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Accessibility in Biometrics

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Representing SC 37 at the JTC1 SWG-A meeting (Brussels – Sept. 06)

JTC1 Special Working Group on Accessibility,
18 September 2006 Brussels, Belgium
Biometrics - Main technologies

- Recognition of
  - Fingerprints
  - Iris
  - Face
  - Hand geometry
  - Voice
  - Signature dynamics
  - Vascular pattern
  - ...

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Accessibility in Biometrics - Premise

- A biometric system should be easily accessible to all subjects and should not disadvantage any subject
Accessible systems should be designed to be:

- equitable in use for data subjects who have physical or psychological inabilities,
- flexible in use,
- simple and intuitive to use,
- easy-to-understand with appropriate additional prompts,
- appropriately signed,
- tolerant of error,
- usable with low physical effort,
- of a size and space for easy approach and use.
**Duties of the operator (1)**

The system operator and/or designer should take into account the following disabilities:

1. The absence of physical body parts required for the correct operation of a biometric or its specific instantiation in the system.
   - *Example: missing index finger(s) in an access control system using prescribed fingers*

2. The absence of behavioural features required for the correct operation of a biometric or its specific instantiation in the system.
   - *Example: data subject with no power of speech required to use a voice-activated door entry system*
Duties of the operator (2)

3. Unusable physical body parts required for the correct operation of a biometric system
   - Example: person with extreme arthritis asked to use a flat plane hand geometry biometric

4. Unusable behavioural features required for the correct operation of a biometric system
   - Example: data subject in a country with a writing system based on non-Latin alphabet required to use a dynamic signature system designed for Latin alphabets
Duties of the operator (3)

5. An inability to present the required biometric characteristic in a sufficiently consistent and predictable manner under the particular conditions of operation.

- Example: uncontrollable movement of the eyeball (iris resulting in difficulty in operating an iris recognition system

- Example: person with a speech impediment (e.g. stuttering) asked to use a speaker verification scheme
Duties of the operator (4)

6. An accelerated drift, that is a change in a characteristic over a period of time in physical or behavioural aspects resulting in increasing difficulty in meeting the matching criteria for an identification or verification.
   - Example: data subject with conditions that rapidly age the facial features being verified in certain automatic face verification systems

7. An inability to access, or difficulty with physical access to, the biometric sensor or user terminal.
   - Example: wheelchair data subject or person with a stature not tall enough to access a sensor or user terminal fixed at a specific height
Duties of the operator (5)

8. An inability either to read, due to illiteracy, or to understand the instructions, or to recall the correct procedures, in order to operate the biometric system successfully.
   - Example: Forgetting which finger was enrolled in an unattended access control system, and being locked out after three attempts

9. Psychological conditions that prevent the data subject operating the biometric systems correctly.
   - Example: Persons with extreme compulsive-obsessive disorder required to use sensors or keypads/keyboards with physical contact
Duties of the operator (6)

10. Conditions, such as those listed above, that result in disproportionate use of resources.
   - Example: Senior citizens who require a longer period of adjustment to changes in context and situation, exceeding the notional time allowed for an authentication

11. Inability to capture biometric for children or individuals that don’t have “standard” size biometrics.
   - Example: Child using a hand geometry reader due to the position or size of the sensor.
In order that potential data subjects with disabilities should not be disadvantaged in the application of systems using biometrics, care should be taken to design these systems to operate in accordance with the following accessibility principles.

- **Inclusive Design:**
  Biometric systems should be designed so that as many subjects within the target population as is reasonably possible can use the system effectively and with the minimum of discomfort.

- **Early consideration of the needs of disabled:**
  In the design of such new systems or services, the needs of disabled subjects should be considered from the outset.
Principles for subjects with disabilities (2)

**Testing**
Before systems are deployed, they should be thoroughly tested by subjects who represent the widest range of abilities (that is, in respect of visual, auditory, physical, cognitive and behavioural ability).

