A Comprehensive Study on Biometrics Authentication

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Abstract- Information technology and information security both the fields are related to each other. As this field is flourishing this leads in the preferment of information security field. When we talk about information security , authentication plays a pivotal role.[1] One of the authentication technique is biometrics and this paper tells about biometrics , different techniques of biometrics , future scope of biometrics, pros and cons of biometrics and whether biometrics authentication technique is secure or not .

I. INTRODUCTION

As world is getting inclined towards technology and becoming digital identification of an individual is getting difficult day-by-day.With elevated identity theft issues and frauds, a person's identity is pivotal role . Various types of authentication technologies or techniques are present nowadays, biometrics authentication is just one of them.biometrics authentication is a technique of verifying a persons claimed identity through bio- logical characteristics of humans Authentication speaks about verifying a person's claimed identity and biometrics can be interpreted as the measurement or calculations of biological characteristics of humans like face,voice,iris etc.As biometrics is found to be reliable by many people ,so this paper tells usabout comprehensive study on biometrics authentication,its security, present and future.

II. BIOMETRICS AUTHENTICATION TECHNIQUES

a. FINGER PRINT RECOGNITION

Finger print technology has evolved immensely.It was started with taking finger print on the paper and then scanning that particular paper using a traditional scanner. But with its evolution now live finger print readers are available in market. Finger print scanning was antecedently used for some specific work only but now it has become our day-to-day activity. Now-a-days we can see example of fingerprint scanning everywhere we go , starting from just unlocking your smartphone to unlocking your office doors through finger scan and many other things like that.This makes finger print scan most popular biometrics authentication technique from all other techniques which are present[1]. In fingerprint recognition, whenever a person enter their fingerprint it is compared with the fingerprint print is already exists in data.Fingerprint identification could be performed in two ways.In first way , the fingerprint entered is put through a comparison with all the fingerprint which are gathered in the database, for example:unlocking office door through fingerprint recognition technique.The second way is that where the entered fingerprint is put through a comparison with only a specific person's fingerprint, for example: unlocking our smartphones.

b. FACIAL RECOGNITION

It is one of the biometric authentication techniques. Facial recognition technique is the approach through which we can recognize human face by using technology. Facial Recognition assists us to authenticate person's identity. In biometric, it is a class in which it projects person's facial countenance mathematically and collects the information as faceprint [1].

In our day-to-day life, we identify a person through their face and we keep in mind their face with assorted countenance such as eyes,nose,mouth etc.Similarly, in a face recognition software whenever it sees a face it stocks the info that can be accessed. A picture is taken ,and then it is put through comparison with the stored data, face identification software compares the facial feature of the picture with the data stored. Many example of facial identification system are present like U.S government at the airports, in many mobile phones facial recognition technique is used.

c. IRIS RECOGNITION TECHNOLOGY

Iris is an organ of human body which remains same throughout the life. So, it could be used for identification as one of the biometric authentication technique. It is more reliable as it remains same throughout the lifetime of human. Pattern recognition technique based on high-resolution and distortion-free images of human iris is employed by iris recognition technique. As it is almost accurate and agile it is credible method from all the other methods present which is used for identifying a person[1].

Iris recognition works on three simple steps. First step is taking the image, in this the image of iris of an individual whose identity needs to be verifiable is taken. Second step involves locating iris , in this step what happen is the system focuses on the clarity of image and the picture is scan to identify the boundaries so that it can locate the iris properly. Third step is storing the data or comparing the data , in this step if we wish to store the data of iris of the particular person we can store that at the database or the iris information which obtained by doing above given steps can be compared with data existing in the database.

d. VOICE RECOGNITION TECHNOLOGY

Voice is biological characteristics of human which could be utilize

for authentication purpose as every individual have a different pitch but voice identification technique is basically done by taking into consideration how a particular individual speaks.Vocal feature that produces speech is the centre of voice recognition and not the sound or pronounciation of the speech. Vocal tract, mouth, nasal cavities and other speech generating mechanism of human body are the factors on which the vocal characteristics depends.

Three types of spoken input are utilized by voice recognition system.

e. HAND GEOMETRY RECOGNITION

In Hand Geometry Recognition, for performing authentication the shape of the hand silhouette is utilized as a personal attribute. Estimation of various attribute like length, width, thickness and surface area of hand are the techniques incorporated in the hand geometry identification[3].

