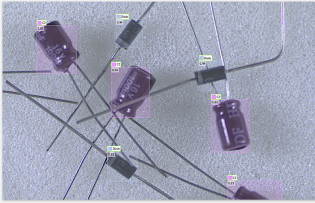# EasyLocate

Deep Learning localization and classification library

At a Glance

- Localization and identification of objects/products/defects
- Counting of objects
- Axis Aligned Bounding Boxes : for precise annotation and localization of multiple objects and sizes
- Interest Point: for fast single point annotation and localization of objects of similar sizes
- Supports data augmentation and masks
- Compatible with CPU and GPU processing
- Includes the free Deep Learning Studio application for dataset creation, training and evaluation
- Only available as part of the Deep Learning Bundle

Benefits

New in Open eVision 24.02

EasyFind : Significant speed increase, without any loss of accuracy.

EasyImage

- New Gabor filtering function to help with texture analysis and edge detection.
- New inverse circle warp function, providing conversion between polar and cartesian coordinates.

Easy: Improved off-screen rendering on all platforms.

Admin: Simplified version upgrade procedure with version numbers removed from filenames.

What Is Deep Learning ?

Neural Networks are computing systems inspired by the biological neural networks that constitute the human brain. Convolutional Neural Networks (CNN) are a class of deep, feed-forward artificial neural networks, most commonly applied to analyzing images.

Deep Learning uses large CNNs to solve complex problems difficult or impossible to solve with so-called conventional computer vision algorithms. Deep Learning algorithms may be easier to use as they typically learn by example. They do not require the user to figure out how to classify or inspect parts. Instead, in an initial training phase, they learn just by being shown many images of the parts to be inspected. After successful training, they can be used to classify parts, or detect and segment defects.

EasyLocate Description

EasyLocate is the localization and identification library of Deep Learning Bundle. It is used to locate and identify objects, products, or defects in the image. It has the capability of distinguishing overlapping objects and, as such, EasyLocate is suitable for counting the number of object instances. Two methods are available:

- "EasyLocate Axis Aligned Bounding Box" predicts the bounding box surrounding each object (or defect) it has found in the image and assigns a class label to each of them. It must be trained with images where the objects (or defects) that must be found have been annotated with a bounding box and a class label.
- "EasyLocate Interest Point" predicts the position (as one point, typically the center, but may be otherwise defined) for each object (or defect) it has found in the image and assigns a class label to each of them. All the objects (or defects) in the image must have the same approximate size. It must be trained with images where the objects (or defects) that must be found have simply been annotated with an interest point and a class label. The annotation process is faster with EasyLocate Interest Point as a single click is enough to annotate an object.

New in Open eVision 23.12

Import of standard datasets into Deep Learning Studio

- Import of COCO Json dataset for EasyLocate or EasySegment Supervised

- Import of YOLO TXT annotations for EasyLocate

- Import of Pascal VOC XML annotations for EasyLocate

EasySpotDetector (Beta release, contact us for more information)

- A single API and license for the alignment of region of interest, surface defect detection (particles, scratches,…) and classification with a custom trained Deep Learning classifier.
- Realtime processing for inline surface inspection

Data Augmentation

Deep Learning works by training a neural network, teaching it how to classify a set of reference images. The performance of the process highly depends on how representative and extensive the set of reference images is. Deep Learning Bundle implements "data augmentation", which creates additional reference images by modifying (for example by shifting, rotating, scaling) existing reference images within programmable limits. This allows Deep Learning Bundle to work with as few as one hundred training images per class.

Why Choose Open eVision's Deep Learning Bundle?

- Deep Learning Bundle has been tailored, parametrized and optimized for analyzing images, particularly for machine vision applications.
- Deep Learning Bundle has a simple API and the user can benefit from the power of deep learning technologies with only a few lines of code.
- Try before you buy: Deep Learning Bundle comes with the free Deep Learning Studio training and evaluation application.

EasyClassify, EasySegment and EasyLocate cannot be purchased separately. They are only available as part of the Deep Learning Bundle.

Download and evaluate Deep Learning Bundle using Deep Learning Studio today, and feel free to call Euresys' support should you have any question.

Deep Learning Studio

Open eVision includes the free Deep Learning Studio application. This application assists the user during the creation of the dataset as well as the training and testing of the deep learning tool. For EasySegment, Deep Learning Studio integrates an annotation tool and can transform prediction into ground truth annotation. It also allows to graphically configure the tool to fit performance requirements. For example, after training, one can choose a tradeoff between a better defect detection rate or a better good detection rate.

