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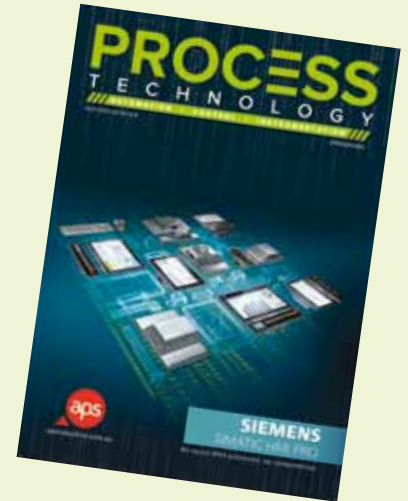ENCLOSURES POWER DISTRIBUTION CLIMATE CONTROL IT INFRASTRUCTURE SOFTWARE & SERVICES

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ON THE COVER

COLLABORATING TO CREATE THE FUTURE FOOD AND BEVERAGE FACTORY

HELPING MANUFACTURERS AND THEIR INNOVATION PARTNERS SUCCEED

Most food and beverage manufacturers understand that accelerating digital transformation and maximising the value of data will be central to tackling today's challenges.

The climate crisis, a national skills shortage, a global pandemic: any one of these factors in isolation is enough to disrupt a food and beverage manufacturing industry. In 2020, all of these factors coalesced to create unprecedented levels of pressure. Both manufacturers and machine builders adapted quickly to try and protect staff while minimising supply chain issues. But they're also hard at work considering how best to move forward in the long term.

Most understand that accelerating digital transformation and maximising the value of data will be central to tackling these challenges. Manufacturers know that operations need to become more resilient and agile, with minimal machine downtime and the ability to pivot production at speed. Productivity and efficiency need to go up — while costs need to go down. There's a demand for more proactive planning, more preventative actions and more recommendations. And all of this needs to be achieved with sustainability targets in mind.

The race to transform successfully is on. Some are already out of the starting blocks, embracing digitalisation and automation to drive outcomes. Machine builders, of course, have a pivotal role to play in this shift — supporting end users with greater machine performance and roadmaps for the future. In fact, there's a growing awareness that since manufacturers and machine builders can bring different things to the table, organisations can't solve these problems on their own.

Silos of innovation and best practice need to be bridged, with manufacturers and machine builders finding the sweet spot for collaboration. But it's not always clear what role different parties need to play. For businesses that have historically worked on a transactional basis only, working together is easier said than done.

To achieve this, manufacturers and machine builders need clear oversight of what their respective strengths are, as well as what the other is expecting and can feasibly deliver. New partnerships and forums for innovation need to be developed — and external technology providers may have a role to play in facilitating the shift.

The motivation for innovation

Even before external factors like the COVID-19 pandemic cast a shadow over the industry, food and beverage manufacturers were already under pressure from issues like aging infrastructure and rising costs. Now — with technical, economic, political and workforce challenges in the mix — manufacturers collectively recognise that innovation and greater machine performance will be critical to their future success.

Strategic motivations

Manufacturers are looking to radically improve machine performance across a range of areas. Quality of output remains a key concern, but manufacturers also need to be able to withstand disruption, adapt faster to change, and hit growing sustainability targets.

Resilience and agility

Improving business resilience, machine performance and production agility is a growing concern for food and beverage manufacturers facing supply chain risk, demand fluctuation and production challenges. Even brief downtime can have serious and wide-reaching effects, meaning there's strong industry appetite both for improved diagnostics, but also for proactive, preventative maintenance of machinery.

Threats to the supply chain are driving a need for better scenario planning, with manufacturers seeking the ability to change production levels quickly as needed. Many are exploring greater flexibility for production times — and seeking ways to scale up and down faster to meet demand closer to real time.

Efficiency and productivity

The demand for greater productivity has always been present in manufacturing. However, growing pressures — like labour shortages and a need to facilitate remote working, for example — mean manufacturers are facing spiralling workforce productivity challenges.

Food and beverage

Bots and automation provide the opportunity to reduce spreadsheet work and repetitive tasks, but skills gaps mean innovation can't always be taken advantage of. Manufacturers ultimately need support, not only with machinery and software that facilitates automation, but with people and process training.

At the same time, manufacturers are striving to create efficiencies wherever they can, minimising costs while maintaining quality. One way of doing this is to improve machine resilience and extend equipment lifecycles; many manufacturers are looking to sweat their assets more effectively to avoid the need for costly new kit.

Doing this successfully requires better maintenance and understanding of asset health — which in turn demands not only better HMIs and dashboards with smarter integrations and greater visibility of machine data, but also the skills and experience to understand and respond to that data at speed.

Sustainability

From environmental legislation to investor and consumer pressure, sustainability is high on the agenda. Having the ability to transform energy use and packaging is rapidly evolving into a central issue for suppliers and consumer food and beverage brands alike.

To achieve this goal, manufacturers must be able to track, measure and mitigate their environmental impact. But as it stands, many lack the ability to accurately understand their energy usage or the carbon footprint of their production and operations environment.

Some are more mature than others, but all are reaching the end of the road with conventional efficiencies for energy and down-gauging for packaging. Having done all they can, the onus is increasingly on machine builders and other technology providers to help manufacturers reach the next stage of sustainable productions.

For all of these strategic priorities, digital transformation — and in particular, better access to and ability to use data — can deliver powerful results.

But as it stands, food and beverage manufacturers face serious challenges in gathering, analysing and reacting to data effectively. For the industry to progress, these roadblocks must be overcome.

Data and digitalisation

Production line environments are rich with data, and manufacturers are keen to both utilise it effectively, and embrace digitalisation more widely. Yet data maturity is low, and most manufacturers are still in the early stages. Some have limited data visibility, with interfaces that make data gathering difficult to manage, while others have an abundance of data but no real sense of what to do with it.

Fundamentally, all the data in the world means nothing if it's not possible to analyse and respond to it in a timely manner. It should be noted, however, that this is as much a point around people and processes as it is technology. As automation and data gathering increases, the demands on people change. There's anxiety about what growing automation means for certain roles. And while the value of greater data usage and digitalisation is obvious, the absence of relevant skills in the workforce means it's difficult to realise value.

As a result, some businesses are cautious about a tech-led agenda that neglects to facilitate people and process change sensitively. Even as tech evolves and digital transformation accelerates outcomes, it can create serious problems with those working onsite.

Increasingly employees are being asked to shift to more analytical, problem-solving roles, which means major cultural and skills evolution is required — whether that's reframing objectives, retraining those whose jobs have been impacted by automation, or bringing in external support to upskill existing workforces. Ultimately, those

working in the industry need thoughtful support and considered training to move in step with transformation.

Supporting change

With so much complexity to wade through — and with technology, people and process challenges to untangle — food and beverage manufacturers need support if they're going to succeed. Machine builders and other industry tech providers have an important role to play — and manufacturers are looking to these organisations to assist.

There's an emerging sense that manufacturers want to evolve how they buy machinery. Their desire for assurances around KPIs, and SLAs, suggests that a shift to a servitisation model could be beneficial, rather than simply buying machinery and taking it from there.

Beyond this, they want to work with external partners to evolve, adapt, learn and grow. With internal skill sets often lacking, manufacturers are seeking expert voices that can guide them on resilience, agility and predictive capabilities. And they don't just want access to more data — they need help turning this into useful, actionable information.

Stepping up to support: machine builder ambitions

At present, machine builders are some way off being able to collaborate with manufacturers on all of their strategic goals. However, their capacity for innovation is significant, and many are collaborating with manufacturers successfully on specific briefs and problem solving — such as making specific machines more agile.

Broadly, many providers feel they can offer guidance and visibility of digital strategy for assets, and assurance that assets will be kept up-to-date with factory norms and connectivity over their lifecycle.

Yet as the industry gets to grips with ambitions around the data-driven factory of the future, a general shortage of data and

iStockphoto.com/Serjio74

analytics experts in the industry means machine builders aren't yet in a position to help to full effect.

However, they have ambitious plans for the future.

Facilitating agility

Machine builders are exploring how they can help manufacturers pivot at speed — a capability that has proved crucial during the COVID-19 pandemic. Some manufacturers have needed to adapt packaging, repackaging products previously sent to hospitality businesses for a direct-to-consumer model. Others had to change the size of packaging; it's just one example, but with many spending Christmas in lockdown, demand for large turkeys decreased, meaning there was a greater need to package crowns and legs.

Machine agility is fundamental to achieving this. It can also contribute to sustainability goals, as green packaging alternatives emerge and manufacturers have to adapt. And it may even support manufacturers looking to decentralise sourcing and rely on food grown locally — meaning the goods requiring packaging change with the seasons.

Creating the conditions for resilience

With end-user manufacturers seeking more assurance about performance and availability, machine builders are increasingly advising on predictive capabilities — along with proactive maintenance and preventative fixes — to ensure operations can continue without interruption.

Many machine builders agree they should act as the experts on how their equipment runs, how it can be maintained, and how assets can be sweated — although they're also aware that some use cases are very specific, making it hard to commit to contractual guarantees in a scalable way.

Research suggests that while most manufacturers are discussing resilience, not all of the machine builders are having these discussions with end users — meaning there's a need for more conversation between the two groups.

Remote management

The COVID-19 pandemic has forced an acceleration for those exploring how the production line can be managed, maintained, altered or analysed remotely.

However, the constraints of lockdown aren't the only motivating factor here. With skills in such short supply, using augmented reality or remote management capabilities eases the burden on a limited pool of skilled individuals being physically in the room.

Data management

With manufacturers producing more and more data, machine builders are looking to support them with utilising this information effectively. What this looks like in reality varies — from dashboards that make data easier to understand, to integrations at the edge that ensure insight can be shared easily.

As with manufacturers, the overall conclusion is that machine builders are working hard to innovate and accelerate digital transformation — all while moving towards an operational model that enables everyone across the industry to collaborate for better outcomes.

However, the fact remains that there are still hurdles to be jumped on both sides — such as talent shortages, facilitating collaboration and even financing the necessary transformation.

Collaboration for the future factory

Although there's a clear sense of where innovation efforts should focus, there are undeniably many challenges afoot for both food and beverage manufacturers and the machine builders hoping to support them.

There's uncertainty about finding or developing the right talent to lead on key projects. Since no single organisation alone has the time, talent and resources to solve all of the industry's problems, a big cultural shift is required to facilitate the collaboration that's needed. And with so much innovation required, organisations are also being placed under financial pressure, at a time when many are already feeling the pinch due to the broader economic situation.

But, more positively, there is an emerging sense of how to move forward.

Manufacturers understand both the trends in the market, and what innovation should look like in order for the industry to thrive. From smarter data analytics to remote management and greater flexibility in the production line, these businesses can see a smarter, more resilient and more agile future for the factory floor — and they're keen to build on recent transformational changes and learnings.

Perhaps most importantly there's a growing sense that businesses don't have to figure all of this out alone. Everyone involved sees the need for a more holistic approach to achieving all of these ambitions — with people, processes and technological innovation considered in tandem, rather than silos.

There's an appetite for collaboration, understanding and sharing of best practice across the industry. With skills in short supply, and pressures mounting, food and beverage manufacturers are keen to be supported and guided by those who provide their production line equipment. Machine builders, meanwhile, are also keen to share knowledge across the industry, while taking on more of a consultative role for manufacturers.

But since this level of collaboration is new ground for an industry that has traditionally worked in silos, there's a need for external partners to step up and facilitate.

Siemens Ltd
www.siemens.com.au

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Pilz Australia Industrial Automation LP

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DISTRIBUTED CONTROL SYSTEM

ABB has launched its latest release of ABB Ability Symphony Plus distributed control system (DCS), which it says will further support digital transformation for the power generation and water industries.

The updated Symphony Plus provides access to digital solutions, such as fleet asset management enabled by ABB Ability Genix Asset Performance Management. It also enables users to access process and alarm data from mobile devices through the ABB Mobile Operations application.