**Training**
For subjects with a disability, training appropriate to mitigate the disability in the use of the system should be offered.

**Choice**
Wherever practicable, the subject should have a choice of biometric systems to use, and should not be disadvantaged if their disability prevents them from using a specific biometric.
Principles for subjects with disabilities (3)

- **Alternative method**
  Where no alternative biometric technology is available and where the disability prevents the use of the particular biometric technology, subjects should be permitted to use an alternative method. Wherever practicable, the use of such an alternative should not result in an inferior level of service or functionality to the subject.

- **Re-enrolment**
  If the subject can no longer reliably use a verification system, the subject should be provided, wherever feasible, with the opportunity to repeat the registration process.
Principles for subjects with disabilities (4)

- **Staff training**
  Staff who operate systems that use a biometric technology should be trained in how to work with disabled subjects.

- **Consent**
  A biometric system should not store details of a subject’s disabilities without his or her informed consent.

- **Equality**
  The rights to privacy of a disabled subject should be the same as those of a non-disabled subject.
Biometrics & Accessibility

- Biometrics, more than other IT technologies, is strongly depending on accessibility
- The challenge of biometrics is to be compliant with the largest number of users
- In consequence of large international projects (such as passports), accessibility could become a critical point in a short-medium time
  - Some countries are planning to include fingerprints in passports
Accessibility in SC 37 “Biometrics”

ISO / IEC JTC1 SC37 “Biometrics” has a significant interest in the issues connected to accessibility particularly in consequence of the activities carried out in its WG 6 on “Cross-jurisdictional aspects” of biometrics.
SC37’s Structure

- **WG 1 “Harmonized Biometric Vocabulary”**
  - Convenor: Ms. Rene McIver, Canada
- **WG 2 “Biometric Technical Interfaces”**
  - Convenor: Mr. Young-Bin Kwon, Korea
- **WG 3 “Biometric Data Interchange Formats”**
  - Convenor: Mr. Axel Munde, Germany
- **WG 4 “Biometric Functional Architecture and Related Profiles”**
  - Convenor: Mr. Mike Hogan, USA
- **WG 5 “Biometric Testing and Reporting”**
  - Convenor: Mr. Bob Carter, United Kingdom
- **WG 6 “Cross-Jurisdictional and Societal Aspects”**
  - Convenor: Mr. Mario Savastano, Italy
**WG 6’s Terms of Reference**

Standardization in the field of cross-jurisdictional and societal aspects in the application of ISO/IEC biometrics standards. Within this context, the terms of reference includes the support of design and implementation of biometric technologies with respect to:

- accessibility
- health and safety
- support of legal requirements and acknowledgement of cross-jurisdictional and societal considerations pertaining to personal information

Specification and assessment of government policy are excluded from the scope of WG6
Progression of work: TR 24714

- WG6 is producing TR 24714 divided in two parts:
  - 24714-1: Part 1: Guide to the accessibility, privacy and health and safety issues in the deployment of biometric systems for commercial application
  - 24714-2: Part 2: Practical application to specific contexts
Example of accessibility issues related to fingerprints (TR 24714 – Part 2)

- Fingerprints – accessibility issues
  - Particular types of workers (e.g. brick masons or chemical workers), elderly, minors and, in general, people with medical conditions resulting in dry skin, as elderly, may experience problems, both in enrollment and verification when using particular classes of sensors.
  - Furthermore the elderly, as well as infants, may have problems being enrolled by existing fingerprint scanners because of the reduced height of their papillary relief.
  - In infants and small children the height of the papillary relief increases in accordance with the growth of the body while the elderly generally experience a “wearing down” of their papillary relief...
Conclusions

- Accessibility, more than other issues, is becoming a real challenge on the road of biometrics
- Some particular aspects in biometrics should be mainly considered
  - Disabilities
  - Age
    - For many biometric technologies there is a “age golden window”
- Even if with some limits, the use multi-biometrics should be considered a possible solution
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