Iris Image Interchange Format

ANSI/INCITS 379
ISO/IEC 19794-6

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Iris Image Interchange Format

- Exchange of iris images among multiple vendors/applications
- Compile iris image databases for use in evaluating multiple algorithms
- Protect the investment in enrollment databases

Iris Image Interchange Scope

- Image capture requirements
- Data formats
  - > Rectilinear image
  - > Polar Image
- Parameters
  - > Optional compression
  - > Color or monochrome
  - > Intensity depth
- Compliance
  - > Conformity to data format
  - > Multiple image quality levels

Quality Levels

- Level A (76-100) – highest quality
  - > Highest cost
  - > High security, high volume public use
- Level B (51-75) – medium quality
  - > Moderate cost
  - > Medium security, physical access
- Level C (26-50) – low quality
  - > Low cost
  - > Single user, verification only, portable/desktop use
- Level D (1-25) – unacceptable quality

Related Standards

- [CBEFF] NISTIR 6529-2001 – Common Biometric Exchange File Format
- [BioAPI] ANSI/NIST 358-2002 – Information Technology – BioAPI Specification
- [X9.84] ANSI/X9 X9.84-2001 – Biometric Information Management and Security
- [JPEG] ISO/IEC 10918-1:1994– Information Technology – Digital Compression and Coding of Continuous-tone Still Images (JPEG)
- [JPEG] ISO/IEC 15444-1:2000– Information Technology – JPEG 2000 Image coding System
- [JPEG-LS] ISO/IEC 14495-1:1999, ISO/IEC 14495-2:2002– Information Technology -Lossless and Near-lossless Compression of Continuous-tone Still Images

