INDUSTRIAL AUTOMATION

DELIVERING AUTOMATION INTELLIGENCE THROUGH QUALITY CONTENT

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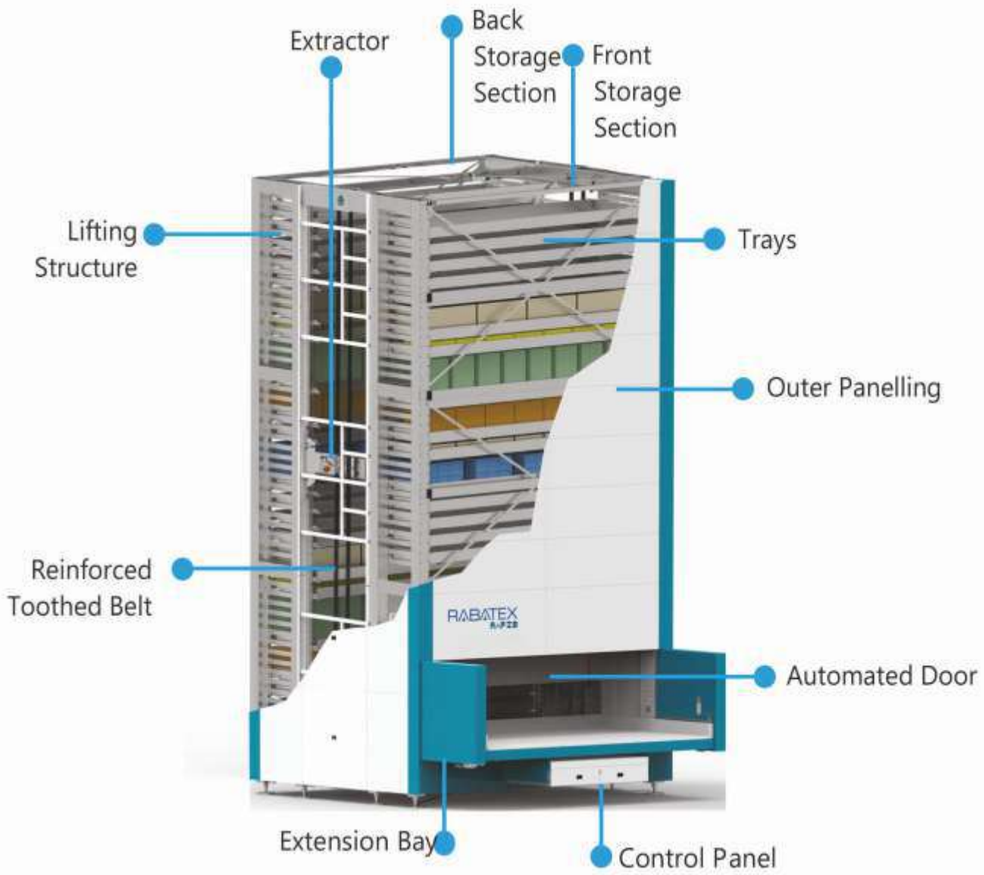
The Road to Smart Manufacturing

- Tech Trends 2024: Artificial Intelligence
- Benefits of Smart Factory Management System
- Decentralised Automation and Industrial Transformation

RAPID

SPACE UTILIZATION

Vertical Storage System



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- Storage and handling of light to heavy parts
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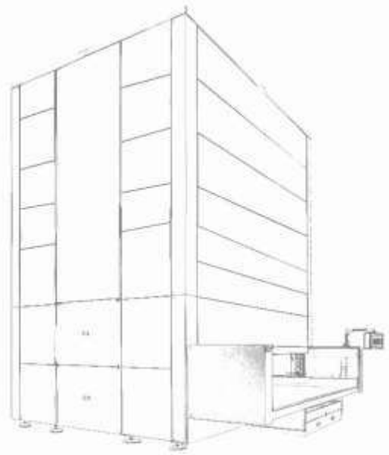
- Easy and ergonomic operation
- Modularity



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UNIVERSAL ROBOTS

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FOOTPRINT
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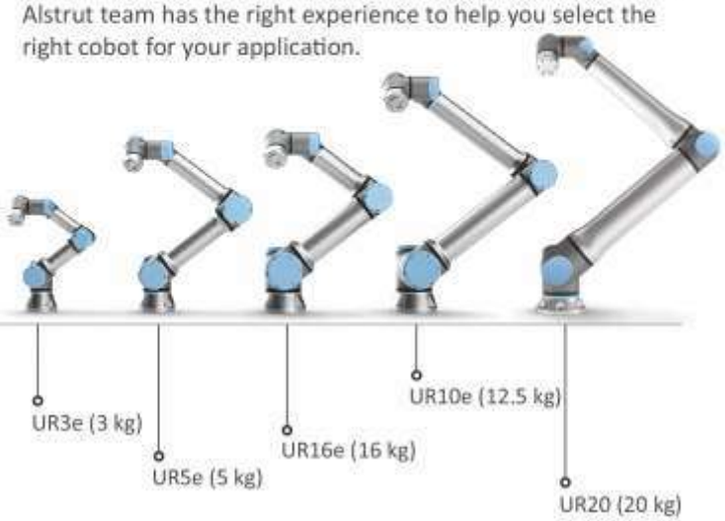
Alstrut has been a partner of Universal Robots since 2016.

With the largest cobot install base across India, Alstrut is the only 'Gold Partner' of Universal Robots in India, and has emerged to be the leading collaborative company in the region.

Successfully deployed applications ranging from machine tending, palletizing, welding, pick & place, glue dispensing, the Alstrut team has the right experience to help you select the right cobot for your application.



ALSTRUT
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Alstrut India Private Limited
267 Kilpauk Garden Road
Chennai 600 010, India

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CEO Networking Nite

21st Aug, 2024 | 06.00 PM Onwards | Nesco Grande

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Conference on

Process Automation

22nd Aug 2024 | 10:00 AM to 02:30 PM

BEC, Goregaon, Mumbai

Sub-Topics

- Digital Twin applications
- Cybersecurity and protection of critical infrastructure
- AR/VR Applications
- OPA,APL
- AI in PA

Conference on

Factory Automation

23rd Aug 2024 | 10:00 AM to 02:30 PM | BEC, Goregaon, Mumbai

Sub-Topics

- Impact of AI & Robotics on Manufacturing
- AI in Logistics, Supply Chain
- AI, Robotics, Virtual Reality, Augmented Reality, Mixed Reality applications
- Applications of Computer Vision and NLP applications in operations
- 4.0 innovative use case, successful Digitally transformed businesses

Conference on

Robotics

24th Aug 2024 10.00 am to 02.30 PM | BEC, Goregaon, Mumbai

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- CYBER SECURITY
- CONTROL ROOMS
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- WAREHOUSE AUTOMATION
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- INTEROPERABILITY TECHNOLOGIES
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DIGITALEVES – INNOVATION AND TECHNOLOGY – NARI SHAKTI

This Special Feature recognises lady technocrats, who have contributed substantially to the cause of

▪ INSTRUMENTATION & AUTOMATION ▪ ELECTRONICS & ELECTRICALS ▪ ARTIFICIAL INTELLIGENCE ▪ ADVANCED ROBOTICS ▪ INDUSTRIAL INTERNET OF THINGS ▪ EDGE & CLOUD COMPUTING ▪ IMMERSIVE TECHNOLOGIES ▪ ADDITIVE MANUFACTURING ▪ CYBERSECURITY ▪ 5G ▪ BLOCKCHAIN ▪ WEARABLES ▪ DIGITAL TRANSFORMATION

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INDUSTRIAL AUTOMATION

From The Editor

Reports indicate that the year 2023 was the hottest year in recorded history and one that witnessed numerous extreme weather events. These include heavy snowfall that blanketed Los Angeles in February – a region known for its sunshine; Cyclone Freddy that devastated the West coast of Africa the same month causing devastation in Madagascar, Malawi, Mozambique and Zimbabwe; a severe sandstorm that hit Beijing – the Chinese capital in March that forced people to stay indoors; the brutal heat wave that scorched several Asian countries in April; Cyclone Mocha that wreaked havoc in Myanmar in May; extreme summer heat that caused hottest summers in parts of Europe and the US in July; the heavy rainfall in the wake of Storm Daniel that flooded parts of Libya in Africa in September; and closer home, Cyclone Michaung that made landfall on the Andhra Pradesh coast near Bapatla in early December and caused intense rain that flooded Chennai and other places.

On the plus side, global policy makers are now a little more serious about tackling the looming climate crisis as is evident from the recent COP28 Summit in UAE. The final COP28 declaration expressed serious concern that '2023 is set to be the warmest year on record and that impacts from climate change are rapidly accelerating and emphasizes the need for urgent action and support to keep the 1.5°C goal within reach and to address the climate crisis in this critical decade'. More significant is the call for 'transition away' from fossil fuels – 'in a just, orderly and equitable manner, accelerating action in this critical decade, to achieve net zero by 2050 in keeping with the science'.

We at **IED Communications** – publishers of **Industrial Automation** and organisers of **Automation Expo** series of events – wish all our Readers, Advertisers, Exhibitors and Patrons a Very Happy, Prosperous and Cooler New Year!

Dr M Arokiaswamy
Editor & Publisher
arokiaswamy@industrialautomationindia.in

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High Computing Performance PPC-600 Series

Configurable Panel PCs for enhanced image visualization and data processing capabilities

Advantech's PPC-600 series has a panel PC chassis developed for Mini-ITX motherboards. It offers multiple sizes, from small to wide screens: 12"/15"/17"/19"/15.6"/18.5"/21.5".

PPC-600 can support Mini-ITX motherboards and has a modular design, with extra ports and expansion slots for diverse applications including machine control, data visualization, and process management.

Multiple combinations of chassis and motherboard

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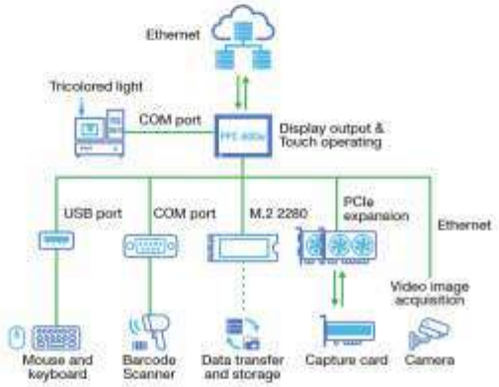
Data Processing For Pharmaceutical and Medical Applications



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CONTENTS

Edited & Published by
Dr. M Arokiaswamy
arokiaswamy@iedcommunications.com

Associate Editor
Milton D'Silva
milton@iedcommunications.com

International Editor
Bridget Joseph
jyothi@iedcommunications.com

Strategic Developments
Benadicta Chettiar
beni@industrialautomationindia.in

For Advertisements/Editorial inquiries:
Ms Sony Jha
sony@industrialautomationindia.in

Registered Office:
IED Communications Limited
903, Orion West, Station Road
Santa Cruz West, Mumbai 400054
Cell: 98200 93667/77770 15667
Web: www.iedcommunications.com

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Customer care:
WhatsApp: +91-9867223530
Email: crm@industrialautomationindia.in

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HMS Networks acquires Red Lion Controls

HMS Networks AB, a global provider of industrial information and communication technology, has recently entered into a binding agreement with Spectris Group Holdings Limited to acquire the Red Lion Controls business, a well-established US-based provider of industrial automation solutions, through the acquisition of 100 percent of the shares in Red Lion Controls Inc and Red Lion Europe GmbH as well as certain assets in other jurisdictions, significantly expanding HMS' presence in the North American market and complementing HMS' offering.

Red Lion is a well-established US-based provider of industrial automation solutions with an innovative product portfolio with premium brands. The acquisition will significantly strengthen HMS' presence in North America and enable cross-selling of both HMS' and Red Lion's products through their respective market channels. The acquisition is expected to close during the first half of 2024.

"We are very happy to welcome Red Lion into the HMS Networks family, the companies are a great match both when it comes to products, geographic presence, and cultural aspects. We are eager to start working together and to realise the synergies between the companies and to enable each other to take the next steps on our common future journey once the transaction closes," says Staffan Dahlström, CEO of HMS.

Red Lion has four development sites, located in York, Pennsylvania (US), Mobile, Alabama (US), Dinkelsbühl, Germany and Pune, India, and manufacturing sites located in York and Dinkelsbühl.

Mitsubishi Electric inaugurates new manufacturing plant in Pune

Mitsubishi Electric India recently announced the launch of its state-of-the-art smart manufacturing facility for advanced Factory Automation Systems in Talegaon Industrial area, Maharashtra, India. This manufacturing facility is driven by best industry practices to deliver the products with the highest quality and reliability.

The overall manufacturing facility measures 40,000 sq.m, initially built up to 15,400 sq.m, backed by a Greenfield investment of INR 2,200 million. This investment reinforces Mitsubishi Electric's commitment to strengthen its business in India and address the growing demand for advanced automation and smart manufacturing solutions across the globe.

This new manufacturing plant will not only act as a tool for business expansion but will also create avenues to expand the local manufacturing of its global product range to address the ever-evolving customer demands and enhance the market presence of Mitsubishi Electric in India.

Mitsubishi Electric India's Factory Automation & Industrial Division holds a strong presence in India since over a decade and is contributing to varied Industrial and commercial sectors including automotive, food & beverages, pharmaceuticals, textiles, and has been increasingly catering to upcoming diverse sectors like data centres, e-commerce and many more. Mitsubishi Electric India's automation business has expanded by more than three times over these years which has supported altering requirements of the Indian market.

FieldComm Group announces Daikin winner of 2023 Plant of the Year Award

FieldComm Group has announced that the Daikin Industries Ltd plant in Kashima, Japan, has been selected as the 2023 Plant of the Year. This is the 21st annual awarding of this unique international honor, presented to end user companies in the process automation industry to recognise the exceptional and valuable application of FOUNDATION™ Fieldbus, FDI™ and/or HART® Communication technologies.

The Daikin Kashima plant produces a wide range of fluorochemical products used in air conditioning equipment, automobiles, semiconductor production, and other applications. Advanced digital technologies have been applied at this site as part of a digital transformation (DX) initiative. The team has implemented HART-enabled instrumentation, and associated digital diagnostic tools and predictive analytics, all combined with artificial intelligence (AI), so the facility can transition from traditional time-based maintenance to more effective condition-based maintenance.

By first learning normal plant behavior from historised big data, the AI system can then perform nonlinear regression analysis on live data using a neural network, enabling the anomaly detection and prediction needed to address potential problems and avoid unexpected shutdowns. Many valve positioners, pressure transmitters, and Coriolis flowmeters were already HART-enabled, and the team used Fast Ethernet-based HART converters to access other equipment, along with various DCS/PLC systems.

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Atmus Filtration inaugurates world-class global capability centre in India

Atmus Filtration Technologies Inc., a global leader in filtration and media solutions, has announced the inauguration of its state-of-the-art Global Capability Centre in Pune, India. The opening of this centre marks a major milestone for the company in its continued focus to design and manufacture high-performing filtration systems. Building on the over 65 years of experience and continued innovation from Atmus, the Global Capability Centre is designed to enhance collaboration and cross-functional learning, and employs advanced analytics to facilitate the development of cutting-edge filtration technologies that adhere to the highest industry standards.

“At Atmus, our focus has always been towards advancing technological frontiers and cultivating a culture of innovation – and our new Global Capability Centre in India allows us to take the next steps in delivering high-performing, proven solutions to our customers,” said Greg Hoverson, Chief Technical Officer at Atmus.

Avani Shah, Atmus India Global Capability Centre Leader, emphasized the significance of this investment for the company's growth, stating, "The establishment of the centre in India allows Atmus to leverage diverse, highly skilled talent in India while supporting global markets. This strategic investment in the Atmus business in India represents our unwavering commitment to fostering innovation and excellence, while strengthening our position as a global frontrunner in the filtration industry."

SANY India presents a vision into the future at EXCON 2023

SANY India, a leading manufacturer of construction equipment, unveiled an array of revolutionary construction equipment at EXCON, the largest construction equipment exhibition in South Asia. A total of 44 machines were showcased this year, including the debut of 15 new models, including cutting-edge electric machines designed for diverse applications such as earthwork, excavation, heavy lifting, deep foundation works, mining operations, road construction, and port equipment, signifies a significant leap forward in transforming the industry. These electric machines deliver superior operating economics without compromising on safety, productivity, or efficiency, paving the way for a more sustainable future in construction.

SANY India remains steadfast in its pursuit of innovative solutions that redefine industry standards and contribute to environmental sustainability. Recognising the growing importance of sustainability, operator comfort, high productivity, and cost-effectiveness, SANY India ensures that all their equipment incorporates advanced technologies such as GPS, biofuel-compliant engines, and alternative fuel options to exceed industry standards for efficiency and environmental performance.

SANY India takes great pride in being recognised as "Naye Bharat ka Nirmata". Currently, over 30,000 Sany machines are actively contributing to major and minor infrastructure projects across the country, solidifying their position as a pivotal player shaping India's infrastructure development. SANY India is committed to making sustainable construction equipment more accessible to its customers.

NORD Drivesystems at SPS – “Inspiring discussions, valuable contacts”

Three intensive days on the topic of efficient drive solutions for the automation industry: Drive specialist NORD Drivesystems successfully attended the SPS trade fair in Nuremberg.

The SPS – smart production solutions 2023 trade fair in Nuremberg ended with a significant increase in visitor numbers compared with the previous year. NORD, too, draws a very positive conclusion to the event. “We had inspiring discussions with many customers and prospects, and made valuable contacts,” Jörg Niermann, Head of Marketing at NORD, points out.

Highlights at the NORD stand:

• The decentralised NORDAC ON frequency inverters. The NORDAC ON PURE version with the nsd tupH surface treatment for special hygienic requirements attracted particular interest.

• The NORD ECO consulting service, which helps to find a particularly efficient drive solution for your individual applications

• Drive solutions for the end-of-line packaging, which operate particularly economically by using controlled asynchronous drive systems with decentralised frequency inverters

• The NORDAC PRO control cabinet inverters for powers of up to 22 kW, which provide a large variety of interfaces and functions

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FPT Industrial takes a leading role in sustainability at Agritechnica

FPT Industrial makes all-round sustainability of all its products and processes a fundamental part of all its projects and activities. This time, however, the Iveco Group brand dedicated to the design, production and sale of low-environmental impact powertrains wanted to do even more. And it did it in style, making use of its presence as an exhibitor at Agritechnica 2023 to demonstrate that participating in an international trade fair while remaining CO2-neutral is possible.

The brand indeed not only showed off some of the most innovative solutions applied to Internal Combustion Engine (Diesel, Biomethane and Hydrogen) and to Electrification in Hanover, but it chose to do so from a stand whose environmental impact had been completely offset. Thanks to a study carried out in partnership with Polytechnic University of Milan, the system perimeter was defined, in other words the exact sequence of phases of the stand's creation. Having defined the perimeter, the individual phases were isolated – for example the supply of materials, the fitting out of the stand, the transport of people and objects, the energy consumption during the course of the event, disassembly and end-of-life – and an estimate of the relative carbon footprint was made.

When designing the stand, a particular focus was placed on optimising the materials, with the goal of being able to subsequently reuse or recycle them in order to create the least possible environmental impact.

WEF recognises Schneider Electric Hyderabad factory as a Sustainability Lighthouse

Schneider Electric, the leader in the digital transformation of energy management and automation, has announced that its Hyderabad, India, factory has been recognised by the World Economic Forum as a Sustainability Lighthouse.

This is the third such recognition for Schneider Electric, whose factories in Lexington, Kentucky, and Le Vaudreuil factory, France, received Sustainability Lighthouse status in 2021 and 2022, respectively.

The World Economic Forum began the Global Lighthouse Network initiative in 2018 to recognise manufacturers leading growth of the Fourth Industrial Revolution (4IR). The network now consists of more than 150 Advanced Lighthouses worldwide. Just 17 of these are also Sustainability Lighthouses which are recognised by the Forum for their technology-enabled improvements on environmental footprint. Together, these serve to showcase best practices of how companies can leverage 4IR solutions to unlock new levels of sustainability and efficiency in their operations.

Schneider Electric's Hyderabad factory manufactures mission-critical electrical equipment and operates with an advanced, cloud-based manufacturing system powered by IoT-enabled devices, leveraging real- time data and predictive analytics for smart decision-making processes. Over four years, the plant reduced its energy consumption by 59%, improved waste optimisation by 64%, decreased CO2 emissions by 61%, and reduced water consumption by 57%.

