RESEARCH NEWS

2018 Hannover Messe: App serving to adapt and maintain plants

MIALinx connects machines

MIALinx, a web-based application from the Fraunhofer Institute for Manufacturing Engineering and Automation IPA, connects machines, sensors and data to an agile network. Building on a previous project called Sense&Act, this latest advance brings a great measure of adaptability to plants and, as an added perk, optimizes machine maintenance. MIALinx even interfaces with old lathes and milling machines.

Today, in the age of Industrie 4.0, machines and manufacturing plants generate large amounts of data. An armada of sensors provides steady streams of stats on machines' condition, fluid levels, power consumption and temperature. Companies have to harness these data flows to make the most of their production lines.

This is exactly where MIALinx comes in. The Fraunhofer Institute for Manufacturing Engineering and Automation IPA joined forces with the University of Stuttgart's Institute of Parallel and Distributed Systems for this project funded by the Baden-Württemberg Foundation.

Linking disparate data sources

The idea behind MIALinx is to bring together and interconnect all kinds of data sources. However, this web-based application does more than merely link up machines. A dynamic system, it is able to respond to events and act on if-then rules. For example, a measurement reported by a sensor can trigger specific messages or actions. Plant personnel define the rules for how this is done. A case in point: A color sensor monitors a machine's air filter and continuously sends the data to MIALinx. If the filter's discoloration indicates that the contamination has reached a critical level, MIALinx messages the person responsible for that machine or generates a filter replacement order in the ERP (enterprise resource planning) system. Fraunhofer expert Prof. Dominik Lucke says, "Machines, production lines and IT systems in an advanced manufacturing environment must be able to adapt quickly to changing situations. MIALinx reduces the effort involved in making adjustments while increasing the entire plant's adaptability."

Even older machines can be readily integrated, for example, an aging milling machine that has been retrofitted with sensors. One sensor controls the coolant pump. If there is some sort of blockage in the coolant hose, a preset if-then rule takes effect and that machine's maintenance worker receives a notification on their tablet or smartphone.

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No programming skills needed

Another great benefit of this system is its ease of use. "It can be handled and configured intuitively via a graphical user interface – without a lot of time spent getting acquainted and without programming skills," says Lucke. MIALinx also speeds up robots' work. For instance, a robot could use optical sensors to detect and then sort or process color-coded components.

MIALinx is the next step up the evolutionary ladder from Sense&Act, the technology Fraunhofer IPA and its partners used to put the principle of flexible, rule-based machine connectivity into practice. One new feature developed at Fraunhofer IPA is the Manufacturing Service Bus (MSB), which runs in the background. The MSB is best pictured as a virtual patch panel that connects different data sources with one another and transforms data formats when necessary. This way, even machines from different manufacturers can exchange status information.
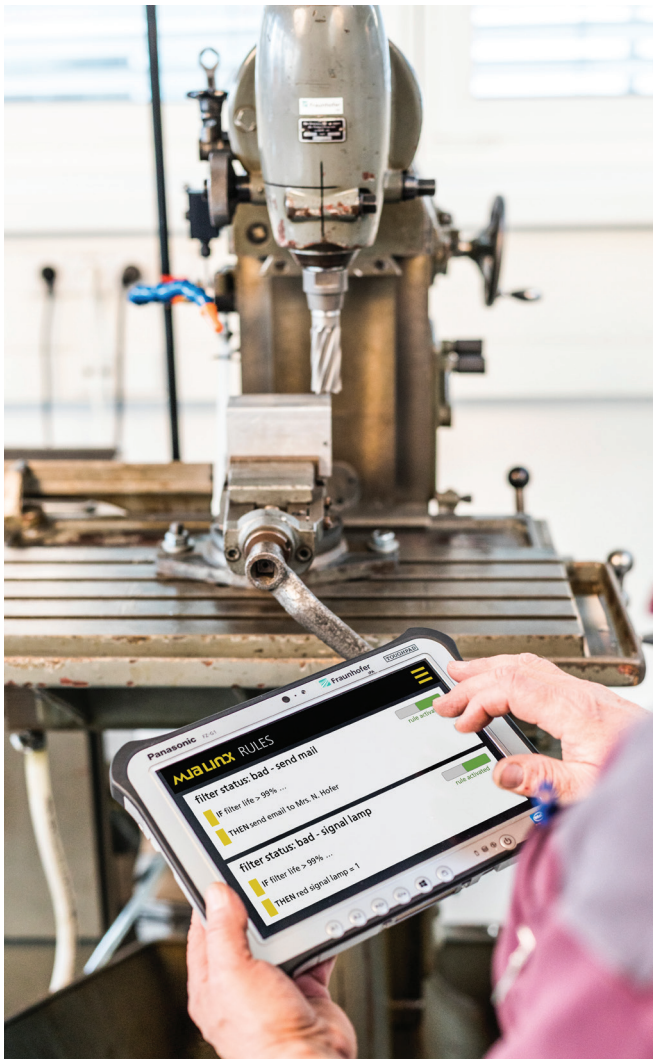
Secure collaboration in Virtual Fort Knox

MIALinx is a web-based application. It can be installed on a company's server on request, but to make the most of this technology's potential, MIALinx really should be integrated into the Virtual Fort Knox (VFK) platform. VFK is an open, federated cloud platform that furnishes IT services to manufacturing enterprises. "A company can flexibly combine services from different vendors and use them as needed," says Daniel Stock, Group Manager Production IT Architectures and Integration at the IPA, by way of explanation.

One of VFK's major advantages is that companies can work together yet store their data separately and securely on the platform. VFK works with a cell concept in which each industry partner stores its data discretely and shares it with others when the need arises. A spin-off called VFK AG has marketed this technology. "Small and medium-sized enterprises that lack in-depth IT and security know-how benefit from VFK in particular", says Stock.

MIALinx and Virtual Fort Knox will feature prominently at the Hannover Messe (March 23 to 27, 2018). MIALinx: hall 17, booth C24, Virtual Fort Knox: hall 2, booth C22.

Even older machines can be integrated into the production network, if they are upgraded with sensors. © Fraunhofer IPA | Picture in color and printing quality: www.fraunhofer.de/en/press