



PROTECTING YOUR ENTERPRISE THROUGH SECURE AUTHENTICATION™



COMPUTER NETWORKS



PHYSICAL FACILITIES



APPLICATIONS



MANUFACTURING AUTOMATION SYSTEMS



TIME & ATTENDANCE SYSTEMS

IDENTITY ASSURANCE MANAGEMENT™

ANSI INCITS 377 Fingerprint Pattern Data Format

NIST

National Institute of Standards
and Technology

Technology Administration
U.S. Department of Commerce

Fingerprint Standard Update Workshop

ANSI INCITS 377-2004

- American National Standard for Information Technology – Finger Pattern Data Interchange Format
 - Approved January 2004



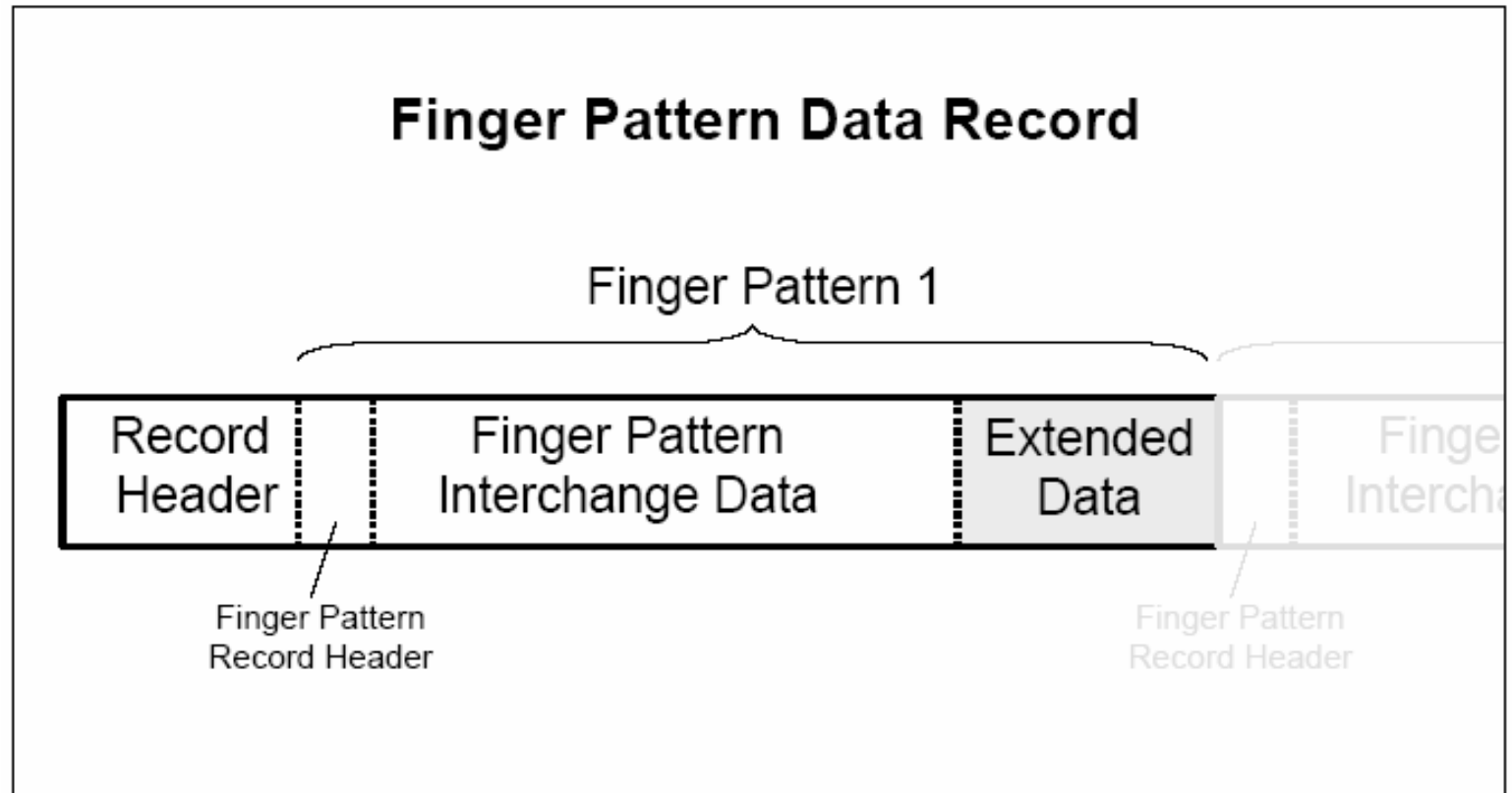
- International version at FCD stage
 - ISO/IEC 19794-3



