ANSI/NIST Fingerprint Standard Update Workshop

Overview & Update of Current Standard

April 27, 2005

ANSI/NIST-ITL 1-2000

- Data Format for the Interchange of Fingerprint, Facial, & Scar Mark & Tattoo (SMT) Information
- Law enforcement data Interchange format
- Used to exchange various types of data between the FBI, state, local, and federal agencies
- De facto ISO – UK, Interpol, Canada

TYPES OF DATA EXCHANGED

- Subject's descriptive, demographic, and rap sheet information
- Finger and palmprint image information
- Finger and palmprint minutiae information
- Subject's facial image
- Subject's scar mark and tattoo image and descriptive information

NIST Developed Fingerprint Standards

- **Data Format for the Interchange of Fingerprint Information**
  - **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 — ?**

ANSI/NIST-ITL 1-2000 Standard Logical Record Types

1	Transaction Information	ASCII
2	User-defined Descriptive Text	ASCII
3	*Low-Res F/P Grayscale Image Data*	Binary
4	High-Res F/P Grayscale Image Data	Binary
5	*Low-Res F/P Binary Image Data*	Binary
6	*High-Res F/P Binary Image Data*	Binary
7	User-defined Image Data	Binary
8	*Signature Image Data*	*Binary*
9	Minutiae Data	ASCII
10	Facial & SMT Image Data	ASC/Bin

ADDITIONAL RECORD TYPES IN ANSI/NIST-ITL 1-2000

13	Latent Image Data (Variable-resolution)	ASCII/Binary
14	Tenprint Fingerprint Impressions (Variable-resolution)	ASCII/Binary
15	Palmprint Image Data (Variable-resolution)	ASCII/Binary
16	User-defined Testing Image Data (Variable-resolution)	ASCII/Binary

Type-1 Transaction & Type-2 Descriptive Data

1.001: Record Length

1.002: Version {0300}

1.003: Content {Count of rec}{type,IDC}

1.004-015: TOT, Date, Priority,…….

....

2.001: Record Length

2.002: IDC

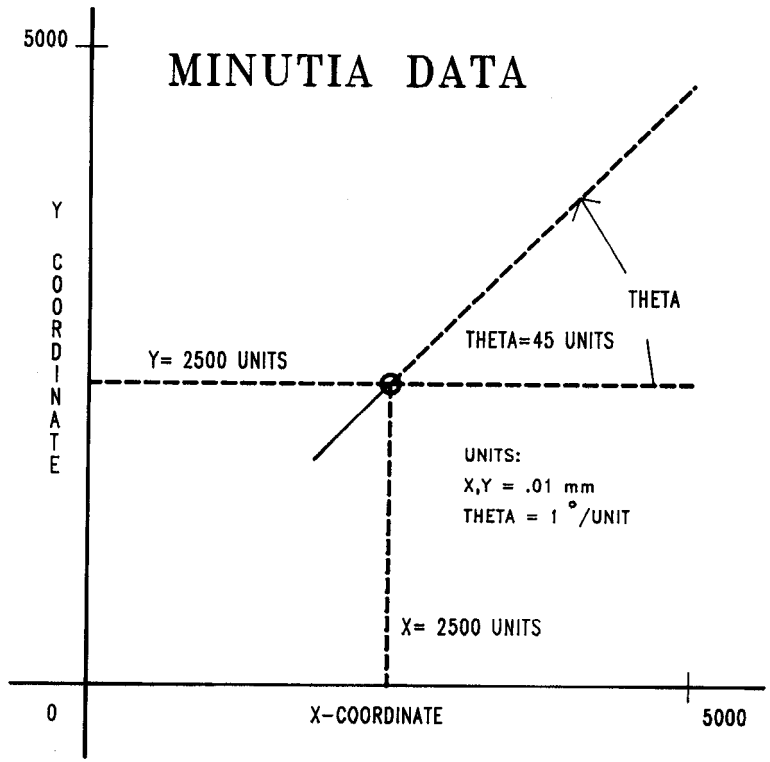
2.003: Subject Identifiers,etc.

