

Second International BSI-Symposium on Biometrics

Darmstadt, Germany March 1-2, 2004

Biometrics: Trust But Identify

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- **John D. Woodward, Jr. is a senior RAND Corporation researcher detailed to his current position at the U.S. Department of Defense**
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Outline

1. **19th Century Biometric History**
2. **21st Century Biometric Status**
3. **National Security Needs & Biometric Reality**
4. **Summary**

What Can We Learn about ID Systems from 19th Century Criminal Justice?

Law & policy focus on recidivists

- E.g., 1869 Habitual Criminals Act in England
- Dominant belief that small number of habitual criminals caused most crime
- Past events linked to present person: Criminals had to be linked to their past crimes to punish them appropriately

Ability to identify prior offenders hampered by:

- Data subject's non-cooperation
- Data subject's use of alias
 - to conceal present person
 - to conceal past events

How Did the 19th Century ID System Work to Identify Recidivists?

Use of visual- and textual-based recognition

- Police gathered regularly at prisons to see if they recognized any criminals
- Police published information sheets with photos and descriptions of criminals

Problems

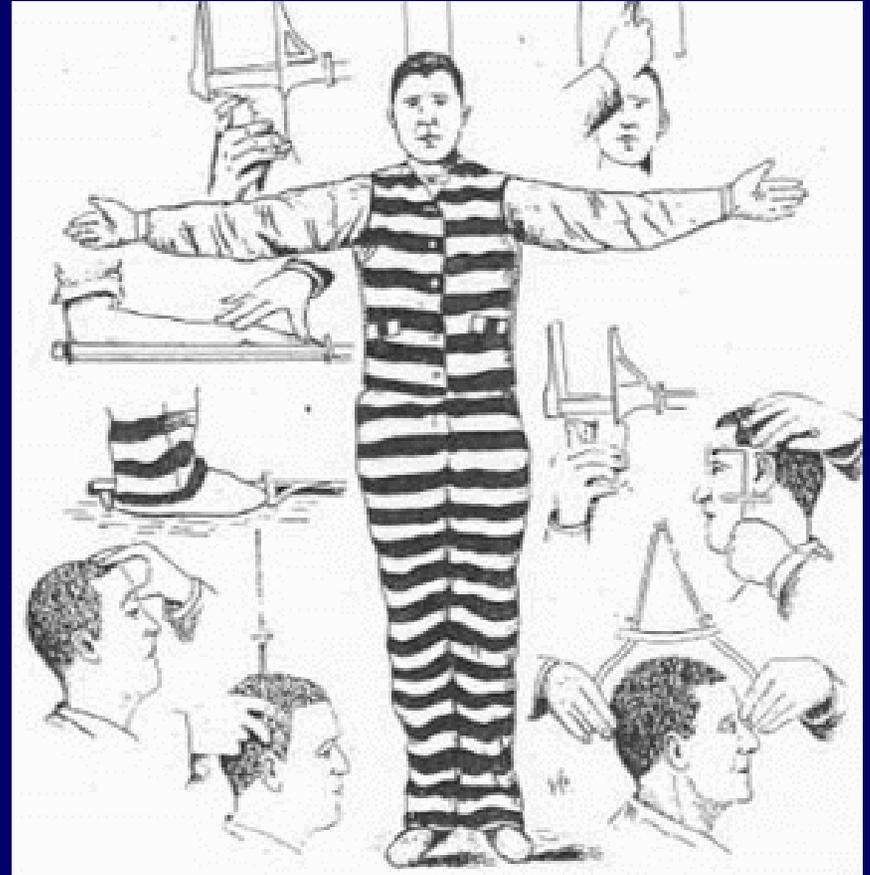
- Technical / operational
 - Inefficient; ineffective
- Geographic / socioeconomic
 - Mobile populations
 - In U.S., open society; frontier spirit

A New ID System Comes to the Fore in 1880s Thanks to Alphonse Bertillon

Anthropometric identification system

Three basic steps:

