



VeriEye 12.3/MegaMatcher 12.3 Algorithm Demo

User's guide

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1 Introduction

Iris recognition is acknowledged as the most accurate, stable and scalable non-invasive biometrics. This document is user's guide for Neurotechnology VeriEye 12.3/MegaMatcher 12.3 Algorithm Demo application. The purpose of this demo application is to demonstrate the speed and accuracy of Neurotechnology iris recognition engine interactively.

1.1 System Requirements

The exact system requirements highly depends on the use scenario, some approximate minimal requirements are listed below.

Hardware requirements:

- x86 (32-bit) or x86-64 (64-bit) compatible processors.
 - AVX2 support is highly recommended. Processors that do not support AVX2 will still run the Neurotechnology algorithms, but in a mode, which will not provide the specified performance. Most modern processors support this instruction set, but please check if a particular processor model supports it.
 - The CPU plugin supports inference on Intel® Xeon® with Intel® AVX2 and AVX512, Intel® Core™ Processors with Intel® AVX2, Intel Atom® Processors with Intel® SSE.
- 2 GB of free RAM is recommended for general usage scenarios. It is possible to reduce RAM usage for particular scenarios.
- (Optionally) A webcam or IP camera or any other camera (recommended frame size: 640 x 480 pixels) for face images capturing. Neurotechnology SDK includes support modules for a list of cameras. An IP camera should support RTSP and stream video in H.264 or M-JPEG. Cameras, which can operate in near-infrared spectrum, can be also used for image capture. Any other webcam or camera should provide DirectShow, Windows Media or Media Foundation interfaces for Windows platform, GStreamer interface for Linux and Mac platforms.
- (Optionally) Fingerprint scanner. Neurotechnology SDKs includes support modules for more than 150 models of fingerprint scanners under Microsoft Windows, Linux and Mac OS X platforms. See the list of [supported fingerprint scanners](#).
- (Optionally) Iris scanner (recommended image size: 640 x 480 pixels) for iris image capture. Neurotechnology SDKs includes support modules for several iris cameras. See the list of [supported iris scanners](#).
- (Optionally) Microphone. Any microphone that is supported by the operating system can be used.

Microsoft Windows specific requirements:

- Microsoft Windows 7 / 8 / 10, 32-bit or 64-bit. Note that some fingerprint scanners are supported only on 32-bit OS or only from 32-bit applications.
- Microsoft .NET framework 4.5 or later (for .NET components usage)
- Microsoft Visual Studio 2012 or newer (for application development with C++ / C# / VB .NET)
- Sun Java 1.7 SDK or later (for application development with Java)

Linux specific requirements:

- Linux 3.10 or newer kernel (32-bit or 64-bit) is required. If a fingerprint scanner is required, note that some scanners have only 32-bit support modules and will work only from 32-bit applications.
- glibc 2.17 or newer
- GStreamer 1.10.x or newer with gst-plugin-base and gst-plugin-good is required for face capture using camera/webcam or rtsp video. GStreamer 1.4.x or newer is recommended.
- libgudev-1.0 219 or newer (for camera and/or microphone usage)
- alsa-lib 1.1.6 or newer (for voice capture)
- gcc 4.8 or newer (for application development)

- GNU Make 3.81 or newer (for application development)
- Sun Java 1.8 SDK or newer (for application development with Java)

2 Application

This simple application demonstrates capabilities of Neurotechnology iris recognition engine. It can answer several questions: how fast Neurotechnology iris extraction is (creation of iris template from one iris image), and how fast matching is (how many templates of irises are compared per second) on some particular machine, how much memory it will use for these operation, and finally, how accurate it will be with some particular data. The following common tasks are implemented:

- Enrollment - iris image is converted to a compact representation called template which is further saved in the database for rapid identification or verification.
- Identification - newly created iris template is compared to each previously saved iris template and all matching database entries are showed.

Verification task is not implemented and there is no need for that because it is the same as identification in the database with one record using Neurotechnology SDK.

