ANSI/NIST Fingerprint Standard Update

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Michael McCabe
mccabe@nist.gov
fingerprint.nist.gov/standard
www.itl.nist.gov/iad/vip

What is it?

- ANSI/NIST-ITL 1-2000 Standard Data Format for the Interchange of Fingerprint, Facial, & Scar Mark & Tattoo (SMT) Information
- Standard describing the Fingerprint Data Interchange Format Used by Law Enforcement agencies
  - *FBI*
  - *DHS*
  - *State & local Police Agencies*
- De facto ISO Standard
  - *Canada, UK, Germany*
  - *Eurodac, Interpol*
- Format similar to commercial M1 standards

Structure of Standard

- Sixteen record types - ASCII, binary, or combination
- Used for exchanging information describing:
  - Transaction itself
  - Descriptive, demographic, and rap sheet information
  - Finger and palm print image and minutiae information
  - Facial image
  - Scar mark and tattoo image and descriptive information
  - User defined type record.

History of ANSI/NIST Fingerprint Standard

❒ ANSI/NBS-ICST 1-1986	Minutiae-Based
❒ ANSI/NIST-CSL 1-1993	Image-Based 8-bit gray levels 500 ppi WSQ/15:1
❒ ANSI/NIST-ITL 1a-1997	Facial & SMT
❒ ANSI/NIST-ITL 1-2000	Tagged-field records higher resolution palms & latents
❒ ANSI/NIST-ITL 1-200X	?

Revision of 1-2000 Standard

- Open workshop held April 26-28, 2005 (NIST)
- ANSI requirement for a 5-year review
- Overview of major implementations
- New initiatives from the FBI/CJIS
- Talks on PIV and Quality indicators presented
- Review of current ANSI/NIST-ITL 1-2000 standard
- Identify aspects of the standard for update
- Introduce new features for possible inclusion

ANSI/NIST - INCITS/M1 Comparison

- Both address finger image, finger minutiae, and face data (M1 provision for Iris data)
- M1: encodes data using a format consisting of fixed binary fields - not easily expandable.
- ANSI/NIST: tagged fields containing both ASCII and binary data - expandable format
- ANSI/NIST: vendor-specific minutiae fields
- M1: Contains additional information fields in the finger image, minutiae, and face formats
- M1: requires use of CBEFF

ANSI/NIST - INCITS/M1 Harmonization

- WHY? Provide systems the option of processing and converting information between ANSI/NIST and M1 data formats.
- Reserve an additional block of vendor-specific fields for M1-type fingerprint minutiae data
- Define finger and palm image fields to specify image capture parameters, optional product identification, and image quality information
- Define a new record type for iris image data
- Define additional face information fields to contain visible facial features.

CBEFF Considerations

- CBEFF structure requires a header record to precede the data block
- Would change the structure of the ANSI/NIST format - not well received

Alternatives

- For existing record types define five additional fields to satisfy the minimum requirements of a CBEFF header record
- For biometric data types not addressed by ANSI/NIST define a new record type to include required ANSI/NIST and CBEFF information fields

XML Representations

- Four different approaches proposed

Favored Approach

- Develop a representation of the existing standard
- Map as closely as possible the existing records and numeric tags to XML tags
- Tag names to be descriptive of the element content
- Use the language of the text of the current standard

XML Sample

- Create a tag name for the entire package <ITL_Identification_Transmission_Package>
- Create tag names for each logical record <Tenprint_Fingerprint_Impressions>
- Create tag names to replace all numeric tags (for 1.004) <TypeOfTransaction>
- Recommend Base64 Encoding for embedded binary data.

Latent Fingerprint Issues

- Develop an approach to encode first- and third-level details which may include:
  - pores
  - ridge widths
  - ridge relationships
  - ridge edge shapes
  - dots
  - ridge flow
- Require a minimum scanning resolution of 1000 ppi for the capture of latent images
- Develop codes and descriptions for major case prints
- Update Finger Impression Type table (swipe,etc.)

Face Image Proposals

- Allow color JPEG 2000 for compression to improve image quality
- Add provision for quality score and algorithm identification information
- Define fields for 3D pose angle (yaw, pitch, & roll)
- Include a facial image capture profile that addresses compression limits, capture requirements, and other best practice attributes or requirements.

Miscellaneous Issues

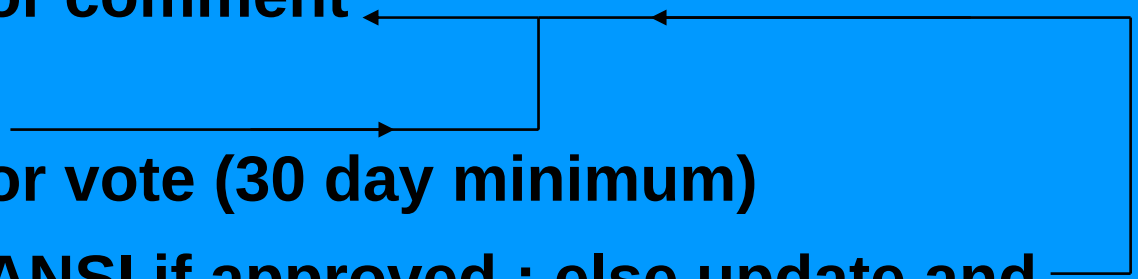
- Consider UTF-8 in place of 7-bit ASCII for user-defined fields to simplify international uses
- Formally specify codes for WSQ, JPEG, etc.
- Develop a GPS field for a mapping of location
- Develop a Submission Tracking Field to support traversing of vendors and jurisdictions
- Adjust length and width dimensions to accommodate enlarged platen sizes for plain images on newer live-scan devices

Conclusions of 1st Workshop

- No authorized voting body established
- Modification and new features were presented but more definition of each item was needed
- A consensus of all present was that the standard should be updated and revised
- Further refinement of updates and enhancements was needed before inclusion in the standard
- Form 8 ad hoc groups to formalize update proposals
- Develop & circulate summary of the 1st workshop
- A second workshop should be convened

Development of the Revision to the Standard

- Schedule a 2nd workshop (December 5-6, 2005)
- Develop a Canvass List
- Convene 2nd workshop (December 5-6, 2005)
- Present findings of each ad hoc group
- Vote on each proposal for inclusion in standard
- Develop draft update: ANSI/NIST 1-200X
- Circulate for comment
- Edit draft
- Circulate for vote (30 day minimum)
- Submit to ANSI if approved ; else update and



Standards Approval Considerations

- Consensus on a proposed standard by a group that includes representatives from materially affected and interested parties;
- Broad-based public review on draft standards;
- Consideration and response to comments from voting members of the consensus body;
- Incorporation of approved changes into a draft standard; and
- Right to appeal by any participant that believes that due process principles were not sufficiently respected during the standards development in accordance with the ANSI-accredited procedures.

More Information

Fingerprint.nist.gov/standard

- Current and future drafts of standard
- Presentations made & summary of April 2005 workshop (NISTIR 7242)
- Method used to develop revision
- How to participate and become a canvassee
- Results of ad hoc groups
- Information and registration for 2nd workshop