UNIQUE IDENTIFICATION BASED ON IRIS RECOGNITION

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ABSTRACT : *Iris recognition works to increase the efficiency in biometric identification because of its reliability in exceedingly secured areas. Iris recognition is more efficient and gives better results for the identification. Iris recognition deals with pattern recognition. In iris recognition the image of new iris pattern is compared with stored iris image by computing the code for both iris images. This paper represents different methods used for Identification and comparison of iris recognition with other biometric identification techniques.*

Keywords—Iris recognition; biometric identification formatting; images matching style; pattern recognition.

I. INTRODUCTION

A biometric technique used for recognition of individual with the help of unique feature or characteristic. Fingerprint, facial element, voice,hand geometry,the retina and Iris are the unique feature for identification.Inthe biometric technique these unique features are stored in a predefined format and then compared with other stored objects. Iris recognition uses a mathematical model for pattern matching. Iris recognition works at a low false acceptance rate so it is more secure than other biometric techniques.

The iris recognition system is used in many areas like ID proof cards and passports, Adhar card and other security programs. it provides a better security in all these programs.The structure of iris is very unique and stable throughoutlife. Ithas a high degree of randomness that makes itunique. Iris is internal organ which provide high degree of acceptance.The pattern of iris is immutable over time.

II. BIOMETRIC AUTHENTICATION

A. Authentication Process

The biometric features of individual are unique so it is used for authentication in security system. This security system relies on the concept of pattern matching in which captured biometric features are compared with stored pattern and verify the correct person.

B. Biometric Sensor

In biometric sensor transducer is responsible for conversion of biometric treat of a person into an electrical signal. The all unique feature like face texture, retina, iris, and fingerprint are biometric treats. Biometricsensor captures the different parameter of these treats. Theseparameter are surface, structure, temperature, heat and light.The conversion of non-electrical parameter into electrical signal is performed by sophisticated system of sensor networks, digital cameras and other input devices. Input devices play a major role in the biometric recognition by capturing large amount of desired data. High definition camera is used for capturing the facial image, video and microphone is used for voice capture.After getting this data different techniques are applied for extracting the biometric features from this captured data.
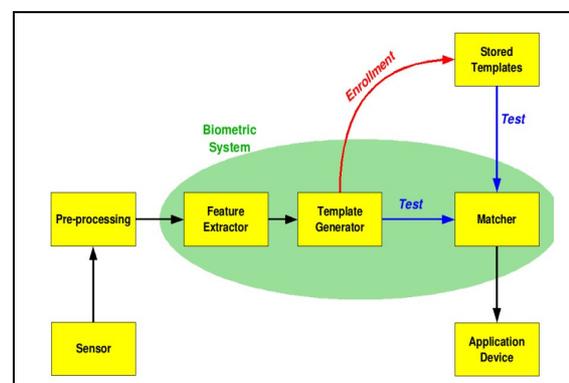

Fig. 1.The basic block diagram of biometric system

III. TYPES OF BIOMETRICS

A. Fingerprint Identification

Fingerprint identification or fingerprint authentication refers to the automated method of verifying a match between different fingerprints. This method is based on pattern matching of fingerprint of a user by analyzing the characteristic of the finger.

Mainly two methods are used for fingerprintrecognition in the first method, the finger is scan optically. Other methodbased on electric charges thatdetermine the part of finger which are directly contact with the sensor.

Every finger has some differentcharacteristic like Spiralpatterns. Concentric Whorl patterns, Arch patterns, tented arch patterns, Radial loop patterns.The characteristic of finger is not change if it is little dirty or a cut on a finger.Fingerprint has a weakness that reproducing of a fingerprint is possible by silicone and many optical devices accept even a picture of a fingerprint.

B. Retinal Recognition

In retinal recognition a laser device is used for capturing the blood vessels structure of user eyes. For this purpose user has to look at the laser light device and the device take the picture of retina structure. Blood vessels structure of each retina is different so this feature providesstrength to retina identification technique.But retina identification has a weakness that it is not user friendly. User has to fix his eye in front of scanning device while laser beam analyze the eyes

C. Iris Recognition

Iris recognition technique is more user friendly comparative to retina scanning. In this method a digital camera performs scanning and takes picture of iris.Users do not need to fix his eyes in front of camera. Picture can be captured from 5 to 10 meter distance. After taking the picture, this picture is analyzed by the device and contains 266 different spots. Iris has different characteristic so these 266 spots are based on these different characteristic of iris. The iris is stable because it does not change in whole life so the values of these 266 are similar throughout life.

The iris is an externally visible, yet protected organ whose unique epigenetic pattern remains stable throughout adult life. These characteristics make it very attractive for use as a biometric for identifying individuals. Image processing techniques can be employed to extract the unique iris pattern from a digitized image of the eye, and encode it into a biometric template, which can be stored in a database. This biometric template contains an objective mathematical representation of the unique information stored in the iris, and allows comparisons to be made between templates. When a subject wishes to be identified by iris recognition system, their eye is first photographed, and then a template created for their iris region. This template is then compared with the other templates stored in a database until either a matching template is found and the subject is identified, or no match is found and the subject remains unidentified [2].

