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Review on Iris Based Security System Using Edge Detection Mechanism

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Abstract:- Iris recognition is the method of biometric to be identify it's use mathematical recognition techniques on video images of one or both of irises of an individual eye, whose difficult random patterns are unique, stable, & can be seen from some distance. Digital templates encoded from these patterns by mathematical & statistical algorithms allow identification of an individual or someone pretending to be that individual. Databases of enrolled templates are searched by matcher engines at speeds measured in millions of templates per second per (single-core) CPU, & within remarkably low false match rates.

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[1] INTRODUCTION

Iris recognition is an automated method of biometric identification that uses mathematical pattern-recognition techniques on video image of one / both of irises of an individual's eyes, whose complex random patterns are unique, stable, & could be seen from some distance.

Not confusion to be few frequently, ocular based biometric technologies such as retina scanning, iris recognition uses video camera technology within subtle near infrared illumination to acquire images of detail-rich, intricate structures of iris that are visible externally. Digital templates encoded from such patterns by mathematical & statistical algorithms allow identification of an individual. Databases of enrolled templates are searched by matcher engines at speeds measured within millions of templates per second per (single-core) CPU & within remarkably low false match rates. Several hundred millions of persons in several countries around world have been enrolled in iris recognition systems, for convenience purposes such as passport-free automated border-crossings, & some national ID systems based on this technology are being deployed.

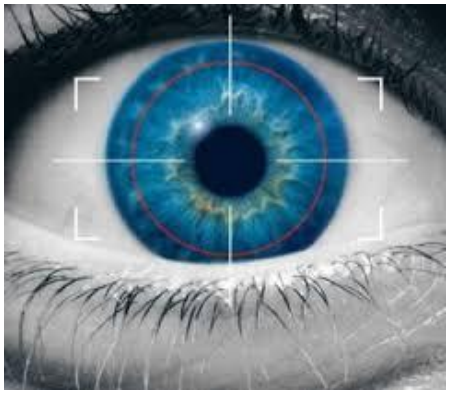

Fig 1 Iris recognition

[2] IRIS AS A POWERFUL IDENTIFIER

Iris is focus of a relatively new means of biometric identification. Iris is called living password because of its unique, random features. It is always within you & cannot be stolen / faked. Iris of each eye is absolutely unique. So no two irises are alike within their details, even among identical twins. Even left &

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right irises of a single person seem to be highly distinct. Every iris had a highly detailed & unique texture that remains stable over decades of life. Because of texture, physiological nature & random generation of an iris artificial duplication is virtually impossible.

Iris Recognition systems

The iris-scan process begins with a photograph. A specialized camera, typically very close to subject, not more than three feet, uses an infrared image(picture) to illuminate eye & capture a very high-resolution photograph. This process takes 1 to 2 seconds.

Iris recognition is an automated method of biometric identification that uses mathematical pattern-recognition techniques on video image(picture) of one / both of irises of an individual's eyes, whose complex random patterns are unique, stable, & could be seen from some distance.

Not to be confused with other, less prevalent, ocular-based biometric technologies such as retina scanning, iris recognition uses video camera technology with subtle near infrared illumination to acquire images of detail-rich, intricate structures of iris that are visible externally. Digital templates encoded from such patterns by mathematical & statistical algorithms allow identification of an individual / someone pretending to be that individual. Databases of enrolled templates are searched by matcher engines at speeds measured within millions of templates per second per (single-core) CPU & with remarkably low false match rates.

[3] LITERATURE REVIEW

Philip L. Worthington (2002) had proposed enhanced canny edge detection using curve consistency. “Edges are often considered as primary image(picture) artifacts for extraction by low-level processing techniques, & starting point for computer vision method. As a result, reliable edge detection had big been a research aim. This author had described initial investigations into recovering reliable edges using curvature models.

Wenshuo Gao, et al., 2010 had been proposed an improved sobel edge detection.

Combining sobel edge detection soft-threshold wavelet de-noising is done for edge detection on picture that involved white Gaussian noises. A lot of edge detection methods have been proposed. commonly used to this methods that combine mean de-noising & Sober operator / median filtering & cannot remove salt & pepper noise very well.

The concept of using iris pattern for identification was first proposed by Ophthalmologist Frank Burch within 1936 (Iradian Technologies, 2003). During 1960, first semi-automatic face recognition system was developed by Woodrow W. Bledsoe, that used location of eyes, ears, nose & mouth on photographs for recognition purposes. In same year, first model of acoustic speech production was created by a Swedish Professor, Gunnar Fant. His invention is used within today's speaker recognition system by Woodward et al, 2003.