The product also features a simplified and more secure OPC UA connection to the edge and the cloud, without interfering with core control and automation functionality.

Critical data can now be viewed more flexibly, due to HTML5 web-based operation and engineering tools, promoting collaboration. Flexible field device management has also been enabled with ABB's Field Information Manager (FIM), making the configuration, commissioning, diagnostics and maintenance of fieldbus instruments quick and easy.

ABB is also introducing the SD Series e-Class process controller that offers a low-disruption retrofit solution for traditional Harmony Rack (HR) installations. It is designed to bring increased speed, higher capacity and more functionality to HR systems and help enable digitalisation.

ABB Australia Pty Ltd
www.abbaustralia.com.au

EXPLOSION-PROOF CONVERTER FOR OXYGEN DETECTION

Yokogawa has announced that it has developed the ZR802S explosion-proof converter as part of its OpreX Analyzers range. The ZR802S converter supports the IECEx, FM, ATEX, CSA, China Ex, Korea Ex, India Ex and Taiwan Ex explosion-proof standards. It is intended for use with the ZR22S explosion-proof zirconia oxygen detector, an existing Yokogawa device with a durable zirconia sensor that is dust-resistant and easy to install and replace. Together, the ZR802S converter and the ZR22S detector comprise a complete oxygen analyser system.

Yokogawa has also introduced remote monitoring and other capabilities that reduce the time and effort required for maintenance operations and increase uptime. The ZR802S converter features a self-assessment function that provides early detection of deterioration in a zirconia oxygen detector, a data logging function that records essential maintenance information, and support for a number of key communication protocols.

The automatic transmission of sensor resistance value at regular intervals, enables replacement timing to be determined without onsite inspection, while the data logging function reduces maintenance time and downtime in the event of a fault.

The ZR802S converter is said to be the only device in the zirconia oxygen analyser market that supports all three of communication protocols: HART7 for analog output, and Modbus TCP and Modbus RTU for digital communications. It also complies with the NAMUR NE43 guideline for the issuance of signals to indicate a sensor fault and the NAMUR NE107 guideline for onsite instrument self-assessment functions.

Yokogawa Australia Pty Ltd
www.yokogawa.com/au

COMPACT MAGNETIC FIELD SENSORS

Turck has extended its range of compact position sensors with the WIM-IOL series for detecting magnetic pistons in pneumatic or hydraulic cylinders. The series consists of eight models with IO-Link 1.1, covering measuring spans from 32 to 256 mm. Users can teach the measuring range of sensors quickly and conveniently to the stroke of the pistons in the cylinder with IO-Link and the integrated pushbutton. This makes mounting simpler when compared to analog sensors, as they either have to be fitted exactly to the dead points or operate with correction factors in the controller. The sensors are IP67-rated and operate with a 15-bit resolution.

Typical applications include feed detection in injection moulding or automatic screwing machines, the positioning of the welding head with ultrasonic welding and the monitoring of the foil tension in packaging machines.

Turck Australia Pty Ltd
www.turck.com.au

Treasury Wines creates Australia's largest digital winery

Treasury Wine Estates (TWE) is one of the world's largest wine companies, selling its wines in more than 70 countries and employing more than 2600 people across nine locations around the world. The company operates wineries not only in South Australia, but also in New Zealand, the USA, France and Italy.

In 2022, TWE unveiled its new state-of-the-art winemaking facility in the Barossa Valley, the largest premium winemaking site in the Southern Hemisphere, with the capacity to produce more than 100 million litres of wine every year. It is also its largest bottling operation, packaging up to 216 million bottles per year.

In 2019, when TWE was beginning to design its winery expansion, it was seeking an automation system that would improve on the cumbersome maintenance and inflexibility of the traditional hard-wired valves and sensors that had been used on previous sites. As a completely new greenfield installation, this was an opportunity to embrace new technology across the whole winemaking operation, improving efficiency and safety for workers.

Bürkert presented TWE with an opportunity to digitally transform its network for the new tank farm and bring its infrastructure in line with Industry 4.0 and modern digitalisation trends using IO-Link capabilities. Bürkert Type 8801 - ELEMENT On/Off Valve Systems were chosen for fermentation, glycol and must delivery (heating and cooling) applications across a tank farm of over 400 tanks. The fully integrated valve and automation system has an IP65/67/NEMA 4X protection class and high chemical resistance, suitable for the environmental demands of an outside tank farm.

Today, digitalisation is the fastest moving automation requirement for food and beverage producers across the world. Ensuring simplicity in installation and management, reducing maintenance and improving environmental footprint are also part of this modern automation infrastructure. By using smart valves and sensors and the right fieldbus technology, wineries can embrace automation for now and into the future while saving on implementation costs.

"Working closely within this industry and hand in hand with Australian winemakers, we are ensuring that Australian producers are at the forefront of this movement," said Bürkert Australia's General Manager, Chris Hoey. "In the implementation of digitalisation across a winery, we can begin assessing and improving wastage, blending errors, burdensome maintenance, long wait times for upgrades and installations, whilst improving energy efficiency, hitting sustainability targets and reducing bottom line expenditure."

The automation infrastructure proposed by Bürkert offered the opportunity of moving to best practice with smart equipment and connectivity that could improve the overall control and management of the winery. Bürkert offered valve systems with IO-Link capability, due to IO-Link's seamless integration capabilities as well as its standardisation as an independent fieldbus network.

Over the next two years, the project got underway and collaboration between partners, including Chris Hoey and National Engineering Manager Nelson Chymiak, ensured the tank farm was up and ready to go in no time.

"The most noticeable positive impact of this solution was the diagnostic information provided from the network connected field devices," said Harry Robinson, Project Engineer for Treasury Wine Estates.

He also received positive feedback from the electrical contractor that the single cable installation for each device was a welcome change from legacy systems.

Not only do the new valves supplied by Bürkert enable efficient error-free activation of valves on wine tanks through QR-coded operation, they also improve safety in a number of ways.

Firstly, they can automatically prevent tank collapse by the automated activation of tank vent valves and remove the need for costly catwalks and access stairways to the tops of tanks. There is also a reduced risk of harm or injury due to operators working at heights or having others working overhead with risk of dropping implements onto staff below.

With traceability and transparency direct from the valves themselves, management and maintenance of the entire site can be controlled from one central point. Smart valve actions and alerts ensure reduced risk of wastage and faster reaction times if things go wrong, and having that peace of mind has made an incredible difference to the team and how the winery undergoes managing the winemaking process.

Although the site itself is still evolving and growing with further installation and upgrades, the bulk of the work is done and the foundations for a futureproof winery are in place. With IO-Link capabilities, flexibility of connectivity across the site means that the sensor and actuator network could be customised to TWE's requirements.

Burkert Fluid Control Systems
www.burkert.com.au

REFRIGERATED AIR DRYERS

ELGi Equipments recently expanded its range of high-efficiency non-cyclic refrigerated air dryers with the inclusion of three-phase options on five of its medium-sized models that produce flow rates from 210 to 590 cfm (5.95 to 16.71 m³/min).

The Airmate EGRD series of non-cyclic refrigerated dryers feature a controller that is designed to ensure optimum efficiency by automatically reducing the fan speed or stopping the fan depending on the condensing pressure and dryer temperature. An efficient rotary compressor also provides low specific power consumption, which further contributes to the overall energy efficiency of the dryers, while the inclusion of ELGi's next-gen heat exchanger minimises the pressure drop and maximises thermal efficiency.

For maximum efficiency, the three-stage heat exchange system with cold storage allows the unit to cycle on and off as necessary. The efficient and compact heat exchanger is also able to operate effectively in high ambient temperatures, making it suitable for Australian conditions. Energy savings are also achieved through the inclusion of a zero loss drain which means that only condensate is drained with no air loss.

The Airmate EGRD 200 to 500 series models include a fixed speed, hermetically sealed and energy-efficient rotary compressor. Together key features such as a suction separator muffler, an internal protector, a reverse-phase protector in the three-phase variants, as well as a run capacitor contribute to the reliability of these compressors. A hot gas bypass valve prevents the freezing phenomenon in the heat exchanger.

Elgi Equipments Ltd
www.elgi.com.au

ONLINE TOC ANALYSER TECHNOLOGY

TOC analyser technology plays a role in helping plants optimise process control, minimise product loss and reduce energy and wastewater treatment costs.

The Hach BioTector B7000i Online TOC Analyser is a TOC analyser, designed to detect product loss, decrease and conserve water usage and improve production processes.

The product measures organics in food processing conditions with 99.86% uptime and requires preventive maintenance only twice per year.

The analyser comes with a built-in self-cleaning sample line and reactor. This enables the B7000i to deliver results even if water contains high levels of fats, oils, greases, sludge and particulates or has pH swings. Installing the analyser decreases chemical dosing, reduces waste and reduces samples processes. Industry studies show that lost product can be reduced by over 15% by using accurate and continuous TOC measurement. Further savings of up to 40% can be made in the operating cost of the treatment plant by reducing energy and water consumption.

Hach Pacific Pty Ltd
www.hachpacific.com.au

ELECTRONIC ACCESS PERMISSION SYSTEM

Pilz has introduced an RFID-based electronic access permission system known as PITreader. Users can implement tasks relating to access permissions for plant and machinery whether simple or complex, from a simple enable and authentication of specific machine subfunctions to a complex hierarchical permission matrix.

The transponder keys are also available in a freely writeable version and with fixed, stored permissions. For manipulation protection, the RFID keys can be coded using PITreaders with company-specific programming. PITreader is flexible and can be used as a standalone device or in conjunction with a Pilz controller.

PITreader is a compact device for controlling all access permission tasks, is suitable for use in a rugged industrial environment and is easy to retrofit. It has a standard installation diameter of 22.5 mm and a low modular depth of 45 mm.

Both Ethernet and serial communication are available, with a standard 24 V output if the transponder key is valid. All functions can be programmed via integrated web server, and front protection meets IP65/IP67.

Pilz Australia Industrial Automation LP
www.pilz.com.au

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EDGE COMPUTING FOR INDUSTRIAL AIoT APPLICATIONS

*Alicia Wang, Product Manager, Moxa*

The advent of the Industrial Internet of Things (IIoT) has allowed a wide range of businesses to collect massive amounts of data from previously untapped sources and explore new avenues for improving productivity. By obtaining performance and environmental data from field equipment and machinery, organisations now have even more information at their disposal to make informed business decisions. Unfortunately, there is far too much IIoT data for humans to process alone, so most of this information goes unanalysed and unused[1]. Consequently, it is no wonder that businesses and industry experts are turning to AI and machine learning (ML) solutions for IIoT applications to gain a holistic view and make smarter decisions more quickly.

Most IIoT data goes unanalysed

The staggering number of industrial devices being connected to the internet continues to grow year after year and is expected to reach 41.6 billion endpoints in 2025, according to a 2019 report by IDC. What's even more mind-boggling is how much data each device produces. In fact, manually analysing the information generated by all the sensors on a manufacturing assembly line could take a lifetime[2]. It's no wonder that less than half of an organisation's structured data is actively used in making decisions — and less than 1% of its unstructured data is analysed or used at all. In the case of IP cameras, only 10% of the nearly 1.6 exabytes of video data generated each day gets analysed, according to Intel. These figures indicate a staggering oversight in data analysis despite our ability to collect more and more information. This inability for humans to analyse all of the data we produce is precisely why businesses are looking for ways to incorporate AI and ML into their IIoT applications.

