

# Biometric authentication and identity theft

---

Andy Adler

School of Information Technology and Engineering  
U. Ottawa

# Newsflash! biometrics

---

- ❑ eight fingerprints and face required to get new US Visa (US VISIT)
- ❑ New ICAO passport standard requires biometric data in document
- ❑ UK will issue biometric based ID card
- ❑ New Seafarers ID card will have two fingerprints

# What are **Biometrics**

---

Automatic  
identification  
of an  
individual  
based on  
behavioural or  
physiological  
characteristics

# What are Biometrics

---

**Automatic** ←  
identification  
of an  
individual  
based on  
behavioural or  
physiological  
characteristics

Computer based  
ie. fast

*Forensics* is the  
science of humans  
identifying humans

# What are Biometrics

---

Automatic  
**identification**  
of an  
individual  
based on  
behavioural or  
physiological  
characteristics



- Two types:
1. Verification
  2. Identification

# What are Biometrics

---

Automatic identification of an **individual** based on behavioural or physiological characteristics

Biometrics is **only** about identity of individual. Other technologies manage security

# What are Biometrics

---

Automatic identification of an individual based on **behavioural** or physiological characteristics

Behavioural biometrics:

- Gait
- Voice
- Typing dynamics
- Signature

# What are Biometrics

---

Automatic identification of an individual based on behavioural or **physiological** characteristics

## Physiological Biometrics

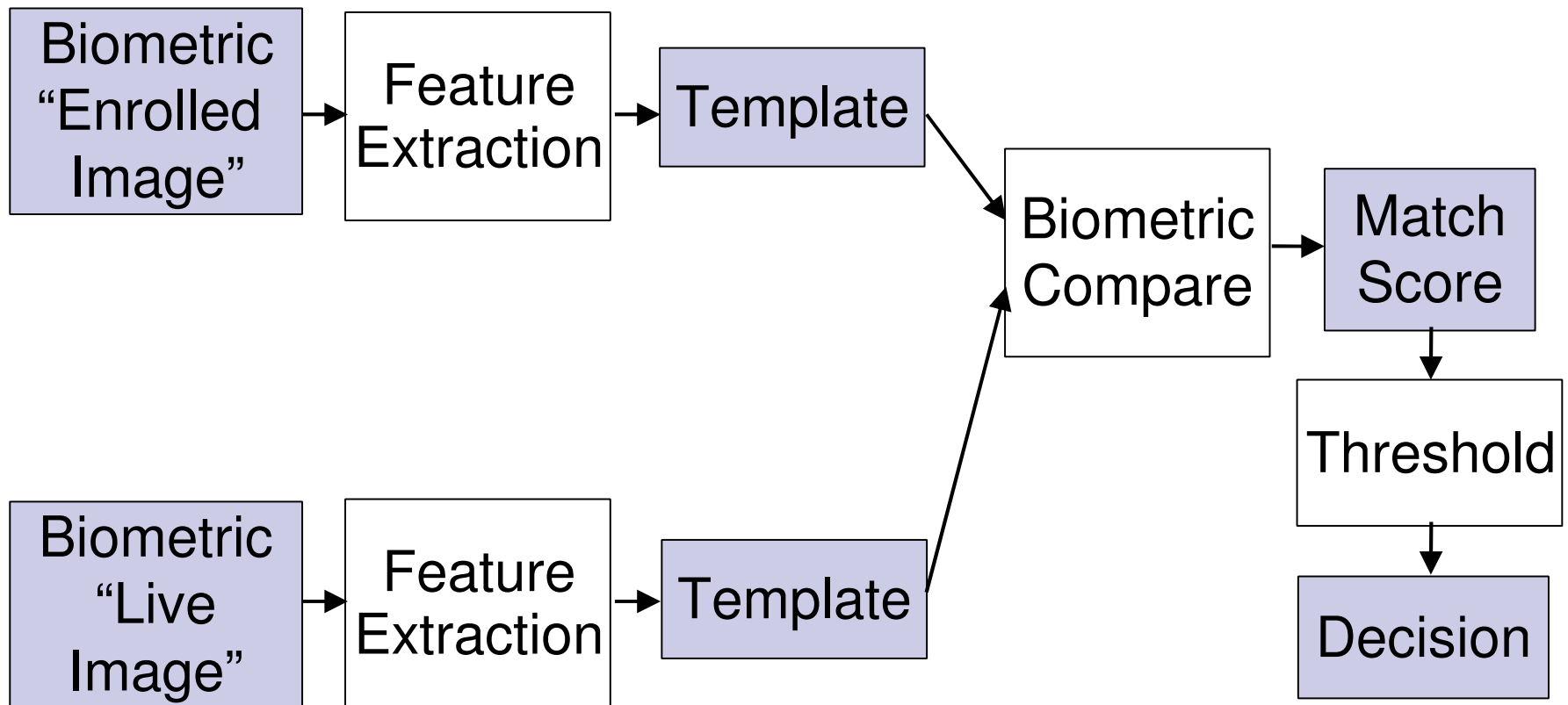
- Fingerprint
- Face
- Iris
- Retina
- Hand Geometry
- Dental shape
- DNA