User-Defined ASCII fields

Type-4 Grayscale Image (500ppi)

- Binary Record 9 ordered & unnumbered fields
  - **Length** **4 bytes**
  - **IDC** **1 byte**
  - **IMP** **1 byte**
  - **FGP** **6 byte**
  - **ISR** **1 byte**
  - **HLL** **2 byte**
  - **VLL** **2 byte**
  - **GCA** **1 byte**
  - **Image Data**

MINUTIA POSITION



Type-9 Minutiae Data

- 9.001: LEN
- 9.002: IDC
- 9.003: IMP
- 9.004: FMT {‘S’ or ‘U’}
- 9.005: --> 9.012: Information fields
- 9.012: Minutiae & ridge count data

  index;XXXXYYYYTTT;QQ;M;n-index,count

  Repeat for each minutiae
- Vendor proprietary data format blocks defined

Minutiae Format Differences

- **ANSI/NIST Type 9**
- **Minutiae data as ASCII data**
- **Min. placement undefined**
- **Origin lower left corner**
- **Location in .01 mm**
- **Core/Delta X & Y**
- **Angle in 1.0 degree steps**

- **M1**
- **Minutiae data as binary data**
- **Min. Placement defined**
- **Origin upper left corner**
- **Location in pixels**
- **Core/Delta X,Y & Theta**
- **Angle in 2.0 degree steps**

MINUTIAE FORMAT DIFFERENCES (CONTINUTED)

- **ANSI/NIST Type 9**
- **Theta to projection**
- **Optional ridge count data with each minutia**
- **IDC for multiple scans**
- **Provision for user-defined format**
- **No proprietary data**

- **M1**
- **Theta 180 degrees off**
- **Optional ridge count data in extended area**
- **Multiple views**
- **Provision for 4 or 8 near minutiae**
- **Proprietary data**
- **Designed for CBEFF wrapper**

Harmonize ANSI/NIST & M1 Minutiae Data Formats

- Define a new M1-Type block of fields in the Type-9 record format to mimic existing fields
- Add angles to Core and Delta location
- Add a field to indicate compliance with Appendix F
- Add fields to indicate size of original image

Type-10 Face & SMT Image

- 10.001: LEN
- 10.002: IDC
- 10.003: IMT {face, scar, mark, tattoo}
- 10.004: --> 10.998: Descriptive & other informative fields
- 10.999: Image data

Type-14 Tenprint Fingerprint (Tagged-Field Version of Type-4)

- 14.001: LEN
- 14.002: IDC
- 14.003: --> 14.013: Mandatory information
- 14.014: --> 14.019: Res. for future definition
- 14.021: --> 14.199: Res. for future definition
- 14.999: Image data

Harmonize ANSI/NIST Type-14 & M1 Image Data Formats

- Add field for horizontal image capture
- Add field for vertical image capture
- Add a field for count of views
- Add a field for view number
- Add a field for finger the image quality scale and value
- CBEFF product ID & Capture Device ID

***NEW*: IRIS IMAGE RECORD**

- 18:001: LEN
- 18.002: IDC
- 18.004: Source Agency
- 18.005: Iris Capture Date
- 18.006: Horizontal Length (capture)
- 18.007: Vertical Length (capture)
- 18.008: CBEFF Product ID
- 18.009: Capture Device ID
- 18.010: Globally Unique ID

IRIS IMAGE RECORD (continued)

- 18.011: Compression Algorithm
- 18.012: Bits per Pixel
- 18.013: Iris Position
- 18.014: Rotation Angle of Eye
- 18.015: Rotation Uncertainty
- 18.022: Iris Image Quality Scale
- 18.023: Iris Image Quality Value
- 18.999: Iris Image Data

ADJUST MAX SLAP SIZES (Table 6)

Finger Position	Finger Code	Width (inch)	Length (inch)
Plain Right Thumb	11	1	2.0
Plain Left Thumb	12	1	2.0
Plain Right 4-Fingers	13	3.3	3.0
Plain Left 4-fingers	14	3.3	3.0
Plain Thumbs (2)	15	2.0	3.0

ADDITIONAL PALM CODES

Palm Position	Palm Code	Width (in)	Length (in)
Right Interdigital	31	5.5	3.0
Right Thenar	32	3.0	.0
Right Hyperthenar	33	3.0	5.5
Left Interdigital	34	5.5	3.0
Left Thenar	35	3.0	4.0
Left Hyperthenar	36	3.0	5.5

SOURCE AGENCY FIELD SIZE

- Interpol requirements:
- 10.003:CC/agency{$^{G}_{S}$} where

  CC is 2 alpha-numeric characters

  Agency is up to 32 characters

- Proposal: Increase size of source agency /ORI to a maximum of 43 characters for all records Types 10 and above

IMPRESSION TYPES AND VENDOR IDENTIFICATON

- Adjust Table 5 to include
  - **Swipe impression image**
  - **Contactless image**
- Add vendor identification fields to all image and minutiae records

Questions?

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