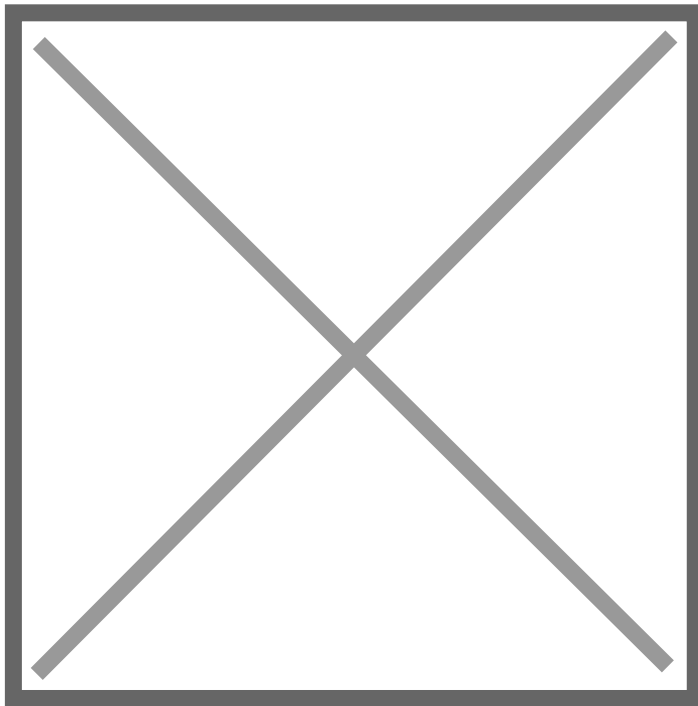


Krones improves beverage production simulation through digital twins with integrated AI agents

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Krones, with its technology ecosystem partners, optimises production operations through the use of Digital Twins, NVIDIA Omniverse libraries, and OpenUSD. This new generation of digital twins integrates AI agents that combine physically accurate real-time simulations with artificial intelligence capable of reasoning and decision-making.

These Agentic Digital Twins are no longer just virtual replicas of Krones's filling or packaging machines - they are advancing industrial processes. By continuously simulating and optimising themselves, they transfer the insights gained in the digital world directly to real machines.

"With the Agentic Digital Twins, we are demonstrating that digitalisation and AI are not just visions for the future but deliver tangible efficiency gains and sustainable benefits today," says Markus Tischer, Member of the Executive Board. "Together with our partners, we are setting new benchmarks for the beverage industry."

Within just two months, Krones has fundamentally transformed its machine and plant simulations, taking beverage production efficiency to a new level. Previously, individual simulation runs took three to four hours - too slow for real-time optimisation in a dynamic production environment. The inability to quickly test multiple scenarios led to delays in decision-making, higher

resource consumption, and limited agility. Now, based on the high-precision physics simulations developed with CADFEM to model liquid behaviour during the filling process and the integration of Omniverse libraries into Ansys Fluent running on Microsoft Foundry Krones can design and interact with physically accurate virtual replicas of bottling facilities in real time - accelerating decision making and optimisation.

To remain competitive in Industry 4.0, Krones needed faster, scalable, and more intelligent simulations.

Together with Ansys, part of Synopsys, CADFEM, Microsoft, NVIDIA, and SoftServe, Krones developed a physically accurate digital twin application capable of completing these simulations in less than five minutes. Its integrated AI agents test multiple scenarios in a virtual model, automatically optimising workflows. In an iterative optimisation loop, the AI analyses results, adjusts parameters, and runs new simulations - testing variables such as speed, temperature, or control logic in real time.

Through this process, the digital twin application learns autonomously which configurations yield optimal results. The best solutions are then transferred directly to the physical machines, enabling real-time comparisons, instant implementation of optimisations, and smarter resource utilisation.