



HALCON

a product of MVTec

THE COMPREHENSIVE
STANDARD SOFTWARE
FOR ALL MACHINE
VISION APPLICATIONS

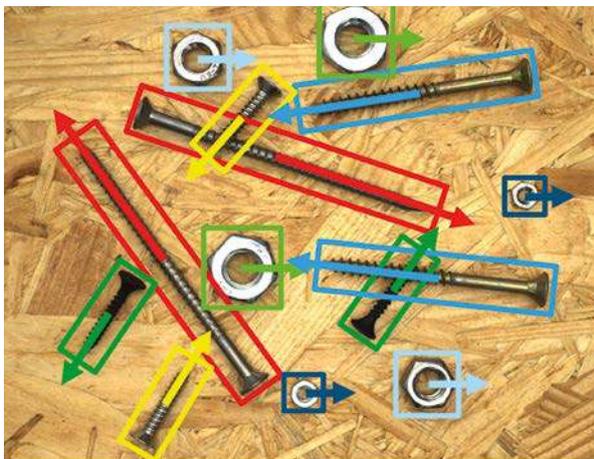
EN

NEW
VERSION
19.05

New Features – 19.05

Deep Learning

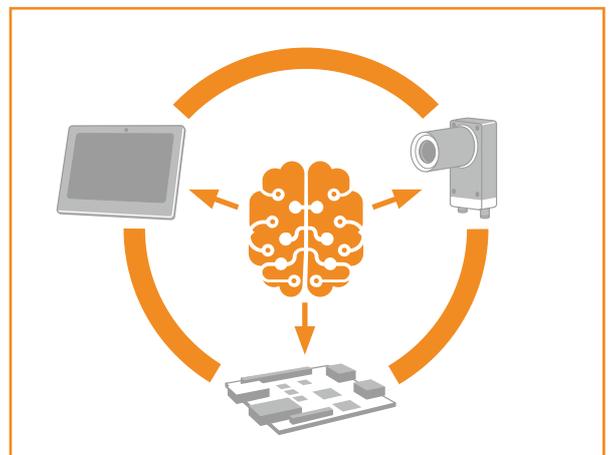
HALCON 19.05 allows users to apply deep learning technologies to an even broader range of application scenarios by increasing accuracy and extending the choice of compatible platforms.



Object detection with aligned bounding boxes

ENHANCED OBJECT DETECTION

HALCON's deep-learning-based object detection localizes trained object classes and identifies them with a surrounding rectangle. HALCON 19.05 now also gives users the option to have these rectangles aligned according to the orientation of the object, resulting in a more precise detection, as rectangles now match the shape of the object more closely. This is especially useful when detecting elongated, tilted objects such as screws, tube sections, or pens.

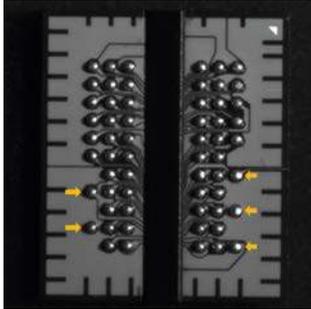


The power of deep learning on Arm®-based platforms

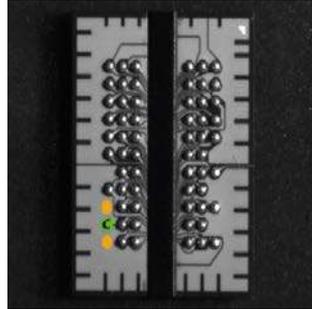
INFERENCE ON ARM PROCESSORS

With HALCON 19.05, inference for all three deep learning technologies – image classification, object detection, and semantic segmentation – runs out-of-the-box on Arm® processors. As this removes the need for special components like a powerful GPU or a desktop CPU, HALCON significantly broadens the range of possible deep learning applications. Execution times on Arm®-based platforms vary by complexity and the type of hardware, but MVTec benchmarks have shown them to be suitable for many conceivable applications.

