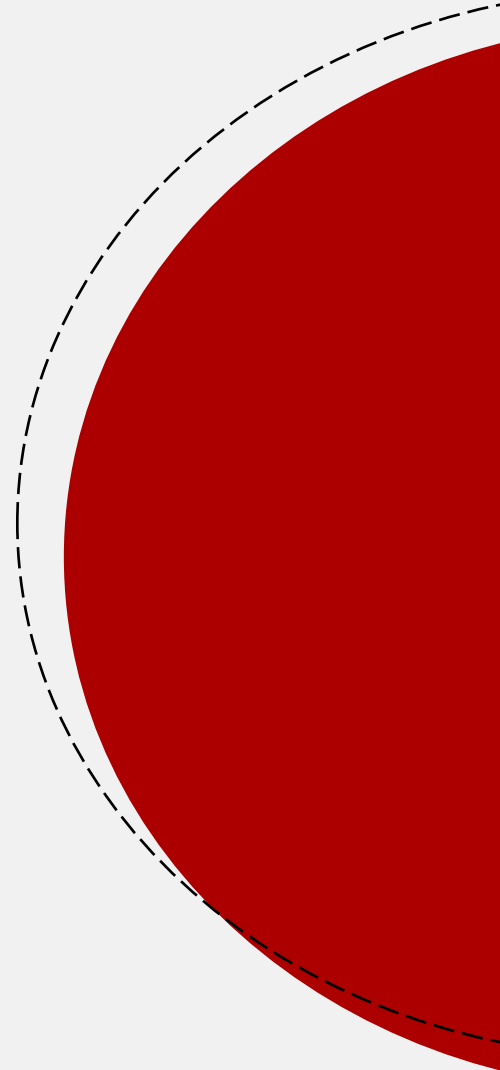


BROCHURE

IriCore

State-of-the-art Iris Recognition
Software Development Kit



Iris Segmentation
Template Generation
Template Matching
Quality Assessment

Superior Iris Identification

Features

- Support various image formats including raw and compressed images format like BMP, JPEG, JPEG2000.
- Supports ISO iris image interchange formats such as uncompressed (K2), cropped (K3), cropped and masked and polar (K7) image formats.
- Support various ISO standard quality metric (IREX II) for quality assessment like sharpness, contrast, iris texture, usable iris area, and self-defined metric.
- Support multiplatforms (Windows, Linux, Android) and multiple programming languages (C/C++, .NET and Java).
- Thread-safe capability for multithread applications.
- Short learning curve with simple, easy-to-use, and well-engineered APIs.

(※ Specifications to change without notice)

Why IRITECH?

IriTech, Inc. is one of very few iris providers who owns all in-house proprietary technologies vital for deploying any scalable end-to-end iris ecosystem. With more than 20 years of experience in iris recognition technology and top-ranked NIST¹⁾-proven algorithms, IriTech has been trusted by many prestigious clients. Our systems have been deployed in multiple large-scale projects ranging from governments to corporates due to its exceptional performance in tough environment. IriTech is proud to be the partner of choice, leading the iris biometrics technology.

¹⁾ National Institute of Standards and Technology

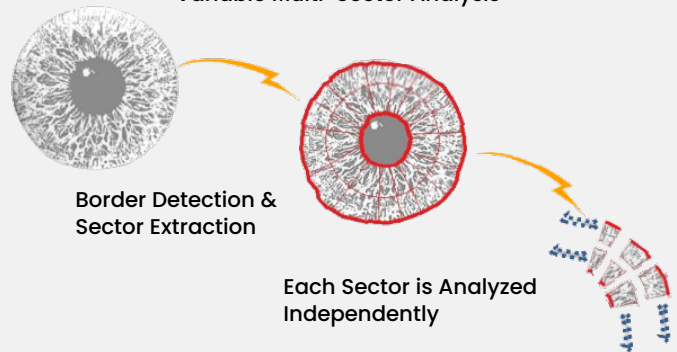
Overview



IriCore SDK is an iris recognition library that provides various application programming interfaces (APIs) and functions to generate iris templates from iris images for enrollment and to match an iris image against array of iris templates for identification. IriCore SDK is intended for biometric system developers or integrators to develop security applications using iris recognition. IriCore SDK is designed for large-scale iris identification applications and enterprise applications on Windows, Linux and Android platforms.

IriCore SDK consists of various IriTech's accurate iris segmentation and fast matching algorithms based on the variable multi-sector analysis world-wide patent. IriCore SDK also consists of image quality assessment algorithms to perform the analysis of image quality. IriTech's highly-acclaimed iris recognition technology has been examined and proven in many systems and evaluated by prestigious organizations such as NIST (National Institute of Standards and Technology).

