

Automatic Attendance System through Video Monitoring

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Abstract

In today's rapidly changing technological environment, people run after the automation for precious time saving, using reliable and effective systems. In general, marking attendance in a college, school or work environment, at regular intervals during the day requires a lot of time consumption, as well as proxy, to solve these limitations, everyone looking for automated system using bio-metrics. Bio-metrics are of different methods like finger print, iris, facial recognition etc, out of these; we follow facial features recognition system for marking attendance in class or college where targets at certain distance. This present paper proposes the methodology for facial recognition through video monitoring. For facial recognition many algorithms are available but for good resolution we follow the Kanade-Lucas-Tomasi (KLT) system. The proposed system uses the database for comparing the Principle Component Analysis(PCA) and Linear Discriminant Analysis (LDA). The video output, which is collected from the web camera is verified through data base using KLT algorithm and attendance is marked using MATLAB and the data is stored in excel data sheet.

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I. INTRODUCTION

In recent years, the Video-based face recognition has gained significant popularity and is the key focus of research in the field of image processing. There are several facial recognition methods that may be more precise than facial recognition [1], but due to its non-invasive nature, it evolves gradually in the biometrics and is the primary way of identifying the individual, this can be used to track the participation of students in the field of education. Each organization is expected to report student or employee attendance in a detailed way. The conventional approach to attendance is well known, but it is very inefficient and time-wasteful and the register can be easily changed, lost or misplaced. Various biometric technologies, such as fingerprints, iris signatures, smart cards, etc have evolved and

have been commonly used in all reputed organizations. In order to avoid human involvement, the researchers' emphasis has established several biometric approaches, particularly camera-facing, for secured way of attendance marking. This paper examines how facial recognition technology can be used to record an effective attendance system for an identified people's presence at the respective venue. This face recognition system process is divided into several stages but the main steps are facial detection and recognition. Furthermore on the similarity with the qualified data collection, the individual person image will be detected and marked in the Excel data sheet.

II. EXISTING METHOD

The present system consists of biometric scanner or iris scanner that scans the corresponding thumb or iris of an individual and compare the database already exist in that. If the person identity is matched with the database, the attendance is recorded and is marked in the manual sheets. Suppose the person iris or finger print is not matched with database, correspondingly absent is recorded. In this method time duration is more and wastage of paper is high. To overcome this issue we proposed programmed participation framework.

III. PROPOSED METHODOLOGY

The system contains a camera, which captures the video of the students in classroom and sending it via web service to the administrator. The input of the database is the student's image, the image is pre-processed and then the facial features are obtained by using LBP (Local Binary Pattern) and HOG (Histogram of Oriented Gradients), during this processes the features of mouth, nose, and eyes, are extracted by Support Vector Machine (SVM) classification, this will be stored in the database. Frame/ image number can be extracted from the video. The image/frame pre-processing is performed and then the image is subjected to the Face Detection where faces are identified from the image/frame. The facial features are to be extracted using LBP and HOG in the feature extraction module; the features are extracted from the mouth, nose, and eyes. The SVM is then performed on the faces, then all these images are identified, and the algorithm is used to compare one by one frame/picture with the database. If the facial features are mapped with the database faces, then the attendance is marked.

OVER ALL BLOCK DIAGRAM

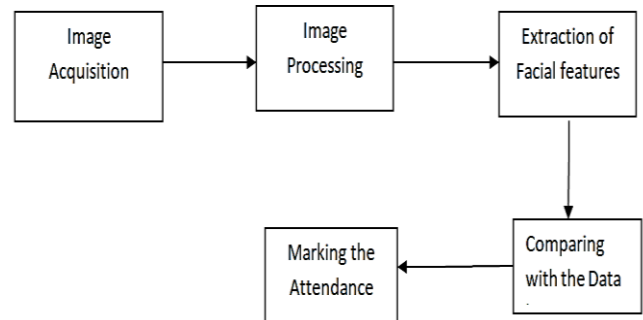


Fig.1. Block diagram for Attendance Monitoring System

Explanation for block diagram: In the present study camera is used for recording the video at entry or top of the class room by covering all the faces which takes input as the triggering of time which gives the acquisition of image in the form of frames. Those frames are analyzed by using image processing and finally attendance marking of the students/people is done for those who attend their respective classes/work like in the college or work place.