Imagine if we relied solely on human vision to manually inspect tiny defects on golf balls on a manufacturing assembly line for
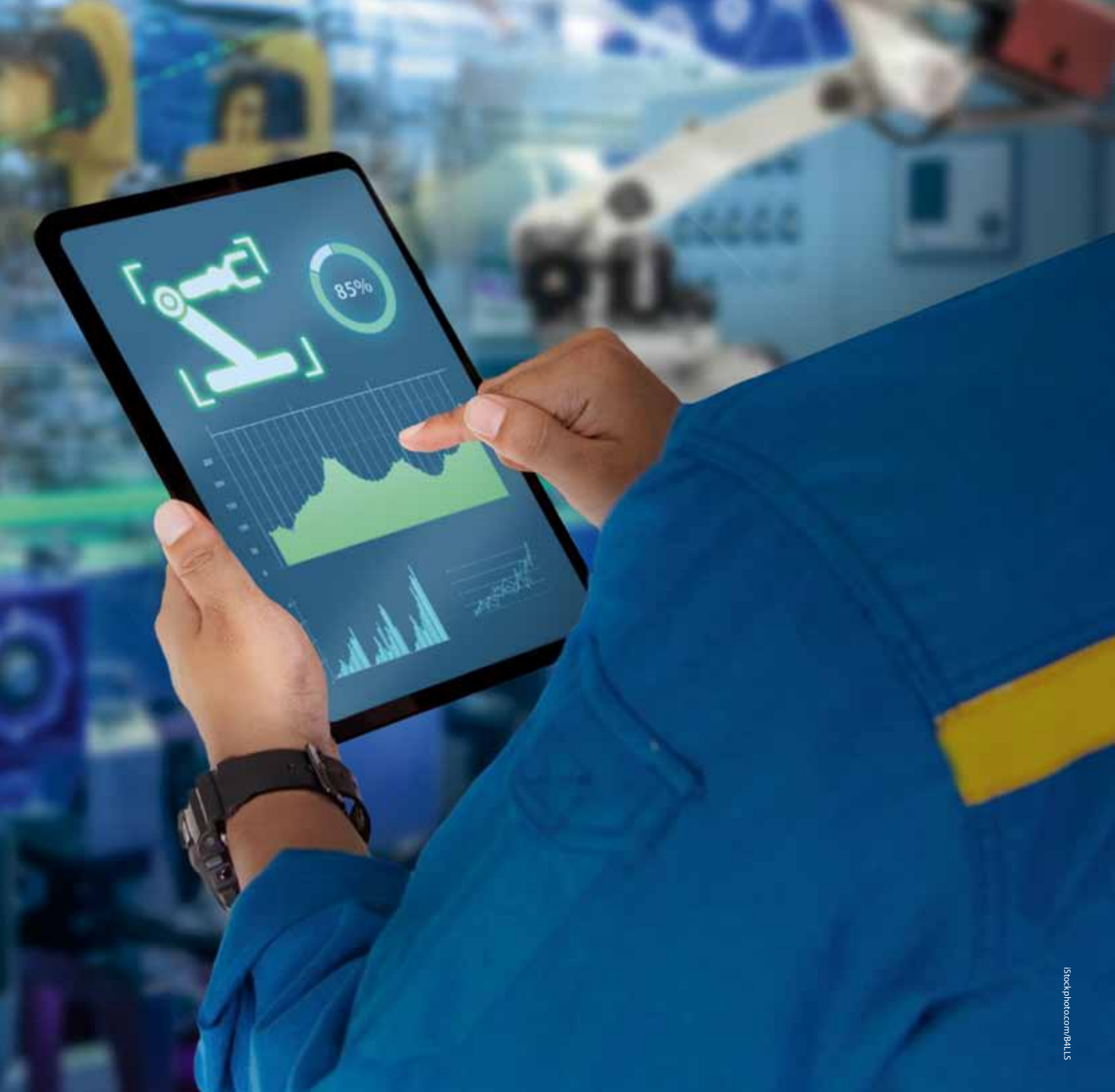
eight hours each day, five days a week. Even if you could afford a whole army of inspectors, each person is still naturally susceptible to fatigue and human error. Likewise, manual inspection of high-voltage powerlines and substation equipment also exposes human personnel to safety risks.

Combining AI with IIoT

In industrial applications, the AIoT offers the ability to reduce labour costs, reduce human error and optimise preventive maintenance. The 'Artificial Intelligence of Things' (AIoT) refers to the adoption of AI technologies in IoT applications for the purposes of improving operational efficiency, human-machine interactions, and data analytics and management[3]. But how exactly does AI fit into the IIoT?

Since AI is such a broad discipline, the following discussion focuses on how computer vision or AI-powered video analytics

— other subfields of AI often used in conjunction with ML — are used for classification and recognition in industrial applications. From data reading in remote monitoring and preventive maintenance, to identifying vehicles for controlling traffic signals in intelligent transportation systems, to agricultural drones and outdoor patrol robots, to automatic optical inspection of tiny defects in golf balls and other products, computer vision and video analytics are unleashing greater productivity and efficiency for industrial applications.

Moving AI to the IIoT edge

As previously mentioned, the proliferation of IIoT systems is generating massive amounts of data. For example, the multitude of sensors and devices in a large oil refinery generates 1 TB of raw data per day. Immediately sending all this raw data back to a public cloud or private server for storage or processing would require

> ENABLING AI CAPABILITIES AT THE EDGE ALLOWS YOU TO EFFECTIVELY IMPROVE OPERATIONAL EFFICIENCY AND REDUCE RISKS AND COSTS FOR YOUR INDUSTRIAL APPLICATIONS.

considerable bandwidth, availability and power consumption. In many industrial applications, especially highly distributed systems located in remote areas, constantly sending large amounts of data to a central server is not possible. Mission-critical industrial applications must be able to analyse raw data as quickly as possible.

In order to reduce latency, reduce data communication and storage costs, and increase network availability, IIoT applications are moving AI and machine learning capabilities to the edge of the network to enable more powerful pre-processing capabilities directly in the field. More specifically, advances in edge computing processing power have enabled IIoT applications to take advantage of AI decision-making capabilities in remote locations. Indeed, by connecting your field devices to edge computers equipped with powerful local processors and AI, you no longer need to send all of your data to the cloud for analysis.

Choosing the right edge computer for industrial AIoT

When it comes to bringing AI to your industrial IoT applications, there are several key issues you need to consider. Even though most of the work involved with training your AI models still takes place in the cloud, you'll eventually need to deploy your trained inferencing models in the field using AIoT edge computing. In order to effectively run AI models and algorithms, industrial AIoT applications require a reliable hardware platform at the edge. To choose the right hardware platform for your AIoT application, we need to consider the following factors.

Processing requirements for different phases of AI implementation

Generally speaking, processing requirements for AIoT computing are concerned with how much computing power you need and whether you need a CPU or accelerator. Since each of the following three phases in building an AI edge computing application uses different algorithms to perform different tasks, each phase has its own set of processing requirements.

Data collection

The goal of this phase is to acquire large amounts of information to train the AI model. Raw, unprocessed data alone is not helpful because the information could contain duplications, errors and outliers. Pre-processing collected data at the initial phase to identify patterns, outliers and missing information also allows you to correct errors and biases. Depending on the complexity of the data collected, the computing platforms typically used in data collection are usually based on Arm Cortex or Intel Atom/Core processors. In general, I/O and CPU specifications (rather than the GPU) are more important for performing data collection tasks.

Training

AI models need to be trained on advanced neural networks and resource-hungry machine learning or deep learning algorithms that demand more powerful processing capabilities, such as powerful GPUs, to support parallel computing in order to analyse large amounts of collected and pre-processed training data. Training your AI model involves selecting a machine learning model and training it on your collected and pre-processed data. During this process, you also need to evaluate and tune the parameters to ensure ac-
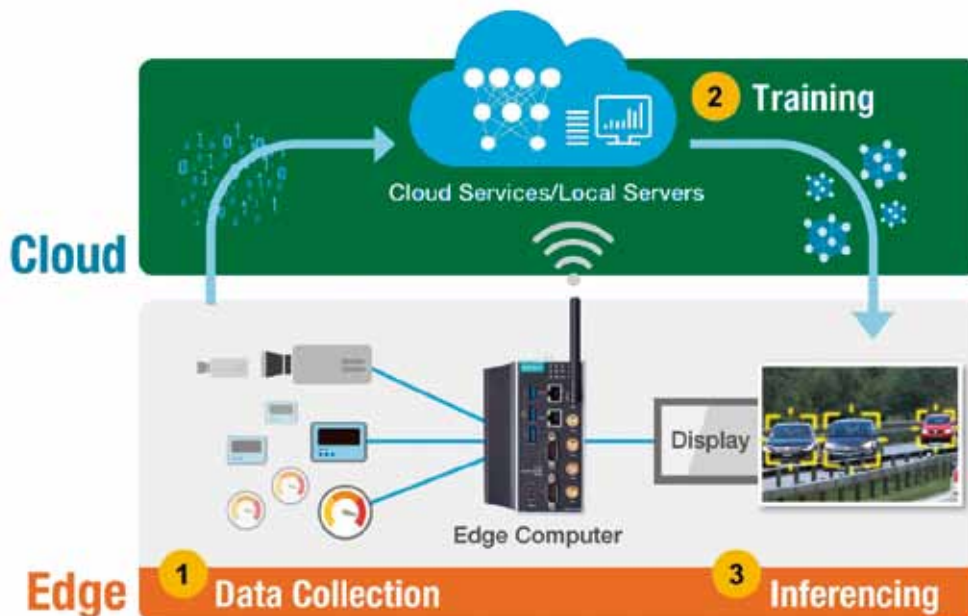

Figure 1: The three phases of building AIoT applications.

curacy. Many training models and tools are available for you to choose from, and training is usually performed on designated AI training machines or cloud computing services.

Inferencing

The final phase involves deploying the trained AI model on the edge computer so that it can make inferences and predictions based on newly collected and pre-processed data quickly and efficiently. Since the inferencing stage generally consumes fewer computing resources than training, a CPU or lightweight accelerator may be sufficient for your AIoT application. Nonetheless, you will need a conversion tool to convert the trained model to run on specialised edge processors and accelerators, such as Intel OpenVINO or NVIDIA CUDA. Inferencing also includes several different edge computing levels and requirements, which are discussed in the following section.

Edge computing levels

Although AI training is still mainly performed in the cloud or on local servers, data collection and inferencing necessarily take place at the edge of your network. Moreover, since inferencing is where your trained AI model does most of the work to accomplish the application objectives, you need to determine which of the following levels of edge computing you need in order to choose the appropriate processor.

Low edge computing level

Transferring data between the edge and the cloud is not only expensive, but also time-consuming, and it results in latency. With low edge computing, you only send a small amount of useful data to the cloud, which reduces lag time, bandwidth, data transmission fees, power consumption and hardware costs. An Arm-based platform without accelerators can be used on IIoT devices to collect and analyse data to make quick inferences or decisions.

Medium edge computing level

This level of inference can handle various IP camera streams for computer vision or video analytics with sufficient processing frame rates. Medium edge computing includes a wide range of data complexities based on the AI model and performance requirements of the use case. Most industrial edge computing applications also need to factor in a limited power budget or fanless design for heat dissipation. It may be possible to use a high-performance CPU, entry-level GPU or VPU at this level. For instance, the Intel Core i7 series CPUs offer an efficient computer vision solution with the OpenVINO toolkit and software based AI/ML accelerators that can perform inference at the edge.

High edge computing level

High edge computing involves processing heavier loads of data for AI expert systems that use more complex pattern recognition. High edge compute level inferencing generally uses accelerators, including a high-end GPU, VPU, TPU or FPGA, which consumes more power (200 W or more) and generates excess heat. Since the necessary power consumption and heat generated may exceed the limits at the far edge of the network, high edge computing systems are often deployed in near-edge sites to perform tasks.

Development tools

Several tools are available for various hardware platforms to help speed up the application development process or improve overall performance for AI algorithms and machine learning.

Deep learning frameworks

Consider using a deep learning framework, which is an interface, library or tool that allows you to build deep learning models more easily and quickly, without getting into the details of the underlying algorithms. Deep learning frameworks provide a clear and concise way for defining models using a collection of pre-built and optimised components. The three most popular include PyTorch, TensorFlow and Caffe.

