AUTOMATED FACE RECOGNITION ATTENDANCE SYSTEM

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ABSTRACT

In this paper, we propose an Automated Face Recognition Attendance System for Educational and Work Organizations for marking and maintaining attendance with the use of Face Recognition. Keeping up participation is imperative in all learning foundations for checking the execution of understudies. In most learning foundations, understudy attendances are physically taken by the utilization of participation sheets issued by the office heads as a major aspect of control. The understudies sign in these sheets which are then filled or physically signed in to a PC for future examination. This strategy is dull, tedious and wrong as a few understudies regularly sign for their missing partners. This technique additionally makes it hard to track the participation of individual understudies in a huge classroom condition In this undertaking, we propose the outline and utilization of a face recognition and acknowledgment framework to consequently distinguish understudies going to an address in a classroom and stamp their participation by perceiving their countenances

Keyword: - *Face Recognition, LBP, SVM*

1. INTRODUCTION

Keeping up the participation is essential in every one of the establishments for checking the nearness of understudies. Each foundation has its own strategy in such manner. Some are taking participation physically utilizing the conventional pen and paper or document based approach and some have received strategies for programmed participation methods. There are numerous strategies existing for this reason they are:

- Fingerprint Based System
- Iris Recognition
- RFID Based System
- Face Recognition

The initial three techniques demonstrated wasteful in light of the fact that understudies need to make a line to touch their thumb on the checking gadget which devours the time. This framework utilizes the face acknowledgment approach for the programmed participation of understudies in the classroom condition without understudy's intervention. This participation is recorded by utilizing a camera connected in the classroom that is constantly catching pictures of understudies, identify the appearances in pictures and contrast the recognized countenances and the understudy database and check the attendance. The framework comprises of a camera that catches the pictures of the understudies sitting in the classroom and sends it to the picture upgrade module. In the picture improvement module, pictures are upgraded with the goal that coordinating can be performed effectively. After improvement, the picture comes in the face discovery and acknowledgment modules. At the season of enlistment, formats of face pictures of individual understudies are put away in the face database. The countenances are recognized from the caught by camera. In the acknowledgment module the identified appearances are continually looked at against put away database. On the off chance that any face is perceived the participation is refreshed and can be gotten to by anybody, the data will be sent to the truants' folks utilizing GSM innovation. This framework utilizes iris acknowledgment administration framework that does catching the picture of iris acknowledgment, extraction, putting away and coordinating. In any case, the difficulty strikes lay the trans-mission lines in the spots where the geology is terrible. The Authors have proposed a

framework in view of constant face recognition which is reliable, secure and fast which needs improvement in different lighting conditions.

2. LITERATURE SURVEY

The Authors have proposed a unique mark based participation framework. A versatile unique mark gadget has been created which can be passed among the understudies to put their finger on the sensor amid the address time without the educator's mediation. This framework guarantees an idiot proof technique for denoting the participation. The issue with this approach is that going of the gadget amid the address time may occupy the consideration of the understudies. Various works identified with Radio Frequency Identification (RFID) based Attendance Systems exist in the writing. In the writers have proposed RFID based framework in which understudies convey a RFID label compose ID card and they have to put that on the card per user to record their participation. RS232 is utilized to interface the framework to the PC and spare the recorded participation from the database. This framework may offer ascent to the issue of fake access. An unapproved individual may influence utilization of approved ID to card and go into the association. Iris is another bio-metric that can be utilized for Attendance Systems. In the creators have proposed Daugman's calculation based Iris acknowledgment system. This framework utilizes iris acknowledgment administration framework that does catching the picture of iris acknowledgment, extraction, putting away and coordinating. In any case, the difficulty strikes lay the trans-mission lines in the spots where the geology is terrible. The Authors have proposed a framework in view of constant face recognition which is reliable, secure and fast which needs improvement in different lighting conditions.

