ANSI/NIST Fingerprint Standard Update Workshop

Standards Harmonization

April 26, 2005

Data Format Standards

- Finger Image Data * ***ANSI/NIST***
- Finger Minutiae Data * ***COUNTERPART***
- Face Image Data *
- Finger Pattern Spectral Data
- Iris Image Data
- Hand Geometry Silhouette Data
- Signature/Sign Behavioral Data
- Pattern Skeletal Data
- Vascular Data

DATA INTERCHANGE FORMAT CHARACTERISTICS

- Interchange formats designed to be usable for:
  - Computer identification and verification functions
  - Human comparison of image details
  - Compact binary formats
  - Emphasis on verification for physical and logical access

FINGERPRINT FORMATS

- DIFFERENCES:
  - Minutiae Standard - Comparisons based on ridge endings/bifurcations (minutiae)
  - Pattern Standard - Comparisons based on sub-pattern tiles within the fingerprint image
  - Image Standard - Generic form usable by both minutiae and pattern approaches

Finger Image Data Format

- Used with CBEFF wrapper
- Image capture requirements dictated by application use, amount of raw pixel data, and performance targets.
- Use of numeric value for specific combination of image capture parameters
- The choice of this setting commensurate with system and application requirements

IMAGE ACQUISTION SETTINGS

Setting Level	Scan Res (ppcm)	Scan Res (ppi)	Pixel Depth	Dynamic Range	Certification
10	49	125	1	2	None
20	98	250	3	5	None
30	197	500	8	80	None
31	197	500	8	200	EFTS/F
40	394	1000	8	120	None
41	394	1000	8	200	EFTS/F

FINGER IMAGE FORMAT

- Compact Fixed Binary Format
- NOT Readily Expandable
- Pertain to a single subject containing an image record (one or more views) for each of one or more fingers, multiple fingers, or palms
- Record format organization:
  - **Fixed-length (36 byte) general record header**
  - **Single finger record for each finger, multi-finger, or palm image**
    - Fixed-length (14-byte) finger header for single, multi-, finger image, or palm image
    - Compressed/uncompressed image data view

GENERAL RECORD HEADER

- Format Identifier (‘FIR‘)
- Version (‘010’)
- Record Length
- CBEFF Product ID
- Capture device ID
- Img Acquisition Level
- Number fingers/palm
- Scale Units
- H/V Scan Resolution
- H/V Image Resolution
- Pixel Depth
- Image compression algorithm
- Reserved

FINGER IMAGE HEADER RECORD

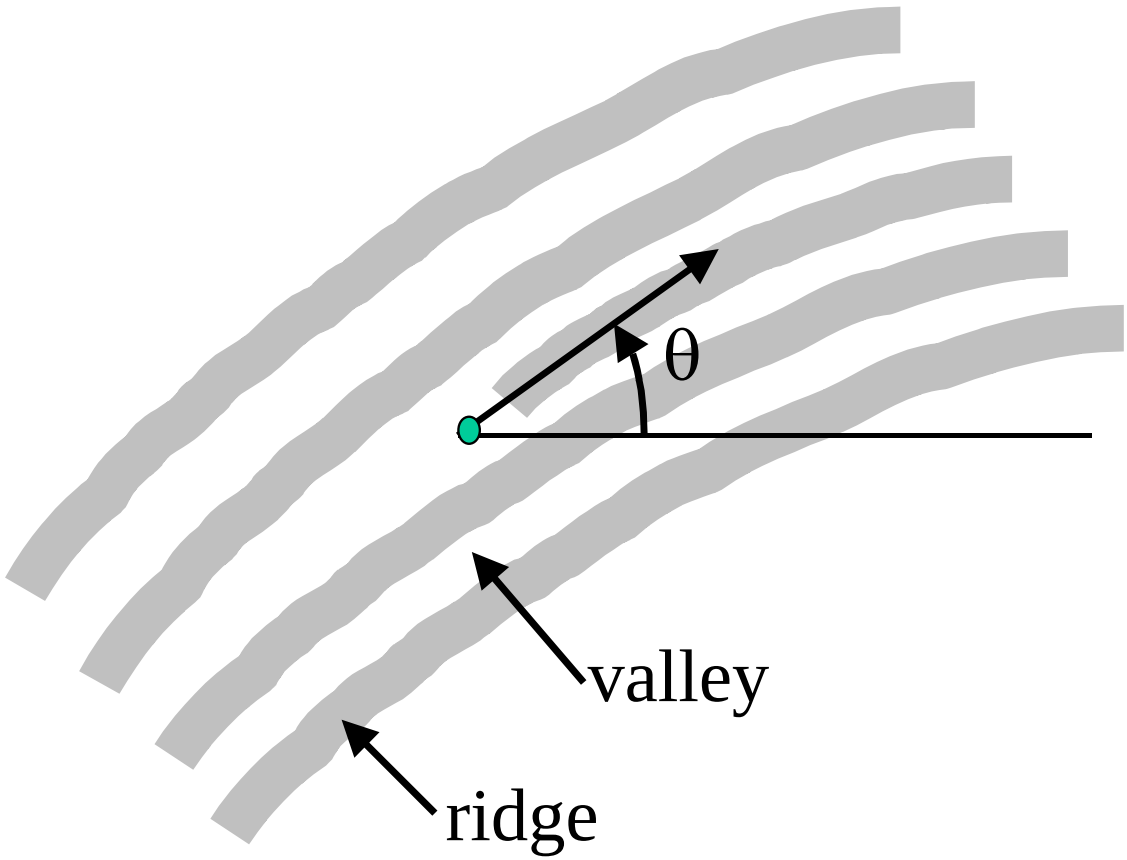
- Length of Finger Data Block (bytes)
- Finger/palm position
- Count of views
- View number
- Finger/palm image quality
- Impression type
- Horizontal line length
- Vertical line length
- Reserved
- Finger/palm image data

