

ATTENDANCE MANAGEMENT SYSTEM USING FACE RECOGNITION

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Abstract— In this paper, we propose a system that takes intervention in the participation of students for classroom lecture. The proposed system framework utilizes face identification and recognition. The attendance is marked by utilizing an android mobile phone application that captures pictures of students, detects the faces in image and contrast the distinguished appearances and the database and marks the attendance. This work describes the efficient algorithm that automatically marks the attendance without human

I. INTRODUCTION

Maintaining the attendance is essential in every institution for checking the performance of students. Traditionally student's attendance is taken physically by using participation sheet, given by the lecturer in class. The current attendance techniques are repetitive and tedious. Physically recorded participation can be effortlessly controlled. Besides, it is exceptionally hard to confirm one by one student in a substantial classroom environment with disseminated branches whether the verified students are really reacting or not.

Facial recognition (or face recognition) is a type of biometric software application that can identify a specific individual in a digital image by analyzing and comparing patterns. Facial recognition systems are commonly used for security purposes but are increasingly being used in a variety of other applications.

Consequently this paper is proposed to handle every one of these issues. Framework is such that it uses face detection and recognition algorithms which automatically detect and registers student attending on a lecture. Hence, this system handles all the issues which occurred in traditional system.

Face detection and recognition is often referred to as, analyses characteristics of a person's face image input through a camera. It measures overall facial structure, distances between eyes, nose and mouth.

The software first captures an image of all the authorized persons and stores the information into database. The system then stores the image by mapping it into a face coordinate structure. Next time whenever the registered

person enters the premises the system recognizes the person and marks his attendance along with the ID. For face recognition there are two types of comparisons.

1. Verification.

This is where the system compares the given individual with who that individual says they are and gives a yes or no decision.

2. Identification.

This is where the system compares the given individual to all the other individuals in the database and gives a ranked list of matches.

II. REQUIREMENTS

i) HARDWARE REQUIREMENT

Processor : Mediatek
Memory : 512 mb RAM

ii) SOFTWARE REQUIREMENT

Operating System : Android

III. WORKING OF THE PROPOSED SYSTEM

The proposed attendance system mainly consists of four phases; Image acquisition, Face Detection, Feature Extraction, Face Recognition. The working of the system is depicted as follows:

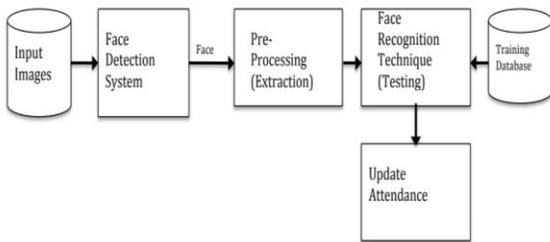
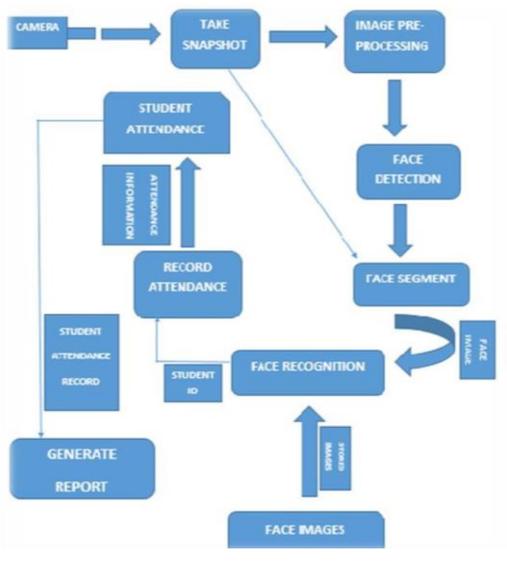
A. Image Acquisition: The system consists of a camera on a mobile phone that captures the images of the classroom and sends it to the image pre-processing. Then that image is sent for face detection.

B. Face Detection: This process separates the facial area from the rest of the background image. The faces which are stored in the database.

C. Feature Extraction: Feature extraction is done for distinguishing faces of different student. In this system, eyes, nose and mouth are extracted. Feature extraction is helpful in face detection and recognition.

D. Face Recognition: The face image is then compared with the stored image. If the face image is matched with the stored image then the face is recognized. Then for that particular student the attendance is recorded.

Screenshot of Proposed System:



IV. MODULES OF PROPOSED SYSTEM

Student Management: This constitutes the first phase of our project module. This section consists following parameters:

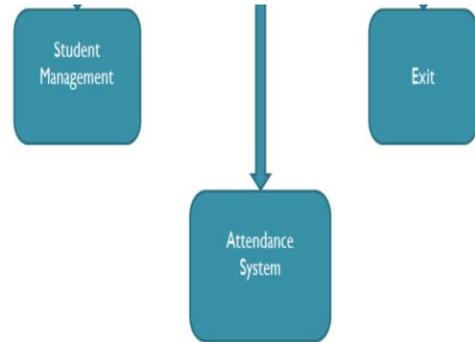
Student Registration Form: The student appears as a new candidate for registration. Registration consists of adding each candidate’s personal details.

Student Face detection: The newly registered candidate’s face gets detected for the very first time and stored in the database.

Attendance System: 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.

Exit: It takes the control out of the module.



