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3D DEPTH IMAGES WITH MILLIMETRE ACCURACY

3D TOF CAMERA CAPTURES CURRENT STATUS IN A PROCESS WITH EXTREME PRECISION AND SPEED

The portfolio of a safety technology provider now also includes a 3D camera that records processes in real time. This expands the portfolio of optoelectronic system components for intralogistics and automation technology.

Hardly any industrial automation process can be realised without high-performance optoelectronic sensors. This applies, for example, to the detection of components or load carriers in machines and on conveyor belts. Increasingly, it also applies to machine safety. Here, non-contact safety light barriers, light grids and light curtains offer benefits that surpass those of traditional safeguarding of hazardous areas with guard doors. The operator retains a clear view of the process, and the manufacturer or operating company of the system can introduce additional flexibility into workflows with functions like muting or blanking (spatial or temporal masking of individual areas of the safeguard system).

Optoelectronics replaces electromechanics…

With its sister company, Safety Controls, which focuses specifically on optoelectronic protective devices, the Schmersal Group is very well placed for this segment. Schmersal's range also includes sensors for non-safety-related tasks in automated assembly, production and intralogistics, particularly as the range is currently being expanded to include a high-end automation module to replace conventional industrial sensors (inductive, magnetic, laser-based) and thus enable additional functions.

… and 3D camera technology replaces industrial sensor systems.

This range expansion involves industrial-grade cameras that provide 3D depth images with millimetre accuracy.

The AM-T100 camera came about as part of a cooperation project with a long-term development partner. This gave Schmersal the opportunity to integrate the customer's requirements directly into the development and, at the same time, to benefit from the partner's expertise in camera technology.

The AM-T100 is equipped with a Sony DepthSense sensor and uses Time-of-Flight (ToF) technology – the runtime measurement of emitted light pulses within the infrared range (850 Nm), which are reflected by the objects being detected. This enables high-speed creation of a 3D image of the scene with millimetre accuracy that is available as a point cloud.

With an image frame rate of up to 60 fps, this kind of 3D ToF camera can determine the positions and dimensions of objects in real time, e.g. the position and stacking height of the boxes that are being palletised by the robot. All this needs is one recording.

The camera is also capable of 'looking into' containers or large load carriers to detect their current fill level. In addition, the camera facilitates volume determination of general cargo and birds-eye monitoring of staging areas in production, assembly, storage and order-picking. Other uses include the capture of dimensions and surface quality. With IR illumination and an image resolution of 640 x 480 pixels, the AM-T100 achieves a visual range of 67° x 51° at a range of 8.3 metres.

Data evaluation in real time

What really boosts the performance of the 3D camera is its software, which allows the user to define and monitor things like 3D zones within a space in real time and as a moving image.

If the camera detects an object within the zone, it will switch digital outputs. In addition, digital inputs allow for switching back and forth between different 3D zones. An integrated Software Development Kit (SDK) offers support to software developers and system integrators with software configuration and application creation.

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High-performance algorithms can pre-filter the data so that the AM-T100 can be adapted to different ambient conditions. The image data are captured and transmitted via GeniCam so that they can be analysed by common image processing software. An Ethernet interface enables rapid and extensive data transmission, as well as a 24 V power supply if required (Power over Ethernet).

The camera opens up a wide range of automation solutions in logistics and line manufacturing, thereby creating the preconditions for accurately recording the current status in a process as promptly as possible.

This helps to create a precise image of the current state so that subsequent steps in processing, assembly and handling of products, containers and packaging units can be initiated.