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Report on Biometrics

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Introduction

The word Biometrics can be explained as the strategies adopt in an attempt to Identify people by evaluating some physical characteristics and detail analysis of Individuality such as fingerprint, handwritten signature and the utilization of legacy data (such as voice Analysis). This is being employed in security and access control application.

In most of the countries in Europe, America, Asian and some part of Africa.

Biometric has been widely used in their national passport and driver license, this

Contains information about holder, such as weight, height, eye colour and hair

Colour. Moreover, some part of these physical characteristics change naturally and with time. Your hair colour change naturally or sometimes on purpose while your height May increase with age.

Over the last quarter century or so, people have developed a large number of biometric devices, but the best demonstrated biometric techniques precede the

Computer age are the use of handwritten signature, facial features and fingerprints. We will try to discuss these before going to more high-tech methods.

Handwritten Signatures

Handwritten signatures is one of the existing biometrics data, this is typically easy to Put together and by examination, it does not cause much intrusion. These are being used in most of the Countries of the word. Though carved personal seals consider to be higher Status and still being employed in serious business transaction in countries like Japan, Korea and China till today. Contrary to Europe where Seals was being used in the middle age but since the rising of the Modern world, people started writing their name to give assent to business transaction and other document. After some period of time, signature was spread and accepted as the regular way of doing this in the Western world and people use handwritten signature in concluding business transaction that worth several billions of dollars.

Concern over security of handwritten signatures;

It is very possible that forged signature will be accepted as an authenticated One, but this depends on how vigilant and measure of care taken when it is being examined. Series of transaction takes place in stores, which involves the usage of Bank card and these cards are being accepted without verification of specimen Signature. This has gotten to the extend that many people in developed countries do not agitate to sign their credit card. Though carefully signature verification does not reduce the fraud risk to zero. Moreover, handwritten signature is being encircled by number of rules and convention which difference from one country to another .

The variation in rules and convention from one country to another cause a reported Clash in nineteenth century, when a real estate business transaction that involves a Bank in Spain was taken to be Invalid simply because the business transaction was completed by fax and a Bank in United Kingdom kicked against it.

In a real fact, it is possible for an ordinary name at the bottom of email message to be as legal as a real signature. Except if there are rules and regulation that demand the transaction to be in proper writing and this makes it rare for a court of law to dispute any case involve signatures since the content of the letter will tell us who did it.

In an important and highly value security dealing, **Signature tablet** may be employed . This is a process by which the users put their signature on the surface of sensor and this will record the shape of the hand and its movement.

Since it is a very tedious task to compare the signatures because of the similarity that may exist between the real signatures and others. This can cause a lot of insult in business transaction because of fraud that this may allow. In order to reduce the level of insult and fraud, when there is a doubt in signature, the best practice is to ask for driver license, national passport or any photo identification.

Face Recognition

This is the oldest method of recognizing people, by using their facial features which has been existing as far back in time of primate ancestors. Theoretically, the ability of human being to recognize one another by their faces seems better than any automatics methods of doing it.

Practically, ability of human being to recognize faces is very important in security measure, this occur because of the trust and reliance put on identity card. The means of identification such as national identity card, national passport and possibly School access card are not only using to gain entrance to School building or

computer rooms, but also assist in other security measure.

In some countries, before the opening of Bank account, applying for job or whatever, you will be asked to present a passport photograph.

But the main concern is how effectively are people recognize one another by their faces? If people are good at recognizing their families and friends but are they still good in recognizing strangers through identity card.

The inability of people to employ their facial recognition skills efficaciously was one of the reasons that necessitated the needing for the automation of the process.

Automatics face recognition is the automated way of recognizing people, and this may be done by the subject focus straight at the Camera under controlled lighting conditions, and those faces will be compared to the faces on file. But the problem we may have found is in forensic, where the recorded face of the suspects may have a low quality recording on the security video.

This makes it difficult in facial features extraction to say one automatic method is one Hundred percent error free.

Fingerprint Identification

Fingerprint is an important aspect of security measure, it remains the same throughout the life. If a fingerprint that has taken since over many decades is compare, there may be less than one percent error. According to report, there were no case of two fingerprints that have ever found the same after comparison.

