



Biometrics 101



A Primer for Senior Leaders



Our Agenda

- Definition
- Why use biometrics?
- Types of biometrics
- Some basic terms
- A little science...
- Collateral issues
- Demonstrations

Definition

Biometrics

- measurable
- physiological and/or behavioral characteristics
- can be used to verify the identity of an individual

Source: Ashbourn, Julian, [Biometrics - Advanced Identity Verification](#)

Why Biometrics ?

- Only biometrics can verify *you as you*
- Tokens (smartcards, etc.) aren't you and,
 - can be lost
 - can be stolen
 - can be duplicated (some)
 - can be forgotten
- Passwords aren't you and,
 - can be forgotten
 - can be shared
 - can be observed
 - can be broken

Source: Dunn, Jeffrey, [Introduction to Biometric Technologies](#)

Types of Biometric Technology

• Physiological

- Iris
- Retina
- Fingerprint (incl. nail)
- Hand (incl. knuckle, palm, vascular)
- Face
- Voice
- Odor*
- Earlobe*
- Sweat pore*
- Lips*
- DNA

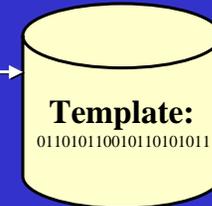
• Behavioral

- Signature
- Gait*
- Keystroke
- Voice

The Process (Terminology)

Enrollment

User provides sample(s) by means of a scan. User's sample(s) registered as a template.

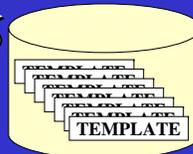


The Process (Terminology)

Live Scan



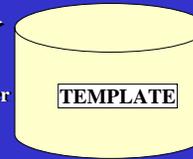
Identification (or "one-to-many")
- The biometric system identifies a person from the entire enrolled population



Live Scan + Password, PIN, Token



Authentication ("one-to-one")
- The biometric system matches a person's claimed identity to his/her biometric and one or more other security technologies

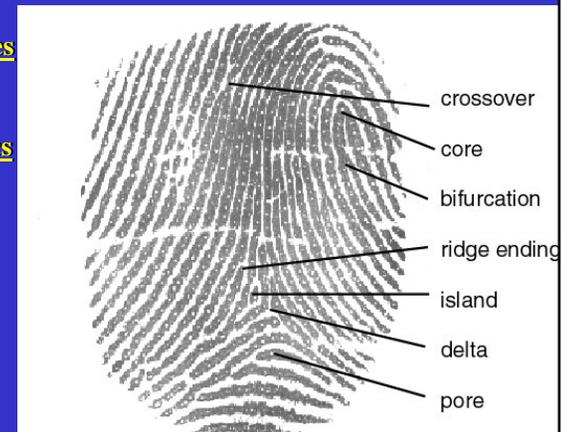


The Science of Biometrics Fingerprints

Local Features (Minutiae)

Characteristics

- Type
- Orientation
- Spatial Frequency
- Curvature
- Position



Source:
<http://www.finger-scan.com>

Figure 1

The Science of Biometrics

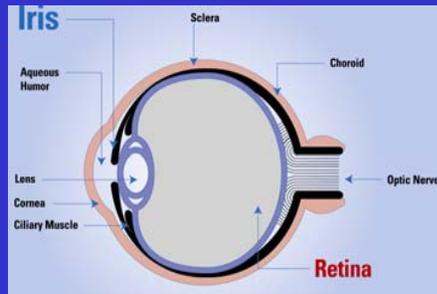
Iris Recognition

- Based on visible features, i.e. rings, furrows, freckles and the corona

- Iris essentially formed by 8 months and remains stable through life

- Each iris has 266 unique spots vs. 13-60 for other biometrics

- Features and their location are used to form the IrisCode™, which is the digital template (512 bytes)



Source: <http://www.iris-scan.com>

The Science of Biometrics

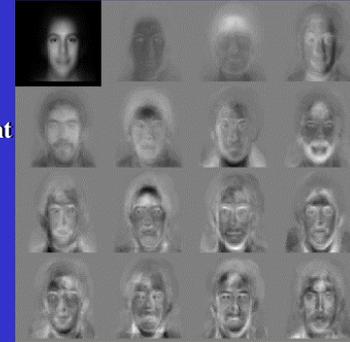
Facial Recognition

- Uses low cost off-the-shelf camera at low speed, low resolution (3-5fps, 320x240)

- Several pictures taken at enrollment to allow for more accurate searches

- All technologies emphasize facial features that are less susceptible to alteration such as eye sockets, cheekbones, sides of mouth

- Features extracted to form template (1300 bytes)



The Science of Biometrics

Voice Recognition

- Not the same as *speech* recognition

- Considered physiological and behavioral

- Popular and low-cost, but less accurate and sometimes lengthy enrollment

- Capable of working over the phone

- telephone banking
- password reset
- calling card security
- call center authentication (i.e. home alarm systems)
- probation/house arrest monitoring

- Many vendors; many proprietary technologies

Cultural and Social Issues

- In any large scenario some portion of the general population is likely to be physiologically unable to use one or more technique.

- Some people have a concern for the physical effects of the technology upon them. This accounts for the greater acceptance of newer iris recognition technology over the older retinal scan technology.

- Religious and cultural concerns may also need to be accommodated by organizations implementing biometric technology. For example, certain cultures and religions prohibit or look with great disfavor upon photographing of individuals