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IRIS Recognition Using Cumulative Sum Based Change Analysis

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Abstract:

With increasing identify fraud and emphasis on security, there is a growing and urgent need to efficiently identify individuals. A biometric technology seems to be imminent method. Iris recognition is reliable and precise biometric system. This paper proposes efficient iris recognition is reliable and precise biometric system. This paper proposes an efficient iris recognition system with CUMSUM based CPA approach. The experimental results are conducted using CASIA v 1.0 and CASIA –Interval Database which gives minimum EER of 0.088 with correct Recognition Rate of 99.84% the proposed method is reliable, efficient where overall computational complexity is reduced.

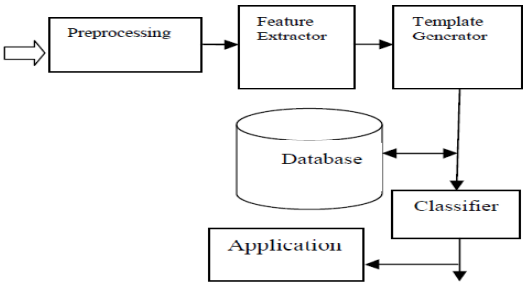
KEYWORDS :
IRIS , Authentication, Security, Identification.

I. INTRODUCTION (HEADING 1):

All Biometric can be used for security, privacy convenience fraud reduction such as physical security and access control, financial services, health services and law enforcement. Recently passport and biometric ID cards has been released based on iris, face and fingerprint technology to improve control process and make person travel at airport in simple way. In U.K. and Australia biometric passport based on face recognition technology are being released. U.S.Government used multimodal of biometric technology in a program called Registered Travelers Program to increase the performance of security process at airports. Furthermore, database access control, computer login applications are new biometric technologies with more security and easier accessibility and have manipulated problems such as forgetting or hacking passwords.

The new login method using combination of password and its typing pattern has been proposed. Aadhaar, India's Unique ID project for its one billion citizens uses Iris scan as one of the identification features. Generally a biometric system is characterized by highly unique and stable features in order to provide convenience and prevent misinterpretation of features.

The basic block diagram of biometric system is shown in Fig. 1.1.. Iris recognition is one of the important biometric approaches for human identification. Iris patterns are highly unique, stable and reliable. Iris recognition system consists of image acquisition, localization of the iris region, feature extraction from normalized and classification of iris patterns. Fig: 2.1shows stages of iris recognition system.



1.1.Block diagram of biometric system

II. EXISTING SYSTEM:

Iris recognition is one of the important biometric approaches for human identification. Iris patterns are highly unique, stable and reliable. Iris recognition system consists of image acquisition, localization of the iris region, feature extraction from normalized and classification of iris patterns. Fig: 2.1shows stages of iris recognition system.

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Iris recognition technique is one of the biometric verification and identification techniques which are being used by many security applications. Daugman technique, Wilde's systems are two earliest and best known iris recognition systems.

These systems include every stage of iris recognition as: segmentation, feature extraction, encoding and matching. A variety of methods have been developed for iris localization. In the system with circular edge detector, in gradient based Hough Transform are used for localizing iris regions.

Also circular Hough Transform random Hough transform are applied to find iris circles and complete localization of iris. In Canny Operator is used to locate pupil boundary. Various normalization methods also have been developed.

In Daugman devised the homogenous Rubber Sheet model for normalization. For feature extraction and pattern matching many algorithms have been applied using Phase based approach, Wavelet transform Zero crossing approach, Gabor Filtering texture analysis based methods are also considered for iris recognition.

The independent is proposed for iris recognition in Makram Nabti and Bouridane proposed a novel segmentation method based on wavelet maxima and especial Gabor Filter bank for feature extraction which obtains an efficient recognition with an accuracy of99.43%. Narote et al. proposed a new algorithm for iris recognition based on the Dual Tree Complex Wavelet Transform.

Emine Krichen use a hybrid method for iris segmentation, Hough transform for outer iris boundary and Integral-differential operator for inner iris boundary. The iris code was produced using wavelet packets.

This method obtains 2% FAR and 11.5% FRR which is improved to Daugman method. A region based feature extraction method based on 2D discrete wavelet transform was proposed by N. Tajbakhsh.