German Bionic to present Apogee+ power suit for the health sector at CES 2024

Recognised with last year's CES "Best of Innovation" Award in the Wearable Technologies category, Berlin-based robotics and wearable tech specialist German Bionic is back in Las Vegas in 2024 with its latest e-exoskeleton, the Apogee+ power suit. The device is specifically developed to provide dynamic support for healthcare professionals including frontline workers in hospitals, geriatric wards, or rehabilitation clinics. It follows the celebrated launch of its industrial counterpart, the Apogee exoskeleton, at CES 2023.

With its safety-first design and human-centric approach, the Apogee+ represents the new standard for lifting and patient mobilisation across diverse healthcare environments. Both the Apogee+ for the healthcare sector and the Apogee for industrial deployments – such as in logistics, construction, and manufacturing – are available now and can be tested live in Las Vegas, January 9 to 12, 2024.

Specifically made to support caregivers during their work on the ward, the Apogee+ powered exosuit was developed based on the latest advancements in nursing care research and in close cooperation with leading healthcare institutions such as Germany's renowned Charité Hospital in Berlin. Now, the Apogee+ will be showcased for the very first time in North America on the occasion of CES 2024. Its innovative technology improves the safety and well-being of nursing and other care professionals.

Space World Group launches Constl digital network infrastructure service

In a bold leap towards the future, Space World group has announced the launch of Constl, a cutting-edge venture established in 2023. Focused on realising an enduring vision, Constl is committed to providing world-class digital infrastructure solutions specifically tailored to connect people, businesses, and communities across the globe.

The launch comes in the backdrop of a landmark move in 2021 that proved to be a defining year for Space World Group as Brookfield-sponsored Tower Infrastructure Trust (Tower InvIT) successfully acquired Space Teleinfra Pvt Ltd (STIPL), valuing the acquisition at an impressive 150 million USD.

Embark on a Visionary Journey with Constl and empowering Digital Connectivity. In the wake of India's rapid digital transformation, Constl is poised to empower businesses with comprehensive nationwide coverage, offering business critical connectivity infrastructure. Currently, in India, there is a scarcity of good quality fiber as current fiber is built for access for dedicated customer sets. There is a need for high-capacity and reliable network infrastructure which is flexible and scalable as per customer needs.

Mr Ankit Goel, Founder & Chairman of Space World Group stated, “Constl's primary goal is to provide services that set the industry standard, aiming to stand out prominently among its peers. We want to give the flexibility of bandwidth specification, consumption model & scale at user convenience to our customers and business partners."

Rohde & Schwarz verifies automotive radar sensor reference design

The radar target simulator R&S RTS, Rohde & Schwarz’ game-changing solution of automotive radar, in particular its ability to electronically simulate very close-range objects, has been used to verify the performance of NXP® Semiconductors’ next-generation radar sensor reference design. This collaboration enables the automotive industry to take another step forward in the development of automotive radar, the principal technology that enables advanced driver assistance systems (ADAS) and autonomous driving features.

Engineers from both companies conducted a comprehensive series of tests to verify the new sensor reference design which is based on a NXP’s 28 nm RFCMOS radar one-chip SoC (SAF85xx). The R&S RTS radar test system combines the R&S AREG800A automotive radar echo generator with the R&S QAT100 antenna mmW frontend, offering unique short-distance object simulation capabilities as well as superior RF performance and advanced signal processing with many advanced functions. This enables realistic tests of next generation automotive radar applications and brings the automotive industry’s vision of fully autonomous driving one step closer.

NXP’s next generation automotive radar sensor reference design is enabled by the industry’s first 28 nm RFCMOS radar one-chip SoC family leveraging the R&S RTS radar test system. The radar sensor reference design can be used for short, medium and long-range radar applications to serve challenging NCAP safety requirements as well as comfort functions.

Emerson chosen as automation partner for Korean EV lithium-ion battery recycler

Global automation technology and software leader Emerson has been selected by Korea's SungEel HiTech Co Ltd, a specialist in lithium-ion battery recycling, to provide advanced automation solutions in support of sustainable production and operational efficiency goals at the newest of three lithium-ion recycling plants located at SungEel's Hydro Center complex in Gunsan, Jeollabuk-do.

Through the combination of Emerson's process automation technology and SungEel HiTech's unique battery recycling methods, the collaboration aims to establish a robust resource cycle that will help enable a more stable supply of battery materials for electric vehicles in pursuit of bolstering the world's overall production capacity.

"Our automation portfolio and expertise are empowering our customers to optimize and scale the circular economy for critical battery components, a key step toward meeting global net-zero targets head-on," said Mike Train, Emerson's chief sustainability officer.

SungEel HiTech operates a comprehensive battery recycling ecosystem across nine global locations, including a recycling park for collection and pretreatment and a hydrometallurgical battery material production facility at the Gunsan Hydro Center. The upcoming third Hydro Center plant will be triple the size of the first two, contributing to increased production capacity that can supply raw materials for approximately 400,000 electric vehicles each year.

The Road to Smart Manufacturing

COVER STORY

Sureshbabu Chigurupalli
Board Member-Director,
Balasore Alloys Ltd.

Craig Resnick
Vice President,
ARC Advisory Group.

Amit Saluja
Founder and
Managing Partner – digiXLT.

Shatam Bhattacharyya
Principal Business Consultant,
AI Transformation Consulting.

Girish Ayya
Co-founder,
Avadhoot Automation
Solutions Pvt Ltd.

Ramnath S Mani
Managing Director,
Automation Excellence.

Sudhanshu Mittal
Head & Director Technical Solutions,
Nasscom Center of Excellence –
IoT & AI, Gurugram.

The Road to Smart Manufacturing

How digitalisation is helping companies to rapidly scale up on the factory

The process of automation in manufacturing has been a continuous one ever since the first industrial revolution. However, the internet played the role of a catalyst in first hastening the pace, and next, by unleashing digitalisation that is now revolutionising manufacturing and much else. Industry 4.0 ushered the era of smart manufacturing by bringing together all the emerging technologies on a single platform, making the transition from traditional manufacturing to the smart factory environment much easier. In the process, it has also levelled the field, bridging the technology gap that traditionally existed between the large manufacturing conglomerates and the Small and Medium enterprises of SMEs.

As **Sureshbabu Chigurupalli,** Board Member-Director, Balasore Alloys Ltd, and one of the participants in this discussion says: "Many modern businesses now rely on automation in manufacturing to get products built faster, optimise workplace processes, and get orders to customers more efficiently. Automation in manufacturing refers to using technology and machines to perform specific tasks without the need for humans to intervene. The goal of automation is to increase efficiency, productivity, and accuracy in the production process, reducing manual labour and minimising the risk of human error."

At a time when there is a deluge of information freely available from various sources about the process of digitalisation in industry, many companies are still undecided on the right course to adopt for the transformation. **So what are the key aspects to consider for a typical company that wants to switch over from a traditional manufacturing process to an automated environment?**

Within each objective comes a calculation regarding investments that need to be made

"The key aspects for companies to consider when wanting to switch over from a traditional manufacturing process to an automated environment start with defining what the company's objectives are, such as increasing production to grow the business based on revenue forecasts or increasing productivity of existing assets and employees to be able to

'A phased approach, starting with pilot projects, can help manage risks and costs'

Sureshbabu Chigurupalli,
Board Member-Director, Balasore Alloys Ltd.

meet production goals for a lower cost," says **Craig Resnick,** Vice President, ARC Advisory Group. "Within each objective comes a calculation regarding investments that need to be made to achieve those production or cost goals, which can include what technology, such as hardware, software and services would be required; and based on those investments, what would be the expected key performance indicators and the return on investment," he adds. As the primary analyst for many of ARC's automation supplier and financial services clients, Craig's focus areas include production management, OEE, HMI software, automation platforms, and embedded systems.

Amit Saluja, Founder and Managing Partner – digiXLT, an accelerator to help manufacturing industries, especially Small and Medium Enterprises, navigate through digital journey, believes that manufacturing has become the backbone for the country and with growing demand in both domestic and exports, it has become imperative for enterprises to look for ways to produce more with consistent quality and that too at a lesser cost. "While manufacturers prepare for this transformation, they need to plan it as a journey and not look at it as a one time setup. The start must be with building a digital mindset where management understands the applications of technologies on the shop floor and workers are open to using automated digital solutions. When it comes to assessing RoI to decide on adoption, both direct and indirect benefits and cost needs to be considered. As this is not straightforward, a better way of getting confidence is to do deployments at a small level in the plant and scale later based on the benefits received. Another important aspect is technology adoption should be planned with long term focus considering the company's future business objectives rather than trying to handle immediate challenges," he suggests.

"Traditional manufacturing companies (such as in energy, mining, utilities and manufacturing) struggle in setting bold aspirations, developing robust business cases, leveraging cross-functional capabilities, and devising effective deployment approaches to reap maximum value from automation initiatives. Building these capabilities could help those companies realise benefits at scale, improve customer and employee experience, and build a long-term competitive advantage," says **Shatam Bhattacharyya,** Principal Business Consultant, AI Transformation Consulting. As a seasoned business consultant with 11 years of experience in process transformation by leveraging AI, Shatam has prior experience in the BFSI, FMCG and manufacturing industries spanning across multiple functions like supply chain, manufacturing and IT services. According to him, the traditional manufacturing industry's distinctive nature requires a tailored approach to achieve ambitious business goals and ensure sustainable process and cultural changes. "First, the fragmented data landscape and complex legacy infrastructure has posed challenges for heavy manufacturing companies to adopt emerging technologies. Second, core manufacturing industries operate in a more risk-averse culture compared to other industries, sometimes contributing to distrust in the deep tech such as Artificial Intelligence, Virtual Reality, Augmented Reality, Blockchain, etc," he opines.

Tools based on popular standards and open standards are the most preferable

While most experts are united in maintaining that rather than going the whole hog, companies should make a small beginning and then scale up, **how scalable are automation and digitalisation solutions for different sizes of manufacturing facilities?**

"Scaling up digital transformation is a complex process that needs careful planning, management, and evaluation of the costs,

'The initial costs of factory automation and digitalisation can vary widely'

Craig Resnick,
Vice President, ARC Advisory Group.

benefits, and impacts of the solutions," cautions **Girish Ayya,** Co-founder, Avadhoot Automation Solutions Pvt Ltd. As a Technologist, Industrial IoT Evangelist and Thought Leader, Girish is helping Indian manufacturing industries to achieve digital transformation journey through disruptive technologies. Some of the factors that affect the scalability of automation and digitalisation solutions according to his are: the compatibility and integration of the solutions with the existing processes, systems, and machinery; the availability of resources like IT infrastructure, skilled workforce and leadership; and the alignment and coordination of solutions with business goals, needs, and core values.

Sudhanshu Mittal, Head & Director Technical Solutions, Nasscom Center of Excellence – IoT & AI, Gurugram, also believes that scalability is critical to any automation activity. The tools – both software and hardware – should not become bottlenecks as the company looks to scale up its operations. Tools based on popular standards and open standards are the most preferable as those prevent the vendor lock-in and provide capability to work with different vendors in future. "A large enterprise may use a tool like SAP or a high end automation platform like PTC, but this may not be suitable for a small enterprise, both from the cost and tool complexity perspective. This makes the job of selecting appropriate tools more challenging for small enterprises. However most of the MSME category suppliers also try to follow open standards as much as possible, primarily due to demand from the customers so manufacturing players should try to prioritise those," he

'One area that can never be overlooked is the worker engagement on digital'

Amit Saluja,
Founder and Managing Partner – digiXLT.

explains. Having spent 25+ years in technical roles in different companies like HCL, Agilent, Marvell, Freescale, Juniper among others, Sudhanshu Mittal has gained extensive experience in embedded domain in different verticals like networking, storage, printing and imaging, medical equipment, IoT, security, etc.

"Different manufacturing facilities have different needs and one has to understand the needs, be it the manufacturing process, the product profile, manufacturing resources, the customer base, the served market and future plans. While the scalability would depend on the above factors, there is technically no limit to scalability with present day technologies," opines **Ramnath S Mani,** Managing Director, Automation Excellence. With over four decades of industry experience with companies like Rockwell Automation, Emerson Control Techniques India, and Emergys Software India behind him, Ramnath is also past President of IIT Kharagpur Alumni Foundation India and past Chairman of Pan IIT Alumni India from 2018-20. According to him, "What limits scalability is the vision of the top management and the approach it takes towards the selection of platforms, vendors, ecosystems and the technology. The prudent way forward would be to have a vision and an end goal and move towards it in steps and see improvements and stability in each step before moving forward. For this selection of the technology, the platform, vendor ecosystem has to be planned well in advance, consistent with the market needs."

Whether a company goes for a total transformation approach or opts for scalable solutions, what are the **initial costs associated with implementing factory automation and digitalisation?**

"The initial costs of implementing factory automation and digitalisation can vary depending on factors such as the size of the operation, the complexity of processes, and the level of technology being adopted. It is important for businesses to consider various cost categories when planning for automation and digitalisation," says **Sureshbabu Chigurupalli,** who has achievement-driven professional experience in spearheading entire unit/plant operations to maintain continuity and match

'Core manufacturing industries operate in a more risk-averse culture'

Shatam Bhattacharyya,
Principal Business Consultant,
AI Transformation Consulting.

organisational goals at Balasore Alloys Ltd. He is leading and managing all plant operations with effective utilisation of all resources and implementing industry best practices such as TPM, Six Sigma, Lean Management & others Business Excellence initiatives that contribute to improve productivity and efficiency. According to him, capital expenditures (CAPEX) include costs for automation equipment, such as robots, conveyors, CNC machines, and AGVs. Software costs encompass expenses for purchasing or licensing software like MES, ERP systems, or PLM tools. Integration costs involve customising and integrating automated equipment and software systems into existing processes.

Software costs encompass expenses for purchasing or licensing software like MES, ERP systems, or PLM tools

According to **Craig Resnick,** the initial costs with implementing factory automation and digitalisation can vary widely. "The initial costs of adding some proximity sensors connected to a nano or micro PLC may cost less than $1000 to do an extremely simple material handling application, but when you are dealing with thousands of sensors, multiple PLCs and PACs networked together, AC drives, HMI/SCADA software, etc., the initial cost can rise to tens of thousands of dollars. The good news is that thanks to the modularity of factory automation

'Scaling up digital transformation is a complex process that needs careful planning'

Girish Ayya,
Co-founder,
Avadhoot Automation Solutions Pvt Ltd.

The adoption of automation and digitalisation has a considerable influence on the skills needed for the workforce

and digitisation solutions, a manufacturer can just spend what is currently needed and add to or expand the existing installed base as their needs change. This is especially true with most software thanks to software as a service, subscriptions, and cloud, where these initial costs for a small application could cost under $1000/month, but quickly scale to thousands of dollars per month depending on what applications are being added," he elaborates.

Amit Saluja concurs with the low threshold of initial cost with the right approach. "When a manufacturer plans to initiate the factory digitalisation process, the initial priority is to build the basic level of digital infrastructure. This means getting machine level connectivity established that will enable transfer of operations data and analytics capability for the specific application/use case where the manufacturer is facing challenges," he says. However, once connectivity is established, there are multiple applications that can be deployed based on the priority areas of improving plant operations. While it is needed that all the machines in the plant should be connected and on network, but to feel confident of the benefits, initially it can be done for a small number of machines, say 5 to 10 critical process equipment. "This level of proof-of-concept solution for limited machines along with data analysis capability can be built with an initial investment of around Rs 10 lakh," he states.

How does the adoption of automation and digitalisation impact the skills required for the workforce?

"How companies navigate the technology world to sustain competitive advantage is the ultimate challenge for many CxOs of the core manufacturing industry. To be fair, this challenge has been persistent over the last decade. But the business implications are getting broader day by the day with the advent of emerging technologies like AI, blockchain, etc. Companies realise they need to respond to this challenge, but they are struggling," observes **Shatam Bhattacharyya.** Per him, it is also a challenge with enormous potential for those who get it right. Industry leaders in other industries like BFSI, Telecom, etc., have outperformed their peers with a deeper integration of technology across end-to-end core business processes. "During this journey, these industry leaders have prioritised workforce reskilling, building the right talent base and improving technology adoption. Currently, heavy industries face few challenges in their adoption journey. First, the core manufacturing companies have traditionally outsourced large technology transformation programs. They have emphasised on building in-house competency on core operations. On the other hand, other industry leaders have leveraged a robust in-house Centre of Excellence model to embark on a transformation journey with emerging technologies," he explains.

"The adoption of automation and digitalisation has a considerable influence on the skills needed for the workforce," says **Girish Ayya.** Based on some studies, the primary effects according to him are as follows:

'In Automation and Digitalisation, one must be aware of cybersecurity breaches'

Ramnath S Mani,
Managing Director, Automation Excellence.

- The need for technological skills will increase, as the worker force will have to use, develop, or adapt new technologies in their work.

- The need for soft skills, such as communication, collaboration, creativity, and problem-solving, will also increase.

- The need for cognitive skills, such as data entry and processing, will decrease, as these tasks can be more easily automated.

- The need for lifelong learning and reskilling will become more important, as workers will have to adapt to changing work environments.

For **Sudhanshu Mittal,** the skill requirement impact has two areas – first the required skills to manage the automation and digitalisation, and second, the skill upgrade for workers so that they are able to perform tasks which machines can't do and prevent themselves from becoming redundant. "About automation management, the workers will be required to build digital and technical proficiency, as well as have sensitivity to the data being generated from manufacturing processes as the leak of digitised data is much easier than the traditional paper-based data. Workers will need to develop capabilities for data analysis. Regarding the second point about workers protecting themselves from getting replaced, this will require them to develop leadership and management skills so that they can guide the changing processes. They will have to develop soft skills as their role will become larger and may require more collaboration with team members and outsiders," he elaborates.

'Tools based on popular standards and open standards are the most preferable'

Sudhanshu Mittal,
Head & Director Technical Solutions, Nasscom Center of Excellence – IoT & AI, Gurugram.

What regulatory considerations should manufacturers keep in mind when implementing automation and digitalisation with respect to safety and security?

"As we move towards Automation and Digitalisation, especially towards Cloud based technologies, we have to be aware that cybersecurity breach could be a threat. Safety and security forms the basis of a successful implementation of Automation and Industry 4.0," says **Ramnath S Mani.** "With a view to ensure operation and maintenance of the plant and associated equipment is improved with greater efficiency, safety, reliability and risk management, a number of Standards have been formalised through IEC, ISA, ANSI, ISO, etc. In the US, Homeland Security has set up formal standards for cybersecurity for manufacturing to avoid external threats. The Indian government is also working on similar lines to protect manufacturing," he explains.

According to **Sureshbabu Chigurupalli,** when implementing automation and digitalisation in manufacturing, manufacturers need to consider various regulatory aspects related to safety and security. He points out some key considerations under different heads like:

• Safety Regulations: Machine safety, work environment and electrical safety

• Data Security and Privacy: Cybersecurity, data privacy and IIoT security, and

• Additional Considerations: Regular risk assessments, employee training and regulatory updates.

"By addressing safety and security considerations and complying with relevant regulations, manufacturers can minimise risks, protect employees and data, and maintain compliance with legal requirements. It is important to continuously monitor regulatory changes and update processes accordingly to ensure ongoing compliance," says **Sureshnbabu.**

Different manufacturing facilities have different needs and one has to understand the needs

When talking of digital transformation, there is always that issue of legacy equipment. **How can the existing machinery and systems be integrated into a digitalised manufacturing environment, and what are the challenges in the integration process?**

"Existing machinery and systems can be integrated into a digitalised manufacturing environment by leveraging open communication standards, such as OPC-UA and MQTT. OPC can be used, for example, to provide connectivity for software, such as HMI/SCADA to any existing PLCs and PACs, even if the controllers go back to the 1990s," says Craig Resnick.

Amit Saluja feels this is the biggest challenge that comes in front of manufacturers looking to digitalise their plants, but also believes there are lots of innovative deeptech startups who have come up with workarounds to extract data from the machines by capturing signals. "In addition, there can also be options of placing sensors on the machines that provide basic level of operations data like counts, vibrations, noise, working time and electrical parameters. These approaches enable a good amount of operations visibility in the plant and help in condition monitoring of the critical assets," he says.

Girish Ayya agrees: "Some components may require retrofitting, upgrading or replacing due to incompatibility with new technologies," he says.

