GROUP PHOTO BASED ATTENDANCE TRACKING SYSTEM

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Abstract: Face recognition is crucial in daily life in order to identify family, friends or someone we are familiar with. We might not perceive that several steps have actually taken in order to identify human faces. Human intelligence allows us to receive information and interpret the information in the recognition process. We receive information through the image projected into our eyes, by specifically retina in the form of light. Light is a form of electromagnetic waves which are radiated from a source onto an object and projected to human vision.

To build an automated system to have the same capability as a human to recognize faces. However, we need large memory to recognize different faces, for example, in the Universities, there are a lot of students with different race and gender, it is impossible to remember every face of the individual without making mistakes. In order to overcome human limitations, computers with almost limitless memory, high processing speed and power are used in face recognition systems.

The human face is a unique representation of individual identity. Thus, face recognition is defined as a biometric method in which identification of an individual is performed by comparing real-time capture image with stored images in the database of that person.

Keywords: Face Detection, Eyes Detection, AMS, LBP, PCA,SVM..

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I. INTRODUCTION

Image content analysis and pattern recognition are rapidly expanding areas of application today, thanks to the increased efficiency offered by the power of computers. Even though the systems proposed in literature are becoming more robust, reliable and efficient in performing face recognition tasks, several real technical and application aspects in the field are often omitted, or very simplified, making formal and complete use of its performance far from being yet a final solution.

In this work, several scientific contributions that have demonstrated good results and provided good methods in the field of face recognition are being considered with some modifications in order to pick the most effective solution and ensure that the recognition performance is extremely interesting compared to the state-of-the-art. We would like to develop a face recognition system that will be used within a class as an attendance system to mark presence of lecturers and students.

The proposed project is aimed to implement smart class room using technologies such as AI, AI part will be used with respect to attendance tracking via images, main objectives are listed below

- To detect the face segment from the image frame.

- To extract the useful features from the face detected.

- To classify the features in order to recognize the face detected.

- To record the attendance of the identified student.

II. LITERATURE REVIEW

"A Study of Various Face Detection Methods", International Journal of Advanced Research in Computer and Communication Engineering. This paper has information about Local Binary Pattern (LBP), Ada boost algorithm, local successive mean quantization transform (SMQT) Features, sparse network of winnows (SNOW) Classifier Method and Neural Network-based face detection methods in addition to Viola-Jones algorithm. They concluded that Viola-Jones algorithm has the highest speed and highest accuracy illumination problem, their overall performance is weaker than Viola-Jones algorithm for face detection illumination problem, their overall performance is weaker than Viola-Jones algorithm for face detection .technology used here is Python, CNN and this Viola-Jones method of face detection has performed well but works only for frontal face pose

"Face recognition ACM Computing Surveys", this paper has mentioned that different lighting and head poses are often the problems that could degrade the performance of face recognition based student attendance system .and they have used the technology Mat lab for image processing and simulation and Accuracy of the result varies with intensity of light put on images.

Class participation enrollment system based on face recognition which gives new method of achieving automatic enrollment based on face recognition with the use of android application. Considering the accuracy and speed they have used haar classifier for face detection, Visual Graphic Group (VGG) model for face recognition including illumination preprocessing algorithm. This system can achieve l00% accuracy under good illumination. Under the environment of poor illumination, the accuracy is 85.9%, but the accuracy can reach more than 90% through preprocessing. When the illumination is poorer, the accuracy of the recognition decreases which is as shown in table 1, and the accuracy is slightly improved after preprocessing. This system also has some drawback, such as the attitude and expression of individual changes a lot when take photos which will have a certain effect on the face recognition results. And when the illumination is too poor, the accuracy of this system is not constant.