3. PROPOSED MODEL

The Authors have proposed a unique mark based participation framework. A versatile unique finger impression gadget has been produced which can be passed among the understudies to put their finger on the sensor amid the address time without the educator's intercession. This framework guarantees an idiot proof strategy for denoting the participation. The issue with this approach is that going of the gadget amid the address time may divert the consideration of the understudies. Various works identified with Radio Frequency Identification (RFID) based Attendance Systems exist in the writing. In the writers have proposed RFID based framework in which understudies convey a RFID label compose ID card and they have to put that on the card per user to record their participation. RS232 is utilized to interface the framework to the PC and spare the recorded participation from the database. This framework may offer ascent to the issue of fake access. An unapproved individual may influence utilization of approved ID to card and go into the association. Iris is another bio-metric that can be utilized for Attendance Systems. In the creators have proposed Daugman's calculation based Iris acknowledgment system. This framework utilizes iris acknowledgment administration framework that does catching the picture of iris acknowledgment, extraction, putting away and coordinating. In any case, the difficulty jumps out at lay the trans-mission lines in the spots where the geography is awful. Authors have proposed a framework in view of constant

Algorithm 1:
Pseudo Code of Proposed System
1. Capture the Student's Image
2. Apply Viola-Jones algorithm (Face Detection)
3. Extract the ROI in Rectangular Bounding Box
4. Convert to gray scale, apply histogram equalization and Resize to 100x100
5. if Updating Database then
   Store in Database
   Else
   Apply PCA/LDA/LBPH (For feature Extraction) Apply Distance Classifier/SVM/Bayesian
   (For Classification)
   End if
6. Post-processing

3.1 Image capture

The Camera is mounted at a distance from the entrance to capture the frontal images of the students capture

TABLE 3.1: Drawbacks of various Attendance Systems

Types of System	Drawbacks
RFID based	Fraudulent usage
Fingerprint based	Time Consuming for students to wait and give their attendance
Iris-based	Evades the privacy of the user
Wireless-based	Poor performance if topography is bad Extraction Feature Image Capture Face Detection Pre−processing Image Capture Face Detection Pre−processing Classification

3.2 System Architecture
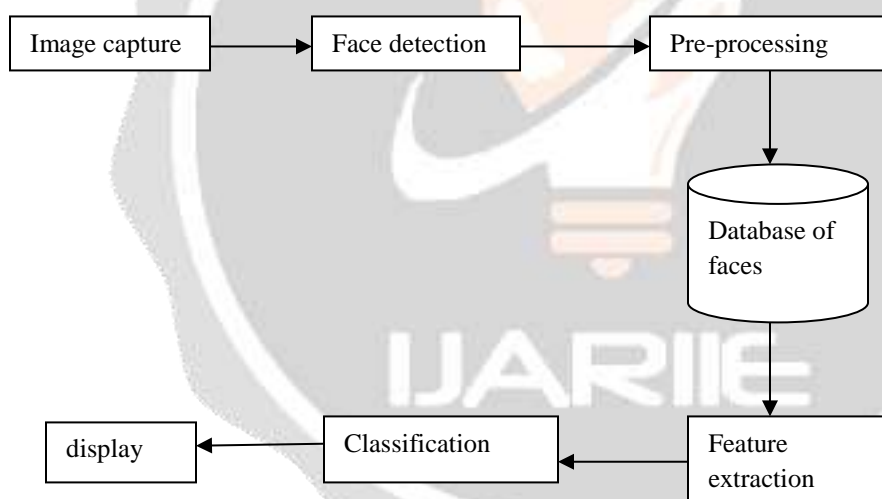
Fig: - System architecture

3.2 Face Detection

A proper and efficient face detection algorithm always enhances the performance of face recognition systems. Various algorithms are proposed for face detection such as Face geometry based methods, Feature Invariant methods, Machine learning based methods. Out of all these methods Viola and Jones proposed a framework which gives a high detection rate and is also fast.Viola-Jones detection algorithm is efficient for real time application as it is fast and robust Hence we chose Viola-Jones face detection algorithm which makes use of Integral Image and AdaBoost learning algorithm as classifier. We observed that this algorithm gives better results in different lighting conditions and we combined multiple Haar classifiers to achieve a better detection rates up to an angle of 30 degrees.

