

PRESS RELEASE

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Innovation and Intelligence for the Factory of the Future

How adaptive algorithms are creating new ways to optimize production

Omron Industrial, Johannesburg. South Africa

Thanks to increased processing power and the availability of increasing volumes of data ("sensitisation" of the industry), the discussion about "Artificial Intelligence" (AI) in the mechanical engineering sector is gaining momentum.

In the case of the advancements required for Industry 4.0, such as predictive maintenance and networked, efficient production, the use of adaptive algorithms offers enormous potential. Many manufacturing companies are realizing that AI presents an opportunity to increase Overall Equipment Effectiveness (OEE) and therefore combine reduced costs with increased productivity.

However, there is still something of a chasm between the desired status and the reality of the situation: Many of the AI solutions advertised on the market, which are often cloud-based, have significant requirements in terms of infrastructure and IT; these solutions also work with an overwhelming amount of data that is laborious and time-consuming to prepare and process. The question of added value often remains somewhat murky for providers, who cannot determine whether and how the investment in AI will provide a return.

The fact that system designs for the mechanical engineering sector are generally both complex and unique is another contributing factor. As a result, it is not a matter of simply transferring learnt experiences from other machinery as you might see for mass-produced products in the consumer goods industry. The majority of systems are generally so complex that it is not possible to map out the entire system mathematically (as a "white box") and maintain costs at an acceptable level — it is Omron's view that a "black-box approach" is more common; the available data in these systems for typical AI algorithms is underdetermined, and reliable operation can only be confirmed through testing, optimization and, frequently, over-dimensioning.

Given these conditions, how do we go about designing and integrating AI that creates tangible added value in the production process? Instead of laboriously searching a huge volume of data for patterns, in addition to the processes that are running, OMRON tackles things from the other direction: The required

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algorithms are integrated in the machine control system, thus creating the framework for real-time optimization — at the machine, for the machine. In contrast to edge computing, where individual manufacturing lines or sites are analysed using limited processing power, the AI controller used by OMRON, which features adaptive intelligence, is closer to the action and learns to distinguish normal patterns from abnormal ones for the individual machine.

The AI controller integrated in the SYSMAC platform — a complete solution for factory automation featuring modules for control, motion and robotics, image processing and machine safety — is primarily used in the manufacturing process at the points where the customer is experiencing the greatest efficiency problems ("bottlenecks"). The processes gain intelligence based on previous findings and improvements that have been made and subsequently drive holistic optimization of the entire manufacturing process.

Although OEE values of 80% and above have been achieved in isolated cases, in the automotive industry in particular, many of the systems currently in live usage have been generating figures of around 50%. If quality is improved and predictive maintenance is used to prevent machine downtimes, it is possible to make significant efficiency gains. The AI controller provides optimization in exactly these areas; it is driven by practical requirements and aims to noticeably improve the OEE — it is important to note that an improvement of just a few percentage points can result in significant efficiency gains and cost reductions. With its new AI solution, which is currently in the testing phase with pilot customers, OMRON hopes to drive added value and practical improvements, thus helping to create a smarter industry.

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About Omron

Omron Electronics is the South African subsidiary of Omron Corporation, a global leader in the field of automation based on its core technology of "Sensing & Control + Think." Established in 1933, Omron has about 36,000 employees worldwide, working to provide products and services in more than 110 countries and regions. The company's business fields cover a broad spectrum, ranging from industrial automation and electronic components to automotive electronics, social infrastructure systems, healthcare, and environmental solutions. In the field of industrial automation, Omron supports manufacturing innovation by providing advanced automation technology and products, as

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well as through extensive customer support, to help create a better society. For more information, visit Omron's website: <http://www.industrial.omron.co.za>

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