*Short Communication*

# Role of Biometrics in Anthropological Settings

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## Abstract

*Biometrics refers to the science concerned with the precise measurement of the characteristics of living things— "biometry"—such as dimensions and weights. Biometric techniques are used to study how individuals differ from one another. In present scenario, biometry to authenticate and identify person by their physical traits: face, hand shape (geometry), fingerprints and iris or retina pattern has emerged as a security solution. Therefore, biometrics has been a valuable tool to forensic anthropologist and scientists who can now build an accurate replica of a person's facial features starting with a skull. Anthropology play important dimension to see connections about historical and cultural development of biometrics in the world. In a world of new applications and constant experimentation, older biometrics such as fingerprinting and face recognition continued their central position. But Since the 1980s, technological advances have facilitated the production of high-quality devices that are relatively low in cost. For example, iris scan technology is already being piloted for bank pass machines (ATMs), and 'live scan' Automated Fingerprint Identification Systems (AFIS) are already popular with police forces throughout the world. The conclusion of the study is that consistent and rapid technological developments are centered somewhere on only a subset of the available methods of personal identification through biometrics. Some methods would be performance-specific and overall applicable for the implementation of particular applications and may be more acceptable regarding privacy, security and personal identification.*

**Keywords:** Anthropology, Anthropometry, Biometrics, Identification.

## Introduction

In the advent of technology and machine, role of biometrics within the society has been playing an imperative role for the secure living. When it comes to man-machine relationship, biometric identification became a particular scientific and governmental issue in the era of globalization because of colonial expansion and the rise of modern cities. Biometrics is concerned with the precise measurement of the characteristics of living things— "biometry"—such as dimensions and weights. Biometric techniques are used to study how individuals differ from one another[1]. The complexity of designing a biometric system depends upon 3 main factors: accuracy, scale or size of the database and usability, if we can make biometric systems more secure, robust and cost effective, the result will be a widespread adoption of biometric system resulting in broad economical and social impact. Biometry is, in analysis, a descriptive method. It enables the researcher, to a certain chosen attributes from a large number of individuals of a given population, and so to obtain a fuller description of a "species " than that derived as the result of selecting a few individuals as typical[2]. Thus, biometrics can also be used within a species or population to understand the variation within the group. Service of biometric technique is to observe seemingly undifferentiated populations, but especially the habitual and non-habitual criminals. Result of this are the discovery of fingerprints, retinal scans and skull shapes and how these differ from individual to

individual. These discoveries have led to the development of fingerprinting techniques and eye, ear, and face scanning equipments that can ascertain an individual's true identity. In present scenario, biometry to authenticate and identify person by their physical traits: face, hand shape (geometry), fingerprints and iris or retina pattern has emerged as a security solution[3]. Therefore, biometrics has been a valuable tool to anthropologist and scientists who can now build an accurate replica of a person's facial features starting with a skull. In the probable error concept, there is a useful check on deductions drawn from relatively meager material. Upon this fundamental biological error, which is taken as a basic assumption, the whole superstructure of the biometric treatment, inheritance is taken into account[4]. So on this basis; we can say that ranges of biometric technologies are becoming the foundation of highly secure identification and verification solutions. It is suitable for both commercial and governmental utilization as evidenced by the various nations i.e. in early 2002 the British government began issuing asylum seekers identity smart cards storing two fingerprints. General plans to extend the use of biometric technology throughout the UK visa system have also been announced and similar plans have been unveiled in France, Germany and Italy[5]. Indeed the Australian Customs Service (ACS) has revealed a biometric passport recognition pilot scheme at Sydney Airport as a precursor to a nationwide implementation of the system, where it is testing the Smart Gate facial recognition system for passport verification on Qantas