3.3 Pre-processing

The distinguished face is removed and subjected to pre-preparing. This pre-preparing step includes with histogram evening out of the extricated confront picture and is resized to 100x100. Histogram Equalization is the most widely recognized Histogram Normalization procedure. This enhance the complexity of the picture as it extends the scope of the powers in a picture by making it all the more clear.

3.4 Database development

As we picked biometric based framework enlistment of each individual is required. This database advancement stage comprises of picture catch of each person and concentrates being the bio-metric component, for our situation it is confront, and later it is upgraded utilizing pre-handling systems and put away in the database. In our undertaking we have taken the pictures of people in various points, distinctive articulations and furthermore in various lighting conditions. A database of 80 people (NITW-database) with 20 pictures of every has been gathered for this task. Figure 2 demonstrates few extricated and pre-handled appearances put away in the database.

3.4 Feature extraction and classification

The performance of a Face Recognition system also de-pends upon the feature extraction and their classification to get the accurate results. Feature extraction is achieved using feature based techniques or holistic techniques. In some holistic techniques we can make use of dimensionality reduction before classification. We compared the results of different holistic approaches used for feature extraction and classification in real time scenario. Table II provides the comparison details. Principal Component Analysis (PCA) was the first al-gorithm that represents the faces economically. In PCA the face images are represented using Eigen faces and their corresponding projections along each eigen face. Instead of using the entire all the dimensions of an image only meaningful dimensions are considered to represent the image. Mathematically an image using PCA is represented as

$$\chi = W\,Y\,+\mu$$

Where χ is the face vector, Y is vector of eigen faces, W is the feature vector, and μ is the average face vector. These projections (feature vectors) are then used as classification features in face recognition. Later Fisherâ ĂŹs Linear Discriminate Analysis (LDA) was proposed in which the ratio of between-class scatter and within-class scatter maximizes. PCA does not consider the discriminative information in the data where as LDA stores the discriminative information in the data. LDA may recognize an image in well-illuminated condition but fails in bad-illuminated conditions. There are some cases in which PCA outperforms LDA and vice versa Local Binary Pattern Histogram (LBPH) is recently proposed algorithm for face feature extraction. In this method LBP image is segmented into local regions and histogram of each is extracted and are concatenated to form a face descriptor. Accuracy of a system implemented using PCA and LDA are affected by database size which is not the case in LBP. In general features extracted from PCA and LDA are subjected to distance classifiers. The distance between the features of probe image and features of trained images is calculated. If the distance is less than the threshold then the probe image is recognized.

$$eR\ =\min k\omega-\omega I\ k$$

where eR is euclidean distance ω is image vector and i is number of trained image. But we can make use some machine learning algorithms for better classification. PCA is used for feature extraction and Support Vector Machine (SVM) is used for the classification. SVM is recently proposed algorithm which is an effective pattern classification algorithm. For pattern recognition SVM finds the optimal separation of closest points in the training set. This separation can be done linearly or non-linearly. In real world scenario we require a multi-class classification.

4. THREATS TO THE SYSTEM

Major threat to the face recognition systems is spoofing. Hence anti-spoofing technique like eye blink detector is included in the system. In order to detect the eye blink the number count of eye detection and count of iris region detection are compared. In static image the number of times eye get detected is equal to the number of times the iris region is detected or iris region detection count would be zero(if person closes his eyes). This count is incremented for certain number of frames. As shown in Figure 3 the eyes are extracted from the image using haar classifiers as in (i), then eye region is converted to gray scale image as in (ii) and the image is subjected to inverse suppression using binary threshold filter (as shown in (iii)). Then iris region gets a gray scale

