

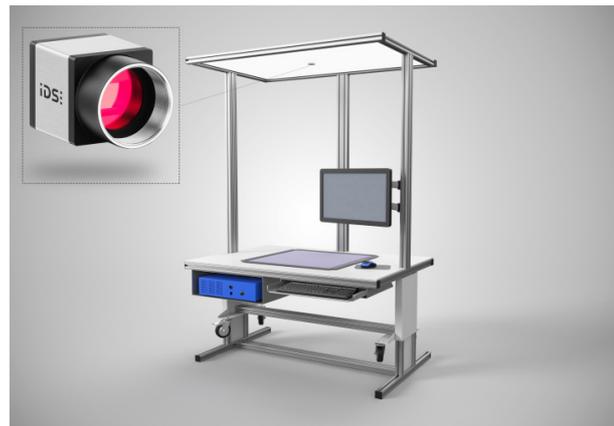
Intelligent image processing supports production workers in industrial 4.0 applications

Automation plays a major role in Industry 4.0. Cost reduction, increased productivity and zero-defect quality are factors that are increasingly prompting companies to digitise their processes. But often full automation also means high investments. At the same time, the focus will continue to be on the human being in the interaction between man and machine. Given the prevailing shortage of skilled workers and high standards of industrial safety, this is no easy task for companies. Additional challenges for a successful process optimisation are a large number of variants, complex tasks and processes, as well as increasing quality requirements. How can this succeed? With the assistance system "Der Schlaue Klaus" (Smart Klaus), the German company Optimum datamanagement solutions GmbH has developed a smart solution: The easy-to-integrate, camera-based assistant uses digitisation to optimise and simplify manual inspection processes. By combining industrial image recognition using a high-resolution USB3 industrial camera from IDS and an intelligent database, the assistance system recognizes every step and assists the employee in real time during the entire assembly process. According to the simple principle: Instructing - checking - confirming - documenting even these complex processes become manageable.

Application

The intelligent assembly assistance system "Der Schlaue Klaus" (Smart Klaus) guides employees step by step with digital assembly instructions. The worker scans the order document and the assembly process begins. An IDS camera installed above the work table records the workpiece or individual parts to be mounted. Both operating instructions and error messages appear on a touch monitor in real time: After each successful work step the worker receives a confirmation. Once assembly is complete, the system provides evidence of fault-free production.

"The camera generates the digital shadow", explains Wolfgang Mahanty, managing director of OPTIMUM datamanagement solutions GmbH. All digital data of the process - when and how what is done - is recorded and processed. This enables the creation of a knowledge base and the subsequent transfer of knowledge to all. "The camera has to capture many details and a wide range of variations and provide stable images. Sensory recognition must be reliable, i.e. the sensor must be able to cope with poor or changing lighting conditions," says Mahanty, summarising the demands on the camera. The reason: "In today's factory, the employee should get as much daylight as possible, which can affect the quality of the recording."



"Smart Klaus" assembly assistance system with USB 3 uEye CP industrial camera from IDS



The intelligent assembly assistance system "Smart Klaus" guides employees step by step with digital assembly instructions.

No problem for the USB3 industrial camera UI-3590CP from IDS. The light-sensitive AR1820HSSC00SHEA0 rolling shutter CMOS sensor from ON Semiconductor uses BSI ("back-side-illumination") technology to ensure outstanding image quality even in low light conditions. Even when capturing the smallest details, extremely high-resolution images with low image noise are produced. With a resolution of 18 MP (4912 x 3684) it reaches a frame rate of 21 fps. "Products are detected with deviations of 1mm on DIN A 3", confirms Wolfgang Mahanty. Moreover, the small, compact size as well as the easy integration of the camera convinced the team of "Smart Klaus".

The German, Ludwigsburg-based company Mann + Hummel, world market leader and expert in the field of filtration, also appreciates the advantages of the assistance system optimised with the IDS camera model. Peter Sawatzky, Technical Manager at Mann + Hummel, also relies on the use of the "Smart Klaus". "During the final assembly of our filter components, many manual activities are required. This demands changing devices with very complex and therefore failure-prone sensory queries. The assistance system has convinced us because we make far fewer mistakes." New variants can be easily learned during work preparation and can be installed by the worker on the same day. "Our variant management has thus become much easier," underlines Sawatzky.

Additional benefit: The system can be integrated very easily into the respective production facility and even the use of several camera models is possible very simply and cost-effectively if the customer application requires it.

Employees learn new procedures quickly and safely with Klaus' help through the digital step-by-step instructions. The relief of the worker through the individual assembly assistance system as well as easier work organisation allow a significant increase in productivity. Assembly costs are reduced, at the same time complaint costs are minimised by the increased quality assurance. "Since 'Smart Klaus' has been supporting our workers during assembly, the number of complaints has fallen significantly," confirms Sawatzky.



Easy integration into the respective production equipment, simplified variant management.

Outlook

Particularly in the electronics and automotive sectors, assistance systems such as the one from OPTIMUM datamanagement solutions GmbH are increasingly accelerating processes and ensuring increased efficiency and quality. Manufacturing processes run almost flawlessly, are fully documented and can be traced. In this way, they help companies to increase productivity and, if necessary, to gain a competitive advantage. Simple, intuitive operation is an important basis for the successful introduction of Industry 4.0 and the associated. Optimum is therefore constantly working on how the system can be easily taught. This is done using CAD data, intelligent filters or even artificial intelligence. A further step on the way to digitisation is also the possibility of virtual commissioning. The assistance system must be designed so intuitively that every employee from the maintenance or work preparation department can operate it himself.

No doubt: Digitisation is advancing all the time, and the need for solutions to increase efficiency and quality in the factory of the future is growing. With individual, easily integrated assistance systems and intelligent image processing, it can be covered quickly and easily. An investment that pays for itself in a short time.

USB 3 uEye CP - Incredibly fast, incredibly reliable, incredible sensors



- ✔ Interface: USB 3.0
- ✔ Model: [UI-3590CP Rev.2](#)
- ✔ Sensor type: CMOS
- ✔ Manufacturer: ON Semiconductor
- ✔ frame rate: 21.0 fps
- ✔ Resolution: 4912 x 3684 px / 18.10 MPixel
- ✔ Shutter: Rolling Shutter
- ✔ Sensor format: 1/2.3"
- ✔ Dimensions: 29 x 29 x 29 mm
- ✔ Weight: 45 g
- ✔ Connector: USB 3.0, Micro-B, screwable
- ✔ Applications: among others industrial image processing, medical technology or in electronics inspection

Client

Optimum is specialised in intelligent image processing that combines digitisation, database management and camera technology. The IT expert team from Karlsruhe has been automating and optimising the processes of leading industrial companies for over 26 years. Today, Optimum is a leading supplier in the field of camera-based assistance systems with its camera-based assistance system "Smart Klaus", which has won several awards.

<https://www.optimum-gmbh.de/en/>

OPTIMUM
datamanagement solutions