Press release

Human versus software: Optimizing robots

SEW-Eurodrive is showcasing a new add-on for MOVIKIT® Robotics at HANNOVER MESSE

Bruchsal/Hanover 2025 – How complicated is it to optimally set up a robot? Visitors will learn more about SEW-EURODRIVE software solutions for robotics applications using a tripod trade fair model. They can play against the software and experience how complicated manual optimization of the cycle time is as an example. The new PxG® integrated precision planetary gearmotors, in which the gear unit and motor merge into a very compact unit, are also on board the trade fair model.

SEW-EURODRIVE has already been offering its MOVIKIT® Robotics software module with various add-ons for many years. Furthermore, a large number of available robot mechanics can be used to implement the appropriate kinematics for delta robots etc. The configuration and parameterization is performed in the MOVISUITE® engineering software platform, which the drive and automation specialist from Bruchsal has also developed.

If the preconfigured robot is to be further optimized, there are a number of possible tasks:
– The cycle time of the machine: The robot should complete its task as quickly as possible.
– The material flow: For example, in the case of a conveyor belt on which a large number of products are transported, it is necessary to decide how to improve the pick-and-place process.
– The drive load: Robot movements should be optimized in such a way that the drive load and thus the energy consumption are as low as possible.
– The arm lengths: The robot should be as small and light as possible.

Large customers often use their own offline systems to optimize cycle time and path. These systems are usually not available to smaller customers. So far, they had to approach their ideal solution manually and iteratively.

Addon ParameterOptimization
This is where the new add-on ParameterOptimization comes into play, which the software developers of SEW-EURODRIVE have added for the MOVIKIT® Robotics software module. This new optimization tool automatically changes the input parameters using an evolutionary algorithm. With this support, users can find a much better solution much faster and more efficiently than with manual searches for ideal parameters.

“To illustrate the advantages of this software, we came up with something special for HANNOVER MESSE,” says Dr. Markus Müller, an expert in robotics and automation at SEW-EURODRIVE. As a task, visitors can try to avoid a virtual obstacle in the most efficient path possible in the shortest possible time. The input parameters are the height and blending

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Tripod

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Contact person
SEW-EURODRIVE GmbH & Co KG
Corporate Communication
Ernst-Blickle-Straße 42
76646 Bruchsal
Germany
www.sew-eurodrive.com

Ms. Wilma Berweiler
Press Spokesperson
T +49 7251 75-2552
wilma.berweiler@sew-eurodrive.de

Reader inquiries
SEW-EURODRIVE GmbH & Co KG
Press and Public Relations
Ernst-Blickle-Strasse 42
76646 Bruchsal
Germany
T +49 7251 75-0

press@sew-eurodrive.de
www.sew-eurodrive.com

radius at which the obstacle is traveled. In addition, the time required to overcome the obstacle is the output parameter.

“What sounds simple is actually relatively complex,” says Dr. Markus Müller from experience. "Because a supposedly good combination of height and blending radius can lead to a suboptimal overall result of path interpolation due to the non-linearity." At the trade fair stand, two monitors are available for the fun experience: On the one hand, there is a surface where visitors can try out their own experiences and approach their solution. A 3D simulation runs on the other monitor, where the evolutionary algorithm simultaneously searches for the ideal path and cycle time. Here, “machine learning” becomes tangible for visitors: The software analyzes human attempts to play, saves the findings gained and applies them in the next game to continuously learn.

PxG® integrated precision planetary gearmotors combine gear unit and motor into one unit

In the trade fair model, the three arms of the tripod robot are driven by the new PxG® integrated precision planetary gearmotors. The tripod is a very dynamic and precise application in which products are portioned, sorted and positioned. The features of PxG® integrated are tailored to this.

"The fact that this gear unit-motor unit does not require an adapter shaft and clamping ring, i.e. the sun gear of the planetary gear unit is inserted directly into the motor shaft, significantly reduces the length compared to standard planetary gearmotors," explains Dr. Petr Osipov, system engineer at SEW-EURODRIVE. "On the one hand, this facilitates installation in confined spaces. On the other hand, the extremely short length of the drive ensures a low mass moment of inertia and thus enables high dynamics."

QR code labels are applied to all drive components from SEW-EURODRIVE installed in the trade fair model. These QR codes allow customers to have their products entered via Complete Drive Management (CDM®) and thus make their work easier in the event of service. Visitors can follow live how CDM® supports a drive that exhibits anomalies or fails in the digital control center at the SEW-EURODRIVE trade fair stand. By scanning the label, customers immediately receive all the necessary data about the specific product and can therefore plan and implement the necessary measures in a well-informed manner.

The precision planetary gearmotors PxG® integrated are installed in two-cable technology at the trade fair. However, they are also available in single-cable technology. In this case, the hybrid cable contains a data line in addition to the three-phase power supply. This not only reduces the use of materials, but also the effort involved in laying the cable. In addition, the connection to the MOVILINK® DDI digital motor interface from SEW-EURODRIVE is in preparation.

About SEW-EURODRIVE

Founded in 1931, SEW-EURODRIVE GmbH & Co KG is a family business headquartered in Bruchsal, near Karlsruhe, in the Baden-Württemberg region of Germany. Today, SEW-EURODRIVE is one of the world's leading specialists in drive and automation technology, with more than 22 000 employees, 17 production plants, and 92 Drive Technology Centers in 57 countries.

As a market leader in its field, SEW-EURODRIVE keeps applications, processes, systems, and machinery moving in countless sectors – from airport logistics to industrial processes. With

around 800 employees working in research and development, the company is making an innovative contribution to shaping the future of drive technology.
Proximity to customers is one of SEW-EURODRIVE's top priorities. An extensive sales and service network provides professional advice on site and ensures the rapid availability of spare parts and repairs – anywhere in the world.

Alongside its headquarters and production facilities in Bruchsal and its plant in Graben-Neudorf, the company operates 30 other sites across Germany. SEW-EURODRIVE has also had a presence in Canada, the partner country for HANNOVER MESSE 2025, for over 50 years. Its headquarters there are in Toronto.