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Biometrics and Its Use: Viewpoint

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Description

Biometric is a combination of two Greek words, namely Bio (life) and Metric (to measure). Biometrics has been used for many purposes including identification of human, in particular, recognition of an individual through physiological and behavioral traits or attributes.

It includes physical characteristics of human such as the appearance, body structures, and other aspects. Computational algorithms are used to extract various biometric characteristics such as 2D ridge-valley maps in fingerprints, face image, audio recordings of the voice, near-infrared images of the iris, video of gait motion, etc.

Are those which are related to the behavior (in certain aspects) of an individual? Hence, such biometrics verification can prevent a person from authenticating/accessing if his behavior is different from the stored behavioral pattern/profile. The examples of this type of biometrics are voice, keystroke analysis, mouse dynamics, signature, etc.

While biometrics applications are widespread, these mainly fall in three different categories: law enforcement, governments, and commercial.

Commercial sectors increasingly use biometrics to secure their authentication process, and verified transactions. Some example applications include ATM booths, credit cards, facility access, network login, online service and data access. Healthcare and medical science extensively use various forms of biometrics (external and internal) for blood transfusion, organ matching, identification of biological parents, ancestry, etc.

Different biometrics is used primarily in two spaces: real-world physical verification of human and increasingly used for cyber-identity, authentication and authorization of legitimate access to the computing systems and services. In cyber space, identity verification is always challenging, since in many instances, it is not possible to know who is on the other side of a virtual communication. Specifically, it is difficult to verify legitimate user identity (from Spoofed) with cent percent accuracy in both biometric or none biometric authentication processes. To alleviate the situation, multi-factor authentication is becoming essential for important transactions and services on the Internet.

Similarly, in our real-world, physical biometric verifications are also facing major challenges due to many reasons such as:

Due to the above-mentioned factors and technological advancements of appearance and shape shifting, it is quite difficult to accurately identify human by physical attributes as these can be easily altered now.

Furthermore, if we consider the above-mentioned factors as external biometrics, internal biometrics is also emerging for human identity verification. Forensic science is now going deeper inside human body to identify a person using internal characteristics, such as body pressure, blood type, pulse rate, assuming that these are inert and hard to change, though these require intrusive measurements and can undergo changes during stress and sickness. In addition, organ transplant, blood transfusion, immunotherapy and hormone therapy may influence the internal biometrics of the body; also recently reported that 7% percent of DNA has changed to an astronaut after spending a year-long in the space shuttle.

If the purpose of biometric use is to check the human behavior (good, bad, harmful, harmless, authentic, non-authentic facts) then the focus should be on the brain, which is irreplaceable and controls human behavior. Accordingly, human identity is reflected through expressions of human mind that can be seen by how the person behaves in different contexts and situations. If we can precisely capture, the manifestation of brain activities or mind change (if it is the expression of brain function), we may reach a more accurate representation of a human's identification. A mind reader can interpret the state of mind from the changes in brain's electrochemical signals and can determine the true identity of a human and his actions.

Researchers developed a biometric brain print system to identify individuals with 100% accuracy measuring their EEG signals that represent their brain activities. In general, every individual's brain reacts in a different manner to a same set of images. Hence, the brain activities through EEG signals are able to identify every brain print (in other words, individuals) with absolute accuracy.

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