USE OF ARTIFICIAL INTELLIGENCE IN THE INDUSTRIAL ENVIRONMENT

Innovative solutions using AI for your company.

Artificial intelligence (AI) is currently on everyone's lips. There are many ways to integrate AI into products, also in the field of mechatronics. This not only increases the efficiency, accuracy and robustness of solutions, but also gives companies a decisive competitive advantage. AI opens up applications that would be unimaginable without this technology. Find out how AI can revolutionize your company in an industrial context and how you can make the most of this transformative technology!

INTEGRATION OF AI-TECHNOLOGIES

An R&D service provider such as LCM supports its customers in the integration of AI in their specific use cases, for example in the area of condition monitoring. Typically, both the company and the R&D partner have extensive technical expertise about the system in question, also known as „domain knowledge".

As illustrated in the figure, customized sensor technology initially records precise system data. At the same time, it is possible to create a computer model that can be used to simulate the system. The simulation generates additional data that can potentially also represent undesirable operating states. The domain knowledge flows into both data acquisition and modeling & simulation.

The collected measurement and simulation data is then analyzed using AI algorithms, for example to determine the current operational status of the component or machine. Appropriate actuators or measures are activated to ensure that the system is and remains in optimum condition.
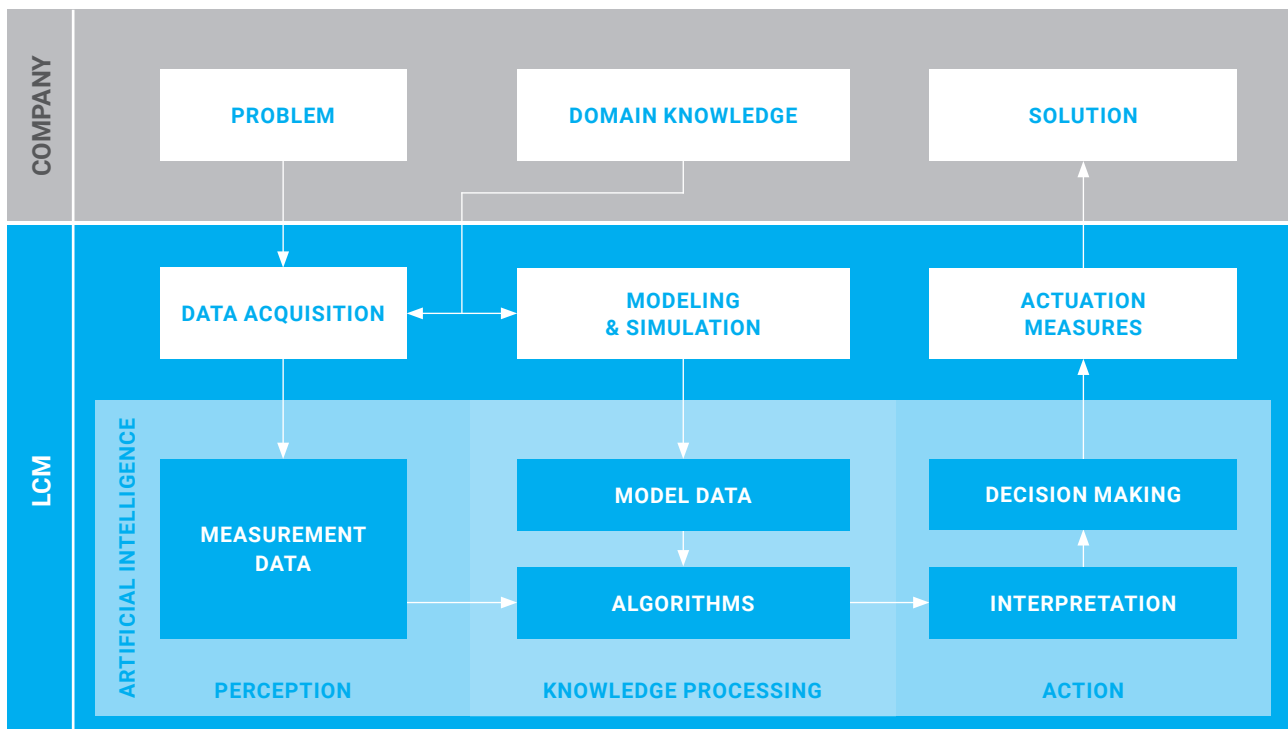

Figure: Implementation of AI in an industrial environment incorporating domain knowledge (Source: LCM) ▲

AI IN PRACTICE: HOW AND WHERE TO START?

Based on a study by McKinsey, the following steps can be taken to integrate AI into your own business:

1. Obtain a realistic picture
Separate the hype from feasible applications. Formulate use cases and prioritize them according to their degree of complexity and potential economic impact. Record the key framework conditions.

2. Build Core Technical Skills
The relevant specialist knowledge can be built up internally, but also with the help of external resources.

3. Utilize domain knowledge
Hybrid approaches seamlessly incorporate domain knowledge to minimize computational overhead while enhancing both performance and reliability.

4. Establish a Database Early On
Continuously capture existing machine data, augment with additional data sources through retrofitting, and document faults carefully. Ensure to preserve faulty parts and systematically structure & annotate existing data and error scenarios to the fullest extent possible.

5. Step-by-step implementation
Initiating small, rapidly executable steps such as pilot projects, simulations, and test runs often involves minimal investment. These early stages can frequently be accomplished using existing data and adaptable sensor technology, including retrofitting and laboratory systems.

IMPORTANT TERMS

MACHINE LEARNING

Machine learning enables understanding a system through data analysis. With adequate data from various operating states at hand, it's possible to distinguish between these states, aiding in early fault detection.

DIGITAL TWIN

At LCM, the digital twin is not only composed of the CAD model, but also integrates the physical behavior and simulation of the entire model. This extensive simulation enables the generation of data from operating states for which only limited measurement data is normally available.

DOMAIN KNOWLEDGE

This approach not only generates a broader range of data but also enables the simulation of operating states that are rare or undesirable in normal operation.

USE THE ADVANTAGES OF AI SOLUTIONS FOR YOUR COMPANY, TOO:

https://www.lcm.at/en/industrial-ai-integration/

INFOBOX

DEFINITION „AI"
„Artificial Intelligence is the ability of a machine to display human-like capabilities such as reasoning, learning, planning and creativity. AI enables technical systems to perceive their environment, deal with what they perceive, solve problems and act to achieve a specific goal. The computer receives data – already prepared or gathered through its own sensors such as a camera – processes it and responds. AI systems are capable of adapting their behaviour to a certain degree by analysing the effects of previous actions and working autonomously."
Source: European Parliament

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Linz Center of Mechatronics GmbH I Science Park I Altenberger Straße 69 I 4040 Linz I Austria I **T** +43 732 2468-6002 I **F** +43 732 2468-6005 I office@lcm.at