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Cobot vision

The supplied archive cover labels this 08/2020 and the website previously dated it April 2020. The actual publisher cover states the 100th issue, 29 October 2020. The translation follows that dated issue. Historical safety and performance claims are retained; original advertisements remain unchanged. Original publisher artwork, logos and advertisements are retained in their original language.



How robots and machine vision combine to become versatile performers

Cobot vision

"With industrial machine vision and sensitive robots, we can implement cybernetics reliably in easily scalable human-robot collaboration in industrial environments. Machines, systems and processes are controlled, regulated and optimised through feedback to their sensory organs."

Alexander Trebing, CEO of Cretec.



The German manufacturer Cretec offers its own modular machine-vision and identification systems and integrates them into mobile, fully automated work platforms based on cobots or robots. Without retooling, these self-regulating machines can autonomously adapt their parameters to constantly changing process conditions within a few milliseconds. As intelligent, easily scalable human-robot collaboration systems, these complete solutions open up new business models, for example in quality assurance.

By Dipl.-Ing. Kamillo Weiß

The key concept of simplification unleashes previously unimaginable creativity through cobots, particularly for smaller companies. Complex quality-assurance and identification tasks can often be radically simplified across design, configuration, sizing, assembly, commissioning, human-robot collaboration and flexibility. Adaptive strategies using hardware and software system solutions are needed to handle smaller batches,

straightforward integration of tamper-proof information systems into an extensive overall network with near-real-time data exchange.

Versatile capabilities combined

Cretec's modular QBIC system is a new generation of mobile, fully automated work platforms based on cobots. Different modules, each with a broad range of capabilities, are combined in control,



A Cretec QBIC station performs 3D inspection of aluminium die-cast parts for planarity, protrusions, recesses, voids and damage.

product variety, strong demand fluctuations, short life cycles and short-term availability efficiently. Sensitive collaborative cobots can cooperate directly with people without mechanical protective equipment. Their sensitive sensing technology opens up high safety standards in collision detection and management through sensors, evaluation electronics, communication and control. Besides established, standardised communication interfaces, the highly scalable IOTA communication protocol, for example, permits

communication and analysis into an economically attractive, fully automated, autonomous system. The QBIC station has been extended with the flexible FlexiBowl parts feeder. Integrated robots and vision systems allow quick, frequent product changes with extremely simple operation. In February 2020, Cretec took over exclusive distribution of the FlexiBowl parts feeding system from the Italian company ARS. Integrating the modular VisionTube allows all 1D, 2D and DPM codes to be read and verified. Flexible, complete vision modules with cameras, variable lighting, power supply and interfaces support complex machine-vision tasks under the principle of configuration rather than programming.

The versatile QBIC systems are modular, particularly easy to operate, very fast and individually deployable. The complete system occupies only 0.8 x 0.8 m and



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Zwei besonders Knifflige?

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Benchmark: 6 min 34 s

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The inspection sequence, individual steps and inspection data of the installed vision systems are clearly visualised at the QBIC station.



stands 2 m high. It integrates electrical equipment, controls, a PC, cameras, the VisionTube code verifier, different vision modules, intelligent lighting, communication modules, a monitor, a robot and an additional independent power supply. A QBIC station can be unplugged and moved immediately to a new location while remaining fully operational - an important factor in making optimum use of existing industrial production space. Complete solutions can be integrated directly into production lines or used economically to reinspect reworked rejects and falsely rejected parts.

Application example: parts inspection

The QBIC system provides flexible, efficient inspection and measurement of safety-critical automotive components, and the turnkey complete solution fits through an office door. Product changes can effectively take place at the touch of a button. All inspection steps and data are shown clearly on a large screen. Inspection parts are supplied in bulk under motor control to the flexible FlexiBowl feeder. Its family of feeding units distributes parts measuring 1 to 250 mm and weighing 1 to 250 g reliably on a circular vibrating disc. Even sensitive components are reliably separated, and an air blower maintains a safe distance from the edge. Integrated, modular LED backlighting or top lighting and precise vision-based position measurement allow an agile six-axis robot to handle even delicate components accurately. The vision system supplies precise part and position data relating to geometry, surface properties, material condition and weight for reliable robot gripping.

The reliable, flexible LBK protective-space monitoring

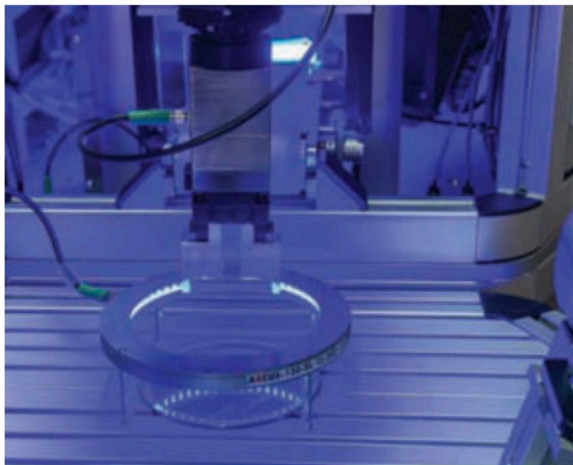
Fotos: Cretec, Adobe Stock

system uses radar technology with 3D detection. It includes a restart interlock and, if requested, automatic restart once the protected space is clear.

Complex tasks

3D machine vision checks parts for planarity, protrusions, recesses, burrs and missing material. Subsequent precise 2D surface inspection checks for voids and damage from 0.2 mm². Other functions include 360° 2D inspection, dimensional measurement to an accuracy of 0.2 mm and detection of defect features from 80 µm. The turnkey system uses nine 5-megapixel cameras and handles twelve parts per minute in three-shift operation. Power supply, cabling, control units and the PC are arranged compactly and clearly, with easy access at all times. The system already incorporates neural networks and deep learning for difficult surface variations and damage. In the same process, conventional machine vision can check dimensional accuracy and tolerances while AI simultaneously checks variable defect classes. Previously, employees had to reinspect these features because conventional machine vision could not do so.

360° 2D inspection of safety-critical automotive components measures dimensions to an accuracy of 0.2 mm and detects defect features from 80 µm.



Both are now possible in one system and one flexible process. (TR)

About the author: Dipl.-Ing. Kamillo Weiß is a freelance technical journalist in Germany and wrote this article on behalf of Cretec.

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