Xournals

Academic Journal of Information Security

ISSN UA | Volume 01 | Issue 01 | June-2018

Biometric devices and Security

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Available online at: www.xournals.com

Received 5th January 2018 | Revised 4th February 2018 | Accepted 12th March 2018

Abstract:

The major problem in our daily life is security. To deal with the information security major role is played by authentication. Biometric security is one of the widely used technology in identification and security. Biometrics is the automatic identification system of a person. The identification system of biometrics depends upon the physiological as well as behavioral characteristics of a person. In the current field of security biometric has depicted his work. In the prevention of unauthorized admittance of ATMs, smart cards, PCs, computer networks, etc. biometrics can be used. Many industries and companies uses biometric security for the recognition of employees. Because of liability and efficiency of biometrics, it is quite popular. This paper provides biometric techniques with some discussion and comparison of biometric system with other authentication method can also be discussed for the achievement of a security system with maximum advantages.

Keywords: Biometrics, Security, Authentication, Information.

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Introduction

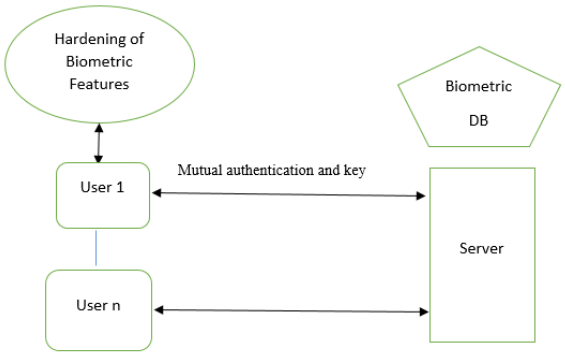
The assurance of privacy, integrity and information availability in all forms is concerned with Information security. The administration of information security is supported by many tools and techniques. But some features of information security are based on biometric.

Biometrics comes from the Greek word 'bios' means life and 'metrikos' means measure. It is a science in which statistical analysis of biological characteristics takes place. In information security biometric authentication supports the side of identification, authentication and non-repudiation. For personal identification biometric authentication becomes popular. The identification of person is significant in many application. The major issue concern in today's society is increasing of large number of credit card frauds and in identification of theft biometrics plays major role. A capable method for security application with many advantages over classical method is offered by biometric system.

Biometric recognition offers an auspicious approach for security, with many advantages over the classical methods, which depends upon something you have like key, id proofs, etc. or something you know password, pattern, etc. the simple stuff of biometric traits is that it is based on the data or information which you have or which you do, so there is no need to remember in anything in biometric security or neither to hold any token.

BIOMETRIC SYSTEM

To improve security of network the overall structural plan of the biometric system is shown. User's encoded bifurcation point pattern is stored in the database which is preserved in the Server. Biometric feature of user should be provided to connect with the server. Since there are various techniques on biometrics and still various researches in the field of biometrics is in working condition. For the improvement of the authentication system numerous techniques have been combined with the biometric authentication system. The two main issues to be considered for user authentication system are acknowledgement of authorized user and refusal of frauds. These two issues can be incorporated into the biometric authentication system using the classifiers.



Biometric is a particular portion of security system with good number of advantages over other classical Authentication methods. There are also some drawbacks which is compared with other authentication method and discussed below.

Table: Comparison of different Authentication Method

Authentication method	Advantages	Drawbacks
Handheld tokens (ID cards, Passports, etc.)	• If it is misplaced the new can be issued. • It is standard although moving in a different republic, facility, etc.	• Fake IDs can also be issued. • It can be shared and stolen. • With different identities people can be registered.
Knowledge Based (Passwords, pin, Patterns, etc.)	• It is simple and economical. • It can be easily replaced by your own choice.	• It can be cracked by guess. • Sometimes it is difficult to recall. • It can be shared.

		• With different identities people can be registered
Biometrics	• It cannot be lost, forgotten, stolen, shared or guessed. • If a person has sever identities it can be easily checked. • As compare to other it provides great degree of security	• In some cases a false one can be issued. • It can neither be replaceable nor be secret. • If biometric data is stolen, it is impossible to substitute.

