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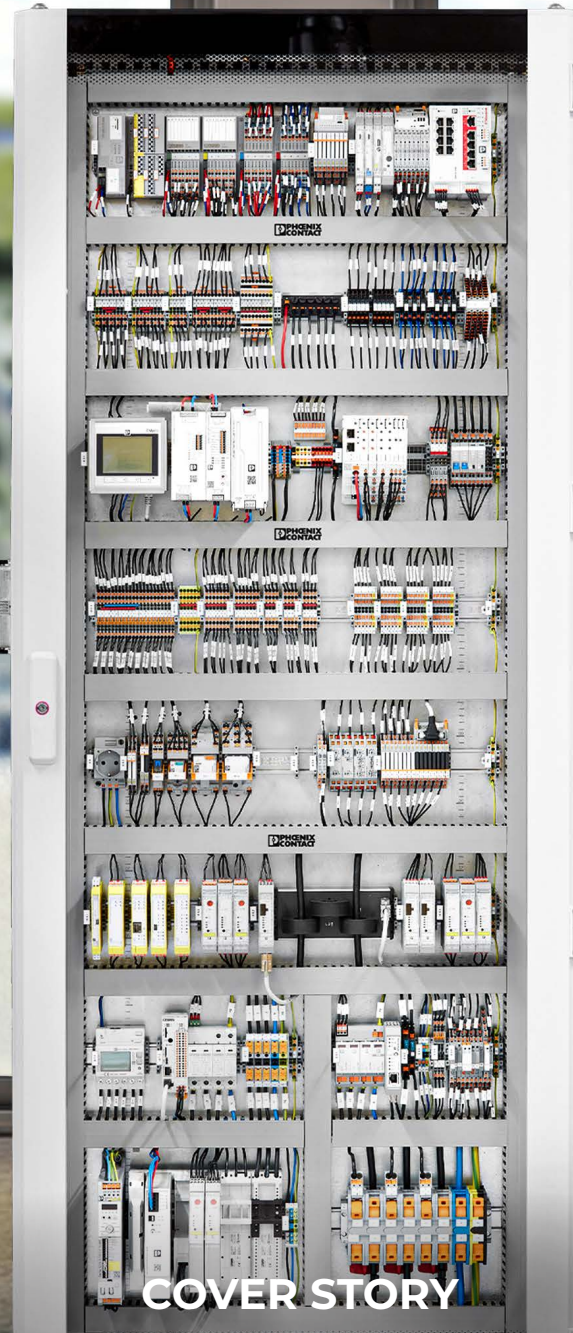
AUTOMATE

ASIA MAGAZINE

Are You Ready to Hug a Robot?

How are Pressure Sensors used in the Era of Industry 4.0?

AI Set to Supercharge Robotic Automation



COVER STORY

Success in Motion Towards a Resilient Future
An Interview with Charlie Lim, Managing Director, Phoenix Contact Southeast Asia

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PUBLISHER'S MESSAGE

Prime Minister Anwar Ibrahim issued a cautionary message to Malaysians, urging them not to lag behind in the rapid integration of artificial intelligence (AI). He made this statement while unveiling an e-learning course aimed at enhancing the skills of workers who may be at risk of job displacement as machine learning becomes increasingly prevalent in the workforce.

In collaboration with tech giant Intel, the 'AI For The People' online course has been introduced as the latest initiative in the government's push towards digitization, suggesting it could contribute as much as US\$113.4 billion, equivalent to a quarter of the country's GDP.

On the other hand, Malaysia is set to unveil its artificial intelligence (AI) code of ethics and governance guidelines as early as April. The Ministry of Science, Technology, and Innovation (MOSTI) has revealed that the progress of developing these guidelines has reached 90%. The guidelines, tailored for users and the public, policymakers, and providers or developers of AI-based technology, are structured around seven principles of responsible AI.

On behalf of the editorial team, thank you for your massive support of Automate Asia Magazine. Stay in touch with us at www.asiaautomate.com for more updates

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Multiple interfaces for connectivity

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Standard Web Control operation allows users to coordinate with partners to make configurations and tests remotely

Application

应用

Power Design

12-bit resolution and 4096 vertical digitizing levels enable users to capture the signal details of the high-precision power supply efficiently. The S model is equipped with a standard configuration of built-in signal generator and Bode plot loop analysis function, making it easy to do the switching power supply test.

Embedded Design

The DHO900 series is equipped with a standard configuration of embedded decodes and supports digital signal analysis, efficiently addressing the analysis requirements for the analog and digital signals in the embedded system.

Automobile Electronics

The DHO900 series offers standard CAN and LIN auto bus decodes, capable of addressing the decoding demands of the automobile communication system.

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Alibaba Cloud Unveils Serverless Solution to Harness Gen-AI Capabilities for Enterprises

Empower global customers with LLMs to develop customized AI applications

Alibaba Cloud, the digital technology and intelligence backbone of Alibaba Group, unveiled a serverless version of its **Platform for AI (PAI)-Elastic Algorithm Service (EAS)**, designed to offer a cost-efficient solution for model deployment and inference to individuals and enterprises.

It also announced the latest integration of its vector engine technology into more product offerings, including its data warehouse **Hologres**, search services **Elasticsearch** and **OpenSearch**, during its inaugural AI & Big Data Summit in Singapore. The integration is designed to make it easier for enterprises to access various large language models (LLMs) and build customized generative AI applications.

The **PAI-EAS** platform allows users to tap into computing resources as needed, eliminating the need to oversee the

management and upkeep of physical or virtual servers. Furthermore, users will be billed only for the computing resources they employ, resulting in a 50% reduction in inference costs when compared with the traditional pricing model.

The serverless offering, which is currently undergoing beta testing, is accessible for image generation model deployment. In March 2024, the serverless version is scheduled to expand its capabilities to support the deployment of prominent open-source LLMs and models from Alibaba's AI model community, ModelScope. This includes models tailored for tasks such as image segmentation, summary generation, and voice recognition.

With LLMs serving, training services and the vector engine technology, Alibaba Cloud is able to support a **Retrieval-Augmented Generation (RAG)** process,

enabling enterprises to enhance LLMs with their knowledge bases for improved outcomes. This translates to improved accuracy, accelerated retrieval of relevant information, and more nuanced insights for enterprises, contributing to heightened efficiency and decision-making capabilities across a wide range of applications.

“Alibaba Cloud continues to remain at the forefront of AI and cloud technology innovation. Our technology updates underscore our commitment to empowering enterprises with the latest Intelligence-driven solutions for heightened efficiency and performance. This marks a significant stride in our mission to provide innovative solutions that redefine the possibilities of artificial intelligence in diverse applications,” **Zhou Jingren, Chief Technology Officer (CTO), Alibaba Cloud**, commented during the summit.

Make model training more easily

Alibaba Cloud also announced an upgrade on its big data service, called **MaxCompute MaxFrame**, a distributed Python data processing framework, to tap into growing demand for data preprocessing and data offline/online analysis in AI-related computing tasks. It allows users to process massive amounts of data more efficiently and flexibly with launching AI task such as LLM training.

To foster enhanced creativity among designers, Alibaba Cloud has introduced **PAI-Artlab**, a comprehensive platform for model training and image generation. This solution empowers designers to quickly produce professional-grade designs and unlock greater creative potential.

Designers can leverage the platform to generate design images for a variety of applications, including interior home design, product promotional posters, gaming character creation, and gaming scene development. The platform also

provides a rich ecosystem of ready-to-use tools to enable designers with no coding background to develop and train custom models that generate images tailored to their specific requirements. Currently, the platform is operational within mainland China and is slated for operation in the Singapore region in the upcoming months.

In a landmark move last year, Alibaba Cloud elevated its entire range of database solutions, including the cloud-native database PolarDB, cloud-native data warehouse AnalyticDB, and cloud-native multi-model database Lindorm, integrating its proprietary vector engine technology to significantly enhance performance and capabilities.

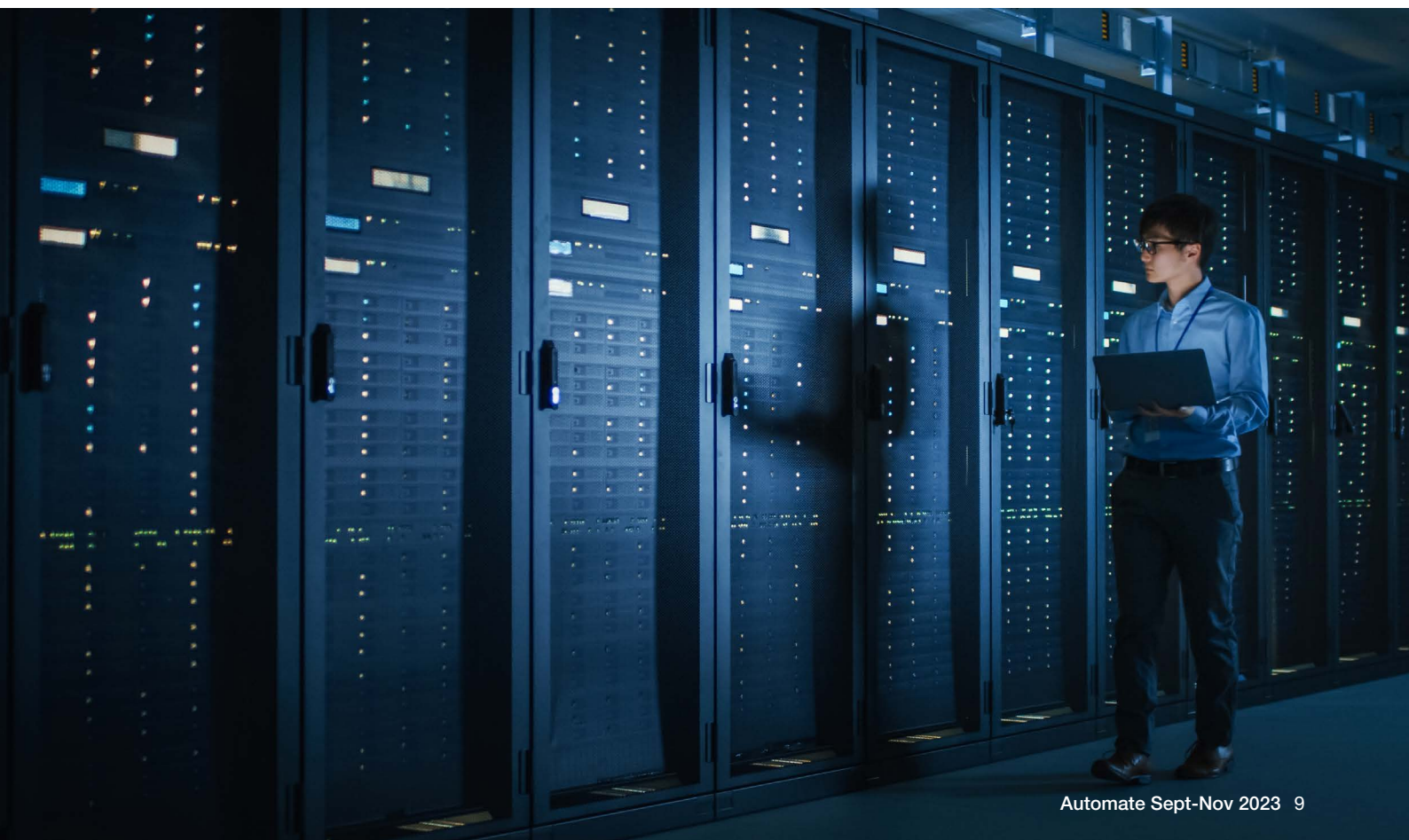
Vector engines transform text and data into a high-dimensional space, optimizing AI performance by embedding large volumes of structured and unstructured context in a complex yet efficient manner. This facilitates and streamlines tasks like similarity comparisons and semantic

analysis, particularly benefiting LLMs and advancing various advanced AI functionalities.

Supporting customer success

Global customers ranging from large companies and start-ups use Alibaba Cloud's latest technologies to support their digital transformation journeys.

“There is an increasing demand for AI technologies among our global customers. By open-sourcing our proprietary language models, we are well-equipped to offer powerful computing solutions and cutting-edge AI innovations to support clients in developing customized generative AI applications, addressing their unique challenges and positioning them to harness the wave of opportunities emerging from the dynamic generative AI sector”, **Selina Yuan, President of International Business at Alibaba Cloud**, told the summit.



Utilizing the advanced capabilities of Alibaba Cloud's Large Language Model (LLM), Tongyi Qianwen, and Retrieval-Augmented Generation (RAG) technology, **Haleon**, a world-leading consumer health company, has introduced a specialized AI nutritionist for its Chinese consumers. This AI-powered nutrition expert excels at precisely interpreting consumer inquiries, engaging users with valuable nutritional guidance that is both comprehensive and delivered efficiently. The integration of Tongyi Qianwen's robust functionalities and Haleon's extensive internal nutritional knowledge base ensures that the AI nutritionist operates at the forefront of accuracy and relevancy.

Shivani Saini, **Haleon's** Global Vice President of Digital & Tech Business Units, emphasizes the importance of digital innovation in the healthcare domain:

“As the role of digital services becomes increasingly critical in the consumer health industry, our collaboration with Alibaba Cloud to harness the potential of artificial intelligence reflects our commitment to offering personalized health advice to our Chinese consumers. Our aim is to empower our customers with the tools they need for enhanced diet and nutritional management.”

rinna, a Japanese startup specializing in the development of pre-trained foundation models adept at processing Japanese, has launched its latest innovation: the Nekomata models. These new models are based on the open-source Tongyi Qianwen LLMs, namely the Qwen-7B and Qwen-14B, developed by Alibaba Cloud. The Nekomata series has exhibited exceptional performance in the Stability-AI/lm-evaluation-harness, one of the prominent benchmarks for assessing Japanese language model capabilities. Furthermore, the comprehensive Qwen



vocabulary significantly enhances the Nekomata models' ability to process Japanese text with greater efficiency compared to the earlier series, which were based on the Llama2 architecture.

“We were impressed by the capabilities of Alibaba Cloud's LLMs, which help us greatly enhance the performance of our models in a cost-effective way,” said Tianyu Zhao, Researcher from rinna. “We believe Alibaba Cloud's contribution to the open-source community can help other SMEs and startups to accelerate their AI innovation as well.”

About Alibaba Cloud

Established in 2009, Alibaba Cloud (www.alibabacloud.com) is the digital

technology and intelligence backbone of Alibaba Group. It offers a complete suite of cloud services to customers worldwide, including elastic computing, database, storage, network virtualization services, large-scale computing, security, management and application services, big data analytics, a machine learning platform and IoT services. Alibaba maintained its position as the third leading public cloud IaaS service provider globally since 2018, according to IDC. Alibaba is the world's third leading and Asia Pacific's leading IaaS provider by revenue in U.S. dollars since 2018, according to Gartner.

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AI Set to Supercharge Robotic Automation

Last year was an exciting time for innovation when it comes to the world of robotics and automation. And while there's plenty more in store for 2024, there are also sure to be stops and starts and various challenges along the way.

The emergence of artificial intelligence (AI) technologies, for example, captured global attention and dominated headlines. However, the adoption of generative AI for businesses is still very much in its early stages and questions of how best to harness this technology remain at the forefront of many minds.

Digital transformation itself is an ongoing process, so we can expect to see 2023's breakthrough trends continuing to

shape society. But how will these trends impact robotics and automation, and what can the manufacturing industry expect to see?

Here are a few predictions:

1. [AI will set a new pace of development in robotics and automation.](#)

Artificial intelligence is transforming the world of software development, making it cheaper, faster and more effective. Software is a key component of automation, and, with AI, software developers will be able to create more customized and optimized solutions for various tasks and challenges.

If software development has sometimes

felt like digging with a shovel, the introduction of AI is like bringing two horses and a plow to the process. However, automation expertise will remain a scarce and valuable resource in the process of AI revolutionizing manufacturing.

It has been interesting and, perhaps, surprising to see AI changing the lives of office workers before it touches the working practices in most factories. I look forward to seeing the benefits of machine learning reach more manufacturers in 2024. After all, the technology is already here—we have many partners developing applications using AI to allow robots to perform more complex and diverse functions.

AI allows robots to have human-like perception, handle variation, move parts precisely, adapt to changing environments and learn from their own experience. With time, these capabilities will lead to unprecedented flexibility, quality and reliability in manufacturing.

2. Developments in robotics software will enable more sharing and reuse.

Robotics software is the glue that binds users to their mechanical counterparts—a digital connectivity that transcends physical interaction. Software developments are enabling a new dimension of collaboration—connecting the people that use robots.

