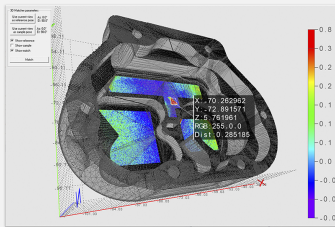# Easy3DMatch

3D alignment and inspection library

At a Glance

- Align a scanned 3D object with another scan or with a reference mesh
- Compute the local distances between 3D scans and a golden sample or reference mesh
- Detect anomalies such as misplaced features, geometric distortions, gaps, bumps,…
- Compatible with all 3D sensors that produce point clouds, depth maps or height maps

Benefits

New features in Open eVision

- All Open eVision libraries are now also available for embedded ARM devices.
- The 3D viewer can now shade opaque rendering sources with the Eye-Dome-Lighting (EDL) algorithm.

Easy3DMatch Description

The Easy3DMatch library features alignment functions to find the exact pose (position and orientation) of acquired 3D objects using a reference model. This model can be specified as a reference point cloud or as a 3D mesh from CAD software. Easy3D is required when using any Open eVision's 3D library and is provided when purchasing Easy3DLaserLine, Easy3DObject, Easy3DMatch or the 3D Bundle.

Anomaly detection by the comparison of 3D data against a reference model

After the alignment of the 3D data with the reference model, Easy3DMatch can search for local discrepancies, like holes, bumps, scratches, gaps… The list of detected anomalies is returned along with their individual position, distance and area. New point clouds with distances and colored data can be generated and displayed by the interactive Open eVision 3D viewer.

Support 2D and 3D subdomains of interest

Arbitrary 2D regions (on ZMaps) and 3D volumes (on point clouds) can be used to define subdomains of interest. In this case, the whole object is used during the alignment process, but only some parts are taken into account for comparison and anomaly detection.

Compatibility with 3D sensors

Easy3DMatch can use 3D data coming from a variety of 3D acquisition techniques like laser triangulation, structured light, stereo vision or time of flight. Open eVision's compatibility has been tested with several 3D sensor brands: Automation Technology, Azure Kinect, Benano, IDS Ensenso, Intel Realsense, Lucid Helios, LMI Gocator, Mech-Mind, Photoneo PhoXi, Shenzhen SinceVision (SSZN), Zivid and others. Point Clouds and ZMaps are managed efficiently and allow 3D processing and analysis to be performed.

3D Viewer

Use the 3D Viewer class of Easy3D to create an interactive 3D display. The 3D Viewer can display point clouds and 3D objects. It uses the OpenGL interface and requires a compatible display device.

3DSensor Fusion

3DSensor Fusion is a functionality enabling the merger of point clouds of the same object's different faces. You can use a number of 3D sensors placed at multiple positions to acquire a complete object at once. The process is split between a calibration phase and a merging phase. As a result, the merger is fast and the calibration is independent of the objects you wish to acquire. Finally, this procedure produces optimized point clouds where duplicate points have been removed and all attributes (colors, normals,...) of the merged clouds are preserved.

Neo Licensing System

- Neo is the new Licensing System of Euresys. It is reliable, state-of-the-art, and is now available to store Open eVision and eGrabber licenses.
- Neo allows you to choose where to activate your licenses, either on a Neo Dongle or in a Neo Software Container. You buy a license, you decide later.
- Neo Dongles offer a sturdy hardware and provide the flexibility to be transferred from a computer to another.
- Neo Software Containers do not need any dedicated hardware, and instead are linked to the computer on which they have been activated.
- Neo ships with its own, dedicated, Neo License Manager, which comes in two flavours: an intuitive, easy to use, Graphical User Interface and a Command Line Interface that allows for easy automation of Neo licensing procedures.