Finger Minutiae Data Format

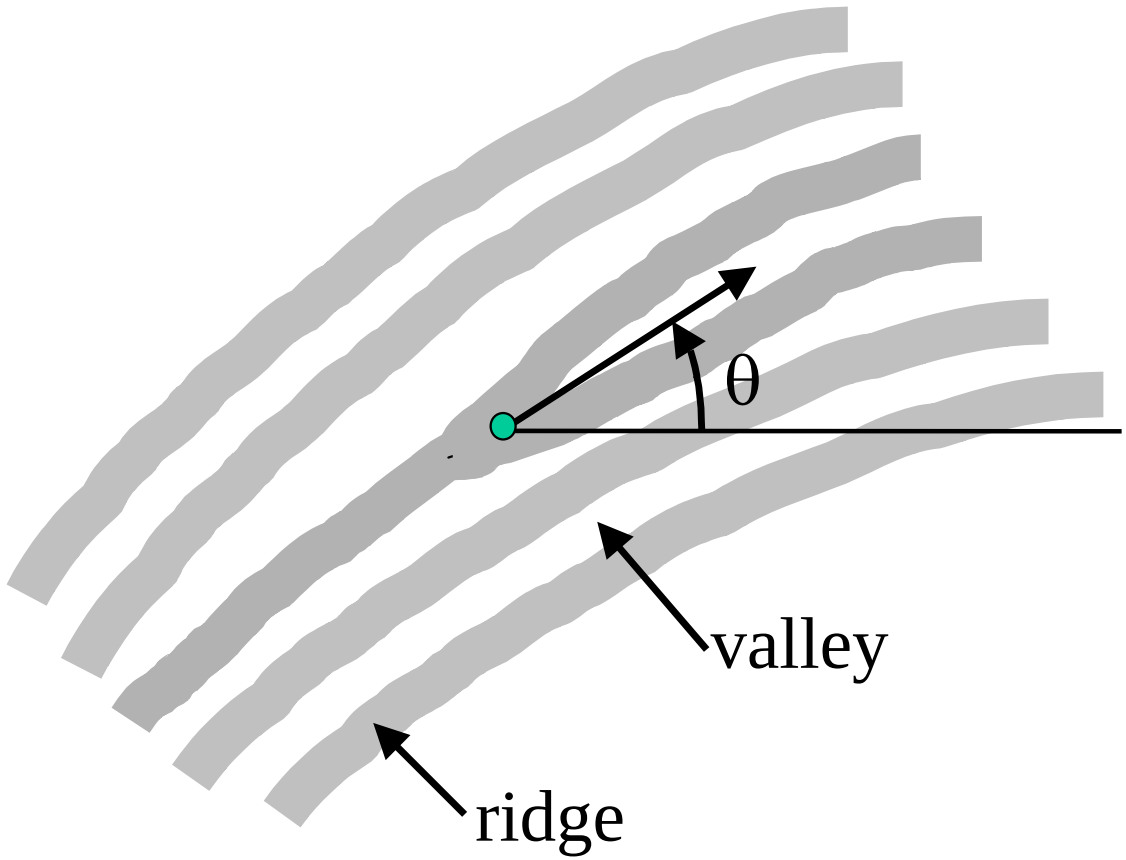
- Used with CBEFF wrapper
- Minutiae data expressed as binary data
- Defines ridge/bifurcation minutiae placement
- Origin upper left corner
- Location in pixels
- Angle in 2.0 degree steps
- Optional ridge count data in extended area
- Provision for 4,8 or vendor defined near minutiae
- Optional core and delta information (x,y, Theta)
- Provision for optional vendor proprietary **data**

Marked Minutiae

RIDGE ENDING SPECIFICATON



BIFURCATION SPECIFICATION



Finger Minutiae Record Organization

- A fixed length (26 byte) record header describing the overall record
- Single finger record for at least one finger view
  - Fixed 4-byte header describing a single finger view
  - Series of 6-byte minutia descriptions
  - One or more “extended” data areas containing optional or vendor specific information
  - Optionally, additional finger view records

FINGER MINUTIAE HEADER RECORD

- Format Identifier (‘FMR‘)
- Version (‘ 20’)
- Record Length
- CBEFF Product ID
- Capture equipment compliance
- Capture device ID
- X/Y size (pixels) of original scanned image
- X/Y resolution of minutiae coordinate system
- Number of finger views
- Reserved

SINGLE FINGER VIEW RECORD FORMAT

- Finger View Header
  - Finger position
  - View number
  - Impression type
  - Finger quality
  - Number of minutiae
- Finger Minutiae Data
  - Minutiae type
  - Minutia position
  - Minutiae angle
  - Minutiae Quality
- Extended Data Fields

EXTENDED DATA AREAS FOR MINUTIAE FORMAT

- Type identification code
  - Ridge count data
    - Four neighbor quadrants
    - Eight neighbor octants
    - Nonspecific
  - Core & delta data
    - Position of Core/Delta
    - Orientation of Core/Delta
  - Vendor defined data

Questions?

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