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Student Attendance System Using Face Detection and Recognition

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ABSTRACT:
In today's blistering pace of population, forgery is proportional to the rate and biometric is the only source to overcome it to an extent. In which there's fingerprint sensor, voice recognition, facial recognition, etc. Face recognition plays a big hand in putting a halt to all the counterfeit happening. Seeing all the circumstances, the authors came across with a facial recognition program that uses computer vision to detect an individual's face and identify it with its data and help in managing attendance system of an institution. Attendance system required human work to keep a track of every individual back in the day, with facial recognition a considerable amount of work shall be reduced as computer can manage attendance as well as keep a track of it and in an institution every individual's attendance can be managed at a single place with the help of face recognition.
TECHNICAL KEYWORDS: *Face recognition, Detection, biometrics, radius calculation, Java ,Mysql, Database , Webcam, image processing, segmentation, pattern recognition*

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I. MOTIVATION:

As we know school, colleges having lots of students
Presents in single class or division, and their attendance management task is critical paper work task for teachers.
It is been a great innovation towards the attendance system and maintaining proper attendance for each and every student based on their presence in class

II. ALGORITHM USED:

There are various algorithms used for facial recognition. Some of them are as follows:

1. Eigen faces
2. Fisher faces
3. Local binary patterns histograms

1. EIGEN FACES

This method is a statistical plan. The characteristic which influences the images is derived by this algorithm. Thewhole recognition method will depend on the training database that will be provided. The images from two different classes are not treated individually.

2. FISHER FACES

Fisher faces algorithm also follows a progressive approach just like the Eigen faces. This method is a alteration of Eigen faces so it uses the same principal Components Analysis. The major conversion is that the fisher faces considers the classes. As mentioned previously, the Eigen faces does not differentiate between the two pictures from two differed classes while training. The total average affects each picture. A Fisher face employs LinearDiscriminant Analysis for distinguishing between pictures from a different class.

3. LOCAL BINARY PATTERNS HISTOGRAMS

This method needs the gray scale pictures for dealing with the training part. This algorithm in comparison to otheralgorithms is not a holistic approach.

A. PARAMETERS:

LBPH uses the following parameters:

i. Radius:

Generally 1 is set as a radius for the circular local binary pattern which denotes the radius around the central pixel.

ii. Neighbours:

The number of sample points surrounding the central pixel which is generally 8.The computational cost will increase with increase I number sample point.

III. LITERATURE SURVEY:

3.1 Literature Survey

1. Paper details

:face Recognition Based on Using Ridgelet and Curvelet Transform.

In this system,Authors proposed asystem to implementfacerecognition algorithm.The new feature extraction methods according to ridgelet transform and curvelet[1] trans- form for identifying thefaceimages are provided. At first, after segmentation and normalization the collarette area offace imageshas been extracted. Then the quality of image by using median filter, histogram equalization, and the two-dimensional (2D) Wiener filter is improved. Finally the ridgelet transform and curvelet transform are applied for extracting features and then the binary bit stream vectors are generated. .

2. Paper details

:face Feature Extraction for Personal Identi- fication using LiftingWavelet Transform.

In this system,Author suggested novel approach toface recognition. Lifting wavelet- based algorithm was developed which reduces noise,extract important features and Enhanceface images. Eucledian distance[2] and threshold is used to estimate similarity between images. The proposed technique was computationally effective with recogni- tion onface database. This approach was simple and effective. The experimentswere done in MATLAB.

3. Paper details :Implementation of anIdentification SystemUsingface Recognition.

This system gives Solution to implement Security system is proposed in this paper using anface recognition technique.This system acquires images using an infrared cam- era which extracts 2D code through scale-space filtering and concavity.Experiments were then performed using a set of 272face images[3] taken from 18 persons. The re- sults showed that theface feature patterns obtained can be clearly discriminated from person to person. A scale-space filtering technique was used to overcome the noise sensitivity related to the second derivatives. The implemented approach was able to resolve mis-identification problems caused by variations in color and brightness among people under a variety of illumination conditions.

4. Paper details

:face SegmentationUsing Geodesic Active Contours**.**

In the implemented system, Author described a novelface segmentation scheme employing geodesic active contours (GACs)[4] to extract theface from the surrounding structures. The proposed scheme elicits theface texture in an iterative fashion.The matching performance of the implemented segmentation algorithm was evaluated on the WVU non-ideal and CASIA -Intervalface image database. In the case of the WVU

database, we speculate that the image acquisition protocol has a role to play. If the leftface is captured rst, the subject may get used to the acquisition process and thus be able to present the right eye in a fashion that results in better image quality (or vice-versa).

5. Paper details: New Methods inface Recognition**.**
This paper suggests the four advances inface recognisation[5] :
1) more disciplined methods for detecting and faithfully modeling their is inner and outer boundaries with active contours, leading to more exible embedded coordinate systems.
2) Fourier-based methods for solving problems inface trigonometry and projective geometry, allowing off-axis gaze to be handled by detecting it and "rotating" the eye into orthographic perspective.
3) statistical inference methods for detecting and excluding eyelashes.
4) exploration of score normalizations, depending on the amount offace data that is available in images and the required scale of database search.

