

AUTONOMY OF ATTENDANCE USING FACE RECOGNITION

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I. ABSTRACT:

This paper proposes and compares the methodologies for an automated attendance system using video-based face recognition. Here input to the system is a video and output is an excel sheet with attendance of the students in the video. Automated attendance system can be implemented using various techniques of biometrics. Face recognition is one of them which does not involve human intervention.

Keyword - face detection, haar cascade

II. INTRODUCTION:

In recent years, video-based face recognition has received extensive attention and is one of the most important topics of research in the field of image processing for people's identification. We can utilize it in the field of education to maintain the attendance of students. In most learning institutions, student attendances are manually taken by the use of attendance sheets issued as part of regulation. This method is tedious, time consuming and inaccurate as some students often sign for their absent colleagues. This method also makes it difficult to track the attendance of individual students in a large classroom environment.

We propose the design and use of a face detection and recognition system to automatically detect students attending a lecture in a classroom and mark their attendance by recognizing their faces. The system is developed for deploying an easy and a secure way of taking down attendance. The software first captures a video of all the authorized persons and stores the information into database. While other biometric methods of identification can be more accurate, students usually have to queue for long at the time they enter the classroom. The process of this face recognition system is divided into various steps, but the important steps are detection and recognition of the face. Firstly, to mark the attendance of students, the image of student's faces will be required. We can get this image either by recording a video or by capturing an image from a camera device, which will be placed in the classroom at a suitable location from where the whole classroom can be covered. The camera will record the video of class then the system reads the frames from the video and detects the faces in it. After acquiring the frames, system performs face detection, which distinguishes face and other objects. The detected cropped faces are processed further for face recognition using the suitable algorithm. The Eigenfaces are used along with Face recognition algorithm. Eigenfaces are the extracted features of the image which contain the relevant information about the image. The input image is recognized by comparing them with the face database which is our training set. After finding the valid match attendance is registered in an excel sheet. which is our training set. After finding the valid match attendance is registered in an excel sheet.

III. RELATED TECHNOLOGY

- Face detection technology

Face detection is a hot research direction in the field of computer vision. With the rapid development of biometric technology, face detection technology has been widely used in various fields, which has a certain commercial value, and also has a very important academic value. The Haar feature proposed by Viola et al. combined with AdaBoost cascade classifier can detect face quickly. Since then, many researchers have devoted themselves to using more advanced features to improve the accuracy of face detection, such as Local Binary Pattern (LBP), Histogram of Oriented Gradient (HOG), Scale-invariant Feature Transform (SIFT).

