

When it comes to AI and process control, the quality of data is key

Process control plays a vital role in manufacturing and industrial operations, guaranteeing consistency, efficiency, and effectiveness. It relies on accurate measurements as the foundation for effective control, and this becomes even more critical as artificial intelligence (AI) takes on a greater role in the process.

In the past, human operators were primarily responsible for monitoring and adjusting processes, but with the increasing prevalence of automation and digital technologies, AI is becoming an indispensable tool. AI can analyse data from process measurements and various sources, identify patterns, and make decisions to optimise performance. However, the quality and accuracy of measurement data are of utmost importance.

Benefits of AI in Process Control

AI in process control offers several key advantages. First and foremost, it excels at analysing vast amounts of real-time data. In manufacturing and industrial settings, numerous sensors and data sources continuously generate data. Traditional control methods make it challenging for human operators to monitor and make quick decisions based on this data. AI, on the other hand, can process this data rapidly and accurately, facilitating real-time decision-making.

Another benefit of AI is its ability to identify patterns and anomalies that might elude human operators. AI algorithms can analyse data from multiple sensors, detect correlations, and uncover patterns not immediately apparent to the human eye. This capability is crucial in identifying potential issues before they become critical, enabling proactive corrective actions.

Predictive maintenance is another application of AI in process control. It uses sensor data to predict when equipment is likely to fail, allowing proactive maintenance scheduling to prevent unplanned downtime, reduce maintenance costs, and extend equipment lifespan. AI can also optimise processes in real-time by analysing data from sensors, identifying opportunities for efficiency improvements, waste reduction, and cost savings.

Data Quality is the Key

Despite the many benefits, AI in process control faces challenges, and data quality is a primary concern. AI algorithms depend on high-quality data for accurate predictions and decisions. Inaccurate or inconsistent data can lead to erroneous results. Thus, ensuring data quality is crucial when implementing AI in process control.

An example from the Almaraz Nuclear Power Plant in Spain illustrates the importance of data accuracy. Enhanced equipment performance and calibration led to a significant improvement in the accuracy of reactor power measurements, resulting in higher revenue. As the energy sector increasingly adopts AI for power generation optimisation, precise measurements become even more critical.

Effective calibration of process measurements is essential for maintaining data accuracy in AI-based process control. Regular calibration is necessary to ensure the accuracy of data generated, emphasising the need for more efficient calibration processes. Effective calibration processes should be fully digital, ensuring high-quality data and data integrity throughout the process.

AI's Impact on Jobs and Conclusion

Concerns exist regarding the potential job displacement caused by AI's increasing role in manufacturing and industrial settings. AI could replace human workers in some roles, potentially leading to job losses and societal disruption. However, AI also creates new opportunities for innovation and growth. Jobs related to measurement and calibration will emerge as AI places greater importance on data accuracy.

In conclusion, AI-based process control is revolutionising manufacturing and industrial operations. To fully realise its benefits, we must address challenges like data quality, proper calibration, and the need for skilled personnel. By doing so, we can unlock new opportunities for innovation and growth. The saying "Everything is based on measurements" holds even truer in the era of AI-based process control. The key to ensuring high-quality measurement data is a rigorous calibration program that maintains the regular calibration of measurement instruments with traceability and certainty.

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