All Open eVision libraries are available for Windows and Linux

- Windows 7 to Windows 10 x86 (32-bits) and x86-64 (64-bits)
- Windows 11 x86-64 (64-bits)
- Linux 64 bits (x86-64 and ARMv8-A) with a glibc version 2.18 or newer

Developed with the support of the DG06 Technology Development Department

Applications

Machine Vision for the Electronic Manufacturing Industry

- High speed image acquisition for AOI, 3D SPI, 3D lead/ball inspection machines.
- Very high resolution line-scan image acquisition for Flat Panel Display inspection and solar cell inspection
- PCB inspection
- LED inspection
- Connector inspection

Machine Vision for the General Manufacturing Industries

- High frame rate image acquisition for inspection machines
- Line-scan image acquisition for surface inspection machines
- Line-scan image acquisition for textile inspection
- Checking dimensional accuracy
- Assembly inspection
- Object positioning for pick and place machines

Machine Vision for the Printing Industry

- High speed line-scan image acquisition for printing inspection machines

Machine Vision for the Food Inspection Industry
- Food inspection and sorting

Video Acquisition and Recording
- High-frame-rate video acquisition for motion analysis and recording

Specifications

Software

Host PC Operating System	• Open eVision is a set of 32-bit and 64-bit libraries that require an Intel compatible processor with the SSE4 instruction set or an ARMv8-A compatible processor.
	• The Deep Learning Bundle is only available in the 64-bit Open eVision library.
	• Open eVision can be used on the following operating systems:
	  – Windows 11 (64-bits)
	  – Windows 10 (32- and 64-bits)
	  – Windows 8 (32- and 64-bits)
	  – Windows 7 (32- and 64-bits)
	  – Linux 64 bits (x86-64 and ARMv8-A) with a glibc version greater or equal to 2.18
	• Since Open eVision 2.6, discontinued support of:
	  – Windows Vista 32-bits Service Pack 1
	  – Windows XP 32-bits Service Pack 3
	  – Windows Embedded Standard 2009 32-bits
	• Remote connections
	  – Remote connections are allowed using remote desktop, TeamViewer or any other similar software.
	• Virtual machines
	  – Linux virtual machines are supported. Microsoft Hyper-V and Oracle VirtualBox hypervisors have been successfully tested.
	  – Windows virtual machines are not supported.
	• Minimum requirements:
	  – 2 GB RAM to run an Open eVision application
	  – 8 GB RAM to compile an Open eVision application
	  – Between 100 MB and 2 GB free hard disk space for libraries, depending on selected options.

APIs	• Supported Integrated Development Environments and Programming Languages:
	− Microsoft Visual Studio 2008 SP1 (C++, C#, VB .NET, C++/CLI)
	− Microsoft Visual Studio 2010 (C++, C#, VB .NET, C++/CLI)
	− Microsoft Visual Studio 2012 (C++, C#, VB .NET, C++/CLI)
	− Microsoft Visual Studio 2013 (C++, C#, VB .NET, C++/CLI)
	− Microsoft Visual Studio 2015 (C++, C#, VB .NET, C++/CLI)
	− Microsoft Visual Studio 2017 (C++, C#, VB .NET, C++/CLI)
	− Microsoft Visual Studio 2019 (C++, C#, VB .NET, C++/CLI)
	− Microsoft Visual Studio 2022 (C++, C#, VB .NET, C++/CLI)
	− QtCreator 4.15 with Qt 5.12
	• Since Open eVision 2.5.1, discontinued support of:
	− Borland C++ Builder 6.0 update 4 (C++)
	− CodeGear Delphi 2009 (Object Pascal)
	− CodeGear C++ Builder 2009 (C++)
	− Microsoft Visual Studio 6.0 SP6 (C++, Basic)
	− ActiveX API
	• Since Open eVision 2.4.1, discontinued support of:
	− Embarcadero RAD Studio XE4 and XE5 (C++, Object Pascal, 32 bits only)

Ordering Information

Product code - Description	• 4184 - Open Easy3DMatch for USB dongle
	• 4234 - Open Easy3DMatch for PAR dongle
	• 4284 - Open Easy3DMatch for soft-based licensing
	• 4334 - Open eVision Easy3DMatch
Optional accessories	• 6512 - eVision/Open eVision USB Dongle (empty)
	• 6513 - eVision/Open eVision Parallel Dongle (empty)
	• 6514 - Neo USB Dongle (empty)

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