The hand geometry identification system works in a comparable way as that of any other biometric technique. It works in two phases, the first phase enrollment phase and the second step is comparison phase. In enrollment phase, set of pictures are taken from the user and then those photographs are preprocessed after performing preprocessing where the measurements are taken the individuals patterns are computed and gathered in the database. The comparison phase is the verification stage, in this the photograph is taken which is later preprocessed and then measurements of the photographs are compare with that of the already existing measurement in the database.

f. RETINAL RECOGNITION

At the back of the eyeball of vertebrates we have a fragile layer of cell which is referred as retina. It is the section of our eye that converts lights in nervous signals. Retina is utilizedas biometric authentication technique because each and every eye has different arrangement of blood vessels ,so it could be utilized as a unique feature.

Retina recognition performs its duty as any other authentication technique. Retina recognition process starts with taking an eye image then the image which is taken preprocessed after the preprocessing of the image various features and measurements are extracted through that image, once the extraction is done then there arises two options, first option is to enroll the extracted features into database and the another option is to check the individual's identity by comparing extracted features of the image with the features of the images which are already existing in the database, at the end if the picture features are matching with the existing image then it is acknowledgedelse ways it is rebuffed[5].

g. OTHER TECHNIQUES IN USE

Various other techniques for biometric authentication are also present and they are illustrated below.

1. PALMPRINT RECOGNITION

Palmprint can be treated as the unique characteristics and because of that it is utilized in authentication.Palmprint recognition is marginally different from fingerprint recognition, it also uses scanners and optical readers for scanning but they are bigger in size and require more space for installation. So,they cannot be utilized in cell phones and that is the reason why this technique is not used frequently as fingerprint recognition or any of the other technique.

2. HAND VEIN RECOGNITION

This technique came into picture to avoid some performance issues of fingerprint recognition and hand geometry recognition.In the case of fingerprint,sometimes due to contact with water or oil the image feature is not ex- tracted properly and this leads to performance issues.Also vein pattern for every individual is distinct. So,in hand vein recognition technique is both performance and user comfort is increased.

III. FUTURE SCOPE OF BIOMETRIC AUTHENTICATION

Biometrics authentication technique like fingerprint is in use for like over 100 years by law enforcement agencies to identify individuals. With advancements in science and technology, those days are gone where we use to associate with criminals getting fingerprinted or in any sci-fi movies where doors where getting unlocked by eyes, now biometrics authentication is becoming component of our day to day security.

Biometrics authentication techniques are developing developing day-by-day and with that combination of physical biometrics and behavioral biometrics is leading its way to provide security to data . Behavioral biometrics is not what you do , that is the way you do it. It is not new but it is not utilized to its fullest. If utilized rightly behavioral biometrics can replace logins and passwords in various industrial sectors. Banking sector is the industry where we can anticipate the growth in utilization of biometrics for security. Not only in mobile phones ,but biometrics can also replace tradition lock system for doors and lockers in home[6] .

We have talk about advancement of biometrics in industry and day to day lives but biometrics couldfurther be used for making smart cities, transportation purpose and other ecosystem. Our plastic money i.e. credit cards, license and other likewise stuff can further be represented through biometrics more securely. Scientists are actively working on advancement of biometrics like measuring the fashion in which people walk and move , cardiac defects can be detected through the sound of heart(heartbeat) and phonocardiograms can be confirmed to be effective.

IV. IS BIOMETRICS AUTHENTICATION SECURE ?

Biometrics authentication is becoming future of security with expanding utilization of it we should ponder upon few things and the first question which comes into our mind is, is biometrics secured ? The answer to this question will be very useful for further

advancement of biometrics. Biometrics is secure but no totally there are various method through which biometrics authentication can be hacked or spoofed those methods are listed below.

Spoofing of fingerprint: We all know in biometrics authentication , for opening any smartphone or in any other device which use fingerprint authentication a high quality print is required. That print should contain patterns which are sufficient to authenticate and open the device. The attacker can lift the fingerprint and paste onto a plastic laminate and after that attacker can place finger into that mold this will create a fake finger which could be further used by placing that finger into the scanner and to open the phone[7].

Conspiring Against Iris Scanner: We can trick iris scanner by clicking a photo from cheap camera in night mode printing the iris on paper and then putting the wet contact lens so that it can mimic the roundness of the eyes.

Gaining Unauthorized Access To Data By Hacking Sensors: sensor are being hacked which results into data breach , and this data leak can affect a person's life and could be utilized in any harmful way.

V. REFERRENCES

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