In 2024, expect to see software developments leading to new levels of sharing and reusability. Imagine a world where, instead of reinventing the wheel, we leverage existing software assets—components, interfaces, algorithms—across multiple applications. It's a principle that already underpins our UR+ partner ecosystem, streamlining innovation and reducing time to market.



Logistics is expected to see a 46% growth in cobot shipments for 2023-2027. DCL Logistics in California deployed Universal Robots' UR10e cobot and realized a 500% efficiency increase, 50% labor savings, a three-month ROI and 100% order accuracy. (All photos Provided by Universal Robots)

3. Companies will fuse IT and OT using data to improve operations.

The future of manufacturing is intricately linked to information/operating technology) integration as data will underpin innovation and efficiency.

Research shows that the manufacturing industry has been at the forefront of adopting cloud-based software services, and we are already seeing some customers use these to enhance quality, cost efficiency and predictability. That makes me confident that 2024 will see the growth of data-driven logistics and manufacturing systems.



3D Infotech is a UR+ partner developing software designed specifically to run deep learning applications.

Many still have an outdated view of the cloud merely being a data collector and backup function, as we know it from our private lives. But the real potential and power doesn't lie in storing data or even in linking machines. The real transformative leap comes when cloud-based software services connect humans and machines, helping manufacturers simplify complex processes and make smarter decisions.

The benefits of this digital evolution are significant. Remote access to manufacturing data enables quick responses to issues and continuous automation improvement. With dynamic systems now essential, trusted cloud technologies offer the latest in security



and state-of-the-art services. Industrial Internet of Things (IIOT) companies highlight this progression, promising improved efficiency and reduced downtime through overall equipment effectiveness (OEE) visualization and predictive maintenance.

As we enter 2024, manufacturers stand to gain from these advancements, achieving higher quality, reduced downtime, better predictability and cost optimization. This transition is a strategic necessity, supporting the shift toward high-volume, high-mix production, resilient supply chains, competitive data utilization and sustainability goals.

4. Logistics will be a focus area for robotics.

Last year, Interact Analysis looked at projected growth rates in robot shipments

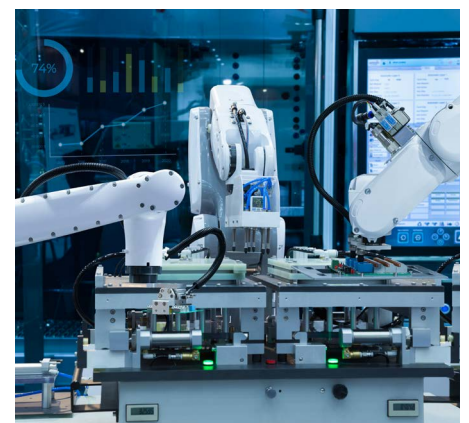
across industries. The standout projected growth area was logistics, where Interact Analysis put the projected CAGR for cobot shipments at 46% for 2023-2027.

Like manufacturing, many logistics companies face serious labor shortages while pressure is increasing as a result of globalization, e-commerce and complex multichannel supply chains. More logistics, warehouse and distribution centers will turn to automation next year to provide services faster and with greater accuracy.

To take an example—facing the challenge of surging e-commerce demands, one logistics company we worked with revolutionized its fulfillment center with collaborative robots, resulting in a fivefold surge in efficiency and order accuracy.

The automation system, adept at processing thousands of orders daily,

particularly excelled during peak periods, such as Black Friday, where a robot managed up to 4,400 orders in one day with just a small crew for replenishment.



Robots—and the smart use of data—are poised to revolutionize logistics businesses across the whole value chain, from incoming packages to outbound logistics. The pace of development in robotics remains impressive, and I look forward to another exciting year of progress.

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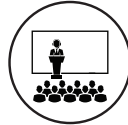
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Govt Task Force on AI Must Involve Stakeholders, Says Expert

Harris Zainul of the Institute of Strategic & International Studies warns against knee-jerk reaction to developments in the technology.

An expert has advised the government to tackle current concerns with generative artificial intelligence (AI) and use the technology to improve productivity.

Harris Zainul, an analyst at the Institute of Strategic & International Studies, urged the establishment of a task force involving industry stakeholders, as the issue requires detailed study and handling.

“While we are concerned about the potential harm that generative AI may pose, we should not be technophobic and respond with knee-jerk reaction that could undermine AI’s potential for productivity gains. Striking this balance will be crucial for Malaysia,” he told FMT.

“I recommend that the task force involve stakeholders such as government officials, academics, policy analysts, civil society and private sector representatives.”

Bangi MP Syahredzan Johan urged the government to establish a task force to handle AI-related matters, amid the emergence of a new tool that can generate realistic text-prompted videos.

He expressed his concern that irresponsible parties would use the technology to produce videos or images to attack political opponents or break up society.

Yonhap agency reported that South Korea’s election commission detected AI-generated media content ahead of the April elections.

On Feb 4, the Voice of America website

reported that a firm in Hong Kong lost around US\$26 million after being deceived by a scammer impersonating as a chief executive using deepfake technology.

Asked if the Penal Code should be reviewed, Harris said the government first has to identify the dangers AI poses to Malaysian citizens.

“With this understanding, we will be able to approach AI regulation in a way that better reflects opportunities and concerns with AI,” he said.

He also said he believed Malaysia has skilled people that are able to handle the risks of AI.

“The government’s challenge is to talk them into discussing and giving their advice on the best way to curb the technology’s pitfalls,” he said.



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A person is shown in profile, looking at a large digital display. The display features a complex neural network structure with glowing white lines and nodes. The letters 'AI' are prominently displayed in the center of the network. The background is a deep blue with various digital and data-related icons and text, including 'DIGITAL' and 'DATA'. The person's hands are visible, gesturing towards the display as if interacting with it.

Malaysia to Launch AI Code of Ethics & Governance Guideline as Soon as April



Malaysia plans to launch artificial intelligence (AI) code of ethics and governance guidelines as soon as April, according to national news agency Bernama.

The development of AI code of ethics and governance guidelines has now reached 90 percent, according to the Ministry of Science, Technology and Innovation (MOSTI).

The ministry said the document is scheduled to be presented to the Cabinet this month before its official launch in April, according to the report on Friday.

“These guidelines are developed specifically for three main categories, namely users and the public, policymakers and providers or developers of AI-based technology.

“In general, it outlines seven principles of responsible AI that can be applied to all three main categories. Compliance with these guidelines can ensure ethical and safe use of AI,” it said in a written reply published on the Parliament’s website.

The ministry was responding to a question from member of parliament Wong Chen who wanted to know the current status of the code of ethics and governance for AI and how it aligns with the National Artificial Intelligence Roadmap 2021-2025, the report added.

MOSTI said that a public consultation session is currently underway with the Malaysia Productivity Corporation through the Unified Public Consultation portal, with a minimum consultation period of two weeks.



“The document is being circulated for public consultation. The purpose of this session is to gather feedback from the public on the draft document for improvement before it is finalized,” it said.

ABB Robotics and METTLER TOLEDO International Inc. Join Forces to Accelerate Global Adoption of Flexible Lab Automation

- Companies will accelerate adoption of robotic lab technology, redefining the limits of robotics in laboratories to accelerate innovation and address labor shortages
- The collaboration seamlessly integrates ABB robots with METTLER TOLEDO's LabX™ management software and its connected instruments

ABB Robotics and METTLER TOLEDO, a global supplier of precision instruments and services, have signed a Memorandum of Understanding (MOU) to offer an innovative solution that seamlessly integrates ABB's robots with LabX™, METTLER TOLEDO's laboratory instrument management software.

The combined solution will enable greater levels of efficient and high-quality automated laboratory workflows across a range of industries, making research,

testing, and quality control more flexible, while accelerating time-to-market and addressing critical labor shortages.

“In combining METTLER TOLEDO laboratory equipment with ABB's collaborative robots, communicated through the LabX platform, we will support operations and enable the highest traceability, productivity, and data management in the industry,” said Jose Manuel Collados, Manager of ABB Service Robotics. “By unlocking new possibilities in lab automation, our collaboration with METTLER TOLEDO will create efficiencies and unlock resources in pharmaceuticals, chemicals, food and beverage, semiconductors and battery industries.”

Laboratory automation, working alongside lab technicians, can perform an increasingly sophisticated range of tasks faster, more consistently and with fewer errors than human workers. Yet,

the uptake of automation in laboratories is challenged by a gap in the skills needed to handle automation technology and the complexity in setting up highly sensitive workflows.

With the collaboration, METTLER TOLEDO's LabX software will seamlessly integrate into ABB's OmniCore™ robot controllers, enabling LabX to orchestrate robotic lab workflows. By combining the flexibility, ease-of-use and precision of ABB robots with the secure data capture, method control and instrument management of LabX, customers can increase lab productivity, reduce system complexity, fulfill data quality, and safety and regulatory requirements. This also relieves scientists and lab technicians of mundane, repetitive tasks; eliminating common errors; and optimizing productivity – providing lab professionals additional time to pursue higher-value activities, such as data analytics.





“Great innovation starts at the bench, especially when you are able to minimize process times and human error while also supporting the generation of high-quality data and information,” says Stefan Heiniger, Head of Laboratory Division for METTLER TOLEDO. “METTLER TOLEDO and ABB will provide a

powerful, intuitive, and standardized toolset that meets the need of laboratories of all sizes and types that will deliver new levels of automation, speed, and insights, while also reducing costs.”

The collaboration is part of ABB’s ongoing strategy to bring the benefits of

automation to new segments worldwide and complements the work at the Life Sciences and Healthcare lab at the Texas Medical Center in Houston as well as the newly inaugurated Open Innovation Lab for Life Science and Healthcare in Zhangjiang Robot Valley, Shanghai.

Source: www.automate.org

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SCAN ME



Adopt, Grow with Industry 4.0

The manufacturing sector in Malaysia ought to take advantage of the prospects presented by the Industrial Revolution 4.0 (IR4.0) to enhance business performance, according to Tan Siew Jin, managing director of Jabil Penang.

The manufacturing sector in Malaysia ought to take advantage of the prospects presented by the Industrial Revolution 4.0 (IR4.0) to enhance business performance, according to Tan Siew Jin, managing director of Jabil Penang.

He said that the convergence of technologies in operations, information technology (IT), and the supply chain is causing seismic shifts in manufacturing.

These shifts create predictable, data-driven environments that facilitate increased productivity and operational excellence, he told Business Times.

Tan said that Jabil Malaysia's proactive automation adoption and advancement of IR4.0 principles like IoT, connectivity, analytics, and digital visualization are driven by the company's dedication to manufacturing excellence and innovation.

"These allow us to deliver cost-effective solutions that enhance machine utilization and process efficiencies.

"We leverage state-of-the-art technologies and implement digital transformation initiatives to give customers real-time insights, helping

them monitor and optimize operations from anywhere," he said.

Tan said industry players need to consider or address capital investment as technology implementation involves varying costs.

"Here, government grants or funding can further catalyze and incentivize adoption, enabling Jabil's continued efforts in technology transfer opportunities through upskilling and partnerships across our network of local small and medium-sized enterprises (SMEs).

"This ensures that SMEs are also empowered to build a digitally driven, high-income nation and a preferred

regional manufacturing leader by optimizing technologies in automation, high-value machining, and digitalization.”

He pointed out that the combination of the digital and physical worlds is bringing about a shift in how things are done, which is known as IR4.0.

According to Tan, strategies need to be backed by a system of support that equips staff members with the necessary knowledge and abilities and fosters an environment that is ready for the shift to IR4.0.

He said that Jabil had recently pioneered an innovative bidirectional communication system on the manufacturing lines that significantly

reduces human dependency and enables automated process adjustments, especially in automated optical inspection (AOI).

The innovation helped to maintain accurate inspection limits and reduce non-value-added or repetitive work.

“Investing in factory automation, robotics, and machine learning has also enabled us to build sustainable operations. Jabil Malaysia saw a 25 per cent reduction in energy usage in 2023, going from 153.4 million kWh in 2022 to 116.8 million kWh in 2023, with the annual carbon dioxide reduction equivalent to planting 40,000 trees a year,” he said.

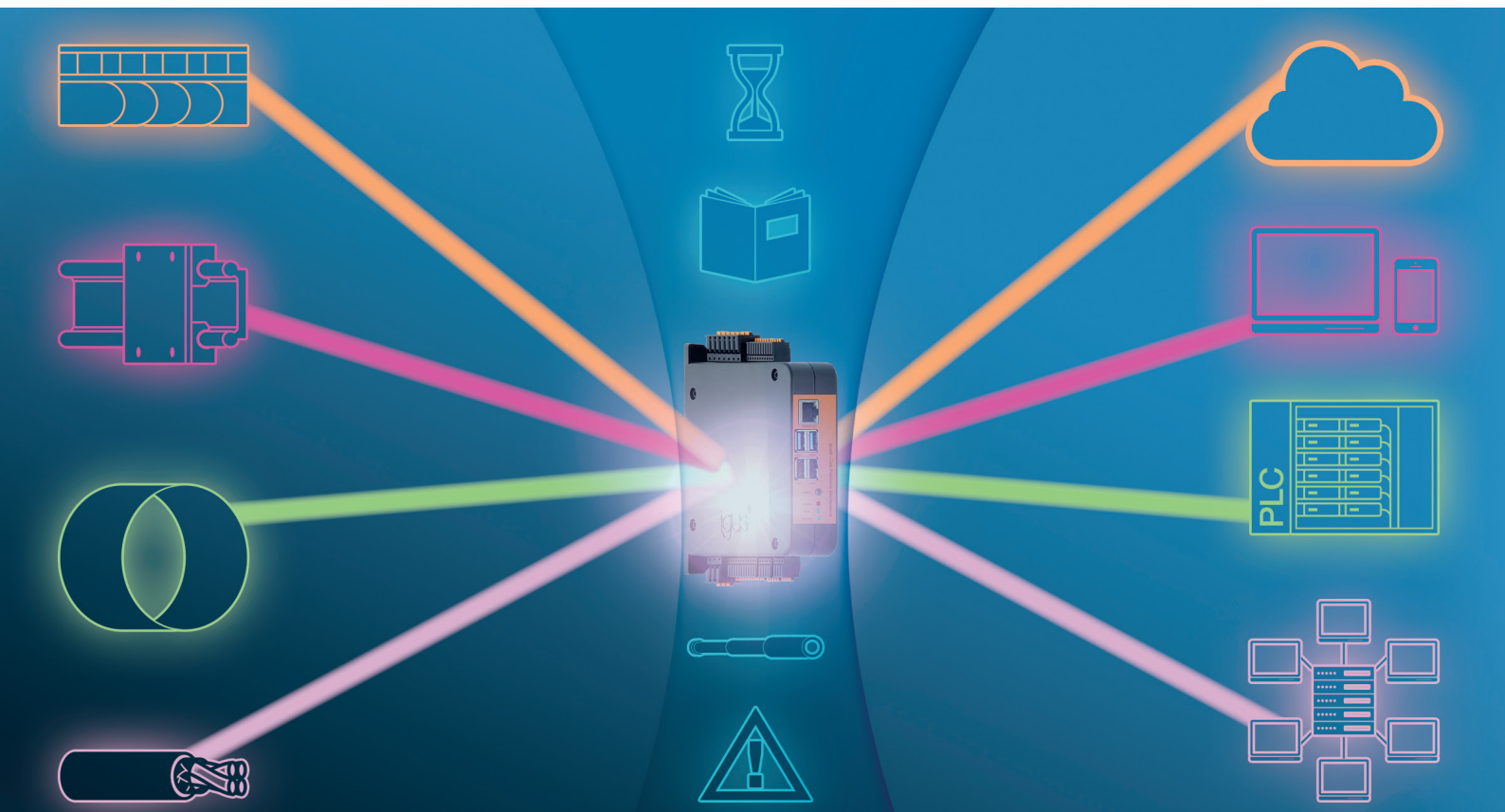
Jabil Malaysia’s operations began in 1995. Its Penang facility was the first

expansion for the company in the Asia-Pacific region. Today, the company has seven production facilities in Malaysia.

“Bringing breadth and depth of scale across the manufacturing value chain, the rapid factory digitalization adopted in our local operations is a business differentiator and a sign of the industry to come.

“Influenced by the principles of IR4.0, we are creating “smart factories,” bringing this to life by leveraging our strong digital foundation and continuously applying automation and digital technologies to our entire value chain to drive step-change improvements in safety, quality, delivery, and cost,” added Tan.

Source: www.nst.com.my



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How are Pressure Sensors used in the Era of Industry 4.0?



Image Credit: Superior Sensor Technology

Smart factories are revolutionizing manufacturing with interconnected, data-centric technologies. In the Industry 4.0 age, incorporating Internet of Things (IoT) sensors in production methods is changing factory operations. Emphasis is now on transitioning maintenance from reactive to predictive, facilitated by sophisticated sensing.