6. Paper details :Face detection for automatic exposurecon- trol in handheld camera**.**
Author present a face detection system for automatic exposure control in a hand- held digital camera or camera phone. Contributions include a complexity control scheme to meet hard real- time deadlines and a system design exploiting several lev- els of parallelism. Adaboost Algorithm is used in implementation of system. The Adaboost[6] based method proposed by Viola and Jones gains great popularity due to a high detection rate, low complexity and solid theoretical basis. The fast speed of Adaboost method is due to the use of simple Haar-like features and a cascaded classier structure, which excludes most of the image window hypotheses quickly.

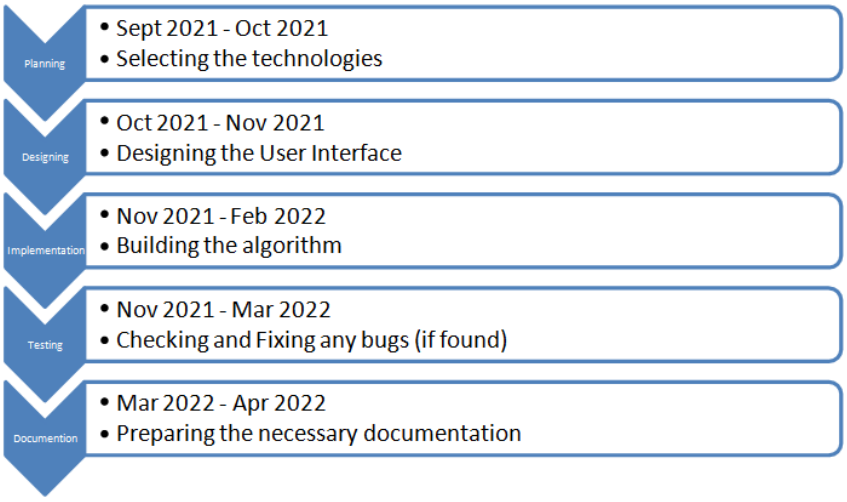
7. Paper details:Exploring Multispectralface Recognition beyond900nm.
Mostface recognition systems acquire images of the eye in the 700nm - 900nm range of the electromagnetic spectrum. But, the system implemented in this paper is able to examine theface at wavelengths beyond 900nm[7]. The purpose is to understand theface structure at longer wavelengths and to determine the possibility of performing cross-spectralface matching. An acquisition system is rst designed for imaging theface at narrow spectral bands in the 950 nm - 1650 nm range.

8. Paper details
:face Recognition:An EmergingBiometric Technology**.**
The system examines automatedfacerecognition as a biometrically based technology for personalidentification and verification. The motivation for this endeavor stems from the observation that the humanface provides a particularly interesting structure on which to base a technology for noninvasive biometric assessment. In particular, the biomedical literature suggests thatfacees are as distinct as fingerprints or patterns of retinal blood vessels. Further, since theface is an overt body, its appearance is amenable to remate examination[8] with the aid of a machine vision system.

9. Paper details :Performance Evaluation offaceBased Recog- nitionSystem Implementing PCAand ICA EncodingTech- niques.
The system describes and analyzes the performance of twoface-encoding techniques. The first technique is based on Principle Component Analysis (PCA)[9] encoding method while the second technique is a combination of Principal Component Anal
ysis with Independent Component Analysis (ICA) following it. Both techniques are applied globally. PCA and ICA are two well known methods used to process a variety of data. Though PCA has been used as a preprocessing step that reduces dimen- sions for obtaining ICA components forface, it has never been analyzed in depth as an individual encoding method. In practice PCA and ICA are known as methods that extract global and fine features, respectively. It is shown here that when PCA and ICA methods are used to encodeface images, one of the critical steps required to achieve a good performance is compensation for rotation effect.

10. Paper details
: Iris liveness detection methods in the mobile biometricsscenario.
Biometric systems based onface are vulnerable to direct attacks consisting on the presentation of a fakeface to the sensor (a printed or a contact lensesface image, among others). The mobile biometrics scenario stresses the importance of assessing the security issues. Widening a previous work, several state of-the-artface liveness detection[10] methods were implemented and adapted to a less-constrainedscenario. The proposed method combines a feature selection step prior to theuse of state-of- the art classiers to perform the classication based upon the "best features". Five well known existing databases forface liveness purposes (Biosec, Clarkson, NotreDame and Warsaw) and a recently published database, MobBIOfake, with real and fake images captured in the mobile scenario were tested. The results obtained suggest that the automated segmentation step does not degrade signicantly the results

- **PLAN OF PROJECT:**



IV. Conclusion:

It can be concluded that automated student attendance system in classroom using human face recognition technique works quite well. Certainly, it can be improved for yielding a better result particularly by paying attention in feature extraction or recognition process. This improvement may help the recognition process become more robust. The success rate of the proposed system in recognizing facial images of the students who are seated in classroom is about 82%.