"Integrating existing machinery into a digitalised manufacturing environment can present challenges such as data silos, lack of standardisation, technical expertise shortage, cybersecurity risks, high costs, downtime, data overload, change management resistance, and regulatory compliance complexity," says **Sureshbabu Chigurupalli.** "To address these challenges, companies can collaborate with automation experts, invest in workforce training, and partner with technology providers. A phased approach, starting with pilot projects, can help manage risks and costs," he concludes IA

Note: The responses of various experts featured in this story are their personal views and not necessarily of the companies or organisations they represent. The full interviews are hosted online at https://www.iedcommunications.com/interviews)

Deepfake: Know About the Dicey Technology

Public awareness and education are critical components of mitigating the impact of deepfakes, says **Benedicta Chettiar.**

The advent of deepfake in the rapidly changing world of digital technology has sparked both curiosity and alarm. The term 'deepfake' describes the application of artificial intelligence (AI) to produce hyper-realistic fake content, usually in the form of pictures or videos.

Deepfake technology has intriguing potential uses in entertainment and filmmaking, but there are also serious ethical, legal, and security concerns that need to be taken into account. Even Prime Minister Narendra Modi has raised concerns about the misuse of this AI technology.

In general, deepfakes convert existing real source content where one person is swapped for another. This AI technology also generates wholly original content in which a character is shown saying or doing something that they did not say or do.

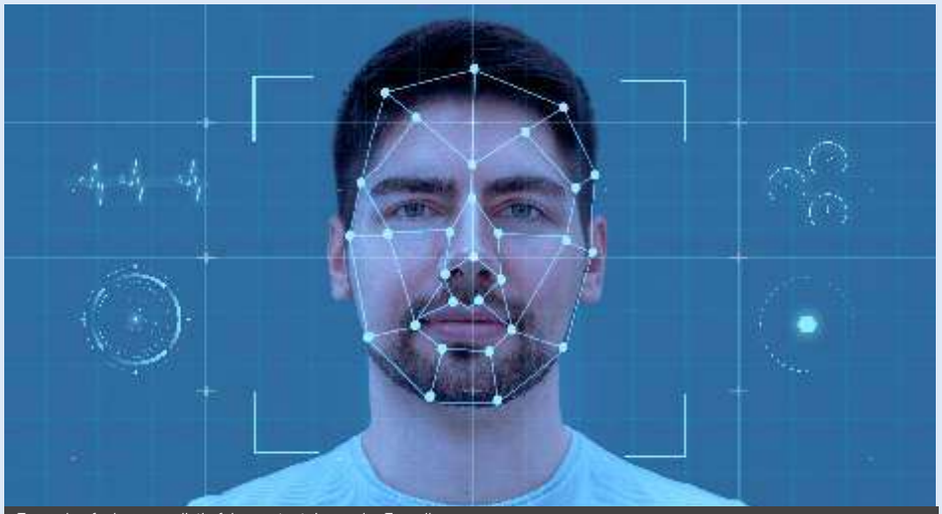
The technology behind deepfakes

Deepfake technology makes use of generative adversarial networks (GANs), one type of deep learning algorithm. GANs consist of two neural networks, a discriminator and a generator, that work together to continuously produce and assess content. Through learning from large datasets, this dynamic process enables the AI to improve its capacity to generate remarkably lifelike simulations of human faces and voices.

Deepfake: Applications and implications

The initial applications of deepfake technology were frequently rooted in entertainment, allowing filmmakers or directors to resurrect deceased actors or seamlessly integrate actors into scenes they were not originally a part of. However, the widespread availability of deepfake tools has paved the way for potential abuse.

The implications of deepfake technology go far beyond harmless entertainment, ranging from fabricating political speeches to manipulating sensitive content for malevolent ends.



Example of a hyper-realistic fake content. Image by Freepik

Deepfakes have raised a lot of concerns due to their potential to sway public

Social and political consequences

Deepfakes have raised a lot of concerns due to their potential to sway public opinion and interfere with democratic processes. It is possible now to portray political figures as spreading misleading information that confuses and misinforms the public. This, in turn, makes it more difficult to distinguish manipulated fabrications from real information due to the viral spread of deepfake content on social media platforms.

Legal and ethical challenges

Deepfake technology is developing at a rate that legal frameworks cannot keep up with. Regulating and controlling the spread of deepfake content is made more difficult by issues with jurisdiction, accountability, and the line between free speech and harmful manipulation. The production of false information and the possible harm to people who might unintentionally become subjects of manipulated content present an ethical conundrum.

Educating the public

Public awareness and education are critical components of mitigating the impact of deepfakes. Individuals can become more discerning digital content consumers by understanding the capabilities and risks of this technology. Media literacy programs and public campaigns are also critical in empowering people to critically evaluate the authenticity of information available online.

The final thought

It is no wonder that deepfake technology will shape our digital landscape in the future. Therefore, ethical considerations and careful regulation will be essential as we navigate this unexplored territory of the digital landscape.

To get more such insights, visit
https://www.industrialautomationindia.in/

Benedicta Chettiar is Director, IED Communications and Manager, Strategic Developments, Industrial Automation. Besides these roles, Beni, as she is known, is also actively managing the affairs of Jyothi Process, a state-of-the-art printing press.

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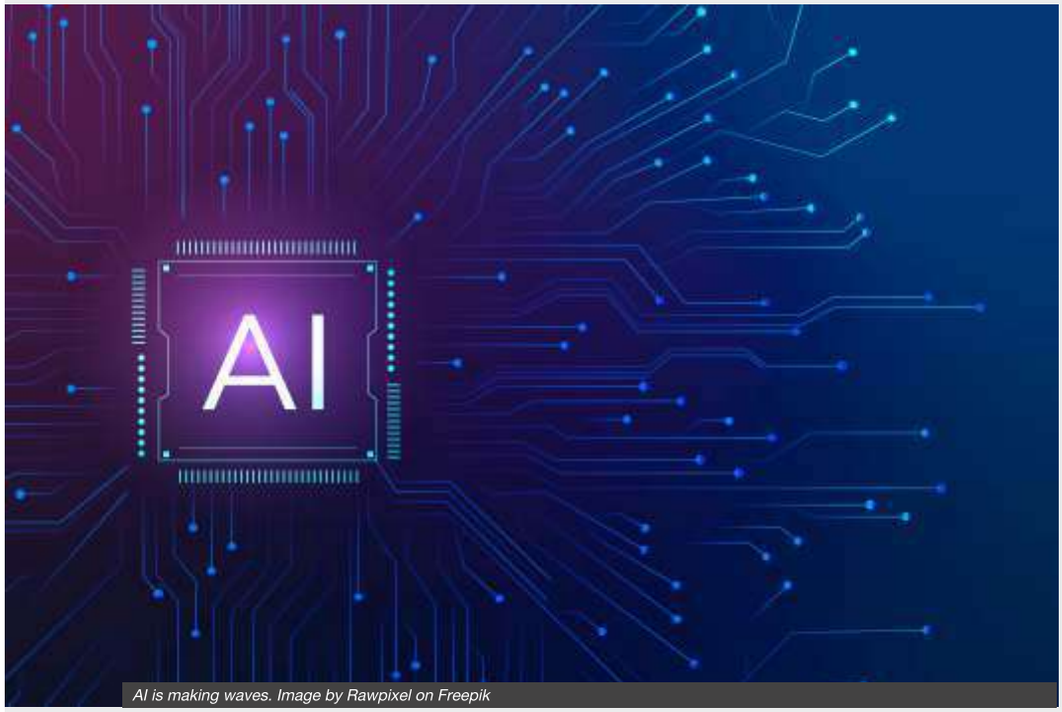
Tech Trends 2024: Artificial Intelligence

The present approaches towards artificial intelligence do not replicate any process or function of the human brain, says **PV Sivaram.**



AI is making waves. Image by Rawpixel on Freepik

Artificial Intelligence is a hot topic today, and people blessed with an abundance of natural intelligence are busy looking for some AI to use. It is a serious topic, there are big advantages being promised, which could be turned into big money for the early implementers. Having said that, where is AI being rolled out?

We encounter AI today largely as voice assistants on mobile phones or entertainment applications. It can respond to queries or prompts and attempts to largely emulate a human. But, for a tool which is so powerful, these are rather tame applications.

Some possible areas of investigation could be:

- Hype on AI today
- Subtle and steady ways of encroaching by AI
- Possible areas of application
- Present area of application
- High focus on development of algorithms and platforms

Intelligence and Artificial Intelligence can be studied by engineers and philosophers in different ways

- Industry is not yet beating a path to the doorstep
- AI being seen as a threat to jobs
- Weaponisation of AI, and
- Fallibility of AI – possibility of AI making mistakes.

Intelligence and Artificial Intelligence can be studied by engineers and philosophers in different ways with a view to achieve different objectives. Here, we will examine AI from the point of view of Industrial Automation, with the manufacturing industry as the intended beneficiary. I will cover the topic in three instalments as below:

1. What is AI?
2. Where are we today?
3. Where shall we go tomorrow?

What is AI?

Why is it making waves?

AI is making waves! It is all over the news today, from tech journals to political news. We browse through this information, trying to get a grip of it all. Many times it doesn't seem that the various people are all talking about the same thing at all! This article attempts to set a vocabulary of discourse, so that we at least understand each other before we launch off into a discussion on the more difficult topics.

AI is a very rapidly growing technology. It is an integral component of the Fourth Industrial Revolution creating a transformation of the manufacturing industry. However, the scope of AI stretches way beyond industry and manufacturing. It is subtly but strongly entering into every aspect of our existence.

AI has moved from a lab topic to a plaything for techies. Now it is entering into 'serious' topics. The days of AI playing games and AI enhancing capability of Tiktok kind of frivolity are now behind us. AI can seriously manipulate the transactions which we as individuals and organisations do with each other. In every discussion we need to be aware of the presence of one or more cyber-entities.

Debate raging today is whether AI is altogether benevolent? It does promise many benefits, but also brings in many threats. How to balance the negative with the positive? How to enable only the positive and block the negative? These are debates where every citizen should participate and express his or his opinion. But to participate and intelligently contribute, some knowledge is needed.

Is artificial intelligence a faithful servant? Or is it trying to become a tyrant, a master? Is it possible that the scientists in their labs are trying to create a powerful entity to serve mankind, which may escape and become a rogue?

The scope of AI stretches way beyond industry and manufacturing. Image by Freepik

There are some ways to visualise AI for humans. Since it is always software in a disembodied form, it cannot be provided as a box or gadget. The best way is to imagine a Cyber entity, which is always at the elbow of a physical (human or robot) entity offering decisions or suggestions relevant to the action or transaction that is going on.

We will restrict our discussion to examining the coexistence of Industrial Automation and Artificial Intelligence (IA and AI).

Terms and definitions

What is intelligence in the context of machines and Industrial Automation? We define Intelligence as the ability to take and retain instructions, retain the instructions, and to apply to different data as provided to the machine. This narrow definition of intelligence allows us to designate machines equipped with a stored program controller like PLC or CNC as intelligent.

Intelligence can be found in a device, in an algorithm, or a machine. The term machine includes robots. There is also intelligence obtained by clever arrangement of purely mechanical elements like gears and springs.

In the context of Artificial Intelligence, we need to broaden the view of intelligence. We can define intelligence in the context of machines as an ability to respond to situations which were not previously encountered, and emerge successful.

It was in the 1950s that a serious proposal was made to simulate the human brain by a machine

Programming of the intelligence – in earlier forms, it was embedded in complex wiring of relays. This principle of relays was carried over to PLC-programming, also in the form of relay-logic. As an evolution, this programming went over to High Level Languages.

Machines became intelligent by virtue of programming. A human programmer encoded instructions and deposited (stored) these instructions. The machine would interpret and execute a subset of these instructions in response to the stimuli received by it, and trigger certain actions, all of which were foreseen by the programmer. These machines are stored program controllers. Error-free operation was guaranteed only if the stimuli (or inputs) were among those foreseen by the programmer.

As the number of stimuli or inputs increases in quantity, it is not easy to foresee all possible combinations of occurrence of stimuli, and the sequence in which they appear. One way to handle this was to throw an ‘exception’ – equivalent to a machine saying I don’t know what to do, and raise an alarm or alert seeking human intervention.

Learning automata are such machines which can modify their own programs. The modifications arise from the feedback on the decisions made by them. This includes correction to the algorithm out of mistakes made, and reinforcement due to good results.

Machine Learning is a type of AI, where the Intelligence algorithm is not 'programmed-in'. Rather the algorithm is derived from a labelled data-set also known as training data set. Here a large number of samples are provided with labels as 'correct' and 'wrong'. The machine learns by studying the samples what makes a sample 'correct' and what makes it 'wrong'.

Self-explaining AI is proposed that produces a decision and an explanation. It provides a human understandable explanation and confidence level for each decision and which was deemed to motivate and lead towards trustworthy AI. In general one cannot understand why the AI reaches the conclusion which it has come to. Therefore this optional feature is useful to make sense of counter-intuitive suggestions or decisions by AI.

Problem solving is a technique to identify a situation (a set of stimuli) which could lead to an undesirable state of the process, then determine a set of actions which could lead the trajectory away from the undesired state to a safe state.

The beginnings of AI

It was in the 1950s that a serious proposal was made to simulate the human brain by a machine. The first attempts were based on trying to emulate by creating devices to mimic neurons and interconnect the neurons to generate intelligent reactions to stimuli. This explains why AI literature is littered with references to neurons, including the very useful neural networks.

In the early days, machines which could repeat a set of tasks in the correct sequence without continuous human supervision were called automatic machines

To be clear, the present approaches towards artificial intelligence do not replicate any process or function of the human brain. Early in the journey it was recognised that the human brain is far more complex than what was imagined, and the processes are yet shrouded in mystery. So this approach is kind of abandoned by engineers.

In the early days, machines which could repeat a set of tasks in the correct sequence without continuous human supervision were called automatic machines. Human intervention was required only to modify the programs and to repair and maintain the electrical and mechanical parts. This concept extends from single, self-standing machines up to a line of machines and entire plants.

What then is needed to convert an automatic machine to an intelligent machine? A capability for problem solving – that could be the answer. As the problems become more complex (more number of variables, less precisely defined safe/unsafe states), the number of responsive mechanisms should increase. The machine becomes more and more intelligent based on the number of responses at its disposal and the greater percentage of success in bringing the process into safe zone.

(This is Part1 of a 3-part series on Artificial Intelligence. Parts 2 &3 would appear in subsequent editions)

PV Sivaram, Evangelist for Digital Transformation and Industrial Automation, is mentor and member of steering committee at C4i4. He retired as the Non-Executive Chairman of B&R Industrial Automation and earlier the Managing Director. He is a past President of the Automation Industries Association (AIA). After his graduation in Electronics Engineering from IIT-Madras in 1976, Sivaram began his career at BARC. He shifted to Siemens Ltd and has considerable experience in Distributed Systems, SCADA, DCS, and microcontroller applications.

India joins consortium to advance deployment of battery energy storage systems

At the 2023 United Nations Climate Change Conference (COP28), India has joined the Battery Energy Storage Systems (BESS) Consortium, an initiative of The Global Leadership Council (GLC) of the Global Energy Alliance for People and Planet (GEAPP). Through the BESS Consortium, India is among the first-mover countries as a part of the collaborative effort to secure 5 gigawatts (GW) of BESS commitments by the end of 2024.

India has taken significant steps for the integration of BESS, which will be crucial in supporting its goal of energy security and access to reliable round-the-clock energy for all. In September this year, the Government of India approved a scheme committing to the development of 4,000 MWh of BESS projects by 2030-31, with financial support of up to 40% of the capital cost to developers in the form of Viability Gap Funding (VGF). The scheme is expected to bring down the costs of BESS infrastructure projects and incentivise public-private partnerships.

Commenting on the announcement, Saurabh Kumar, Vice President – India, GEAPP, said, "The BESS Consortium is an example of GEAPP's firm belief in the power of collaborative actions and partnerships to achieve people-positive energy transition. The expansion of BESS is crucial to bring down the current high cost to resolve the issue of intermittency and lead to accelerated RE integration. It would also help fast-track innovative regulations that will unlock the value streams on batteries and provide much-needed balancing support to the grid. This would positively impact the demand for RE, which is imperative for a Net Zero future."

At The Energy Transition Dialogues (TETD) organised by GEAPP in New Delhi last month, a comprehensive report titled 'Powering Progress: Batteries for Discoms – A Market Action Report on Accelerating Battery Energy Storage in India' was released. This report is a result of the collective effort by GEAPP and RMI. It elaborated that approximately 42 GW (208 GWh) of BESS would be required to integrate 392 GW of VRE (100 GW of wind and 292 GW of solar) by 2030. It also found that integrating increasing amounts of VRE resources, mainly solar and wind, is a major factor driving grid storage adoption.

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Industry 5.0 is not just another new topic for CXO level discussion and investment, says **S Ramachandran.**

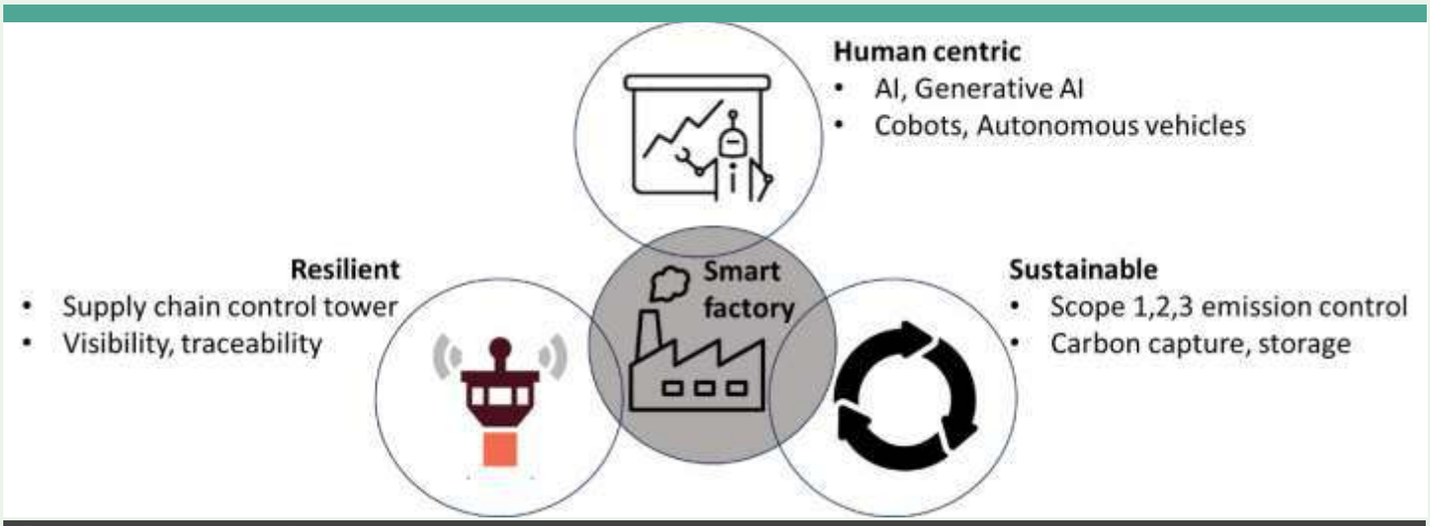

Fig 1. Human centric, sustainable, resilient factories

Many organisations consider Industry 4.0 or the fourth industrial revolution as the ultimate path to pursue for their digital transformation. There are several successful implementations of Industry 4.0 or I4.0 that achieved significant business benefits. However, many more organisations still struggle to scale-up from pilot projects. While I4.0 continues to face challenges, there is already talk about Industry 5.0! It is not a completely new paradigm (Figure 1). I5.0 complements the I4.0 concepts and builds upon it, with a bigger picture and connects to the society, with a focus on human centricity, sustainability, and resilience[1].

The basic tenets of I4.0 were defined by the German government. They are interoperability with technologies such as IoT for connectivity, information transparency with digital twins for example for what-if analyses, technical assistance with analytics, and autonomous decentralised decisions with artificial intelligence. In the Infosys Data+AI Radar study, we called it the SURE taxonomy: Sense, Understand, Respond, and Evolve, to represent the four levels of autonomy or artificial intelligence systems[2]. According to the study, 63% of enterprises operate at the basic Sense and Understand levels today (Figure 2), with only 15% at the highest Evolve level. This gap highlights opportunities to generate significant benefits through autonomous and interconnected systems. Keeping the bigger picture in mind at all stages in the SURE model takes us closer to achieving the goals of I5.0.