Hardware-based accelerator toolkits

AI accelerator toolkits are available from hardware vendors and are specially designed to accelerate artificial intelligence applications, such as machine learning and computer vision, on their platforms.

Examples include the Open Visual Inference and Neural Network Optimization (OpenVINO) toolkit from Intel — designed to help developers build robust computer vision applications on Intel platforms — and the Compute Unified Device Architecture (CUDA) from NVIDIA for enabling high-performance parallel computing for GPU-accelerated applications.

Environmental considerations

Last but not least, you also need to consider the physical location of where your application will be implemented. Industrial applications deployed outdoors or in harsh environments — such as oil and gas, mining, power or outdoor robot applications — should have a wide operating temperature range and appropriate heat dissipation mechanisms to ensure reliability in blistering hot or freezing cold weather conditions. Certain applications also require industry-specific certifications or approvals, such as fanless design, explosion-proof construction and vibration resistance. And since many real-world applications are deployed in space-limited cabinets and subject to size limitations, small form factor edge computers are preferred. Highly distributed industrial applications in remote sites may also require communications over a reliable cellular or Wi-Fi connection.

Conclusion

Enabling AI capabilities at the edge allows you to effectively improve operational efficiency and reduce risks and costs for your industrial applications. Choosing the right computing platform for your industrial AIoT application should also address the specific processing requirements at the three phases of implementation: data collection, training and inference. For the inference phase, you also need to determine the edge computing level (low, medium or high) so that you can select the most suitable type of processor.

By carefully evaluating the specific requirements of your AIoT application at each phase, you can choose the best-suited edge computer to sufficiently and reliably perform industrial AI inferencing tasks in the field.

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2. Stack T 2018, "Internet of Things (IoT) Data Continues to Explode Exponentially. Who Is Using That Data and How?", *Cisco Blogs*, 《https://blogs.cisco.com/datacenter/internet-of-things-iot-data-continues-to-explode-exponentially-who-is-using-that-data-and-how》

3. TechTarget 2019, "Artificial Intelligence of Things (AIoT)", *IoT Agenda*, 《https://internetofthingsagenda.techtarget.com/definition/Artificial-Intelligence-of-Things-AIoT》

HIGH-PRESSURE HOSE REEL

The heavy-duty, high-pressure Quick-test hose reel from Ralston Instruments is designed to keep Quick-test hoses organised and off the ground. Made from solid metal with a powder-coated steel frame, it is a durable, high-quality hose reel that can be used in even the most extreme weather conditions. A sturdy crank ensures smooth winding and unwinding while the drag mechanism prevents the hose from unspooling too quickly.

An included locking pin lets the user keep hoses spooled during transport or when not in use. It can also be mounted on a truck or a wall so it's available when needed.

Each reel includes low-volume, high-pressure Quick-test hoses that stay pressurised while spooled and can be extended or retracted under pressure, making them suitable for field calibration with compressed gas. Quick-test high-pressure hose reels are available with 1.5 m or 3 m, 6900 psi Quick-test hoses with brass or stainless steel connections.

Ralston Instruments LLC
www.ralstoninst.com

HMI PANEL PCs

Interworld Electronics has introduced the HELIO-9C series of rugged industrial all-in-one HMI panel PCs from Aplex Technology, featuring an Intel Tiger Lake 11th generation energy-efficient Core i3/i5 processor with up to 64 Gb of DDR4 RAM. The series comes in a range of sizes from 10.1″ to 21.5″ TFT-LCD and has an IP66-certified front bezel.

The HELIO-9C series has a modern design, with ultra-narrow frame, slim profile, a fanless aluminium chassis and a fast mounting kit. This updated design provides a modern stylish look, decreases system weight, and also improves water and dust protection by eliminating the need for mounting holes on the chassis. It also makes it easy to clean, reduces maintenance cost and provides a long-lasting rugged enclosure.

The projected capacitive touch screen with multi-touch support and anti-scratch surface helps to improve usability, while also providing the screen with tough protection. Optional auto dimming, 1000 nits brightness, and optical bonding make the HELIO-9C series suitable for a range of applications, no matter the environment or weather.

The HELIO-9C series offers a wide range of optional expansions, Power over Ethernet (PoE), 5G, Wi-Fi 6 and CANbus, as well as additional serial, LAN or USB ports that can be added. It also offers an optional smart battery backup feature, providing an emergency backup power source to protect data and the system from unexpected power outages.

Interworld Electronics and Computer Industries
www.ieci.com.au

ANGLE SEAT VALVE

The Bürkert Type 2000 CLASSIC 2/2-way angle seat valve consists of a pneumatically activated piston actuator and a streamlined gunmetal valve body and a precision cast stainless steel body.

The self-adjusting spindle seal with an integrated wiper provides optimal protection for the spindle and actuator against aggressive media and dirt. It is manufactured with a live-loaded spring system that enables low-maintenance operation and ensures a long service life even with high switching cycles. Only components made from tested materials are used in manufacturing. The Type 2000 is particularly noted for its robust actuator and high level of reliability and more than 5 million cycle life expectancy.

The Type 2000 CLASSIC supports a maximum process temperature of 185°C and a maximum pressure of 25 bar.

Application areas of the Type 2000 include steam applications, such as sterilisation of food items and CIP cleaning; water and wastewater treatment; food and drink bottling; pharmaceutical and medical applications; machines for the textile industry; washing and cleaning.

*Burkert Fluid Control Systems*
www.burkert.com.au

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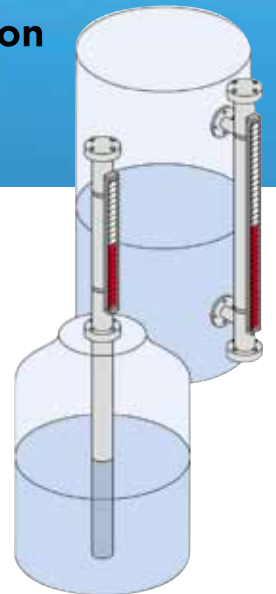
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KARI

SITRON LEVEL SENSORS

Petrochem, Food & Beverage industries

Sitron

AUTOMATED PALLETISING TECHNOLOGIES

MHM Automation has released the MHM automated mobile robots (AMRs) and the H&C SimPal50 gantry palletiser and depalletiser.

The AMR is an automated vehicle which moves product on pallets or in crates, without the need for conveyors. Integrated navigation and vision technology enables the AMR to navigate and move safely around people and objects, making it suitable for congested production environments where automation would previously not have been possible. AMRs' ability to work together as a fleet mean they are a scalable solution that can be used for operations large and small.

The H&C Gantry Palletiser and De-Palletiser (SimPal50) is capable of palletising or de-palletising up to eight boxes or bags per minute, an alternative to a robotic palletiser. The SimPal50 features MHM's proprietary vision system, which enables it to identify and depalletise boxes in a randomly stacked pattern. It reduces labour, allowing staff to be redeployed to higher value work and helps reduce the risk of injury through manual handling.

MHM Automation
mhmautomation.com

SPLIT WASHER GASKET

The Pepperl+Fuchs IP Split Washer enables repair to damaged or missing IP washers on existing installed cable glands without having to go through the standard repair process. This split washer enables cost-effective and efficient repairs by reducing the number of people, materials and tasks involved compared to the standard repair process. It is UV-resistant, ozone-resistant, has an IP66/68 degree of protection and is available for various thread sizes.

The IP Split Washer offers time savings when replacing worn washer gaskets due to easy installation. The split washer gasket consists of a ratchet mechanism and a restraining clip. The washer surface on the retaining clip just needs to be in contact with the cable gland sealing surface when installed and all cable glands tightened with appropriate torque.

Pepperl+Fuchs (Aust) Pty Ltd
www.pepperl-fuchs.com

OPINION

TOP AI TRENDS FOR ENGINEERS IN 2023

Stephane Marouani is Country Manager ANZ at MathWorks.

The progression of AI from futuristic curiosity to critical enterprise tool is a testament to its value for engineers. Gartner recently predicted that enterprises that adopt AI engineering practices would outperform their peers in operationalising AI models by at least 25%, which adds pressure for organisations to continue pushing their adoption of AI.

Below are four major AI trends engineers can expect to adopt or plan around this year.

Teaching machines about the real world: physics-informed AI

In addition to data-centric AI approaches, model-centric AI approaches are also gaining traction. Most data-centric AI models are trying to optimise to the highest accuracy based on the data received, allowing models to make any conclusions without regard to real-world rules and principles. As AI continues to expand into more and more research areas, such as complex engineered systems, models need to consider physical constraints to be relevant worldwide.

Similarly, Reduced Order Modelling (ROM), using physics-based reduction models, is a new trend gaining traction and providing a lower computational barrier of entry to high-fidelity models that are too computationally intensive to be used for system-level design. Using AI can speed up simulations by replacing a first-principles model of a system, all while preserving the expected fidelity of the system.

Demand for collaboration across AI: Open access to AI will continue to expand

A growing trend is for researchers, engineers and data scientists to leverage the work of each other in the name of innovation. We see the need for more collaboration based on a few trends in engineers' workflows and responsibilities.

The primary trend driving cross-collaboration is that research is increasingly being done in AI, which creates more urgency for the latest models to be available on demand. A high quantity of high-quality models allows all practitioners to build on the latest research in less time than ever before.

The second trend is a growing reliance on open-source solutions. Models may come from several different frameworks, so engineering teams will want solutions that bridge the gap between their preferred system of choice and the end solution. Enter interoperability between frameworks, allowing AI to be incorporated into more diverse fields of study.

Finally, companies are increasingly working with academia to take advantage of the accelerating pace of research focused on AI for their specific application.

Companies will focus on smaller, more explainable AI models

When engineers and scientists first explore models, accuracy is the primary motivating factor, and other model trade-offs may not be a focus. However, AI practitioners are learning that for

models to be relevant, they must be deployed, fit onto hardware, and provide easily explainable decisions.

A rising trend is using traditional machine learning models to meet the requirements of low-cost, low-power devices with explainable output. Parametric models are also an example of 'old is new again', as we see a growing number of companies wanting guaranteed results fitting specific formulas and parameters. Traditional machine learning techniques aren't cutting-edge, but they get the job done in an understandable and repeatable manner.

AI becomes essential in the design, development and operation of state-of-the-art engineered systems

It is unlikely that a breakthrough engineering innovation doesn't contain AI. AI will continue to impact established fields, including those working with time-series and sensor data. As AI pushes toward the mainstream in all industries and applications, complex engineering systems that don't contain AI become outliers.

The growing trend of electrification is an example of AI opening doors to even more applications like battery management, virtual sensing and reduced-order modelling. However, engineers working in more established fields that have recently incorporated AI may need a background in the technology. This creates demand for specific reference examples that engineers can use to identify how to incorporate AI into their work with minimal disruption.

The question is no longer if AI will impact businesses, but rather when this will happen and what this will look like for individual organisations. Continued AI adoption has implications across an organisation — from cross-disciplinary collaboration to unique component design — so it's critical for engineers to identify the use cases that align with their short- and long-term goals and implement them accordingly.

DUAL-GPU EDGE AI SYSTEM

Advantech has released the AIR-500D high-performance AI system supporting dual NVIDIA RTX GPUs. The solution leverages Intel Xeon D-1700 processors and two PCIe x16 slots that support dual high-performance GPU cards to deliver server-class performance.

The AIR-500D is said to be able to process large datasets and compute-intensive workloads when applied to AI inferencing and training applications. In addition, it supports wide operating temperature operation (-10 to +50°C) and features a 1200 W power supply suitable for industrial environments. AIR-500D also leverages a baseboard management controller (BMC) and Advantech DeviceOn software to enable a wide range of edge AI solutions, including those found in machine automation and vision.

Deploying AI in real-world applications requires machine learning training and inference for AI models. AIR-500D is designed to help businesses accrue value from their AI investment, especially when applied to massive data, image/audio classification, recommendations and decision-making.