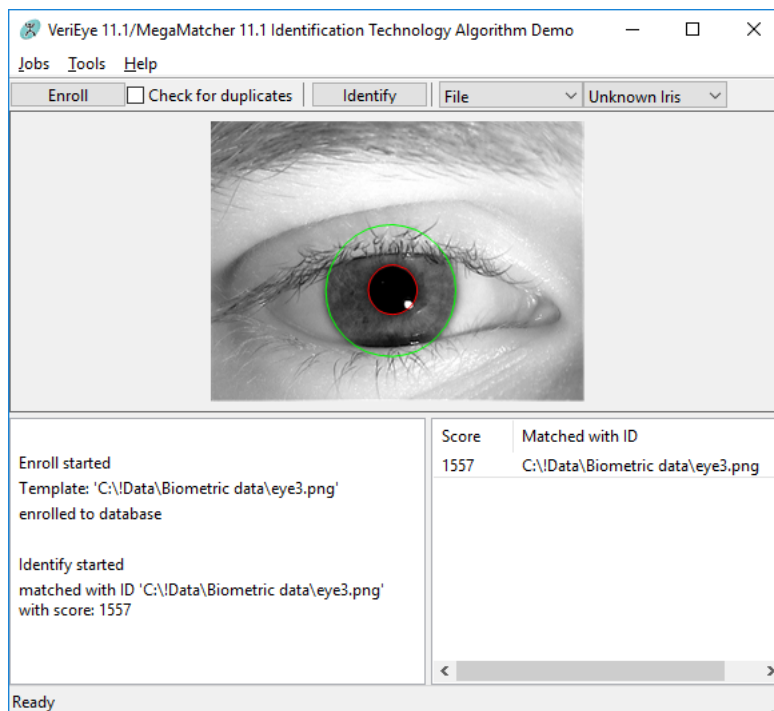
Additionally, all the parameters of iris template extraction and matching algorithms can be changed interactively.

2.1 Windows

VeriEye 12.3/MegaMatcher 12.3 Algorithm Demo application in Windows OS can be started from `IrisesAlgorithmDemo.exe`.

2.1.1 Main Window

When you want to enroll an iris image to a database you should press an Enroll button. If the enrollment succeeded you will see a window like this:



The center part of the main window shows current eye image and its segmentation results (if available). The lower left text box shows application log. The lower right list shows identification results. The biometrical tasks - enrollment and identification - are accessible via "Jobs" menu or toolbar buttons.

2.1.2 Enrollment Dialog

Enrollment dialog is accessible via "Jobs » Enroll" menu or toolbar "Enroll" button. It is a convenient way to enroll single or multiple eye iris images (via multiple files or whole directory selection) to the internal database.

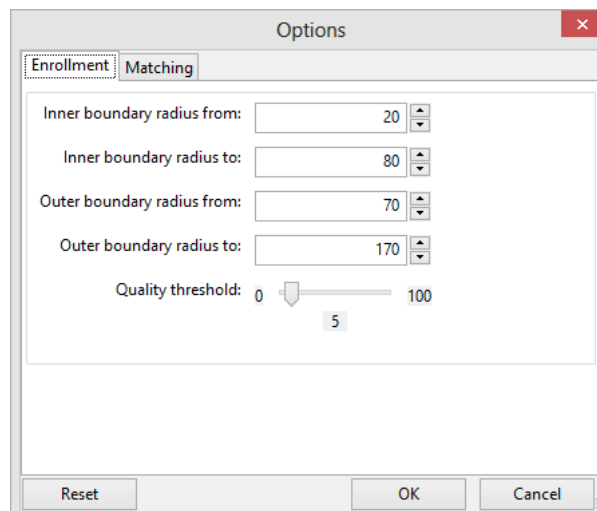
You can choose whether to extract iris images from a file or from a directory using a combo box on the toolbar.

If you have iris scanner drivers installed you can also extract image from scanner by selecting "From Iris Camera" in the same combo box.