Iris recognition is an automated method of biometric identification that uses mathematical pattern-recognition techniques on video images of one or both of the irises of an individual's eyes, whose complex patterns are unique, stable, and can be seen from some distance [3].

D. DNA

To perform a DNA analysis the user has to give some of his cells, for example by giving a hair, or some skin. Analyzing DNA takes a long time. That's why it is not used as an authentication method. It is a shame that it can not be used easily, because it would have provided an excellent authentication, because everyone is unique through his DNA. But it can be easily fooled, because anyone can steal a hair of somebody else. Maybe researchers will find a good way to implement such devices, and it will maybe become the most efficient way of authenticate people.

E. Face Recognition

The device used in a face recognition is a simple camera, with a low resolution web cam the camera capture the image of user and then the device computes the digital representation which is based on some feature of face.the capture image is compared with other image which is stored in database.

Good software provides authentication with unique recognition, excepttwins. The main drawback in this method that this required a single photo of a user's face by which we can easily make fool to others.

IV. IRIS VS FINGERPRINT AUTHENTICATION

A. Iris

The Iris recognition offers one of the most secure strategies of authentication and recognition. Once the impression of an iris has been taken using a standard digital camera, the authentication process involves, evaluating the present subject's iris with stored version. It is one of the most accurate technique with very low false acceptance as well as rejection rates. This is how the technology becomes very useful.

1) Advantages:

Sr. No.	IRIS	FINGERPRINT
1.	Iris possesses unique structure shaped by 10 months of age, and is always stable throughout life.	The fingerprint structure varies during childhood, and become stable after many years.
2.	The iris incorporates fine texture. Even genetically similar people have entirely independent iris textures [4].	A fingerprint pattern has individually distinctive composition.
3.	An iris scan can be carried out through 10 cm to a few meters apart. It uses Non-intrusive data collection (no actual contact with a scanner is	For use the fingerprint device user has to touch the device.

	required)[5].	
4.	Data capturing can be carried out even though a user is putting contact lenses or glasses.	Fingerprint scanning also works if finger is little dirty or a cut on it.
5.	High accuracy and High recognition process speed. Two seconds processing time.	Sometimes it may take many swipe of fingerprint to register.

1)   Disadvantages:

a)   Iris scanners might be very easily fooled through a superior quality image .

b)   The scanning devices are often hard to adjust and   may annoy multiple people of various heights.

c)   The accuracy of scanning devices may impacted by   unusual lighting effects and illumination from   reflective types of surfaces.

d)   Iris scanners tend to be more expensive in   comparison with additional biometrics [6]. Because iris is a tiny organ to scan from a long distance, Iris   recognition becomes challenging to perform well at a distance larger than a few meters.

e)   Iris recognition is vulnerable to inadequate image   quality.

f)   People suffer from diabetes or some other serious   disease cause alterations in iris.

B. Fingerprint

Our fingerprint is constructed of numerous ridges and valley on the surface of finger which are unique to each and every human. "Ridges are the top skin layer portions of the finger and valleys are the lower portions". The particular individuality of a fingerprint could be determined by the several patterns of ridges and furrows plus the minutiae points.Fingerprint authentication in actual an automated method of verifying a match among different human fingerprints.

1)   Disadvantages:

a)   Fingerprint scanner only scans one section of a   person's finger, it may susceptible to error. Many   scanning system could be cheat employing artificial fingers   or perhaps showing another person's finger.

b)   Sometimes it may take many swipe of fingerprint to   register.

c)   Fingerprints of people working in chemical sectors   often affected.

d)   Cuts, marks transform fingerprints which often has negatively effect on performance.

e)   Fingerprints aren't private. The fingerprints imression are naturally occures on any object with human interaction and physical touch at almost everywhere. Once the finger prints are stolen, they are stolen for life time![6]

V. UNIQUE IDENTIFICATION USING IRIS

The biometric authentication technique based on the pattern of the human iris is well suited to be applied to any access control system requiring a high level of security. Iris recognition provides one of the most secure methods of authentication and identification. Once the image of the iris has been captured using a standard camera, the authentication process, involving comparing the current object's iris with the stored version, is one of the most accurate with very low false acceptance and rejection rates. This makes the technology very useful in areas such as unique identification authority of India(Adhar card project). [7]

VI. CONCLUSION

Iris recognition is one of the most effective method for identification of human being. This paper provides review on various biometric methods. Iris and Retina are different parts of an eye and the scanning of both is different.In retina scanning laserscanning performed on the blood vessels but in Iris only the structure of Iris is captured by the digital camera. Due to availability of Iris Recognition Technology in Smart Phone today is better facility for high secure content. So, the over all conclusion the research is that the Iris recognition is very important technology which is demandable for research to enhances its recognition capability and to block unwanted access to device.

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