IMPLEMENTATION ON IRIS BASED SECURITY SYSTEM USING EDGE DETECTION MECHANISM

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Abstract:- Biometrics is technology of identifying human subjects by means of measuring & analyzing more than one intrinsic behavioral / physical traits. 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. 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.

Keywords:- Biometrics, Fingerprints, Irises, Recognition, Authentication

1. INTRODUCTION

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.

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 with 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 & right irises of a single person seem to be highly distinct. Every iris has 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.

Applications

Biometric applications could be categorized into three main groups:

- **Forensic applications** : For criminal investigations: e.g. for corpse identification, parenthood determination, etc.

- **Government applications**: It includes personal documents, such as passports, ID cards & driver's licenses; border & immigration control; social security & welfare-disbursement; voter registration & control during elections.

- **Commercial applications**: It includes physical access control; network logins; e-Commerce; ATMs; credit cards; device access to computers, mobile phones, PDAs; facial recognition software; e-Health.

2.   LITERATURE REVIEW

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 (Woodward et al, 2003).

By 1980 idea had appeared within James Bond films, but it still remained science fiction & conjecture. In 1987, two other ophthalmologists Aram Safir & Leonard Flom patented this idea & within 1987 they

asked John Daugman to try to create actual algorithms for this iris recognition.

These algorithms that Daugman patented within 1994 are basis for all current iris recognition systems & products. Daugman algorithm are owned by Iridian technologies & process is licensed to several other Companies who serve as System integrators & developers of special platforms exploiting iris recognition within recent years several products have been developed for acquiring its images over a range of distances & within a variety of applications.

One active imaging system developed within 1996 by licensee Sensor deployed special cameras within bank ATM to capture IRIS images at a distance of up to 1 meter. This active imaging system was installed within cash machines both by NCR Corps & by Diebold Corp within successful public trials within several countries during I997 to 1999.

3.   EDGE DETECTION MECHANISM

Edge detection is name for a set of mathematical methods that target at identifying points within a digital graphics image/graphics at that image/graphics brightness changes sharply, more formally, has discontinuities. Points at that image/graphics brightness manipulate sharply are usually organized into a set of curved line segments is known as edges. Such problem of finding discontinuities within one dimensional signal is considered as step detection & problem of finding signal that got discontinued over time is considered as change detection. Edge detection is considered as fundamental tool within machine & computer vision, image/graphics processing, particularly within areas of feature detection & feature extraction.

Canny Edge Detection

John Canny considered mathematical problem of deriving an optimal smoothing filter given criteria of detection, localization & minimizing multiple responses to a single edge. He showed that optimal filter given such assumptions is a sum of four exponential terms. He also showed that this filter could be well approximated by first-order derivatives of Gaussians. Canny also introduced notion of non-maximum suppression, that means that given presmoothing filters, edge points are defined as points where gradient magnitude assumes a local maximum within gradient direction. Looking for zero crossing of 2nd derivative along gradient direction was first proposed by Haralick.

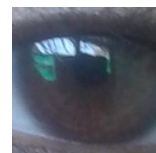Apply canny to i matrix & store within ii
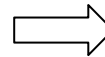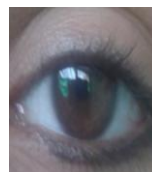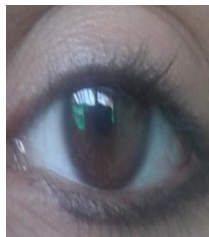
>> ii=canny(i,1,1,1)

Step 5
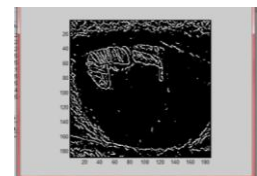
Create histogram using surf command

>>surf(ii)
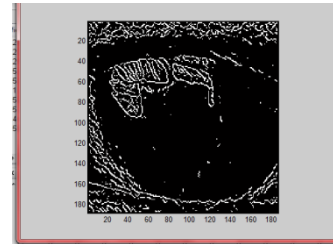
4. RESULTS AND DISCUSSIONS

Iris recognition implementation

Step 1: Acquisation of image of iris: Scan image of eye / take it by digital camera
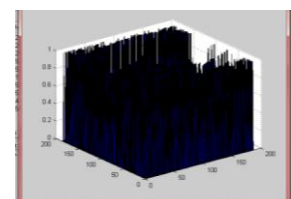

Step2: Before comparison we crop image of eye

Step 3: Store image as matrix within i
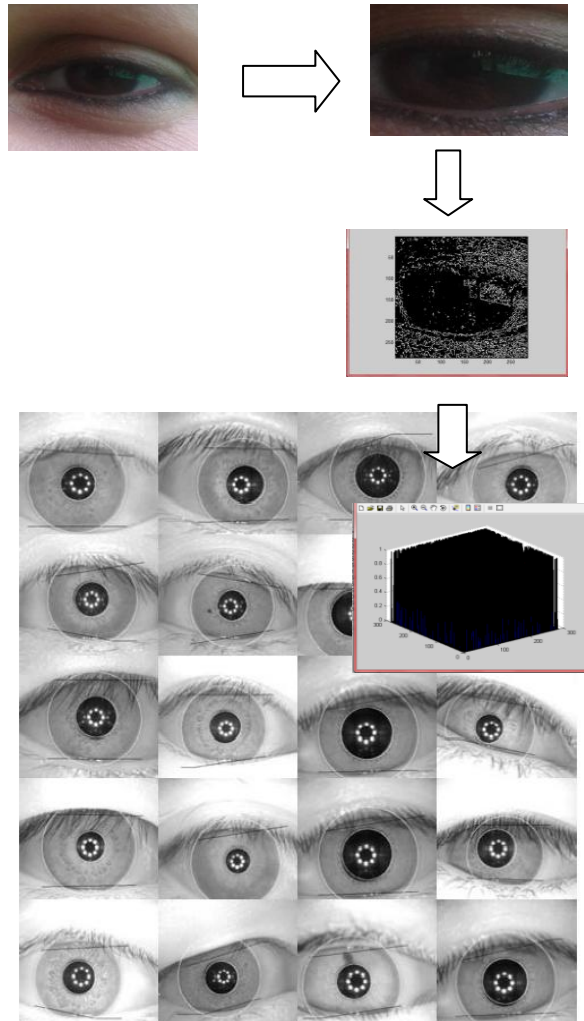
>>i=imread('eye1.jpg')

Step 4

Fig 1 Iris boundaries localized for some eye images(pictures) (iris database:CASIA Iris Interval)

5. CONCLUSION

The technical performance 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 capability required for authentication today. The extremely low probabilities of getting a false match enable iris recognition algorithms to search through extremely large databases, even of a national / planetary scale.

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