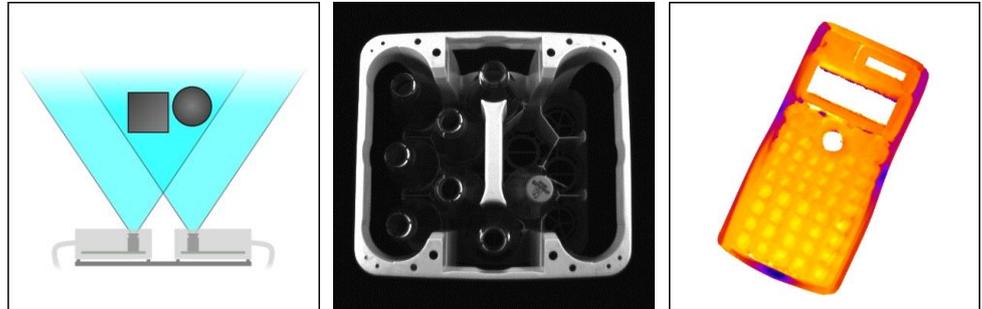




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3D stereo imaging



The 3D stereo image-processing is suitable to perform measurements of three-dimensional objects. To do this, two images are grabbed with two cameras from slightly different positions. Due to the perspective projection and the different positions, the images of both cameras differ from each other. The nearer something is to the stereo-system, the larger is the difference of its position in both images. The height can be calculated from this displacement, then. Due to the fact that the height-information is extracted from complete images and not line-by-line as by 3D laser scanners, a relative movement between the object and the cameras is not necessary. Apart from this, the object can of course be in movement.

The accuracy of the measurement depends on the distance of the cameras to each other and their placement, the resolution of the cameras as well as the size and the distance of the object. The accuracy declines with the square of the distance of the object to the cameras. For example, a camera distance of 100 mm, a focal distance of 12.5 mm, a resolution of 1 μm and an object distance of 0.5 m results in a depth accuracy of up to 0.2 mm under ideal conditions. With an object distance of 1.0 m, the depth will be measured with approximately 0.8 mm accuracy, then.

Due to the fact that a movement of the object is not required for the 3D stereo image-processing, this method is suitable for processing stationary objects or objects which movement cannot be controlled offhand.

A concrete product of the insensiv GmbH is the measurement of crates in reverse vending machines with simultaneous recognition of the bottles. The crate measurement has an accuracy of about 5 mm, the measurement of the bottle heights has an accuracy better than 10 mm. Further areas of application can be found in agriculture or industrial quality and production control.

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