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BIO METRIC SYSTEM ON FACE RECOGNITION

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ABSTRACT

Daily attendance marking is a common and important activity in schools and colleges for checking the performance of students. Manual Attendance maintaining is difficult process, especially for large group of students. Some automated systems developed to overcome these difficulties, have drawbacks like cost, fake attendance, accuracy, intrusiveness. To overcome these drawbacks, there is need of smart and automated attendance system.Traditional face recognition systems employ methods to identify a face from the given input but the results are not usually accurate and precise as desired. In this paper we aims to deviate from such traditional systems and introduce a new approach to identify a student using a face recognition system,the generation of a facial Model. This describes the working of the face recognition system that will be deployed as an Automated Attendance System in a classroom environment.

Keywords: *Image Processing, Face Recognition, Pattern Recognition, Identification.*

I. INTRODUCTION

Face detection is a computer technology being used in a variety of applications that identifies human faces in digital images. Face detection also refers to the psychological process by which humans locate and attend to faces in a visual scene.Facial recognition (or face recognition) is a biometric method of identifying an individual by comparing live capture or digital image data with the stored record for that person. Facial recognition systems are commonly used for security purposes but are increasingly being used in a variety of other applications. It application is Payments, access and security, criminal identification, advertising, healthcare.

Face detection and recognition are challenging tasks due to variation in illumination, variability in scale, location, orientation (up-right, rotated) and pose (frontal, profile). Face detection can be regarded as a specific case object class detection. Facial expression, occlusion and lighting conditions also change the overall appearance of face. Face-detection algorithms focus on the detection of frontal human faces. It is analogous to image detection in which the image of a person is matched bit by bit. Image matches with the image stores in database. So many Face detection techniques, few of them is Viola Jones Face Detection Algorithm, (LBP), and Ada-Boost for Face Detection, SMQT Features and SNOW Classifier Method. After applying face detection techniques we detected the faces or objects in image and crop that image apply Face recognition technique. So many way to recognition the faces by applying Hog features, Haar features, Machine learning, deep leaning, classification techniques some other tech also used for recognition of the faces. Face detection can be done by using viola jones algorithm.

Each possible face candidate is normalized to reduce both the lightning effect, which is caused by uneven illumination; and the shirring effect, which is due to head movement. The fitness value of each candidate is measured based on its projection on the Eigen-faces. After a number of iterations, all the face candidates with a high fitness value are selected for further verification. At this stage, the face symmetry is measured and the existence of the different facial features is verified for each face candidate. Face detection and recognition has many real world applications, like human/computer interface, surveillance, authentication and video indexing.

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II. PROPOSED METHOD

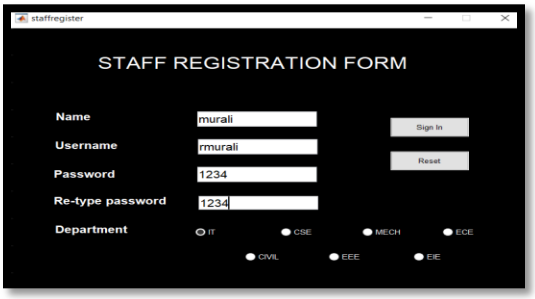
Taking attendance in the schools and colleges is being a waste of time and effort for both the students and lectures as well. Now a days biometric is more usage they are finger print recognition facial recognition iris scanning recognition voice recognition signature recognition etc. One of that biometric category is face detection and recognition. Based on the image we take security safety, attendances and some time it useful for decision also. Mostly this facial detection and recognition is decrease the manual work for human. Image capturing from camera or cc camera sometime this is also a streaming video from camera. Form that offline or online data, we capture the image after that applying the face detection techniques. Face detection is detecting the face location and presence of face in images. In this face detection we mostly see the nose, hair, ears, mouth, eyes and also different pose of faces in images. Recognition of face we need training data sets. Instances taking camera capture now check that image to database Images. Face recognition of different peoples based on the related images of that person image we need take images for before face recognition. In case if the image is not in data base then we store that image as new person in database. Next time same image of that new image person appear in image and recognition the face or else taking as new image and storing in database process is repeating.

Here, the faculty has to maintain proper record for the attendance. The manual attendance record system is not efficient and requires more time to arrange record and to calculate the average attendance of each student. Hence there is a requirement of a system that will solve the problem of student record arrangement and student average attendance calculation. One alternative to make student attendance system automatic is provided by facial recognition.

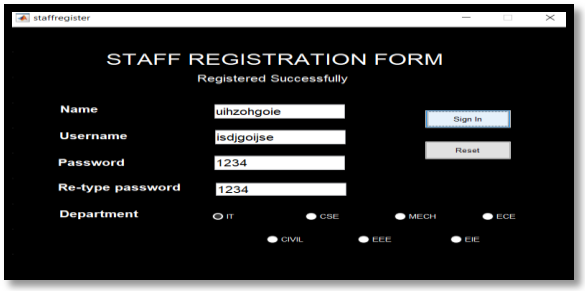
III. RESULTS AND OBSERVATIONS

3.1 Registration:

At first the faculty has to registerusing the registration form is shown in fig3.1.1 and then the details are needed to be given with the login and take the attendance.