Iris Data Record

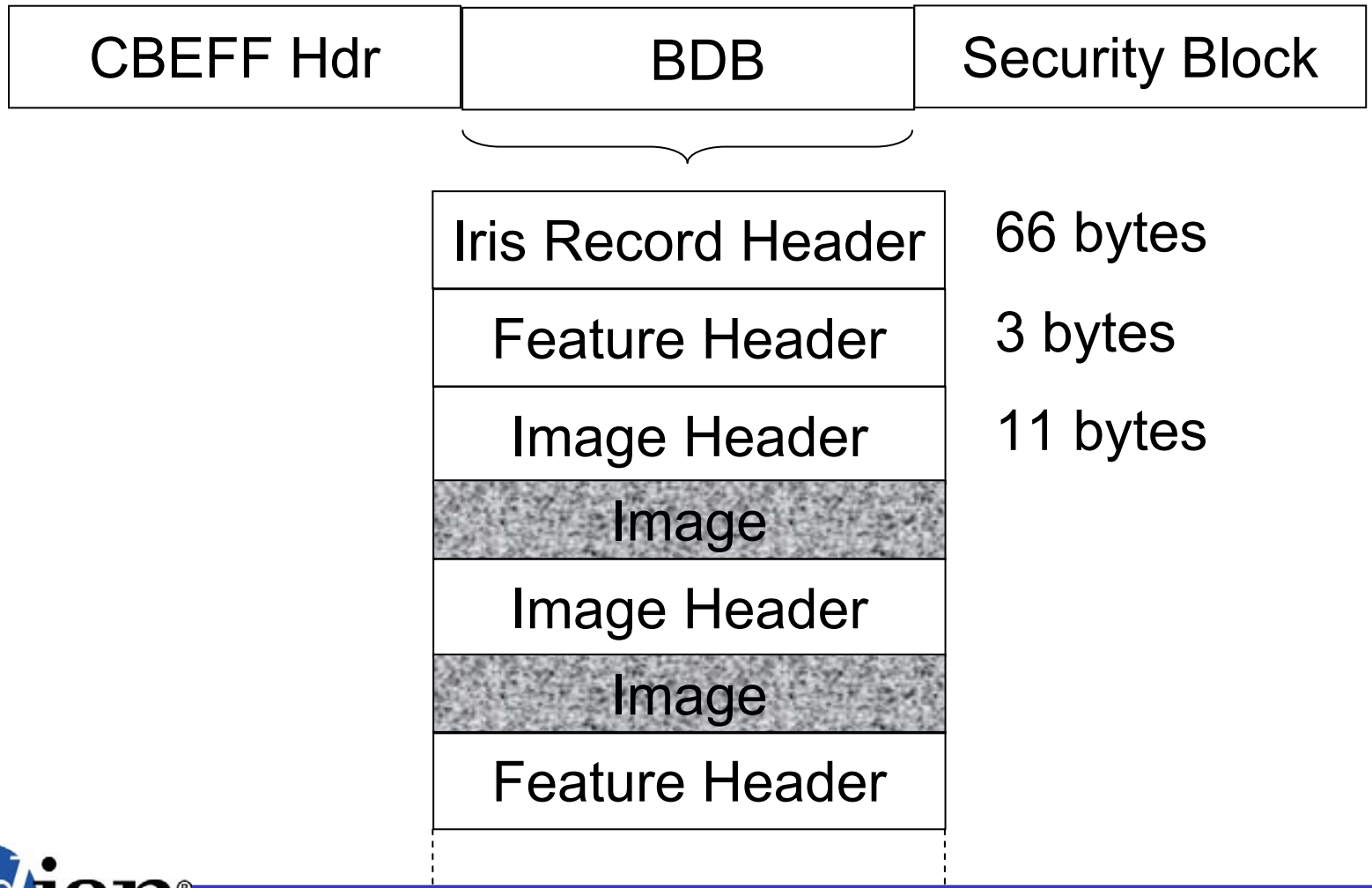
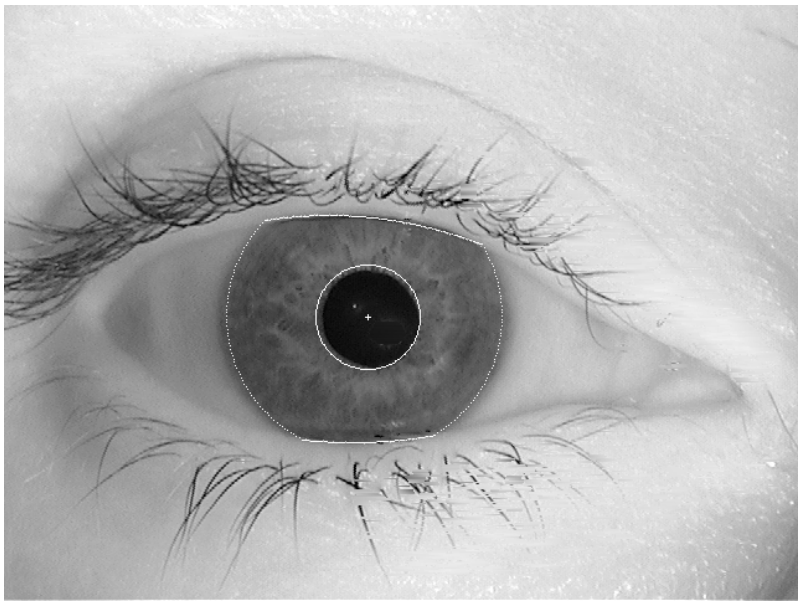


Image Storage Format

- Rectilinear Format
  - > Minimal preprocessing other than image quality assessment
  - > Compression and encryption optional
  - > Typically 12K-15K for cropped, compressed image
- Polar Format
  - > Preprocess to find pupil and iris boundaries
  - > Convert only iris portion of image to polar coordinates
  - > Minimizes data packet size – typically 2K

Iris Image Formats



Rectilinear

Polar

Rectilinear Image Format

- Image orientation
- Scan type (progressive, interlaced)
- Format (raw, JPEG, color, monochrome)
- Image width, height, gray level depth
- Rotation angle (head position)
- Camera ID, capture date