- HAAR FEATURE

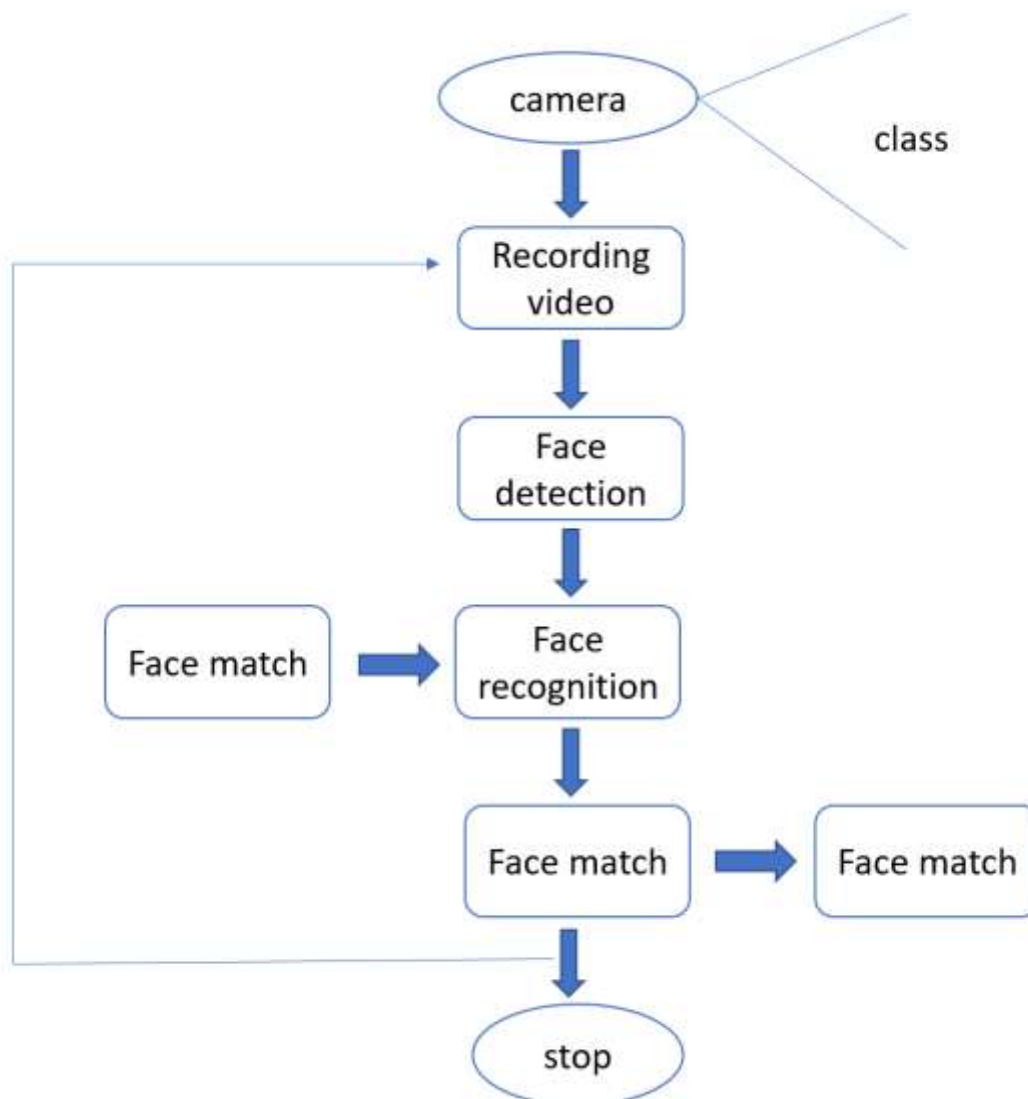
Haar feature is a wavelet-based feature that decomposes image. The function of cascade classification is to combine more feature efficiently. In the beginning, the image process of haar is only based on RGB value of each pixel, then process the image in rectangle shapes with some pixel in every shape. Each of the shapes is processed and the limit level is occurred after that which shows dark and light area. The formula of haar feature is the average value of the result is above the threshold, it means the haar feature exists.

- GRAYSCALE IMAGE

One of the pre-processes in face detection of mankind object is the change of the real image room into grayscale. That is occurred since generally facial object in grayscale image has consistent pattern such as eyes color is darker than cheeks or nose color. Here is the formula to turn color (RGB) into grayscale $Grayscale = \alpha * RED + \beta * GREEN + \gamma * BLUE$ The image that is produced in this stage later will be processed in characteristic extraction stage of the image and face recognition.

IV. SYSTEM DESIGN AND IMPLEMENTATION:

According to the main functions and different locations, the system designed in this paper can be divided into two parts: camera acquisition terminal and server computing terminal. The camera acquisition terminal is installed in the classroom. Its main function is to collect real-time student portrait videos in the classroom, and transmit the collected portrait videos to the server through the line for storage and processing. The main function of the server is to segment the video information of the human image obtained by the camera, get the frame image, then segment the frame image, recognize the human image of the segmented image, and filter and improve the recognition results using multi-frame images. The server will feedback the recognition results to the terminal, and control the movement and focusing of the terminal through the terminal platform, so as to obtain the second video of the area with poor recognition effect, and then improve the recognition accuracy. The workflow of the whole system is shown in figure



Face recognition attendance system flow diagram

V. LITERATURE REVIEW:

In this paper, we get to know about the various face recognition techniques and also realized that it is mainly two steps methodology which involves face detection and face recognition. To get high recognition rate, detection plays a major role. In recent years researchers have developed numbers of face detection and face recognition algorithm. In [2] we came to know about the two stage methodology of automated attendance system. [3] Suggests the improvised recognition rate by enhancing the quality of the image.

NFC Based Mobile Attendance System with Facial Authorization on Raspberry Pi and Cloud Server Attendance system[5] is a system that is used to track the attendance of a particular person and it is applied in many institutions. However, many systems for taking attendance has drawbacks, such as the traditional way has drawback in the data of the attendance that the list is hard to reuse, a biometric attendance system has drawback of the existence of human error such as fingerprint scans are not acceptable, due to the condition of a wet finger, dirty, too dry or peeling fingertips. In this paper, we propose mobile attendance system with NFC and face authorization to add security feature using Raspberry Pi and afford possibility to store the data in cloud. This paper first review the related works in the field of attendance management, NFC, face authorization, microcomputer and cloud storage. Then, it introduces our methodology and design system structure and plan. The result of this research is the system that reduce the amount of paper usage, eliminate the time and effort wasted in taking attendances by Mobile-based attendance system.