Differential pressure sensors, as a central sensing tool, will increasingly contribute to collecting diagnostic data to enhance assets, reduce downtime, and devise more intelligent maintenance plans.

From monitoring air quality in HVAC systems to safeguarding equipment against failure in chemical plants, pressure sensors are becoming essential

components for predictive maintenance.

Predictive maintenance involves the continuous monitoring of equipment to detect issues before a breakdown occurs. This approach is a considerable advancement from traditional reactive approaches that wait for failures to occur before fixing them.

By identifying problems early on, significant time and expenses can be saved, and pressure sensors are perfect for monitoring due to their ability to diagnose issues across pumps, valves, pipes, filters, and beyond.

This article presents an overview of how differential pressure sensors are employed in Industry 4.0 for predictive maintenance.

HVAC Systems

Ensuring ideal indoor air quality in contemporary factories is vital for both employee health and efficient production. Differential pressure sensors in Heating, Ventilation, and Air Conditioning (HVAC) systems oversee air quality, especially in specialized settings like cleanrooms. These sensors gauge the pressure disparity between two locations, allowing the system to identify any blockages in air filters.

If the pressure difference exceeds a set limit, an alert is issued, signaling a need for filter servicing or replacement. This preventive strategy not only fosters a healthier workspace but also averts expensive HVAC system failures.

Pneumatic Systems

Many manufacturing processes are reliant on pneumatic systems to power a range of tools and machines. These systems have integrated pressure sensors to monitor air pressure levels. In an Industry 4.0 environment, these sensors deliver real-time data regarding anomalies and fluctuations in pressure.

Predictive maintenance algorithms are used to analyze this data to recognize trends or patterns that may signal imminent equipment failure. For instance, a sudden decline in air pressure could indicate a leak in the system. Early detection enables maintenance teams to

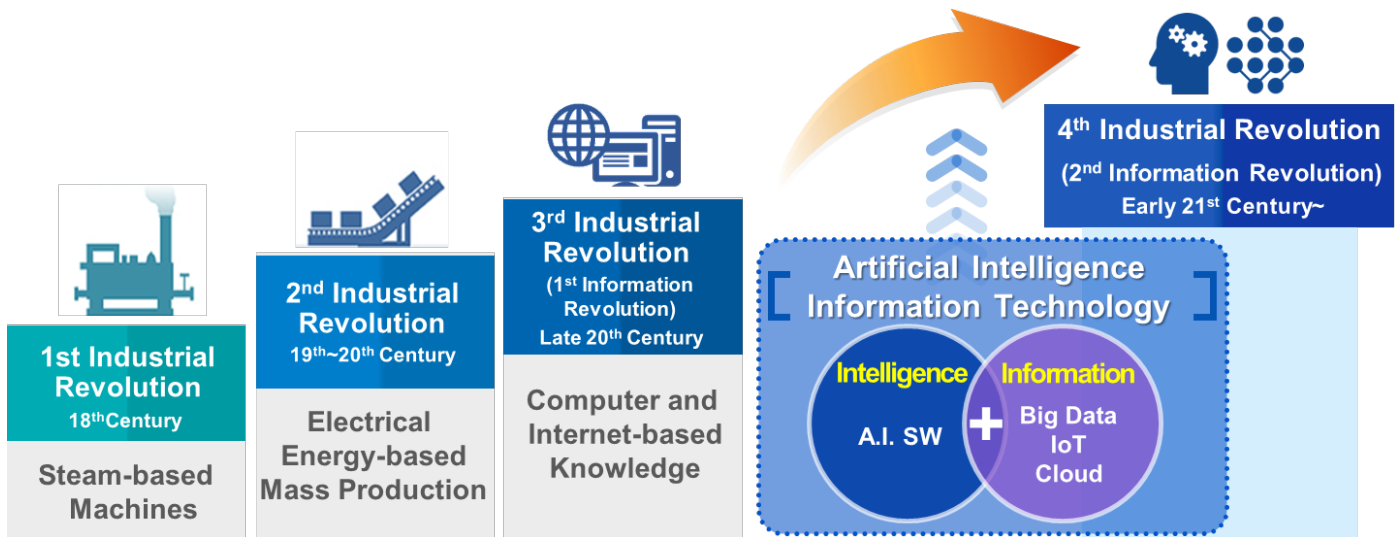


Figure 1. Sequence of the four industrial revolutions. Image Credit: Superior Sensor Technology

address these issues before they result in production downtime or expensive repairs.

Hydraulic Machinery

Hydraulic systems are often employed in manufacturing, particularly in heavy industries such as mining and construction. The pressure in hydraulic systems can be monitored by differential pressure sensors to ensure that the system is operating within efficient and safe parameters.

Industry 4.0 technologies allow these pressure levels to be continuously monitored, and predictive maintenance software can be used to analyze the data to

predict when components, such as valves or pumps, are likely to fail. Proactively addressing these issues enables factories to reduce unplanned downtime and extend the lifespan of expensive hydraulic equipment.

Chemical Processing

Safety and precision are of utmost importance in chemical plants, and differential pressure sensors can be employed to monitor pressure differentials across pipelines, filters, and reactors. They serve a crucial function in the detection of leaks, blockages, or changes in pressure that could suggest a malfunction.

Anomalies in pressure data can initiate automatic shutdowns, while maintenance teams receive alerts in real-time. This prevents devastating accidents and improves the overall efficiency of chemical processes.

Compressed Air Systems

Compressed air systems are the pillar of many industrial operations, such as powering tools and operating conveyors. Differential pressure sensors are employed to monitor the condition of air filters as well as the overall integrity of the system.

Predictive maintenance software facilitates the processing of data from these sensors to identify when air leaks occur, when filters require replacing, or when the compressor may be operating less efficiently. Factories can improve the reliability of their compressed air systems and reduce energy costs by correcting these issues before they escalate.

Steam Boilers

Steam boilers are frequently employed in manufacturing processes for generating power and heat. Pressure sensors are essential to monitor and maintain the safe and efficient operation of such systems.

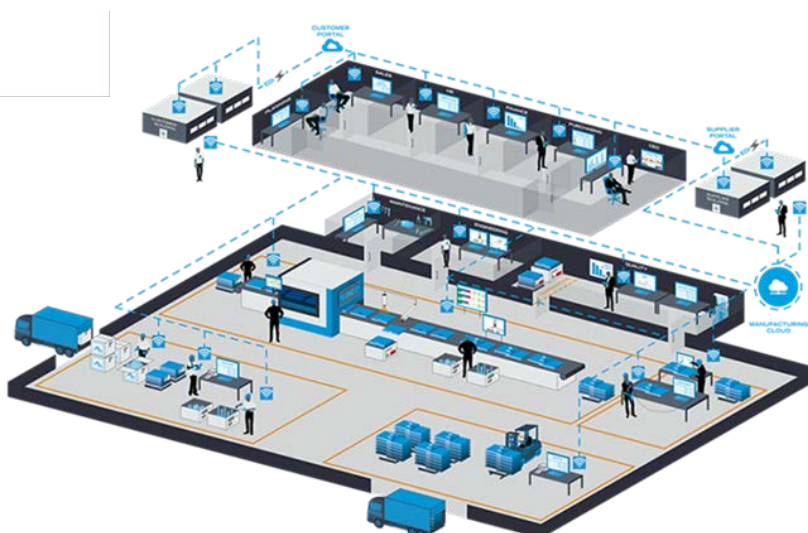


Figure 2. Sketch of an Industry 4.0 factory. Image Credit: Superior Sensor Technology

In an Industry 4.0 setting, pressure sensors are integrated with IoT abilities, facilitating the transmission of data to central control systems. Predictive maintenance algorithms are employed to analyze this data and predict when maintenance is necessary.

For instance, when a pressure sensor detects a gradual rise in pressure, it can imply scaling or buildup inside the boiler. Timely maintenance can extend the lifespan of the boiler and avoid costly shutdowns.

Water Treatment

Pressure sensors are vital for monitoring water treatment systems in industries where water is crucial, such as power generation or food and beverage manufacturing. Differential pressure sensors can be used to measure the pressure difference across membranes and filters. Any shift in pressure may signal filter clogs or membrane damage.

Therefore, the continuous collection and analysis of pressure data enables predictive maintenance systems to provide real-time alerts to issues, delivering consistent water quality and system reliability.

Injection Molding

Pressure sensors are commonly utilized in injection molding machines for the maintenance of precise control over the injection and clamping processes. In an Industry 4.0 setting, these sensors are integrated into the molding equipment and linked to central monitoring systems.

Predictive maintenance algorithms are used for the analysis of pressure data to predict wear and tear on components such as cylinders, nozzles, and seals. This facilitates proactive maintenance scheduling, which minimizes unplanned downtime and enhances the quality of molded products.

Conclusion

In the Industry 4.0 era, the integration of pressure sensors into manufacturing processes is transforming how factories approach maintenance. Facilities that adopt real-time data collection and analysis are more likely to minimize downtime, prevent costly breakdowns, and ensure production lines run safely, smoothly, and with maximum efficiency.

Prognostic pressure-based monitoring extends the lifetime of capital assets, optimizes operational efficiency, and eradicates catastrophic failures via early diagnosis.

As advancements in smart infrastructure and Industry 4.0 continue to be made, differential pressure sensors will expand as a vital technology for steering the predictive maintenance capabilities that define modern, resilient manufacturing.

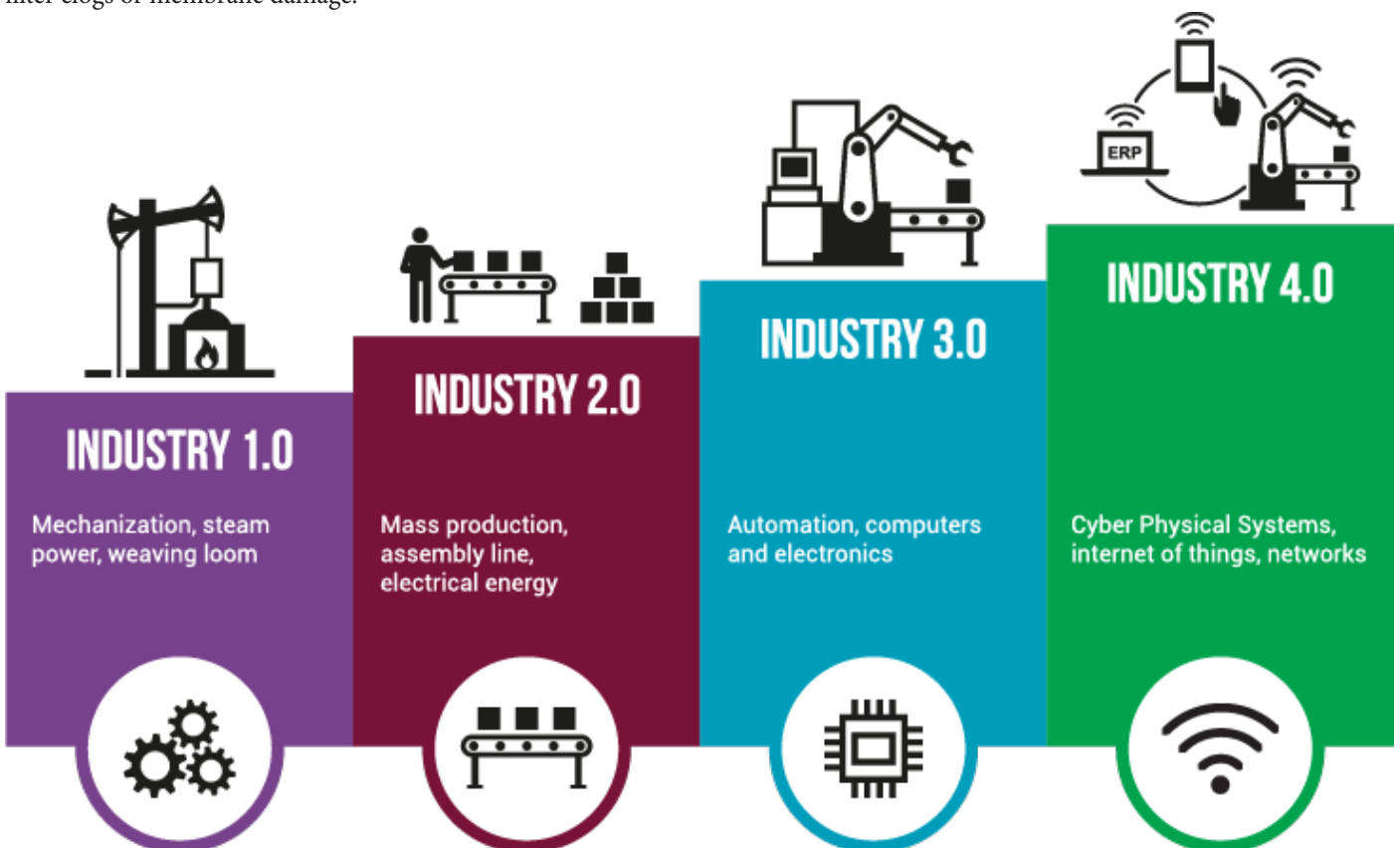


Figure 3. Pressure sensors are a critical part of Industry 4.0 evolution. Image Credit: Superior Sensor Technology

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igus is Once Again Looking for Creative Low-Cost Automation Projects with the Fastest Return on Investment

igus launches application phase for the third ROIBOT Award 2024

The German economy is weakening and will only recover slowly in 2024, according to the Institute for Macroeconomics and Business Cycle Research (IMK). The mechanical engineering industry is also feeling the effects. To strengthen competitiveness, organisations will have to focus on automation. Thanks to Low-Cost Automation (LCA) and the RBTX robotics marketplace from igus, companies of all sizes can find a complete solution that suits their requirements and budget - from as little as €2,000. The plastics company is now honouring the projects with the fastest return on investment (ROI) with the ROIBOT Award for the third time. Users can now apply to win LCA products worth €5,000 in addition to international recognition.

In times of a weakening economy, both corporations and small and medium-sized enterprises (SMEs) are looking for automation solutions that are cost-effective and easy to implement. It is precisely this need that igus fulfils with LCA. The Cologne-based plastics specialist offers everything interested parties need for cost-effective process automation from a single source: from individual components and robots with peripherals to complete solutions for customized applications. The average investment costs here are €12,000. By way of comparison, an industrial robot can easily cost over €100,000, including control system, software, and licenses.



Picture PM0124-1. Whether cobot, articulated arm robot or flat linear robot: igus honors clever and creative LCA projects with the ROIBOT Award for the third time. (Source: igus GmbH)

“We are always amazed at the creative way in which companies use our components. From automated earthworm farms to robots that serve beer,” states Alexander Mühlens, Head of the Low-Cost Automation Business Unit at igus. However, many of these inventions receive too little attention. “Which is why we are organizing the ROIBOT Award 2024. For the third time, we would like to offer a stage to LCA projects that demonstrate courage, creativity and out-of-the-box thinking.” igus holds the competition with an international focus every two years. In 2022, 110 projects from 20 countries applied.

Starting signal for the application phase

Users can apply for the ROIBOT Award with their automation projects until 30th June 2024 at <https://roibot.eu/roibot> registration. igus offers support on request. A team of experts will create free video and image recordings of the application and supervise the staging. Participants thus skip the application process and are direct candidates for the competition. The prerequisite is that the LCA solutions work with components purchased from igus or via RBTX.com. These include, for example, articulated

arm robots, Cartesian robots, delta robots and SCARA robots.

Winning low-cost automation products worth €5,000 and attracting attention



A jury consisting of representatives from the specialist press and industry experts selects the three best projects that stand out due to originality and a low ROI. The winner will receive LCA hardware worth €5,000, while the runners-up will be awarded €2,500 and €1,000. “The competition also offers participants international media attention and the opportunity to network with other automation enthusiasts, share experiences, gain inspiration and perhaps even explore new career opportunities. For example, investors were found for a young start-up at the last ROIBOT Award,” concludes Mühlens. The winner of the ROIBOT Award 2022, MFG Technik & Service GmbH, also benefited from this. The company from Kranzberg near Munich convinced the jury with its Label Monkey, a LCA solution that labels industrial pallets from three sides using the robolink DP robot arm from igus.

ABOUT IGUS:

igus GmbH develops and produces motion plastics. These lubrication-free, high-performance polymers improve technology and reduce costs wherever things move. In energy supplies, highly flexible cables, plain and linear bearings as well as lead screw technology made of tribo-polymers, igus is the worldwide market leader. The family-run company based in Cologne, Germany, is represented in 31 countries and employs 4,600 people across the globe. In 2022, igus generated a turnover of €1,15 billion. Research in the industry’s largest test laboratories constantly yields innovations and more security for users. 234,000 articles are available from stock and the service life can be calculated online. In recent years, the company has expanded by creating internal startups, e.g. for ball bearings, robot drives, 3D printing, the RBTX platform for Lean Robotics and intelligent “smart plastics” for Industry 4.0. Among the most important environmental investments are the “change” programme – recycling of used e-chains – and the participation in an enterprise that produces oil from plastic waste.