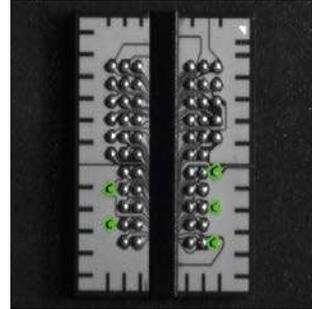
Additional New Features



Marked objects are to be detected



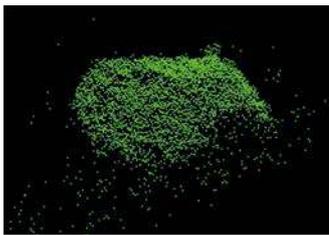
Definition of clutter regions



Matching result based on clutter information

HALCON'S SHAPE-BASED MATCHING

Shape-based matching is one of HALCON's most important core technologies and can be considered to be one of the most powerful matching tools on the market. MVTec continuously improves this technology to widen the application area even further. With HALCON 19.05, users can now, for example, specifically define so-called "clutter" regions (marked above in orange). These are areas within a search model that should not contain any contours. Adding such clutter information to the search model leads to more robust matching results, for example in the context of repetitive structures.



SURFACE-BASED MATCHING

Edge-supported surface-based matching is now more robust against noisy point clouds: Users can control the impact of surface and edge information via multiple min-scores. Additionally, in case that no xyz-images are available, a new parameter now allows switching off 3D edge alignment entirely. This enables users to eliminate the influence of insufficient 3D data on matching results, while keeping the valuable 2D information for surface and 2D edge alignment.



SPEEDUPS

Various operators in HALCON have been sped up. For example, depending on image type and settings, `affine_trans_image` is now up to 230 % faster on AVX2 processors. Furthermore, `polar_trans_image_ext` can be executed up to 160 % faster, depending on the interpolation method. Find more details on these speedups and more in the HALCON 19.05 release notes.

Highlights of Recent HALCON Progress Releases

INNOVATIONS

Deep Learning

- Semantic segmentation enables the pixel-precise localization of objects within an image
- Object detection allows users to detect trained object- or error classes with bounding box accuracy
- Pretrained networks, highly optimized for industrial applications and free of any third party licenses, enable shorter time to market

Deflectometry for easy inspection of specular reflecting surfaces

MAJOR CORE TECHNOLOGY IMPROVEMENTS

Bar/Data Code | **Surface-based Matching** | **Hypercentric Lenses** | **Uncalibrated Photometric Stereo** | **Surface Fusion**

Fieldbus Integration via Hilscher cifX cards

Handle Variable Inspect lets developers inspect current properties of complex data structures at a glance

... and all features contained in previous HALCON releases

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What Is HALCON?

HALCON is the comprehensive standard software for machine vision with an integrated development environment (HDevelop) that is used worldwide. It enables cost savings and improved time to market. HALCON's flexible architecture facilitates rapid development of any kind of machine vision application.

What Is Included?

MVTec HALCON provides outstanding performance and a comprehensive support of multi-core platforms, special instruction sets like AVX2 and NEON, as well as GPU acceleration. It serves all industries, with a library used in hundreds of thousands of installations in all areas of imaging like blob analysis, morphology, matching, measuring, and identification. The software provides the latest state-of-the-art machine vision technologies, such as comprehensive 3D vision and deep learning algorithms.

What Is HALCON Progress?

HALCON Progress is the fast track to the newest features. With new releases approximately every six months, it gives you access to the newest features quicker and more frequently than ever before. These short release cycles are only available via an annual subscription.

Why HALCON?

HALCON secures your investment by supporting the operating systems Windows, Linux, and macOS. The full library can be accessed from common programming languages like C, C++, and .NET languages like C# or VB.NET. HALCON guarantees hardware independence by providing interfaces to hundreds of industrial cameras and frame grabbers, in particular by supporting standards like GenICam, GigE Vision, and USB3 Vision. By default, MVTEC HALCON runs on Arm®-based smart cameras and other embedded vision platforms. It can also be ported to various microprocessors/DSPs, operating systems, and compilers. Thus, the software is ideally suited for the use within embedded systems.

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