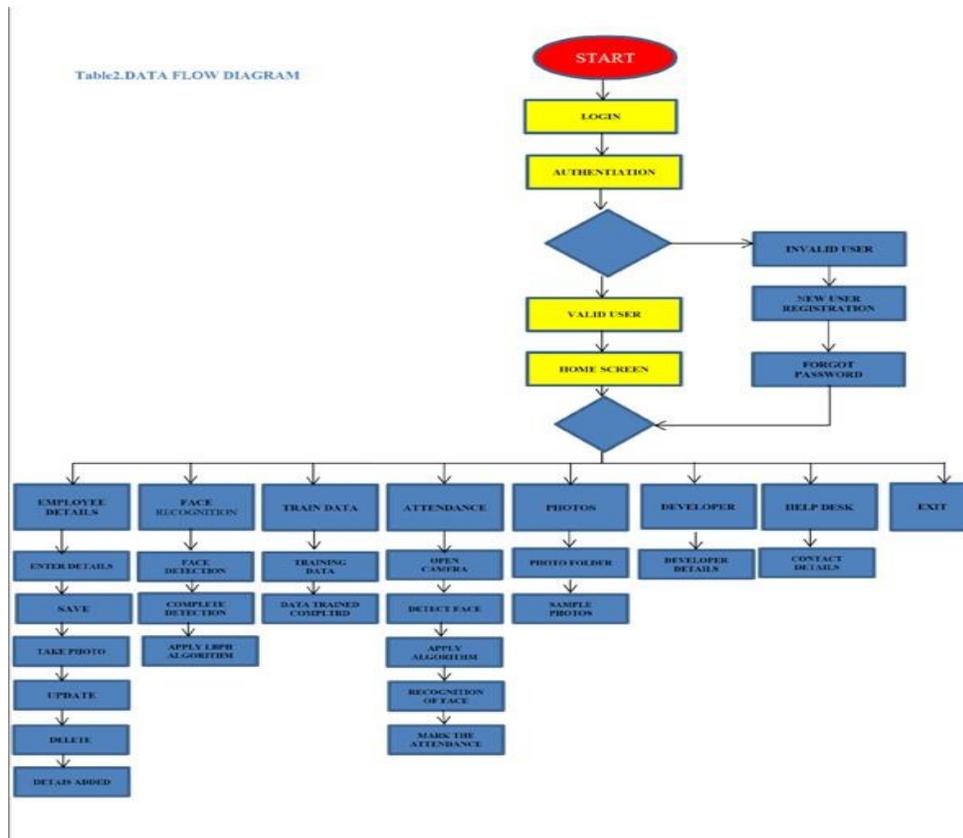
Details such as name, age, phone number, email address, class password, real-time photo capture, department, course, and class.

Login

Using username and passwordView Attendance

Edit Profile

FLOW CHART



CONCLUSION

The Participation Administration Framework is created utilizing Machine Learning meets the destinations of the framework which it has been created. The framework has come to a unfaltering state where all bugs have been dispensed with. The framework is worked at a tall level of effectiveness. It was expecting to unravel as prerequisite detail. The framework can recognize and recognize the confront well with an exactness of 85 %, at a confront separate 40cm from the camera with satisfactory lighting.

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