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KEENON Robotics and Konica Minolta Business Solutions (HK) Ltd. Join Hands to Introduce Advanced Service Robotics in Hong Kong and Macau

KEENON Robotics, a global leader in robotic services and solutions, is excited to announce its partnership with Konica Minolta Business Solutions (HK) Ltd., a subsidiary of Konica Minolta Inc. This collaboration brings forth a diverse range of service robot models, including the KEENON DINERBOT T10, T9 Pro, T9, T8, T3, GUIDERBOT G2 and BUTLERBOT W3, aimed at redefining operational efficiency and customer experiences in Hong Kong and Macau. This distributor partnership, formalized through a business cooperation agreement, signifies the exclusive distributorship of DINERBOT T10, with the signing ceremony taking place at the Konica Minolta Hong Kong office at the AIRSIDE in Kai Tak.

This collaboration marks a significant milestone in KEENON's expansion, bringing cutting-edge service robotics poised to elevate customer experiences across industries. Renowned for its smart enterprise solutions, Konica Minolta Business Solutions (HK) Ltd. will serve as the distributor for KEENON's advanced indoor delivery robots in Hong Kong and Macau. By bringing together both companies, this collaboration addresses the growing demand for intelligent automation solutions in sectors like hospitality, retail, healthcare, and more, emphasizing their commitment to transforming the landscape of indoor deliveries for businesses.



Mr. Robert Ip, Managing Director at Konica Minolta Business Solutions (HK) Ltd (left) and Mr. Gary Liao, Senior Vice President, International Business at KEENON Robotics (right) with DINERBOT T10

With the aim of addressing the pressing challenges faced by businesses, these state-of-the-art robots promise to transform the service sector, offering unparalleled efficiency, flexibility, and engagement. From streamlining food and beverage services to optimizing indoor deliveries, each robot is meticulously designed to meet the evolving needs of modern enterprises, setting a new standard for intelligent automation solutions.

The DINERBOT T10, designed specifically for hospitality service, boasts features ensuring efficiency. With an open-design large-capacity tray, seamless meal retrieval with tray detection, and impressive motion control performance, the robot's elevated chassis enables stable liquid delivery and navigation through narrow passages, with a minimum clearance of just 59cm. Additionally, the DINERBOT T10 features a 23.8-inch

large screen supporting custom image and video playback for advertisements. Its flexible movable head showcases unique facial expressions, and the multi-modal design integrating voice, touch, and vision provides agility and engagement. Head accessories are customizable, allowing businesses to tailor the robot to individual preferences.

“We are thrilled to partner with KEENON Robotics in the service robot business,” commented Mr. Robert Ip, Managing Director at Konica Minolta Business Solutions (HK) Ltd. “In post-pandemic era, with customers facing the issue of manpower shortage, we believe our Robotics Solution is a way out. KEENON’s commitment to innovation aligns with our vision of delivering great new technologies to businesses. By



integrating various solutions with robots, we look forward to enabling organizations to unlock new levels of efficiency and provide exceptional customer experiences.”

“We are excited to join forces with Konica Minolta, ushering in a new era of advanced service robotics,” expressed Mr. Gary Liao, Senior Vice President, International Business at KEENON Robotics. “Leveraging Konica Minolta’s expertise, rich history, and extensive market reach will play a crucial role in broadening our footprint and bringing innovative robotic solutions to a larger audience of customers and end-users. Together, our goal is to reshape the landscape of indoor deliveries, fostering operational efficiency enhancements for our valued customers.”

Source: www.thailand-business-news.com

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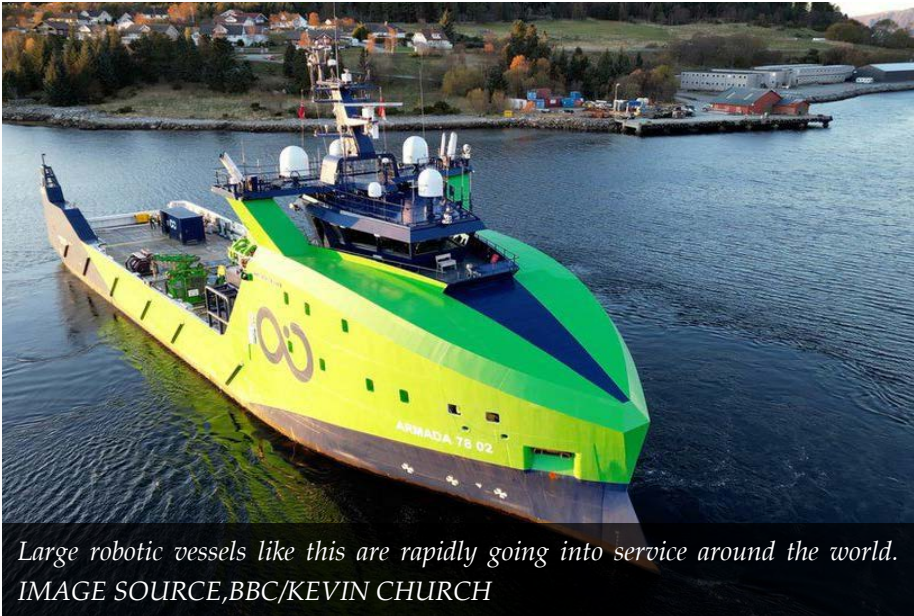
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Robot Ships: Huge Remote Controlled Vessels Are Setting Sail



Large robotic vessels like this are rapidly going into service around the world. IMAGE SOURCE, BBC/KEVIN CHURCH

It sounds like science fiction. Ocean-going ships with no-one on board. But this vision of the future is coming - and sooner than you might think.

You can glimpse it in a Norwegian fjord where a huge, lime-green vessel is being put through its paces. At first glance, it seems like any other ship. Look closer, though, and you suddenly see all the hi-tech kit. Cameras, microphones, radars, GPS and all manner of satellite communications.

“We’ve added a lot of additional equipment and designed her especially to be what we call ‘robotic,’” says Colin Field, the head of remote systems at US-UK company Ocean Infinity (OI).

The ship is part of OI’s new “Armada” - a fleet eventually of 23 vessels - that will survey the seabed for offshore wind farm operators and check underwater infrastructure for the oil and gas industry.

Strikingly for a ship that’s 78m (255ft) in length there are only 16 people on board. A traditional ship carrying out the same kind of work would need a crew of 40 or 50. OI believes it can reduce the numbers still further.

That’s because many of the roles can be done hundreds of miles away on land.

Entering the company’s remote operations center in Southampton is like walking on to a futuristic film set. The dimly lit room is vast, and it’s filled with 20 “bridge stations”, each fitted with gaming-like controls and touch screens.

Operators sitting in their high-backed chairs watch a bank of monitors displaying a live stream coming from the ship’s cameras and a multitude of sensors.

A key test for this new way of working is commanding an underwater robot - or remotely operated vehicle (ROV) - to descend from the deck to scan the seafloor.

“It’s amazing how everything is automated,” says ROV trainee pilot Marian Meza Chavira. “In some ways it’s easier here than offshore because you have so many more cameras for context.”

Autonomy, robotics and remote operation, along with artificial



Marian Meza Chavira is learning to pilot underwater robots from a remote-control center. IMAGE SOURCE, BBC/KEVIN CHURCH

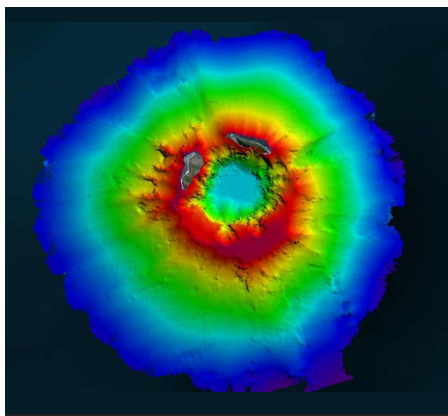
intelligence, will transform all transport sectors. Maritime will be no different and experiments are under way around the globe.

In Norway, for example, there's an 80m (262ft) electric container ship running back and forth between a fertilizer plant and a local port. In Belgium and Japan there are ferries autonomously navigating between destinations, berthing and unberthing at each location. And in China, too, big autonomous container ships shuttle between coastal cities.

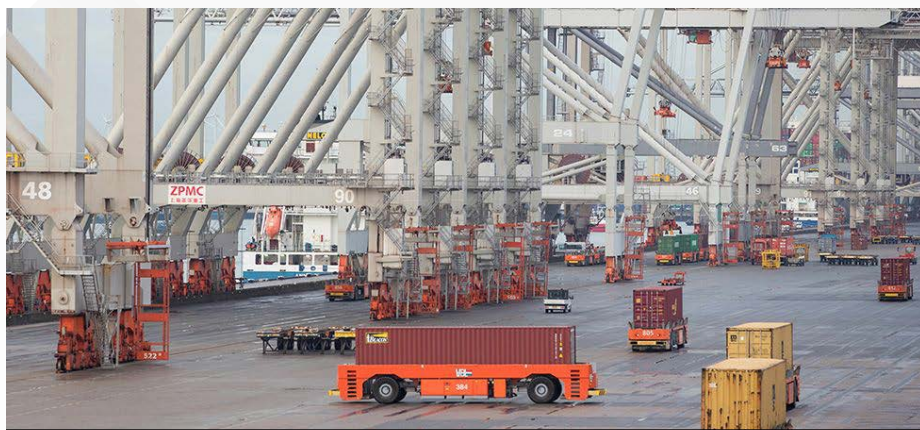
The advantages are obvious. With fewer people on board, ships can be smaller, which means they require less fuel and have a much-reduced carbon footprint.

Rudy Negenborn researches autonomous shipping at Delft University of Technology. He says the hi-tech systems needed to fully replace crew are developing at speed but still have some way to go.

"We've had autopilots that let ships follow a path by themselves. That's not so challenging. The challenges come when interacting with other traffic or a port, or when there are unforeseen situations or bad weather circumstances," he told BBC News.



Robotic vessels can do dangerous work like mapping the caldera of a still-active submarine volcano. IMAGE SOURCE,SEA-KIT/NIWA-NIPPON FOUNDATION/TESMAP



Robots working together: In Rotterdam, guided trolleys move containers around the port. IMAGE SOURCE,GETTY IMAGES



The Yara Birkeland carries fertilizer to a port for export. The plan is for it to work without any crew. IMAGE SOURCE,GETTY IMAGES

"But in the end, this is going to lead to safer, more efficient and more sustainable transport over water. I'm sure about that."

Some smaller vessels are already allowed to work with no-one onboard at all.

The British company Sea-Kit International is designing and building a fleet of these crewless boats.

One was recently sent to Tonga to map the still-active underwater volcano that blew up spectacularly in 2022, a task considered too dangerous to involve people.

We followed a 12m-long (39ft) boat, fresh from the factory, as it sailed out of Plymouth harbor to inspect a WWII wreck. The bright-red vessel called

Vaquita was built for the Dutch survey company Fugro.

It cuts a lonely figure as it skims across the waves. It's being fully controlled by a crew 475 miles away in an office in Aberdeen.

Fugro captain Dmitrij Dadycin's commands, bounced via satellite, turn Vaquita nimbly one way and then the other. An ROV is deployed to go down to explore the sunken destroyer. All the while, cameras at the surface give a 360-degree view of the surrounding waters.

"There's more pleasure to work this way," says Dmitrij, who spent many years at sea.

ROBOTICS

“I definitely don’t miss the pitching and rolling. And at the end of your shift, you get to go home.”

Many questions spring to mind about remotely operated and autonomous shipping, just as they do about driverless cars and trains and the drones that are increasingly filling our skies.

How will these technologies change the nature of work? Can they create new and different types of jobs to replace those they eliminate? How secure are the systems being developed - can they defend against cyber-attack and piracy? More fundamentally, are they robust and reliable enough? What happens if a satellite link falls over?

“Everything we do starts from the standpoint of safety,” says Sea-Kit’s operations director Ashley Skett from his workshop where the team is putting the finishing touches to another crewless boat.

“When this vessel is at sea, there’s no-one on board to fix something if it goes wrong, so you must have an alternative system ready to step in. This vessel is built almost in two halves with two of everything on board. The clever bit is in software that enables the boat to switch seamlessly between systems.”

The International Maritime Organization (IMO) is currently grappling with all the issues surrounding autonomy at sea. It hopes to introduce voluntary codes defining best practice by 2028, with a view eventually to making them mandatory.

As it stands, larger ships have to have a captain - or master - with them at sea.

“We’re specifically going to be considering the role of the master and officers on board a ship in the context of a remote-control centre,” says IMO director Heike Deggim.



Ocean Infinity captain Simon Macaulay: “We’re building up the knowledge and safety case”. IMAGE SOURCE,BBC/KEVIN CHURCH



IMAGE SOURCE,BBC/KEVIN CHURCH

“Would you now consider a remote-control operator to be equivalent of a master on a ship? This needs further work.”

The UK government has already taken a view on this topic and desires to incorporate the idea of remote masters into legislation.

“There is a huge industry coming and the government obviously doesn’t want to miss out on the opportunities. They want to see companies invest here and operate their vessels from here,” observed shipping lawyer Fiona Cain from Haynes and Boone.

Back in the Norwegian fjord, Ocean Infinity captain Simon Macaulay definitely has his eyes on the horizon.



Connected: The Sea-Kit/Fugro boats have four independent satellite systems and cellular links. IMAGE SOURCE,BBC/KEVIN CHURCH

“I could foresee a situation where you have a master mariner who’s in charge of a vessel remotely or a number of vessels remotely. Obviously, that needs legislation change and part of what we’re building up here is the knowledge and safety case. We send probes and satellites to the other side of the Solar System, so this can be done.”

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Edge of Innovation:

New Capabilities That Improve the Rosemount™ 3051 Pressure Transmitter User Experience.

Process automation professionals are aware of the unique history of the Rosemount™ 1151 Pressure Transmitter. It appeared on lists of the top 100 American-made products twice. It changed Rosemount Engineering Co., which is now Emerson, from a supplier specializing in aerospace to an industrial automation firm. The Smithsonian Institution even has showcased the Rosemount™ 1151 Pressure Transmitter.

The Rosemount™ 3051 Pressure Transmitter was designed to improve the lives of process automation professionals when it first came out in 1988, and over the past 35 years, Emerson has been constantly improving the Rosemount™ 3051 Pressure Transmitter to keep up with the rapid improvements in digital technology.

While the transmitter has undergone numerous upgrades over the years, Emerson recently unveiled the most significant update since its original design. With an emphasis on efficiency and safety, the latest advances mentioned in the following pages demonstrate how the updates bring the user experience into the modern day. With a dynamic graphical display, easily accessible data, Bluetooth®



Figure: Rosemount™ 3051 Pressure Transmitter with enhanced capabilities

connectivity, a new user-friendly interface, and extensive diagnostics capabilities, the updated Rosemount™ 3051 Pressure Transmitter caters to a younger generation of engineers, particularly mobile workers, while remaining familiar to existing users.

The Rosemount™ 3051 Pressure Transmitter user interfaces have been redesigned to provide a simplified, task-

based menu structure with common navigation across different hosts and configuration tools for a faster, more intuitive user experience. The new, high-contrast, graphical, and backlit display can operate in eight different languages, and utilizing visual icons relays more information with the added clarity that gives users better insight into transmitter status.

Keeping the Coplanar Process Connection

One thing that customers will find familiar with the Rosemount™ 3051 is the Rosemount™ Coplanar™ design of the device. Emerson pioneered the Coplanar process connection with the Rosemount™ 3051, which features two process connections at the bottom of the pressure transmitter. Because it can be positioned on a single process flange, the mounting becomes lighter in weight than traditional biplanar styles which also limits flexibility. Furthermore, heat, vibration, and electrical noise, as well as other disturbances, can be isolated when using a Coplanar design.

Also, the coplanar design protects the transmitter from static pressure. But the most important element of the Coplanar connections is that the configuration



Figure: Bluetooth capabilities Rosemount™ 3051 Pressure Transmitter

makes it possible for the Rosemount™ 3051 Pressure Transmitter to be a completely integrated application solution for an expanded market.

Enhanced Capabilities of the Rosemount™ 3051 Pressure Transmitter

Bluetooth Connectivity: New Bluetooth technology simplifies configuration and service tasks without having to physically connect to a device, making maintenance safer by eliminating the need to climb ladders or tanks, get hot work permits, and reduce time in hazardous locations. With a few simple inputs and built-in password protection, users will have an encrypted data connection from the transmitter to their mobile device or configuration tool.