The European Union says the I5.0 approach provides a "vison of industry that aims beyond efficiency and productivity as the sole goals, and reinforces the role and the contribution of industry to society[1]". One fear with automation is the loss of jobs, with machines and algorithms taking away the role played by humans. It is a trade-off business leaders need to make. Jobs that are high on programmability and low on decision making will eventually be automated. But there are several jobs that will continue to need human intervention for decisions to be made. Such jobs will mean humans working in collaboration with non-human entities.

AI to augment humans

Cobots are an example on the shop floor, where robots work in collaboration with humans as colleagues. A cobot will not focus just on efficiency, but safety too. Sales of industrial robots reached a record level of more than 517K in 2021, according to the International Federation of Robotics, a growth of 31% year-on-year. Interestingly, the share of cobots in this has been growing steadily, again reaching a record of 7.5% in 2021, a growth of 50% compared to 2020[3]! Ongoing research on ergonomic interaction between robots and humans will be an area to watch out for.

One fear with automation is the loss of jobs, with machines and algorithms taking away the role played by humans

Autonomous vehicles find the streets of cities too challenging to navigate. General Motors recently stopped its driverless vehicle Cruise operation, following an accident in California. On the other hand, they find impactful applications in niche industrial applications such as warehouse and shop floor material movement. Kimberly-Clark, for example, has deployed more than 300 autonomous forklifts at its North American warehouses, up from about 30 in 2019, according to Sarah Haffer, vice president of customer logistics[4]. Warehouses are messy and risky for humans and autonomous vehicles to work together. Kimberly-Clark has segregated its warehouses "into physical areas where only (forklifts) live and physical areas where only people are doing particular work, and we don't cross over", says Haffer. Not all companies may be able to segregate, forcing humans to work safely with the autonomous vehicles.

Generative AI will be the language of factories of the future, for cognitive capabilities. Large language models trained using historical artifacts and reinforced with ongoing interactions will provide conversational AI capabilities. Queries can be resolved by bots. Documents and codes can be auto generated first before a human finetunes it. The Generative AI Radar for North America published by Infosys reported enhanced user experience and personalisation as the use case with the most positive impact[5]. But there is a significant opportunity for inward looking operational efficiency and automation too with Generative AI.

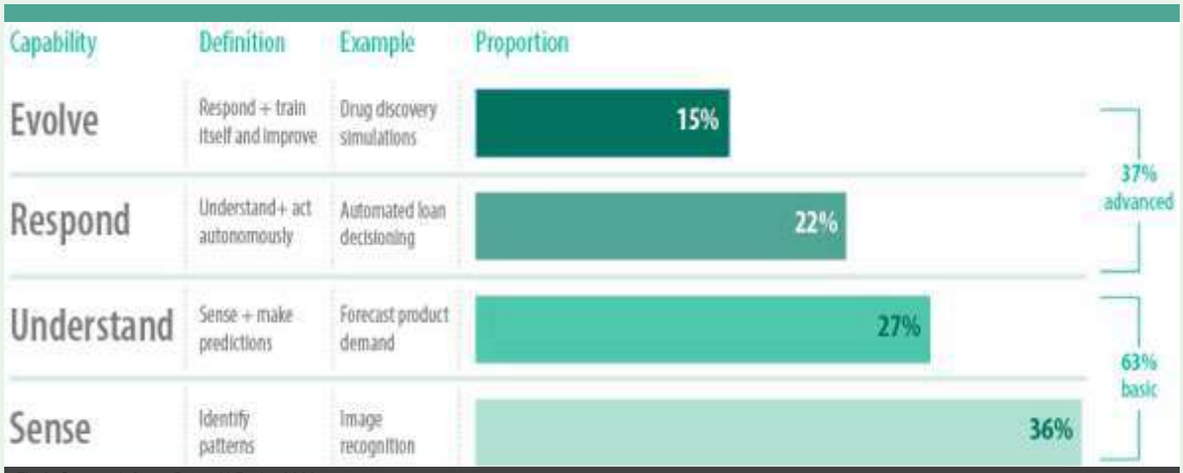

Fig 2. Source: Infosys Data+AI Radar 2022

The joint study on sustainability conducted by Infosys and the Manufacturers Alliance Foundation reported interesting findings[6]. 70% manufacturers who participated in the study said that tracking Scope 3 emissions is the hardest and they were yet to start. Only 28% of the participants had a system in place to track the carbon footprint of their products. Initiatives such as a supply chain control tower will play a key role in I5.0 to measure the upstream and downstream Scope 3 carbon emission for manufacturers, beyond the walls of a factory. Carbon capture, utilisation, and capture was a controversial topic in the COP28 summit, specifically for developing countries which have sources of fossil fuel. Their continued usage would lead to Scope 1 and 2 emissions. Control towers will play a key role for resilience too, providing timely visibility and traceability across the supply chain to take proactive, corrective action.

A standardised model for autonomous systems

The diversity of systems that will exist in a futuristic factory signifies the need for interoperability, for these systems to talk to each other. In a recent article on the need for such a standardised model, we looked at its characteristics, and how the generic levels of autonomy will look like[7]. A factory can no longer be confined to talk to other systems only within its boundary such as the ERP and MES systems, but with other enterprise applications and beyond for IT-OT integration. Operational technology or OT, the language of the factory, should communicate with IT or Information technology across the enterprise – supply chain management, customer relationship management, product lifecycle management and more. I5.0 will take this further beyond the enterprise to systems such as skill and talent management, weather forecasts, healthcare, and multimodal traffic visibility to name a few.

Industry 5.0 is not just another new topic for CXO level discussion and investment! If organisations currently investing in I4.0 are aware of it well ahead of time, they can bring about a green, inclusive transformation by keeping the human, sustainability, and resilience perspectives in mind from the very start IA

The diversity of systems that will exist in a futuristic factory signifies the need for interoperability

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S Ramachandran is Principal Consultant, Lead for Engineering and Manufacturing, Infosys Knowledge Institute. He is an author and speaker for thought leadership – emerging technologies for manufacturing systems, supply chain management, innovation providing in-depth research, analysis and insights.

https://www.linkedin.com/in/ramachsu/

Compact Drive Technology – Translatory Servomotors

Beckhoff ELM servomotor terminals also control electric cylinders and linear motors.

In addition to the AM8100 rotary servomotors (right), the compact ELM72xx drive technology is now also suitable for translational movements with the AA3100 electric cylinders and AL8100 linear motors (left).

The ELM72xx EtherCAT Terminals offer high performance and functionality in the field of compact drive technology from Beckhoff. In addition to the ability to execute rotational movements in this small form factor in connection with the AM8100 servomotors, it is now also possible to perform translatory movements with the AA3100 electric cylinders and the AL8100 linear motors.

The new AL8100 linear motors also enable the highly dynamic, modular linear technology from Beckhoff to be used in the field of compact drive technology

As full-fledged servo drives in a robust metal housing, and with up to 16 A output current (Ieff) at a power supply voltage of 48 V DC, the ELM72xx EtherCAT Terminals expand the Beckhoff portfolio of compact drive technology in terminal format. What's more, they also include all the latest technological features along with increased performance and functionality when compared to the EL versions. The latter include the convenient connector front end, an integrated absolute value interface, One Cable Technology (OCT), and the STO/SS1 and TwinSAFE Logic safety functions.

The new AA3100 electric cylinder series designed for the ELM72xx for the extra-low voltage range from 24 to 48 V DC extends the range of applications of Beckhoff electric cylinders to include compact drive technology. This makes them ideal as direct drives for linear applications, particularly with high process forces. It also means that virtually the same forces as in the AA3000 series are now also available for 48 V applications, without compromising on functionality or robustness. The two available flange sizes offer a peak force of 2,650 to 12,000 N and a maximum speed of 0.12 to 0.56 m/s, depending on the lead.

The new AL8100 linear motors also enable the highly dynamic, modular linear technology from Beckhoff to be used in the field of compact drive technology. They are available with a width of 50 mm (AL812x) and are optimally matched to the ELM72xx. In addition to their wide availability and flexibility, the fact that the motors are developed and produced in Germany guarantees a consistently high level of manufacturing quality, which in turn ensures that durable and highly reliable applications can be executed with linear motor technology IA

Beckhoff implements open automation systems using proven PC-based control technology. The main areas that the product range covers are industrial PCs, I/O and fieldbus components, drive technology, automation software, control cabinet-free automation, and hardware for machine vision. Product ranges that can be used as separate components or integrated into a complete and mutually compatible control system are available for all sectors. Beckhoff new automation technology stands for universal and industry-independent control and automation solutions that are used worldwide in a large variety of different applications, ranging from CNC-controlled machine tools to intelligent building control.

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How Is Artificial Intelligence Making an Impact in Manufacturing?

Industrial Automation explores the transformative power of artificial intelligence in manufacturing.

AI is transforming the manufacturing industry. Image by Freepik

Artificial Intelligence is ushering in a new era for the manufacturing industry. It has transformed traditional processes and redefined the way products are designed, produced, and delivered. From smart factories to predictive maintenance, the applications of AI in manufacturing are diverse and impactful.

According to MarketsAndMarkets, the global AI market in manufacturing is predicted to make a great stride. It is growing at a CAGR of 45.6%, from UD$3.2 billion in 2023 to US$20.8 billion by 2028. As AI and industrial automation have become a necessity for all types of businesses, read on to know more about how you, as an industry leader, can get your hands on high-value, low-cost AI solutions for your business.

AI-powered innovation: What is AI in manufacturing?

Artificial Intelligence is one of the most revolutionary technologies, shaping the field of manufacturing. This technology is playing a crucial role in helping industry leaders better assess data and make decisions. The integration of artificial intelligence and industrial automation into manufacturing can bring unprecedented changes to improve efficiency, productivity, and overall performance.

AI mimics the problem-solving and decision-making capabilities of humans by utilising computers and machines. It enables systems to identify objects and make predictions with accuracy and speed. Integrated with conventional computer vision, AI can expedite anomaly detection in factories, for example, by inspecting cereal boxes for defects on the production floor. This can significantly enhance manufacturing efficiency and minimise production costs.

How is AI used in the manufacturing sector?

Artificial Intelligence is transforming the manufacturing industry with its wide range of applications. It streamlines processes and enhances efficiency while creating room for a more advanced and adaptive manufacturing ecosystem. We have discussed below some of the ways in which AI is used in the manufacturing industry.

Predictive maintenance

Using AI algorithms can help evaluate historical and real-time data from sensors and equipment to envisage when machinery is likely to fail. This will improve predictive maintenance and help in scheduling repairs or replacements before a breakdown occurs, lowering downtime and maintenance costs. By optimising maintenance schedules, manufacturers and industry leaders can extend the lifespan of equipment and improve overall operational efficiency.

Quality control and defect detection

With AI-enabled computer vision systems, manufacturers can inspect and assess products for defects with high precision. Using ML algorithms, visual inspection ensures that products meet quality standards, minimising the likelihood of defective items reaching customers. The speed and accuracy which AI offers can significantly improve defect detection, enhancing overall product quality and customer satisfaction.

Collaborative robots (cobots)

Equipped with AI capabilities, cobots work alongside human operators, assisting in various manufacturing tasks. They enhance productivity, automate repetitive tasks, and improve worker safety.

Autonomous vehicles and drones

Driven by AI, autonomous vehicles like automated guided vehicles (AGVs) can help navigate within manufacturing facilities to transport materials. Drones, equipped with AI, are also used for inventory management, monitoring, and even delivering materials within a manufacturing environment. These technologies can significantly improve logistics, lessen manual labour, and improve the efficiency of material handling processes.

Supply chain management

By assessing data, AI optimises supply chain processes to provide insights for better decision-making. Its demand forecasting algorithms can help manufacturers anticipate market trends and adjust production accordingly. AI algorithms can also help in inventory management, ensuring optimal stock levels, reducing carrying costs, and preventing stockouts.

Data analytics for decision-making

Manufacturers can use artificial intelligence for decision-making as it processes large amounts of data. It can be used to optimise production planning, resource allocation, and overall operational efficiency. The analysis of data generated across the manufacturing ecosystem allows for continuous improvement and strategic decision-making.

Energy management

AI can be helpful in monitoring and optimising energy consumption in manufacturing processes. As AI leads to a smart factory ecosystem, it can adjust energy usage based on real-time demand, lowering overall energy costs and environmental impact. Equipped with AI, energy management systems can contribute to sustainable and cost-effective manufacturing practices.

Customisation and Personalisation

The use of artificial intelligence helps in assessing customer preferences and market trends to enable highly customised manufacturing processes. Using AI, manufacturers can customise products to individual needs and preferences and improve customer satisfaction and competitiveness in the market.

Sustainable manufacturing

With AI, manufacturers can contribute to sustainable practices by optimising resource utilisation and reducing waste. Smart factories equipped with AI can monitor and control environmental factors, minimising the ecological footprint of manufacturing processes. Guided by AI, sustainable practices align with global efforts to lead to environmentally friendly manufacturing.

Process optimisation and continuous improvement

Using artificial intelligence, manufacturers can continuously assess data to identify areas for improvement in manufacturing processes. This enables manufacturers to optimise production flows, lower inefficiencies, and improve overall operational performance. The iterative nature of AI-led optimisation drives continuous improvement and increased competitiveness.

The integration of AI and industrial automation will become even more prevalent and drive further innovation and advancements in the manufacturing sector as technology continues to evolve.

Why is AI critical to the future of manufacturing?

Survival in today's competitive marketplace and ensuring sustainable manufacturing are more important. This is where fourth industrial (Industry 4.0) technologies, particularly AI and ML-powered innovations, play a pivotal role. Large amounts of production floor data can be processed and interpreted by AI tools to identify patterns, study and forecast customer behavior, identify anomalies in real-time production processes, and more.

Cobots will become more adaptable and intuitive. Image by Freepik

With the aid of these tools, manufacturers can obtain complete visibility over all manufacturing processes in locations worldwide. AI-powered systems are also continuously able to learn, adapt, and improve because of machine learning algorithms.

Crafting Tomorrow: What is ahead for artificial intelligence in manufacturing?

AI in manufacturing has various potential uses, apart from improving demand forecasting, inspection, quality assurance, and warehouse automation. It can play a crucial role in Industry 4.0, the trend toward greater automation in manufacturing. AI will bring fully interconnected and intelligent manufacturing ecosystems driven by IoT and automation.

AI in manufacturing will also present a range of opportunities, which are as follows:

- The development of more innovative and efficient products
- Evolution in human-robot collaboration, where Cobots will become more adaptable and intuitive
- AI-driven supply chain management with more sophisticated algorithms for demand forecasting
- Energy-efficient sustainable manufacturing
- Advancement in training, maintenance, and design processes through the integration of AI with AR and VR technologies
- Advanced AI-enabled cybersecurity measures to tackle potential security breaches
- Continuous improvement through machine learning
- Transparency and traceability in the supply chain through the integration of AI and blockchain technologies
- Improved problem-solving abilities and adaptability with Cognitive Robotics, and
- Adherence to complex regulatory requirements and quality standards

The Final Thought

AI in manufacturing is not just about the intelligent processing of data or the automation of tasks. It is about the transformation of a whole industry. So, as we peer into the future, Industrial Automation believes that the opportunities presented by AI for the manufacturing industry are as boundless as our imagination IA

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The Historic Journey of Rabatex Industries

The trajectory of Rabatex Industries (1962-2023) mirrors the evolution of the textile sector itself!

Mr Haresh Panchal, Managing Director, Rabatex Industries

Rabatex Industries has embarked on a new chapter of innovation and diversification

In the annals of textile innovation, Rabatex Industries stands as a beacon of excellence, tracing its roots back to the year 1962. What began as a modest venture has burgeoned into a powerhouse in the textile industry, specialising in the manufacturing of advanced textile warping machines and material handling units. The trajectory of Rabatex Industries mirrors the evolution of the textile sector itself, a testament to the company's resilience and commitment to excellence.

Over the decades, Rabatex Industries has played a pivotal role in revolutionising the textile warp preparation segment. The journey has been marked by relentless dedication to craftsmanship and a pioneering spirit that has propelled the company to the forefront of the industry. Today, Rabatex Industries stands as a paragon of precision and efficiency, setting industry benchmarks with its state-of-the-art machinery.

The Rabatex Vertical Lift Module (VLM)

Pioneering Textile Warp Segment and Diversifying into Warehouse Automation

Having solidified its position as a leader in the textile warp segment, Rabatex Industries has embarked on a new chapter of innovation and diversification. Recognising the evolving needs of industries, the company has ventured into warehouse automation with its revolutionary product, the Vertical Lift Module (VLM). This cutting-edge solution offers not only space-saving benefits but also incorporates a real-time inventory tracking system, transforming the way warehouses operate.

Rabatex Industries, true to its legacy of innovation, has seamlessly transitioned into the warehouse automation sphere

Rabatex Industries, true to its legacy of innovation, has seamlessly transitioned into the warehouse automation sphere, becoming a pioneer in this domain as well. The Vertical Lift Module not only optimises storage space but also enhances operational efficiency, aligning seamlessly with the company's ethos of delivering excellence across diverse industrial segments.

Adapting Advanced Technologies for a Visionary Future

The visionary approach extends beyond the immediate needs of industries. Rabatex Industries, led by Mr Haresh Panchal, is positioning itself as a thought leader in the warehouse automation space, anticipating future challenges and developing solutions that transcend conventional boundaries.

The company's commitment to staying ahead of the technological curve aligns seamlessly with Mr Panchal's vision for Rabatex Industries to be a trailblazer, setting benchmarks for excellence and innovation in every endeavour.

In conclusion, Rabatex Industries' historic journey is a saga of innovation, resilience, and visionary leadership. From its humble beginnings in 1962 to pioneering roles in textile warp preparation and warehouse automation, the company continues to shape the landscape of the textile and logistics industries, setting the stage for a future marked by technological excellence and unwavering commitment to customer satisfaction IA

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How is Industrial Automation Reshaping Smart Manufacturing?

Industrial Automation checks out the trends and opportunities leading the industry into an era of automation and strategic growth.

The manufacturing industry has undergone a tremendous transformation over the last few years. The industry has significantly moved towards smart factories, driven by Industry 4.0 and industrial automation (IA). By incorporating artificial intelligence (AI), data analytics, and the Internet of Things (IoT) into the production ecosystem, smart manufacturing goes beyond traditional automation.

This amalgamation has created a new era of smart manufacturing, where industrial automation plays a pivotal role. According to The Insights Partner, the global industrial automation market is forecast to reach US$322.67 billion by 2023, up from US$171.23 billion in 2022. The market is growing at a CAGR of 8.2% during the projected period.

The core components of industrial automation

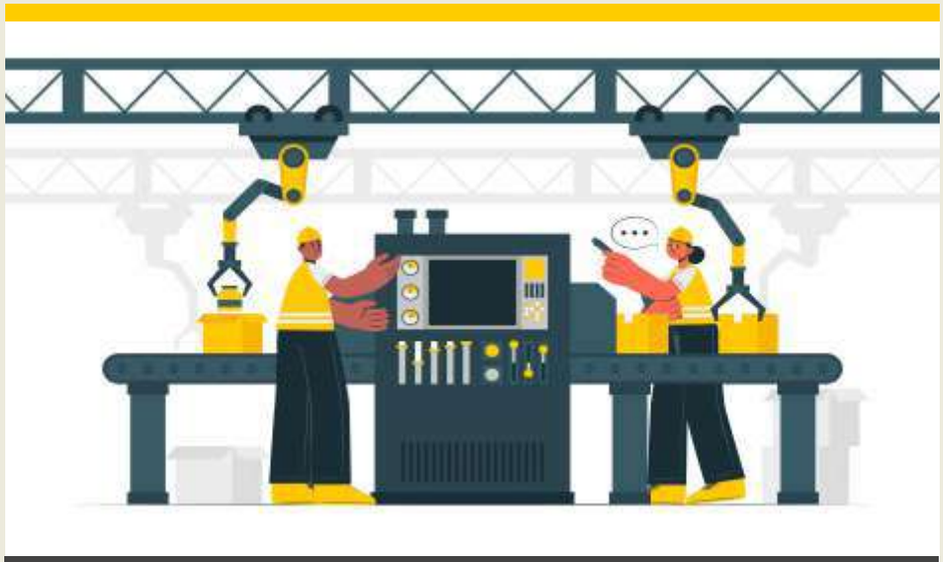
Industrial automation refers to the automation of industrial processes. It uses computers, communication systems, and process operators. The IA technology helps enhance the productivity and quality of products while simultaneously lowering the production cost. Industrial automation has various core components for effective industrial processes, which are discussed below:

Sensors and actuators

In industrial automation, sensors serve as the eyes and ears. They gather information from the production setting, keeping an eye on things like machine status, pressure, and temperature. On the other hand, actuators make sure that the manufacturing processes follow predetermined parameters by acting in response to the data they collect.