AIR-500D is powered by Intel Xeon (up to 10 cores) and supports dual GPU cards at up to 800 W for immediate training and high-performance inference.

It also features TPM and adheres to PFR NIST for advanced security and firmware resiliency. This combination of features facilitates the remote execution of administrative tasks and provides an integrated multi-hardware defence mechanism for stable daily operation when applied to server power cycle, fan speed and component temperature monitoring, and hardware failure analysis.

Advantech Australia Pty Ltd
www.advantech.net.au

ELECTROMAGNETIC FLOWMETERS

Electromagnetic flowmeters, or magmeters, comprise a transmitter and sensor that together measure flow. The magnetic flowmeter's sensor is placed inline and measures an induced voltage generated by the fluid as it flows through a pipe.

The principle of the electromagnetic flowmeter (volumetric flowmeter) is based on Faraday's law of electromagnetic induction. The coils of the flowmeter generate a magnetic field orthogonal to the flow direction. According to Faraday's law of induction, a conductive liquid passing through the magnetic field induces a current between the two electrodes of the flowmeter. The higher the flow velocity, the higher the induced voltage. This voltage signal is converted into a standard signal (eg, 4–20 mA or pulse) by the integrated electronics.

Electromagnetic flowmeters have basic application in demanding flow and custody transfer measurements. They have designs and liner materials for various applications: from potable water to extremely adhesive, abrasive or aggressive fluids.

This electromagnetic flowmeter, being a non-intrusive type, can be used in general for fluid with an electrical conductivity greater than 5 μS/cm. Fluids like sand water slurry, coal powder, other slurries, sewage, wood pulp, chemicals, water (other than distilled water) in large pipelines, hot fluids, high viscosity fluids in the food processing industries and cryogenic fluids can be metered by the electromagnetic flowmeter.

Modsen electromagnetic flowmeters come in wafer and flanged versions and a large choice of nominal sizes from DN3 to DN3000.

Slentech Pty Ltd
www.slentech.com.au

HYGIENIC VALVE-SENSING UNIT

The ThinkTop V20 from Alfa Laval is a valve-sensing unit that is maintenance-free and does not require manual adjustment or programming. It enables 360° LED visual status indication from all directions, and also provides control-room monitoring of the real-time status of Alfa Laval hygienic valves.

Purpose-designed to digitalise essential on-off valve monitoring, the product is said to have a 40% faster set-up than previous valve indication units. Sensors automatically recognise the valve type and size, calibrate and record valve opening and closing distances, and complete set-up without requiring manual interaction. Replacing or hot swapping the valve top is easy without disrupting production. No expertise, training, adapters or special tools are required.

The unit shares the same look, maintenance-free housing and enhanced 360° LED visual status indication as the ThinkTop V-series control tops. Its compact, robust design makes it suitable for tight installations. Manufacturers select the communication protocol — digital, AS-Interface or IO-Link — that best suits their processing needs.

The product is hermetically sealed to prevent the risk of water, dust and other unauthorised access into the unit. Using the point-to-point IO-Link communication protocol allows the connection of sensors to automation systems. IO-Link also makes access to meaningful real-time data easier, improving diagnostics and simplifying configurability and control while supporting Industry 4.0.

Alfa Laval Pty Ltd
www.alfalaval.com.au

SCADA and MES connect with SAP in beverage plant

AriZona Beverages is famous for its 23-ounce 'big can', and since its founding in 1992 AriZona has produced popular teas, juices and energy drinks. The company is based in Woodbury, New York, and its newest plant is in Keasbey, New Jersey. The plant opened in November 2019, is 58,000 m² on 15 ha, and will produce 60 million cases of drinks per year.

For the New Jersey plant, AriZona wanted a comprehensive solution for HMI, SCADA, and a manufacturing execution system (MES) that would connect to its ERP system, which is SAP. Working with system integrator Vertech, AriZona implemented a system based on Ignition by Inductive Automation and Sepasoft.

Ignition is an industrial application platform with tools for building solutions in HMI, SCADA and the IIoT. Sepasoft MES works seamlessly with Ignition and provides control, traceability and documentation of the transformation of raw materials into finished goods in real time.

Systems integrator Vertech has extensive experience in food and beverage and other industries. The requirements for the project were to provide the Ignition SCADA platform, the Sepasoft MES solution, an ISA-88-compliant batch control system within Ignition, and a connection to SAP — while also improving access to data for better production efficiency and lower costs.

"We have improved efficiencies and processes throughout the plant," said Shami Usmani, vice president of engineering and manufacturing for AriZona Beverages.

He said Ignition's ease of use and flexibility were a big part of the project's success.

"Getting analytics out of a manufacturing facility has always been difficult," he said. "We wanted best-in-class software to help us analyse the data received from the plant."

"Ignition allowed us to integrate a lot of the controls into the batching, communicating with all the different systems in the plant," said Alex Hunt, quality manager for AriZona Beverages. "It really smoothed out our process."

He added that Ignition has been easier to use than other systems he'd used in the past.

"We were always adding new recipes into the system, and we found that it was much easier than we'd expected," Hunt said. "And it's also very easy to change current recipes."

Paul Warning, solutions architect with Vertech, said Ignition gave AriZona benefits on several levels.

"The flexibility of Ignition and database integration made it an ideal platform to build a custom batch solution from the ground up that followed the core principles of ISA-88, while also providing some freedoms to adapt the system to AriZona's business needs," he said.

Defining those business needs involved AriZona's core teams getting together to take a good look at their workflows.

"We saw there were a lot of manual handoffs, where people were just exchanging information via emails and phone calls," said Kimon Stergakos, chief solutions architect for business applications and technology for AriZona. "So we designed a solution that removed those manual handoffs. We identified seven areas where we had those, and now we feel we're getting a lot out of the fact that we automated that."

The automated system with Ignition and Sepasoft helps AriZona convert manufacturing data into actionable analytics. It includes a batch control system that interacts with every level of automation, from device control to SAP. The system delivers data for overall equipment effectiveness (OEE), downtime tracking, scheduling, and finished goods reporting.

Another aspect of the solution is Ignition Perspective, which leverages the power of mobile devices.

"The Perspective application for phones and tablets shows a summary of current work orders, sugar tank inventories, syrup tank inventories and more," Warning said. "You can see what's been batched, and where the products are. You can see production packaging counts for OEE and downtime, and key performance indicators over the last seven days."

iControls
www.icontrols.com.au

CABLE GLAND WITH BEND PROTECTION

The LAPP SKINTOP BS-SC-M METAL brass cable gland with stainless steel bending protection spiral has been developed for use on moving machine parts and protects the moving cable on the connection housing from excessive bending or kinking.

The cable gland can withstand high mechanical loads and allows a high number of bending cycles. This provides additional protection against breakage of wires and should ensure their function.

The cable gland has an integrated conductive and flexible contact spring that contacts the copper stranded shielding over a large area and therefore earths the cable via the gland on the housing. This makes the product suitable for EMC-compliant insertion of copper-shielded cables and offers protection against electromagnetic interference, wherever a low-resistance transition from the cable shield to the housing is to be established.

The cable gland also offers a wide, variable clamping range for different cable outer diameters, as well as a variant with a reduced sealing insert to seal cables with smaller diameters. The cable gland has been specially developed for use on moving machine parts and is also suitable for outdoor use due to its IP68 (10 bar) and IP69 protection class.

Treotham Automation Pty Ltd
www.treotham.com.au

RADAR LEVEL TRANSMITTER

Emerson has introduced the Rosemount 3408 level transmitter, a non-contacting radar device designed to optimise ease of use.

While the benefits of radar level measurement are widely acknowledged, leading to the technology's fast-growing adoption across multiple industries, radars are still sometimes perceived as being complex to commission, operate and maintain. Addressing this concern, the device provides a range of functions that reduce complexity throughout its lifecycle, including an intuitive interface, Bluetooth wireless technology remote capabilities, predictive alerts, in-situ verification, data historian and an upgradeable design.

The user interface provides pictorial instructions, allowing operators to be guided through installation, commissioning, proof-testing, operation and maintenance.

The device is based on frequency modulated continuous wave (FMCW) technology and is also suitable for use in critical safety applications such as overfill prevention, as it is SIL 2-certified and designed according to the IEC 61508 standard.

Emerson's proprietary Smart Meter Verification software provides an easy means of verifying the health of the device, without interrupting the process. Official records of device verification are generated, and an advanced diagnostics suite continuously monitors key device health and process parameters. A built-in historian enables users to access stored process data and alerts to gain process insights and aid troubleshooting.

The transmitter can be proof-tested remotely and in situ, which makes the procedure quick and easy, saving time and increasing plant and worker safety. In the event of device failure, its exchangeable design enables the simple replacement of a cassette within the transmitter housing, rather than replacing the entire transmitter head.

Emerson Automation Solutions
www.emerson.com/au/automation

SPRING ARMS AND MEASURING WHEELS

Turck has added spring arms and measuring wheels to its encoder range, offering another solution for measuring linear moving objects. The freely combinable spring arms and measuring wheels enable length and speed measurement using conventional encoders. This makes it possible to monitor the progress or speed of conveyor belts easily. The three spring arms all address different requirement profiles — from price-sensitive/space-saving to low-maintenance/flexible spring arms right through to more robust spring arms providing high-contact pressure.

All spring arm variants were developed for incremental and absolute solid shaft encoders. The spring arms are combined with measuring wheels with circumferences from 200 to 500 mm. Different coatings provide optimum contact stability on metal, glass, textiles or wood. Users can thus put together the most suitable encoder, spring arm and measuring wheel for their specific application.

The space-saving, small RA-SAB-5-20 and -24 spring arms are designed for measurement in small spaces with quietly running machines. The easy-to-install and compact 15-36 model has a wide pretension range and a wide choice of measuring wheels. Applications that require more contact pressure can be implemented utilising the larger 30-36 spring arm.

Turck Australia Pty Ltd
www.turck.com.au

EDGE AI PLATFORM

The Neousys Nuvo-8108GC-QD is the most recent model in the Nuvo-8108GC series and is a tough edge AI platform created specifically for NVIDIA RTX A6000 and RTX A4500 Ampere GPU cards. In order to advance GPU-accelerated edge AI applications like vision inspection and intelligent video analytics, the GPUs provide high computing power and a claimed long product life.

The product is powered by an Intel Xeon E or 9th/8th-Gen Core CPU with a workstation-grade Intel C246 chipset to support up to 128 GB ECC or non-ECC DDR4 memory. It also incorporates an efficient thermal dissipation architecture to maximise GPU performance in hot settings.

A special mounting bracket for the RTX A6000/A4500 is included to keep the GPU card securely fastened in the PCIe slot, for functionality under extreme shock and vibration situations. With the addition of the RTX A6000/A4500 to Neousys's GPU computer line-up, an edge AI platform with up to 309.7 TFLOPS tensor performance and 38.7 TFLOPS FP32 performance is realised.

The system has wide-ranging DC input of 8–48 VDC with built-in ignition power control, a thermal design for -25 to 60°C operation, and damping brackets to withstand $3g_{RMS}$ vibration.

Backplane Systems Technology Pty Ltd
www.backplane.com.au

HANDHELD INDICATOR AND DATA LOGGER

Vaisala's Indigo80 Handheld Indicator is designed for industrial spot checking, short-term data logging, field sampling, data analysis and diagnostics. The company has also announced the HMP80 HUMICAP handheld humidity and temperature probe and the DMP80 DRYCAP handheld dewpoint and temperature probe, both designed for portable use with the handheld indicator.

Vaisala says the handheld indicator combines leading-edge technology and ultramodern industrial design. Special attention has been paid to its look and feel, customer experience and usability. It must be easy to take along and operate in varying measurement environments, while being as durable as fixed installed devices.

In addition to the two newly launched probes, Indigo80 operates together with Vaisala's other Indigo-compatible measurement probes and select measurement instruments. Together with the probes, the product allows measurement of multiple parameters, including humidity, temperature, dewpoint, carbon dioxide, hydrogen peroxide vapour and moisture in oil.