Table 1: Accuracy of face recognition under poor illumination with processing [1]

Experiments	Class	Students	Recognition rate	Accuracy (%)
1	A	64	55	85.9%
2	A	64	52	81.2%
3	B	55	45	81.8%
4	B	55	46	83.6%

AMS using hybrid face recognition techniques which uses modified viola-jones algorithm and free partial face recognition algorithm for face recognition for face detection for high accuracy. The method uses Gabor Ternary Pattern (GTP) for robust and discriminative recognition. This system improves the existing AMS by avoiding manual recording of attendance. The efficiency of face recognition depends upon the number of faces detected. The higher the detected faces the greater the face recognition rate. From the table 2, it is observed that the percentage of detected faces is 95% and percentage of recognized faces is 47.36% and it keeps changing for each frame [2].

Table 2: Percentage of detected face in each frame [2]

Frame number	Number of students recognized	Percentage
1	9/19	47.36%
2	14/20	70%
3	5/12	41.67%

An efficient automated AMS based on Eigen face recognition is integrated by the face recognition technology using Eigen face database and Principal Component Analysis (PCA) algorithm with Matlab GUI. By using PCA technique facial characteristics are extracted from the database. By calculating distance between feature vectors, the test image is compared with the training image. The PCA approach requires full frontal image is to be hand over each time else the performance is reduced. The histogram equalization technique is used to direct the contrast of image depending on the threshold value the accuracy of the image is compared i.e. recognized image and test image are compared with the resemblance score with respect to threshold score. If matches then face are recognized else the face recognized [3].

Asymmetric Local Binary Pattern (AS-LBP) for facial expression recognition along with the modified convolution techniques results in high rate of face recognition without the loss of appearance information. The face image is detected with the help of viola jones algorithm. SVM is used to identify the facial expression which has high accuracy. The face recognition rate increases when the

width is more than the height of the operator This provides maximum of 95.71% for 13x3 and 15x3 sizes with an exception for 5x7 size. When the width and height of the operator is same the recognition rate will not i there is an increase in the operator and recognition rate on FGNET database for the size 15x7. It is compare with same work performed with LBP as the face recognition rate rely on some parameters such as image size, image sub-region size, databases used, classifier parameters The performance of face detection, which uses skin color division with thresholding skin color model combined with AdaBoost algorithm. The facial properties extraction is obtained with the help of PCA and K-Nearest Neighbour(KNN) based classification. Additionally, they have used morphological operators to the face detection performance. Some images for which the expected results have not been reached are no proper orientation of faces, image illumination is not good and if the distance of faces from the camera is not same. For very few images that vary in the high level of orientation are not recognized properly. This results 96% recognition rate for the accessible database Various approaches like Discrete Wavelets Transforms(DWT), Discrete Cosine Transform(DCT), Local Ternary Pattern(LTP), are used for face recognition and Equalized Uniform Local Binary Pattern(EULBP) is used for images with the less resolution, but with respect to accuracy this is not acceptable. Combination of DCT and DWT using LTP is accommodated to improve the low resolution of image and improves the accuracy face recognition. Performances of various approaches on the basis of accuracy, False Acceptance Rate(FAR) using various approaches and False Rejection images using different approaches are discussed an rejection rate of resolution image using different approaches are also discussed [6]. Component-based face detector using SVM classifier to achieve sufficient accuracy and speed in a face recognition system. This proposal uses main approach in classifier with a Gaussian kernel that detects images. Details on design of an iterative bootstrapping are provided, and training parameter values are best results. The disadvantages are time consuming to identify the face region and it is less accurate [7]. Generalizations to the gray scale and rotation invariant texture organization method based on LBP derive a presentation that permits for realizing a gray scale and rotation operator for any quantization of the angular space and for any spatial resolution .This presents a method for combining multiple operators for multi-resolution analysis.