Programmable logic controllers (PLCs)

PLCs control and coordinate different aspects of the manufacturing process, acting as the brains behind industrial automation. These programmable controllers serve as the brains of the system, coordinating the data and command flow to guarantee smooth functioning.



Industrial automation is a potent strategic tool. Image by storyset on Freepik

Human-machine interface (HMI)

Human operators can monitor and control machinery with the help of HMIs, which provide a visual representation of the manufacturing processes. Efficient human-machine communication is made easier by intuitive interfaces, which also improve system performance.

Communication networks

The various parts of the automation system are connected by strong communication networks, which are frequently built on protocols like MQTT or OPC UA. Owing to the real-time data exchange made possible by these networks, the manufacturing ecosystem is synchronised and responsive.

How can industrial automation be used as a strategic tool in manufacturing?

In the manufacturing sector, industrial automation is a potent strategic tool offering numerous benefits that directly support the accomplishment of corporate goals. To fully realise the potential of industrial automation in manufacturing and its observable benefits for business growth, strategic utilisation of this technology is essential.

Several strategic approaches are available to effectively harness industrial automation in manufacturing, some of which are mentioned here:

Comprehensive process analysis

Manufacturers must find automation opportunities. They should perform a comprehensive examination of production procedures in order to pinpoint jobs and procedures that would profit from automation. They must give top priority to areas where automation can result in notable improvements in quality, cost savings, or efficiency.

Strategic goal alignment

Industry leaders must align their strategies with their business objectives. They should ensure that the adoption of industrial automation is in line with the overall goals and expansion plans of the company. Automation should be a strategic enabler, regardless of the

objective—raising production capacity, enhancing product quality, or reaching a wider consumer base.

Modular automation integration

Businesses should take a modular approach. They must take into account integrating automation in a modular fashion. The automation process can be implemented incrementally, causing less disruption to current operations and offering flexibility for future expansions, by breaking it down into modular components.

Data-driven decision-making

It is essential for companies to collect data in real time from different manufacturing stages by utilising industrial automation. To gain practical insights for process optimisation, predictive maintenance, and well-informed decision-making, they must use data analytics tools.

Flexible and adaptive systems

It is important to put in place automation solutions that can be quickly and easily adjusted to accommodate modifications in the demands of production. This guarantees that the production process can react swiftly to changes in consumer demand, product modifications, or unplanned interruptions.

Investment in workforce training

Investing in developing workforce skills through workforce training initiatives is imperative that will provide workers with the know-how to run and maintain automated machinery. The smooth integration and best possible performance of automation technologies are guaranteed by a workforce with proper training.

End-to-end integration in supply chain

Businesses need to automate every step of the supply chain, from obtaining raw materials to distributing them. This cuts lead times and bottlenecks while ensuring a coordinated and effective flow of materials.

Investment in emerging technologies

Businesses must investigate emerging technologies and keep themselves informed about cutting-edge technologies like the Internet of Things (IoT), machine learning, and artificial intelligence. They should think about how these technologies can increase productivity and creativity, in addition to industrial automation.

Strategic asset utilisation

Making use of industrial automation to make the best possible use of labor, energy, and machinery is crucial. By ensuring that resources are used effectively, this strategic approach helps to lower costs and increase profitability.

Automation can significantly enhance productivity
Image by Lifestylememory on Freepik

The future of industrial automation in smart manufacturing holds enormous opportunities for innovation, efficiency, and competitiveness

Apart from these, scalable solutions for growth, cybersecurity measures, strategic vendor partnerships, regular performance evaluation, regulatory compliance, clear communication channels between different stakeholders, including management, engineers, and operators, benchmark performance, and intuitive design are some other strategic approaches.

Adopting these approaches will help manufacturing businesses harness the full potential of industrial automation to drive growth, boost competitiveness, and position themselves as leaders in the ever-evolving landscape of modern manufacturing.

Do we need to automate everything, or are there limits?

It is no wonder that automation can significantly enhance productivity by eliminating the need for manual labor and accelerating processes. However, the decision to automate must be determined by a strategic evaluation of the specific needs, challenges, and goals of a business.

Since industrial automation offers a wide range of advantages to businesses and society at large, it also brings certain challenges. The first and foremost challenge is job displacement and unemployment. When industries begin to use machines and robots to increase productivity, the unemployment rate will surge, especially in low-skilled or repetitive roles.

This is where individuals are required to upskill themselves to adapt to the world of machines and operate them efficiently. Other challenges include initial implementation costs, technical challenges and limitations, reduced human interaction and customer experience, and dependency and loss of skills.

Future opportunities of industrial automation in smart manufacturing

The future of industrial automation in smart manufacturing holds enormous opportunities for innovation, efficiency, and competitiveness. A number of significant opportunities are expected to influence the path of industrial automation in the coming years as technology progresses. Some of these are as follows:

- Integration of digital twins
- Edge computing for real-time processing
- Advanced robotics and cobots
- Integration of AI and machine learning algorithms
- 5G Connectivity for enhanced communication, and
- Human-centric automation design.

The final thought

Industrial automation is about enabling businesses to innovate and empowering workers to collaborate seamlessly with technology. With a lot of advancements in industrial automation and smart manufacturing, Industrial Automation believes that the final act is yet to unfold, and the possibilities are as endless as the ingenuity that drives us forward IA

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Letting Go of Jurassic Technology

Refusing to evolve is not an option, says **Piyush Jha.**

You're in the driver's seat of a 1960s classic Ford Mustang. It is timeless craftsmanship; an absolute gem – vintage, powerful, and iconic. But against the latest Tesla Model your Mustang may look like a relic from the past. Complex circuitry, automated systems, and cutting-edge technology offer the Tesla, all the features it needs to succeed today. The Mustang, for all its charm, simply doesn't stand a chance. Why, you ask? Technology running a business in this digital age is no different.

The concept of Digital Twin City has been widely accepted

Welcome to the race of our lives, where clinging to antiquated systems – or 'Jurassic Tech', as I like to call it – is like racing a Ford Mustang against a Tesla. And the finish line? It's survival. Modern businesses are embracing 'digital transformation'. But what does it really mean? Simply put, it's the integration of digital innovation into all areas of a business, fundamentally changing how you operate and deliver value to your customers. It is the resilience to leave behind and move at pace to deliver enhanced customer experience.

It's also a cultural shift that requires organisations to continually challenge the status quo, experiment, and get comfortable with failure in the process. The 'Why' behind the imperative Speed and efficiency: Today's business landscape is like a high-speed autobahn. Everything moves fast, and if you don't keep pace, you're at risk of being left behind. Adopting digital tools can streamline your operations and make your business more agile and efficient.

Customer expectations: Modern customers demand more – they want personalised, seamless, and on-demand experiences. Businesses like Netflix and Spotify use complex algorithms to provide tailored recommendations, raising the bar for personalisation. Innovation and opportunity: Digital transformation not only keeps you in the game but also opens up a world of innovation and unseen opportunities. The question then arises, "Can businesses survive without digital transformation?" In theory, yes. But in practice, it's a risky gamble. Take the example of Nokia. When smartphones stormed the market with their advanced features and slick operating systems, Nokia, which clung to its traditional models, was left in the dust. These examples are a stark reminder that survival in today's business landscape isn't about size or legacy; it's about adaptability and agility, about becoming a T-Rex in a world of digital opportunities.

If we've learned anything from Jurassic Park, it's that life — and business — finds a way

Gear up for the digital race

If we've learned anything from Jurassic Park, it's that life — and business — finds a way. Digital transformation is a survival imperative for businesses wanting to stay relevant and competitive in this ever-evolving landscape. Your business journey might be bumpy with twists and turns, but refusing to evolve is not an option. It's time to trade that charming but outdated Ford Mustang for a Tesla and join the race IA

Piyush Jha is Managing Director, and Head – India and APAC, GlobalLogic.

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Next Generation Digital Valve Controller

Emerson's DVC7K Digital Valve Controller offers cutting edge performance, diagnostics, and integrated troubleshooting advice for both control and on/off valves, says Janelle Prusha.

Automated valves are the heart of an industrial process, enabling the control system to maintain critical flows, temperatures, and pressures; route and divert materials throughout the plant; and safely isolate processes to protect personnel and equipment. Valve positioners/controllers play a vital role in this effort, ensuring each valve reaches and maintains its commanded position, despite variable conditions.

First introduced nearly 50 years ago, the valve controller has evolved continuously to meet the changing needs of industry. Recently a new generation of digital valve controller, the Fisher™ FIELDVUE™ DVC7K, has entered the market. Utilising edge computing, advanced integrated diagnostics, and a variety of connectivity options built on decades of field proven experience, this next generation controller provides unparalleled levels of performance and data analytic capabilities.

This article will highlight the value provided by the DVC7K in six key areas:

- Real-time awareness
- Valve health at-a-glance
- Diagnose issues locally
- Reliable by design
- Install with ease, and
- Paving the way for the future.

But first, let's look at the history of valve controllers.

The evolution of the valve controller

Originally, simple single loop controllers commanded control valves directly, driving them open or closed as necessary to move the process to setpoint. As plant automation advanced in the 1970s, it became clear that control valves needed some means of local control to ensure a valve was reaching the commanded position, even as air pressure and process conditions varied. That need was met with the Fisher™ 3582i pneumatic valve positioner introduced in 1975 (Figure 1). The 3582i monitored the analog signal from the control system and the actual valve position and adjusted the actuator pressure as necessary to make the valve position match the commanded setpoint.

Improvements rapidly followed. In 1994 Fisher introduced the first digital valve controller that not only positioned the valve, but also provided a feedback signal of valve position back to the automated system. The DVC6000 was introduced six years later, incorporating a modular design to reduce maintenance costs. Further improvements in reliability were achieved when the DVC6200 eliminated the troublesome and error prone mechanical linkages in 2010.

All this advanced functionality is built on a valve positioner hardware platform that has over 10 billion hours of runtime

Figure 1: Valve positioners have evolved from the pneumatic Fisher 3582i in 1975 (top left) to the first digital model Fisher™ FIELDVUE™ DVC5000 in 1994 (top right). The Fisher™ FIELDVUE™ DVC6000 introduced modular design in 2000 (bottom left) and in 2010 the DVC6200 model (bottom right) was introduced with linkageless feedback.

Each of these models dramatically improved the performance and capabilities of automated valves by addressing pressing needs, but challenges remained. The current generation of top tier digital valve controllers integrates numerous sensors to measure a wide variety of valve related data, including valve position, actuator performance, packing performance, and supply air pressure. Unfortunately, much of this data is either lost or not utilised because the valve controller can store little or no data, and it has no analysis capabilities. Continuous data capture and analysis therefore requires an external software package to receive the data and feed it to outside entities or specialised software programs for review.

Another opportunity for digital valve controllers exists for on/off valves. Advanced controllers can provide a wealth of diagnostic capabilities and enable partial stroke testing for critical safety applications, but the cost of adding a top tier digital valve controller to these valves can be prohibitively expensive.

Next generation valve controller

Emerson addresses these shortcomings with a new generation of digital valve controller called the DVC7K. This controller builds on a thirty-year history of proven digital valve controller performance and design innovation, while also incorporating the latest in edge computing and advanced diagnostics to dramatically improve capabilities (Figure 2).

Figure 2: The Fisher FIELDVUE DVC7K incorporates next generation data collection and troubleshooting analytics into the industry's leading digital valve controller.

The biggest innovation of the DVC7K is its data driven design. The edge computing processor and analytics engine gathers and stores real time valve data locally. That information is available through the easy-to-use local user interface, or via a variety of connectivity options, including HART and Emerson Secure Bluetooth™. Unlike previous digital valve controllers, the DVC7K continuously senses and stores valve data in the device – so information before, during, and after an event is available for review.

Onboard diagnostic software runs continuously within the DVC7K, utilising patented technology and experience-based algorithms to analyse valve performance. If that analysis detects a problem, an alert is generated that can be viewed locally or remotely. Local alerts are indicated by an integrated status LED (Figures 2 and 3), prominently shown on the face of the device.

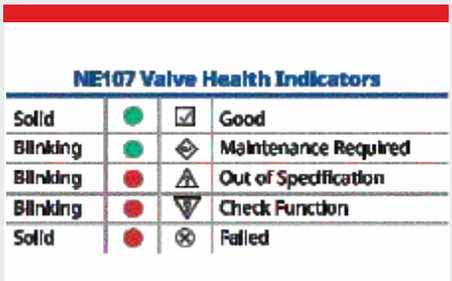

Figure 3: An LED on the face of the Fisher FIELDVUE DVC7K indicates the operating status of the instrument. Developing problems are detected and indicated well in advance of outright failure so the issues can be addressed before production is impacted.

The alert not only indicates the problem, but offers Advice at the Device™, suggesting actionable steps to further troubleshoot, identify, and repair the problem. 24/7 continuous analysis helps identify and correct immediate issues, while also providing real-time awareness by detecting and flagging developing problems before they impact valve performance and plant profitability.

All this advanced functionality is built on a valve positioner hardware platform that has over 10 billion hours of runtime. A wealth of integrated sensors allows the DVC7K to monitor all aspects of valve performance, and features like linkageless valve position sensing ensures long life and minimal maintenance cost. Installation and retrofits are very easy, utilising a variety of different connection kits to allow direct mounting on Fisher™ 657/667i and GX actuators, Fisher sliding-stem and rotary actuators, or any actuator that complies with IEC 60534-6-1, IEC 60534-6-2, VDI/VDE 3845, or NAMUR mounting standards. The positioner also offers an integrated analog position output and two limit switches as options.

On/Off valve positioner options

While the DVC7K offers unparalleled performance and capabilities for control valves, it also offers a cost-effective digital controller option for critical on/off valve applications. This version of the DVC7K is specifically designed for on/off service, incorporating the same breadth of sensors, data gathering, and analytical analysis – but at a lower price point than the model designed for control valve service.

The advanced level of diagnostics and features, such as partial stroke testing within the DVC7K, allow SIL-rated safety interlock valves to achieve significantly higher levels of reliability. This can extend proof test outages, increase plant production, and allow safety analyses to take credit for unplanned trips, should they occur, as a functional test. Built-in analytics can also detect and identify developing air supply, process plugging, and other problems before they impact plant operations.

Conclusion

Digital valve controllers play a critical role in automated valve functionality, ensuring the valve meets its commanded position despite changing process conditions. The DVC7K extends this role to include the ability to not only detect and alert plant personnel to deteriorating valve performance, but to also help them quickly troubleshoot and resolve problems for both control and on/off valves. Such proactive responses can yield dramatic improvements in valve performance and plant productivity.

The future is now, and the DVC7K is leading the way from the vague promises of digital transformation to the realisation of tangible financial benefits through cutting edge performance, advanced diagnostics, and next generation analytics

For more information on the DVC7K, visit Emerson.com/FisherDVC7K.

All figures courtesy of Emerson.

Janelle Prusha is the strategic marketing manager for Emerson's Flow Control products in Marshalltown, Iowa. Prusha graduated from Missouri University of Science and Technology in 2012 with a degree in Environmental Engineering, and from the University of Iowa in 2016 with an MBA.

Accurate Fiscal 3 Bar Steam Measurement Reduces Utility Spend

The implementation of clamp-on technology has delivered a much clearer picture of the 3 bar steam network across the chemical site.

Non-invasive, clamp-on ultrasonic flow measurement is transforming the way that the chemical industry monitors and manages utility services. Once considered an almost insurmountable measuring task for clamp-on flowmeters, this innovative technology is accurately and reliably measuring steam without interrupting normal system processes.

Ever since installation, the clamp-on flowmeters have continued to prove their reliability.

Two pairs of ultrasonic sensors are mounted on the pipe at a defined distance from each other, forming two acoustic measuring 'gates'. Ultrasonic signals are then radiated into the pipe and modulated by the vortices of the turbulently flowing steam. Because the vortices are carried along by the flow, they pass between the two measurement gates with a time delay. And through cross-correlation of the modulation signals over time, the flow velocity of the steam can be determined, with the mass flow being calculated based on the geometry of the measuring point and the physical parameters.

Low accuracy results in paying more for consumption

At a sprawling chemical hub in the southeast of the Netherlands, a cooperative approach to utility services is in operation, including the supply of essential energy sources such as electricity, compressed air, natural gas, pure gases, water and steam. The utilities are meticulously tracked and accounted for in a document known as the 'measuring book' – setting the rules for utility transactions on the industrial park.

Operators were searching for a more cost-effective and reliable steam measurement system, as previously installed meters were proving unreliable. In fact, they were classified as the lowest accuracy class (D). This meant that a significant amount was paid for steam consumption, while less revenue was received for the steam contributed to the network.

FLEXIM was tasked with proving the effectiveness of clamp-on steam meters as a viable alternative. Following a detailed technical review and discussions with the utility provider, it was clear that clamp-on technology would require verification in order to be accepted.

The calibration process involved using compressed air as the medium, and ensuring that the conditions closely matched the actual steam application

Tests, calibration, on-site testing and implementation

The calibration process involved using compressed air as the medium, and ensuring that the conditions closely matched the actual steam application. The calibration setup differed from the customer's in terms of medium, pipe size and temperature, but this was not critical for validation. The calibration process ran for two days and effectively showcased the technology's accuracy, with all test points well within its accuracy statement.

Following the successful calibration and additional on-site tests, the purchase and installation of two clamp-on steam meters went ahead. The meticulous installation process took into account factors that can influence accuracy, such as pipe diameter and wall thickness. With the meters connected to the process computer, the total uncertainty of the measurement was calculated, classifying the meter solution as a class B (better than 5%) solution.

Reduced costs and increased revenue

Ever since installation, the clamp-on flowmeters have continued to prove their reliability, with the measurements typically agreeing within a 1% margin. This level of accuracy has been invaluable to the utility provider, reducing the cost of steam import and increasing revenue from steam production. The implementation of clamp-on technology has delivered a much clearer picture of the 3 bar steam network across the chemical site, helping to recover the mass balance. IA

For more detailed information on the benefits of non-invasive ultrasonic flow measurement in the chemical industry, contact: salesindia@flexim.com

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Safety, Simplicity and Productivity Provide Value in Plant Operations

Implementing the latest widget or tool in the market only matters if it provides intrinsic value to plant personnel, says **Ashley David.**

In today's manufacturing environment, process automation professionals must choose from a multitude of widgets and innovations to help their plants run more smoothly. This raises questions as to what makes a new technology or widget useful and not just another PowerPoint™ slide detailing features and benefits.

When researching the universe of process automation technologies, it is easy to get excited about something new and innovative. However, investing in new technology for the plant environment is much harder than upgrading to the newest smartphone. Many different aspects and effects of proposed improvements must be considered, including compatibility with existing systems, ease-of-use, cost/benefit ratio and other factors.

Before deciding to install the newest widget in the market, it is important to evaluate the everyday work and demands of the process automation professionals who are the end users of the equipment. How can this new technology make their lives easier, and why should they care about this new tool? While the reasoning may change depending on who in the plant one is talking to, simplicity, safety and productivity are interconnected points that provide a solid basis for evaluating new technologies. This sentiment is shown in the following examples.

Improving instrument commissioning and operation with smart instrumentation

Smartphone apps are a relatively new tool in the industrial arena, although they have been in use for over a decade in the consumer and commercial sectors. Many process plants experience problems with instrument commissioning and with ongoing operations due to a lack of readily available diagnostics.

Existing tools — ranging from pen and paper to frequent field visits — are not up to the task. To address these and other issues, some instrument vendors have introduced smartphone apps, allowing plant personnel to interact with process instruments via Bluetooth. The following details how this new technology can be used to improve safety, simplicity and productivity.

: Figure 1 – Process data and diagnostics in real time

Instrument apps make interactions with instruments safer

With smart instruments, technicians do not need to open electrical panels or instrument housing to establish the connectivity required for commissioning and diagnostics.

Commissioning wizards can walk a technician through the entire startup process, while ensuring that no steps are skipped

Commissioning wizards can walk a technician through the entire startup process, while ensuring that no steps are skipped. This is especially important for startup and verification of safety systems, where completing every step is essential for devices to function as intended (Figure 1).

Bluetooth provides connectivity up to 30 ft., eliminating the need for a lift in certain cases, while decreasing fall risks and job-site accidents. When combined with onboard monitoring and verification software, technicians can see process data and diagnostics in real time. This empowers them to make predictive maintenance decisions on the spot, further decreasing the possibility of job site accidents due to equipment failure or product contamination. An oftenoverlooked aspect of safety is cybersecurity, which should be provided along with any Bluetooth app intended for use in industrial applications.

