



BioHealth and Biometrics

Biometrics serves to identify and authenticate individuals and is in many cases replacing current password systems. Its relevance is increasing in many areas of our daily lives, one of them being healthcare. We want to give a short overview on Biometrics and its use in eHealth, and outline the legal and standards' background.

How does it work

After having „enrolled“ the individual in a biometric system, the individual's characteristic trait (e.g. iris pattern) is registered. Via a mathematical algorithm a sample is converted into a so called „template“ which is stored in a system. When the person wants to be authenticated, he/she must provide a biometric characteristic (e.g. fingerprint) to the system, which after having been processed -using the same algorithm as at the time of enrolment- is compared to the template. In case it matches, the individual's identity has been verified.

When a biometric measurement from an individual is compared to that subject's enrolled template there might be a mismatch. These errors are dependent on a number of factors, ranging from the uniqueness of the feature to the cooperation of the user. To increase the overall accuracy various biometric techniques can be combined when authenticating a person.

eHealth Applications

In Europe the use of biometrics in the health area is still scarce. Presently most applications are restricted to access control and limited to fingerprints and iris scans, but several pilot projects have been initiated to widen the scope. Thus Danish Biometrics, for example, is developing a biometric recognition solution for secure log-on procedures for doctors and nurses at the Copenhagen Hospital. In Germany, where a nationwide eHealth infrastructure is being introduced, doctors will be able to digitally sign prescriptions using fingerprints. In an Italian health care location, a biometric system controls the access to the surgical rooms

Biometric Techniques

either measure the physiological characteristics of a person (e.g. hand geometry) or the behaviour of a person (e.g. handwritten signature, keystroke dynamics and gait). Some examples:

Fingerprint recognition

was one of the first methods for biometric identification. The uniqueness of a fingerprint can be determined by the pattern of ridges and furrows as well as the minutiae points.

Iris recognition

is presently considered the most accurate of the physiological based techniques. The iris is protected, its pattern is unique and forms randomly and is stable throughout life. The technique is based on high-resolution images of the irises of an individual's eyes.

Facial recognition

is considered the main future biometric application in travel and transportation. Facial recognition is based on the analysis of the measurements of overall facial structure, including distances between eyes, nose, mouth, and jaw edges.

Hand geometry

recognition is one of the oldest and most robust biometric technologies. It is based on the evaluation of several features of the hand such as length and thickness of the fingers.

Vascular pattern

recognition is an emerging biometric technology based on the evaluation of blood vessel patterns with particular reference to the hand. Biometric authentication systems may recognize the vein pattern of the back of the hand or the vascular pattern of the palm or of just an area of a finger.

Definition

The Danish Biometrics Society describes Biometrics as “a science and technology for authentication (identification/verification) of a human being based on the human beings own (unchangeable) physiological or behavioural characteristics”.

Concerns

Biometric technology offers a lot of prospective benefits, but it is not free of potential threats to the individual. Therefore one ought to consider

- Security and privacy issues
- Social impacts
- Potential medical threats
- Ethical aspects
- Legal regulations

European Policy & Legislation

The Charter of Fundamental Rights of the European Union [1] states in Article 1 that "Human dignity is inviolable and must be respected and protected". It also recognises the right to the protection of personal data (Article 8). This is reflected by the European legal framework on the protection of personal data, such as the

- » **Directive 95/46/EC** on the protection of personal data of individuals with regard to the processing of personal data and on the free movement of such data [2].
- » **Directive 2002/58/EC** of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector [3].

Further Reading

European Biometrics Portal (EBP): Initiated and hosted by the European Commission in order to encourage and support the exchange of information and data on biometric technology initiatives, deployments and trials. <http://www.europeanbiometrics.info>

BioSecure: A network of excellence which aims to integrate multidisciplinary research efforts on biometrics-based identity authentication methods. <http://www.biosecure.info>

Biometric Vocabulary: Provides terms and definitions based on the ISO SC37 Harmonized Biometric Vocabulary (Standing Document 2) <http://www.3dface.org/media/vocabulary.html>

References

- [1] http://www.europarl.europa.eu/charter/default_en.htm
- [2] http://www.dataprotection.ie/docs/EU_Directive_95/46/EC_Chapter_1/92.htm
- [3] http://www.dataprotection.ie/documents/legal/directive2002_58.pdf
- [4] <http://isotc.iso.org/livelink/livelink?func=ll&objId=2262372>
- [5] <http://www.jtc1sc27.din.de/en>
- [6] http://www.cen.eu/CENORM/businessdomains/businessdomains/iss/activity/biometrics_fg.asp

Standardisation

Some of the BioHealth partners are active in Biometrics' standardisation. Major groups are:

ISO/IEC JTC 1/SC37–Biometrics [4] deals with the standardisation of biometric technologies to support interoperability and data interchange among applications and systems, cross jurisdictional and societal aspects of the utilisation of biometric technologies.

Current activities are for example:

- » **ISO/IEC DTR 24714** which provides a Draft Technical Report on Cross-jurisdictional and societal aspects of implementation of biometric technologies
- » **ISO/IEC TR 24722:2007** that gives a description of and analysis of current practice on multimodal and other multi-biometric fusion, including (as appropriate) reference to a more detailed description.

ISO/IEC JTC 1/SC27 WG 5 [5] pays attention to identity management and privacy technologies.

Current activities are for example:

- » **ISO/IEC NP 29100** which provides a framework for defining privacy requirements as they relate to personally identifiable information processed by any information and communication system in any jurisdiction.
- » **ISO/IEC NP 29101** that describes good practices for a consistent, technical implementation of privacy requirements as they relate to the processing of personally identifiable information in information and communication systems.

CEN ISSS Biometrics Focus group [6] is concentrating on European interest in biometric standardisation.

Upcoming Events

ISO/IEC JTC1 SC37 Working Group Meeting
January 07-11, 2008 Tel Aviv, Israel

Infosecurity Europe
April 22-24, 2008 London, England

Summer School for Advanced Studies on Biometrics
June 09-13, 2008 Alghero, Italy

FG2008 - IEEE conference on Automatic Face and Gesture Recognition
September 10-13, 2008 Amsterdam, Netherlands

Partners and Contact Details

- Bull Hungary, **Hungary**
- IBB-CNR – National Research Council of Italy, **Italy**
- IMA Ltd. – Institute of Microelectronic Applications, **Czech Republic**
- ITS-Norway – Norwegian Association for Multimodal Transport Services, **Norway**
- eHCC – eHealth Competence Center, Universität Regensburg, **Germany**

GSF – National Research Center for Environment and Health (Coordinator)

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