- Different measurements taken w/ specially designed instruments
- Precise physical description taken
- “Peculiar marks” recorded



Leading to Bertillon's first successful matches in 1883

History of Biometrics



But “Bertillonage” Was No “Silver Bullet”

System administration issues

- **Complicated enrollment system**
 - **Highly-trained Bertillon operators, supervisors, and special equipment required for precision**
 - **Deployment difficult in rural, remote regions lacking police resources**
- **No latent capability**
 - **Anthropometrics not left behind at crime scenes**
- **High error rates**

Timeline of Selected Events In the History of Fingerprints

1880 – Faulds publishes on fingerprints in *Nature*

1889 – Galton speaks on fingerprints to scholars

**1892 – Galton publishes *Finger Prints*
Twain publishes *Pudd'nhead Wilson***

1901 – Britain adopts “Henry System” of classification

1902 – Fingerprints used to prove guilt in Britain

1911 – Fingerprints used to prove guilt in U.S.

1999 – IAFIS becomes operational

What Lessons are to be Learned About ID Systems?

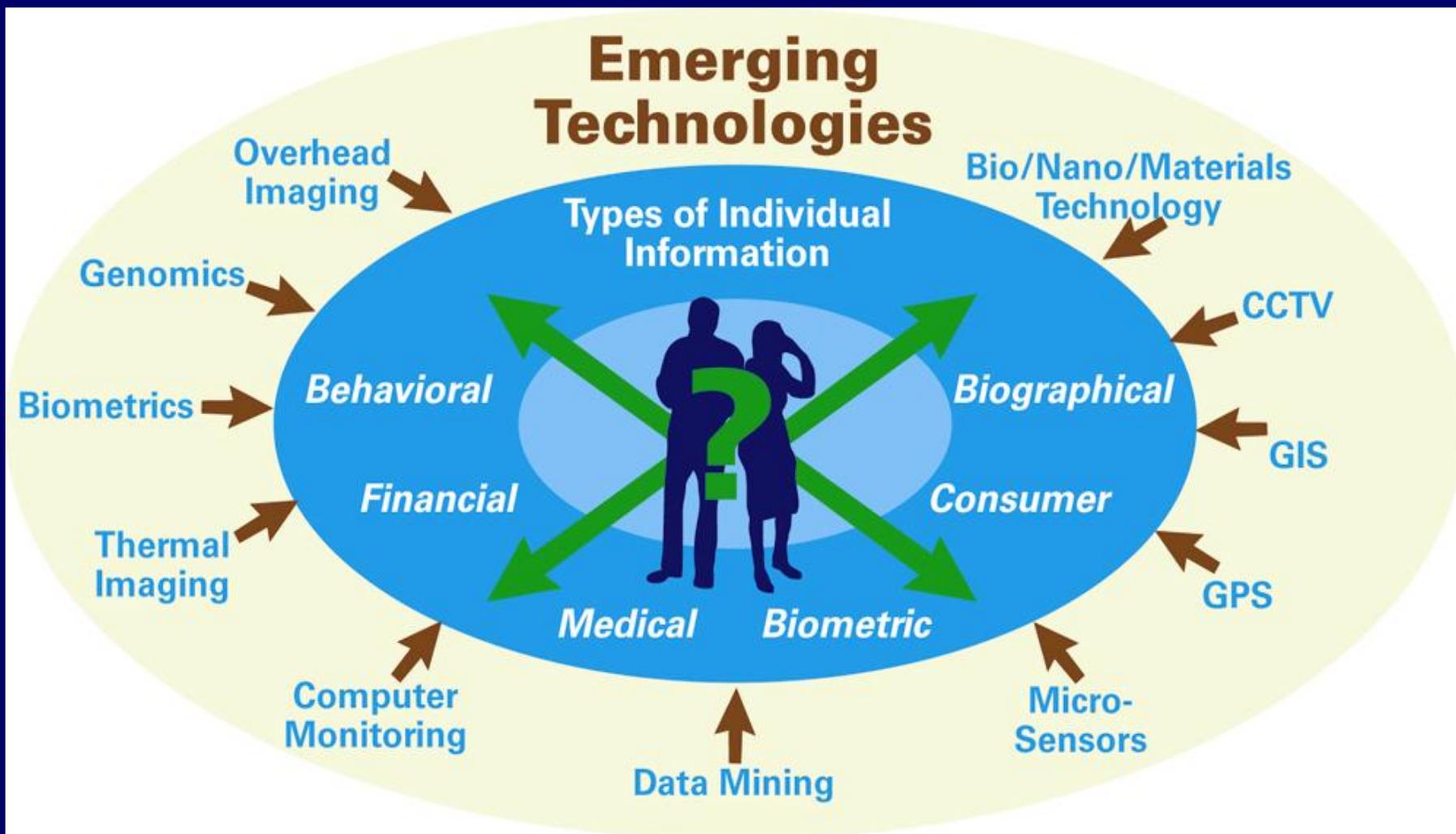
Fingerprints eventually dominate

- **Correct technical decision: Fingerprints are better than Bertillonage**
- **Roles of FBI and J. Edgar Hoover in promoting fingerprints**
- **This legacy has produced IAFIS (CJIS Criminal Master File)**

However . . .

- **Accompanied by controversy**
- **Took much time and much effort**
- **Represented a “paradigm” shift in thinking about identity**

Where Does Biometrics “Fit In”?



What are the Advantages of Biometrics as a DAT?

We have a need to identify people

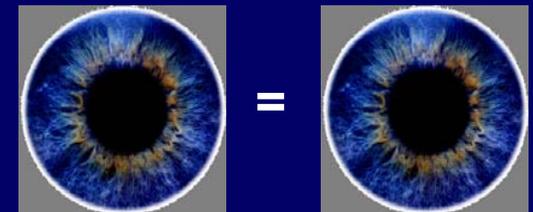
- Link identity to person

- Such that John Doe = John Doe

- Such that



- Such that



- Link past to present
- Link present to future

A Solution? Paradigm Shift from What You Have or What You Know to What You Are

Human recognition based on biometrics

Less susceptible to:

- **Duplication**
- **Inconvenience**
- **Mistake**
- **Fraud & forgery**

Concrete link is made to the person

Paradigm Shift: The Case for Biometrics

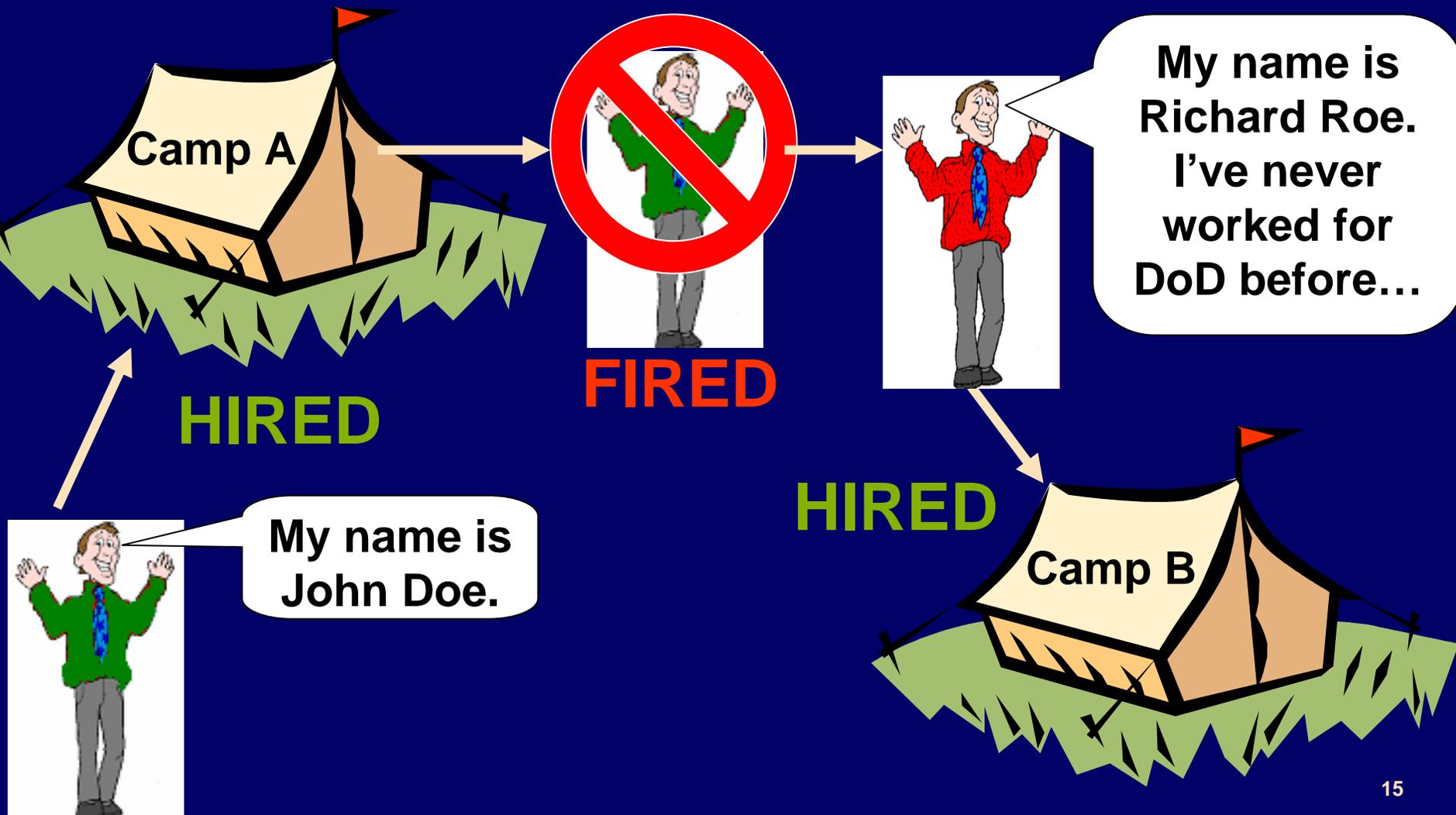
Benefits (alleged) of biometrics:

- Increasing security
- Increasing convenience
- Decreasing costs
- Freezing / fixing identity



**New & Needed
Capability!**

Example of Problem in a National Security Context



Problem for Homeland Security: The National Security Threat



His real name is Richard Roe. On USG Watchlist.

Applies for visa

Visa granted.

Enters U.S.



My name is John Doe. I want a US visa!



New Capability: Freeze / Fix Identity

Examples:

- **One felon; one criminal record**
- **One entitlements recipient; one check to authorized recipient**
- **One foreigner applying for entry to US; one US government-issued travel document to foreigner**
- **One licensed driver; one driver's license**
- **One soldier; one identity**

However:

- **Few biometrics have this capability over large-scale databases (1:N); operational challenges**
- **Not all will want this paradigm shift**

The Building Blocks for Biometrics

Business Process
(Track Personnel & Assets)

National Security Threats
(Deter, Prevent)

Resource Optimization
(\$\$\$, Manpower)

Drivers

Logical Access

Physical Access

Accountability

Applications

Identity Authentication
(Vetting and Fixing Identity)

Foundation

Summary

- **Biometrics:**
 - High Tech Word for Old Concept
- **Biometrics:**
 - Part of 21st Century World of Data Acquisition Technologies
- **National Security Needs:**
 - Freezing & fixing identity: the underappreciated power of biometrics?
 - Can biometrics rise to the challenge?
- **DoD Building Blocks for Biometric Uses**

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