In 2012, N. Kar [6] introduced a automated system, which uses two libraries, OpenCV and FLTK. In this system, there are two processes, namely request matching and adding new face to database. In request matching, the first step is opening the camera and capturing the photo, then the face is extracted from the image. The next step is recognizing the face with the training data and projecting the extracted face onto the principal component analysis. The final step is displaying the face that closely matched the acquired image. Meanwhile, adding new face to database process is started with capturing the photo, then the face is extracted from the image. The Haar cascade method then performed to the image to find the object in the image in different window size. The next step is storing the image into the database, then learning the face, and followed with application of principal component analysis algorithm. The final step is storing the information inside the face XML file. The system is focused on the algorithm to improve the face detection from acquired images or videos.

In [7], the author also proposes a system which implements automatic attendance using facial recognition. The system can extract the object in the face such as nose or mouth by using MATLAB with principal component analysis (PCA). The system [7] designed to resolve the issues of attendance marking system such as the time-consuming issue. The study result shows that the system can recognize face image in the dark background or different view of the face in the classroom

In [4], Priyanka Thakare proposes a method using Eigenface and principal component analysis with architecture as follows. The camera is installed in the front, which is used to capture entire face of the students inside the class. Then, the captured images are transferred into the system as inputs. The images captured from the camera could be too dark or too bright, thus enhancement is needed to convert them to gray images. In the next step, histogram normalization is used to remove the contrast of the images, thus it is easy to recognize the students who sit in the back row. The median filter is used to remove noise from the images. Noise sometimes still occurs even when high definition camera is used. The system also implements skin classification that changes all pixels to black, except the pixels that are close to the skin.

VI. CONCLUSION:

This project on Face recognition had given us an opportunity to study about various methods used in the field of face recognition. The literary survey provided us with the pros and cons of many recognition systems. Compared with the traditional classroom attendance method, the system designed in this paper has the following advantages:

1. Save time. The classroom attendance system designed in this paper is real-time in the classroom. It will not waste any classroom time and avoid the waste of time caused by manual roll-call.
2. It will not interfere with the classroom. When the system is used for classroom attendance, it will not produce factors such as voice that interfere with the classroom order, so it will not affect the classroom order.

VII. REFERENCES:

- [1]. Bahram, D., Elias, D., Shahram, D. And Omid, M. Discrete Wavelet Transforms of Haar's Wavelet, Vol.3 , pp.247-251, 2014.
- [2]Ajinkya Patil and Mrudang Shukla, "Implementation of Classroom Attendance System Based on Face Recognition in Class", International Journal of Advances in Engineering & Technology, Vol. 7, Issue 3, pp. 974-979 , July 2014.
- [3] Naveed Khan Baloch, M. HaroonYousaf, Wagar Ahmad, M. Iran Baig, "Algorithm for Efficient Attendance Management: Face Recognition based Approach", IJCSI, Vol. 9, Issue 4, No 1,pp.146-150, July 2012.

[4] P. Wagh, R. Thakare, J. Chaudhari, and S. Patil, "Attendance system based on face recognition using eigen face and PCA algorithms," in *2015 International Conference on Green Computing and Internet of Things (ICGCIoT)*. IEEE, oct 2015, pp. 303–308.

[5] Siti Ummi Masruroh, Andrew Fiade, Department of Informatics, FST UIN Syarif Hidayatullah, Jakarta, Indonesia, 28 march 2018 *6th International Conference on Cyber and IT Service Management (CITSM)*

[6] N. Kar, M. K. Debbarma, A. Saha, and D. R. Pal, "Study of Implementing Automated Attendance System Using Face Recognition Technique," *International Journal of Computer and Communication Engineering*, vol. 1, no. 2, pp. 100–103, 2012.

[7] J. Joseph and K. P. Zacharia, "Automatic Attendance Management System Using Face Recognition," *International Journal of Science and Research (IJSR)*, vol. 2, no. 11, pp. 327–330, 2013.

[8] S.-h. Jeng, H. Y. M. Liao, C. C. Han, M. Y. Chern, and Y. T. Liu, "Facial feature detection using geometrical face model: An efficient approach," *Pattern Recognition*, vol. 31, no. 3, pp. 273–282, 1998.