Features to look for include:

- Connectivity with a security level rating of at least "High" from an independent security specialist [e.g., the Fraunhofer Institute for Applied and Integrated Safety (AISEC)], which provides a level of security just below that of passports and credit cards.

- Passwords are never stored on the app or the instrument.

- Instruments can only be accessed wirelessly using the app.

Once paired with a handheld device, basic information — such as tag number, PV and instrument status — are visible to the technician without the need for a password (Figure 2). This provides visibility to basic information but with no ability to alter settings without the password.

Figure 2 – Smart instrumentation and multiple tasks

Smartphone apps make instrument interactions simpler

Bluetooth communication eliminates the need for handheld communicators, which may require periodic updates. Guided commissioning ensures all bases are covered, converting a complex set of steps to a simple procedure. The ability to access the reports generated by verification and monitoring software makes documentation much simpler, as well. Rather than manually filling out a report each time a setting is changed or when an instrument is checked, technicians can generate an "As Found" file before and an "As Left" file after assessing the instrument. This eliminates any questions about who made the adjustment or why it was made, which provides homogeneity among technicians.

The right software improves productivity

Imagine walking all the way across a plant to the instrument shop, grabbing a communicator if there is one available, walking back to the other side of the plant and then climbing up the side of a tank only to discover that the handheld does not have the proper EDD or DTM file loaded to communicate with the instrument requiring service. This problem becomes even more pronounced in petrochemical plants and refineries because they are often spread out over wide areas and require a lot of time to traverse from one side to the other.

Once the technician has gone back to the instrument shop—either updated the drivers or grabbed a different handheld that has them preloaded—and trekked back to the instrument, diagnostic information can be accessed from the device.

However, even after the diagnostic code(s) has been retrieved, another trip to the instrument shop may be needed to look up the diagnostic information unless the technician makes a habit of carrying around all the manuals required for each instrument. Once a decision is made about what to do with the instrument, it may require a part replacement or a call to technical support, forcing another trip back to the instrument shop.

Loading all the information contained in a manual into an app that is easily accessed and updated keeps technicians from having to go back and forth, increasing productivity and reducing frustration. The ability to access all technical information, manuals and diagnostic codes for specific devices through an app allows technicians to handle everything in a single trip to the instrument, as well as provides them the ability to retrieve any part number(s) or technical support they may need right then and there.

As shown in Figure 2, verification and monitoring software provides homogenous report generation, so technicians can document issues without having to type or open a separate laptop or other device. Everything is at their fingertips, quite literally. One single problem that may have lasted the entire workday now can be solved in a fraction of the time.

New instruments should be assessed for their intrinsic value

While a smartphone app, along with verification and monitoring software, were used in this example, the guidelines of safety, simplicity and productivity can be used to evaluate any new instrument or innovation. Implementing the latest widget or tool in the market only matters if it provides intrinsic value to plant personnel. Investment in new products requires a specific need to be met, along with justification for changing standard operating procedures that may have been in place for decades. When all the above criteria are satisfied, enhancements are much more likely to provide expected improvements in productivity IA

Ashley David is a Product Marketing Manager for Endress+Hauser. She is currently focused on providing strategic vision, leadership and marketing direction of Endress+Hauser's level and pressure products, as well as leading and managing the development of business portfolio concepts and marketing plans.

CCTV – More Than Just a Pretty Picture

Brian Taylor charts the evolution of CCTV in hazardous and industrial applications and considers where the technology is headed next.

Since its inception, CCTV technology has proven its worth in hazardous and industrial environments by helping fallible humans to monitor reliably and consistently 24/7. Sometimes the application is for safety purposes: there are obvious benefits in ensuring only authorised personnel can gain access to potentially dangerous machinery or chemicals, for example. Other times, remote CCTV cameras are invaluable in monitoring processes in hazardous environments which are hostile or largely inaccessible to humans. Examples include remote pipelines, unmanned offshore platforms and locations that involve extreme temperatures, from -60degC to +70degC.

Digital developments

The advent of digital technology at the beginning of the 21st century set a new baseline for basic functionality – improved image clarity, zoom capability, operational ease and remote surveillance. These fundamentals of a high-performing surveillance system continue to progress and now, combined with added 'smart' functionality, workers and processes are safer than ever.

Image advancements

Digitalisation has prompted rapid developments in increased CCTV functionality. In addition to fixed cameras, users can now opt for CCTV systems with tilt, panning and zoom capabilities at magnifications (x20, x30) that were previously unknown. These functional developments significantly improve the ability to track, monitor and respond to potential safety or process incidents, while high definition (HD), full HD, and 4K resolutions allow better definition than ever before.

Even the challenge of low light levels has been overcome. WDR technology has improved the ability of CCTV cameras to capture clear images in challenging lighting conditions and smart IR solutions allow image capture even in complete darkness – crucial for 24/7 surveillance. Eaton offers a Smart IR optical camera in which the light beam will mimic the zoom function to ensure the illumination is focused on the same object or area. In addition to maintaining high quality monitoring, night vision enables the extension of reliable CCTV coverage into largely unlit industrial areas, such as warehouses and silo storage facilities, where monitoring was previously not possible.

The recent advent of combined optical and thermal cameras means that CCTV is also capable of environmental monitoring, with cameras being used to measure the temperature of vessels, machinery and conveyors. This means CCTV is used increasingly as an integral part of quality control, traceability and predictive maintenance regimes.

Digitalisation has prompted rapid developments in increased CCTV functionality

Smart functionality

Smart and AI features include facial recognition, object detection, and behavioral analysis to enable more proactive and intelligent surveillance.

Cameras equipped with artificial intelligence (AI) and smart features use visual data to trigger a desired response. Cross line detection and person counting are just two examples, both of which have important roles in ensuring safe working. The first may raise an alert if a person or vehicle enters a restricted, virtually-defined zone. The latter may be used to prevent too many people entering a defined area, or to ensure an area is clear of all personnel.

Better image clarity and improvements in motion detection mean that digital CCTV is able to differentiate between vehicles, people, animals and trees – improving accuracy and reducing false alarms.

Indeed, the technology can provide sophisticated decision-making, based on digital data. 'Person down' functionality has the intelligence to discern between someone working close to the ground as opposed to someone 'overall not moving' and trigger an alarm for the viewer to verify and send out a responder service. This function can also work in tandem with crowd detection, where people may gather around a casualty.

In other words, CCTV functionality has moved from passive monitoring to providing high quality, real-time data which enables smarter working: increasing efficiency in problem/incident solving and improving security and safety in the workplace.

Connectivity and data advancements

For users who have already invested in analogue CCTV for their hazardous or industrial application, the cost and downtime involved in swapping out an entire analogue system in order to reap the benefits of digital technology can be prohibitive. Cabling is the central issue, because it is both expensive and disruptive to replace standalone systems based on Coax with the CAT5/CAT6 digital cables that are essential for full networking and IP based CCTV systems.

Eaton was quick to realise the need for a transitional technology to resolve this dilemma. Its solution – Ethernet over Coax (EoC) –allows IP data to be transmitted across existing analogue cabling up to 20km.

Once the most suitable solution for data transmission is established, the management and protection of that data becomes a primary concern.

With H.265 and H.265+ compression standards, storage and bandwidth requirements of CCTV camera systems have decreased.

Compliance with data protection regulations and cybersecurity are of paramount importance. Cameras can now be integrated into Internet of Things (IoT) ecosystems and cloud-based platforms. While that allows for

CCTV has become a fundamental part of industrial control systems.

remote access, storage, and management of video footage from anywhere with an internet connection, cybersecurity measures need to robustly protect that footage, and continuously evolve to stay ahead of new threats.

Where next: materials technology and innovation

In order to keep pace with the demands of modern industrial environments, industrial CCTV equipment has to be able to withstand extremely harsh operating conditions and function reliably with minimal maintenance, particularly when being used in hazardous locations or on remote or difficult-to-access sites. The increasing reliance on CCTV data for continuous monitoring, process control and safety means that the technology has to be able to survive for longer, with less intervention.

Innovations in materials technology are providing the answer. Composite materials offer several potential benefits: particularly around corrosion resistance and attractive strength-to-weight ratios, when compared to traditional metal housings. The price of composite materials also compares favorably with 316 stainless steels. These attributes are particularly desirable in applications such as offshore platforms and industrial complexes where margins are tight, space is at a premium and the constant presence of salt spray or other corrosive substances can shorten operational life.

Eaton has already developed its own GRP composite material for such environments, which has been successfully applied on beacons, sounders and call points in hazardous area communications systems for more than 30 years. Using this proven material, Eaton has become the first manufacturer to develop a range of Ex-rated GRP Cameras for hazardous and harsh industrial environments.

The introduction of the lightweight and durable GRP range begins with the fixed (XFG) camera. The use of GRP housings offers end-users significant improvements in lifetime performance compared to aluminum alternatives, as well as reduced transportation, operating and maintenance costs. With space, cost and weight continuing to drive product choices, it is likely that GRP cameras will soon become the product of choice for hazardous and harsh industrial applications.

Conclusion

Industrial CCTV technology continues to evolve rapidly. Where the emphasis has been on digitalisation and the additional functionality it offers, focus is now shifting to the practical challenges being faced by industrial users and how CCTV can contribute positively to optimising production and driving down TCO.

The hazardous area communications team at Eaton continues to innovate and provide timely solutions which benefit customers seeking cost-effective CCTV systems for industrial and hazardous applications A

Brian Taylor is a specialist in Hazardous Area Communications at Eaton.

Navigating Unpredictable Cyberthreats for 2024

By tracking cyber-attack statistics of 2023, SecureClaw helps companies navigate cyberthreats for 2024, says **Dr Shekhar Pawar.**

The various types of cyber-attacks.

SecureClaw Cyber Threat Advisory, which keeps an eye on daily cyber threat news and alerts and tries to recommend solutions to companies worldwide, has studied more than 4,500 pieces of cyber news from across the world, appearing in leading cyber news forums and websites. Here are a few important statistics that are the outcome of the compilation of cyber news worldwide, considering the period from January to December 2023. Geography-wise, this data may differ from the actual cyber-attack statistics of a few countries, as at the ground level, many organisations from a few countries never report cyber incidents to authorities or news channels. Whereas the eagle eyes of our cybersecurity experts from SecureClaw have captured maximum cyber-attack news from many countries, it will give more insights about types of cyber threats and related information.

Key observations by SecureClaw

Apart from various industry domains, a few domains, such as automobiles, manufacturing, software providers, cloud providers, energy, telecom, healthcare, crypto, government, hospitals, pharmaceuticals, gaming, shipping, aerospace, and a few service providers, were mostly on the radar of cybercriminals throughout entire 2023. Most cyber threats were targeted at database systems, IT infrastructures, software systems, operational technology (OT), websites, servers, computer machines, emails, the cloud, APIs, ChatGPT, and mobile apps. Different techniques and sophisticated cyber-attacks were used via various types of data breach methods, including ransomware, malware, phishing, DDoS, unauthorised access, backdoors, integrity hacks, operational technology (OT) hacks, credential theft, spyware, SQL injection, insiders, and Trojan horses. The purpose of these cyber-attacks can be summarised as damaging reputations, disrupting business activities, hurting the competition's business, extortion (financial demands), or illegal or unauthorised access to data. Also, few cyber-attacks seem to be state-sponsored, as there are wars and conflicts going on across the borders of the few countries.

The Russian ransomware group Clop is well-known for its demand that victims pay millions of dollars

More advancement in the cyber-attack techniques

Ransomware attacks in 2023 had negatively impacted a few large enterprises, including automobile companies Ferrari, Tesla and Volvo Cars; maritime information services company Royal Dirkzwager; Hitachi Energy; Taiwanese PC company MSI; the Suzuki motorcycle plant; multinational tech firm ABB; Japanese pharma giant Eisai Group; Spanish bank Globalcaja; chip giant TSMC; Japanese watchmaker Seiko; Johnson Controls; MGM casino; Chilean telecom giant GTD; British Library, and the attack on a South Korean anti-aircraft weapons system.

During these months, PlayCrypt (Play ransomware), Clop ransomware, Vice Society ransomware, Black Basta ransomware, LockBit ransomware, BlackCat/ALPHV ransomware, Snatch ransomware, Rorschach ransomware, and Rhysida ransomware were among hundreds of ransomware gangs that were more active in sophisticated cyber-attacks. Each of these ransomware gangs has a typical pattern they have developed for performing cybercrimes. Since June 2022, multiple victims of Play ransomware assaults have surfaced in Bleeping Computer forums. The ransomware named Play gets its name from the way it encrypts files: it adds the ".play" extension afterward. The group's email address and the solitary word "PLAY" are also included in the ransomware note which is a unique pattern followed.

The Russian ransomware group Clop is well-known for its demand that victims pay millions of dollars before disclosing information that it says it has compromised. Vice Society is the next Ransomware-as-a-Service (RaaS) attacker targeting the education industry; move over, Lockbit. Vice Society is thought to be an extortion, exfiltration, and intrusion organisation

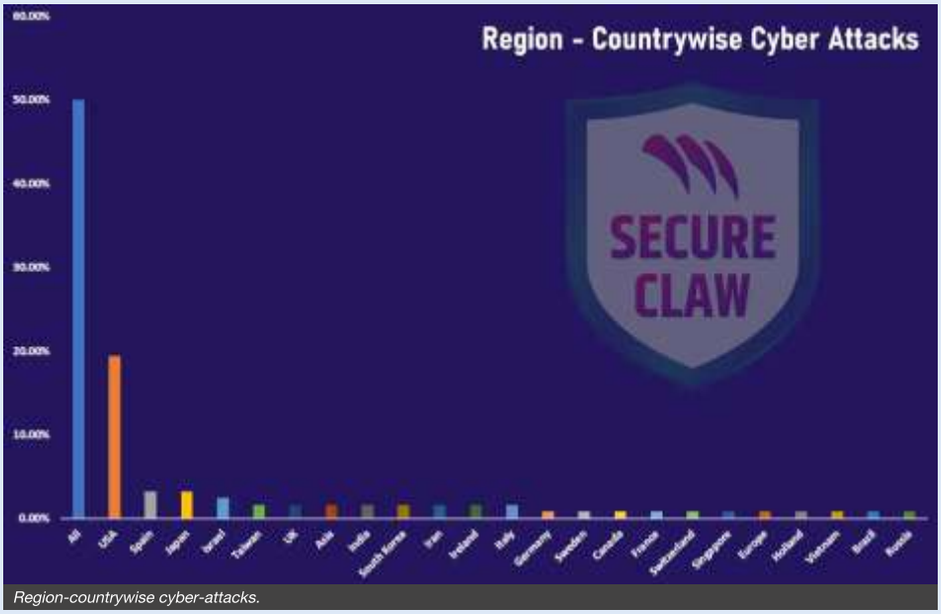
with Russian roots. Vice Society is well-known for, like many other ransomware groups, stealing data from victims' networks prior to encryption in order to use it for double extortion. They then threaten to post the data on the dark web if the demanded ransom is not paid.

The Black Basta ransomware group, which has been active since April 2022, has been seen attacking American companies, concentrating mostly on the manufacturing and construction sectors. They have also been seen focusing on the real estate, food and beverage, chemicals, insurance, healthcare, and mining and metals industries, as well as business services. Malicious malware known as LockBit ransomware which encrypts files, renders them inaccessible, and demands payment for the decryption key. LockBit will automatically scan a network for worthwhile targets, disseminate the malware, and encrypt every machine that is reachable. Highly targeted attacks on businesses and other organisations are carried out by this ransomware.

The majority of cyber-attacks originate because employees do not have proper cybersecurity awareness

Originally appearing in November 2021, BlackCat is a family of ransomware written in Rust, also going under the names ALPHV and Noberus. It also happens to be the name of the threat actor or actors that take advantage of it. BlackCat uses the RaaS business model, wherein the malware's creators provide it to affiliates for use and keep a cut of any money received in ransom. The Snatch ransomware, formerly known as Team Truniger, initially surfaced in 2018. Using RaaS, Snatch charges other threat actors for the ransomware payloads they supply. Snatch further employs double extortion by gaining access to their victims' private information. Snatch presses their victims to pay the ransom by threatening to expose the stolen material to the public if the requested ransom is not paid.

BabLock, also known as Rorschach, is a ransomware that has been making waves lately because of its fast-moving, sophisticated assault chain that employs deceptive yet powerful strategies. This ransomware was found to use an unusual method of attaching



Region-countrywise cyber-attacks.

extensions in June 2022. Investigators found that, in contrast to the standard ransomware assault strategy of "one sample, one extension," the attackers for this particular infection were appending numerical increments ranging from 00 to 99 on top of the preset ransomware extension. Because of this, several extension versions may arise from a single execution even on an infected machine. Rhysida is a ransomware operation that targets Windows systems. It gained notoriety in May 2023 when it was connected to several high-profile cyber-attacks that occurred in Western Europe, North and South America, and Australia. There seems to be a connection between the group and the infamous Vice Society ransomware group.

Few malwares were very active in this period, such as Frebniis Malware, SwiftSlicer Widget, Emotet, Invicta Malware, Fluhorse Malware, Letscall Malware, Big Head, PDF-related malware, Backdoor-related malware, StripedFly, SysJoker Malware, and KV-Botnet. Researchers have uncovered a new, sneaky malware called "Backdoor.Frebniis", or simply "Frebniis". It uses an IIS weakness to create a backdoor into Windows web servers. Targets in Taiwan have been actively targeted by anonymous cybercriminals. Hackers must first gain access to an Internet Information Services (IIS) server in order to infect a system. The malware's internal mechanisms, however, are distinct. Failed Request Event Buffering (FREB) is a feature that IIS employs to gather information about requests, such as the originating IP address and port, HTTP headers containing cookies, etc. Frebniis abuses this feature. Before utilising the malicious iisfreb.dll module to take control of the FREB code, Frebniis first makes sure that the FRT feature is active. After that, it gains access to the IIS server process memory. The malware replaces the original FREB file, allowing Frebniis to intercept and examine each HTTP request from the IIS server in a "stealthy" manner. The backdoor interprets any string that is received encoded in Base64, which it believes to be executable C# code, and uses that interpretation to perform remote execution directly in memory. In this sense, Frebniis operates in an entirely covert manner by not storing any data as a physical file on disk. Similarly, each identified malware has its unique technique to perform malicious activities till actual cybercrime.

How to be more secure and have good cyber resilience?

The entire world is experiencing advancements in technologies like AI-ML, ChatGPT, automations, and quantum computing, whereas the other side, which is largely unethical practices, is also getting more benefits to increase cybercrimes, probably using the same technologies with different motives. As each one of us has seen the impact of the Coronavirus pandemic, it is time to ask, "Are our industries, businesses, or even personal assets prepared for any upcoming highly innovative computer virus kind of threat?" Each one of us should think about it, as I am sure many of us and our ecosystems are not even prepared for this. If such a thing really happens and one day all businesses or all

electronic equipment stops working or starts malicious behaviour, it will be the biggest show stopper to the economy and many other things.

A few important points on which businesses should focus

1. Adopt Cybersecurity Standard: Every organisation, starting from schools, colleges, manufacturing, maritime, chemical, pharma, information technology (IT), e-commerce, and even government organisations, should adopt cybersecurity best practices. Globally, today, 90% of the business population is small and medium businesses or enterprises (SMBs or SME companies), which are responsible for 60-70% of employment opportunities and 55% of GDP contribution in developed economies. If they are not able to adopt existing big cybersecurity standards, they should at least adopt the Business Domain Specific Least Cybersecurity Controls Implementation (BDSLCCI) framework. This is easy to implement, less expensive, and, more importantly, provides tailored cybersecurity for the business domain of the company. Without structured cybersecurity implementation, it is difficult to reduce the cyber-attack surface for organisations. This should cover people, processes, and technology control areas.

2. Cybersecurity Awareness Training for Employees: The majority of cyber-attacks originate because employees do not have proper cybersecurity awareness. Good cybersecurity awareness training must be designed to cover many aspects, such as phishing attack precautions, policies, guidelines, insider threats, etc. Also, employees should undergo tests to check the effectiveness and delivery of the training. Few organisations can use phishing simulations to identify the impact of such cybersecurity awareness training.

3. Monitor Your Network: It is important to regularly monitor logs on the organisation's network devices and computers and even check notifications related to business transactions on mobile phones or emails. It will give hints on the malicious activities going on, so you can take action to prevent them.

Assets under cyber-attacks.

