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NEW

EasyDeepLearning

Convolutional Neural Network-based classification library

At a Glance

- Includes functions for dataset creation, classifier training and image classification
- Compatible with CPU and GPU processing
- Able to detect defective products or sort products into various classes
- Supports data augmentation, works with as few as one hundred training images per class
- Includes a free Studio application to ease the creation of deep learning applications

Benefits

What Is Deep Learning ?

- Neural Networks are computing systems inspired by the biological neural networks that constitute the human brain and Convolutional Neural Networks (CNN) are a class of deep, feed-forward artificial neural networks, most commonly applied to analyzing images. Deep Learning uses CNNs to solve complex problems difficult or impossible to solve with so-called conventional computer vision algorithms. EasyDeepLearning learns by example. It learns how to distinguish defects or classify parts by being shown many images of the parts to be inspected. This is called the training process.
- EasyDeepLearning does not require the user to explain how to differentiate good parts from bad ones or how to recognize products from each class; it only requires the user to label training images, that is to tell which ones are good and which ones are bad, or which ones belong to which class. After this learning/training process, the EasyDeepLearning library is able to classify images. For any given image, EasyDeepLearning returns a list of probabilities, showing the likelihood that the image belongs to each of the classes it has been taught. For example, if the process requires setting apart bad parts from good ones, EasyDeepLearning returns whether each part is good or bad, and with what probability.

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. EasyDeepLearning implements “data augmentation”, which creates additional reference images by modifying (for example by shifting, rotating, scaling) existing reference images within programmable limits. This allows EasyDeepLearning to work with as few as one hundred training images per class.

EasyDeepLearning Studio

Open eVision also includes the EasyDeepLearning Studio application. This application assists the user during the learning and testing phases.

What is EasyDeepLearning Good or Bad for?

Deep Learning is generally not suitable for applications requiring precise measurement or gauging. It is also not recommended when some types of errors (such as false negative) are completely unacceptable. EasyDeepLearning performs better than traditional machine vision when the defects are difficult to specify explicitly, for example, when the classification depends on complex shapes and textures at various scales and positions. Besides, the "learn by example" paradigm of Deep Learning can also reduce the development time of a computer vision process.

Why Choose Open eVision's EasyDeepLearning?

Open source versions of neural networks are available for free, so why choose Open eVision's EasyDeepLearning?

- EasyDeepLearning has been tailored, parametrized and optimized for analyzing images, particularly for machine vision applications.
- EasyDeepLearning has a simple API and the user can benefit from the power of deep learning with only a few lines of code.

Feel free to download and evaluate EasyDeepLearning using EasyDeepLearning Studio, and feel free to call Euresys' support should you have any question.

Performance

Deep Learning generally requires significant amounts of processing power, especially during the learning phase. EasyDeepLearning 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.

Developed with the support of the DG06 Technology Development Department

Applications

Machine Vision for the Electronic Manufacturing Industry

- 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 32-bit and 64-bit libraries that require a processor compatible with the SSE2 instruction set. • The EasyDeepLearning library is only available in the 64-bit Open eVision library. • Open eVision can be used on the following operating systems: – Windows 10 (32- and 64-bits) – Windows 8 (32- and 64-bits) – Windows 7 (32- and 64-bits) • 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 • The Open eVision installer does not allow installation on virtual machines. • Minimum requirements: – RAM: 8 GB – Display size: 800 x 600. 1280 x 1024 recommended. – Color depth: 16 bits. 32 bits recommended. – 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 .NET 2003 SP1 (C++) – Microsoft Visual Studio 2005 SP1 (C++, C#, VB .NET, C++/CLI) – 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) • Since Open eVision 2.6, discontinued support of: – Microsoft Visual Studio 6.0 SP6 (C++, Basic) – Borland C++ Builder 6.0 update 4 (C++) – CodeGear C++ Builder 2009 (C++) – CodeGear Delphi 2009 (Object Pascal) – Embarcadero RAD Studio XE4 (C++, Object Pascal) – Embarcadero RAD Studio XE5 (C++, Object Pascal)

Ordering Information

Product code - Description	• 4182 - Open EasyDeepLearning for USB dongle • 4232 - Open EasyDeepLearning for PAR dongle • 4282 - Open EasyDeepLearning for soft-based licensing
Optional accessories	• 6512 - eVision/Open eVision USB Dongle (empty) • 6513 - eVision/Open eVision Parallel Dongle (empty)

AMERICA

Euresys Inc.

27126-B Paseo Espada - Suite 704
San Juan Capistrano, CA 92675 - United States

Phone: +1 949 743 0612
Email: sales.americas@euresys.com

EMEA

Euresys SA

Liège Science Park - Avenue du Pré Aily, 14
4031 Angleur - Belgium

Phone: +32 4 367 72 88
Email: sales.europe@euresys.com

EMEA

Sensor to Image GmbH

Lechtorstrasse 20 -
86956 Schongau - Germany

Phone: +49 8861 2369 0
Email: sales.europe@euresys.com

ASIA

Euresys Pte. Ltd.

750A Chai Chee Road - #07-15 Viva Business Park
Singapore 469001 - Singapore

Phone: +65 6445 4800
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

Phone: +86 21 33686220
Email: sales.china@euresys.com

JAPAN

Euresys Japan K.K.

Expert Office Shinyokohama - Nisso Dai 18 Building, Shinyokohama 3-7-18
Kouhoku-Ku, Yokohama-Shi 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

Phone: +81 45 594 7259
Email: sales.japan@euresys.com

More at www.euresys.com