Variable Multi-Sector Analysis



- Non-linear detection of iris border and pupil border
- The region between pupil and iris is decomposed into a multitude of sectors
- Each sector is allowed to deform independently while still maintaining overall coherence

The variable multi-sector analytic method selectively utilizes only the good portions of the captured iris image. Even if the iris image is adversely affected by eye glasses, contact lenses, tears, eyelids, or eyelashes, IriCore SDK can operate with no discernible performance degradation as long as at least 50% of the iris image sectors are good at the time of enrollment and at least 25% are good at the time of identification.

Product Highlights

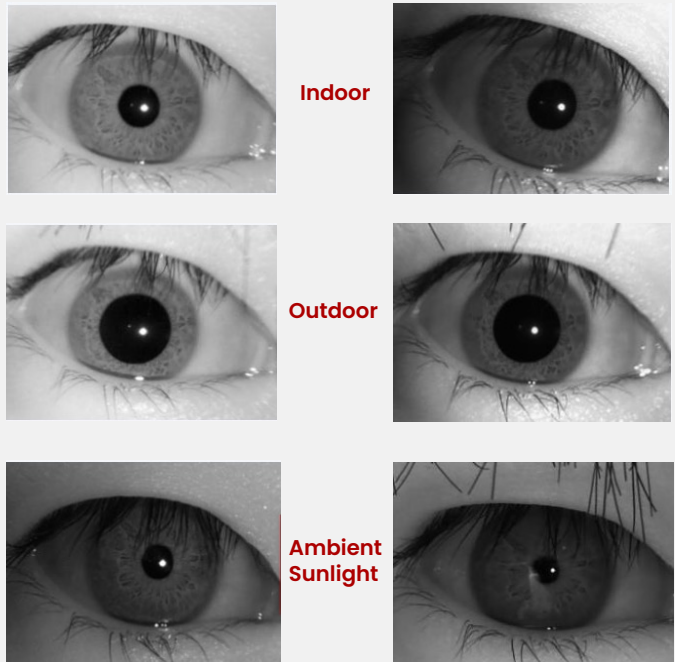


IriCore SDK supports any iris scanners available on the market. Besides, IriTech also provides a cost-effective version, IriCoreLite SDK, an Iris SDK that is exclusively intended for IriTech's iris scanners. IriCoreLite SDK is designed for large-scale iris identification applications on PC and enterprise applications using IriTech's iris scanners.

Superior Iris Recognition Algorithms

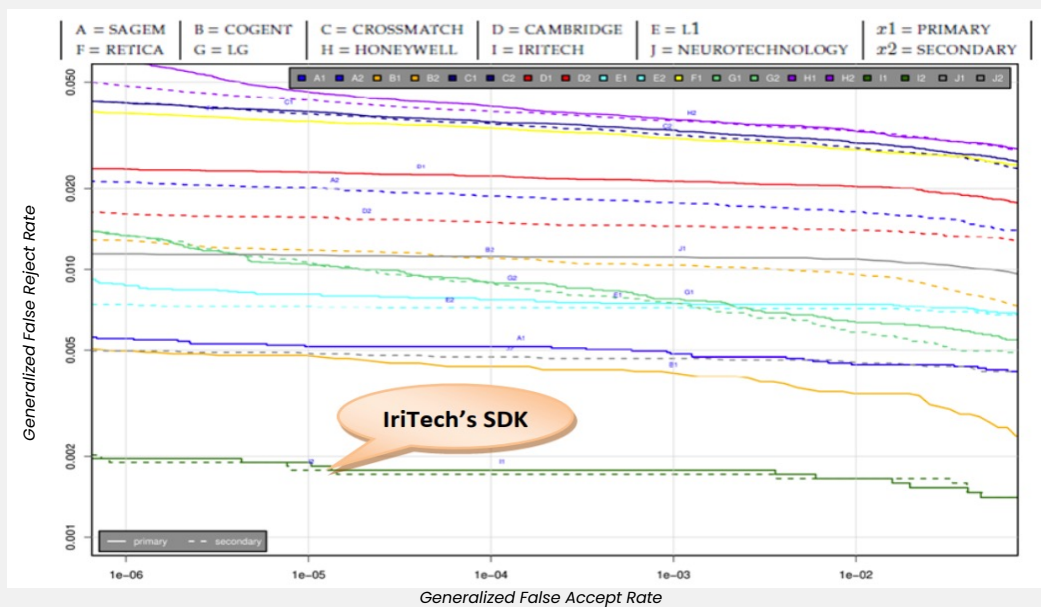
IriCore is an iris recognition SDK which has been developed by IriTech for many years. All of the IriTech's state-of-the-art iris recognition algorithms packaged in IriCore have been tested and proven to be solid in performance by the NIST's ICE & IREX.