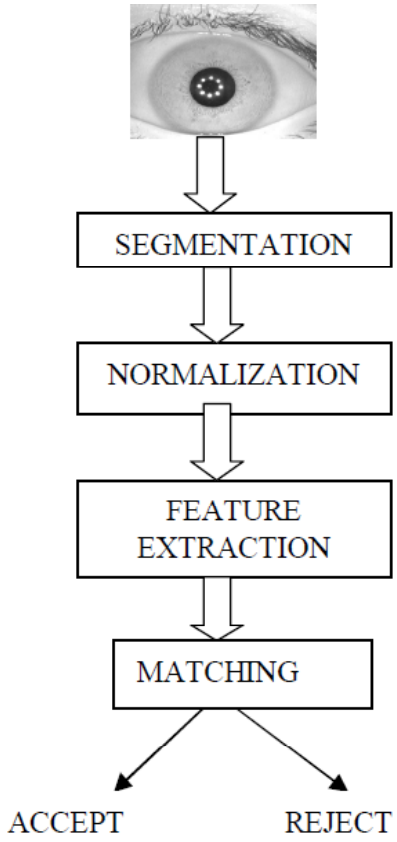

Fig: 2.1. Stages of Iris Recognition System

III. PROPOSED SYSTEM:

Our preprocessing operates in three steps. An iris image contains not only the region of iris but also eyelash, eyelid, reflection, pupil, etc .To facilitates the subsequent processing, the original iris images should be first segmented and the irrelevant parts are removed from the original image.

Then, the localized iris is unwrapped to a rectangular block of a fixed size in order to reduce the deformation caused by variations of the pupil and obtain approximate scale invariance. Finally, lighting correction and contrast improvement are applied to compensate for Differences of imaging conditions.

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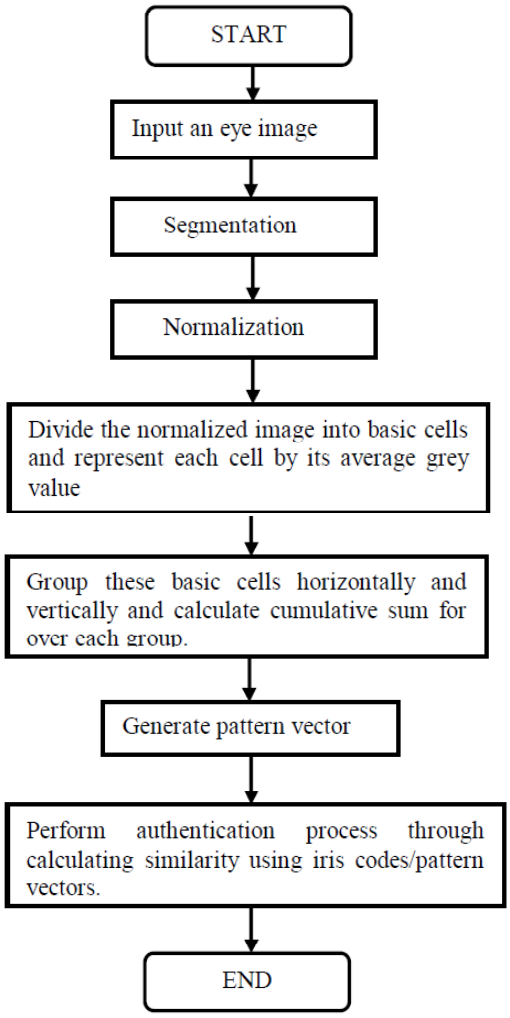

Fig: 2.5 Iris recognition using CUMSUM based CPA

IV. PROJECT PLAN:

Human IRIS (Iris Recognition Integrated System) is used in many security purpose because of it is more accurate and reliable than other biometric techniques. In our project we are discussing one of the applications of IRIS

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A.PROJECT DESCRIPTION:

The operation is that human iris is captured by using CCD (charge couple device) camera. Then this images are stored in laptop or computer. The computer processes the image using a code which written in MATLAB. If a man want to open the locker or door he interface the images stored in the laptop to the micro controller using UART cable..

Then run code in system which verify whether his is authorized person or not and sends the message to the person through GSM.

