

Face Recognition for Class Room Attendance System

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Abstract-In this paper, we propose a framework that takes the participation of students for classroom lecture. The proposed system framework takes the participation naturally utilizing face identification and recognition. A classroom attendance system using face recognition is most important research topic in computer technology. There are automated systems which are used for recording the attendance of a person within the organization, but the limitation is that the attendance is registered only when entering and leaving the work area. In this paper, the attendance is recorded by using a web camera which detect the faces in images and compare the detected faces with the database and mark the attendance. This system is also used to avoid proxy attendance of students. This automation reduces human efforts of paper work, maintaining the attendance registers, generating reports as needs of academics.

Keywords: Face recognition, Face detection, Webcam, Attendance system, Automated attendance

I. INTRODUCTION

Maintaining the attendance is essential in every one of the foundations for checking the performance of students. Each organization has its own technique. Traditionally student’s attendance is taken physically by utilizing participation sheet, given by the employee in class

Biometric recognition has the potential to become an irreplaceable part of many identification systems used for evaluating the performance of those people working within the organization. Although biometric technologies are being applied in many fields it has not yet delivered its promise of guaranteeing automatic human recognition. Face recognition is a technique of biometric recognition. It is considered to be one of the most successful applications of image analysis and processing; that is the main reason behind the great attention it has been given in the past several years

The Face detection and face recognition are very advanced in terms of computer authentication technology. The system is going to work by some techniques such as the image is captured by web camera of laptop is then processed towards the detection as the detected face image is obtained face recognition has to be done which is divided into further parts namely face alignment, preprocessing, feature extraction, face matching. This has been done by using Feature matching algorithm. This technique is considered to be one of the most successful for image processing or analysis.

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 that captures the image of the person and sends it to the image pre-processing.

B. Face Detection: This process separates the facial area from the rest of the background image. The faces which are stored in the knowledgebase data. Face detection is a technology that determines the location and sizes of human faces in an image. It detects faces and ignores anything else, such as building, chairs, and trees. It is a starting point for face recognition. Most of the face detection methods focus on

detecting frontal faces. These methods are categorized into four types Knowledgebase, Feature invariant, Template matching and Appearance-Based. Each method involves color segmentations, pattern matching, statistical analysis and complex transform. Face detection is an important part of face recognition as to implement the automatic face recognition.

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

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. Face Recognition is automatic identification or verification of a person from an image/video. It is one of the most active and widely used techniques because of its reliability, accuracy in the process of recognizing and verifying the person’s identity. Problem that may occur with face recognition are different people may look similar characteristic of the face may change with time. Face can be recognized by two approaches that are based on geometry of face and based on appearance of face. The recognition process is done by comparing the extracted features from the image with the one previously stored in the database. Face recognition can be implemented by using Principal Component Analysis (PCA), Linear Discriminant Analysis (LDA) and Discrete Cosine Transform (DCT).

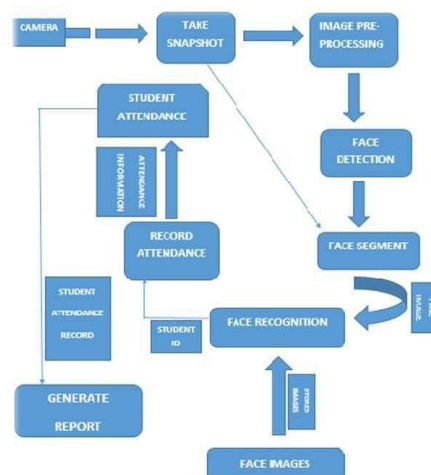


Fig 3: MODULES OF PROPOSED SYSTEM [1]

A. Face Detection Methods:

The different techniques used for face detection are as classified as shown below:

- Knowledge Based Method
- Feature Invariant Method
- Template Matching Method
- Appearance Based Method

B. Face Feature Extraction Methods:

The techniques used for Face Recognition can be divided into two main categories:

- Holistic Approach
- Feature-based Approach

II. SYSTEM DESCRIPTION

The system consists of a camera that captures the images of the person and sends it to the image enhancement module. After enhancement the image comes in the Face Detection and Recognition modules and then the attendance is marked on the database server. At the time of enrolment templates of face images of individual students are stored in the Face database. Here all the faces are detected from the input image and the algorithm compares them one by one with the face database. If any face is recognized the attendance is marked on the server from where anyone can access and use it for different purposes.