Backlit Display: The brand-new display on the transmitter boasts a backlit, high-contrast, graphical screen that assures ease of use under any lighting scenario. It is equipped to convey information in eight diverse languages. Visual symbols provide a clearer comprehension of the transmitter's status, enhancing user-friendliness.



Figure: Backlit display feature on Rosemount™ 3051 Pressure Transmitter in Inline, Coplanar, and DP Level configurations



Figure: A common menu design across hosts and tools provides an identical experience regardless of how you are accessing the device

Improved User Experience for Differential Pressure Solutions: The transmitter upgrades also include capabilities for dynamic variable configuration, allowing output of dedicated flow, level, or volume variables, something that has historically been limited to flow meters and level devices. Now operators can easily configure the device to measure flow rate or track total flow, measure Level in any installation with simpler built-in configurator steps, and measure Volume for common tank geometries or even customized tanks that require a strapping table.

Diagnostics: The Rosemount™ 3051 helps identify issues in electrical loops and impulse lines using built-in diagnostics. If not identified, these issues could result in the control system receiving incorrect measurements, potentially leading to safety and quality compromising decisions. When the transmitter identifies an issue through the diagnostic capabilities, it enunciates that back to the control system, displays it clearly on the graphical display, and adds that diagnostic event to its built-in diagnostic log which allows users to always know the device status, even when not connected to the

device. These capabilities help service technicians address potential problems faster by detecting and communicating them early when they can still be corrected before they jeopardize people's safety, operations, and the environment.

Today's labor force expects technology to be intuitive, mobile, and responsive. With an enhanced graphical display, Bluetooth wireless technology, and better overall usability, Emerson's Rosemount™ 3051 Pressure Transmitter meets expectations to modernize operations – making it safer to interact with field equipment and more efficient to manage maintenance and service.



About the Author:



Varshneya Sridharan leads the Pressure & Temperature business for Asia Pacific. If you wish to contact him regarding any of the products you may email him at Varshneya.Sridharan@Emerson.com.

Figure: Loop Integrity and Plugged Impulse Line Diagnostics Troubleshooting on the Rosemount™ 3051 Pressure Transmitter

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Unlock Precision Imaging: Navigating Autofocus Solutions for Industrial Brilliance



While autofocus has become a standard perk in consumer cameras, the industrial imaging realm demands a touch of innovation. This article by Basler outlines various autofocus options and their tradeoffs, helping you understand how to choose the right solution for your specific application.

1. What are the possible scenarios that require autofocus in industrial inspections?

Autofocusing is a valuable feature in industrial inspection applications where maintaining sharp focus on the object or scene is crucial for accurate analysis, measurement, and quality control.

Here are some scenarios in industrial inspection where autofocus is commonly required:

- 1) When the working distance keeps changing in dynamic environment;
- 2) When the application requires high resolution, and you need lenses with larger apertures to maintain image clarity and sharpness;
- 3) In high-speed inspection scenarios where the camera is operating in low-light conditions or capturing rapidly moving objects;

The implementation of autofocus in these scenarios enhances the efficiency, accuracy, and reliability of industrial

inspection systems. This reduces the requirement for manual adjustments, ensuring optimal image quality for subsequent analysis and decision-making processes.

2. Common autofocus challenges in industrial settings

For clear visibility of varied heights, opt for a larger depth of field with a smaller aperture (bigger F number). However, this requires longer exposure for ample brightness. In high-speed applications, a wider aperture (smaller F number) is needed for sufficient light, but it limits depth of field, impacting focus.'

3. What are the different AF methods and their tradeoffs?

In professional imaging, autofocus methods typically fall into two categories: active and passive. Active autofocus employs tools like lasers to calculate the working distance and positions the imaging system accordingly. In contrast, passive autofocus captures multiple images as the working distance changes and selects the focused image through evaluation. Active autofocus is also known as distance-detection-based autofocus, while passive autofocus is referred to as image-based autofocus.

Both approaches are used in industrial applications, and they have their respective advantages and limitations. Let's look at them one by one.

Active Autofocus

In an active autofocus system, a distance detection device is necessary. The most commonly used device in industrial settings is a laser, while interferometers are less common and mainly utilized in labs. In this article, we will delve into the benefits and limitations of laser autofocus.

The key advantages of a Laser AF solution include: firstly, active autofocus proves beneficial when the working distance of the application cannot be predicted. Secondly, the laser detection system excels in both speed and accuracy of distance detection.

However, it's evident from the system diagram in Figure 2 that the hardware setup is quite complex, leading to

naturally higher costs. Another significant drawback of the active autofocus approach is its low flexibility.

Passive Autofocus

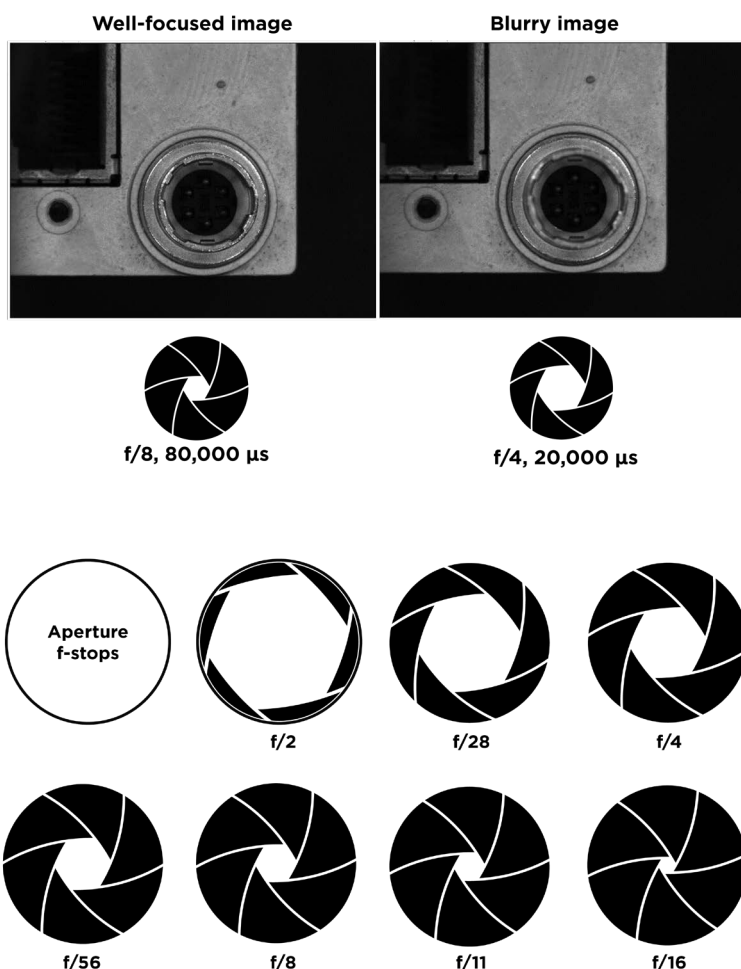
There are primarily two methods for passive autofocus: phase-detection autofocus (PDAF) and contrast detection autofocus (CDAF).

PDAF, designed within the camera sensor, is more commonly used in consumer cameras. However, for larger projects that allow for a customized sensor with PDAF, it can also be an option for industrial applications.

CDAF, also known as image-based autofocus, finds wider application in industrial scenarios. The key advantages of CDAF include a simpler system architecture, lower costs due to requiring less hardware, and greater flexibility. However, this approach has its limitations. Firstly, the speed and accuracy are slightly lower compared to the laser-detection approach. Secondly, as complex image analysis and processing are involved, independently developing a solution from scratch can be resource-demanding. Thirdly, the choice of where to run the image processing becomes crucial. If executed on the CPU, it may consume more resources than desired, impacting the overall system stability. Alternatively, if run on a frame grabber, it involves additional hardware and thus additional costs.

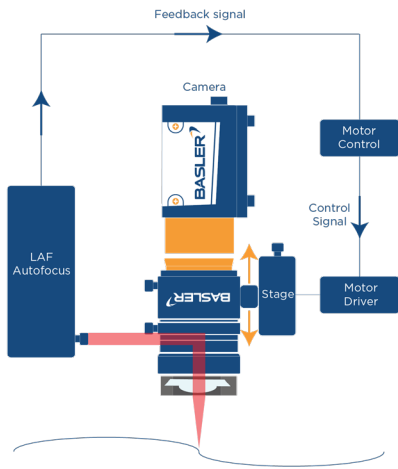
4. How to select and develop your own autofocus solution?

In engineering, there's typically no perfect solution that solves all problems at once; rather, it often involves shifting a problem from one area to another. The methods employed to address the problem will also change. The suitability

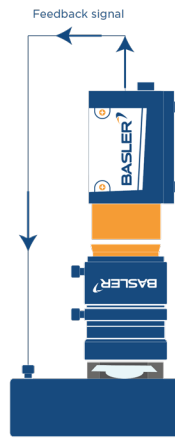


Aperture and F number

Active Autofocus
Distance detection-based



Passive Autofocus
Image-based



VS

of a solution depends on your application requirements, and a thorough professional project evaluation before initiation is always essential.

In the preceding section, we explored the advantages and limitations of both active and passive autofocus methods. When it comes to selecting the right solution for your application, there is usually no simple and straightforward answer. The following comparison chart provides a comprehensive overview of the advantages and limitations of different approaches for industrial autofocus. Four

distinct autofocus methods are compared based on their re-focusing speed, result accuracy, system flexibility, complexity, and cost.

“In this chart, the speed for CDAF involves the use of a liquid lens, providing a faster re-focusing mechanism.

So, if your project demands utmost accuracy, even with the associated higher cost and system complexity, a laser-based autofocus method is the optimal choice. However, if the speed and accuracy offered by CDAF already meet your project

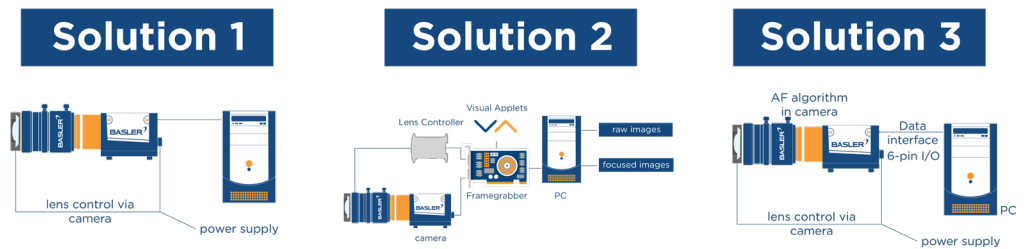
requirements, it stands out as a more cost-effective option that excels in all aspects. Even within CDAF, you can choose either a liquid lens or a motorized lens as the key focus-changing device. If you need a fast and continuous re-focusing solution for high-speed inspection lines, a liquid lens autofocus solution is more suitable. On the other hand, when you need occasional zooming and re-focusing, a motorized lens is the better solution.

When opting for the CDAF approach, whether with a liquid lens or a motorized lens, the key challenges to overcome include:

- 1) Coordinating the control of the liquid/ motorized lens with the camera.
- 2) Developing an autofocus algorithm for pre-processing and analyzing images.
- 3) Addressing CPU loading considerations.

And to solve all these problems, building a team with different skillsets and organizing necessary trainings are essential. This will enable the seamless integration of the selected lens and the development of an AF algorithm that works. These tasks don't sound very difficult until you

		Speed	Accuracy	Flexibility	Complexity	Cost
Industrial Autofocus	Passive	PDAF	●	●	●	●
		CDAF	●	●	●	●
	Active	Laser	●	●	●	●
		interferometer	●	●	●	●



Hardware complexity	Simple	Complex	Simple
Hardware cost	Low	Highest	Low
Host device	1	1	1
Software development efforts	High	Low	Low
AF algorithm	Requires development	Built into frame grabber FPGA	Built into camera FPGA
CPU loading	Some	None	None

*This is for high-end application usage.

really dive into it. For example, managing different APIs for the re-focusing device and camera. Additionally, developing autofocus algorithm is a very complex task, requiring in-depth understanding of industrial imaging. Some of the major challenges in refocusing include: insufficient lighting, high image noise, insufficient contrast, targets on different planes, and ill synchronization of lens and image analysis.

5. What are the available CDAF solutions in the market?

If your project timeline is tight, or it's challenging for you to build the right team quickly, you might be looking for solutions available in the market to help you realize autofocus. The expectations of an AF solution would be one that is able to address one or more of the challenges outlined in the previous part of this article. Here are some of the main solutions available from Basler:

Solution 1: Liquid/motorized lens control from an industrial camera, but no AF algorithm available.

In this solution, camera manufacturers develop a feature within the camera FPGA to control the re-focusing lens. The advantage of this approach is that users only need to interact with a single camera API, eliminating the need for lens integration. However, they will still need to develop their own autofocus (AF) algorithm. Nevertheless, if your team can develop the algorithm quickly, Solution 1 may already be sufficient to meet the requirements

Solution 2: Liquid/motorized lens control and AF algorithm from a frame grabber FPGA

This solution is better suited for high-end applications involving complex image processing or the need to handle large amounts of image data. Developing both

the lens control and autofocus algorithm on the frame grabber is advantageous to free up CPU load.

Solution 3: Lens control + AF algorithm from an industrial camera

Compared to the previous two solutions, this option is the most streamlined in both hardware and software. Users can achieve the best-focused image out of the box, and the integration process is as simple as incorporating a standard industrial camera. There is no additional CPU load, no need for complex programming, and no extra cost for additional hardware.

Read more about the autofocus use cases from Basler website.

Yokogawa Releases OpreX Carbon Footprint Tracer to Support Decarbonization in the Process Manufacturing Industries

-In collaboration with SAP, a world's first product CO2 emissions management service for the process manufacturing industries-



CO2

Yokogawa Electric Corporation (TOKYO: 6841) announces the development and release on this date of OpreX Carbon Footprint Tracer, a solution in the OpreX™ Transformation lineup that targets the carbon footprint management needs of companies in the process manufacturing industries.

OpreX Carbon Footprint Tracer is a cloud service that calculates CO2 emissions based on measurement data and other types of primary information collected from instrumentation systems, power monitors, and other systems, and a consultation service that aids in the formulation of strategies for calculating and reducing CO2 emissions. This is a total solution for the process manufacturing industries that enables the visualization and reduction of CO2 emissions.

For the calculation of CO2 emissions, this service realizes seamless integration with the SAP® Sustainability Footprint Management service and ERP solutions offered by SAP, enabling the visualization and management of product carbon footprint (PCF) based on European standards. The support for European standards and linkage with the SAP Sustainability Footprint Management service is a world first, giving companies in the process manufacturing industries the ability to both visualize and manage their PCF.

Development Background

Efforts to achieve carbon neutrality by 2050 are accelerating worldwide, and Europe is leading the way in carbon neutral-related activities by implementing

PCF solutions that use measurement data and other primary information to evaluate the impact of climate change over the entire product life cycle. With the passing of regulations such as the Carbon Border Adjustment Mechanism (CBAM) tariff and the introduction of the Digital Product Passport (DPP) tool, the need to support these policies is particularly urgent. To give process manufacturers the ability to calculate CO2 emissions for individual products, Yokogawa Digital, a Yokogawa subsidiary, has leveraged the company's wealth of information and operational technology (IT and OT) to develop OpreX Carbon Footprint Tracer. By linking with the SAP Sustainability Footprint Management service, this solution enables the visualization and management of PCF based on carbon-neutral standards.

1. Quick and accurate assessment of emissions data for verification of emissions reduction measures

Utilizing Yokogawa’s data collection technology, this solution automatically collects data from sensors and systems, including those from other vendors, to assess the operational parameters for individual products and update a PCF dashboard. This is expected to make it easier to audit CO2 emissions by providing operational data as evidence.

