Chapter 6
Biometrics:
An Overview on New Technologies and Ethic Problems

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ABSTRACT
The term biometrics is derived from the Greek words: bio (life) and metrics (to measure). “Biometric technologies” are defined as automated methods of verifying or recognizing the identity of a living person based on a physiological or behavioral characteristic. Several techniques and features were used over time to recognize human beings several years before the birth of Christ. Today, this research field has become very employed in many applications such as security applications, multimedia applications and banking applications. Also, many methods have been developed to strengthen the biometric accuracy and reduce the imposture errors by using several features such as face, speech, iris, finger vein, etc. From a security purpose and economic point of view, biometrics has brought a great benefit and has become an important tool for governments and institutions. However, citizens are expressing their thorough worry, which is due to the freedom limitations and loss of privacy. This paper briefly presents some new technologies that have recently been proposed in biometrics with their levels of reliability, and discusses the different social and ethic problems that may result from the abusive use of these technologies.

INTRODUCTION
One of the oldest characteristics that have been used for recognition by humans is the face (and sometimes the voice). Also animals are used to recognize each other by the smell and maybe by the sound they produce. For instance, dogs are able to recognize their human masters with a high accuracy. Thus, human beings and animals use these characteristics, unconsciously, to recognize known individuals every day.

Other characteristics have also been used throughout the history of civilization as a more formal means of recognition, as we can see in the following chronological sequence of examples during our old history:
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- In a cave estimated to be at least 31 thousand years old, the walls are surrounded by numerous handprints that may be considered as signatures of their owners (NSTC, 2006). Several similar cases have been observed in different places.
- In 500 years B.C. Babylonian business transactions were recorded in tablets including fingerprints (NSTC, 2006).
- Early Chinese merchants used fingerprints to settle business transactions (NSTC, 2006).
- According to early Egyptian history, traders were identified by their physical descriptors (NSTC, 2006).
- In 1857, Bertillon developed anthropometrics to identify individuals (NSTC, 2006).
- In 1892, Galton developed a classification system for fingerprints (NSTC, 2006).
- In 1903, New York prisons began to use fingerprints (NSTC, 2006).
- In 1936, the use of iris pattern was proposed (NSTC, 2006).
- In 1963, many research works in signature recognition were proposed (NSTC, 2006).
- In 1974, appeared the first commercial hand geometry system (NSTC, 2006).
- In 1976, the first system for speaker recognition was developed (NSTC, 2006).
- In 1987, a patent stating that the iris could be used for identification was awarded (NSTC, 2006).
- In 1991, real-time face recognition possibility (NSTC, 2006).
- In 1996, NIST began hosting annual speaker recognition evaluations (NSTC, 2006).
- In 1998, FBI launched CODIS, which is a DNA forensic database (NSTC, 2006).
- In 2000, a research work described the use of vascular patterns in biometrics (NSTC, 2006).
- In 2003, the European Biometrics Forum is established (NSTC, 2006).
- In 2005, Fujitsu proposed a security device that uses vein patterns to verify identity.
- In autumn 2005, RFID was integrated into passports in Germany.
- In 2007, RFID was integrated into identity cards in Germany.
- The BioSecure Network of Excellence supported the data collection, software development and infrastructure necessary to conduct a Multimodal Evaluation Campaign in 2007.
- In 2009, Sagem and Hitachi unveiled the first multi-modal finger vein and fingerprint device at Biometrics 2009 in London.
- In 2010, new biometric modalities using internal physical characteristics have been proposed, such as the Boneprint and ImpPrints (Brooks, 2010).

As we can see, the utilization of biometric techniques has become very popular over the time and especially during the last years, since the computing technologies have seen an important advance and since the need of secure transaction means have been much solicited. In fact, nowadays the applications of biometrics are very varied: security applications (airport and immigration security), multimedia applications (multimedia access and interactivity), banking applications (direct and remote transactions), etc.

However, an important question may arise: what are the disadvantages of biometrics (if any)? The response is obviously clear, since many human organizations have shown their disappointments regarding this technology. In fact, several ethic and social problems have been quoted, such as: the limitation of freedom (democracy limitation, travelling limitation, etc.), loss of privacy (personal and private information revealed to others), risk of imposture (banking transactions), risk of false rejection (identity rejection during