The indicator's data logging capabilities enable enhanced industrial process efficiency by monitoring process conditions during the needed time period. Spot checking helps to ensure that process conditions are within the required range to produce consistent and high-quality products.

The device can also be used for reference checking of the stationary installations of Vaisala measurement instruments, and for onsite calibration of existing Vaisala fixed-mount instruments.

Vaisala Pty Ltd
www.vaisala.com

RAIL-MOUNT TERMINAL BLOCK

WAGO has expanded its TOPJOB S rail-mount terminal blocks with levers, with a rated cross-section of 4 mm². The additional variant now provides rail-mount terminal blocks with levers with rated cross-sections from 2.5 to 16 mm². It is easy to combine with existing terminals blocks, whether they have operating slots or push-buttons. They use the same jumpers and marking system. The intuitive connection with levers requires no tools to open or close and identify the open clamping point when raised. Rail-mount terminal blocks with levers are appropriate for quick and easy network connection, among other uses.

2-wire and 3-wire through terminal blocks are available in grey, blue and green–yellow for PE (ground conductor). They offer lever operation for the external connection and a choice of either an operating slot or push-button for the internal connection. The lever makes simultaneous connection of difficult-to-bend multi-core sheathed cables more convenient. In addition, intuitive tool-free lever open reduces the significant time needed for rewiring.

WAGO Pty Ltd
www.wago.com.au

RUGGED LAPTOP

The Winmate L140TG-03 is a robust laptop with an IP65 rating and is certified to MIL-STD-810H for shock, drop and vibration.

The heavy-duty laptop has optical bonding technology and its bright FHD 13.3″ display can enable daylight readability. Additionally, it has customisable multi-touch gestures and a variety of touchscreen modes, including fingertip, pen and glove controls for quick access to frequently used Windows features and functions.

The 80-key, spill-resistant keyboard has a full-scale QWERTY layout and offers good tactile feedback and backlighting. Long battery life is achieved with hot-swappable dual batteries.

The computer has a user-friendly projective capacitive touchscreen and has a 1920 x 1080 resolution. Based on an Intel Core Tiger Lake processor, it also has wireless connectivity choices that include Wi-Fi and BT compatibility, GPS/GLONASS and 4G LTE (optional).

Backplane Systems Technology Pty Ltd
www.backplane.com.au

THREE WAYS TO USE FLOW DATA FOR CORPORATE WATER SAVINGS

McCrometer's FPI Mag flow meter is the ideal solution for leakage detection.

Countless companies have published initiatives on water conservation and efficiency, often for compliance, financial benefits, and social responsibility. Companies in hospitality, healthcare, and general office buildings are all working to reduce their facilities' water usage in practice and method, but you cannot manage what you do not measure.

In order to quantify water savings at different points within a facility, a highly accurate and dependable flow measurement device is necessary. In fact, reliable flow data collected at regular intervals can be useful for daily operation decisions.

Here are **three major ways** that operators, technicians, and engineers can use flow measurement data to support corporate water savings initiatives.

1. Leak detection

These days, water is money. Facilities should be metering to verify that they're receiving what they're paying for and using water efficiently in their manufacturing processes. Multiple metering points throughout a facility's pipeline provide additional data points for long-term comparison, allowing operators and technicians to identify leaks, system failures, and broken equipment such as valves and pumps.

For instance, if a facility is using automatic shut-off valves to manage the flow of water that is cooling equipment, a flow meter sending data at regular intervals to a management system would indicate failure of the shut-off valve — thus indicating wasted water during a non-operational time period.

Having the flow data from sufficient points in the system will provide operators and technicians with the information needed to make decisions on water losses and to repair leaks. More information about economic levels of leakage and achieving zero net leakage can be found in a technical article by McCrometer.

2. Compliance

Many facilities strive to have buildings certified to various standards and ratings like ENERGY STAR. Monitoring flow using a highly accurate flow meter provides operators with the data they need to achieve the necessary credits, as well as meet corporate water objectives.

Industrial facilities needing to report to local, state, or federal regulators will benefit from highly accurate, repeatable flow measurements. Facilities flowing large quantities of water will see a significant difference between a ±2% accurate meter and a ±0.2% accurate meter, which can equate to financial savings as well as water usage and effluent levels below thresholds.

3. Reducing water footprint

Many companies are taking the initiative by announcing their commitment to be 'water positive', a combination of water-use reduction, recycling, and investment into the local water infrastructure. Often this involves wastewater treatment on-site for many factories and production centres, with the goal to reuse 100% of the facility's process water and reducing the burden on the local municipality.

When the stakes are high to meet environmental and corporate initiatives involving a company's water footprint, it's critical to invest in valuable measurement technology. Flow data at intake, effluent, and post-wastewater treatment will allow operators and technicians to calculate efficiency and conservation.

In addition to recycling process water for reuse at facilities, companies can also quantify the amount of water they're treating and returning to the community. Many companies in drought-plagued regions have made a commitment to return a certain percentage or amount of treated water to support local agriculture and wildlife, and require accurate, reliable flow data to quantify that water.

Flow meters to achieve corporate water savings

While companies in a variety of industries report to different regulators, and have unique conservation and sustainability objectives and industrial water practices, they can all benefit from installing the right meter in the right location to meet their application's needs.

A full-bore electromagnetic (mag) meter like McCrometer's Ultra Mag, or a full-profile insertion mag meter such as the FPI Mag offer system integration, unprecedented accuracy and repeatability, minimal-to-no maintenance, and provide flow data for the lifetime of the industrial facility. These meters are ideal for new and retrofit projects in a variety of industrial verticals and are a cost-effective measurement solution that meets regulatory requirements.

For more information about McCrometer's high-quality flow measurement solutions that contribute to corporate water savings, visit www.mccrometer.com/ind.

AMS

AMS Instrumentation & Calibration Pty Ltd
www.ams-ic.com.au

KEEPING MOVING

COMMUNICATION AND SAFETY CHALLENGES
FACING MOBILE ROBOT MANUFACTURERS

Mark Crossley, Daniel Heinzler, Fredrik Brynolf and Thomas Carlsson, HMS Networks

Modern communication solutions help overcome the challenges in implementing mobile robots.

Mobile robots are everywhere, from warehouses to hospitals and even on the street. Their popularity is easy to understand: they're cheaper, safer, easier to find and more productive than actual workers. They're also easy to scale or combine with other machines. As mobile robots collect a lot of real-time data, companies can use mobile robots to start their IIoT journey.

But to work efficiently, mobile robots need safe and reliable communication. This article outlines the main communication and safety challenges facing mobile robot manufacturers and provides an easy way to overcome these challenges to keep mobile robots moving.

What are mobile robots?

Before we begin, let's define what we mean by mobile robots.

Mobile robots transport materials from one location to another and come in the form of two types: automated guided vehicles (AGVs) and autonomous mobile robots (AMRs). AGVs use guiding infrastructure (wires, reflectors or magnetic strips) to follow predetermined routes. If an object blocks an AGV's path, the AGV stops and waits until the object is removed.

AMRs are more dynamic: they navigate via maps and use data from cameras, built-in sensors or laser scanners to detect their

Sometimes a Bluetooth connection will be sufficient, as it offers a stable non-congested connection, while other applications will require a high-speed, secure cellular connection. What would be useful for mobile robot manufacturers is to have a networking technology that's easy to change to meet specific requirements.

The second challenge is to ensure that the installation works as planned. Before installing a wireless solution, users should complete a predictive site survey based on facility drawings to ensure the mobile robots have sufficient signal coverage throughout the location. The site survey should identify the optimal location for the access points, the correct antenna type, the optimal antenna angle and how to mitigate interference. After the installation, wireless sniffer tools should be used to check the design and adjust APs or antenna as required.

Connecting mobile robots to industrial networks

Mobile robots need to communicate with controllers at the relevant site even though the mobile robots and controllers are often using different industrial protocols. For example, an AGV might use CANopen while the controller might use Profinet. Furthermore, mobile robot manufacturers may want to use the same AGV model on a different site where the controller uses another industrial network, such as EtherCAT.

Mobile robot manufacturers also need to ensure that their mobile robots have sufficient capacity to process the required amount of data. The required amount of data will vary depending on the size and type of installation. Large installations may use more data as the routing algorithms need to cover a larger area, more vehicles and more potential routes. Navigation systems that use vision navigation process images and therefore require more processing power than installations using other navigation systems such as reflectors. As a result, mobile robot manufacturers must solve the following challenges:

1. They need a networking technology that supports all major fieldbus and industrial Ethernet networks.
2. It needs to be easy to change the networking technology to enable the mobile robot to communicate on the same industrial network as the controller without changing the hardware design.
3. They need to ensure that the networking technology has sufficient capacity and functionality to process the required data.

Creating a safe system

Creating a system where mobile robots can safely transport material is a critical but challenging task. Mobile robot manufacturers need to create a system that considers all the diverse types of mobile robots, structures and people in the environment. They need to ensure that the mobile robots react to outside actions, such as someone opening a safety door or pushing an emergency stop button, and that the networking solution can process different safety protocols and interfaces.

They also need to consider that AMRs move freely and manage the risk of collisions accordingly. The technology used in sensors is constantly evolving, and mobile robot manufacturers need to follow the developments to ensure their products remain as efficient as possible.

iStockphoto.com/Vanit Janthra

surroundings and choose the most efficient route. If an object blocks an AMR's planned route, it selects another route. As AMRs are not reliant on guiding infrastructure, they're quicker to install and can adapt to logistical changes.

Communication and safety challenges

Establishing a wireless connection

The first challenge for mobile robot manufacturers is to select the most suitable wireless technology. The usual advice is to establish the requirements, evaluate the standards and choose the best match. Unfortunately, this isn't always possible for mobile robot manufacturers as often they don't know where the machine will be located or the exact details of the target application.

Wireless Standard	Advantages	Disadvantages
Bluetooth	Stable	Low bandwidth
Cellular	Secure Easier to control traffic Low latency Offers high or low bandwidth options	Expensive to install Requires expertise to configure the network
Wi-Fi	Cheap to install and scale	Prone to congestion Sensitive to interference

Table 1: Wireless standards advantages and disadvantages.

The safety standards provide guidelines on implementing safety-related components, preparing the environment, and maintaining machines or equipment.

While compliance with the different safety standards (ISO, DIN, IEC, ANSI, etc) is mostly voluntary, machine builders in the European Union, for example, are legally required to follow the safety standards in the machinery directives. Manufacturers can only affix a CE label and deliver the machine to their customers if they can prove in the declaration of conformity that they have fulfilled the directive's requirements.

Although the other safety standards are not mandatory, manufacturers should still follow them as they help to fulfil the requirements in machinery directive 2006/42/EC. For example, manufacturers can follow the guidance in ISO 12100 to reduce identified risks to an acceptable residual risk. They can use ISO 13849 or IEC 62061 to find the required safety level for each risk and ensure that the corresponding safety-related function meets the defined requirements.