...



# Biometric Processing

---



# Some problems with verification

---

- Need to “train” users for equipment.
  - Enrolled image is most important, but users are least trained
- False Accepts
- False Reject
  - Many can't enrol in fingerprint / IRIS
- Template ageing => need to re-enrol

# Biometrics standardization

---

- ISO standardized interchange formats
  - Fingerprint (image/minutiae)
  - Face image
- ICAO passport specification
- ILO seafarer's ID
- AAMVA fingerprint in driver's license

# Biometrics and ID Theft

---

- ID Theft: Core issue is fraudulent claims to identity
- This can be done because ID claims cannot be easily validated
- Biometrics promise the ability to validate ID claims
  - Requires an infrastructure to enrol and store biometric information
  - Requires infrastructure to reliably transport information

# Who manages enrolment?

---

## ***Government***

### Advantages

- Access to good source data
- Ability to build enrolment infrastructure
- Universal program

### Disadvantages

- Core interest is national security
- Significant privacy concerns

# Who manages enrolment?

---

## *Industry*

### Advantages

- Biometric system is tailored to need

### Disadvantages

- Biometric balkanisation
- Significant privacy concerns – perhaps worse than governments
- No control of source document quality
- Not all users will have access

# Who manages enrolment?

---

## *Individuals*

### Advantages

- No privacy concerns
- Biometric adapted to individual preference

### Disadvantages

- No control of source document quality
- Not all users will have access

# ID Theft scenarios

---

## Phishing

- Victims account numbers and passwords are stolen
- Thief logs in as user and uses funds

## Dump Diving

- Thief gets CC application from garbage
- Credit Card used in victim's name



# Biometric systems

---

## □ *Government:*

Driver's License with Iris recognition

- Similar fingerprint / passport / ID card systems may be available soon

## □ *Industry:*

Voice recognition in phone service

- Advantage is low enrolment cost

## □ *Individual:*

Fingerprint enabled cell phone

- 1M such phones have sold in Japan, biometric stays on phone, but crypto keys are transmitted

System

*Phishing*

*Dump.  
Diving*

---

*Government:*

Driver's License with  
Iris recognition



?

*Industry:*

Custom service line  
with voice recognition

?



*Individual:*

Fingerprint enabled  
cell phone



# Conclusions

---

- ❑ Biometrics promise a way to unequivocally identify
- ❑ Need to be part of an infrastructure
- ❑ Government / industry systems don't seem offer compelling use cases
- ❑ Individual systems appear to be most powerful

# Biometric authentication and identity theft

## Andy Adler, CASCON 2004

---

**Abstract:** The idea of identifying individuals using body measurements is credited to William Herschel, who began in 1859 to collect the fingerprints of friends and relatives. Automatic identification of humans based on such measurements is now called "biometrics" and is widely being piloted and implemented for government and (to a lesser degree) for commercial identification purposes. This talk will explore the issues associated with biometric authentication in the context of identity theft. We will briefly review the capabilities of face, fingerprint, voice and iris recognition and how such systems are integrated into general security systems. Specifically, we will look at the storage and management of biometric data, and possible avenues for security breach. There are several important areas in which biometrics are becoming standardized into identification documents. Passports and other government ID is standardized under the international Civil Aviation Organization (ICAO). Similarly the American Association of Motor Vehicle Administrators (AAMVA) has developed a standard for the incorporation of fingerprint data into drivers licenses. The talk will conclude with my thoughts on how biometrics might counter ID theft, and some issues with biometrics: technical, usage and perception.

---