ANSI INCITS 377

- Based on Robust Commercial Algorithm Implementations
- Small Area/Slide Format Sensors
- Data Reduction
 - Reduction in Resolution
 - Cellular Representation
 - Pattern broken down into “cells”
 - Each cell represented by a sinusoidal waveform
- Data Format Definition

Record Structure



Record header (1 per record, 36B)

- Format identifier
- Version number
- Length of record
- CBEFF product identifier
- Number of finger patterns in record
- Size of finger pattern in X&Y direction (pixels)
- Resolution of finger pattern in X&Y direction
- Number of cells in X&Y direction
- Cellular X&Y offset
- Bit depth of cell structure: angle, wavelength, phase phase offset, quality
- Cell quality granularity

Finger pattern record header (1 per finger, 6B)

- Finger location
- Impression type
- Number of views in finger pattern record
- Fingerprint pattern quality
- Length of data block (bytes), including any extended data

Finger pattern data

- View number
- Finger pattern cell data
- Cell quality data
- Finger pattern extended data

Step 1 – Reduction in Resolution

- Pattern-based algorithms generally require less image resolution than provided by most sensors
- Cropping & resampling to a lower resolution
 - Minimum - 200 ppi



Original

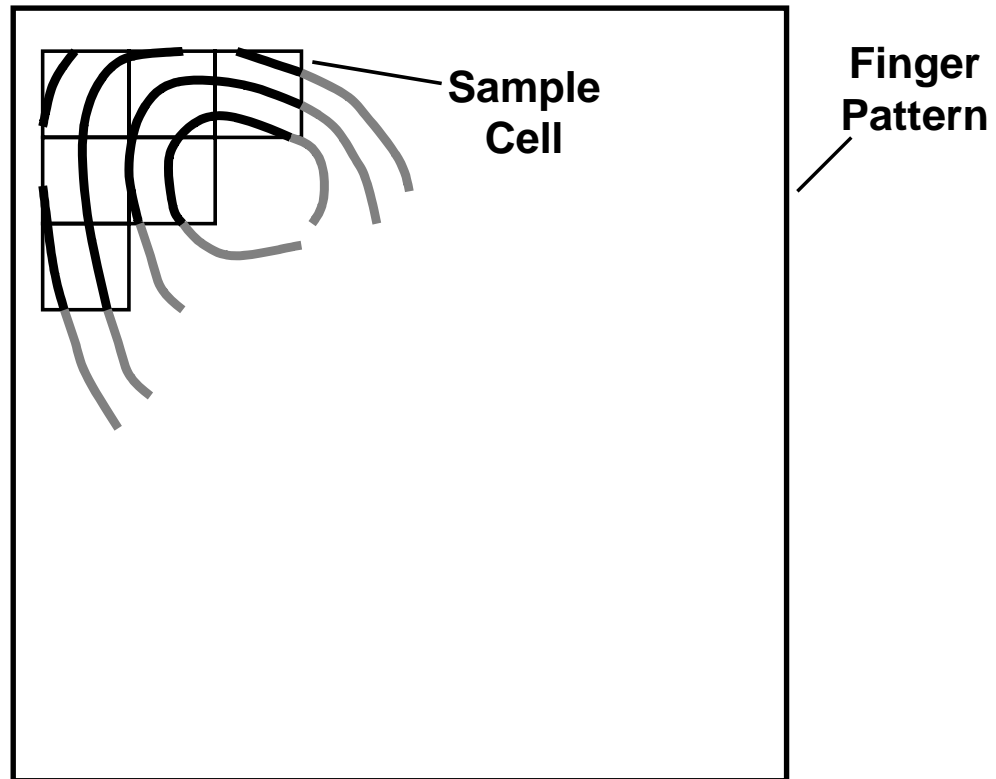


Downsampled

Copyright © 2004 by SAFLINK Corp.