The image is pre-processed using image processing algorithms that include a morphed image and is used for comparison with the database. Even though many algorithms are there, KLT algorithm is accurate and efficient for analyzing image. Processing of image follows steps like removal of noise using filters, factors like saturation, hue and RGB values. The processed image extracts its facial features using algorithms like viola jones, KLT etc, and further it is used for compare them with the image available in the data base for marking the attendance. The facial features are different for each person based on the theory that images can be obtained ^[2], which involves an algorithm uses filter for good efficiency. The student's data for marking attendance is stored in the data base. The captured data from camera is compared with the data stored in the data base, during comparison if captured and database image are matched, the attendance will be marked for the respected students. This automated

attendance system helps saves lot of time instead of taking attendance manually. MATLAB software is used for this automated attendance marking and output is displayed in the excel sheet.

IV. WORKING PROCESS

The following are the quick steps need to design automated attendance system:

- 1.Database Creation
- 2.Recording video
- 3.Detection of face
- 4.Recognition of face
5. Registering attendance

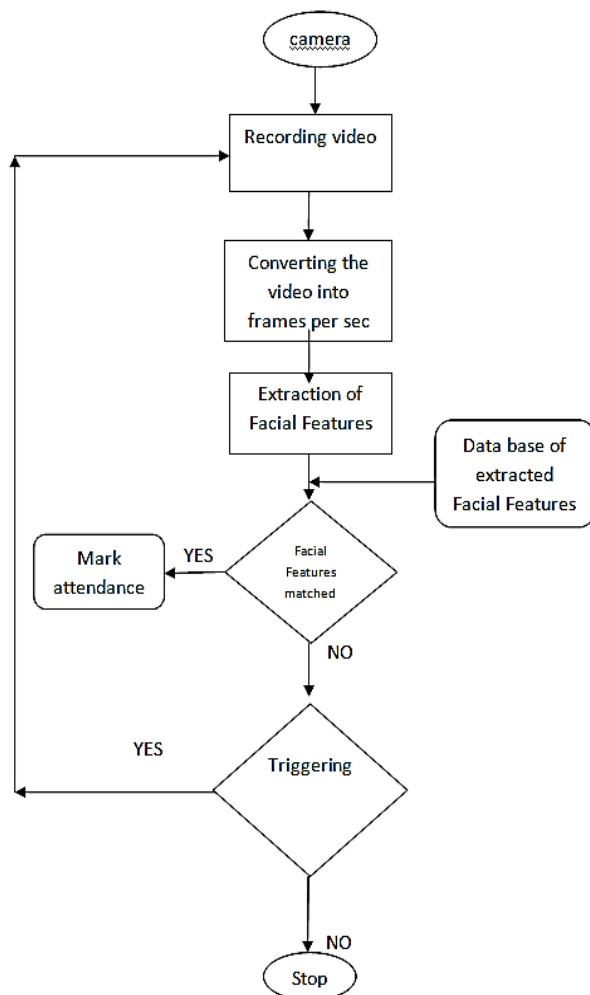


Fig.2.Data Flow Diagram

V. ANALYSIS AND RESULT

The implementation for An Automatic Attendance System through video monitoring incorporates^[4]:

- Enlistment of understudy features.
- Recording the video of understudies.
- Features identification along with highlight abstraction.
- Features acknowledgment and stamping participation.
- Subsequent screen captures for execution of the undertaking.

1. Creation of Database:

The creation of database of the students is shown in this window. The details of the students are stored in the Database.

Details of the students in the database include the information of semester, Branch, Roll Number etc. The pre processed pictures are changed into to binary format, in this stage extraction of face features like mouth, eyes and nose will be done, using Linear Binary Pattern (LBP) and Histogram of Orientation Gradients (HOG) algorithms.

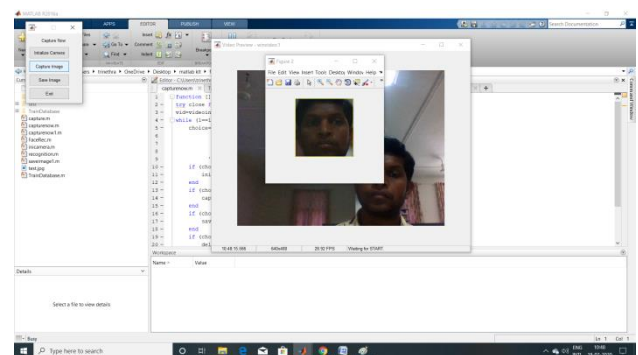


Fig.3.Creation of database for students

2.Menu Form

The menu driven dialog box, which asks the captured image which is recorded using web camera and it is saved in data base as shown in Fig.4.