4. Regular Security Audits: The organisation should invest in vulnerability assessment and penetration testing (VAPT), followed by fixation of the issues identified. Apart from technology assets undergoing VAPT, processes should be enhanced with time as per the organisation's needs and compliances.

The entire world is experiencing advancements in technologies like AI-ML, ChatGPT, automations, and quantum computing

5. Track Incidents until Permanent Closure: Few incidents are alarming towards the possible harm to confidentiality, integrity, and availability of the critical assets of the organisation. It is important to track all possible incidents by preparing reports and taking the resolution towards permanent solutions.

6. Prepare BCP: Many organisations never prepare a business continuity plan (BCP) for any unseen circumstances, including natural disasters and cybercrimes. It is important to prepare for the worst. Also, organisations can test the effectiveness of such a BCP by executing cyber drills.

Dr Shekhar Pawar is a DBA in the cybersecurity domain at SSBM, Switzerland. He has completed his executive management degree from SJMSOM, IIT Bombay, and engineering in electronics and telecommunications from Mumbai University. Some of his skills and certifications include Certified Information Systems Auditor (CISA), Certified Ethical Hacker (CEH), Computer Hacking Forensic Investigator (CHFI), ISO 27001 – Lead Auditor, PCI DSS Implementer, Diploma in Cyber Laws, Microsoft Certified Professional (MCP), Certified Blockchain Developer, Certified ATM for CMMi Assessment, DSP & Applications – IIT Madras, and Diploma in Industrial Electronics. He is also the author of the nonfiction book 'Air Team Theory: Understanding 10 Types of Teammates and Best Practices to Succeed'. Currently he is working as Founder and CEO of SecureClaw Inc., USA, and GrassDew IT Solutions Pvt Ltd, Mumbai.

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Learning the Importance of Data Management

David Starc presents an overview of the importance of data management.

Corporations can eliminate decision-making challenges by replacing empirical strategies with data-backed business development roadmaps. While data analysis, visualisation, and cloud computing help might help you extract insights, their quality will vary based on analytical methods. Besides, business leaders must ensure data integrity irrespective of when they acquire data objects.

Data management's future will likely revolve around trainable chatbots.

What is data management?

Data management fulfills an organisation's analytics and business intelligence requirements while designing, protecting, and updating relevant databases. A data manager can implement several protection measures to prevent data leaks and unauthorised database changes. Additionally, strategies emphasise answering consumer and investor queries regarding ethical data usage.

Today, multiple industries rely on data management consulting to improve their data governance standards. Moreover, scalability and process automation have become mainstream, increasing stakeholders' expectations of a commercial database management system (DBMS).

Extract-load-transform (ETL) pipelines, data architecture, governance, business intelligence, reporting visualisation, and flexible storage are the components of a comprehensive data management approach.

With conversational artificial intelligence's rising popularity, data management's future will likely revolve around trainable chatbots. So, non-technical users will interact with your company's DBMS through dynamics queries instead of rigid command syntaxes.

Understanding the importance of data management

1. Data Governance and Privacy Regulation

Authorised users must follow a strict cybersecurity policy to protect the business's trade secrets from potential data thieves. Therefore, encrypting all communication and data storage resources is vital. Similarly, tracking DBMS-related activities empowers you to find those employees who misuse company databases and hold them accountable.

Some methods often helpful in combating data safety threats include firewalls, virtual private networks (VPNs), and biometric authentication. Simultaneously, brands implement advanced antimalware software to safeguard data assets concerning consumers, suppliers, and employees.

Since specific performance disclosures and pivotal meetings require confidentiality, data governance solutions are indispensable to modern data management strategies. They increase the reliability of computing and human resources to mitigate data security risks.

More stakeholders have instructed brands to optimise their processing methods requiring personally identifiable information (PII). Many nations and economic zones have enforced laws penalising corporations failing to comply with data governance directives. Therefore, every data management system must integrate cybersecurity and ethical data analytics to reduce legal risks.

2. Efficient and Modernised Insight Exploration

Companies utilise data analysis to address operational challenges and craft effective growth strategies. Nevertheless, if they use outdated hardware-software systems, they risk wasting excess time during data management.

So, responsible data managers must adopt workflows that help make data analytics and insight reporting more efficient. They will want power efficiency in a DBMS to control IT costs and maintain reasonable returns on technology investments.

3. Automation-Friendly Data Processing

Documentation tasks have burdened your employees with repetitive work items. Instead, your team must spend more energy on dynamics challenges by focusing on productive meetings and brainstorming. Thankfully, artificial intelligence (AI) customised for DBMS practices can assist leaders in automating database updates, quality assurances, and report creation.

Automated insight exploration will work on structured and unstructured data. After all, large language models (LLMs), sentiment analytics, and machine-enhanced translations have broadened the scope of corporate data analysis. Using these technological marvels, AI and machine learning specialists allow the brands to find the essence of consumer feedback, investor inputs, news coverage, and employee reports.

Companies utilise data analysis to address operational challenges and craft effective growth strategies

Conclusion

An ideal DBMS lets you interact with your business's data objects in a user-friendly and secure environment. That is why integrating data management tech is important for the present enterprises. It helps improve your competitive edge by automating mundane reporting tasks and preventing corporate espionage.

Article Courtesy: NASSCOM Community – an open knowledge sharing platform for the Indian technology industry: https://community.nasscom.in/communities/digital-transformation/learning-importance-data-management

Factory Automation and Digitisation in MSMEs

While implementing automation and digitisation, small industries must assess their specific needs, capabilities, and budget constraints, says **Darshana Thakkar.**

Large companies in India are very competitive due to modern production technologies. During the previous decade, the manufacturing advancements led by automation and digitisation have been crucial for many large firms to become a part of global value chains. With the rise of Industry 4.0, some forerunner companies are now transitioning their business to vertically integrating manufacturing systems and processes. They widely use emerging technologies like artificial intelligence, machine learning, big data analytics, cloud computing, IoT, and additive manufacturing. That uses real-time data for enhanced decision-making from shop floor to boardroom and increased competitiveness. With real-time data, they can optimise cost and manufacturing footprint.

Large companies are leading with better market shares, diversity, quality, precision, and resource efficiencies. These attributes allow them to align with global manufacturing shifts to achieve net-zero goals driven by international climate change commitments.

Yet, the country has a significant technology adoption gap among the MSMEs. Our country's lower manufacturing maturity is a legacy challenge and a lost economic opportunity. Still, in the post-pandemic era, there is a slight acceleration in technology adoption among the MSMEs. The tendency among the smaller companies when it comes to technology is that an overhaul of existing equipment with complex technologies to their operations can impact their bottom line negatively.

Being an MSME Transformation activist, my primary focus is to make our Indian MSMEs globally competitive and a part of the global value chain by adopting emerging technologies to assist their business operations. There are many constraints to MSMEs adopting affordable and optimal solutions. But the first and most significant challenge is awareness and willingness.

With the beginning of 2024, I appeal to all business leaders and business owners of

The journey from digitisation to digital transformation.

MSMEs to make a resolution to transform their business processes by adopting emerging technologies. Many options exist to do so in a phased manner, but determination is crucial. The government also supports various schemes and helps MSMEs adopt technology.

There are many constraints to MSMEs adopting affordable and optimal solutions

Lack of such a vision critically affects the Indian government's ambition of #atmanirbharbharat and #viksitbharat@2047, especially the potential of the production-linked incentive scheme (PLI) to advance the country's manufacturing sector.

The scheme aims to reduce import dependencies of the 14 target sectors and boost competitive exports while generating employment.

Factory automation and digital transformation are the critical drivers for the success of Indian MSMEs in being competitive and becoming an integral part of the global supply chain.

Factory automation and digital transformation are related concepts but have different aspects regarding processes and systems.

Automation uses technology to perform tasks or processes without human intervention. It involves using machines, software and other tools to perform repetitive or complex tasks. Its applications include manufacturing, business processes, IT operations, and more. It can involve both physical and software-based automation.

IIoT, Robots, cobots, robotic process automation (RPA), automated machines in manufacturing, automated customer service systems, and self-checkout devices are examples of automation.

While digitisation involves converting information or processes into a digital format, it's the process of converting analog data, such as physical documents or manual processes, into digital form. It is often associated with documents, records and data.

A few examples: Scanning paper documents to create digital archives, converting physical records into electronic databases, and adopting electronic signatures for documents are examples of digitisation.

In summary, automation is about mechanising tasks and reducing human involvement in processes, while digitisation converts analog information into a digital format. Both concepts can complement each other, and their integration can lead to more sophisticated and efficient systems.

Factory automation and digitisation in MSMEs

Important factors and potential areas for factory Automation:

1. Identify Critical Processes:

• Analyse the production process and identify tasks that are repetitive, time-consuming, or prone to human error.

• Prioritise automation for processes that significantly impact production efficiency and product quality.

2. Invest in Flexible Automation Solutions:

• MSMEs can invest in scalable, flexible automation solutions.

• Modular automation systems can be easily adapted or expanded based on the evolving needs of business.

3. Smart Manufacturing:

• Industrial Internet of Things (IIoT) devices help to gather real-time data from machines and processes.

• Sensors and actuators monitor and control equipment remotely.

• Machines and systems are connected to a centralised control system for better coordination.

4. Collaborative Robotics (Cobots):

• Cobots work alongside humans to perform repetitive or physically demanding tasks.

• It is more affordable than traditional industrial robots and easily programmed for different tasks.

5. Automation of Material Handling:

The many benefits of automation.

• Automate the movement of raw materials and finished goods within the factory using conveyor systems, automated guided vehicles (AGVs), or robotic arms.

6. Quality Control and Inspection:

• Implement automated inspection systems to ensure product quality and consistency.

• Vision systems and sensors detect defects or deviations in realtime.

7. Digital Twins:

• Digital replicas (digital twins) of physical assets simulate and optimise manufacturing processes.

• Improves design, maintenance, and performance monitoring through virtual models.

8. Data Collection and Analysis:

• Sensors and data collection devices monitor machine performance and gather production data.

• Data analytics identify trends, optimise processes, and predict maintenance needs.

• Extracting actionable insights to optimise production processes, predict equipment failures, and improve overall efficiency.

9. Inventory Management:

• Implement inventory tracking and management automation to reduce the risk of stockouts and overstock situations.

• Automated systems can provide real-time visibility into inventory levels.

10. Energy Management:

• Use automation to optimise energy consumption by controlling lighting, heating, ventilation, and other energy-intensive processes.

• Implement energy-efficient technologies to reduce overall operational costs.

11. Employee Training and Support:

• Invest in training programs to help employees adapt to and work alongside automated systems.

• Provide ongoing support to ensure that the workforce is comfortable and proficient in operating and maintaining automated equipment.

12. Cost-Benefit Analysis:

• Before implementing automation, conduct a thorough cost-benefit analysis to ensure that the investment aligns with the business's long-term goals and financial capabilities.

It's crucial to approach automation to complement the existing workforce and enhance overall operations. MSMEs can benefit significantly by carefully selecting automation solutions that address specific needs and challenges within their production processes.

Digitisation opportunities in MSMEs

1. Supply Chain Integration:

• Digitising supply chain processes can improve visibility and coordination with suppliers.

• Utilising automation to streamline order processing, shipment tracking, and other logistics activities.

2. ERP (Enterprise Resource Planning) Systems:

• Integrated ERP system manages various aspects of the business, including finance, human resources, and production planning.

3. Cybersecurity Measures:

• Robust cybersecurity is required to protect sensitive data and prevent unauthorised access to automated systems.

• Regular updating and patching software to address potential vulnerabilities.

Benefits of automation

1. Increased Efficiency: Automation allows streamlined production processes and reduces time and effort in manufacturing products.

2. Cost Reduction: While the initial investment in automation technology can be significant, it often leads to cost savings over time. Automated systems can operate 24/7 without breaks, reducing labour costs and minimising errors.

3. Improved Quality Control: Automation systems can perform tasks with high precision and consistency, resulting in improved product quality with fewer defects, less waste, and increased customer satisfaction.

4. Enhanced Safety: Dangerous or repetitive tasks can be automated, reducing the risk of workplace injuries. Automation can handle assignments in hazardous environments or those requiring precision beyond human capabilities.

5. Flexibility and Adaptability: Automation systems can be programmed to handle different tasks and adapt to changes in production requirements. This flexibility is valuable for MSMEs needing to produce various products or adjust to changing market demands.

6. Increased Production Capacity: Automation allows for higher production rates and increased throughput, enabling MSMEs to meet growing demands.

7. Data Collection and Analysis: Automation systems often have data monitoring and reporting capabilities. These data analyse production trends, identify bottlenecks, and help make informed decisions.

8. Competitive Advantage: Implementing automation can give MSMEs a competitive edge by allowing them to produce goods more efficiently and cost-effectively.

9. Labour Shortage Mitigation: MSMEs, like larger ones, may face challenges in finding skilled labour. Automation can help bridge the gap by handling repetitive or labour-intensive tasks, allowing human workers to focus on more complex and strategic aspects of production.

10. Regulatory Compliance: Automation systems that adhere to industry regulations and standards ensure product quality and safety requirements. It is imperative in industries with stringent regulatory frameworks.

While implementing automation and digitisation, small industries must assess their specific needs, capabilities, and budget constraints. Training employees and fostering a culture of innovation and adaptability are also essential for successful integration IA

Darshana Thakkar is an MSME Transformation specialist and Founder of Transformation-The Strategy HUB. She is a pioneer in transforming MSME companies with an Electrical engineering and MBA in operations background and 28 years of hardcore industrial experience. She helps MSMEs define growth paths, derive marketing strategies, improve business operations, adopt digital Transformation, and increase profitability.

https://www.linkedin.com/in/darshanamthakkar/

Revolutionising Automation for Smart Factories

Automators Industrial Projects stands as a trailblazer in the automation industry.

Santosh Dongerpure, CEO, Automators Industrial Projects (AIP).

Leveraging mechatronic principles to design integrated solutions. Image by Mech-Mind Robotics on Unsplash

Do you want your plant to be sustainable, Digitally Transformed, Human Centric Automation??

In the dynamic landscape of industrial automation, Automators Industrial Projects Pvt Ltd (AIP) emerges as a beacon of innovation, dedicated to transforming traditional factories into smart, sustainable, and human-centric environments. Led by CEO, Mr Santosh Dongerpure, AIP specialises in providing intelligent automation solutions across various domains, including Mechatronics, Electrical, High-level PLC, SCADA, Data Handling with track & trace, and MES systems. Their expertise extends to seamlessly connecting diverse machines on the shop floor to SAP/ERP systems, facilitating a comprehensive digital transformation and enhancing Overall Equipment Efficiency (OEE).

Leadership and expertise

At the helm of AIP is Mr Santosh Dongerpure, a visionary leader with extensive experience in the automation industry. His proficiency spans across Automobile Paintshop Technologies, Material Handling, Conveyor Technologies, HVAC Systems, AS/RS, Warehouse Systems, Electro Monorail Systems, and Power & Free Conveyors. Mr Dongerpure's track record includes the successful execution of numerous turnkey projects in collaboration with European OEMs and Line Builders. This wealth of experience positions AIP as a reliable partner for organisations seeking to revolutionise their operations through advanced automation technologies. AIP distinguishes itself by offering a comprehensive suite of automation solutions that cater to the diverse needs of modern industries. The company's focus areas include:

AIP's no-code, low-code revolution has pioneered smart automation for OEMs and line builders

1. No-Code, Low-Code Revolution

AIP's no-code, low-code revolution has pioneered smart automation for OEMs and line builders. In the dynamic realm of industrial automation, AIP is not just automating plants; it is revolutionising the very process of automation.

AIP's groundbreaking approach lies in the development of intelligent software that transcends traditional PLC-SCADA-MES systems. The introduction of a no-code, low-code platform not only accelerates development but also eliminates the need for extensive commissioning, empowering OEMs and Line Builders to bring smart automation to life with unprecedented speed and efficiency.

Breaking the Code Barrier: No-Code, Low-Code Mastery

Traditionally, developing software for PLC-SCADA-MES integration has been a complex and time-consuming task. AIP disrupts this paradigm by introducing a no-code, low-code platform. This revolutionary approach allows OEMs and Line Builders to create sophisticated automation solutions without the need for extensive coding expertise. AIP's platform empowers users to visually design and configure automation processes, breaking down the barriers of traditional coding complexity.

Quick Development, Faster Deployment

Speed is the essence of the modern industrial landscape, and AIP understands this imperative. By employing a no-code, low-code philosophy, AIP enables rapid development of automation software. This not only reduces time-to-market but also provides the agility required to meet ever-changing industry

demands. OEMs and Line Builders can now bring their automation solutions to fruition at an unprecedented pace.

Successful execution of numerous turnkey projects. Image by vectorpocket on Freepik

Eliminating Commissioning Hassles: Plug-and-Play Automation

Commissioning has long been a bottleneck in the automation process. AIP's no-code, low-code platform transforms the narrative by allowing for plug-and-play automation. The software developed on AIP's platform seamlessly integrates with existing systems, requiring minimal commissioning efforts. This not only reduces downtime but also ensures a smoother transition to automated processes.

Customisation without Complexity: Tailored Solutions at Your Fingertips

AIP's platform offers the best of both worlds – the simplicity of no-code and the flexibility of lowcode. OEMs and Line Builders can easily customise automation solutions to meet specific requirements without delving into intricate lines of code. This democratisation of customisation ensures that automation is not only smart but also perfectly aligned with individualised industry needs.

AIP remains committed to revolutionising automation, paving the way for the future of manufacturing

2. Mechatronics

AIP leverages mechatronic principles to design and implement integrated solutions that seamlessly combine mechanical and electronic/Electrical components. This approach enhances the efficiency and performance of manufacturing processes.

Smart Conveyors

Redefining material flow-conveyors are the lifeline of any manufacturing facility.

AIP's smart conveyors are not just mechanical marvels; they are intelligent systems that optimise material flow with precision. Through AI algorithms, these conveyors adapt to varying production demands, minimising energy consumption, and maximising efficiency.

The result is a conveyor system that thinks and acts smartly, contributing to a sustainable and resource-efficient production process.

3. Electrical Solutions

AIP provides advanced electrical solutions that optimise energy consumption, improve safety, and ensure the reliability of industrial operations. AIP takes a giant leap forward by seamlessly integrating electrical design with EPLAN tools. Traditionally, the creation of Bills of Materials has been a time-consuming and error-prone process. AIP's innovative approach automates this crucial step. The synergy between electrical and mechanical design allows for the automatic generation of BOMs, ensuring accuracy and saving valuable time in the project lifecycle. This integration marks a significant leap towards efficiency and precision in project execution.

4. Data Handling with Track & Trace

AIP employs cutting-edge technologies for data handling and track & trace functionalities, ensuring transparency and traceability throughout the production and supply chain. What sets AIP apart is its ability to provide comprehensive tracking without hefty investments in traditional RFID or barcode systems. With a focus on PLC and SCADA systems, AIP's solutions redefine transparency, enabling real-time monitoring of every transition in conveyors, ASRS, recipes, and data handling processes.

5. MES System Integration

MES bridging the gap between PLCs and SAP/ERP with 3D visualisation and web-based access – AIP facilitates the integration of Manufacturing Execution Systems (MES) to streamline production processes, enhance resource utilisation, and improve overall operational efficiency.

It is not just iconnectivity but the added dimensions of 3D visualisation and web-based access, ushering in a new era of accessibility, efficiency, and holistic operational insights.

6. Success Stories with European OEMs

Mr Santosh Dongerpure's successful collaboration with European Original Equipment Manufacturers (OEMs) and Line Builders underscores AIP's global competence. The ability to execute turnkey projects with precision and reliability has positioned AIP as a preferred partner for international ventures.

Summing up

In conclusion, Automators Industrial Projects Pvt Ltd stands as a trailblazer in the automation industry, spearheaded by a visionary leader and a team of experts dedicated to transforming traditional factories into smart, sustainable, and human-centric entities. As industries continue to evolve, AIP remains committed to revolutionising automation, paving the way for the future of manufacturing.

Benefits of Smart Factory Management System

Smart factory management system enhances the working of multiple industries through advanced technologies, says **Amit Samsukha.**

Smart manufacturing relies on digital technologies

Technological advancements are at their top to implement in diverse fields. It has revolutionised manufacturing and led to multiple changes that boost efficiency and growth. And the buzzword, Smart Factory, is poised to transform the manufacturing sector's entire value chain.

A smart factory management system refers to the integration of advanced technologies and digital solutions in manufacturing processes

There are numerous other benefits that can be concretely measured by the smart factory. Smart manufacturing relies on digital technologies to create flexibility and efficiency in data, supply chain, machinery, personnel, and more; a smart factory can focus on solving many pain points.