This technique recognition rate of 98% for various textures [8]. The application of LBP for facial expression recognition is suggested the textures modelled with Volume SURVEY ON ATTENDANCE MANAGEMENT SYSTEM USING FACE RECOGNITION compared with the resemblance score with respect to threshold score. If matches then face are recognized else the face is not for facial expression recognition along with the modified convolution techniques results in high rate of face recognition without the loss of appearance information. The face image is detected with the help is used to identify the facial expression which has high accuracy. The face recognition rate than the height of the operator. Maximum of 95.71% for 13x3 and 15x3 sizes with an exception for 5x7 size. When the width and height of the recognition rate will not improve, though recognition rate of 79.46% 7. It is unbalanced to LBP as the face on some parameters such as image size,

III. PROPOSED SYSTEM

The approach performs face recognition based student attendance system. The methodology flow begins with the capture of image by using simple and handy interface, followed by pre-processing of the captured facial images, then feature extraction from the facial images, subjective selection and lastly classification of the facial images to be recognized. Both LBP and PCA feature extraction methods are studied in detail and computed in this proposed approach in order to make comparisons. LBP is enhanced in this approach to reduce the illumination effect. An algorithm to combine enhanced LBP and PCA is also designed for subjective selection in order to increase the accuracy. The details of each stage will be discussed in the following sections.
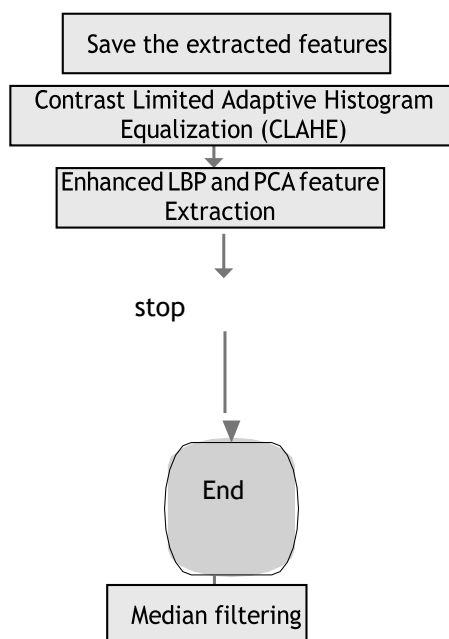
3.1 Training database
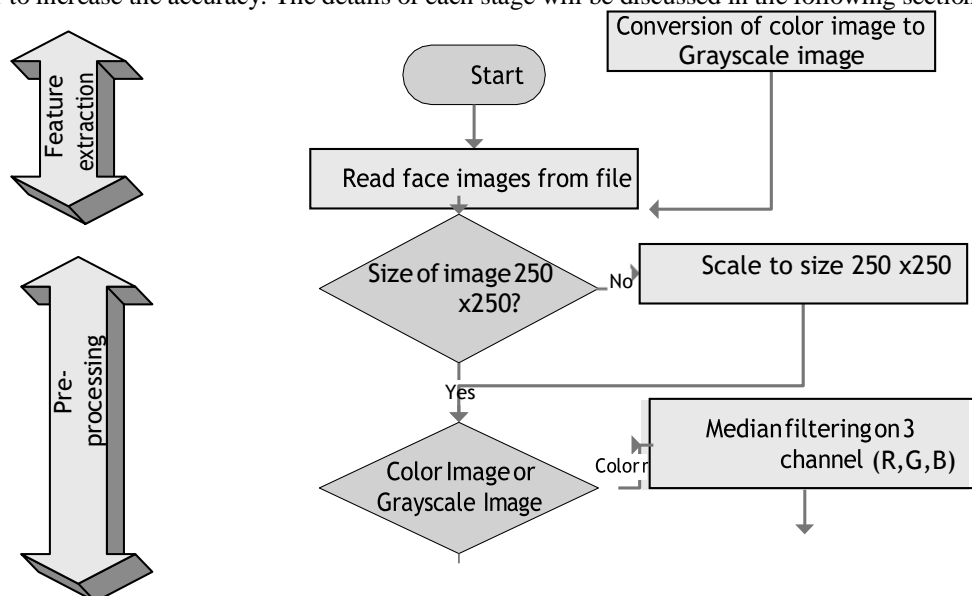
Grayscale

