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Generating an Iris Code Using Iris Recognition for Biometric Application

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Abstract

One of the major issues in iris code is code generation technique has an error false report. In this paper, the templates produced by IrisCode and its generalization are convex polyhedral cones. Each convex polyhedral cone represents one iris template but an iris is represented by a set of convex polyhedral cones that are near in terms of hamming distance. So, the iris recognition algorithm remains incomplete. In order to avoid this issue they apply pattern recognition to identify the person for security implications. An iris image is taken as predefined image and that image is scanned through various phases. The iris image is then converted to gray scale image using gray scale conversion. In addition to this, canny edge detection algorithm is used to find smoothing, gradients and threshold value.

Keywords– *Biometrics, iris recognition, palm print recognition, template protection.*

1. Introduction

Image processing is a form of signal processing for which the input is an image, such as photograph or video frame; the output of image processing may be either an image or set of characteristics or parameters related to the image. Most image processing techniques involved treating the image as a two dimensional signal and applying standard signal processing techniques. Modern digital technology is used to manipulate multi-dimensional signals with systems that range from simple digital circuits to advanced parallel computers. Image processing consists of three major techniques.

(I)Image enhancement

It refers to accentuation or sharpening of image features such as boundaries or contrast to make a graphic display more useful for display and analysis. This process does not increase the inherent information content in data. It includes gray level and contrast manipulation, noise reduction, filtering and so on.

(ii)Image restoration

It is concerned with filtering the observed image to minimize the effect of the degradation. Effectiveness of image restoration depends on the extent and accuracy of the knowledge of the degradation process as well as on filter design.

(iii) Age compression

It is concerned with minimizing the number of bits required to represent an image. Applications of compression are in broadcast TV, remote sensing satellite, education and business documents, and motion satellite images and so on.

Advantages

i. The processing of images is faster and more cost-effective. One needs less time for processing, as well as less film and other photographing equipment.
ii. It is more ecological to process images. No processing or fixing chemicals are needed to take and process digital images. However, printing inks are essential when printing digital images.
iii. When shooting a digital image, one can immediately see if the image is good or not.
iv. The expensive reproduction is faster and cheaper.
v. By changing the image format and resolution the image can be used in a number of media.

Disadvantages

i. Misuse of copyright is easier than it was earlier.
ii. The value of image will get worse.
iii. Work has become more technical, which may not be a disadvantage for everyone.
iv. A digital file of a certain size cannot be enlargened with a good quality anymore.

Applications

i. Image processing is used in Visualization progress. Visualization is nothing which is used to observe the objects that are not visible.
ii. Image sharpening and restoration – To create a better image.
iii. Image retrieval- Seek for the image of interest.

iv. Measurement of pattern-Measure various objects in an image.
v. Image recognition- Distinguish the objects in an image.

2. Related Work

A wavelet transform as feature extraction technique is created. Since it doesn't have shift invariant property. It is a system property that can be verified by experimental measurement. To find the shift difference between the new image and the original image position.Iris recognitionprovides a reliable method for personal identification.Inspired by method recent achievements in the field of visual neuroscience. We encode the non-local image comparison. In non-cooperative iris recognition one should deal with uncontrolled behavior of the subject as well as uncontrolled lighting conditions.

In this paper, the proposed system is the method for applying pattern recognition. An iris image is taken as predefined image and scanned through various phases. Using gray scale conversion technique an iris image is converted and passed through median filter to eliminate noises. Canny edge detection algorithm is used to find the values of smoothing, gradients and threshold values. The pupil detection algorithm is used to find the value of inner and outer circle radius. Normalization is must to remove the blurred image before feature extraction. This normalization slightly reduces elastic distortions of the iris. Feature extraction is the corners in the normalized iris image and can be used to extract features for distinguishing two iris images. In this corner detection algorithm is used.

3. System Model

Daugman is the most influential iris recognition algorithm. In this paper, bit pair attributes based secured key, its central ray, being a rough representation of the original biometric signal. The central ray is an expected ray and also an optimal ray of an objective function on a group of distribution. This algorithm is derived from geometric properties of a convex polyhedral cone but that does not rely on any prior knowledge. In the existing system, the biometric feature is basically used to identify the individual faces, fingerprint, handprint, voice and etc. But these all also have an error false report. So in the proposed system iris is used by generating code. Iris is said to be an internal organ and that is visible externally. Iris has a unique feature, and it is unique for each individual. Iris recognition is the identification of the person identity based on an image of their eye. The patterns are ideal for biometric identification because they are both hard to alter as well as exceptionally complex. It has been detected that iris patterns are stable from about one year of age until death, meaning that the patterns on the iris are relatively constant over a person's lifetime. It is used to implement and analyze local intensity variation-based method.