Performance

Deep Learning generally requires significant amounts of processing power, especially during the learning phase. Deep Learning Bundle supports standard CPUs and automatically detects Nvidia CUDA-compatible GPUs in the PC. Using a single GPU typically accelerates the learning and the processing phases by a factor of 100.

Sample Dataset: Ceramic Capacitor

Our "Ceramic Capacitor" dataset shows how EasyLocate Interest Point is able to reliably detect and count a lot of ceramic capacitors that are overlapping or touching each other.

Deep Learning Bundle Feature Comparison

Sample Dataset: Electronic components

Our "Electronic Component" dataset shows how EasyLocate Bounding Box is able to reliably detect and count different kinds of standard electronic components stored in bulk inside plastic bags, in spite of the poor lighting conditions.

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

- Microsoft Windows 11, 10, 8.1, 7 for x86-64 (64-bit) processor architecture
- Linux for x86-64 (64-bit) and ARMv8-A (64-bit) processor architectures with a glibc version greater or equal to 2.18

Developed with the support of the DG06 Technology Development Department

Applications

Machine Vision for the Electronic Manufacturing Industry

- PCB inspection
- Mark inspection
- LED inspection

Machine Vision for the General Manufacturing Industries

- Presence / Absence check
- Surface analysis
- Assembly inspection
- Code quality verification for label printing machines

Machine Vision for the Food Inspection Industry

- Food inspection and sorting

Specifications

Software

Host PC Operating System	• Open eVision is a set of 64-bit libraries that require an Intel compatible processor with the SSE4 instruction set or an ARMv8-A compatible processor.
	• Open eVision can be used on the following operating systems:
	  – Microsoft Windows 11, 10, 8.1, 7 for x86-64 (64-bit) processor architecture
	  – Linux for x86-64 (64-bit) and ARMv8-A (64-bit) processor architectures with a glibc version greater or equal to 2.18
	• Remote connections
	  – Remote connections are allowed using remote desktop, TeamViewer or any other similar software.
	• Virtual machines
	  – Virtual machines are supported. Microsoft Hyper-V, Oracle VirtualBox and libvirt hypervisors have been successfully tested.
	  – Only the Neo Licensing System is compatible with virtualization.
	• 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 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

Ordering Information

Product code - Description	• 4189 - Open EasyLocate for USB dongle • 4239 - Open EasyLocate for PAR dongle • 4339 - Open eVision EasyLocate
Optional accessories	• 6512 - eVision/Open eVision USB Dongle (empty) • 6513 - eVision/Open eVision Parallel Dongle (empty) • 6514 - Neo USB Dongle (empty)

EMEA

Euresys SA

Liège Science Park - Rue du Bois Saint-Jean, 20
4102 Seraing - Belgium

Email: sales.europe@euresys.com

EMEA

Sensor to Image GmbH

Lechtorstrasse 20
86956 Schongau - Germany

Email: sales.europe@euresys.com

AMERICA

Euresys Inc.

316 Prado Way
Greenville, SC 29607 - United States

Email: sales.americas@euresys.com

ASIA

Euresys Pte. Ltd.

750A Chai Chee Road - #07-15 ESR BizPark @ Chai Chee
Singapore 469001 - Singapore

Email: sales.asia@euresys.com

CHINA

Euresys Shanghai Liaison Office

Unit 802, Tower B, Greenland The Center - No.500 Yunjin Road, Xuhui District
200232 Shanghai - China
Euresys上海联络处
上海市徐汇区云锦路500号绿地汇中心B座802室
200232

Email: sales.china@euresys.com

CHINA

Euresys Shenzhen Liaison Office

Room 1202 - Chinese Overseas Scholars Venture Building
518057 Shenzen - China
Euresys深圳联络处
深圳南山区留学生创业大厦1期1202
518057

Email: sales.china@euresys.com

JAPAN

Euresys Japan K.K.

Expert Office Shinyokohama - Nisso Dai 18 Building, Shinyokohama 3-7-18, Kohoku
Yokohama 222-0033 - Japan
〒222−0033
神奈川県横浜市港北区新横浜3−7−18 日総第18ビル　エキスパートオフィス新横浜

Email: sales.japan@euresys.com

More at www.euresys.com