

3D machine vision made easy

GenICam 3.0 for standardized 3D cameras

With the new 3.0 release the GenICam standard hosted by the European Machine Vision Association (EMVA) receives a multiplicity of new functions. One special feature therein is the standardized connection of 3D cameras. For this, 3D camera manufacturers and software developers commonly developed a uniformly accepted standard which not only 3D experts offers a much easier integration but also enables so far unexperienced users an easy access into 3D machine vision.

3D-cameras have become very popular in machine vision. The market has expanded in the last years; a multitude of 3D cameras is now available from different vendors. Technically, the most popular 3D camera technologies are the Sheet of Light technology and Structured Light method. However, also cameras based on Time of Flight and Stereo Vision technologies are offered. Still, most integrators tend to rely on standard 2D cameras at the moment due the lack of compatibility between machine vision software and 3D cameras.

The different 3D technologies also bring different implementations of the various camera manufacturers. In many cases the camera maker requires a special driver or proprietary programming interface (API) to operate the respective camera. This problem has been addressed and solved for 2D cameras already years ago through the introduction of the commonly used GenICam standard. The standard made a significant contribution to the success of machine vision and now takes this success to the next level through the integration of 3D cameras.

In the GenICam 3.0 release for the first time the access to 3D cameras is standardized. By this, communication and image acquisition between the application (software) and the camera takes place on a uniformed basis and enables a controlled exchange which applies across various camera manufacturers and interfaces (GigE Vision, USB3 Vision, CoaXPress, CameraLink HS). Furthermore, also proprietary transport layers can make use of the new standardized GenICam 3D interface.

“Since practically all software solutions support the standard, GenICam compliant cameras are being recognized and put into operation automatically by the software”, says Stephan Kieneke, 3D Product Manager at Automation Technology and member of the GenICam standard committee. “This facilitates the handling in particular for users with little experience in 3D imaging since they can access the 3D camera in a familiar working environment.”

During the VISION 2014 in Stuttgart a demo was presented at the International Machine Vision Standards booth organized by the EMVA, which showed the interaction between the 3D camera and vision software using a preview of the new GenICam 3.0.

It showed that for instance integrators will be able in the near future to extract 3D point clouds out of the cameras and process them directly in their software without circumstantial data conversion.

“This will make it possible to perform the transformation of 2D pixels to 3D world coordinates either within the camera or have it calculated by the software according to the given standardized transformation parameters”, explains Christoph Zierl, Technical Director at MVTec Software GmbH and Vice-Chair of the GenICam standard committee. “Until now, this process was only possible through a proprietary manufacturer setting which complicated usability and interchangeability for the customer.” A problem which has been solved with the introduction of GenICam 3.0, since no matter which technology hides behind a 3D camera, the user always receives a standardized data format.



The expansion of GenICam for 3D cameras now bears the chance that the dissemination of 3D applications increases considerably and establishes as future oriented solution in many industries. Machine vision user from other industries now have an ease access to 3D image processing which sets the scene for a much broader usage of this technology in the coming years.