(a)



(b)

Fig: 3.1.1 Faculty Registration page(a) Before Registration (b) After Registration

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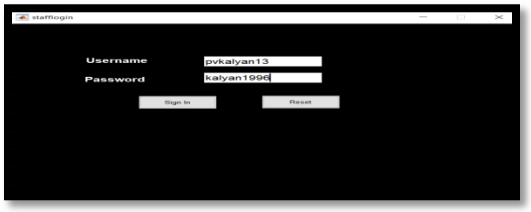
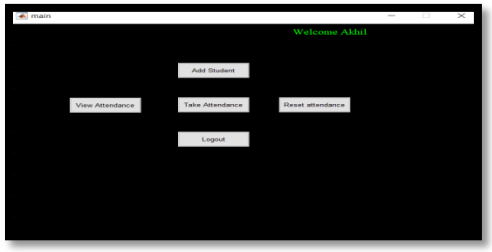
3.2 Login page:

After registration the login details of the faculty are given by the administrator who maintains the system and is shown in figure 3.2.1.



(a)



(b)

Fig: 3.2.1 Log in Page (a) Before login (b) After login

3.3 Add Student:

3.3.1 Database creation:

First, we need to create a folder with a name we desire, let us say here it is "ImageDatabase". Let us create an interface to store and read the data of the person we are capturing and saving. Here, we are taking only the name and the registered number of the person and taking it as the folder name. Image is acquire from the camera that is connect above the board. A camera capture image after every two minutes and send this image to the computer for processing. Digital cameras give a whole new meaning to the idea of painting by numbers. Unlike old-style film cameras, they capture and record images of the world around us using digital technology. Then we will click on 'Take images', to capture about 300 images of each person with different facial actions.

Fig: 3.3.1.1 Adding of Student

From the fig3.3.1.1, we are taking the name and number of the student before capturing the data for training purpose. This will automatically create an folder if it doesn't exist in the folder 'ImageDatabase' after clicking on 'Take pictures' button.

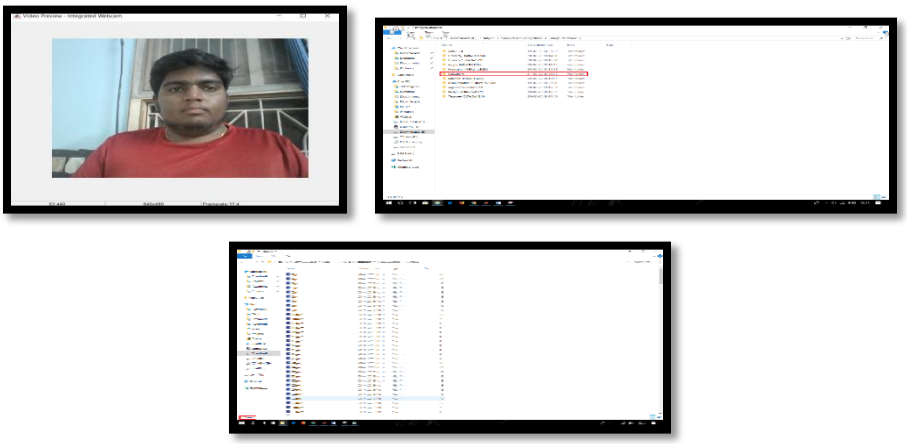
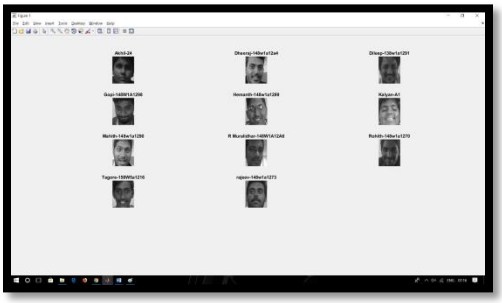


Fig: 3.3.1.2Image preview while capturingFolder created with name and registered number

3.3.2 Display the images in Database

To view the images stored in database Click on the 'Show DB' button as shown in the fig.

(a)



(b)

Fig: 3.3.2.1displaying of images in databases (a) Student details form (b) Images stored in database

We can see all the faces in the DB stored in the form of a subplot as in fig 3.3.2.1

3.4 Take Attendance

If we click on 'Take Attendance', we will switch the camera on and the picture is taken from the webcam. The faces are detected by using HOG feature extraction.

