



Application of Biometric Technology Solutions to Enhance Security

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Abstract: In the contemporary era, a new area of engineering science has been established whose products like biometric is to create a large market in the future. Biometric system is a pattern recognition system which recognizes a user by determining the authenticity of a specific physiological or behavioral characteristic of the user. Several important issues must be considered in designing a practical biometric system. First, a user must be enrolled in the system so that his biometric template can be captured. This template is securely stored in a central database or a smart card issued to the user. This paper gives an overview of biometric technologies, types of the biometric and applications of the biometric. The various benefits of the biometrics are mentioned.

Keywords: DNA, Eyes, Ears, Face Recognition

I. INTRODUCTION

Biometrics refers to the emerging field of technology devoted to the identification of individuals using biological traits or behaviors. This is a pattern recognition system which recognizes a user by determining the authenticity of a specific physiological or behavioral characteristic possessed by the user. It captures an image of a unique feature of an individual such as a fingerprint, hand, eye or face, and comparing it with a template. Several important issues must be considered in designing a practical biometric system. First, a user must be enrolled in the system so that his biometric template

can be captured. This template is securely stored in a central database or a smart card issued to the user.



Fig. 1 Biometric System

II. TYPES OF BIOMETRICS

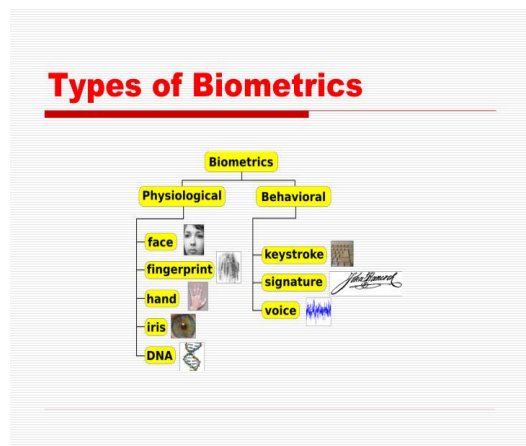


Fig. 2 Types of Biometric

1. **Face Recognition:** It is one of the newer biometric technologies. The technology analyzes facial characteristics and attempts to match it to database of digitized pictures. Face recognition uses distinctive features of the face –including the upper outlines of the eye socket, the areas surrounding the cheekbones, the sides of the mouth, and the location of the nose and ears—to perform verification and identification. Usually, several pictures at different angles are taken. Individuals may also be asked to make different facial expressions for the data base. Next; the images are analyzed and extracted to create a template.
2. **Finger Recognition:** Finger prints are unique to each individual and no two

fingerprints are alike. Fingerprint recognition is most widely accepted biometric among the technology being used today. Fingerprints contain patterns of ridges and valleys as well as minutiae points. [2]

3. **Hand Geometry Recognition:** Hand geometry is concerned with measuring the physical characteristics of the user's hand and fingers and it is believed to be sufficiently unique for use as a means of biometric authentication. The technology records various dimensions of the human hand, it is relatively easy to use, and offers a good balance of performance characteristics. Reader configurations vary among a softball-shaped device which the subject grabs in his hand and a flat plate which the subject places his hand, a bar which the subject grabs as if opening a door, and a flat plate which the subject places his hand on.
4. **DNA Matching:** Deoxyribonucleic acid is the genetic material found in most organisms, including human. Each individual human is identifiable by hereditary traits found in their DNA, which is located in the nucleus of the cells as well as the mitochondria. So DNA analysis requires a lab environment and a form of tissue, blood or other bodily sample. However, issues like contamination, sensitivity, and automatic real-time recognition limit the utility of this biometric.
5. **Eyes:** It analyzes and identifies unique blood vessel patterns of an individual. It works on



the capillary blood vessels existing in the back of the human eye. It throws a low intensity light to a person's eye to get an image pattern formed by the blood vessel.

6. **Ear:** The shape of the ear is just as distinguishing as fingerprints. No two ears, even on the same person, are alike. Startup Descartes Biometrics has come up with an app that can identify smart phone users by the way they press their phone to their ear and check-though its less than consistent recognition means that perhaps this particular app is not yet ready for prime time.
7. **Typing Recognition:** The reorganization of keystroke dynamics is the process of analyzing the way an individual types at a terminal by monitoring the keyboard inputs in an attempt to recognize the individual based typing rhythm patterns.
8. **Voice recognition:** Speakers can be recognized by their voice print, the set of measurable characteristics of a human voice. The user is requested to speak a word or phrase which was saved earlier during the enrollments process. The spoken input is represented by a sequence of feature vectors and compared with previously recorded input vectors, to calculate the degree of similarity.
9. **Signature recognition:** This system measure and analyze the physical activity of signing. Important characteristics include the pressure applied, the pen movement, the angle of the pen is held, the time taken to sign, the velocity and acceleration of the signature. This method is known as dynamic signature reorganization.

III. APPLICATIONS OF BIOMETRICS

The world would be a fantastic place if everything were secure and trusted. But unfortunately, in the real world there is fraud, crime, computer hackers, and theft. With our lives becoming more and more dependent on digital technology and automation, how do we know if people are really who they claim to be? Here are just some application of biometric technology and how it can be used. [4]

1. **Airport security:** Iris recognition has been used in a number of large airports for several years. You must sign up to a scheme and your eyes and iris are scanned. Your details are then stored on an international database and instead of waiting in long passport queues, passengers simply walk into a booth and look into a camera. The software then scans the iris and matches the details with the information stored on the database.
2. **Building Access:** Fingerprint access for buildings is not new. Many high security facilities have used biometric technology for years when it comes to ensuring only authorised personal gain access to the most well protected establishments.
3. **Cars:** It's estimated that over 2 million cars in the UK use biometric technology in one form or another. This can be anything from voice recognition when using Bluetooth or entertainment systems to unlocking the vehicle itself.
4. **Blood Banks:** When it comes to giving blood; identity is pretty important. In the past donors were issued with blue cards containing all the information



required. More and more these days that crucial data is being stored digitally.

5. **Time and Attendance:** Biometric data is also used for activities such as; recording attendance, checking out library books or even paying for meals. Due to the sensitivity surrounding children and privacy; schools require full, written permission from the parents [3] of pupils in order to use the system.



Fig. 3 Attendance by biometric

6. **Healthcare:** In the field of healthcare this is particularly true. Health records are some of the most valuable personal documents out there, doctors need access to them quickly, and they need to be accurate. A lapse in security and proper accounting can mean the difference between a timely and accurate diagnosis or enable health fraud.[1]



Fig. 4 Health Care

7. **Law Enforcement:** Law enforcement agencies across all levels of the Federal Government are also starting to use Biometric Technology to confirm the identity of any suspects. It has been traditionally Fingerprint Recognition which is the most widely used modality. Iris, [1] Facial, and even Vein Pattern Recognition are starting to make their entrance into this market application, but they are being used as a supplement to Fingerprint Recognition.

IV. CONCLUSION

Nowadays, a PIN code or a password is being used for the purposes of an authentication, which is the weakest point of the whole system. Biometry offers one reasonable solution..A user will be authenticated by his/her biometric attributes and he/she will be either confirmed or refused. But the PIN and password replacement is not the only benefit of biometry. More might be got. Present biometric technology is not advanced enough to be used for the cryptographic purposes, because it is very difficult to detect and extract always the same or nearly the same features. Where to go on in the future? It is obvious that biometric systems will govern the security domain in future electronic world. The identification speed and accuracy will be the crucial factors.

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[4] Application of Biometric Technology Solutions to Enhance Security.