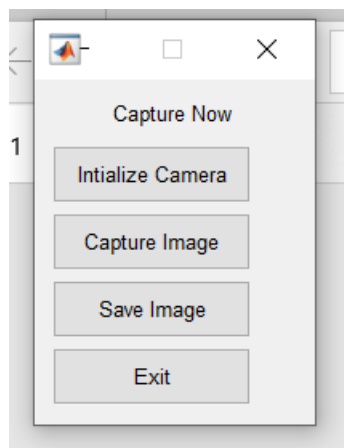


Fig.4. Menu Form

3. Video Acquisition

The video is obtained by the web camera and it is linked to the classroom in such a way that the entire student faces can be captured using the camera. The recorded video from the web-camera is sent to processing unit where the video is divided into number of frames as a sample images and these samples are used to identify the person/student, for the purpose of attendance marking.



Fig.5.The sitting order arrangement of students

4.Image Conversion.

The image obtained from the frames per sec is first transformed to the gray-scale image format, for the purpose needs to calculate the average RGB value for each pixel and this will be taken as a threshold value. If the threshold value is below any instantaneous value such as 110, will be replaced

with black pixel, otherwise it will be replaced with a white pixel [3]. The binary image will be obtained from RGB image using this process. Normalization of histograms is a good method for enhancing and comparisons in the spatial domain. The sample converted image as shown in Fig.6.



Fig.6. Equalized Image of Histogram

5.Frame Generation.

Video is obtained continuously from the web camera will be converted into frames per sec (FPS). The range of frames generation is in between the 99 and 1356. If we take more number of FPS video should be in a slow motion. In general 60 FPS are considered for better video applications.

6.Face Detection.

The image obtained from the all the frames will be used to identity the persons by applying the viola-jones algorithm. The principle of this algorithm is scan a sub-window capable of detecting faces across a given input image. In this method rescale the input images of different sizes into the fixed size. Each sub window will process a series of detectors called cascade. The processing of a sub-window starts from a simple classifier which is trained to separate positive (face) and negative (non-face) images. If the sub-window classified as positive by all the classifiers in cascade, it is declared containing face as shown in Fig.7.



Fig.7.Face Detection

7.Face Recognition.

Face Recognition is done by using the principle component analysis (PCA) it compares the Eigen vectors of each frame taken from the monitoring device with the eigen vectors available in the trained data base^[5]. Based on the minimum difference of the eigenvectors of the image, if the distance is small it recognizes the image of the person, the parameters like person's name, roll number are stored in excel data sheet and accordingly attendance is marked, the sample output is shown as shown in Fig.8.

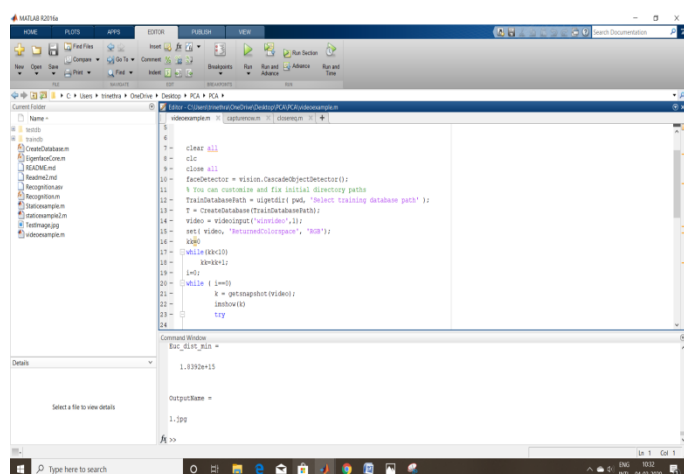


Fig.8.Output of face recognition using MATLAB software

8. Report

The data of person/students who were present in class are stored in an excel data sheet where it

represents name of each and every person and their status of attendance marking as shown in Fig.9

Student Name	RollNo	Attendance	Name of the University	Name of the college	Semester	Subject	Faculty
1		11 Error	VTU Belgaum				
2		11 Error		PDA College of Engg. Kalaburgi			
3		1 Present					
4	Anu shree	2 Present					
5	Priyanka	2 Present			Semester	IV	
6	Suhasini	3 Present					
7	Ieena	4 Present			Subject	Cloud Computing	
8	Sneha	5 Present					Dr. Suman Nandyal
9	Supriya	6 Present			Faculty		
10	Divya	7 Present					
11	Parvata	8 Present					
12		11 Error					
13	Roshi	9 Present					
14	Afreen	10 Present					
15							
16							
17	Total Students Present	10					
18	Total students Absent	0					
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