1. Highly accurate iris segmentation for feature extraction based on variable multi-sector analysis and non-linear segmentation
2. Robust to various obstructions to the images like pupil dilation due to different levels of illumination
3. Ability to handle images with visual noise or blurry by a strong image enhancer
4. Power occlusion detection algorithms to eliminate eyelids and eyelashes to enhance the accuracy
5. Fast and accurate iris matching algorithms for large-scale applications
6. Strong image quality assessment algorithm which provides various quality metrics



With the aforementioned characteristics, IriTech's iris SDK was proven as the most accurate and interoperable algorithm by NIST report

Example images of pupil dilation due to illumination



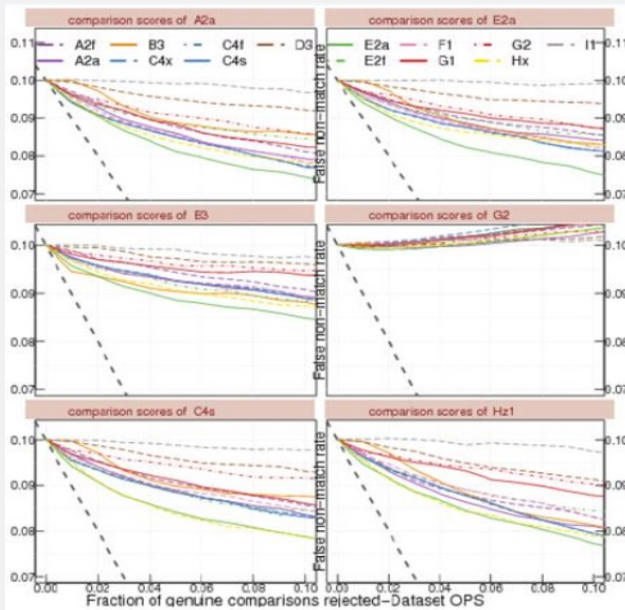
Graph taken directly from NIST's IREX I Test Report, Page 41

The speed of IriTech's latest algorithm measured on a PC (Intel Core i7, 6 cores, 3.33 GHz, 12GB RAM) is as follows

Template generation speed	8.42 templates/ sec/ core
Template matching speed	293,000 matches/ sec/ core (for 1:1 matching)
	388,000 matches/ sec/ core (for 1:N matching)

Accurate Image Quality Assessment Algorithms

Performs a quality check for iris images which is important for enrollment, verification, identification or de-duplication. IriTech's image quality assessment algorithm has been proven as the most accurate ones in IREX II.



Why quality assessment important?

- During image acquisition, it can be used for real-time selection of the best image out of streaming video. It also provides feedback to improve quality of image capture
- During enrollment and identification, it can help reject unqualified images and provide actionable feedbacks to improve the accuracy.
- High correlation of quality score with matching accuracy helps reduce error rates

FNMR vs. quality rejection rate. "E2a [IriTech] is the best performer, followed by Hx and F1." [IREX II Report, Fig. 13, page 56]

Metric		Metric	
1	Scalar overall quality	10	Margin
2	Gray level spread	11	Sharpness (defocus)
3	Iris radius	12	Motion blur
4	Pupil iris ratio	13	Signal to noise ratio
5	Usable iris area	14	Magnification
6	Iris-sclera contrast	15	Head rotation
7	Iris-pupil contrast	16	Gaze angle
8	Iris sclera boundary shape	17	Interlace
9	Iris pupil boundary shape	32-64	Vendor-defined metrics

Full support of IQCE (IREX II) Quality Metrics + Self-defined Metrics

Available APIs

Iris Enrollment	Performs enrollment of an iris image by extracting template from iris image and store it into the SDK gallery.
Iris Identification (1:N)	Performs a one-to-many comparison of the given template/image with the enrolled iris templates in the SDK gallery to identify the individuals that are most likely represented by the given template/image.
Iris Verification (1:1)	Performs a one-to-one comparison of the given template/image with the stored biometric templates in order to verify that the individual is the person he or she claims to be
Iris De-duplication	Similar to identification, but it determines the first one among the biometrics database matching with the captured iris image
Image Quality Evaluation	Evaluate the iris image quality and assign a scalar quality score to various quality metric from ISO/IQCE

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