Figure 1: Flow of the Proposed Approach (Training Part)
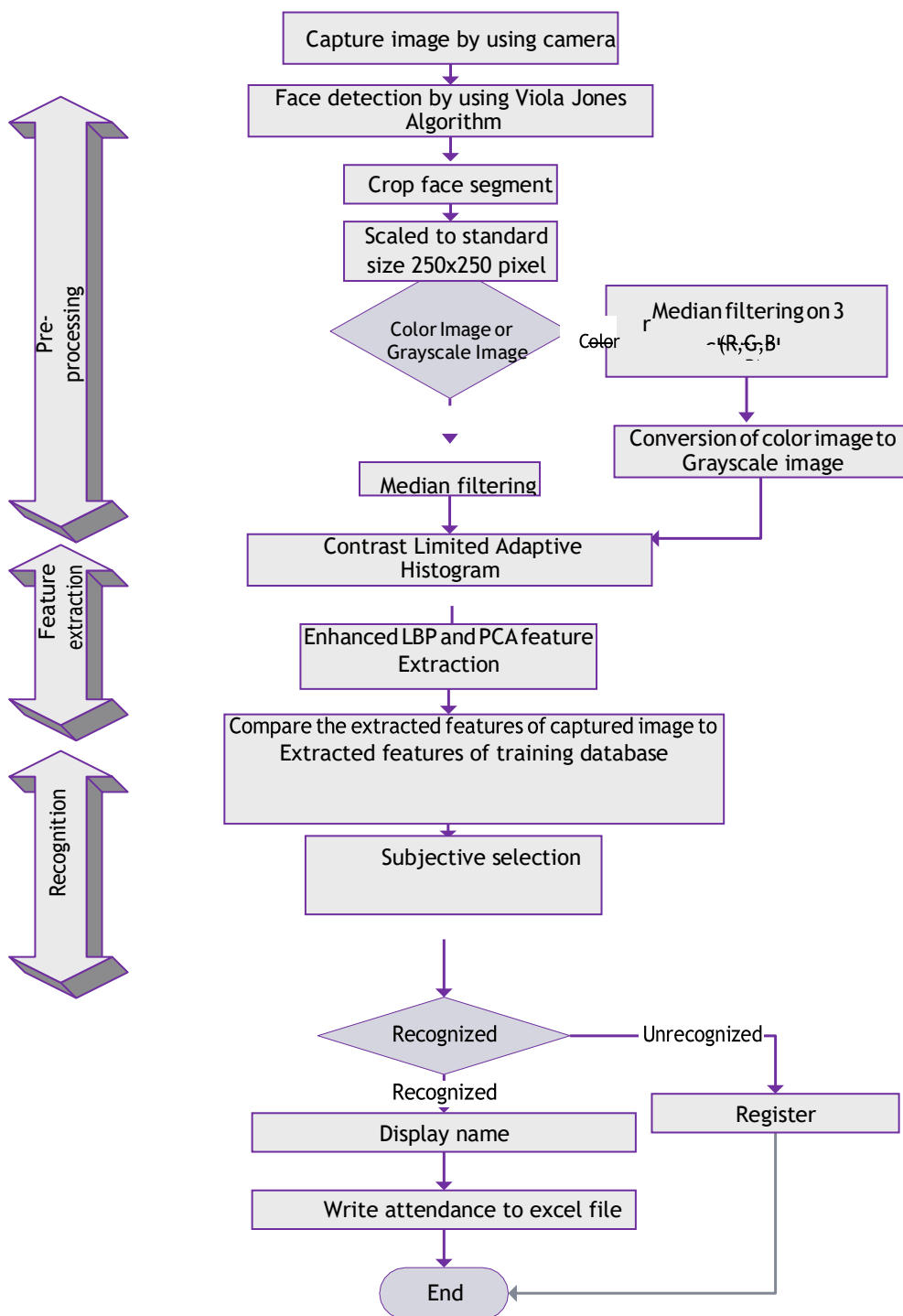
3.2 Recognition

Figure 2   Flow of the Proposed Approach of Recognition Part

3.3 Description of Target User

The proposed project is aimed to help the teachers by automating the process of attendance tracking hence its useful at school, colleges or universities where tracking of students attendance is important and a routine work for the teachers before conducting the classes.