3.4.1 HOG feature extraction

Here, we are selecting the HOG features extraction for the feature extraction from an image. We split the training data and test data into 0.8: 0.2 ratio. We are simply extracting the features data of the training data only. The features

are extracted using the following proposal.1) A 92x112 pixel image is divided by 8x8 pixel cell, forming 11x14= 154 cells.The gradient components of each pixel (x, y) in horizontal and vertical directions are calculated by Eq (1) and Eq (2), and the gradient magnitude and gradient direction of each pixel point are calculated by Eq (3) and Eq (4).

$$G_x(X,Y) = I(X+1,y) - I(X-1,Y)\ldots.(1)$$

$$G_y(X,Y) = I(X,y+1) - I(X,Y-1)\ldots \quad (2)$$

$$m(x,y) = \sqrt{\left(G_x(x,y)\right)^2 + (G_y(x,y))^2} \quad (3)$$

$$\theta(x,y) = arc\tan\frac{(G_y(x,y)}{(G_x(x,y)} \ldots\ldots\ldots \quad (4)$$

2) A block of 16x16 pixels is composed of 2x2 = 4 cells, and 10x13 = 130 blocks are composed. The block step size of 8 pixels, the number of blocks in the horizontal direction is (92−14)/8 + 1 = 10, and the number of blocks in the vertical direction is (112−14)/8 + 1 = 13.

3) Take a histogram of 9 gradient directions for each cell. Such a block has 4x9 = 36 feature vectors, and then 130 blocks of feature vectors are connected in series to form an image of 36 130 = 4680 HOG features.

Now we take the default feature count of all the images as 4680. This helps us create an array for perfect number of zeros to write the data into form conversion. Here we had the name as trainingFeatures with the format of double and a fixed number of zeros for the extraction of the data and saving. We will later classify the data and store it. For comparison from the database we need to update each and every feature of the student or peer and classify it each and every time we look after it.

After detection of faces we compared these detected faces with the database and the output is shown in figures 3.4.1 and 3.4.2.

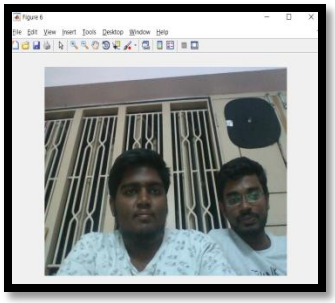


Fig:3.4.1 Input image

Fig:3.4.2 Output image

3.5 View Attendance

If we click on the **View Attendance** button in fig 3.2.1 we will logout as shown in fig-3.7.1.

The attendance is viewed after capturing of the fig3.5.1. Initially all the members are marked absent.

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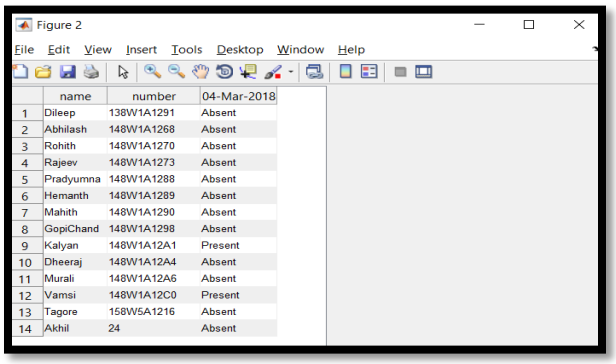

Fig: 3.5.1View Attendance

3.6 Reset Attendance

If we click on the **Reset Attendance** button in fig 3.2.1 we will logout as shown in fig 3.7.1. Here all the members are marked absent on clicking "Reset Attendance" and clicking on view attendance will give the result as in fig 3.5.1.

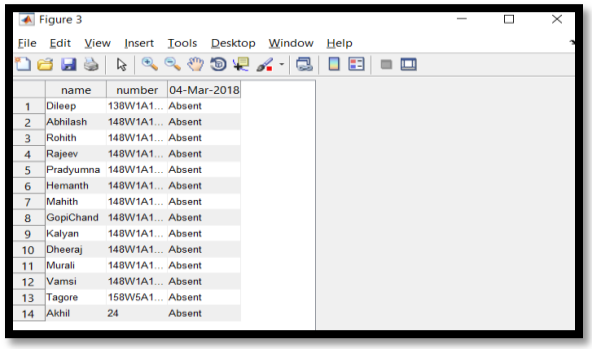

Fig:3.6.1 Reset Attendance

3.7Logout

If we click on the **Logout** button in fig 3.2.1 then the logout page is as shown in fig 3.7.1

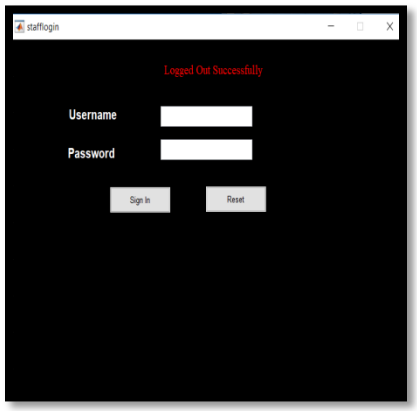

Fig: 3.7.1 Log out page

IV. CONCLUSION

Capturing the images from camera or cc camera and applying techniques face detection and recognition can decrease the manual work from human and increase the security safety, taking the decision from this recognition result. Based on this face detection and recognition can used in implement so many application like automatic attendances system based on face recognition, worker attendances, security, safety, police application like finding thief in image that help to catching thief. In this system we have implemented an attendance system for a lecture, section or laboratory by which lecturer or teaching assistant and record student's attendance. It saves time and effort, especially with huge number of students. This attendance system shows the use of facial recognition techniques for the purpose of student attendance and for the further process this record of student can be used in exam related issues.

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