2. Management of PCF based on European CO2 emission-related laws and regulations

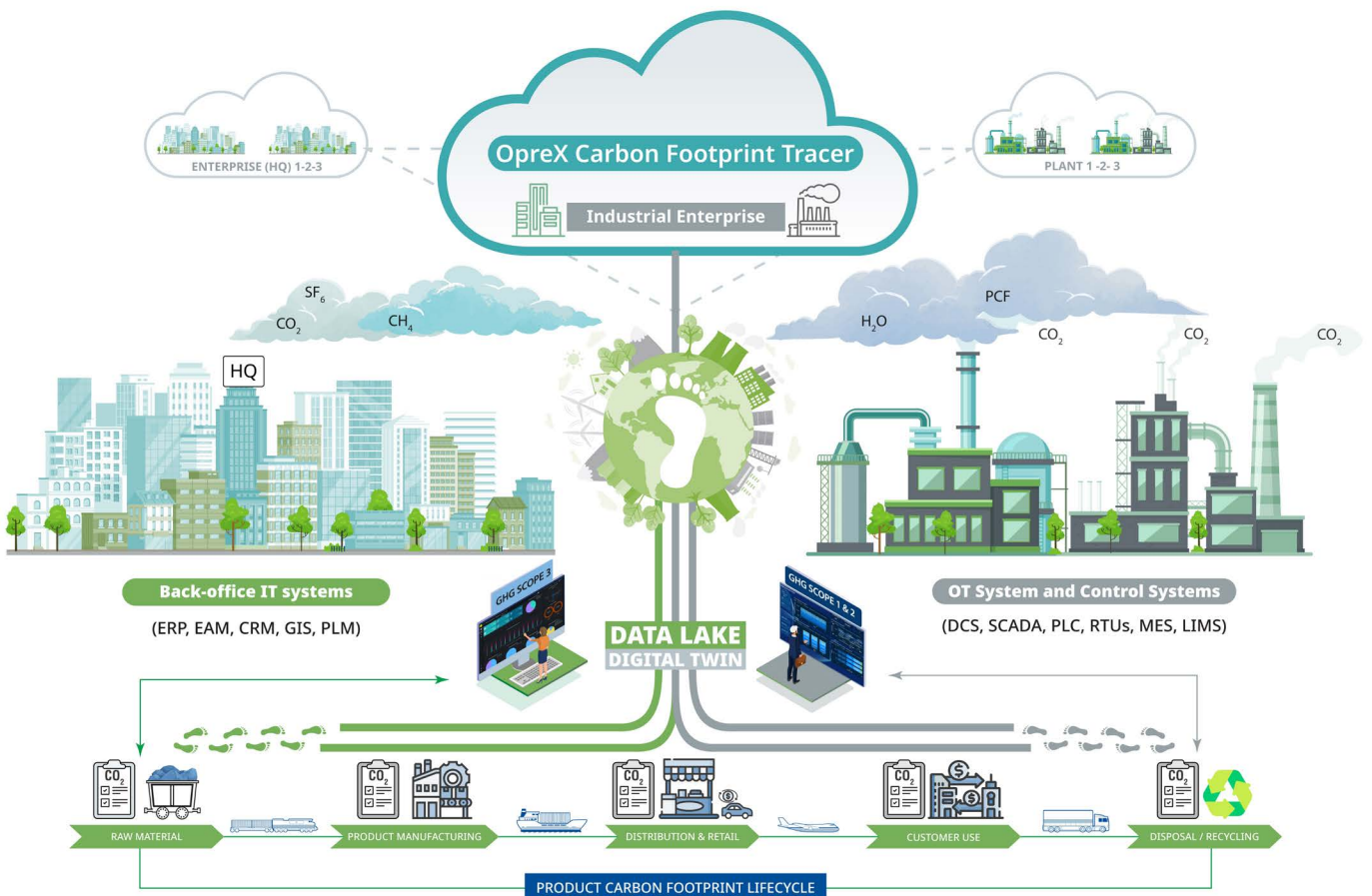
Through the linkage of data with the SAP Sustainability Footprint Management service developed by SAP, which is actively engaged in emissions-related activities in the European market, this solution aids in the creation of dashboard displays and outputs reports that support



WBCSD¹ PACT², Catena-X³, and other European emissions-related laws and regulations. In addition, as this is offered as a cloud service, it can be readily updated in response to changes in laws and regulations.

3. Provision of consultation on emissions reduction in tandem with EMS and supply chain optimization

Yokogawa has multiple solutions such as energy management systems (EMS) that serve to reduce CO2 emissions by



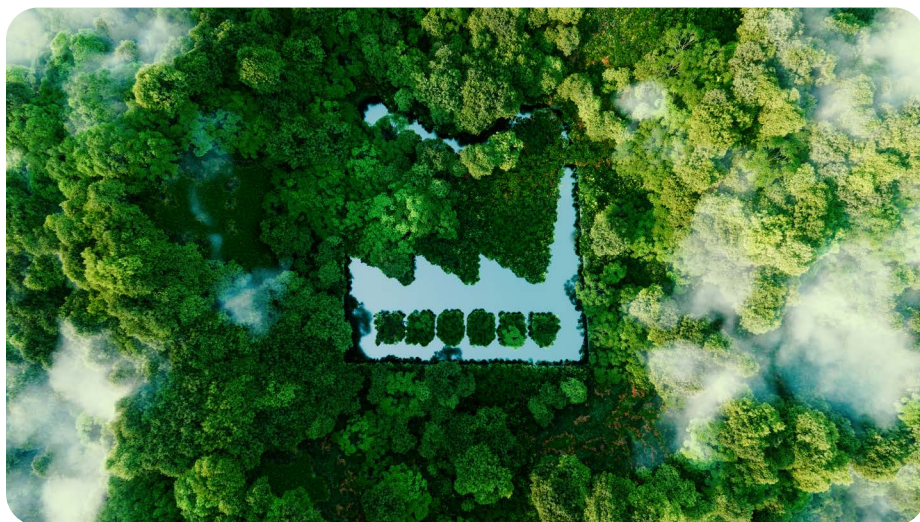
TECHNOLOGY & PRODUCT NEWS

optimizing energy consumption and improving the procurement of raw materials. While putting these solutions to good use, the company will also provide consultation on emissions reduction planning and aid in the implementation of emissions reduction solutions that rely on OpreX Carbon Footprint Tracer to accurately measure PCF.

- 1 WBCSD: World Business Council for Sustainable Development
- 2 PACT: Partnership for Carbon Transparency is hosted by WBCSD
- 3 Catena-X: An open data ecosystem for the automotive industry designed to create data chains that enhance the value chain

Key Markets

Oil and gas extraction and refining processes, pipelines and other transportation processes, plants for petrochemicals, chemicals, renewable energy, electric power, pulp and paper, food and pharmaceuticals, steel, non-ferrous metals, water distribution, water treatment, etc.



Applications

Plant monitoring, operation, control, data acquisition, record keeping, etc.

About OpreX

OpreX is the comprehensive brand for Yokogawa's industrial automation (IA) and control business. The OpreX name stands for excellence in the technologies and solutions that Yokogawa cultivates through the co-creation of value with its customers, and encompasses the entire range of Yokogawa's IA products, services, and solutions. This brand

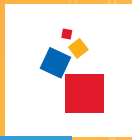
comprises the following five categories: OpreX Transformation, OpreX Control, OpreX Measurement, OpreX Execution, and OpreX Lifecycle. OpreX Carbon Footprint Tracer is an OpreX Connected Intelligence family product in the OpreX Transformation category, which delivers operational excellence throughout an enterprise's activities, from production through to supply chain optimization and risk and business management.

About Yokogawa

Yokogawa provides advanced solutions in the areas of measurement, control, and information to customers across a broad range of industries, including energy, chemicals, materials, pharmaceuticals, and food. Yokogawa addresses customer issues regarding the optimization of production, assets, and the supply chain with the effective application of digital technologies, enabling the transition to autonomous operations.

Founded in Tokyo in 1915, Yokogawa continues to work toward a sustainable society through its 17,000+ employees in a global network of 129 companies spanning 60 countries.





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Innovative Solutions Across Industry:

A Conversation with PT ifm electronic Indonesia



Ching Fum Ywee, President Director

1. ifm Indonesia recently had an opening ceremony in August 2023. How does ifm electronics navigate challenges related to different regulations and standards in various regions?

ifm electronic has been gradually establishing sales and technical subsidiaries since 1970. Today, ifm's customers are supported by independent sales companies or trade partners in more than 165 countries. In Asia, ifm set up its own sales office in Japan in the early 1970s. This move would be seen as an ambitious step for a European-based sensor company, considering the untapped market and the different and new regulations and standards there. One of the key success factors in handling this challenge is to have a team consisting of ifm's senior and experienced management members, along with locally recruited managers and staff. Each team member plays a crucial role in understanding the local regulations and standards while cross-checking with ifm's internal guidelines and best practices. Additionally, they base their decisions on ifm's philosophy. Another important aspect is engaging an international consulting company with a strong establishment in local countries, which offers legal advice and consultation to ifm.

2. ifm electronic specializes in developing innovative Industry 4.0 solutions. How does the company cater to the needs of the industry? What are the product focus and innovative solutions?

The goal of ifm is to make our customers more successful with state-of-the-art technology. We strive to make innovative technologies available to all our customers, which we call ‘**Technology for Everyone**’. Our product development focuses on smart design, excellent user-friendliness, sustainability, and the highest quality, all at an excellent price/performance ratio. With 50 years of experience in industrial manufacturing digitalization, ifm stands out as a specialist in automation technology. We provide concrete and step-by-step support to our customers, offering scalable and simple solutions. ifm caters to companies of all sizes and industries, providing **products, services,**

and **software** that cover the entire journey from sensor parameter setting to the smart factory. Our commitment includes making production processes transparent by **enhancing plant efficiency, avoiding standstills, and optimizing processes.**

To facilitate the implementation of Industry 4.0, ifm has introduced ‘The IIoT-Toolkit’. This toolkit enables a continuous flow of information from the shop floor (machine infrastructure) to the top floor (IT infrastructure). It empowers our customers to access data related to machine states, required maintenance, productivity enhancement opportunities, energy-saving options, and much more.

Another innovation from ifm is the Moneo software, serving as an IIoT platform for industry and production. Moneo seamlessly integrates operational technology with information technology. The sensor data generated in production

plants can be easily read and processed, serving as a foundation for sustainable corporate decisions. Moneo offers a modular structure, including a basic software package and applications such as condition monitoring and IO-Link sensor parameter setting. This flexibility allows us to tailor-make software solutions to meet individual requirements.

3. How does the company adapt its products and strategies for different sectors?

ifm is an automation company that provides solutions for various industries, including food & beverage, automotive, mobile machines, water, port & ship automation, mining, and steel. Each industry requires tailored solutions, specific applications, and expertise related to its processes and systems. For instance:



ifm Indonesia team

In the food & beverage industry, ifm offers products with hygienic housing design, high ingress resistance (up to protection class IP68 and IP69K), as well as high-temperature resistance. These products are also protected against aggressive agents used in high-pressure cleaning.

In the automotive industry, ifm delivers innovative technology for automating and digitalizing plants and processes. This includes sensors to monitor process media, safety sensors for machine and personnel protection, and vision sensors for position detection and identifying product defects.

The key focus for ifm remains on understanding customers' pain points and helping them achieve their key performance indicators (KPIs), minimize downtime, and reduce waste in their processes.

4. Services and products from ifm help to protect the environment worldwide and reduce CO₂ emissions, how is this reflected in the company's business practices and product development?

ifm contributes to improving the living and working conditions of our customers. Our products, services, and software not

only protect the environment worldwide but also help reduce CO₂ emissions, energy consumption, and material usage. In our business practices, ifm has been externally certified and validated according to EMAS (Eco-Management and Audit Scheme) since 2020. EMAS is based on the European Eco Audit Regulation EC No. 1221/2009 and encompasses all the requirements of international standards ISO14001, going even beyond them in certain areas.

For instance, EMAS provides the advantage of legal certainty through verification by environmental auditors. EMAS-certified organizations are also obligated to publish an environmental statement with specified minimum content, including a description of their environmental activities and ecological performance indicators.

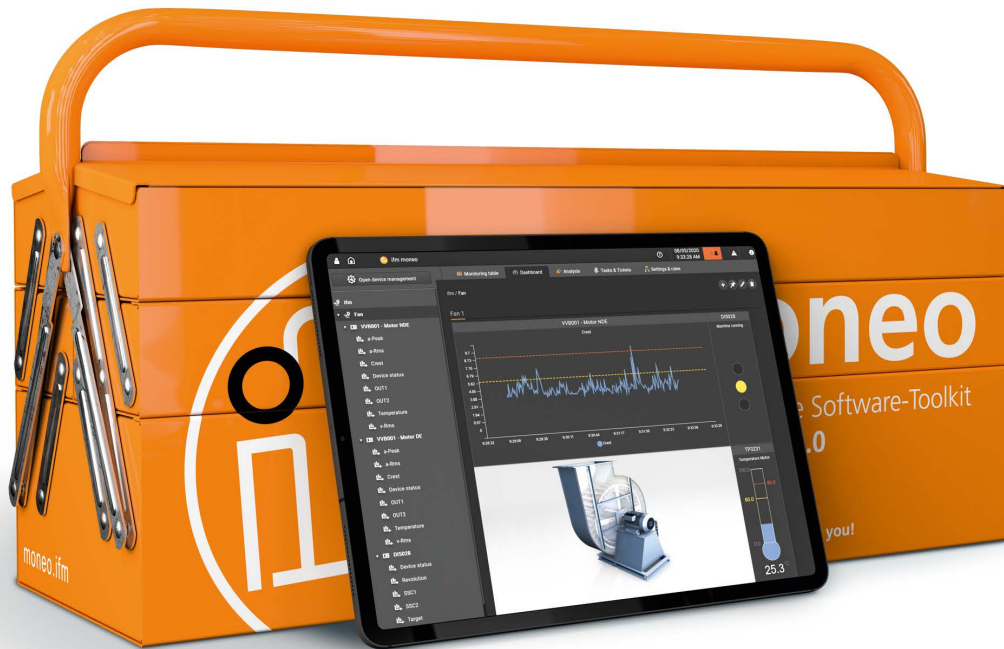
In terms of product development, ifm has created various products such as pressure, flow, and temperature sensors. These sensors find applications in compressed air monitoring systems, leakage detection systems, and energy management systems. Additionally, ifm has developed IO-Link technology, which simplifies wiring systems, and the Moneo software, designed for easy monitoring. These hardware and software innovations empower our customers to streamline their management processes.

5. Any recent successful projects or partnerships that highlight the company's innovative solutions for B2B in automation that you would like to share with us?

ifm has many success stories from projects with global companies. One of the success stories that we also share on the ifm website is the sustainable plant transformation at Danone. ifm collaborated with Danone and Bocard



Jhon Afri Cryman, National Sales Manager



to address the challenge of replacing milk used in the production process with plant-based alternatives, aiming for a more sustainable plant.

ifm's involvement from the early stages of setting up the new plant ensures maximum proximity to the plant manufacturer and the end customer. This enables seamless cooperation and innovative solutions.

The new plant was set up simultaneously with the dismantling of the old one, taking into account the complete integration of the mechanical, electrical, and automation areas. This reflects the urgency and commitment to this sustainable transition. Discover how the integration of IO-Link technology, pressure, and temperature sensors, along with AS-i safety systems, streamlined the

entire process. As a new feature, IO-Link was integrated into the plant, allowing all digital values to be retrieved from the sensors, and the control valves to be operated digitally. It also offers simplified diagnostics, sensor fault reporting, and optimized maintenance procedures.

The cooperation between ifm, Danone, and Boccard enables close contacts, technical solutions, and fast reactions. By choosing ifm's products with the latest high-end technologies, Danone and Boccard are building a forward-looking and sustainable plant for the coming decades.



Management Team, PT ifm electronic Indonesia

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Success in Motion Towards a Resilient Future

An Interview with Charlie Lim, Managing Director,
Phoenix Contact Southeast Asia



Charlie Lim is the Managing Director at Phoenix Contact Southeast Asia, a leading global manufacturer and supplier of power and data connectivity solutions. He is responsible for driving the company's growth within the Southeast Asia region in the core business of Device Connectors, Industrial Components and Electronics, and Industry Management and Automation.

1. Phoenix Contact is a global leader with over 100 years of service excellence in the electrical, and industrial automation industry. How does the company stay at the forefront of technological advancements within the industry?

Over a century of product innovation and service excellence has cemented Phoenix Contact's position as a global leader in the electrical and industrial automation industry. This legacy extends to Southeast Asia, where an insatiable desire to address customer needs and spearhead technological advancements, is the bedrock of the firm's market leadership and service excellence.

The company has dedicated and invested 25 years in building a robust regional structure, as evident in our transformation from a modest 5-person team in Singapore to a thriving 200-strong organization across the Southeast Asia region, with further plans to double in size by 2030.

