

On the Future of Biometrics – Research, Applications, and Social Challenges

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Biometrics Has Gone Mainstream

- Passports and Visas



- **US-VISIT**
Keeping America's Doors Open and Our Nation Secure

- Grocery payments



- School lunch programs



- Medical drug dispensing



- Walt Disney World



- Battlefield intelligence

Changing Landscape

Before

- Criminal history
 - Background checks
 - Crime scene investigation; forensics
 - Specialized access control
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- ➔ Need results in hours to days
 - ➔ Generally controlled environments
 - ➔ Accuracy most important

Now

- Border control (US-VISIT)
 - Passports/visas; frequent traveler
 - Intelligence in the field
 - Personal Identity Verification (PIV) cards (HSPD-12)
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- ➔ Need results in minutes
 - ➔ Dispersed, variable environments
 - ➔ Social acceptability increasingly important

Emerging Applications

- **HSPD-12/PIV (merging of physical and logical access control)**
 - **Extend to state and local government, first responders**
- **Driver licensing – Real ID**
- **FBI Next Generation Identification (NGI)**
- **DoD Automated Biometric Identification System (ABIS)**
- **US-VISIT (two-print to ten-print; multiple biometrics)**
- **UK Identity Card (face, iris)**
- **Intelligence and counter-terrorism**
- **Voter registration (international)**

Recent Advances

- **Fingerprint – identification flat / rolled**

- Device: 6" x 6" x 4.7"; platen: 3.2" x 3.0"
- 4.0 lbs
- Powered by single PC cable (FireWire)
- Automated finger sequence and image quality checks
- Rapid auto. image capture – “4-4-2” slap in < 10 sec



- **Face**

- 2D + skin texture + 3D pose correction
- 3D



- **Iris**

- “Iris on the move” (Sarnoff Labs)



Research Topics

- Algorithms – single and multi-biometric
- Human factors / usability
- Assessment and utilization of data quality
- Performance validation – methods; *representative* test data
- Interoperability – cross agency; system/sub-system
 - Technical and policy
 - Appropriate/inappropriate use of standards
- Scalability and adaptability
 - Dynamic performance management (e.g., workload, threat level, ambient environment)
- Surveillance / at-a-distance operation

Research Topics (concluded)

- Aging effect on a given sample; temporal effect across samples
- Automatic system operational readiness assessment
- Vulnerability assessment; countermeasures
- Transition from legacy systems; technology refreshment
- Greater use of and improved forensic capabilities
 - ◆ Daubert challenges
- Legal and privacy issues, operational policies – US and international; operational and test data
- Return on investment (ROI) modeling
- Unification of application requirements and qualified products

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