2.1.3 Options Dialog

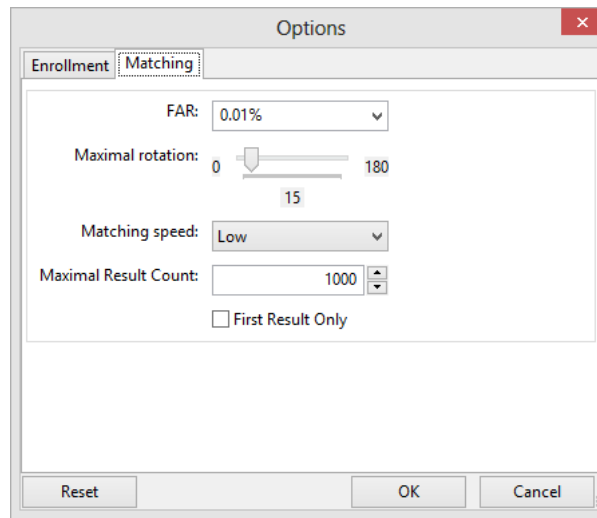
It is accessible via "Tools » Options" menu. All parameters of iris template extraction and matching algorithms can be changed interactively in these dialogs:

Enrollment options



- *Inner boundary radius from* (in pixels) - extractor parameter used to guide segmentation process, specifies the radius of circle which can fully fit inside the iris inner boundary. Default value - 20.
- *Inner boundary radius to* (in pixels) - extractor parameter used to guide segmentation process, specifies the radius of circle inside which the iris inner boundary will fully fit. Default value - 80.
- *Outer boundary radius from* (in pixels) - extractor parameter used to guide segmentation process, specifies the radius of circle which can fully fit inside the iris outer boundary. Default value - 70.
- *Outer boundary radius to* (in pixels) - extractor parameter used to guide segmentation process, specifies the radius of circle inside which the iris outer boundary will fully fit. Default value - 170.
- *Quality threshold* - sets a quality threshold. If an iris's quality threshold is less than specified value, the iris will be rejected. Default value - 5.

