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FACE RECOGNITION BASED - AUTOMATIC ATTENDANCE MANAGEMENT SYSTEM

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Abstract — Face recognition technology has made many improvements in a changing world. Smart attendance using real-time face recognition is a real-world solution that comes with a method to handle the daily activities of student attendance systems. Attendance management can be a great burden for the teacher if it is done manually. To solve the problem, the smart attendance management has been used. Our attendance system takes the attendance automatically using the face recognition. In our method we using, continuous observation technique which improves the performance for the estimation of the attendance based on face recognition. Then, we introduced our system structure and plan. Finally, our attendance management system are implemented to provide as evidence to support the plan. The result shows that continuous observation improved the performance for the estimation of the attendance.

Keywords: Video Framing, Face detection, Continuous observation technique, Face recognition.

I. INTRODUCTION

Face recognition has becoming as the active area of research in recent years, it is mainly used to increase the security demands. The last century has shows a striking progress in this area, with attention on such applications as Human-computer interaction (HCI), biometric analysis, content-based coding of images and videos, and surveillance. Even-though it is a superficial task for the human brain, face recognition has proved that it is extremely difficult to replicate artificially, since although commonalities do exist between faces, they vary in terms of age, skin-tone, color, glow and gender. The problem is further complicated by differing image qualities, facial expressions, facial furniture, background, and illumination conditions. This paper presents a peaceful approach for face recognition that derives from an idea suggested. In our survey, we describe a preprocessing step that attempts to identify pixels associated with skin independently of face related features.

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II. RELATED WORK

A.A NEW FACE DETECTION TECHNIQUE USING 2D DCT & SELF ORGANIZING FEATURE MAP

AUTHOR:Hjelmås and Low

ACE detection is the problem is identifying locations within images at which human faces appear. This is an important task that can facilitate higher-level applications, such as face recognition, face tracking, surveillance, and human-computer interaction (HCI). Face detection has been an area of active research for more than a decade, and is complicated by variations in scale, orientation, illumination, occlusion, and skin color. This paper presents a novel approach for face detection that derives from an idea suggested by Hjelmås and Low. In their survey, they describe a preprocessing step that attempts to identify pixels associated with skin independently of face related features. This represents a dramatic reduction in computational requirements over previous methods, where many systems generated multiresolution image pyramids before preparing lists of candidate face regions, but

these pyramids are no longer needed after segmentation based on skin color.

B. 2-D DCT OF BINARIZED EDGE IMAGES AND CONSTRUCTIVE FEED FORWARD NEURAL NETWORKS

AUTHOR: Ekman

In human to human communications, facial expressions play vital roles since they carry much information about humans, such as one's feelings, emotions and so on. Automatic facial expression recognition (FER) with a set of specified desired accuracy and performance requirements will help one to create human-like robots and machines that are expected to enjoy truly intelligent and transparent communications with humans. To date, many FER methods have been proposed in the literature. See for example, and the references therein. A good review can be found. Ekman developed the facial action coding system (FACS) for facial expression description, which is a novel system that has brought great influence on subsequent research and development in the field. FACS deals with 3-dimensional (3-D) facial models where the entire face is divided into 44 action units (AUs), such as nose, mouth, eyes, etc.

C. FACE DETECTION: A SURVEY

AUTHOR: Chellappa et al

The current evolution of computer technologies has envisaged advanced machinery world, where human life is enhanced by artificial intelligence. Indeed, this trend has already prompted an active development in machine intelligence. Computer vision, for example, aims to duplicate human vision. Traditionally, computer vision systems have been used in specific tasks such as performing tedious and repetitive visual tasks of assembly line inspection. Current development in this area is moving toward more generalized vision applications such as face recognition and video coding techniques. Many of the current face recognition techniques assume the availability of frontal faces of similar sizes. In reality, this assumption may not hold due to the varied nature

of face appearance and environment conditions. Consider the pictures. These pictures are typical test images used in face classification research. The exclusion of the background in these images is necessary for reliable face classification techniques. However, in realistic application scenarios such as the example a face could occur in a complex background and in many different positions. Recognition systems that are based on standard face images are likely to mistake some areas of the background as a face. In order to rectify the problem, a visual front-end processor is needed to localize and extract the face region from the background. Face detection is one of the visual tasks which humans can do effortlessly. However, in computer vision terms, this task is not easy. A general statement of the problem can be defined as follows: Given a still or video image, detect and localize an unknown number (if any) of faces. The solution to the problem involves segmentation, extraction, and verification of faces and possibly facial features from an uncontrolled background. As a visual frontend processor, a face detection system should also be able to achieve the task regardless of illumination, orientation, and camera distance.

D. FACIAL EXPRESSION RECOGNITION USING CONSTRUCTIVE FEED FORWARD NEURAL NETWORKS

AUTHOR: Kwok and Yeung

The computer-based recognition of facial expressions has been an active area of research in the literature for a long time. The ultimate goal in this research area is the realization of intelligent and transparent communications between human beings and machines. Several facial expression recognition methods have been proposed in the literature; see, for example, and the references therein. A well-known facial action coding system was developed by Ekman for facial expression description. In facial action coding system, the face is divided into 44 action units, such as nose, mouth, eyes, etc. The movement of muscles of these feature-bearing

action units are used to describe any human facial expression. This method requires a three-dimensional (3-D) measurement and may thus, be too complex for real-time processing. To overcome and remedy the drawbacks associated with the original facial action coding system, a modified system using only 17 relevant action units was proposed in for facial expression analysis and synthesis. However, 3-D measurement is still needed.

