

# Artificial intelligence: Don't call me stupid!

Tim Foreman of OMRON in Johannesburg, South Africa, talks about harnessing AI: to make machines smarter so they can figure out for themselves why they have stopped or why there is a problem; and for use in making people smarter, by incorporating AI training routines into a machine to teach a new operator, for example.



OMRON's Collaborative Robots represent a big step towards creating an AI environment where humans and machines work in harmony.

Ten years ago, I was quite proud of how smart the machines in our factory were. Now, with today's definition of smart, I realise they were quite stupid. Why? Because although they were doing what they were designed to do, the minute they encountered anything unexpected or out of the ordinary, they were stumped, and resorted to asking the operator "What is wrong with me?"

Troubleshooting and getting machines back up and running called for smart people, highly skilled operators, and experienced software and hardware engineers. The problem is that in the past ten years, these smart people have become increasingly unavailable. There, quite simply, is not enough new talent entering the industry to offset the number of workers reaching retirement age.

When they leave the business, retirees take with them their hard-earned, on-the-job knowledge, which is a culmination of years of experience. And, with each departing smart person, businesses are faced with the prospect of a less productive and less

skilled workforce. The obvious solution is to make machines smarter, so they no longer ask stupid questions. Machine builders must start engineering systems that can figure out for themselves why they have stopped or why there is a problem. This is already happening to some extent. The use of sensors so a cartoning machine can tell the operator it has run out of blanks, for example.

However, you can only get so far with sensors alone. Taking system autonomy to the next level requires Artificial Intelligence (AI) so machines can use smart algorithms that can perform sophisticated analytics more akin to human brain circuitry.

There is a lot of talk about using AI to emulate human thought processes in industrial applications, but real-time examples of businesses that are successfully unlocking the value of AI are few and far between.

## Common AI pitfalls

There are two main reasons for this: firstly, companies often fall into the trap of being too generic in their application of AI, and secondly, they do not know how to handle

the explosion of data this broad-brush approach generates. If you are going to look at how AI can be applied in your factory, you should first establish what problem you want to solve, or what improvement you want to make.

Start small with a specific problem. Then, collect the relevant data, which is not an easy task. Not only do you need to make sure you have the right data, but also that it is stored at the right time, and that you do not miss any data. And you need to analyse the data to extract useful meaning.

OMRON's AI Controller – the world's first AI solution that operates 'at the edge' – has hardware based on the Sysmac NY5 IPC and the NX7 CPU, which will do all this for you. For example, the controller will record the data at micro-speed and analyse it using pattern recognition, based on process data collected directly on the production line. This functionality is integrated into our Sysmac factory control platform, which means it can be used in the machine directly, preventing efficiency losses.

As an example of this approach in ac-

tion, we are currently working with a food industry customer to improve seal integrity. Rather than relying on the operator to recognise when the sealing head is not performing as it should, the packaging machine uses AI to maintain repeatable performance. By applying an AI approach to the sealing operation, we will increase the shelf-life of this sealed product by several days, and minimise the occurrence of faulty seals, thereby eliminating the risk of a complete product batch being rejected by retail customers.

## Machine learning: bridging the experience gap

So far, I have only discussed harnessing AI to make machines smarter. The other development trajectory for AI is making people smarter. Data can be returned from physical assets – in this case highly experienced workers – and pattern recognition applied. Put simply, the skilled operator trains the machine, and the machine trains the unskilled operator.

In our laboratory, we are currently experimenting with AI-driven machines that ask operators to assemble products and record how they do it. The idea is to discover the smartest way of performing this task so the same smart technique can be taught to other operators – by the machine.



OMRON is experimenting with AI-driven machines where the skilled operator trains the machine, and then the machine trains the unskilled operator.

Another industrial application for machine learning might be the use of AI to establish what actions the operator should or should not be performing on the machine. If the operator's hands move in the wrong direction, for example, this generates an alert.

Enterprises that are well advanced on their digital transformation journey will be best placed to harness the value of AI – whether for identifying training best practices, predicting failures or monitoring running conditions. However, businesses at

the start of their journey should not be deterred from exploring AI. When ordering a new machine, make sure it has the functionality to generate data for AI purposes. You do not have to know what data you require – you just need to know the right questions to ask your machine builder. Also, start small and take a step-by-step approach – human DNA has evolved over millions of years, so it is unrealistic to expect machines to emulate the human brain in a matter of months.

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