Image Orientation

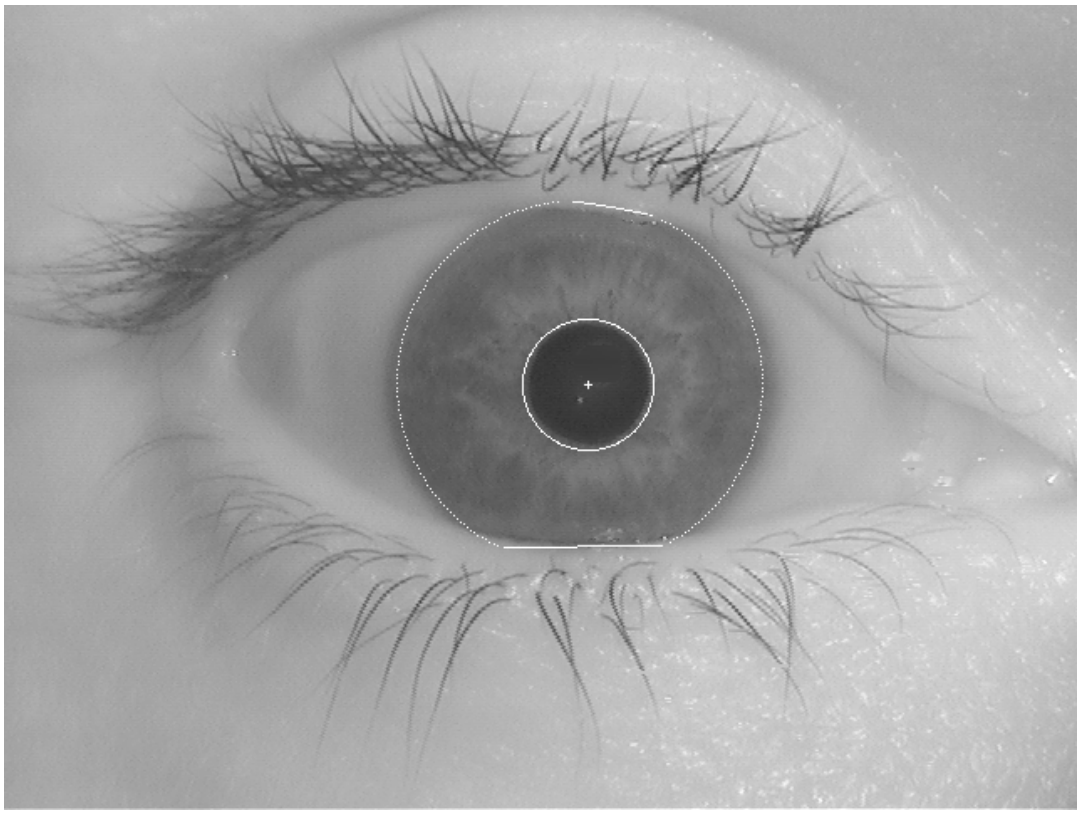
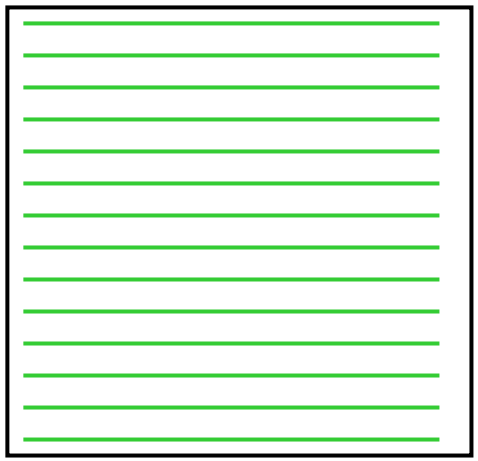


Image may be flipped vertically or horizontally

Scan Type



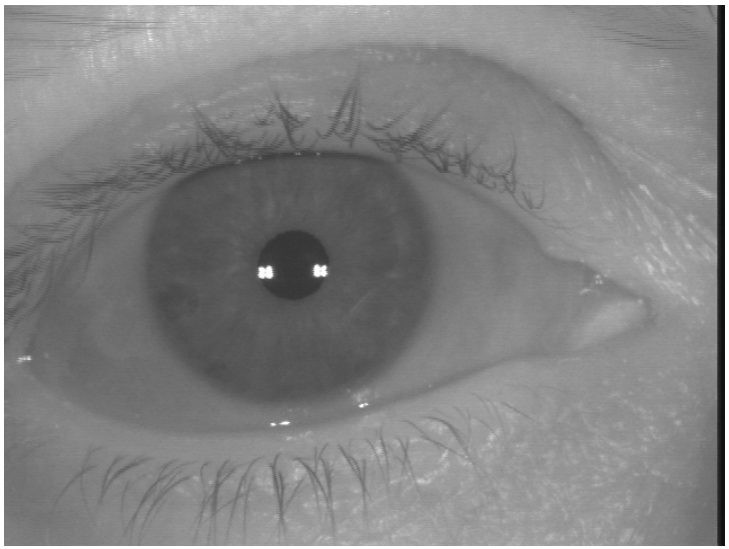
Progressive

Interlaced – even and odd fields may be offset if subject moves so algorithm must correct

