When the microscope comes to the object

Digital microscopes for image processing

For computational microscopy and industrial 4.0 applications, more and more specific and reliable sensors or microscopes are needed that provide a repeatable optimized image for an application and are compact and affordable enough to be installed in machines, products or equipment.

The trend towards 100% inspection requires a resolution as high as possible in order to detect and analyse the smallest details. The new machine vision microscope MVM from Opto is such a solution for these requirements.

No coordination problems with individual components, no different interfaces, no different manufacturers, no complicated assembly. Always the best of everything, completely integrated and as compact as possible. Who doesn't want a plug & play solution for his image processing task. The extensive Opto Imaging Module series, which is available in a multitude of variants with different magnifications, working distances and sensors, was designed for this purpose, to which the new MVM has now been added.

Digital microscope with coaxial incident light illumination and ring light

The new Machine Vision Microscope is a purely digital microscope. It has an apochromatically highly corrected microscope objective as well as a corresponding tube lens which magnifies each object point on a pixel of the 5Mp Sony IMX264 sensor. In addition, a coaxial incident light illumination and a diffuse ring light were installed. Both lights are controlled and powered via the USB 3.1 port of the integrated camera. A specially developed control electronics allows the switching of the two light sources as well as the simple brightness adjustment or the use of the automatic exposure control. The interaction of a highly sensitive sensor and very efficient LED's with a powerful optics allows this compact combination. The MVM is part of the new imaging module family in the 90° IM Compact M design and stable aluminum housing with a single connection. Imaging modules are optimized combinations of camera, optics, illumination and electronics for a special application at the same or lower price than a combination of standard components, only more robust, better adapted to the application and always with the same configuration when re-ordered.

Focus on user-friendliness

Imaging modules offer an unprecedented level of usability, are delivered with their own image capture software, so they can be easily integrated into any network, system or production environment. The new digital microscope is delivered pre-calibrated and can therefore be easily integrated into measuring instruments, analysis systems or bio-imaging systems. The very intuitive measurement and labeling software supplied free of charge is just as helpful for stand-alone applications as the comprehensive camera control for demanding integration tasks. Since each module is invariable in magnification, it is pre-calibrated at the rear and the setting is stored in its own electronics, so it can be measured immediately. With an image field of 4.5 x 3.8mm, a measuring resolution of 1.8µm/pixel and a working distance of 31mm, an optimum compromise between resolution and applicability was found. This combination allows an additional dark field illumination via a diffuse ring light. With the additionally integrated coaxial incident light illumination, many lighting scenarios can be realised in one module with one set-up. This means that no second assembly or complex assembly of individual components is necessary.

Consistent image quality for stable deep learning solutions

"Deep learning" with neural networks is another trend, also in computational microscopy. More and more new companies are taking up this trend, occupying niches and developing applications. The prerequisites for reliable classification are reliable image data and consistent recording criteria. In microscopy, individual experiments can thus be equipped with a microscope.

In comparison to traditional microscopes with a camera, they cannot change apertures, focus or image fields and therefore do not change the specifications for reliable image evaluation.This ensures consistent image quality even with different modules, providing a perfect solution for stable deep learning applications. With the 70 x 150 x 40mm machine vision microscope, it is now possible to integrate microscopy into any application and thus carry out highly magnifying examinations directly on the object. This ensures consistent image quality even with different modules, providing a perfect solution for stable deep learning applications. With the 70 x 150 x 40mm machine vision microscope, it is now possible to integrate microscopy into any application and thus carry out highly magnifying examinations directly on the object.

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