Today, our market leadership and growth have resulted in the establishment of a new, upgraded Southeast Asia headquarters in Singapore, situated at 80 Bendemeer Road. Housed within will

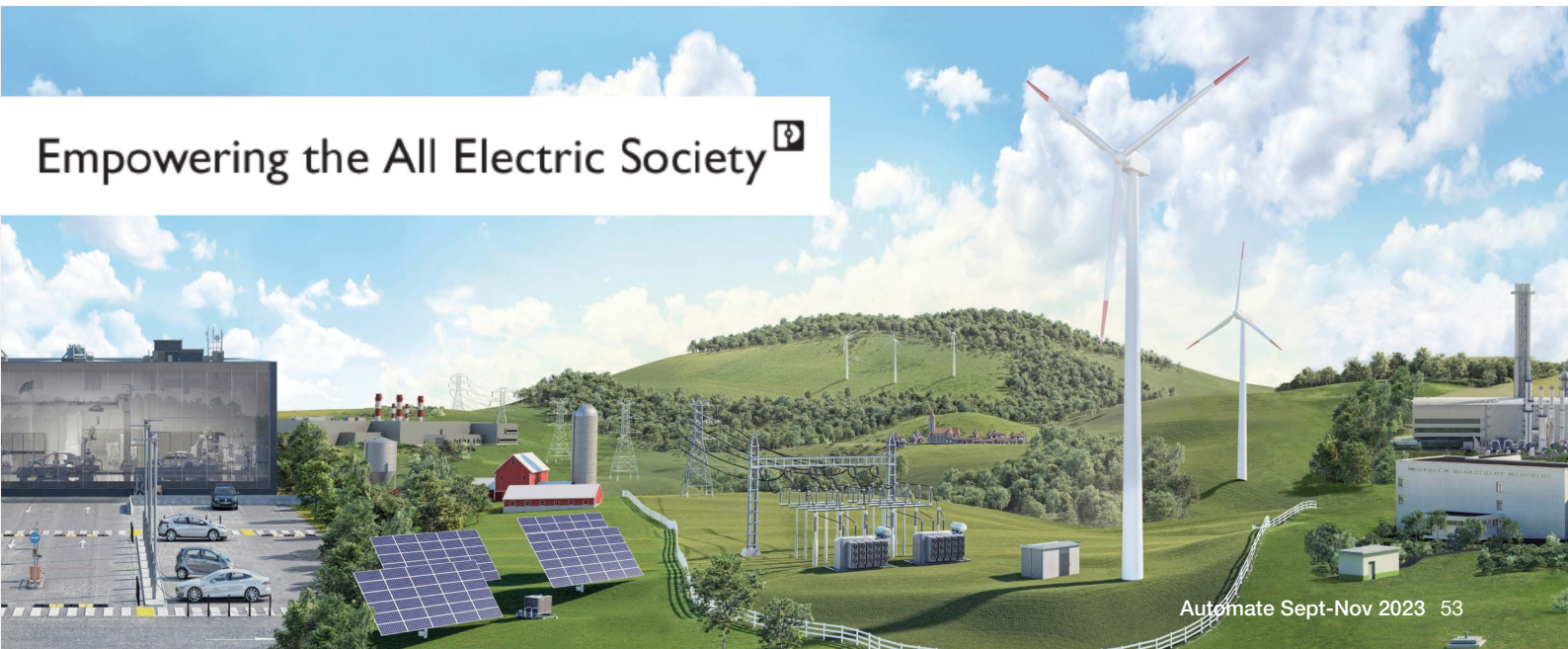


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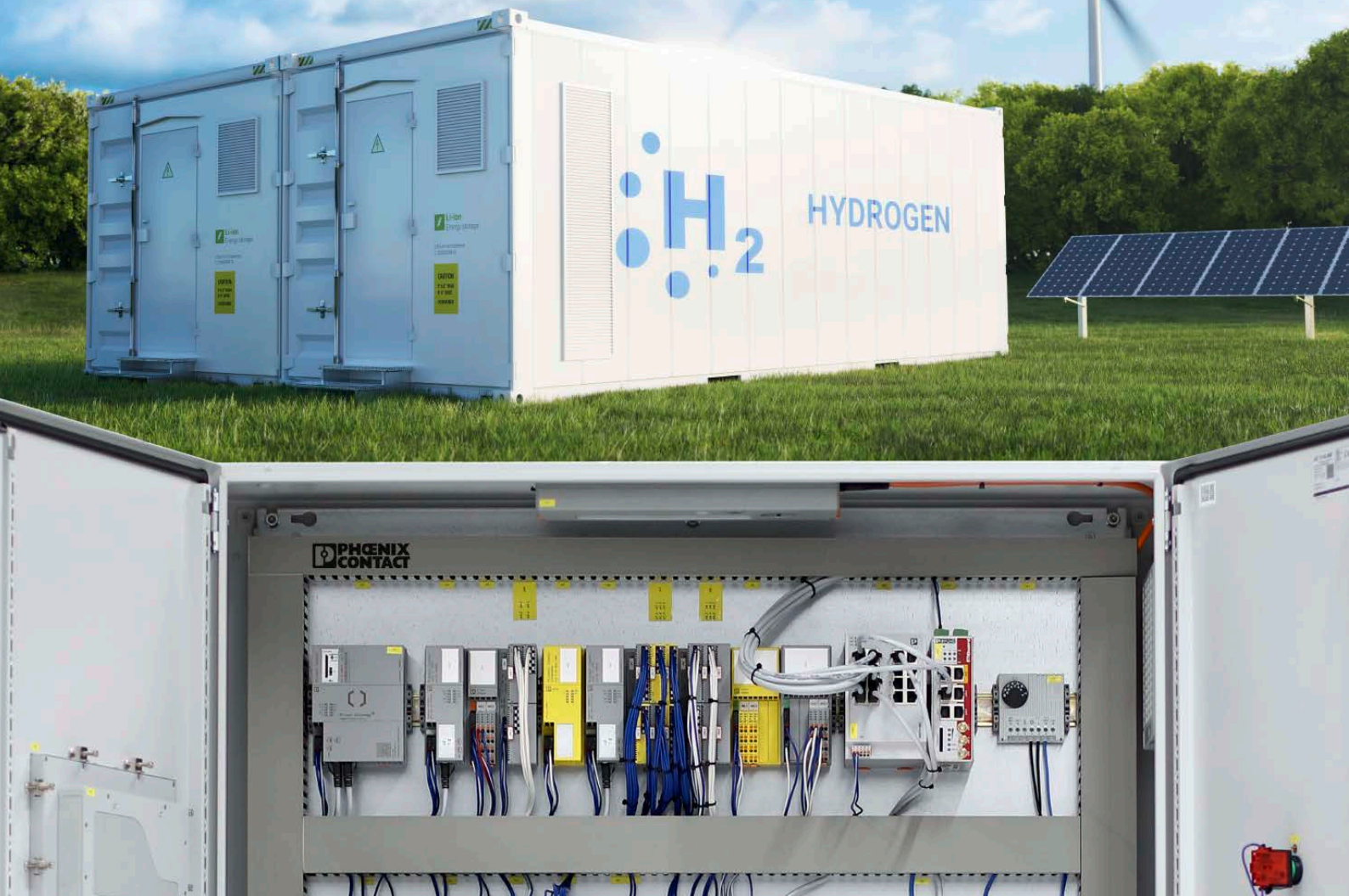
be a dedicated "Customer Technology Centre," which serves as a showcase and collaborative hub for the company's leading-edge innovations. Positioned as the focal point of our customer-centric approach, the center aims to strengthen connections and deepen understanding among our valued customers. Embracing this customer-centric strategy enables us to discern and respond effectively to the evolving needs of the market, thereby developing innovative solutions that provide tangible value.

2. How do you envision the future of industrial manufacturing and what role does Phoenix Contact play in shaping that landscape?

The future of industrial manufacturing is poised for a seismic shift, and so are we. Globally, Phoenix Contact envisions an "All-Electric Society" (AES) where sustainability and intelligence merge seamlessly across industrial



Empowering the All Electric Society 



manufacturing verticals for a thriving, resilient, and interconnected future. The AES vision indicates a trend toward highly automated industrial environments. From building automation, remote monitoring solutions, and cyber-secure automation infrastructure, Phoenix Contact is creating a reliable and complete ecosystem for advanced manufacturing environments.

The rise of automation also brings along, a growing demand for smaller, more cost-effective PCB-based solutions. The CHARX Charging technology by Phoenix Contact, for instance, is a high-density, compact wall box charging solution for electric vehicles (EV) that offers a combination of speed, safety, efficiency, and convenience, making EV charging cost-effective. This commitment to quality, innovative, and cost-effective

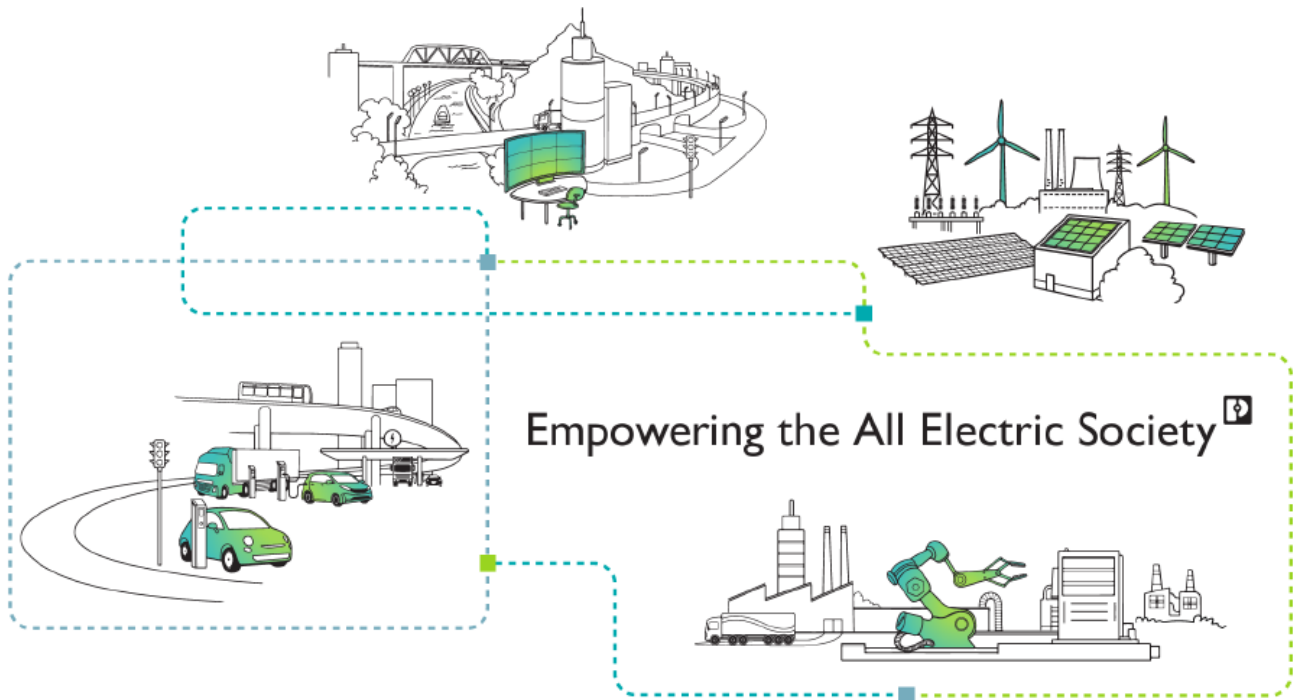
solutions has inspired other industry players to develop. The benefit for consumers within the market? A push for other manufacturers to improve the quality and durability of their products.

Beyond shaping the industry standards, we pride ourselves as a reliable solutions provider that pioneers innovative advancements, and advocates for open standards. With continued investment and collaboration, the AES vision will transcend beyond a futuristic vision into reality for a brighter future. Whether designing comprehensive factory automation systems or developing advanced connectivity solutions, Phoenix Contact is the trusted partner for customers to accelerate their business toward sustainability.

3. Given the current disruptions within the industrial manufacturing sector, what key strategies are in place to ensure business agility and resilience?

Today, the industrial horizon shifts with both promise and peril. Global uncertainties, volatile supply chain issues, and the relentless march towards digitalization demand a proactive stance that Phoenix Contact isn't just observing, but actively shaping.

To bolster agility, the leadership team is strengthening its footprint in Southeast Asia. Investments in strategic marketing initiatives will emerge in markets namely



Cambodia, and Laos. These regions represent a large untapped market with growing economies and infrastructure development needs, where our expertise and solutions present a valuable foothold in sectors namely machine building, Power-to-X generation, and energy distribution. Amongst the strategic plans, also lies Vietnam, a vibrant investment market with an economy routed for continued expansion. This translates into an increased demand for infrastructure development, industrial projects, and technological advancements, all areas in which Phoenix Contact's expertise plays a crucial role.

In ensuring a resilient future, the business will leverage Singapore's strategic position as a global supply chain hub and invest in efficient logistics management over the next three years to ensure the seamless flow of materials, even in the face of unforeseen disruptions.

The digital space will also see an increased focus, with targeted digital marketing strategies and expansions into e-commerce platforms to secure the loyalty of existing customers and attract new ones.

4. Looking ahead, what are the market prospects for the year, and Phoenix Contact's plans to fortify growth against potential challenges in the market?

It is unequivocally evident that the industry is rapidly changing and evolving. Looking ahead, we are anticipating various technological breakthroughs in power-to-X and energy storage solutions in the market.

Artificial intelligence (AI) is another game-changer that we foresee revolutionizing the way we approach the market. Predictive modelling for us, will be advantageous in inventory planning as we project diverse market impacts on business performance. By anticipating potential disruptions, we can proactively adjust our business strategies, and simultaneously optimize resource allocation for enhanced agility in unfavorable conditions.

In the ever-evolving landscape of manufacturing, staying abreast of industry trends is paramount for any

company, including us. The advantage of embracing emerging technologies is immense, ensuring operational efficiency, meeting evolving customer demands, and proactively addressing potential disruptions. For over 100 years, Phoenix Contact has been empowering businesses to thrive amidst constant change with our cutting-edge solutions.

To find out more about our industry-leading solutions and customer service support, visit phoenixcontact.com/en-sg



Embracing Industry 4.0 Revolution: Trends, Challenges, and Readiness In Malaysia Manufacturing Sector for 2024



As part of Malaysia Madani Economy framework, the government is prioritising manufacturing as the country new growth engine.

To achieve this, it is becoming increasingly important to adopt digital technologies within and beyond the factory walls.

Digitalisation in manufacturing offers numerous benefits, including improved efficiency, increased productivity, and the ability to monitor, analyse, and resolve production bottlenecks in real-time throughout the entire business process.

Manufacturers are poised to move towards Industry 4.0 and smart factory transformations as they recognise them as key drivers for future competitiveness.

The Deloitte 2024 Manufacturing Industry Outlook suggests that manufacturers should focus on important technology adoption trends, challenges, and preparedness factors as we approach 2024.

Technology trends shaping the manufacturing industry

The implementation of AI is at the core of the smart factory transformation.

By analysing data from factory equipment, it enables robotics to automate manual tasks, reduce errors, and free up hours for employees to contribute to other areas, which fosters value addition.

Additionally, IoT-connected sensors intelligently predict machinery

maintenance requirements, thus promoting connectivity across the smart factory, standardisation and a competitive edge through precise business forecasts. These cutting-edge technologies are a significant leap forward in manufacturing capabilities and a strategic step towards a more agile, predictive, and resilient industrial landscape.



Challenges and preparation for the adoption of smart manufacturing technologies

While it is imperative for manufacturers to keep up with smart factory transformations, the adoption of technologies can be a daunting step. With this, partnerships between different stakeholder groups across industries play a crucial role in the successful implementation of smart factory initiatives.

In today's economic climate, it can be a costly process for manufacturers to invest in infrastructure, equipment, and software.

Manufacturers can explore funding options as well as scalable and cost-effective solutions such as Everything-as-a-Service (XaaS) to adopt digital transformation.





For example, Lenovo's XaaS approach includes innovative financial empowerment programs, such as flexible lease-to-own options and adaptable loan structures designed to alleviate financial constraints and empower companies to invest confidently in their digital transformation.



This means customers no longer need to take capital ownership of the IT assets, and instead pay for what they use each month as part of their operating expenses.

The process of digitalisation may need more technical expertise for implementation.

To overcome this hurdle, manufacturers can collaborate with industry experts such as Lenovo to assist them in their digital transformation journey.

As a strategic technology partner, Lenovo can serve as a single point of contact for managing all IT infrastructure needs, from consultation to deployment and end-of-cycle service.

With their extensive expertise in the field, Lenovo can provide manufacturers with end-to-end support for their digitalisation efforts.

Ergo, it is essential to choose a technology partner with the right combination of technical experience and industry knowledge to help implement tailored manufacturing solutions that align your unique business needs.

A trusted partner will collaborate with you to offer solutions that are both suitable for the present and future.

The writer is the country general manager, Lenovo Malaysia. The opinions expressed in this article are his personal views.