Table II: Comparision of holistic face recognition algorithm

| Performance	PCA + Distance	LDA + Distance	PCA+SVM	PCA+Bayes	LBPH
Evaluation		Classifier	Classifier		+Distance
Conditions					Classifier
False Positive Rate	55%	53%	51%	52%	7f eet
Distance of	object	7f eet	7f eet	7f eet	4f eet
for correct recogni-					
tion				563 millisecs	
Training time	1081 millisecs	1234 millisecs	24570 millisecs	29798 millisecs	94%
Recognition		93%	91%	95%	95%
Rate(Static					
Images)					65%
Recognition		61%	58%	68%	78%
Rate(Real	time				
video)					2.3%
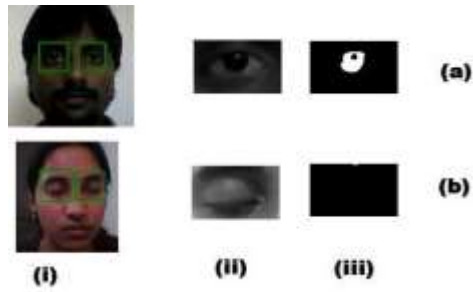
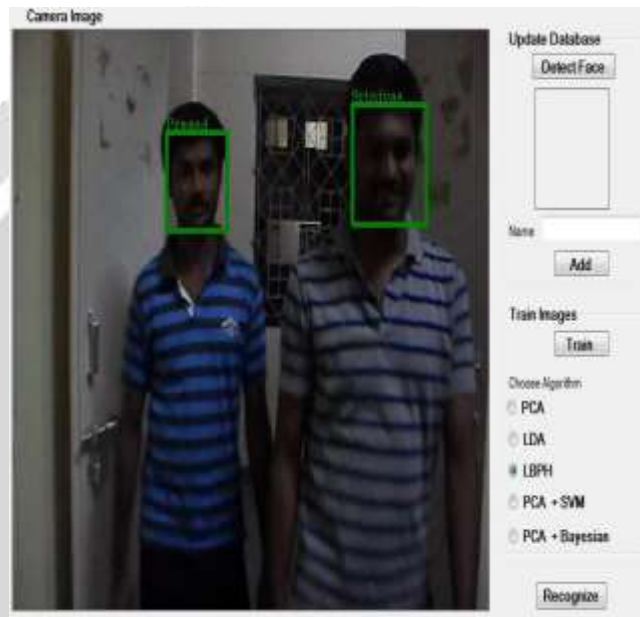**Fig. 3** Eyes and Iris Region Extraction

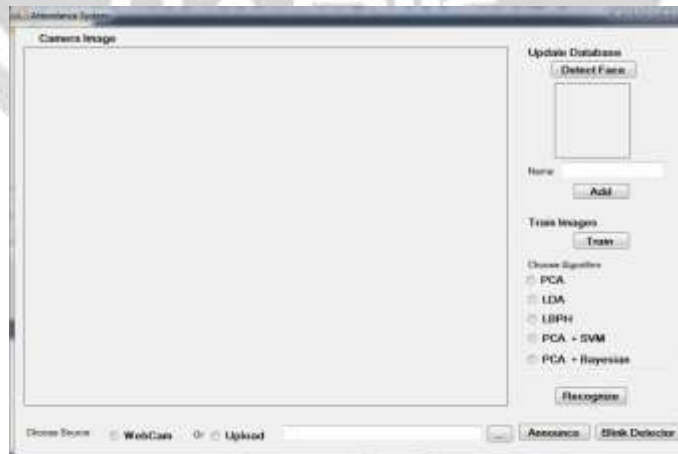
Fig. 4 Extraction and Updating Database

Fig 5. User Interface of the proposed system

5. CONCLUSION AND FUTURE WORK

Automated Attendance Systems based on face recognition techniques thus proved to be time saving and secured. This system can also be used to identify an un-known person. In real time scenarios LBPH outperforms other algorithms with better recognition rate and low false positive rate. SVM and Bayesian also prove to be better classifiers when compared to distance classifiers.

The future work is to improve the recognition rate of algorithms when there are unintentional changes in a person like tonsuring head, using scarf, and beard. The system developed only recognizes face up to 30 degrees angle variations which has to be improved further. Gait recognition can be fused with face recognition systems in order to achieve better performance of the system.

6. ACKNOWLEDGMENT