This is the process by which the shape of the ridges and the pattern of minutiae such as wrinkle and lines on the fingerprint as well as branches and endpoint of the ridges of the specimen will be taken and recorded into database.

The following are the few of the application of fingerprint;

For the purpose of proper identification – It is being used by police to confirm if an arrested people are currently wanted by other law enforcement agencies and they

can only achieve that if the fingerprint taken at the crime scene is matched database record. Secondly, It can also use be used in United state to screen job applicant. For example anyone wishing to work in U.S Government clearance at secret or above must have his fingerprint taken and check by FBI.

Merit and demerit of fingerprint

According to security specialist, the error rate of fingerprint in forensic application is Very low, this may depend how good in quality and size is the image taken from the Crime Scene. And it was reported that fingerprint evidence was successfully used for almost a century without a questioning.

In terms of fingerprint error, there may be one out of ten billion matches, which is less than one percent and in security, this can still categorize as a problem because it can cause a very significant depression.

Having tried to discuss some of the traditional methods of biometrics in the last few minutes, which are the use of handwritten signatures, facial features and fingerprint. We will now mention few of the mothern ways of recognizing people. Namely Iris codes and voice recognition.

Iris codes

One of the best methods of identifying people is by using the patterns in the irises of their eyes, and this seems likely to be the best and most secure method of recognizing people on gaining entry to premises like plutonium stores.

Merit and demerit of Iris codes

One out of numerous advantages of Iris codes is that every human being has a Uniquely different iris pattern and even identical twins can not have the same iris Pattern.

Secondly, Irish code is good to the extend that it does not have any hereditary

Influence.

Few of the problems facing the uses of iris scanning in practice is the ability to get the Pictures without being tampered. Because the best practice is to place object within few inches to the camera, and the best equipment will work within the distance of two to three feet. But people find it difficult to be very close to camera because they need comfort, and this makes it less acceptable in retail.

Other problems are the blinking of an eye, wearing of sunglasses and eyelashes.

Voice recognition

voice recognition also known as speaker recognition. This can be defined as the process of using unique features and characteristics of someone's voice, which include concave shape of their mouth for identification purpose.

How it works

The objective is to get the concern voice sample, notably in forensic application, since the pattern and characteristics of individual voice is different. The unique patterns of an person's voice is produced by the vocal tract. It is actually possible for different people to have the same voice in human hear to some extent, but there must be a clear different in their speech.

This may be achieved by telling the concern people to give speech or recites some sort of text. In order to get the real features of their voice, there must be a repetition in of their speech in number of times. The individual voice can be captured by the use of Computer microphone, mobile phone or landline. And this voice their voice will be converted from analog format to digital format for processing.

Finally, the submitted voice for verification can now be compared with the series of voice samples that have been taken in order to determine any repeating patterns.

Few out of the numerous application of Voice recognition are telephone banking transaction such as the payment of bills, funds transfer and credit card processing (loss prevention, address changes)

DNA

Before the conclusion of this report, one other biometrics method deserves mentioning is the use of DNA typing. This is actually very valuable in crime investigation and can also be used in parenthood determination for child support. DNA can also apply in the case of murder and rape, this may be achieved by the use of the blood, skin cell, hair or any form of genetics evidence that may left in the crime scene that can be used in comparison. Since it has a great support for genotype rather than phenotype.

But this method may become a failure if there is no proper and carefully laboratory procedure.

Conclusion

Biometrics is a good technology development that can guarantee people security to some certain extent if properly applied. It is a kind of measure that has been using for people identification since ancient times. In modern age, the equipment has been built to automate the system. But this equipment have number of advantages and disadvantages. By using automatic method, there may be error rate of one percent. But many biometrics systems achieve their result by prosecution of innocent people rather than identify the real criminal.

References

1. Security Engineering: A Guide to building Dependable Distributed Systems.

Author: Ross J. Anderson, year 2001.

2. <http://www.technovelgy.com/ct/Technology-Article.asp?ArtNum=11>

3. http://www.findbiometrics.com/Pages/voice%20articles/voice_1.html