E. EIGEN FACES

AUTHOR: Sirovich and Kirby

Basically, eigenface is the eigenvector obtained from PCA. In face recognition, each training image is transformed into a vector by row concatenation. The covariance matrix is constructed by a set of training images. This idea is first proposed by Sirovich and Kirby. After that, Turk and Pentland developed a face recognition system using PCA. The significant features (eigenvectors associated with large eigenvalues) are called eigenfaces. The projection operation characterizes a face image by a weighted sum of eigenfaces. Recognition is performed by comparing the weight of each eigenface between unknown and reference faces.

III. MODULES

A. FACE RECOGNITION MODULE

In this Module, store the various facial Expression Images in a folder, get and display any one image from that folder. local directional number pattern(LDN) method is provide to prove to be extremely difficult to imitate artificially, since although commonalities do exist between faces, they vary considerably in terms of age, skin, colour and gender.

B. ADMINISTRATOR FUNCTION MODULE

Update the act and rules, manage the user information, send the acknowledgement to user, Cancel the user registration, manage the user account and update the news.

C. USER FUNCTION MODULE

Register their information and create account, Select demo test and give that test, see the demo test result at the time, see the information regarding students, see the act and rules updated by admin.

D. SPECIFICATION MODULE

In this project, we prepared Students details to maintain all the records like issuing the students profiles registration, attendance, address. Once all these get computerized to work efficiency of the employee will get increases.

E. REPORTING MODULE

"Students attendance Management System" has been designed to automate the process of registration of student's profiles and issuing monthly attendance reports process with various reports. System can make the daily activities.

F. PREPROCESSING

Preprocessing mainly aims to reduce noise effect, difference of illumination, color intensity, background, and orientation. The correct recognition of image depends upon quality of captured image, lighting condition .Recognition rate can be improved by performing pre-processing on the captured image.

G. STUDENT MANAGEMENT

This Constitutes The First Phase Of Our Project Module. This Section Consists Following Parameters: 1. Student Registration Form: The Student Appears As A New Candidate For Registration. Registration Consists of Adding Each Candidate's Personal Details. 2. Student Face Detection: The Newly Registered Candidate's Face Gets Detected for the Very First Time and Stored in the Database.

H. ATTENDANCE SYSTEM

This constitutes the second phase of our project module. The recognition of each individual student takes place by extracting the common features of each individual by using image integral method.

Then the face image is matched with the image stored in the database and the attendance is marked for the candidate only if the facial feature of the newly captured image matches with the already stored image.

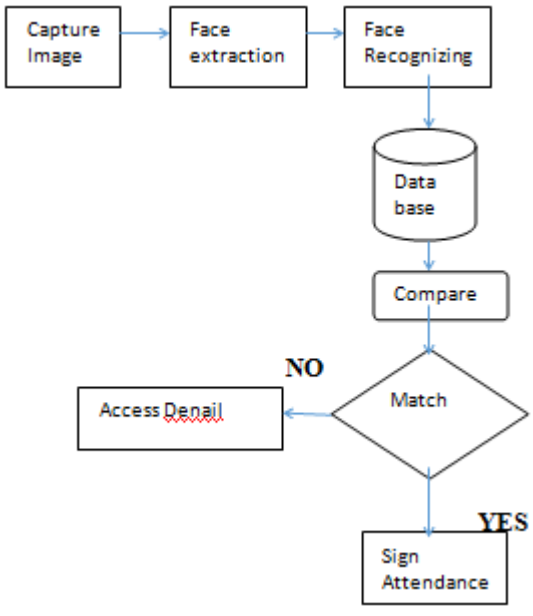
I. FACE RECOGNITION AND ATTENDANCE

After the face detection step the next is face recognition. This can be achieved by cropping the first detected face from the image and compare it with the database. This is called the selection of region of interest. In this way faces of students are verified one by one with the face database using the Eigen Face method and attendance is marked on the server. Face Recognition techniques are used in our system.

J.NOISE FILTERING

Many sources of noise may exist in the input image when captured from the camera. There are many techniques for noise removal. Low pass filtering in the frequency domain may be a good choice but this also removes some important information in the image. In our system median filtering in is used for the purpose of noise removal in the histogram normalized image.

IV. SYSTEM ARCHITECTURE



Face Capturing: During this stage, student face is captured and pre-process. It is important to note that staff face need to be captured under different conditions in order to have real representation of the Student face. Student face image is captured with camera that is properly linked with the system. When student face is captured under different condition, the system has to perform some levels of processing. For simple implementation of this our technique, we recommend the following pre-processing operations: Histogram, Normalization & Noise Removal. Then the recognizing the face, stored to the database and comparing the match of face images, if it true student should have sign the attendance, or it's false the result is denial.

V. CONCLUSION

Face recognition based automatic attendance management system has been developed for the purpose of reducing the errors that occur in the traditional (manual) attendance taking system. Our system will save the time, reduce the amount of work for the processors who has to manage the attendance and also it will replace the stationery material with electronic devices by which it will be in more secured manner, no one can access easily without the permission of attendance manager. It reduces the amount of human resource required for the purpose. Hence our system has been developed with the expected results.

VI. FUTURE ENCHANCEMENT

As face provides a unique identity of a person, it can be used to identify a person and verify his/her identity. Face recognition provides non-intrusive way to recognize a person. By using this system, the chances of fake attendance and proxies can be reduced. The face-recognition using Eigen face method helps overcome problems related to lightning issues and head pose problems in some cases. However, the system accuracy is still not up to the mark owing especially to the face detection method sensitive to head tilt problems. We need to look for some robust face detection method. Other

supervised methods may tend to be quite useful in the system. Besides, we can simplify the system and make more efficient by taking advantage of multiple face detections to mark attendance of all the visible faces in single attempt. This will be economical and more efficient use of face recognition for attendance marking. We also consider to develop an android application for this system in near future.

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