3.4 Advantages of proposed system

- By automating the process of attendance tracking one can save the time
- It's possible to avoid the proxy attendance
- It could be improved further for applications where authentication with bio parameters plays key role.

3.5 Scope

- This system is aimed at developing a Face Recognition of every student that are given in the data set. This system can be used by end user and administrator to perform extensible tasks to predict a face of student in an easy and securemanner.

- Finds useful at schools, colleges or universities where students attendance tracking is utmost important.
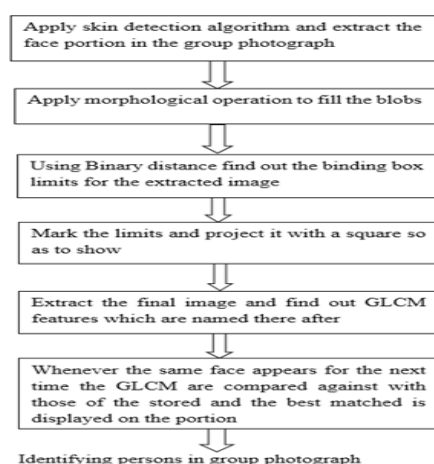
IV. IMPLEMENTATION

4.1 Proposed methodology

Figure 3: Proposed methodologies

4.2 Modules

Skin Detection Algorithm

Skin detection algorithm is applied to detect the face in a digital image. Better recognition is directly proportional to the quality of the image. There are various types of approaches which includes easy and difficult approaches to extract the face portion like edge based, geometry based, with controlled background in a given photograph. By using one of the approaches we extract face portion of the given input image. From the Figure, Input image can be composed of varieties of colors i.e., not color specific. In this approach color information is going to play a key role in extracting the images. This technique is gaining an enormous response in recent days.

When image segmentation provides infected region to do analysis. There are lot of data that can be extracted from the image. Dimensionality reduction is a crucial step to be followed. So as to avoid model confusion and conflict also it is very important to consider all necessary features and avoid any miss. Feature Extraction is one of the most crucial steps in machine learning. Extraction of essential features is very important. Features need to be selected to avoid overfitting and under- fitting. In this project, various image features are extracted such as randomness, mean, entropy, the standard deviation of the colored image.

Morphological Operations

We need to perform the morphological operations to fill the gaps in the input image. Dilation and Erosion are the main morphological operations8. Both operations aim to process the pixels. Dilation deals with maximum value whereas erosion deals with minimum values. Using binary distance approach for the given input image, we get bounding box which limits detecting the boundary of an image. Using the limits, face can be tracked and it is projected in the form of a square in the given image.

Grey Level Co-occurrences Matrix for Face Detection

Extracting the face from the image takes next step to detect who the person is. GLCM is one of the earliest approaches used for texture feature extraction9. From the extracted faces we are going to take the properties of the face. The extracted properties after detecting are projected in the group photograph in the form of a square.

V. RESULT AND SNAPSHOTS

This application helps faculties to take attendance of students by capturing the group photo of students in class room. It is backed by Deep learning algorithm

a) Home Page

b) Students Present in Group Photo

VI. CONCLUSION

In this approach, a face recognition based automated student attendance system is thoroughly described. The proposed approach provides a method to identify the individuals by comparing their input image obtained from recording video frame with respect to train image. This proposed approach able to detect and localize face from an input facial image, which is obtained from the recording video frame. Besides, it provides a method in pre-processing stage to enhance the image contrast and reduce the illumination effect. Extraction of features from the facial image is performed by applying both LBP and PCA. The algorithm designed to combine LBP and PCA able to stabilize the system by giving consistent results. The accuracy of this proposed approach is 100 % for high-quality images, 92.31 % for low-quality images and 95.76 % of Yale face database when two images per person are trained.

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