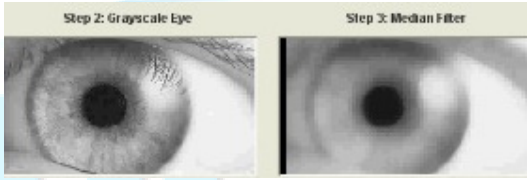
Algorithms and Techniques

i. Gray Scale Conversion
ii. Canny Edge Detection
iii. Pupil Detection
iv. Normalization
v. Feature Extraction
vi. Median Filter

4. Module Description

(I) Image Conversion

Grayscale images are distinct from one-bit black and white images, which in the context of computer imaging are images with only the two colors, black, and white (also called bi-level or binary images). Grayscale images have many shades of monochromatic, denoting the absence of any chromatic variation. Grayscale images are often the result of measuring the intensity of light at each pixel in a single band of the electromagnetic spectrum (e.g. infrared, visible light, ultraviolet, etc.), and in such cases they are monochromatic proper when only a given frequency is captured. But also they can be synthesized from a full color image.



(ii) Edge Detection

Edge Detection is a fundamental tool in image processing and computer vision, particularly in the areas of feature detection and feature extraction, which aim at identifying points in a digital image at which the image brightness changes sharply or, more formally, has discontinuities. The edges extracted from a two-dimensional image of a three-dimensional scene can be classified as either viewpoint dependent or viewpoint independent. A viewpoint independent edge typically reflects inherent properties of the three-dimensional objects, such as surface markings and surface shape. A viewpoint dependent edge may change as the viewpoint changes, and typically reflects the geometry of the scene,

such as objects occluding one another. Gradients at each pixel in the smoothed image.

The algorithm runs in 5 separate steps:

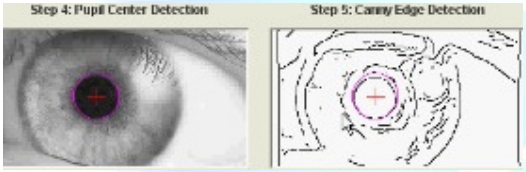
1. ***Smoothing***: Blurring of the image to remove noise.

2. ***Finding gradients***: The edges should be marked where the gradients of the image has large magnitudes.

3. ***Non-maximum suppression***: Only local maxima should be marked as edges.

4. ***Double thresholding***: Potential edges are determined by thresholding.

5. ***Edge tracking by hysteresis***: Final edges are determined by suppressing all edges that are not connected to a very certain (strong) edge.

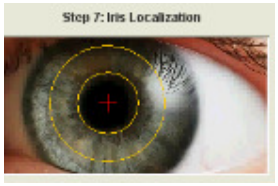


(iii) Pupil Detection

The acquired iris image has to be preprocessed to detect the iris, which is an annular portion between the pupil (inner boundary) and the sclera (outer boundary). The first step in iris localization is to detect pupil which is the black circular part surrounded by iris tissues. The center of pupil can be used to detect the outer radius of iris patterns.

(IV) Normalization

Must remove blurred\occluded images before feature extraction. Localization iris from an image delineates the annular portion from the rest of the image. The coordinate system is changed by unwrapping the iris and mapping all the points within the boundary of the iris into their polar equivalent.



(V) Feature Extraction

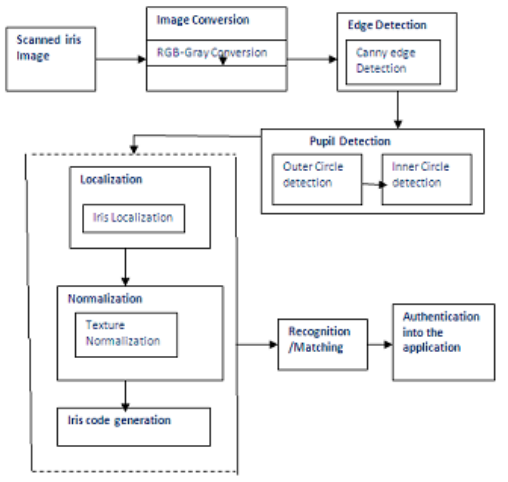
Corners in the normalized iris image can be used to extract features for distinguishing two iris images. The steps involved in corner detection algorithm are as follows;

Step1: The normalized iris image is used to detect corners using covariance matrix.

Step2: The detected corners between the database and query image are used to find cross correlation coefficient.

Step3: If the number of correlation coefficients between the detected corners of the two images is greater than a threshold value then the candidate is accepted by the system.

