

Smart use of data for new applications

Self-learning systems designed by Heiko Claussen monitor gas turbines and other machines.

Almost all modern machines and equipment are equipped with sensors that supply data about parameters such as energy consumption, temperature or noise. Dr. Heiko Claussen develops self-learning systems that use this data to learn how machines operate normally and to identify deviations. The key feature of his smart monitoring systems is that they analyze data that are produced anyway. The young researcher has had a meteoric career at Corporate Technology in Princeton, United States. He has won an award as Inventor of the Year 2016 in the *New Talents* category.



Heiko Claussen

Senior Key Expert at Corporate
Technology, Princeton, New Jersey



Heiko Claussen

Inventor of the Year 2016

“If customers have a problem with their equipment, they need a solution on the spot. That spurs me on.”

Heiko Claussen loves efficiency. For the young researcher, this specifically means getting additional benefits from existing data that has been collected. To this end, he develops self-learning systems that process data in real time and notice immediately, for example, if a machine is no longer running as it should. Mr. Claussen is particularly proud of a system that can be used universally for a variety of equipment. “You simply connect it and can monitor a machine,” he explains. The system’s software learns how a machine behaves in normal circumstances – for example which vibrations occur routinely in certain sections of the machine. If the data starts to differ from this learned behavior, the software notices this and sends an alert over a wireless connection. “It is often not worth creating a mathematical model for data analysis of small items like boiler feed pumps, water pumps or ventilators in a power plant which are of the same type but are only used in small numbers,” explains Heiko Claussen. “Our system is much easier and can be put into operation quickly to monitor matters efficiently.”

Although statistical signal processing plays a major role in many fields of industry, Mr. Claussen mostly works for the Business Units in an energy context. At Corporate Technology in Princeton, he works in the Production Runtime Systems department on the development of prototypes for monitoring gas turbines, among other things. He looks back fondly at a system that analyzes acoustic signals from the combustion chambers of Siemens’ most powerful gas turbines, the SGT-8000H series, and monitors whether the flames are actually on in all of these chambers. “That is very important because the turbine could be damaged if a flame is not burning but gas continues to flow into the combustion chamber.”

Normally, the flames in gas turbines are monitored with an additional, expensive system of optical sensors. But the gas turbines are already fitted standard with sensors that pick up sound waves in the combustion chambers. The system invented by Heiko Claussen uses this existing data to monitor whether the flames are burning. It is connected to the gas turbine’s T-3000 controller, which can automatically stop the gas turbine immediately in an emergency. In addition to monitoring the existence of the flame, other key flame parameters can also be calculated, in real time.

Mr. Claussen often learns which inventions could deliver concrete benefits in direct discussions with customers. “Basic research is interesting but, from the very beginning, I wanted to experience how my ideas are applied in industry,” he explains. This is why the young researcher feels he is in exactly the right place at Corporate Technology in Princeton because “Here, many colleagues collaborate closely with the Business Units and you get a very good overview and can gather experience.”

Born in the idyllic Allgäu region of Germany, Mr. Claussen was drawn abroad at a very early stage. He studied electrical engineering in parallel at Kempten University of Applied Sciences in Germany and the University of Ulster in Northern Ireland. “In doing so, I wanted to lay the groundwork for working internationally later,” he explains. He gained a doctorate at the University of Southampton in England but already had a part-time job at CT in Princeton at the time. “That was ideal for me because I could sometimes attend lectures at the renowned Princeton University.” How did that come about? Simply by contacting the professors. “They are often very pleased to have interested guest students,” he adds. His interests were broad: these lectures ranged from mathematics to philosophy.

For his age, Heiko Claussen has undoubtedly already achieved a lot. 50 registered inventions led to 49 patent families with 19 already granted patents which speaks for themselves. But success alone is not so important for him. What counts is the purpose: “I would not like to work for a company that only focuses on profit. Especially in energy issues, but also in many other areas, Siemens contributes a lot to improving society as a whole, and that is important for me.”

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