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IMTS Insights: Making AI Work for Your Manufacturing Operation

Matt Morgan | Sep 14, 2022

No, artificially intelligent machines are not going to rise and overtake the manufacturing industry along with the rest of the world. But they certainly can give a competitive edge to businesses that are willing to apply AI to their operations.

That's the essence of Jerry Foster's session at **IMTS 2022**: "The Machines Are Not Out to Get You - Making AI Work for Your Manufacturing Operation." The chief technology officer at software maker **Plex Systems** gave attendees an overview of what artificial intelligence (AI) is, walked through a few case studies for AI in manufacturing, and explained how companies can get started with AI.

What Is Artificial Intelligence?

Simply put, artificial intelligence combines automation and machine learning.

"Automation is a machine that does repetitive tasks, something that computers and robots are very good at," Foster says. "Machine learning is from computer algorithms that automatically improve through experience—they are improving the ability to recognize patterns."

"We now have artificial intelligence solutions that are well within reach of most manufacturing plants that I'm aware of."

Jerry Foster
Plex Systems

When they're fed a huge amount of data, machines are able to recognize patterns quickly and accurately, on their own. But storing enough data for the machine to use has prevented widespread adoption of AI. The development of the cloud and the ability to access it, however, have made data storage—and AI—possible for more businesses.

"Now we have a platform on which we can store a ton of data, and we can analyze it with almost unlimited computing power, and we can do it at a fraction of the cost because of economies of scale," Foster says.

How AI Can Apply to Today's Operations

Foster provides three examples of how AI could be used by manufacturing businesses to generate insights for improving operations.

Understanding downtime. Rather than manually sifting through thousands of reports to identify potential causes of downtime, a manufacturer can put all that data into a computer to do the hard work. The machine could reveal, for example, that a high percentage of material issues happen with operators who happened to be trained by a particular employee. "This is actionable insight," Foster says. "It uncovered a relationship that was buried in the data that I could never have found on my own."

Revolutionizing part design. AI makes possible a new process called generative design, drastically reducing the design prototype phase of any project. "Instead of taking a single design and optimizing it, I take my original design *goals* and *considerations*—not the original design—and it iterates over and over and over all possible designs, and optimizations of those designs, and presents them to the engineer. Then the engineer can make adjustments ... and feed it back into the system," Foster says. The machine might also present options that the engineer didn't know existed but use less material, are lighter weight and cost less to make. Combine generative design with ***the latest tools and techniques in 3D printing***, he says, "and we have a whole new way of doing business."

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Monitoring defects. According to Foster, BMW used to have a standard vision system that would flag some normal sheet metal as defective, so an employee would have to manually review the results to weed out false positives. When the company introduced an AI-based vision system, an employee tagged a few hundred photos of good sheet metal and defective sheet metal and fed them into the system. Using this data, the system learned how to identify real cracks in the metal, and with some refinement, it was achieving 100 percent reliability in real time. Foster is quick to point out that it doesn't take a BMW-sized business to use AI in this way. "We now have artificial intelligence solutions that are well within reach of most manufacturing plants that I'm aware of," he says.

What Manufacturers Can Do to Get Started

Foster makes it clear that manufacturers don't necessarily need to know about AI, but they should definitely ask their various providers what AI capabilities are in their workflows.

"Make sure you stick an AI question into your RFQs [requests for quote]," he says. "Any technology solution that's coming out now should either already be building AI routines in them or have a road map to do it."

On the other hand, manufacturers that have technical competencies and access to data can choose to go it on their own. Foster says, "***Google, Amazon, Microsoft*** and some open-source software companies like ***H2O*** provide easy access to extremely powerful AI capabilities."

Read more: 5 Ways Manufacturers Can Use Data Analytics to Improve Efficiency

Busting Myths About AI

Artificial intelligence has been on the fringe for so long that many people are wary about it, including those in manufacturing. Foster sets the record straight:

Myth: AI is going to take all the jobs. Although Foster says people will lose their jobs or will need to be *upskilled* when AI creates operational efficiencies, AI will also create new opportunities. Based on what he has seen *coming out of the pandemic*, automation is helping to fill gaps in the workforce.

Myth: Businesses need a data scientist for AI. “The reality is there is a spectrum across the AI application landscape, which does include data scientists but also includes programmers and business analysts,” Foster explains. “There is a rapidly expanding set of powerful and easy-to-use AI services and applications that can be used by engineers or analysts.”

Myth: Businesses need tons of data for good AI. Really, businesses need *good* data for good AI. “The quality of the results ... is directly dependent on the quality of the data that you provide,” Foster says. “While you don’t need a data scientist, you do need someone who is familiar with and understands your data. It can be anyone in the company, as long as they have a good grasp of what data you have, how it’s used, where it comes from, and whether it’s accurate or not.”



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