The following blocks are used for this operation

1.Microcontroller (PIC16F4877A)

2.GSM

3.LCD display

4.DC motor

5.Power supply

6.Interfacing devices (RS232, MAX232)

7.Motor Driver

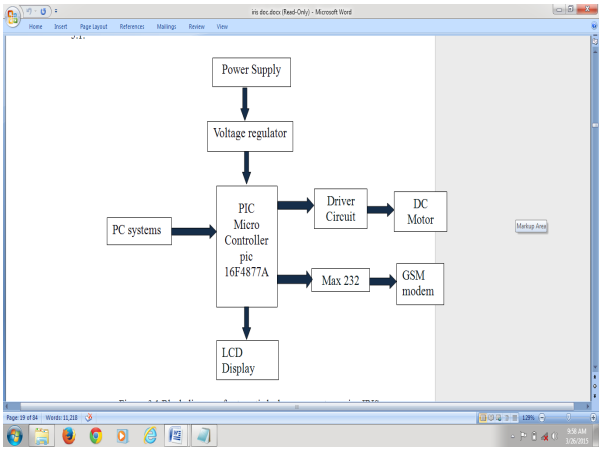

Fig 3.1:Block diagram of automatic locker open system using IRIS

B.LOCALIZATION:

The Iris localization or segmentation is an essential stage that plays an important role in designing more accurate iris recognition systems.The iris region can be approximated by two circles, one for iris/sclera boundary and another for iris /pupil boundary. The eye lids and eyelashes occlude the upper and lower parts of iris region. So a technique needs to be developed to remove these eyelids and eyelashes as well as locating accurate iris region. The segmentation stage is critical issue to the success of an iris recognition system. Many researchers had proposed techniques for locating iris

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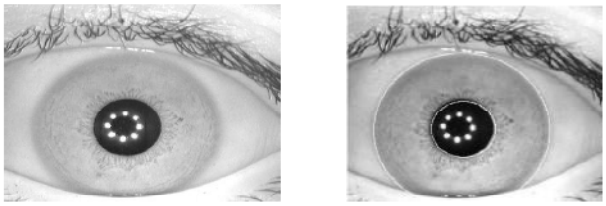
and pupil boundaries such as Hough Transform, Daugman's Intergro-Differential Operator and Active ContourModels. We used circular Hough transform to locate the iris from original eye image. The circular Hough transform deduce radius and center coordinates of pupil and iris regions. An example of iris localization is shown in Fig. 2.2(a).



(a) (b)

Fig: 3.2 (a) Original eye image and(b) segmented image using Automatic segmentation method

A method for eyelash detection has been presented in by Kong and Zhang. The eyelashes can be separable (isolated in image) and multiple eyelashes (bunched together and overlap in eye image). Separable eyelashes are detected using 1 D Gabor Filters. Multiple eyelashes are detected using variance of intensity. The Kong and Zhang model make the useof connective criteria so that each point in an eye lash should connect to another point in eyelash or to an eyelid. Separable reflections along the eye image are detected using thresholding since intensity values at these regions will be higher than at any other regions in the image. Fig. 2.3 shows some of experimental results of eyelash and eyelid removal from image.

Finally due to high computational complexity the time required to segment image using Circular Hough Transform is quite more. However, we have failed to find pupil area correctly of the images where there in small intensity differences between iris region and pupil region. Table 2.1 and Table 2.2 shows the comparative segmentation time for CASIA-Interval and CASIA-Version1 iris database respectively. From Table 2.1 and Table 2.2 we can observe that Circular Hough Transform takes more time for segmentation of CASIA Version 1.0 database than that of CASIA V3Interval database"

C.NORMALIZATION:

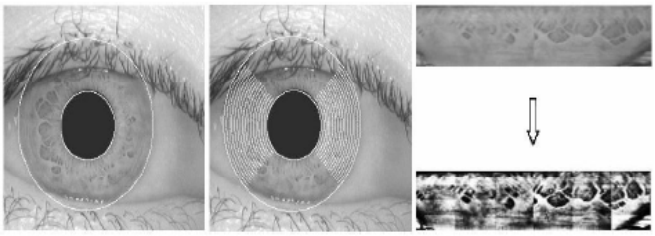
Normalization is a process which performed after the segmentation stage of iris recognition system.

Two images of same iris might be very different as a result of size image, size of pupil, orientation of iris, pupil dilation, rotation of camera, head tilt and rotation of eye within eye socket. To cope with this, the image is normalized by converting it into polar dimensions. In our approach we used Dagan's Rubber Sheet Model for iris normalization. The homogeneous rubber sheet mode is a common method that is used for iris normalization. This model transforms iris region from Cartesian coordinates (x, y) to polar coordinates (r,). The remapping of the iris region is modeled as below.

$$I(x(r,\theta), y(r,\theta)) \rightarrow I(r,\theta)$$

$$\text{Where } \theta \in ([3\Pi/4, 5\Pi/4] \cup [7\Pi/4, 9\Pi/4])$$

A sampling is angle and is normalized distance between each sampling point and papillary boundary. Fig. 2.4 shows a process of normalization.