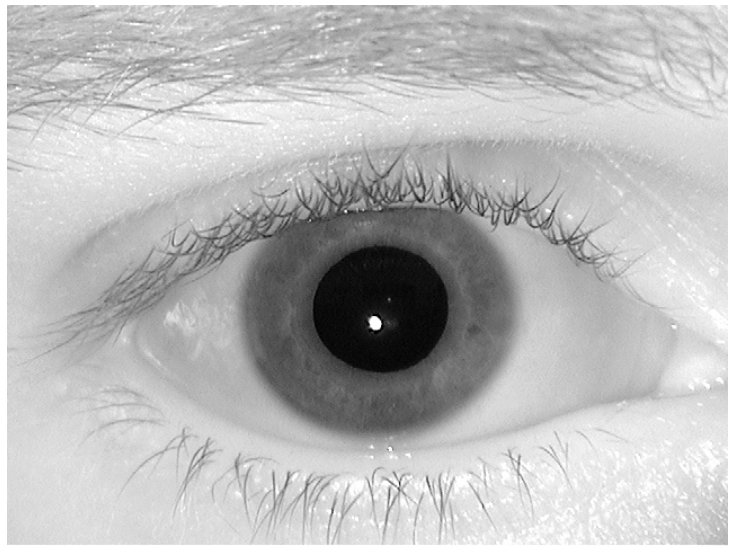
Rotation angle

If both eyes are imaged simultaneously head angle can be measured and corrected when template is generated. Can increase search speed significantly.

Wavelength



Long (800-900 nm)



Broadband (700-900 nm)

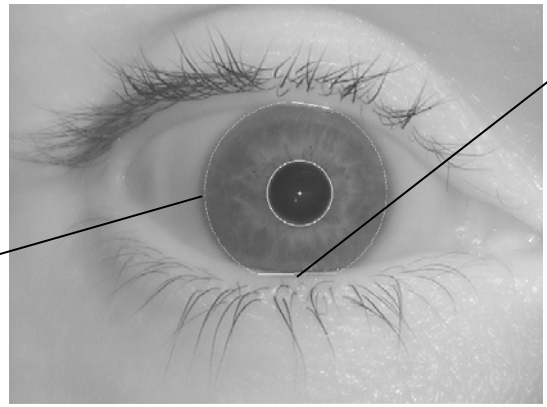
☞Not encoded in header, but available indirectly through capture device ID

Polar Image Format

- Preprocessing requirements
- Conversion to polar coordinates
- Compression, encryption, etc.

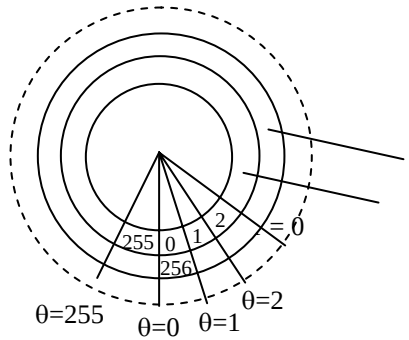
Polar Image Preprocessing

1. Locate iris and pupil boundaries. Use wavelength information



2. Locate areas obscured by reflections, eyelids, etc.

3. Define polar image coordinate system. Correct for head rotation.



4. Resample intensity values from original image to polar coordinates. Correct for scan type.

Polar Data Format

- Image orientation
- Occlusion filling information
- Format (raw, JPEG, color, monochrome)
- Image width, height, gray level depth
- Camera ID, capture date

Iris Image Capture Requirements

Appendix A

- Resolution
- Grayscale Density
- Illumination
- Contrast
- Visible Iris
- Pixel Aspect Ratio
- Image Scale
- Optical Distortion
- Noise
- Image Orientation
- Presentation
- Image Storage Format

ANSI vs ISO Versions

Attribute	ANSI 379	ISO 19794-6
Image Quality Data	4 categories	Value 1-100
Second Level Header Title	Feature Header	Biometric Subtype Header
CBEFF Product ID	Record Header	CBEFF Header
GUID	Record Header	CBEFF Header

Thank you!

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