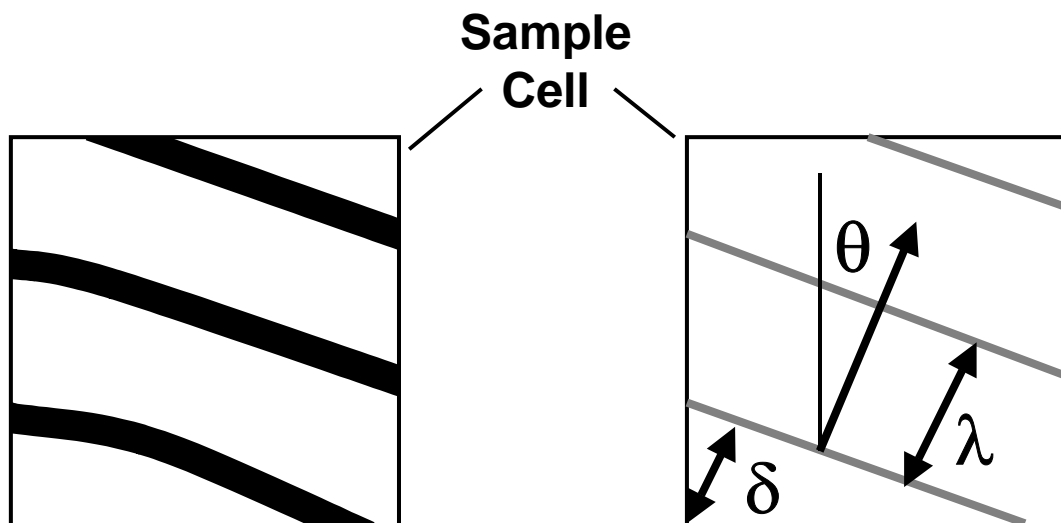
Step 2 – Cellular representation

- Pattern broken down into “cells”



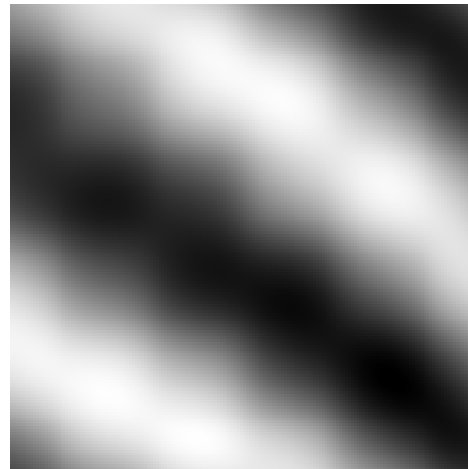
Cellular representation (cont'd)

- Each cell is represented as a sinusoidal waveform
- Defined by 3 parameters:
 - Ridge angle, θ
 - Ridge spacing, λ
 - Phase offset, δ

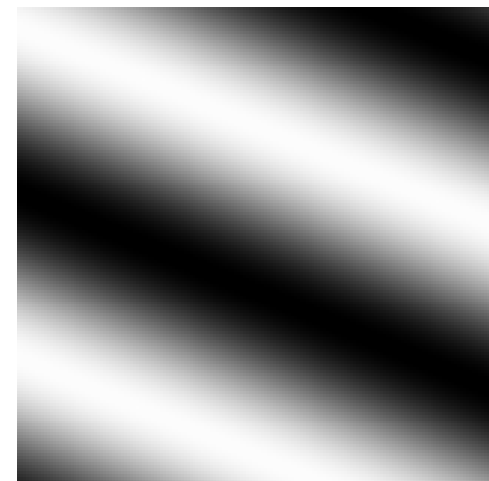


Cellular representation (cont'd)

**Local finger pattern
Information in cell**



**Cell structure chosen
to represent it**



Example

- Original Image 128x128 x 8 bits
- Reduction in resolution to 200 dpi (96x96 x 8 bits)
- Cellular Representation 14x16 x 10 bits
 - (280 bytes + 28 bytes of quality information)
 - ~ 50:1 reduction in data storage requirements
 - (would be 200:1 for 500 dpi image).
- Header Overhead - 43 bytes

The End

Catherine J. Tilton
SAFLINK Corp.
1875 Campus Commons Dr, Suite 301
Reston, VA 20191

ctilton@saflink.com
703-547-0404
Cell 703-472-5546
Fax 703-547-0399