



Chemical Industry

As a supplier to the plastics industry, but also to the agricultural and food sectors, the chemical industry is of great importance to the economy and society. In Germany, the largest chemical nation in Europe, it occupies an essential place. We support companies in the chemical industry in both process and production optimization. Our tools here are modeling, simulation and optimization (MSO).

AI Meets 100 Years of Engineering Expertise

The innovation platform KEEN (Artificial Intelligence Incubator Labs in the Process Industry) aims to accelerate the use of AI technologies and AI methods in the process industry. Employees of the "Optimization" division contribute their know-how around the digitization of chemical production to the project.

The chemical industry has been considered a driver of progress in Germany for more than 100 years. The KEEN project brings together a total of 20 startups, corporations and research institutions. Together, the participants are working to take the experience of the traditionally knowledge-based industrial world in new directions with the possibilities of artificial intelligence. Because one thing is clear: "AI alone will not work. It is a matter of bringing knowledge and data together to unleash practical benefits," says Dr. Michael Bortz.

What if ...

Fraunhofer ITWM runs two subprojects for this purpose: In the first step, together with TU Kaiserslautern, thermodynamic properties of mixtures are modelled so that AI can be used for the prediction of substance properties. In the second step, process simulations are carried out. "Only when we know how substances behave can we, for example, even design a process for separation," says Bortz.

Specifically, the team is working on a decision support system that can run "what if" scenarios in real time. By using AI, it is also possible to display the effects of changes in the process in real time, even in computationally intensive and time-consuming process simulations: "We set up AI models that we train with simulation data and that can then calculate considerably faster and even be capable of real-time," says Bortz, describing the vision.



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Three major fields of research

The KEEN consortium is researching three major topics: the modeling of processes, product properties and plants, engineering, and the realization of self-optimizing plants. The research will run until 2023, with the first commercial AI products for the process industry expected to be available by 2025. The project is 60 percent funded by the German Federal Ministry for Economic Affairs and Energy and has total funding of 23 million euros.

Contact

PD Dr. Michael Bortz
Head of Department "Optimization – Technical Processes"
Phone +49 631 31600-4532
michael.bortz@itwm.fraunhofer.de



Further information is available on the website at www.itwm.fraunhofer.de/keen-en