(a) (b) (c)

Fig: 3.3 Image Pre-processing: (a) Localization of the Iris Region,(b) Unwrapping and Normalization, (c) Enhancement of the Normalized Iris Template

V. EXPERIMENTAL RESULTS AND DISCUSSION:

In our project we are using human iris for the security purpose such as bank locker open, door open system, information security etc.By using CCD (charge Coupled device) camera, we are capturing the human eye then it is stored in database of computer. After extract the features of the eye and take the iris part of the eye only. Because iris of each person is different even iris of two eyes of the single person is different. That's why this experiment is more accurate than the face print, finger print etc. In our project we are taking the iris of the human by using CCD camera then is stored in computer or laptop. By using MATLAB we are writing code then process the code which extracts the features and compare the captured eye with the database. If the eye is matched then sends the message to the authorized person.

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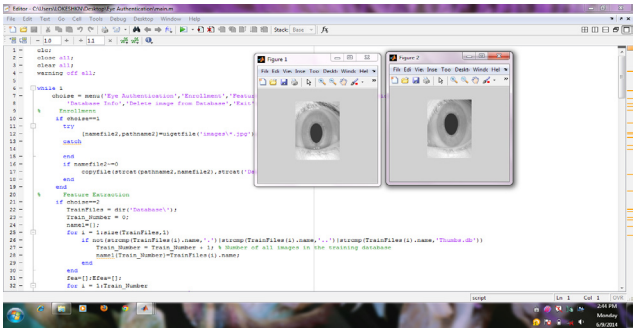

VI.CONCLUSION:

a)In this paper we propose an efficient and reliable iris recognition system. We measure performance evaluation with various parameters such as FAR,FRR, EER, CRR. Iris image is segmented using Circular Hough Transform which result 98% images were properly segmented. Then Daugman's Rubber Sheet Model is used to normalize the iris image so that we get fixed rectangular box for further processing. Next we applied our CUMSUM Based CPA approach.

b)For extraction of features and encoding. Finally we performed classification or matching using Hamming Distance Classifier. Experimental results shows that computational complexity is reduced using our proposed approach. Thus it increases the overall accuracy of the system. The results also show the distribution of Inter-Class and Intra-Class Hamming Distance using CASIA V3 Interval Database..

VII .FUTURE ENHANCEMENTS:

Limitations in the face recognition, fingerprint recognition are that it is not accurate and less reliable. So by using this iris recognition system we can provide most accurate and reliable security. Because iris of two eyes of a single person is different to each other. By using this system we can avoid hacking of others systems and it is more reliable than the password etc. In our project we providing the security to the bank lockers and also provide the security to the houses. This iris recognition system can be used in airports, railway stations for providing effective security. Only one drawback is that it is more expensive than the face print, finger print recognition systems.

ACKNOWLEDGMENT:

The preferred spelling of the word "acknowledgment" in America is without an "e" after the "g". Avoid the stilted expression, "One of us (R. B. G.) thanks . . ." Instead, try "R. B. G. thanks". Put applicable sponsor acknowledgments here; DO NOT place them on the first page of your paper or as a footnote.

REFERENCES:

[1] http://www.passport.gov.uk/index.asp
[2] http://www.dhs.gov/dhspublic/, last access (22 June 2011).

[3]J. Daugman, "How iris recognition works," Proceedings of 2002 International Conference on Image Processing, vol. 1, 2002, pp. 33-36.

[4]J. Daugman, "High confidence visual recognition of persons by a Test of statistical independence," IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 15, no. 11, November 1993, pp. 1148-1160.

[5]J. Daugman, "Biometric Personal Identification System Based On Iris Analysis", US Patent, no. 5291560, (1994) [7] R. P. Wildes, J. C. Asmuth, S. C. Hsu, R. J. Kolczynski, J. R. Matey, and S. E. McBride., "Automated, noninvasive iris Recognition system and method",U.S. Patent No. 5,572,596, 1996

[6] V. Dorairaj, N. Schmid and G. Fahmy, "Performance Evaluation of Iris Based Recognition System Implementing PCA And ICA Techniques", Proceedings of SPIE 2005 Symposium, (2005); Orlando, USA

[7]Sanchez-Avila and R. Sanchez-Reillo, "Iris-Based Biometric Recognition Using Dyadic Wavelet Transform", IEEE Aerospace and Electronic Systems Magazine, (2002), pp. 3-6.