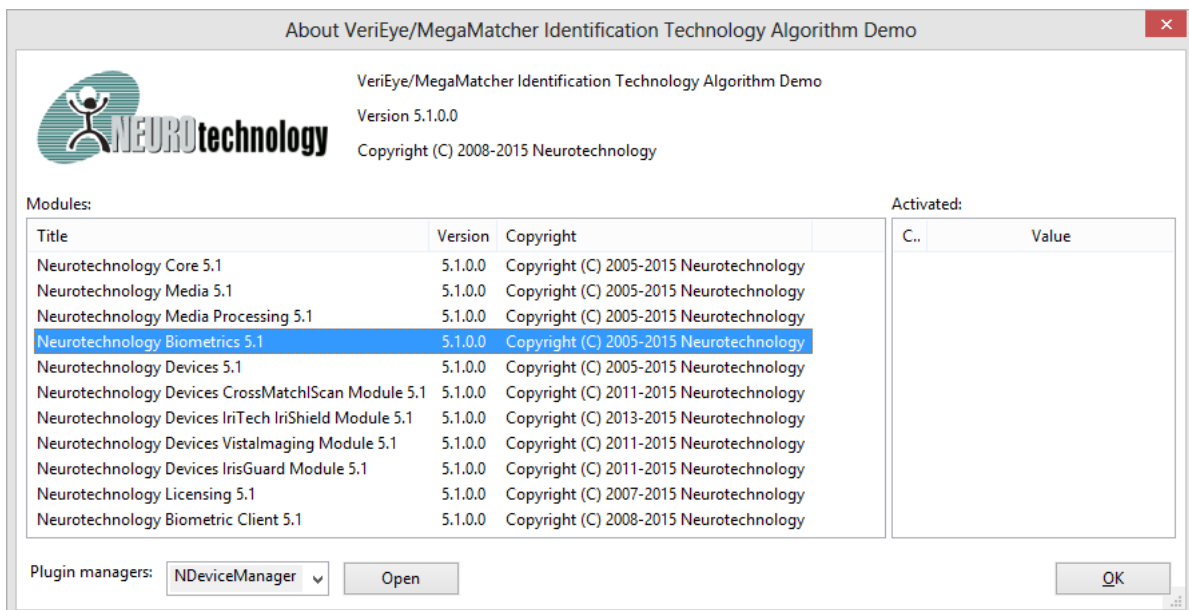
Matching options



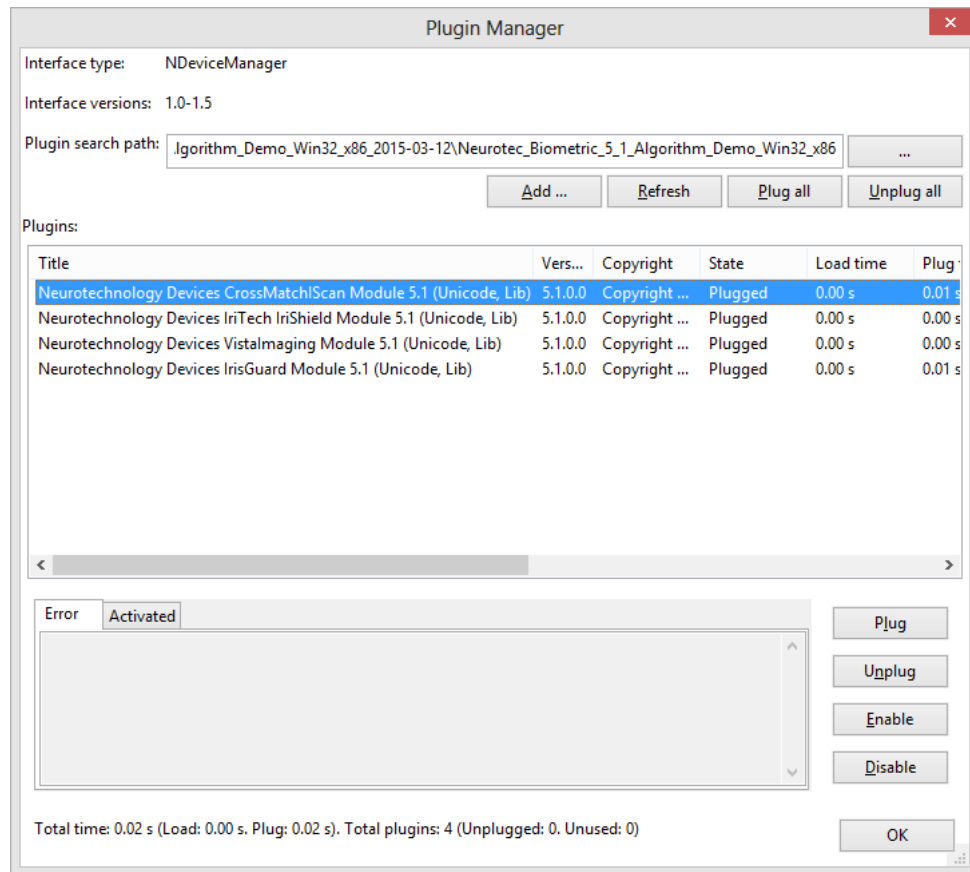
- *FAR* - matcher parameter used to define chosen false acceptance rate (FAR). Actually, controls matching threshold to make a decision whether compared iris templates were created from the same eye. Default value - 0.01%.
- *Maximal rotation* - maximum in-plane rotation angle of iris image which controls until which angle iris images will be identified. **Note:** the bigger *Maximal Rotation* value is, the slower identification task will be.
- *Matching speed* - matcher parameter used to define chosen matching speed. Matching speed can be one of the following: low (best quality), medium or high. Default value - low (best quality).
- *Maximal Result Only* - maximum number of matching results returned. Default value - 1000.
- *First Result Only* – if checked, only the first positive result will be returned during identification.

2.1.4 About Dialog

It is accessible via "Help » About" menu. All Neurotechnology components that were used to create this application are listed in this dialog.



You can also access the plugin managers used by the application from this window.



2.2 Linux

VeriEye 12.3/MegaMatcher 12.3 Algorithm Demo application on Linux can be started from `IrisAlgorithmDemo` file. There are separate distribution for 32 bits and 64 bits operating system. See Windows (see page 3) part to find out how to use this application.

2.3 Mac OS X

VeriEye 12.3/MegaMatcher 12.3 Algorithm Demo application on Mac OS can be started from `IrisAlgorithmDemo.app` file. See Windows (see page 3) part to find out how to use this application.

3 Support

If you encounter problems while installing or using Neurotechnology Iris Recognition Algorithm Demo application, please contact Neurotechnology (support@neurotechnology.com) or your local distributor.

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