V. DESIGN

IMPLEMENTATION STEPS

- Step 1: Face Detection
- Step 2: Feature Extraction
- Step 3: Face Recognition

Face Detection: Commonly Used Techniques • Finding Faces in images with controlled background

- Finding Faces by Color
- Finding Faces by Motion
- Finding Faces using the Mixture of the Above
- Finding Faces in Unconstrained Scenes

Face Detection Technique 1:

Finding Faces in Images with Controlled Background

- Use images with a plain mono colour background, or use them with a predefined static background
- Remove the background will always give the face boundaries.

Face Detection Technique 2:

Finding Face by Color

- The advantage: If you have access to color images, you might use the typical skin color to find face segments.
- The disadvantage: It doesn’t work with all kinds of skin colors, and is not very robust under varying lighting conditions...

Basic Color Extraction for Face Detection

- Color provides a computationally efficient yet effective method which is robust under rotations in depth and partial occlusions. It can be combined with other methods such as motion and appearance-based face detection.
- Human skin forms a relatively tight cluster in color space even when different races are considered.

Face recognition and Attendance:

After the face detection step the next is face recognition. This can be achieved by the first detected face and compare it with the database. In this way faces of students are verified one by one with the database and attendance is marked on the server.

VI. DETAILED FUNCTIONALITY:

APP-Phase 1

- 1.Registration of Students, Faculty
- 2.Enrolment of students and Faculty.
- 3.View attendance of students and Faculty.

APP-Phase 2:

- 1.Click photos of students and store in external storage of mobile.
- 2.Download list of students registered from database.
- 3.Scan the face.
- 4.Attendance will be stored in local database of phone .
- 5.Attendance record will be transferred to website on clicking SYNC ATTENDANCE.

VII.ALGORITHM FOR FACE DETECTION AND RECOGNITION

This section describes the software algorithm for the system.

The algorithm consists of the following steps

- Image acquisition
- Histogram normalization
- Noise removal
- Face detection
- Face recognition
- Attendance

In the first step image is captured from the camera. There are illumination effects in the captured image because of different lighting conditions and some noise which is to be removed before going to the next steps.

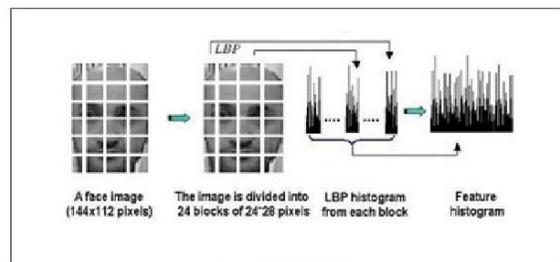
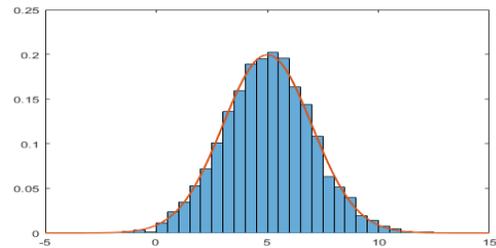
1.Image acquisition:

The first stage of any vision system is the image acquisition stage.

After the image has been obtained, various methods of processing can be applied to the image to perform the many different vision tasks required today. However, if the image has not been acquired satisfactorily then the intended tasks may not be achievable, even with the aid of some form of image enhancement.

2. Histogram normalization:

Each pixel of an image is labeled with an LBP code. First it will divide the image to several block Then it will start calculating the LBP histogram for each block after that it will combine every LBP histogram for that image. Then you will get all the LBP histogram into one vector. Captured image sometimes have brightness or darkness in it which should be removed for good results. First the RGB image is converted to the gray scale image for enhancement.



3.Noise removal:

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.

4. Face detection:

Initially face detection algorithm was tested on variety of images with different face positions and lighting conditions and then algorithm was applied to detect faces in real time video.

Algorithm is trained for the images of faces and then applied on the class room image for detection of multiple faces in the image. After the detection of faces from the images next step is cropping of each detected face. The algorithm uses the technique of threading to enhance the speed of algorithm.

5.Face recognition and Attendance:

After the face detection step the next is face recognition.This can be achieved by the first detected face and compare it with the database. In this way faces of students are verified one by one with the database and attendance is marked on the server.

i) ADVANTAGES:

1. The software can be used for security purposes in organizations and in secured zones.
2. The software stores the faces that are detected and automatically marks attendance.
3. The system is convenient and secure for the users.
4. It saves their time and efforts.

ii) DISADVANTAGES:

1. It can only detect face from a limited distance.

VIII. CONCLUSION AND FUTURE SCOPE

We come to realize that there are extensive variety of strategies, for example, biometric, RFID based and so forth which are time consuming and non-efficient. So to overcome, this above framework is the better and reliable solution from every perceptive of time and security. In this way we have accomplished to add to a reliable and effective participation framework to distinguish faces in classroom and recognize the faces accurately to mark the attendance. This method is secure enough, reliable and available for use. No need for specialized hardware for installing the system in the classroom. It can be constructed using a camera and computer. There is a need to use some algorithms that can recognize the faces to improve the system.In this system we have implemented

an attendance system for a lecture, section or laboratory by which lecturer or teaching assistant an record student's attendance. It saves time and effort, especially if it is a lecture with huge number of students.

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