The above comments and opinions in the article are the author's own own and do not necessarily represent Automate Asia Magazine's view

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Meet a Humanoid Robot, Explore Impact of AI on Workplace at ST Education Forum 2024



Since ChatGPT was launched in 2022, the generative artificial intelligence (AI) chatbot has taken the world by storm and the topic of AI has found its way into everyday workplace conversation.

From chats at water coolers to discussions in boardrooms, the question on everyone's lips seems to be: "Will robots take my job?"

A report in March 2023 by Goldman Sachs suggested that about 18 per cent of work globally could be automated by AI, and 300 million full-time jobs could be lost to generative AI.

The relentless advancement of AI has thrust the workplace into an era of unprecedented transformation, as competition has seemed to ensue between

this cutting-edge technology and its human counterparts.

But instead of fearing the rise of machines, we can embrace the opportunity to understand, adapt and harness the power of AI to shape a future where humans and technology coexist harmoniously.

The Straits Times Education Forum, titled *The AI Revolution: Are You Ready For It?*, seeks to tackle the issues surrounding the permeation of AI in the workplace, and provide solutions for stakeholders.

The forum, which is to be held in partnership with the Singapore Management University (SMU) on March 8 from 9.30am to noon, will feature guest speakers – including a humanoid robot –

who will share insights, perspectives and, most importantly, solutions on how to leverage AI in the workplace.



Helming the first session is ST's newsroom strategy editor Jeremy Au Yong, along with Sophia the Robot, the brainchild of Hanson Robotics.

As the world's first robot citizen, Sophia represents the convergence of science fiction and reality, and embodies the cutting-edge frontier of AI and robotics.

The first session will be followed by a panel discussion on AI in the workplace, moderated by SMU's vice-president of partnerships and engagement Lim Sun Sun.

The panellists include Dr Jason Grant Allen, director of the Centre for AI and Data Governance at SMU, Mr Tan Kok Yam, chief executive of SkillsFuture Singapore, and Mr Ben King, country managing director of Google Singapore.



ST editor Jaime Ho said: "There's no doubt AI is the biggest topic of the moment.

"The ST Education Forum this year presents a unique opportunity to explore and understand the benefits and risks we face with the rapid advances in AI technology."

More than just learning about AI and how to thrive in this new era, certain shifts in perspectives are necessary to address the concerns brought forth by AI, said Professor Lily Kong, president of SMU.

"I would make the case that universities play a pivotal role in this aspect, not only by preparing graduates and professionals with skills to leverage technology, but perhaps more importantly, sharpening in them human attributes that machines cannot replace," she said.

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SKT, Iceotope and SK Enmove Join Forces for AI Data Center Innovation

SK Telecom (NYSE:SKM, “SKT”), Iceotope Technologies, the global leader in Precision Liquid Cooling, and SK Enmove, Korea’s leading base oil and lubricants provider developing thermal fluids for data center, signed a memorandum of understanding (MOU) to collaborate on the development of liquid cooling technique/solution that optimizes energy-efficiency of AI data centers.

Since air conditioning and cooling systems consume the largest amount of energy in data centers, the key to realizing an energy-efficient AI data center lies in reducing the power consumption of these systems.

Under the MOU, SKT, Iceotope and SK Enmove will collaborate to deploy Precision Liquid Cooling (PLC)* using SK Enmove’s thermal fluid at SKT’s AI

Data Center Testbed. The deployment is to demonstrate PLC’s value in cooling efficiency and power savings. Moreover, SKT will develop an integrated Coolant Distribution Unit (CDU) to support various liquid cooling systems with the technical support of Iceotope.

Iceotope’s Precision Liquid Cooling (PLC) technology uses a precise delivery of dielectric fluid to remove heat from the hottest components of the server, thereby significantly reducing energy consumption.

Going forward, SKT plans to develop an AI-based autonomous cooling system. The AI Autonomous Cooling System will analyze the temperature and power load in the AI data center and automatically control the supply temperature and flow rate of thermal fluids in the CDUs to

increase the operational efficiency of the AI data center.

“By combining core technologies and capabilities of SKT, Iceotope and SK Enmove, we expect to develop innovative energy efficiency solutions that can not only help us strengthen our competitiveness in AI data centers, but also put us on the right path towards sustainability,” said Lee Jong-min, Vice President and Head of Future R&D at SKT.

“We are thrilled to be collaborating with SKT and SK Enmove on AI data center innovation and look forward to helping them and their customers to realize energy-efficiency in their facilities with our Precision Liquid Cooling solutions,” said David Craig, CEO of Iceotope.

“Importance of establishing a sustainable environment is increasing these days. Through this cooperation, we aim to contribute to the vitalization of the immersion cooling market and solidify our position as an ‘Energy Saving Company;” said Seo Sang-hyuk, Vice President and Head of e-Fluids B2B Business Office at SK Enmove.

About SK Telecom

SK Telecom has been leading the growth of the mobile industry since 1984. Now, it is taking customer experience to new heights by extending beyond connectivity. By placing AI at the core of its business, SK Telecom is rapidly transforming into an AI company with a strong global presence. It is focusing on driving innovations in areas

of AI Infrastructure, AI Transformation (AIX) and AI Service to deliver greater value for industry, society, and life.

For more information, please contact skt_press@sk.com or visit our LinkedIn page www.linkedin.com/company/sk-telecom.

About Iceotope

Using industry-standard form factors, Iceotope's Precision Liquid Cooling solutions offer extreme cooling performance, simplified maintenance, hot swapping, and significant cost reductions both inside and outside the data center. For more information visit www.iceotope.com or follow us on LinkedIn.

About SK Enmove

SK Enmove is a global market leader with its largest market share of Group III/III+ premium lube base oil. It has solidified its position with its premium base oils and ultra-low viscosity lubricants to improve fuel economy in automobiles by enhancing fuel efficiency. SK Enmove has also strengthened new businesses including data center immersion cooling and battery thermal management with an aim to improve electrical efficiency, which could lead to becoming an “Energy Saving Company”.

For more information, visit <https://www.skenmove.com> or <https://skinnonews.com/global/>



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FPT and Siemens Ink MOU, Accelerating Multifaceted Cooperation Globally



Global IT corporation FPT recently signed a Memorandum of Understanding (MoU) with the multinational industrial technology conglomerate Siemens, fostering collaboration and mutually beneficial business opportunities in advancing the manufacturing sector and semiconductor chip production while accelerating digital transformation globally.

FPT and Siemens will join forces in areas such as smart infrastructure, green and intelligent data centers, digital industrial solutions, automotive software development, and digital transformation. Built on the successful partnership on MindSphere IoT Operating System since 2017, the new agreement focuses

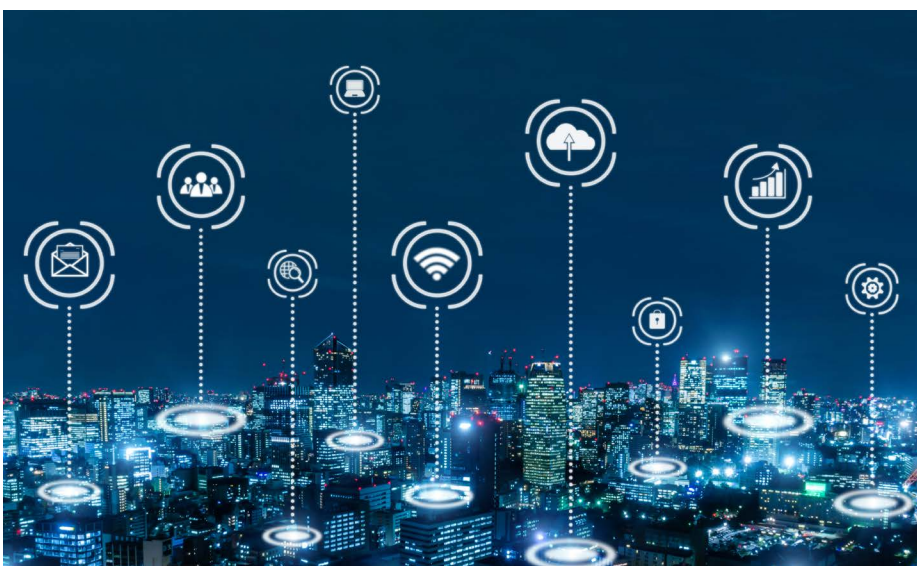
on strengthening engagement and competencies in digital transformation services for both sides and their clients worldwide, as well as opening up new business opportunities.

Harnessing FPT's robust expertise and high-quality workforce, FPT aspires to become the Global SI Partner for Siemens' low-code platform - Mendix, and Engineering Services Provider for Siemens EDA, focusing on AUTOSAR projects.

Siemens also invites FPT to join its Xcelerator ecosystem to accelerate digital transformation with Siemens' solutions and applications. Additionally, the two parties will further expand collaboration

in the smart infrastructure domain, with Siemens targeting to be the preferred supplier for FPT's data center network and its sustainable infrastructure development projects in Vietnam.

Leveraging its profound technology foundation in the digital ecosystem, Cloud, and low-code, Siemens commits to aiding FPT with access to training and knowledge-sharing on a large scale. The German powerhouse will also provide support and explore collaboration with FPT in semiconductor design and manufacturing, one of FPT's pivotal areas for future growth. As a leading chipmaking company in Vietnam, FPT also aims to supply semiconductor chips to Siemens.



Speaking at the signing ceremony, Dr. Truong Gia Binh, FPT Chairman & Founder, said: “FPT focuses on five keywords: Digital transformation, Green

transformation, Artificial Intelligence, Automotive, and Semiconductor. Our greatest resource is our talented people, with 32,000 digital transformation experts

working across the globe. In the future, we plan to invest in AI supercomputers and workforce training and development, prioritizing NVIDIA certifications and advancing innovations in industries such as automotive and semiconductor. I believe these will be the stepping stones to enhance cooperation between FPT and Siemens.”

Mr. Roland Busch, Chairman and CEO of Siemens AG, affirmed that FPT and Siemens have many commonalities: “Siemens has extensive experience in the semiconductor industry, and we are confident in our capability to provide FPT with technological support. Furthermore, Siemens boasts expertise in various domains, including smart infrastructure



and digital industrial solutions. We are positioned to leverage these technologies to enhance product adaptability in daily life. Consequently, Siemens is fully prepared to collaborate closely with FPT in their future endeavors, offering comprehensive support and innovative solutions.”

Siemens and FPT have years of experience in successful collaboration, varying across sectors and industries. With a track record of success and extensive experience, FPT has established itself as a world-class technology enabler for complex business challenges and opportunities. Post surpassing one billion USD in revenue from global IT services in 2023, the Vietnam-headquartered tech

corporation aims to achieve USD 5 billion in revenue from global IT services by 2030 and reach billion-dollar milestones from a single market, a single vertical industry and a single contract.

The signing ceremony took place in Hanoi, Vietnam, on 26 February 2024, with the participation of Dr. Roland Busch, Siemens AG President & Chief Executive Officer; Dr. Pham Thai Lai, President & Chief Executive Officer of Siemens ASEAN & Vietnam; Dr. Truong Gia Binh, FPT Corporation Chairman, Mr. Nguyen The Phuon, FPT Corporation Executive Vice President and Chief Finance Officer, as well as both companies’ senior leaders.

About FPT Corporation

FPT Corporation (FPT) is a globally leading technology and IT services provider headquartered in Vietnam. FPT operates in three core sectors: Technology, Telecommunications, and Education. During over three decades of development, FPT has constantly provided practical and effective products to millions of people and tens of thousands of business and non-business organizations worldwide, establishing Vietnam’s position on the global tech map. Keeping up with the latest market trends and emerging technologies, FPT has developed the Made-by-FPT ecosystem of services, products, solutions, and platforms, which enables sustainable growth for organizations and businesses and offers distinctive experiences to customers. In 2023, FPT recorded a total revenue of US\$2.17 billion and 70,000+ employees. For more information, please visit <https://fpt.com.vn/en>.



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Are You Ready to Hug a Robot?

A new study investigates whether people like robots that hug us and rub our heads.

KEYPOINTS

- Hugging is a powerful emotional experience that supports mental and physical well-being.
- Yet in reality, not everyone has someone that can give them a hug if they need one.
- To address this, scientists are testing out “hug robots” that are able to hug humans.
- In a study, participants reported enjoying robot hugs more if the bot rubbed their heads while hugging them.

Getting hugged by a loved one tends to be a powerful positive emotional experience. Hugs have been shown to enhance social bonding and emotional well-being and to reduce feelings of loneliness and depression. They may also decrease stress and improve measures of physical and psychological health.

However, not everyone can get a hug every time they need one. Some people are lonely and do not have anyone to hug them. Others may be in long-distance relationships in which it may be not easy to get physical affection from their partner. Older, widowed people who do not feel like moving into a new relationship quickly may receive fewer hugs than they like.

Could Hug Robots Help?

How can this problem be solved?

One idea that scientists have proposed is developing social robots that can hug people. This could, they theorize, offer lonely people the positive effects of getting hugged without the need to know a person who could hug them.

However, designing a hug robot that is a) accepted by people and b) leads to positive emotions and reduced stress is not an easy task for scientists. For example, if the robot is very large and made mostly of

metal, or generally has an appearance that evokes a military context, people might be frightened of it, rather than happily hugging it. Therefore, psychological research is needed to design a good hug robot.

New Study: A Robot That Hugs and Rubs Heads

A new study, recently published in the scientific journal *International Journal of Social Robotics* (Onishi et al., 2023) focused on the development of Moffully-II, a newly developed hug robot developed based on Moffully, a previous hug robot. Moffully-II looks like a large, humanoid teddy bear and is covered in soft fur. It is two meters tall.

Importantly, Moffully-II can move its arms to perform different gestures during the hug. When two people hug, they often do specific things with their hands, such as clapping the hugged person on the back to signal sympathy. It is important that a hug robot can perform similar gestures, too, to make the hug feel realistic.

Gestures Make a Difference

Moffully-II can perform rubbing gestures (moving the hand for three seconds vertically on the back of the head of the hugged person) and squeezing gestures (holding the back or the head of the hugged person tightly for three seconds). In the study, the scientists wanted to know whether these intra-hug gestures make people like a hug from a robot better.

Volunteers who Moffully-II hugged generally preferred hugs with gestures of gesture-less hugs. When Moffully-II



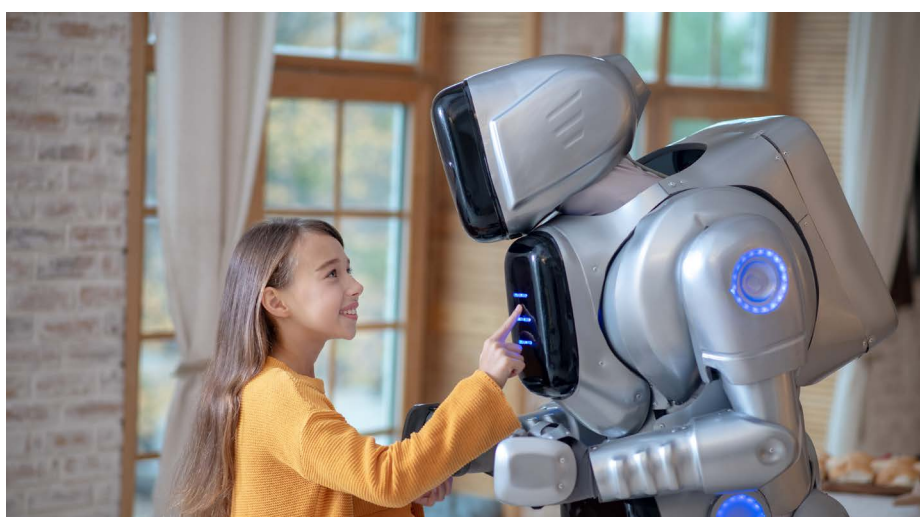
performed a gesture, they felt that the robot was more friendly and safe than when they received a gesture-less hug.

They also thought that Moffully-II felt more intelligent and natural when it performed gestures while hugging them. Moreover, they enjoyed the hug more, compared to hugs without gestures.

When the different types of gestures were compared, volunteers hugged by Moffully-II liked head rubbing the best, followed by back rubbing. Both head squeezing and back squeezing were less preferred than the rubbing gestures.

Designing a Good Hugging Robot Is Not Easy

Taken together, the findings of the study show that it is possible to design a robot that people enjoy to hug. Attention to



detail is important here, as the intra-hug gestures played a big role in how much human volunteers enjoyed the hug. Another takeaway from the study was that people liked rubbing gestures the best.

More research is needed to perfect the design of hug robots and for some people, the idea of hugging a robot instead of

a real person will always be somewhat uncomfortable. However, despite such concerns, hug robots arguably hold promise for increasing the well-being of people without regular access to hugging—including, perhaps, people in nursing homes struggling with dementia or other problems that keep them from having many social contacts.

Source: www.psychologytoday.com

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