6. System Architecture

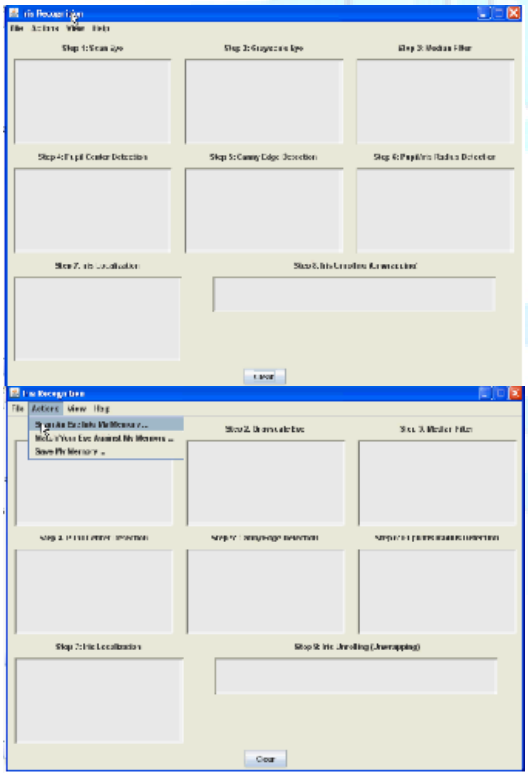


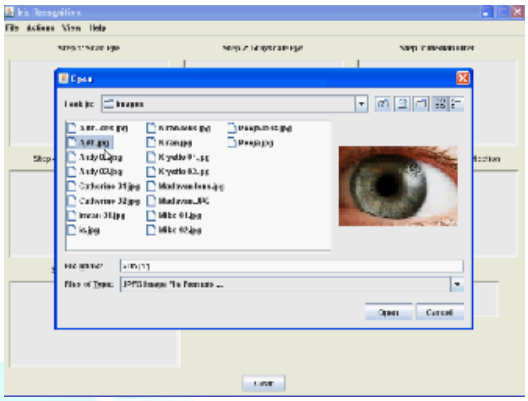
The system architecture describes about the scanned iris image which includes the following techniques and algorithm. The gray scale conversion is the conversion of a colorful iris image to a monochromatic gray and white image. This module includes median filter which helps in extracting noises such as eye lashes, change in white area around pupil.

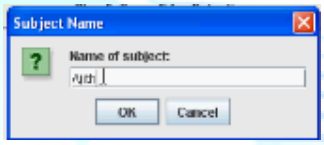
Canny edge detection is next algorithm technique. This detection algorithm consists of three different phases such as smoothing, finding gradients and threshold value. Pupil detection algorithm is used to find the inner and outer circle radius. It has two types such as improved half transform and localization which is used to find the curves. Another type is Standard half transform which is used to find the straight lines. Normalization is the algorithm. It is used to minimize the dimensional inconsistencies between iris regions. Feature extraction is the algorithm which helps us to identify the most important and minute differences in an iris image.

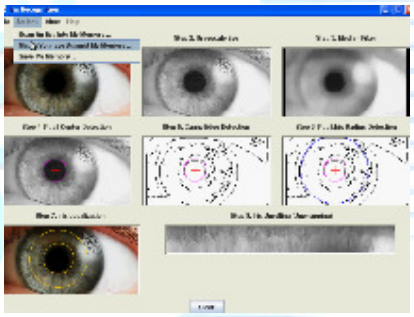
7. Algorithm Implementation

In this paper, we implemented till pupil detection. Open Netbeans and open project of iris partial and run the program.









Then the iris localization, normalization and feature extraction is implemented further to identify the perfect match of that eye.

8. Conclusion

In this work, the explored method of creating iris code for a given person embedded in their natural iris texture. If these textures are used in an iris recognition system, they will give a response similar to the original iris texture. There are some papers that discuss the creation of artificial iris textures using cues from anatomy, or by modeling iris textures using various mathematical models from a pure synthesis point of view. To the best of our knowledge, no work currently exist that starts modeling the iris from the iris bit code which is generally considered to be unidentifiable data. The expected result of proposed system will provide the unique identification to the user. Efficiency will be more in the authentication. It will be more secure while

accessing bank accounts and also in the hospitals for the patients details. Duplication will not be there in the authentication.

Future Enhancement

In our work, we create the iris texture starting from just the iris bit code of the individual and we embed the necessary texture within anyone's iris texture to create an iris code. As mentioned in the offset of this section, the advantage of this is that we can now create alternate iris textures that will give a very similar iris code when compared to the original iris texture. As future work, we will explore countermeasure for detecting such spoof attempts.

References

1] J. G. Daugman, "High confidence visual recognition of persons by a testof statistical independence," *IEEE Trans. Pattern Anal. Mach. Intell.,*vol. 15, no. 11, pp. 1148–1161, Nov. 1993.

[2] J. Daugman, "How iris recognition works," *IEEE Trans. Circuits Syst.Video Technol., vol. 14, no. 1, pp. 21–30, Jan. 2004.*

[3] J. Daugman, "New methods in iris recognition," *IEEE Trans. Syst. Man, Cybern. B, Cybern., vol. 37, no. 5, pp. 1167–1175, Oct. 2007.*

[4] A. W. K. Kong, D. Zhang, and M. Kamel, "An analysis of IrisCode,"*IEEE Trans. Image Process., vol. 19, no. 2, pp. 522–532, Feb. 2010.*

[5] A. W. K. Kong and D. Zhang, "Competitive coding scheme for palmprint verification," in *Proc. Int. Conf. Pattern Recognit., vol. 1. 2004, pp.*520–523.

[6] A. K. Jain, S. Prabhakar, L. Hong, and S. Pankanti, "Fiterbank-based fingerprint matching," *IEEE Trans. Image Process., vol. 9, no. 5, pp.* 846–859, May 2000.

[7] Z. Sun, T. Tan, Y. Wang, and S. Z. Li, "Ordinal palmprint representation for personal identification," in *Proc. IEEE Conf. Comput. Vis. PatternRecognit., vol. 1. May 2005, pp. 279–284.*

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