

INTRODUCTION TO NIST'S BIOMETRICS PROGRAMS

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NIST Statutory Mandates

- USA Patriot Act (PL 107-56)
- Enhanced Border Security and Visa Entry Reform Act (PL 107-173)
- Develop and certify technology standard to
 - verify identity of foreign nationals applying for a visa
 - visa application at embassies and consulates
 - background check against FBI criminal database and DHS databases and “watch lists”
 - ensure person has not received visa under a different name
 - verify identity of persons seeking to enter the U.S.
 - verify that the person holding the travel document is the same person to whom the document was issued
 - airports, land border crossings, sea entry points

NIST Presidential Directives

- Homeland Security Presidential Directive #11
 - terrorist-related screening procedures
 - identify & track terrorists
 - use biometric identifiers
 - mechanisms for sharing information among screeners and all relevant Government agencies
- Homeland Security Presidential Directive #12
 - government-wide standard for secure and reliable forms of identification issued to federal employees and contractors
 - sound criteria for verifying an individual employee's identity
 - strongly resistant to identity fraud, tampering, counterfeiting, and terrorist exploitation
 - rapid electronic authentication
 - Promulgated by Sec'y of Commerce (FIPS)
 - Personal Identity Verification (PIV)

NIST Patriot Act Recommendations

- One-to-One Matching
 - Two index finger images and one face image
 - Fingerprints provide biometric accuracy, the face is for manual human verification
- One-to-Many Matching
 - Ten slap (flat) fingerprint images
 - Existing larger archival government databases will require ten prints because of archival image quality
- All biometrics in standard image formats

NIST Fingerprint Tests

- Test NIST in-house reference system
- Test US Gov systems
 - FBI IAFIS (criminal/civil background checks)
 - DHS IDENT (part of US-VISIT entry/exit system)
- Test commercial vendor systems
 - FingerPrint Vendor Technology Evaluation (FpVTE) 2003 (55 systems, 17 vendors)
 - Software Development Kits (19 systems, 12 vendors)
 - SlapSeg - Segmenting out the separate fingers from 4-finger slap impressions (13 systems, 10 vendors)
 - MINEX - Determine feasibility of using minutia data for fingerprint interchange between different fingerprint matching systems (30 systems, 12 vendors)
- Use large-scale operational data

Data Sets for Accuracy Testing

- Requires large-scale data sets to capture subject variations and fingerprint image quality variations
- One-to-One: Test-sample sizes should be 5,000-60,000 individuals
- One-to-Many: Test-sample sizes should be at least 1,000,000 individuals

NIST Fingerprint Data Sets (Federal, State, County)

NAME	SCAN TYPE	PLAIN	ROLL	TESTS	SIZE	QUALITY
SD 14 (V2)	Ink/Live		10	Roll:Roll	2,700 Card Pairs	Medium
SD 24	Live (DFR-90)	10		Plain:Plain	80 Fingers	Good
SD 29	Ink	10	10	Roll:Roll Plain:Plain Plain:Roll	216 Card Pairs	Medium
INS INDEX (recidivist)	Live (DFR-90)	Index		Plain:Plain	620K Subjects 3M Images	Operational
INS Benefits	96% Live 14% Rescan	10	10	Roll:Roll Plain:Plain Plain:Roll	640K Subjects	Operational (Good)
DOS-BCC	Live (DFR-90)	Index		Plain:Plain	6M Subjects 240K matched	Operational Office
INS CARD	Ink	10	10	Plain:Roll	100K Cards	Operational
TX	60 % Ink 40 % Live	10	10	Plain:Roll	500K Cards	Operational
IAFIS	Ink/Live		10	Roll:Roll Plain:Roll	2.9M Cards	Operational
ESD	Live	10	10	Plain:Roll	3K Cards	Good
US-VISIT Jan. 04- Feb.04	Live	Index		Plain:Plain	1.4M Subjects 187K matched	Good
US-VISIT Mar. 04- Jun. 04	Live	Index		Plain:Plain	2.8M Subjects 819K matched	Good
LA County	90% Live 10% Rescan	10	10	Roll:Roll Plain:Plain Plain:Roll	1.5M Subjects 73K matched	Operational (Good)
AZ	60 % Ink 40 % Live	10	10	Plain:Roll	179K Subjects 100K matched	Operational
FBI 12K	Ink/Live	10	10	Plain:Roll	12K Subjects	Operational
Ohio	Ink/Live	10	10	Roll:Roll Plain:Plain Plain:Roll	925 Subjects	Very Good
IDENT IAFIS	Live	10 Index	10	Plain:Plain Plain:Roll	3.8K Subjects	Operational

Approximately 18M subjects and 128M fingerprint images.

NIST Face Recognition Tests

- Face Recognition Vendor Test (FRVT) 2000
- Face Recognition Vendor Test (FRVT) 2002
 - established a baseline for the capabilities of existing commercial technology
 - Error rates cut in half from FRVT 2000
- Face Recognition Grand Challenge
 - Goal is to reduce error rates an order of magnitude
- A follow-on face recognition vendor test
- US-VISIT face recognition testing – e-passports

Presentations in Today's Session

- Fingerprint SDK (Software Development Kit) Testing
- ANSI/NIST Fingerprint Standards
- Slap Fingerprint Segmentation Evaluation
- Fingerprint Image Quality
- Meta-analysis of Biometrics
- Personal Identity Verification (PIV) of Federal Employees/Contractors (HSPD-12)
- Biometrics and E-Authentication
- NIST Biometrics Standards Program