Working Principle of Biometric System

The basic working principle of all the biometric system are same, in this principle the steps includes are: enrollment, biometric data, presentation, template, feature extraction, matching.

Enrollment or Registration: Initially when the biometric data of user is obtained, treated and deposited for the ongoing use in the system of template in a biometric system it is known as enrollment or registration process. For the further process of authentication these templates will be used.

Biometric Data: During registration the data offered by the user is known as unprocessed image data, which is also mentioned as raw biometric data or biometric sample. The biometric performance is generated by the help of feature extraction process biometric templates is used to generate to perform biometric matches because the raw biometric data cannot be used.

Presentation: It is a process in which user's biometric data is presented to the acquisition devices, the hardware is used to collect data. For example finger should be placed on finger reader device.

Template: After using a number of feature extraction, algorithms mathematical depiction of raw biometric data is obtained which is known as template. The size of templates can be vary in size from few bytes to several thousand bytes. At the time of registration the template is created which is known as stored template and at the time of verification is called live template.

Feature Extraction: To generate a template, locating and programming distinctive features from biometric data is processed which is known as feature extraction. The process of feature extraction takes place during enrollment and verification, any time a template is shaped.

Matching: At the time of authentication the templates which are stored template is matched with live and a score is obtained, on the basis of this score a conclusion is drawn whether a user is authenticate human or not.

TECHNIQUES AND TECHNLOGIES OF BIOMETRICS

Finger Prints

For personal identification fingerprints have been used from a very long time. It is an imprint of friction ridges of all part of finger. Fingerprints are unique even identical twins have different fingerprints. Scanning of fingerprint of a person is easy and affordable, it is used in computer for number of claims. This traditional method ink is used to get fingerprints but now in modern era live fingerprint scanners are used which are based on the principles of optical, thermal, silicon or ultrasonic. This fingerprint recognition system is becoming reasonable in a large number of applications like in Adhar card, banking, Passport etc.

Face recognition technology

A facial recognition technique is an application in which identification or verification of a person is done from a digital image or from a video source. It is one of the most usual means of biometric identification. On the basis of shape of facial attributes, such as nose, eyes, lips, eyebrows, chin and the relationships of these attributes ace recognition are done. As this technique involves many facial elements; these systems have difficulty in matching face images. This technology have recently developed into two areas which are facial metric and Eigen faces.

Iris technology

The iris is biological feature of a human. It is unique and remains stable over a person lifetime. Iris is a combination of specific characteristics known as corona, crypts, filaments, freckles, pits, furrows, striations and rings. The left and right irises of an individual can be treated as separate unique identifier even the irises of identical twins are also different. The information of iris can be collected by iris image or by video based image acquisition system. It gives a promising accuracy for recognition. The recognition system of iris is users friendly and cost effective. The false rate of iris is very low as compared to other biometrics like finger print, face, hand geometry and voice.

Hand Geometry

Hand geometry technology is based on the fact that the shape of every person's hand is different and it does not change after certain age. On the basis of the measurement like shape, size of palm, length and width of the fingers the hand geometry recognition works. This method is very simple and easy to use. On the authentication accuracy it does not appear negative because there is no effect of environment factors such as dry weather or dry skin. Also hand geometry information may not be invariant during the growth period of the children.

Speaker Recognition Technique

In various application voice recognition systems have been currently used. Voice is a physiological trait with the combination of physical and behavioral biometrics. Person voice are based on the features like vocal tracts, mouth, nasal activities and lips movement that are used synthesis of sound. Over time due to age, medical conditions, and emotional state the behavioral part of the person's speech changes. Speaker recognition system employs three styles of spoken input and they are listed below.

Text dependent (b) Text prompted (c) Text independent

Conclusion

The systems in which the physical characteristics of a person like finger print, hand geometry, face, voice and iris are used for the purpose of security. In various application biometric security system have been proved to be accurate and very effective. On the risk to privacy and threat to identify the influence of biometric on society is very facilitation through regulation. Careful consideration of the importance of biometrics data will popularize the biometric technology. The drawbacks of traditional computer based security system which are used at the places like ATM, Passport, Payroll, driver's licenses, government offices and network security was overcome by biometric security. Biometric authentication offer high degree of security but still have some drawbacks for which further studies are required.

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