**Weidmüller Automated machine learning tool for machinery and plant engineering. Independently driving forward, the development of analysis models without having to be trained data scientists. – Driving forward artificial intelligence (AI) in machinery and plant engineering.**

Weidmüller is presenting its automated machine learning fool for machinery and plant engineering for the very first time. Users of the tool will be able to create and further develop models themselves without having to rely on the assistance of a data scientist or an external cooperation partner. This ensures that the existing knowledge of processes and machinery stays within the company, as the engineers can update their domain knowledge themselves. The "auto ML tool" is essentially democratising the use of artificial intelligence (AI), as the methods are being made accessible to a wide audience. The new machine learning tool provides the basis for more efficient production processes and new data-based business models. Within this context, it is no longer particular machine types that are the top selling factors, but instead the availability of the machines or a guaranteed number of parts that can be produced with the machines. The maximisation of production times as a result of industrial analytics constitutes directly measurable added value, which is reflected in a "return on investment" time of just a few months.

The currently available machine learning tools and their features are proving extremely demanding for traditional automation and machinery construction experts, who usually do not have the expertise required to develop corresponding models. Data analysis and model design are therefore carried out by data scientists. Their expert knowledge is required in order to apply the methods of artificial intelligence or machine learning to the data and to develop models that can recognise anomalies or predict errors, for example. The data scientist will of course work closely with the mechanical engineer or machine operator to interpret the correlations detected in the data from an engineering perspective.

Weidmüller is following a completely new approach for machinery and plant engineering with the implementation of its new automated machine learning software. The software tool guides the user through the model development process, which makes the process less complex and allows the user to focus on his

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or her knowledge of machine and process behaviour. Machine and system experts can drive forward the creation and further development of the models themselves without having to be data scientists and without any special knowledge in the field of artificial intelligence. This ensures that the existing knowledge of processes, machinery and error patterns stays within the company, as the engineers can update their domain knowledge themselves and incorporate it into the model design steps. The software helps the company to translate and archive the complex application knowledge into a reliable machine learning application. The tool also provides the necessary software components for the implementation of artificial intelligence, meaning that the user does not need to have any special IT expertise to operate the models.

In order to optimally integrate the domain knowledge of machine and process experts but at the same time automate model design steps, "unsupervised" and "supervised" machine learning have been expertly combined. Unwanted machine behaviour is detected using an anomaly detection process, which is an example of "unsupervised" machine learning.
An algorithm learns the typical data patterns of normal machine behaviour based on historical data. Deviations from these patterns can be identified during runtime. The detected anomalies may be inefficiencies, minor malfunctions or more serious errors. Thanks to this approach, the system is able to detect errors the very first time they occur, even if these errors were previously completely unknown. In order to then assign any suspicious machine behaviour to a certain (error) class, classification processes are used, which are examples of "supervised" machine learning. To carry out this assignment, the algorithm needs to have access to a sufficient number of representative examples from the historical data for all of the different classes. The time ranges for the examples must be marked in the data. If a particular error then occurs again, it will be recognised by the system and correctly assigned to a class straight away based on its typical data pattern. The algorithms can be continually improved using new data, and expanded upon to include new error classes. The corresponding information, such as the error classes, is introduced by the user as part of model creation and model development via a process referred to as "tagging".

With its focus on the target group of domain experts in machinery and plant engineering as well as the corresponding operators, the "auto ML tool" makes it easy for the industrial user to apply artificial intelligence and machine learning processes, without the need for any expert knowledge in the fields of AI or ML. The software tool also takes on the role of a data science assistant, and guides the user through the process of creating models for anomaly detection, classification and prediction.

Summary: The existing knowledge of processes and machinery stays within the company, as the mechanical and plant engineers and operators can update their domain knowledge themselves. The maximisation of production times as a result of industrial analytics constitutes directly measurable added value, which is reflected in a "return on investment" time of just a few months.

***Weidmüller – electrical connection, transmission and conversion of power, signals and data in the industrial environment. – Let's connect.***

**Keyword: Weidmüller Automated machine learning tool**

**Additional information: www.weidmueller.com**

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**Captions:**

**Fig. 1: Weidmüller Automated machine learning tool: Assisted creation of models using artificial intelligence (AI).**

*Fig. no.: Machine Learning_Industrial Analytics.jpg*

**Fig. 2: Weidmüller Automated machine learning tool: Visualisation of raw data in a tile view.**

*Fig. no.: AML_Datenübersicht.jpg*

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