By 1980 idea had appeared within James Bond films, but it still remained science fiction & conjecture. In 1987, other ophthalmologists Aram Safir & Leonard Flom patented this idea & within 1987 they asked John Dugan to try to create actual algorithms for this iris recognition.

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[4] EDGE DETECTION MECHANISM

Edge detection group of mathematical methods that is target at identified points within a digital image & graphics brightness changes sharply, formally, had discontinuities. Graphics brightness manipulate sharply is usually organized into a set of curved line segments is known as edges. Some problem of discontinuities within one dimensional signal step detection & problem of finding signal that got discontinued over time is considered as change detection. Edge detection is judge something as fundamental tool within machine & computer vision, image or graphics processing, particularly within areas of feature detection & feature extraction.

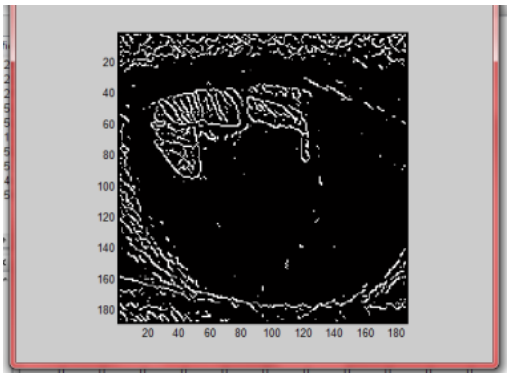

Fig 2 Edge detection

Edges are known as boundaries b/t various textures & could be define as discontinuities within image and graphics intensity from one pixel to another.

Edges for an image/graphics are always important characteristics that offer an indication for a higher frequency. Detection of edges for an image/graphics helps in image/graphics segmentation, data compression & also help for well matching. There are many methods to make edge detection. Most common method for edge detection is to calculate differentiation of an image. Edge detection is an image/graphics processing technique for finding boundaries of objects within images. This works by detecting discontinuities within brightness. Edge detection is used for image/graphics segmentation & data extraction within areas such as image/graphics processing, computer vision, & machine vision. Local changes in intensity could be detected using derivatives. Common edge detection algorithms include Sobel, Canny, Prewitt, Roberts, & fuzzy logic methods.

[5] PROPOSED METHOD FOR IRIS RECOGNITION

The process of Iris Recognition consists of following steps:

1. Image acquisition: within this stage, a photo is taken from iris. Acquisition is done within following factors consideration-

- Bright of surrounding.
- Head tilt & distance.

2. Pre-processing: involving edge detection, contrast adjustment & multiplier. Multiplier is used to enhance canny iris points.

3. Segmentation: including localization of iris inner & outer boundaries & localization of boundary between iris & eyelids.

4. Normalization: involving transformation from polar to Cartesian coordinates & normalization of iris image. This is called iris unwrapping.

5. Feature extraction: including noise removal from iris image & generating iris code. That code is made for matching criterion.

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6. Classification & matching: In this step process of comparing & matching of iris code within codes already saved within database is performed.

Step of Canny edge detection algorithm

Canny Edge Detection involves following steps:

Step 1 Firstly read input image.

Step 2 Apply Gaussian filter to smooth image in order to remove noise.

Step 3 Find intensity gradients of image.

Step 4 Apply non maximum suppression to get rid of spurious response to edge detection.

Step5 Apply Hysteresis Threshold to image.

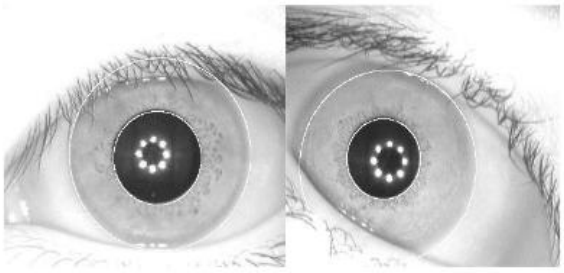

Fig 4.5 Iris inner & outer boundaries localized for two eye images(pictures).

[6] CONCLUSION

The performance of technical capability of iris recognition process far surpasses that of any biometric technology now available. Iris identification process is defined for rapid exhaustive search for very large databases: distinctive ability required for authentication today. Very low probabilities of getting a false match enable iris recognition algorithms to search through extremely big databases, even of a national / planetary scale. As iris methods grows less expensive, it could very likely unseat a large portion of biometric industry, e-commerce included; its technological large had already allowed it to make significant inroads into identification & security venues that had been dominated by other biometrics. Iris-based technology of biometric had been an exceptionally accurate it could soon grow much more prominent.

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