staff at that airport in the first phase of a project expected to lead to nationwide usage across all international air travelers[6.] Elsewhere, the Japanese government planned to introduce biometric features in passports in an effort to tackle illegal immigration and to enable tighter controls on terrorists: passports will be introduced with an embedded computer chip storing a biometric feature such as a fingerprint or a facial scan. Bulgaria has announced the introduction of a collection of fingerprint- and iris-scan biometric identifiers at its border controls[7]. Finally, in India, Unique Identification Authority of India (UIDAI) is issuing Aadhaar which is a 12-digit unique identification (UID) number for all Indian residents. The UID number is stored in a centralized database and linked to the basic demographics and biometric information – photograph, ten fingerprints and iris – of each individual[8]. The implementations of biometric technologies are well underway across various nations, pioneering these relatively new technologies in the provision of security and identity. Several European countries have started to update their border control policies incorporating the use of biometrics. Anthropology plays a unique role when we talk about the new biometric technologies. It is the important dimension to see connections about historical and cultural development of biometrics in the world. Anthropometry as a set of research methods used in anthropology, hence the persons specializing in anthropometry are familiar with range of biological variability present in the human populations and its causes, and are well trained in comparative osteology, human osteology, craniometry, osteometry, racial morphology, skeletal anatomy and function[9]. Anthropometric characteristics have direct relationship with sex, shape and form of an individual and these factors are intimately linked with each other and are manifestation of the internal structure and tissue components which in turn, are influenced by environmental and genetic factors. Anthropometric data are believed to be objective and they allow the forensic examiner to go beyond subjective assessments such as 'similar' or 'different'. With measurement data, the examiner is able to quantify the degree of difference or similarity and state how much confidence can be placed in this interpretation[10]. An 'ideal' biometric should be universal, where each individual possesses the characteristic; unique, where no two persons should share the characteristic; enduring, where the characteristic should be changed nor alterable; and collectable, the characteristic is readily presentable to a sensor and is easily quantifiable[11]. In attempts to satisfy these requirements, a diverse and varied range of different biometric technologies are available, such as those mentioned earlier: from recognition-based scanning systems measuring iris and retinal patterns, fingerprint layout and hand geometry constitution, to methods that measure the accuracy of human sense-based output, such as voice patterns and olfactory sensing. It is to be mentioned here that biometric methods have started functioning in Government/private/semi government offices but no research on these dimensions on Indian populations have been carried out till date.

At the levels of worldwide information system, the necessity for highly secure authentication and personal verification technologies becomes increasingly pronounced. Governments are concerned about user verification and system security services, which are delivered electronically. As a result, the probable benefits of biometrics technologies, identification issues and security, are gaining importance for development. On the other hand, in a world of new applications and constant experimentation, older biometrics such as fingerprinting and face recognition continued their central position. But Since the 1980s, technological advances have facilitated the production of high-quality devices that are relatively low in cost. For example, iris scan technology is already being piloted for bank pass machines (ATMs), and 'live scan' Automated Fingerprint Identification Systems (AFIS) are already popular with police forces throughout the world. The governments as well as market players should focus on promoting the benefits of the biometrics applications in the everyday life, from increased safety through to quick access to information and effective resource management. The sooner this is acknowledged by the public, the faster we can increase security in elements of our day-to-day life[12]. The Australian Customs established an automated passenger processing system, that is, the e-passport Smart Gate at Sydney and Melbourne airports, and it aims to introduce self-processing by employing facial recognition systems to confirm identities and streamline the travelers'' facilitation procedures[13]. The Japanese government plans to use biometric technology in passports to tackle illegal immigration and to enable tighter controls on terrorists. This will be applied within a computer chip which can store biometric features like fingerprints and facial recognition[14]. Other e-government applications are using the biometrics for certain defense bases for secure areas. For instance, hand recognition has been used at the Scott Air Force Base to save more than $400,000 in manpower costs through their metro-link biometric access gate[15]. Biometric applications to authenticate and identify citizens have effectively been used in reducing the issues of illegal immigration, access bottlenecks in busy facilities and high costs of employing security personnel. A good example is the United States whereby, since "September 11", it has widely adopted biometric technology. Two laws were made in the United States as a first mass deployment of biometrics. Seven million transportation employees in the United States incorporate biometrics in their ID cards. Moreover, in order to closely control visitors who enter and leave the country, all foreign visitors are required to present valid passports with biometric data; consequently, over 500 million U.S. visitors have to carry border-crossing documents which incorporate biometrics[16].

## Conclusion

Biometrics can provide a high level of authentication through identifying people by their physiological and behavioural characteristics but there are also several negative aspects. Biometrics can sometimes be ineffective when using the various styles of identification. For instance, fingerprints can be

saturated, faint, or hard to be processed with some of devices, particularly if the skin is wet or dry. Hand recognition can sometimes be ineffective when the h and is damaged, thereby no results will be obtained to match with the images already in the database. Few facilities have databases or hardware to employ iris recognition, which makes the upfront investment too high to initiate a worldwide iris ID system. Biometric technology has also been criticized for its potential harm to civil liberties. This is because people have been denied access to the various regions and countries simply because they do not have the correct identities for those places. Moreover, there is potential for people's privacy to be violated with this new technology[17].

On this basis, we can conclude that due to consistent and rapid technological developments, biometrics are centered somewhere on only a subset of the available methods of personal identification. Some methods would be performance-specific and overall applicable for the implementation of particular applications and may be more acceptable regarding privacy, security and personal identification.

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