Mobile robot manufacturers decide how they achieve a certain safety level. For example, they can decrease the speed of the mobile

Figure 1: Safety challenges for mobile robot manufacturers.
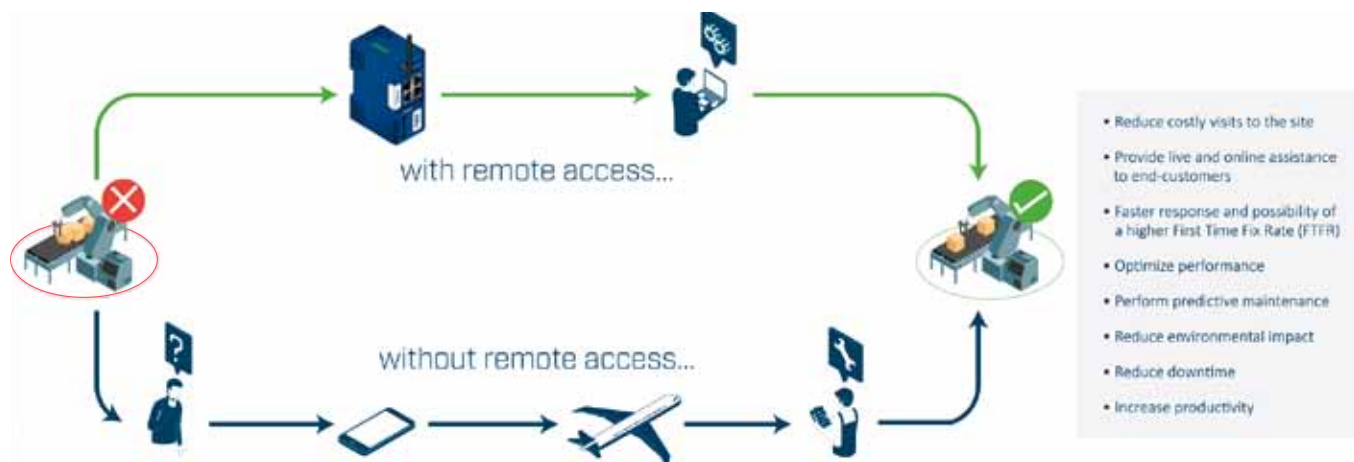
Figure 2: Benefits of remote access.

robot to lower the risk of collisions and severity of injuries to an acceptable level. Or they can ensure that mobile robots only operate in separated zones where human access is prohibited (defined as confined zones in ISO 3691-4).

Identifying the correct standards and implementing the requirements is the best way mobile manufacturers can create a safe system.

Ensuring reliable CAN communications

A reliable and easy-to-implement standard since the 1980s, communication based on CAN technology is still growing in popularity, mainly due to its use in various booming industries, such as e-mobility and battery energy storage systems (BESS). CAN is simple, and is energy- and cost-efficient. All the devices on the network can access all the information, and it's an open standard, meaning that users can adapt and extend the messages to meet their needs.

For mobile robot manufacturers, establishing a CAN connection is becoming even more vital as it enables them to monitor the lithium-ion batteries increasingly used in mobile robot drive systems, either in retrofit systems or in new installations. Mobile robot manufacturers need to do the following:

1. Establish a reliable connection to the CAN or CANopen communication standards to enable them to check their devices, such as monitoring the battery's status and performance.
2. Protect systems from electromagnetic interference (EMI), as EMI can destroy a system's electronics. The risk of EMI is significant in retrofits as adding new components, such as batteries, next to the communication cable results in the introduction of high-frequency electromagnetic disturbances.

Accessing mobile robots remotely

The ability to remotely access a machine's control system can enable mobile robot vendors or engineers to troubleshoot and resolve most problems without travelling to the site.

The challenge is to create a remote access solution that balances the needs of the IT department with the needs of the engineer or vendor.

The IT department wants to ensure that the network remains secure, reliable and retaining integrity. As a result, the remote access solution should include the following security measures:

- Use outbound connections rather than inbound connections to keep the impact on the firewall to a minimum.
- Separate the relevant traffic from the rest of the network.

- Encrypt and protect all traffic to ensure its confidentiality and integrity.
- Ensure that vendors work in line with or are certified to relevant security standards such as ISO 27001.
- Ensure that suppliers complete regular security audits.

The engineer or vendor wants an easy-to-use and dependable system. It should be easy for users to connect to the mobile robots and access the required information. If the installation changes, it should be easy to scale the number of robots as required. If the mobile robots are in a different country from the vendors or engineers, the networking infrastructure must have sufficient coverage and redundancy to guarantee availability worldwide.

Conclusion

As we've seen, mobile robot manufacturers must solve many communication and safety challenges. They must establish a wireless connection, send data over different networks, ensure safety, connect to CAN systems and securely access the robots remotely. And to make it more complicated, each installation must be reassessed and adapted to meet the onsite requirements.

Mobile robot manufacturers are rarely communication or safety experts. Subsequently, they can find it time-consuming and expensive to try and develop the required communication technology in-house. Enlisting purpose-built third-party communication solutions not only solves the communication challenges at hand, it also provides other benefits.

Modern communication solutions have a modular design, enabling mobile robot manufacturers to remove one networking product designed for one standard or protocol and replace it with a product designed for a different standard or protocol without impacting any other part of the machine. For example, Bluetooth may be the most suitable wireless standard in one installation, while Wi-Fi may provide better coverage in another installation. Similarly, one site may use the Profinet and PROFIsafe protocols, while another may use different industrial and safety protocols. In both scenarios, mobile robot manufacturers can use communication products to change the networking technology to meet the local requirements without making any changes to the hardware design.

HMS Industrial Networks
hms-networks.com

OIL CONTAMINATION SENSOR

The Hydac CS 1000 series contamination sensor is an online fluid sensor for permanent monitoring of particle contamination in fluids. The cleanliness results can either be given according to ISO/SAE or ISO/NAS classifications.

Applications include industrial hydraulic and lubrication systems and mobile hydraulics.

The sensor offers the option to switch between SO 4406:1999/ SAE AS 4059 and ISO 4406:1987/NAS 1638 standards and allows the identification of critical machine conditions in early stages through the continuous monitoring of oil conditions, allowing condition-based maintenance planning.

Information including self-diagnosis, flow rate and temperature is displayed locally via a 6-digit, 17-segment LED display and is also available via analog and DC voltage outputs.

The sensor has IP67 protection, an ambient operating temperature range of -30 to +80°C and maximum relative humidity of 95%, non-condensing.

*** HYDAC International***
www.hydac.com.au

MICRO AC VARIABLE FREQUENCY DRIVES

Direct Automation has added the DURApulse GS10 series to its range of micro AC drives. GS10 drives are available in a variety of voltage and horsepower ratings, including single-phase 120 VAC models in sizes from ¼ to 1 hp, single-phase 230 VAC models from ¼ to 3 hp, three-phase 230 VAC models from ¼ to 7.5 hp and 460 VAC three-phase units from ½ to 10 hp.

GS10 micro drives offer advanced features such as sensorless vector control, PID control, multiple motor support for induction motors, as well as the ability to control permanent magnet motors. Modbus RTU communication and built-in I/O, including analog, digital (with one 10 kHz pulse train input) and relay outputs, are standard.

NEMA 1 conduit boxes, DIN rail mounting kits and braking resistors are also available as optional accessories.

Direct Automation Pty Ltd
www.directautomation.com.au

OPEN-CHUTE TIPPER

A high-volume open-chute tipper from Flexicon allows discharging of non-dusty, free-flowing or agglomerated bulk materials from multiple drums or boxes simultaneously, as well as from Gaylords, totes or bins individually.

The bed of the unit's hydraulically tipped housing can accommodate containers from 940 to 1115 mm in height, having an individual or combined footprint of up to 1825 x 2435 mm. Typical applications for multiple containers include simultaneous dumping of four 210 L drums, or four boxes, each having a footprint of 915 to 1220 mm.

Pallets weighing up to 2265 kg are forklift-loaded into the three-sided unit and secured, after which a grate is lowered onto the containers to prevent shifting. The lifting assembly is raised to a height of 1955 mm and tipped hydraulically, causing material to slide through a smooth, three-sided chute into receiving vessels.

Twin hydraulic cylinders pivot the platform-chute assembly to discharge angles of 45 or 60 degrees beyond horizontal, including a motion-dampening feature at the termination of container rotation. Impact-resistant side panels and custom guard panels with a light curtain ensure safe operation.

The tipper is available in heavy-duty, all-stainless construction to sanitary standards or in carbon steel with durable industrial coatings and stainless steel material contact surfaces. It is also available with optional receiving hoppers configured with Flexicon mechanical or pneumatic conveyors to transport discharged material to any plant location.

Flexicon Corporation (Aust) Pty Ltd
www.flexicon.com.au

FANLESS EMBEDDED SYSTEM

The iEi DRPC-W-TGL is a fanless DIN rail embedded system incorporating iEi's 3.5″ single board computers. Its small size is suitable for installing into applications that need numerous I/O connectivity options and improved performance yet have a small footprint. The iEi DRPC-W series is made to manage communication for IoT gateways, motion and vision applications on the factory floor.

The DRPC-W-TGL fanless embedded system includes 11th Generation Intel Core and Celeron processor options and Intel UHD graphics. The Intel Core CPU, which powers the DRPC-W-TGL fanless embedded system and has a maximum turbo frequency of 4.40 GHz, provides a performance boost of two times over Whiskey Lake.

It offers three 2.5 Gb Ethernet ports, an M.2 A Key and a M.2 B Key (with SIM card slot), and has a wide operating temperature range of -20 to +60°C. The ruggedised chassis offers shock protection and has been half sine tested up to 5g, 11 ms, three shocks per axis.

ICP Electronics Australia Pty Ltd

www.icp-australia.com.au
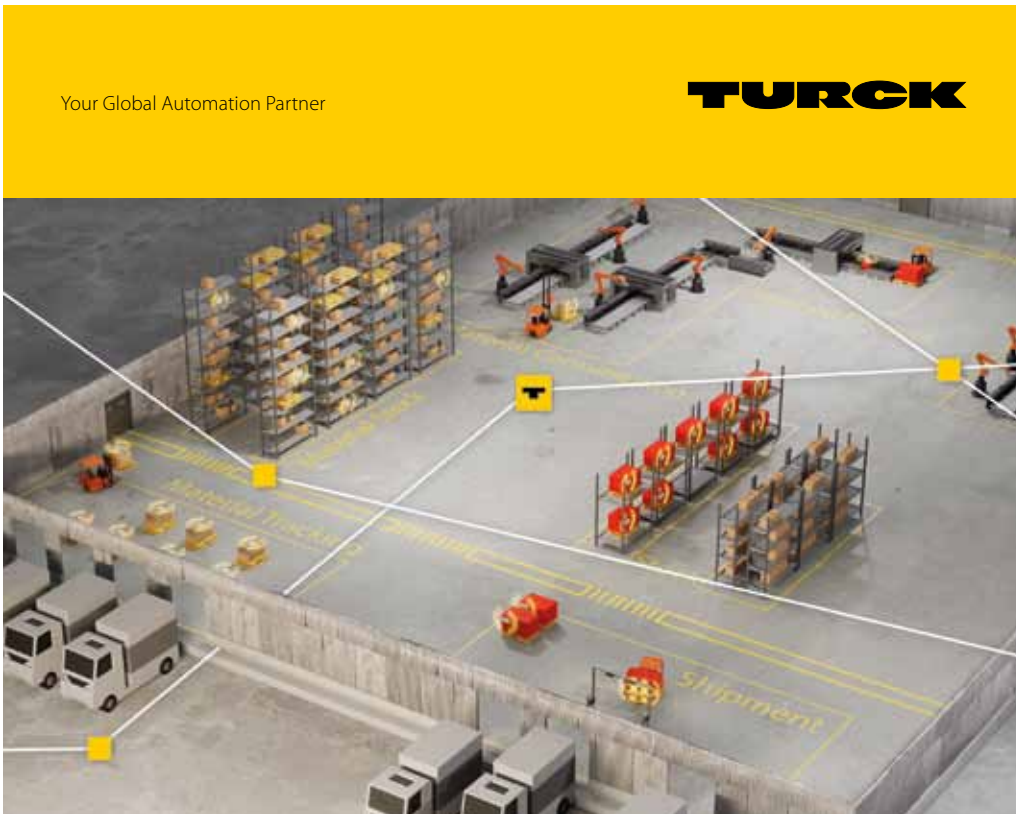
GAS MEASUREMENT DATA LOGGER

The ICP DAS DL-1050 is a gas measurement module and data logger that measures oxygen, temperature, humidity and dew point, as well as various other gases such as CO, CO_2, HCHO (formaldehyde), NH_3, H_2S and total volatile organic compounds. The device can record data and send an alarm when the concentration is too high.

