Digital thinking – software detects faults before they arise

22.03.2019

The start-up IM&P uses artificial intelligence in industrial maintenance and control – with an entirely new approach.

Discovering damage to a machine before it can have an effect - this is achieved by Indalyz Monitoring & Prognostics GmbH from Halle (Saale). The start-up develops and manages software and algorithms based on artificial intelligence for the control and monitoring of a very wide variety of machines and systems. If a wind power plant catches fire, due to a defective gear for example, it is too late. Although wind power plants are remotely monitored by engineers, who analyse process data and react to it, they often do not detect the causes of the failures in time or even at all.

That is why the software from Indalyz Monitoring & Prognostics (IM&P) GmbH from Saxony-Anhalt is different. The software promises predictive maintenance, based on artificial intelligence. The system can be used for machines, plants and vehicles. It analyses large quantities of process data and machine status data measured by sensors, processes it, and can in the end give extremely accurate information about the progress of wear on individual parts and the damage to be expected from this. The prediction period for this ranges from seconds to years.

Software trains itself

Previously, the estimation of the current machine status was based upon its service life statistics. The individual strain on individual machines or systems, on the other hand, was hardly taken into account – if at all, then by the analysis of regular, cost and labour-intensive inspections. "The future, however, requires," says Michael Schulz, "that machines detect and prevent potential damage independently." The software developed by IM&P for this is self-learning and accompanies the machines to the "end of life". Initially, it possesses a pool of basic information, including data based on expert engineering knowledge and the experience of other machines of the same type. Then it starts to gather - information that mostly comes from the machine to be monitored and which reflects its specific operating states. The software learns from this, trains itself and draws conclusions about the future progression of wear. These forecasts are extremely accurate: The main damage groups can be predicted with a probability of 96 percent, only 3.5 percent are false alarms, and 0.5 percent of the damage occurs spontaneously and elude the forecast.

Avoiding breakdowns and damage to the environment

The software cannot only be used with wind power plants, but also water or thermal power plants, cement mills, centrifuges, ship's engines, and mining machinery. IM&P is currently participating in a research project with a chemical works: There, engines open and close pipes and valves, through which various substances flow. From permanent testing, one can conclude whether these engines are functioning sufficiently or when they could break down. If the unpredicted happens, says Prof. Schulz, this might not only lead to a total breakdown of the system, but also have terrible consequences for the environment.

Second pillar: Control

The remote monitoring of systems is one of the two pillars of IM&P's business. The second is the development, installation and configuration of system and customer-specific control hardware and software. This is also self-learning but requires no specific training phase. A decisive factor are the signals which it receives from the machine and to which it reacts in a fraction of a second – almost as fast as the electronics of the machine – thus putting it in a position to intervene and control.

Earlier, says Prof. Schulz, it was largely linear mathematical relations that were used to control a machine. These were manageable for a human being and could be easily understood without much previous knowledge. Today, modern machines are substantially more complicated, and control and monitoring therefore require much more complex relations. This requires high-performance processors and elaborate algorithms. "Humans can no longer detect this on their own. Modern machines are multi-functional systems capable of functions that would previously have been almost inconceivable, thanks to artificial intelligence." The physicist has already been interested in this subject for a long time. He studied in Halle (Saale) at Martin Luther University, and has taught in Ulm, New York and Chemnitz. And from the start he has occupied himself with artificial intelligence and complex systems. In this area, the field of classic mechanics of complex systems, there are many questions, but only a few experts at the universities; the global demand in industry, however, is said to be enormous.

Hugo-Junkers Prize 2017

So, in 2015 he founded IM&P at the Technology and Start-Up Centre on the Weinberg Campus in Halle (Saale). As an innovative start-up, it was awarded the Hugo-Junkers Prize of the state of Saxony-Anhalt for its artificially intelligent machine monitoring system CASIS (Cognitives Autonomous Sensory Intelligent System) in 2017. IM&P today looks after wind power plants all over the world. The initial workforce of four employees has now grown to seven, and three more are to join them this year.

At its presentation at this year's Hanover Fair, however, the company will no longer be focussing exclusively upon wind power plants, but on the monitoring of processing machines, especially in the field of mining and the metalworking industry.

Author: Anja Falgowski

more on the topic

- > Industry 4.0 in Saxony-Anhalt
- >HANNOVER MESSE 2019

22.03.2019

Add page

THIS COULD ALSO BE OF INTEREST FOR YOU:

New site opened: Dataport expands software development in Halle

10/24/19

The IT service provider Dataport officially opened its new location in Halle today.

Digital doctor-patient communication

11/08/19

Digitalisation is providing the opportunity for more efficient work-flows in the healthcare sector and for higher patient satisfaction – an area of application in which the company Innocon Systems GmbH has considerable experience. The company based in Tangermünde develops innovative software solutions for hospitals.

The INKAs: on the path to glory

11/08/19

The INKAs, from the Chair for Intelligent Catheters at the Otto-von-Guericke-University Magdeburg, are making a name for themselves with award-winning innovations for image-based therapies. Their in-house InnoLab IGT (Image Guided Therapy laboratory) is a close companion from the initial idea through to the start-up.

Fighting muscle atrophy in style

11/08/19

Haynl-Elektronik GmbH in Schönebeck (Elbe) focuses on the development and manufacturing of medical technology for treatment methods in which electrical stimulation and biofeedback training are used. For the innovative small business from Saxony-Anhalt, research collaborations are indispensable if it is to assert itself on the national and international market for medical technology.