In order to avoid the false detection we are using the skin classification technique. Using this technique enhance the efficiency and accuracy of the detection process. In this process first the skin is classified and then only skin pixels remain and all other pixels in the image are set to black, this greatly enhances the accuracy of the face detection process. Face Database is the collection of face images and extracted features at the time of enrolment and the second attendance database contains the information about the teachers and students and also used to mark attendance.

III. SYSTEM REQUIREMENTS

Analysing user requirements and needs is a vital task in any system development process. End users must be the main concern of the system designer in order to produce a valid, useful and user-satisfying system. This section examines and analyses the requirements and needs of the possible different system end users.

A. Student requirements

The student needs to keep track of his attendance. This would require him to login using his ID and password to the system. The system will accept him if his ID and password are the same as the ones saved in the database and a page will appear according to the student's privileges which are viewing his progress, course and result.

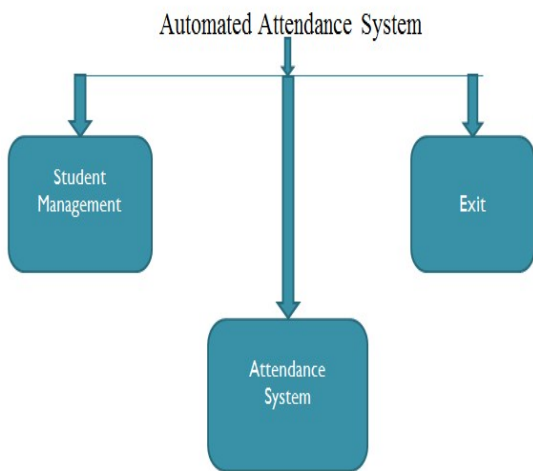


Fig 2: MODULES OF PROPOSED SYSTEM [1]

A. Student Management: This constitutes the first phase of our project module. This section consists of the following parameters: 1. Student Registration Form: The student appears as a new candidate for registration. Registration consists of adding each candidate's personal details, his face. 2. Student Face detection: The newly registered candidate's face gets detected for the very first time and stored in the Knowledge database.

B. 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 the integral method. Then the face image is matched with the image stored in the Knowledge 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.

C. Exit: It takes the control out of the module.

The facial recognition process can be divided into two main stages: processing before detection where face detection and alignment take place (localization and normalization), and afterwards recognition occurs through feature extraction and matching steps.

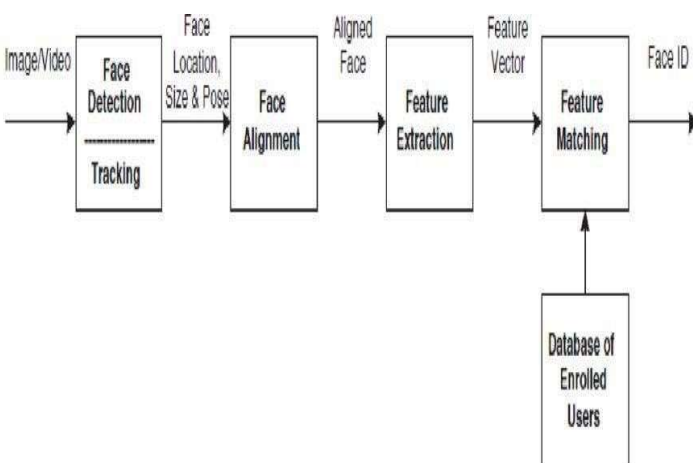


Fig 3: Face recognition processing flow [5]