Real-time data can be accessed from the device using included Windows software, an iOS app or an Android app, as long as they are connected to the same local network. Support is provided for popular industrial protocols such as DCON, Modbus RTU and Modbus TCP, as well as the emerging machine-to-machine and IoT connectivity protocol MQTT.

The data logger can be connected via widely used communication interfaces including RS-485, Ethernet and PoE, meaning that the device can be easily integrated into existing HMI or SCADA systems. It is designed for industrial applications in harsh environments with IP43 grade protection approval.

ICP Electronics Australia Pty Ltd

www.icp-australia.com.au
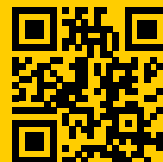
BARCODE READER FOR LOGISTICS TUNNELS

Designed for the Cognex Modular Vision Tunnel, the DataMan 580 fixed-mount barcode reader is designed to optimise logistics processes by enabling high-speed operations while improving traceability. The built-in QuickSort algorithms simultaneously decode multiple 1D and 2D codes at top-line speeds while the 9 MP area scan imager enables good field of view. The system actively tracks packages throughout its field of view so that users can reduce the space between boxes and process more items.

In contrast to linear scanning systems, the product is designed to ensure more robust code reading by deciphering high-perspective labels on irregular objects. The system's HDR+ imaging algorithm is said to reduce the exposure times needed for high-resolution images, delivering crisp, clear images even in low-contrast environments.

The unit can be enhanced with Edge Intelligence, Cognex's device management and performance tool, to track real-time system performance and optimise operations downstream. The company says pairing Data-Man 580 Modular Vision Tunnels with Cognex 3D vision systems enables logistics operations to identify label placement and dimensions in real time, helping validate label compliance.

Automation Systems and Controls Pty Ltd
www.asconline.com.au

FUTURE SOLUTIONS SPEAKER PROGRAM AT AMW2023

Registrations are now open for Australian Manufacturing Week (AMW2023), to be held at the Melbourne Convention and Exhibition Centre (MCEC) 9–12 May 2023. Organised and run by the Australian Manufacturing Technology Institute Limited (AMTIL), AMW2023 will occupy more than 10,764 square metres of exhibition space at the MCEC, with over 330 organisations taking stands to showcase the latest manufacturing technologies, processes and support services.

The AMW Future Solutions Speaker Program rolls out through the week, a free conference within AMW2023, covering major topics within the industry.

On Tuesday, the special focus is Digital and Additive Manufacturing. Richard Elving from Markforged will reveal how Australian businesses are using 3D printing to bring manufacturing back home. Later in the day, Cherry Chen from CSIRO will speak about the research into functional materials for space, biomedical and hydrogen storage applications.

The second day at Australian Manufacturing Week has a special focus on our crucial assets. Wednesday, 10 May features Women in Manufacturing, and as part of the Future Solutions Speaker Program, Wednesday's roll call of experts will expand on career pathways and opportunities open for women to advance in the industry right now. The team from William Buck will talk about unleashing the full potential of your workplace, then a panel from SEMMA will show how women are fuelling Australian manufacturing today.

Thursday, 11 May sees the AMW Future Solutions Speaker Program change tack to a celebration of Australian manufacturing with a focus on new technology. The speakers come from Autodesk, Bosch, ANCA, Adobe and the Victorian Government.

The last day of AMW2023, Friday, 12 May, celebrates Innovation and Research in manufacturing. Jennifer Conley from the Geelong Manufacturing Council reveals some innovative case studies from regional Victoria. There will also be a look inside the Australian National Fabrication Facility and the work being done on advanced materials, with Oded VanHamm.

If you haven't already, now is the time to register online to visit Australian Manufacturing Week in Melbourne. AMTIL says it is going to be the biggest manufacturing show in the Southern Hemisphere.

Register now at australianmanufacturingweek.com.au.

Australian Manufacturing Technology Institute Ltd
www.amtil.com.au

HORIZONTAL CONVEYOR

FastBack 4.0 is the latest horizontal motion conveying technology from Heat and Control. FastBack conveyors are designed to provide benefits to the food processing industry such as near zero breakage and product damage, no loss of coatings or seasonings, reduced sanitation and associated downtime, and quiet operation.

The latest version includes an instant reversing capability, requires no preventive maintenance or lubrication, and has no flexures, linear bearings or bushings. It also has a long design life due to 70% fewer moving parts, high-pressure washdown capability, and a smaller footprint for both ease of installation and ease of sanitation.

FastBack 4.0 is a circular to linear drive horizontal motion conveyor. A key design feature is a rotational (circular) drive motion that produces a horizontal (linear) motion. The circular to linear drive converts rotational motion into pure horizontal motion while also supporting the vertical weight of the pan.

There are no pinch points or moving arms to cover and protect, which further improves the working environment, and it provides high travel rates.

Heat and Control Pty Ltd
www.heatandcontrol.com

DATA ACQUISITION MODULE

The Dewesoft IOLITEr-8xLVe is an 8-channel data acquisition device with easy sensor connectivity. It also provides a high-power sensor supply that is applicable to some types of current sensors.

Test engineers can use it for synchronised high dynamic measurements. The supported measurement modes include voltage, current and potentiometer measurements. The IOLITEr-8xLVe has two input ranges of ±100 V and ±5 V, as well as unipolar excitation and TEDS support. This provides the flexibility to work with different industrial sensors such as pressure sensors, potentiometers and MEMS accelerometers.

Data is acquired simultaneously from all eight channels with a sampling rate of up to 20,000 samples/s. The module uses a 24-bit sigma delta ADC with an antialiasing filter. Protection from external spikes is provided by Dewesoft's channel-to-ground isolation.

The module is available with a D-SUB37 and a terminal block connector, and is suitable for all IOLITE standard chassis.

Metromatics Pty Ltd
www.metromatics.com.au

TEMPERATURE TRANSMITTERS

The iTEMP TMT31 temperature transmitter for analog 4–20 mA signals is said to improve on its RTD transmitter predecessors with better connection technology, and is available in two formats. The first incorporates push-in terminals, enabling fast, tool-free, secure field wiring. It is also available in the classic screw terminal format, with a design that makes wire terminations in the connection head easier. Corrosion-free contacts are designed to ensure maximum reliability of measured value transmission for both connection variants.

For fast commissioning, users have the option to receive the TMT31 transmitter preconfigured from the factory or to apply custom parameterisation onsite with configuration software, such as Endress+Hauser FieldCare or DeviceCare. These software packages run on most operating systems, both on laptops and tablets. The USB configuration kits required for this, such as TXU10 or Commubox FXA291, are also available as accessories.

In accordance with ATEX and CSA C/US standards, along with Pt100 and Pt1000 sensors, the TMT31 is approved for safe operation in Zone 2/Div. 2 hazardous areas (non-sparking). Additionally, the sensor adjustment parameter in the head transmitter can be modified according to Callendar-Van Dusen equations (CvD) to match the connected RTD sensor characteristics, further refining temperature measurement accuracy.

Endress+Hauser Australia Pty Ltd
www.au.endress.com

FULL METALLIC CONNECTORS

Components for the automation industry are required to remain compact and small, but to be resistant to vibration and maintain their seal in rugged environments.

The ILME CQA/MQA 08 fully metallic connectors feature compact overall dimensions and a robust stainless steel lever. The hoods come in one piece for handling any wiring combination and they are EMC-ready if equipped with a suitable M25 EMC cable gland.

They come together with specifically designed CQ 08E inserts in crimp termination technology with integrated PE plate, for granting the connection continuity between the PE contact and the metal enclosure. For fast and error-free wiring, internal keys on both hoods and housings avoid possibly hazardous mounting of inserts without such integrated PE plate.

Treotham Automation Pty Ltd
www.treotham.com.au
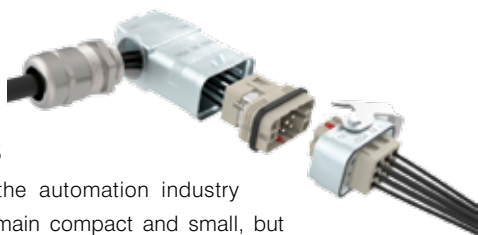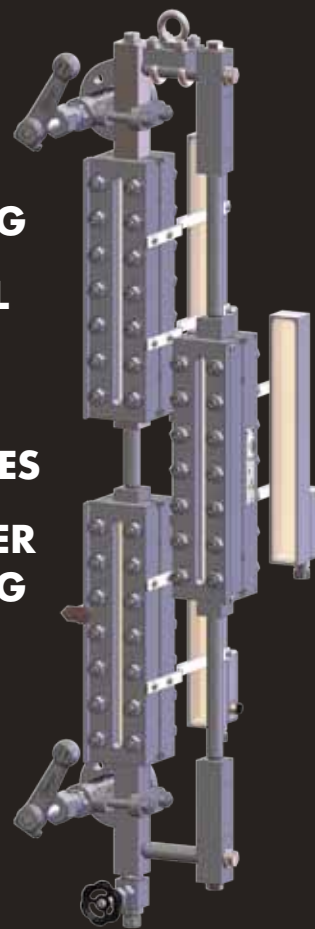
AS I SEE IT

HISTORY DOESN'T REPEAT, IT RHYMES: CHALLENGING THE ROLE OF DATA HISTORIANS IN PREDICTIVE ANALYTICS

As the world continues to become more data-driven, it's no surprise that organisations are turning to predictive analytics to gain insights and improve their operations and maintenance. Utility companies are starting to investigate the benefits of using predictive analytics to optimise energy usage, reduce maintenance costs and improve overall asset reliability. However, many businesses get lost in the hype of technologies, solutions and approaches that seem to make the same promises but in very different ways. One such example is the ongoing debate around the value of data historian technologies in enabling predictive analytics.

I want to challenge this notion and discuss why a data historian may not be as necessary to predictive analytics as some might believe.

First, let's define what a data historian is. A data historian is a software system that collects, stores and retrieves time-series data from various sources. This system enables businesses to analyse historical data trends over time. Data historians are an old technology that has been around for decades and were an enabling component of many early data analytics applications. However, with advancements in cloud-based technology for data collection, processing, storage and analysis, the role of the data historian is diminishing.

One of the main arguments for using a data historian is that it provides a complete historical record of system data. However, with the significant cost reductions in scalable cloud services, cost-effective, high-performance data processing and storage is no longer a constraint. Businesses can store and process infinite amounts of data in the cloud, which means they can access their complete historical data without the need for expensive data historian software and dedicated hardware.

Another argument for using a data historian is that it provides real-time access to data, which is essential for making timely decisions. However, modern industry cloud platforms provide real-time data acquisition and processing capabilities. These elastic industry cloud platforms can be deployed to scale up and down, as and when required. This means businesses only pay for the storage and processing services they require to run predictive analytics applications when they require them. This modern approach eliminates the dead cost of storing large volumes of data not required for predictive analysis.

Finally, a data historian stores yesterday's data, which is of limited value to artificial intelligence-enabled predictive analytics applications. As Mark Twain said, "History doesn't repeat, it rhymes", and this is true of failures in process plants. Historical data is required to train predictive models, but typically this involves no more than a few thousand rows of data extracted from an historian. Once a predictive model is trained, it rarely uses historical data: rather, it relies on real-time or live data. For operators this means once we have accurate and trusted predictions that allow us to take preventative action, the historian should, in theory, never write data outside of normal operating parameters.

In conclusion, while data historians have played a role in many early iterations of data analytics applications, they are not as necessary to predictive analytics as some might believe. With the advancements in industry cloud technologies, businesses can build predictive analytics applications that process massive amounts of live data, providing them with the far more valuable view of what is going to happen tomorrow rather than what happened yesterday.

Luke Davey is a digital transformation specialist and manager of the digital enterprise solutions team at Yokogawa Australia. Luke and his team assist customers in adopting new and emerging technologies to improve operational performance, security, safety and sustainability.