So, let's gear up and see how a smart factory management system can benefit your brand.

What is a Smart Factory Management System?

A smart factory management system refers to the integration of advanced technologies and digital solutions in manufacturing processes to create a more efficient, connected, and intelligent production environment. The main motive of the system is to gain the benefit of digital technologies to enrich various aspects of factory operations, supply chain, cost, and overall maintenance. Key technologies included in the system are:

Internet of Things (IoT): Collect real-time data, monitor, analyse, and make decisions.

Automation and Robotics: To improve the efficiency of the work that is traditionally done by humans.

Artificial Intelligence (AI) and Machine Learning (ML): Analyse data, make predictions, and optimise various processes. Predictive maintenance, quality control, and demand forecasting are also done with it.

Cloud Computing: To store and process data, enabling accessibility from anywhere and facilitating collaboration among different departments.

Augmented Reality and Virtual Reality: Used for training, maintenance, and troubleshooting.

Supply Chain Integration: For smooth coordination with suppliers and distributors and enhances the visibility and responsiveness to changes in demand or supply.

A smart factory management system aims to improve efficiency, reduce costs, and enhance

Image source: Schneider Electric

product quality in response to changing market conditions. By using the power of digital technologies, smart factories represent a notable growth in manufacturing.

Benefits of Smart Factory Management System

A Smart Factory Management system provides multiple benefits that contribute to increased productivity, efficiency, and overall operations. Let's explore some key advantages:

Businesses can watch their production lines more closely with the help of smart factory technology

1. Automation and Efficiency

Smart factory technology helps to lower operating costs by reducing energy consumption and increasing automation efficiency. With the help of advanced technologies, temperature control or pressure setting in industries with the help of automation can result in saving more money on energy bills by using the resources that were once used in the traditional methods. Along with this, it also detects problems much faster than humans by using technologies such as IoT, robotics, and AI and takes corrective action quickly, resulting in fewer unexpected downtime incidents and significant cost savings for businesses.

2. Supply Chain Integration

Integration of the supply chain in the smart factory management system allows better visibility into the entire production and distribution process, providing better responsiveness and coordination to changes. The inventory management and ensuring that the production is aligned with the market needs is done with data analysis with the help of AI tools and algorithms. They can also analyse and make better decisions.

3. Real-time Monitoring and Analytics

The use of the sensors by attaching them to the devices and machines in the smart factory management allows the system to collect real-time data from your equipment and monitor their processes. This can then help the industry to cope with the work faster than the traditional method. This also allows the system to have early knowledge of the errors in the system. Other than this, it also gives an alert for the inventory and other manufacturing processes and enhances them.

4. Flexibility and Customisation

When it comes to the growth and stability of the industry, the manufacturers need to consider flexibility and agility. The smart factory management system, when implemented in the system, is necessary for the owner to bring these changes without disturbing the flow of operations to have less to no loss. With this system, the company can have a better way of doing business, enhancing multiple processes, thus making it flexible for most workers.

5. Quality Control

Businesses can watch their production lines more closely with the help of smart factory technology, which enhances quality control. With fewer faults or returned goods being sent back because inadequate quality control criteria were not fulfilled, automated systems can spot flaws or inconsistencies more rapidly than manual techniques. This results in the production of superior quality products more quickly and efficiently. This results in higher customer satisfaction scores and lower waste

because faulty products don't make it off the assembly line and into the mail.

Features of Smart Factory Management System

1. Dashboard and Analytics

A smart management system consists of a dynamic dashboard and analytics modules that offer users an interface for real-time data visualisation and analysis of the key performance indicators (KPIs). With the help of these features, industry specialists can gain quick insight and make timely decisions. The analytics with the advanced tools make the actionable insights and recognise patterns within the collected data.

The smart factory management system was valued at USD 107.03 bn in 2022 and is anticipated to grow to USD 256.5 bn by 2032

2. Remote Control and Automation

It allows the companies to manage and monitor the process remotely, as it is an integral part of the system. This reduces the physical presence and makes a more flexible, convenient system. Automation is smoothly integrated into the system for the smooth running of the operations, minimising manual intervention, increasing efficiency, and ensuring consistency throughout the task.

3. Inventory Management

Inventory Management is a big part of the system, containing Asset Tracking and Supply Chain Visibility. It allows real-time monitoring and tracking of assets and resources, optimising inventory levels and providing insights into supply chain dynamics. By fostering transparency and efficiency in the supply chain, this feature supports effective decision-making and resource allocation, contributing to overall operational excellence.

4. Collaboration and Communication Tools

To maintain better teamwork and information exchange, these tools are integrated into the system. Collaboration platforms allow document sharing and project management. The communication tools such as video conferencing, notifications, and messaging ensure efficient and timely information flow among the team members. These two features together improve communication and collaboration within the enterprise.

5. Energy Management

Energy management is very important for any industry; thus, with the help of the smart factory management system. The system tracks and analyses the energy consumption, identifying all the faults and the working efficiency, and can optimise that for better results. This also reduces the cost, optimises energy usage, and enhances overall sustainability. By actively managing energy resources, organisations can achieve cost savings

6. Task Management and Scheduling

For good organisational workflow, task management, and scheduling, everything is important. This smart factory management system allows efficient Task assignment, allowing the team to work on the project smoothly. The scheduling feature in the system allows the company to plan and manage activities such as timely task completion and ensure optimal resource allocation. This promotes organisational efficiency, enhances productivity, and supports effective project management.

7. Security Features

One of the must-have features in the smart management system is security, which includes access control, data encryption, and security audits. Access Control ensures that only authorised personnel can access sensitive information, protecting data integrity. Data Encryption adds an extra layer of protection by securing sensitive data from unauthorised access. Regular Security Audits help identify and address potential vulnerabilities, ensuring a robust and secure management system.

8. User Feedback and Support

User Feedback and Support mechanisms are integrated into the smart factory management system to enhance user experience and address concerns. The feedback option allows the industry people to share their opinions and insights to get continuous improvement in the system. For the smooth functioning of the system, it also provides a support service that addresses all the queries and troubleshoots issues.

Future of Smart Factory Management System

The whole system opens up the door to development opportunities in Industries. The modifications in the industries with the system allow the business to expand and enhance productivity by impacting the manufacturing units, manual work, and more. The system is loaded with multiple technologies to improve performance and workflow, thus making it a perfect choice for all.

The smart factory management system was valued at USD 107.03 bn in 2022 and is anticipated to grow to USD 256.5 bn by 2032 with a CAGR of 9.2%.

The stats show the growth of the smart factory system in the industry. With the growing technologies and advancements coming over the years, it is a game changer for most industries. So, be ready to take the futuristic approach to improve your market game with all the competition.

Key takeaways

Smart factory management system enhances the working of multiple industries through advanced technologies like AI, IoT, and data analytics, resulting in better decision-making, providing real-time insights, and much more. It optimises efficiency, with more innovations also ensuring the competition in the industrial market IA

Article Courtesy: NASSCOM Community – an open knowledge sharing platform for the Indian technology industry:
https://community.nasscom.in/communities/ai/benefits-smart-factory-management-system

Amit Samsukha, CTO at Emizentech, is a well-admired ecommerce expert and IT consultant. With a decade of experience in eCommerce and mobile app technologies, Amit has been assisting businesses across the globe with how to leverage digital capabilities to build and improvise their IT infrastructure. A leader in his own rights, his teammates see him as a passionate researcher and an ecommerce evangelist.

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Decentralised Automation and Industrial Transformation

How can Murrelektronik's decentralised automation help the process of industrial transformation?

Industrial automation is a potent strategic tool. Image by storyset on Freepik

Decentralised automation is the outcome of shifting customer expectations as well as a process of technical advancement. Manufacturing facilities must continually adjust and look for ways to increase production, efficiency, and workflow. It affects industrial transformation in this context as a creative and useful remedy.

Decentralised automation, which offers more flexibility, scalability, and ease of maintenance for industrial systems, is a substantial departure from the conventional centralised approach. The logical allocation of control functions made possible by this method saves money and even saves time.

In this situation, Murrelektronik, a business known for its expertise in automation and industrial transformation solutions, has distinguished itself by providing goods and services to help you along the way with your industrial transformation.

We will look more into the idea of decentralised automation in this article, going over its benefits and how it becomes more prominent in the industrial revolution and the pursuit of efficiency and competitiveness.

What is decentralised automation?

To give a thorough overview of these two different techniques, it is necessary to define both centralised and decentralised automation in the quest for a full comprehension of the concepts involved.

The foundation of decentralised automation is the idea of "distributed intelligence," which assumes that most task processing is handled by a number of decentralised controls.

This method enables the use of modularisation concepts and faster processing speeds. Decentralised automation is very useful for automating devices that have several drive functions.

Decentralised automation is the outcome of shifting customer expectations as well as a process of technical advancement

On the other hand, all control functions are gathered into one central location with centralised automation. In this scenario, all activities and communications with peripheral devices are managed by a central controller.

Understanding the differences between centralised and decentralised automation is essential to applying these methods to industrial systems. The first has the benefit of sharing intelligence and task processing, enabling quicker and more effective work completion. This is particularly important for devices with numerous drive functions, as decentralisation offers more performance and flexibility.

The difficulties that modern industries face will be covered in the next section, along with how decentralised automation might assist solve them and increase businesses' productivity and competitiveness.

Industrial transformation and current challenges

Businesses that are undergoing an industrial transformation have several difficulties. The requirement to optimise industrial processes is one of them. Industries are always searching for methods to boost productivity, shorten lead times, cut down on waste, and enhance product quality. In order to maintain a competitive advantage in the market, this optimisation is essential.

Moreover, cutting costs is an ongoing struggle. It is imperative for organisations to discover methods of reducing operational expenses without sacrificing quality and efficiency, given the market demand for reduced pricing and slimmer margins. The profitability and sustainability of industrial organisations are influenced by cost reduction.

Increasing productivity is another obvious but important challenge. Industries must figure out how to boost output without sacrificing quality to meet deadlines and deliver products on time.

Additionally, automation presents a chance to apply cutting-edge technologies that give a more thorough and precise understanding of industrial processes, such as data analytics, artificial intelligence, and the Internet of Things (IoT). These tools further increase an organisation's efficiency and competitiveness by enabling you to see patterns, perform precise diagnoses, and make data-driven decisions.

Decentralised automation may help in enhancing system performance, but the complexity of manufacturing processes and the requirement for incredibly accurate response times at particular work phases have created a significant problem for systems networks.

Murrelektronik's decentralised automation help industrial transformation

Numerous benefits provided by decentralised automation play a major role in the industrial transformation process. These benefits cover anything from increased system availability to lower costs and more agility in production setup. Let's examine these benefits in more detail:

1. Fast production setup and modification during production: Decentralised automation allows for quick adjustments to be made to the production setup, even while production is still in progress. Local testing and rapid, flexible modification are made possible by modular machinery and equipment with decentralised logic.

2. Lower expenses and quicker installation times: One advantage of < /span> is that it makes it simple to use decentralised control for Factory Acceptance Testing (FAT) in the production environment. Commissioning is made easier. It is feasible to minimise or do away with the requirement for control panels using IP67 components and straight forward connectorisation, which will save a great deal of money and cable infrastructure in the field with dispersed automation.

3. Machine cost reduction: By permitting the reuse of preexisting modules, decentralised automation facilitates the reduction of project expenses. As a result, labor expenses are reduced and the resources that are available are optimised, including less cabling and installation work. Related costs are also significantly lower since there is a reduction in the demand for control capacity.

4. Increased availability: Dependency on central systems is decreased by decentralisation of control systems, lowering the likelihood of failures. Decentralised condition monitoring of the machine enables prompt and proactive action, preventing unplanned stops. In addition, module configuration minimises downtime by being quick, straightforward, and easy to replace in the event of a failure.

Advantages of Murrelektronik products:

- boost competitiveness
- save time on installation and activation
- conserve resources, and
- improve profitability.

Murrelektronik Portfolio

1. Murrelektronik offers customised power supply and monitoring systems for complete plants, along with the ability to integrate actuators and sensors with any type of control system, including proprietary ones, all the way up to the cloud.

2. With its I/O systems for all fieldbus and IoT protocols, safety technology, network installation technologies, and efficient power supply solutions, Murrelektronik helps its customers realise new business models in the era of Industry 4.0 and support their digital transformation.

Murrelektronik is a market leader in connection technology and offers a wide array of cable lengths, cable types, and jacket colours

3. Murrelektronik focuses on decentralisation to relocate assemblies from the control cabinet to directly in the vicinity of the process. This conserves resources and saves a great deal of time needed for installation and activation. The modular automation system Vario-X encapsulates this approach.

4. Decentralised modules can be paired with preassembled connectors – this is significantly quicker and results in flawless, secure, and reliable connections. The use of smart decentralised modules makes simplified service and maintenance processes possible. This reduces downtimes and leads to maximum productivity and high quality.

5. Murrelektronik is a market leader in connection technology and offers a wide array of cable lengths, cable types, and jacket colours. Customers benefit from application advice, services such as customer-specific developments or packaging optimisation, and technical and commercial customer service IA

Intelligent Manufacturing for a Sustainable Future

Taiwan Machine Tool and Accessory Builders' Association (TMBA) presents its viewpoint on the eve of TMTS 2024 scheduled during March 27-31, 2024 at Taipei.

The countdown has begun for TMTS 2024 and the show is shifted from its traditional November dates to March and also a change of venue. What is the rationale for this?

TMTS 2024 – Taiwan International Machine Tool Show 2024 will be held from March 27 to 31, 2024 at the TaiNEX (Taipei Nangang Exhibition Center) in Taipei, the capital city of Taiwan. TaiNEX is a spacious exhibition hall that can provide exhibitors with perfect exhibition arrangements and spaces, and its proximity to the international airport is more convenient for foreign buyers, which can increase the willingness to visit and stimulate the Purchase Intentions.

TMBA has stated that the TMTS 2024 event in terms of theme and technology will be much different than the previous editions. What are the changes visitors can expect?

In response to the trend of carbon reduction, this exhibition has replaced the traditional paperwork with digital Apps from booth selection, uploading of exhibition information, to exhibition related information, which not only implements the paperless policy, but also helps exhibitors to obtain the exhibition information more instantaneously and more conveniently.

In addition to the traditional print and electronic media, this exhibition has also extensively used multiple media to promote the event. Famous podcasts and influencers have been invited to interview the exhibitors and share their own experience of visiting the exhibition, which provides visitors with more platforms to receive information and a wider range of professional viewpoints.

The main theme of this exhibition is digital transformation (DX) and green transformation (GX), therefore, aside from the participation of Machine Tool and Accessory Manufacturers, we also plan to design a special zone for hand tools, cutting tools, and UMATI, etc., to create an ecological concept exhibition this year.

Patrick P Chen, Chairman of TMBA, at EMO Hannover 2023.

The theme of TMTS 2024 is 'Dual Axis Intelligent Manufacturing for a Sustainable Future'

As the year 2023 is drawing to a close, what are the early indications of the machine tool industry of Taiwan – will it be a better year than 2022?

Patrick P Chen, the chairman of Taiwan Machine Tool and Accessory Builders' Association (TMBA) believes that there is always a moment of reversal in the downturn, although the European and American economies have bottomed out and rebounded, but due to the slow recovery of the global economy, market demand may go through structural adjustments, and it is expected that the strength of the boom growth will be limited.

However, the outlook for the industry is not only based on the demand in the international market, but also on the domestic market. The Taiwan International Machine Tool Show (TMTS) will be held at the Taipei Nangang Exhibition Center in March 2024 with more than 550 exhibitors and 3,300 booths to compete for orders.

The Taiwan machine tool industry had a highly successful EMO Hannover 2023. What were the trends most in demand at this global event?

Corresponding solutions and innovative technologies are the most eye-catching trends in the face of environmental changes and new policies set by various Countries. At EMO, many companies proposed manufacturing transformation and green transformation, such as process integration, automation, intellectualisation and green technology, to improve production efficiency, reduce equipment investment, maximise space and improve product quality.

The theme of TMTS 2024 is 'Dual Axis Intelligent Manufacturing for a Sustainable Future', focusing on the two main axes of Digital Transformation (DX) and Green Transformation (GX), which include ten major elements including Factory Intelligence, Data Analytics and Cloud Computing, Intelligent Networking, Digital Dual Biology/Human-Computer Collaboration, Blockchain Technology, Intelligent Energy Saving, Environmental Certification, Resource Reuse, Green Supply Chain, and Sustainable Product Design. The ten elements echoed to the topic of EMO 2023 about transformation and green transformation and go further on intensification.

The FFG Group's presentation at EMO Hannover 2023.

With today's environmental impact, sustainability is undoubtedly an unavoidable issue for the global industry. To this end, TMTS 2024 will also showcase Eco Design: the accumulation of sourcing strategies and optimisation techniques from raw materials, green energy, Maintenance 4.0, sustainable technologies, consumables management to drive systems, in order to reduce the carbon footprint of machine tools.

India is the world's ninth largest machine tool builder and the world's seventh largest machine tool consumer

India is an important market for Taiwan machine tools. With all the investments happening in the country, has it resulted in increased orders for Taiwan companies?

From the statistics of the Taiwan Machine Tool and Accessory Builders' Association, China and the United States are Taiwan's two largest export markets for machine tools, Turkey and India occupying the third and fourth place. Owing to Taiwan's success in expanding sales in the Chinese market in the past, the company has been very active in the operation of the Chinese market, however, due to the impact of epidemics in recent years, the demand for China's market has declined significantly, while the demand for India's market has continued to grow.

The Indian government actively promotes the 'Made in India' programme, attracting a lot of manufacturing supply chain to India to set up production bases, manufacturers to expand the demand for investment continues to increase, so the Taiwan machine tool industry is also looking forward to India to expand the layout.

Do you see a trend among Taiwanese companies willing to invest in India in actual manufacturing or value addition?

India is the world's ninth largest machine tool builder and the world's seventh largest machine tool consumer, with an average annual consumption of about US$2.88 billion. Nearly 60% of the consumer market demand is imported from abroad, and only more than 40% of the products are supplied by local manufacturers, with Japan, China and Germany as the main importers, and Taiwan as the fifth largest importer of Indian machine tools.

Patrick P Chen, the chairman of Taiwan Machine Tool and Accessory Builders' Association (TMBA) recently returned to Taiwan from a visit to India, he pointed out that from this year's demand for imported machine tools in India continues to grow, it can be expected that India's supply chain will be more complete in the future, and the performance of the market is also expected to bring new business opportunities for Taiwan's machine tools IA

In 2007, the then chairman of the Taiwan Precision Machinery Development Association, Mr Edward Yang, called for the establishment of the association dedicated to the machine tool industry in order to unite the strength of the industry and enhance the overall competitiveness of the industry. With the great efforts of the members of the organising committee, Taiwan Machine Tool & Accessory Builders' Association (TMBA) was established in Taichung in October 2007, combining the strengths of hundreds of manufacturers across the country.

The establishment of TMBA symbolises the unity of the machine tool and accessory industry in Taiwan. The association plays the role of a communicator between the government and the private sector, and hopes to fully integrate and utilize various resources, leading the industry to be based in Taiwan and connected to the world, moving into the next era together!

‘We are poised to make a lasting impact on the global sustainability landscape’

Annanya Agarwal, Co-founder and CEO of Runaya.

The Runaya journey from zero to INR 1,000 crore in five years appears incredible. What are the core activities of the company?

We've experienced consistent growth year after year, achieving substantial milestones that underscore our commitment to delivering genuine value to our customers. Our revenue trajectory reflects this journey, surging from INR 40 crore in our inaugural year to an impressive INR 650 crore in FY24. This growth is a testament to our focused strategies and unwavering dedication to sustainability.

At the core of our success lies a three-pronged approach encompassing innovation, technology, and sustainability. This combination has not only distinguished us in the market but has also played a pivotal role in advancing the sustainability objectives of the resources industry.

At the core of our success lies a three-pronged approach encompassing innovation, technology, and sustainability

Looking ahead, our ambitious goal is to prevent over 1 million tonnes of waste annually by 2028, signifying a substantial stride towards a greener and more sustainable future. With a robust commitment to environmental stewardship, we are poised to make a lasting impact on the global sustainability landscape.

Annanya Agarwal, Co-founder and CEO of Runaya.

Traditionally, aluminium production is highly energy intensive with significant contribution to GHG. How does Runaya change this equation?

Our patented process extracts Green Aluminium from Aluminium Smelter Waste, remarkably slashing the carbon footprint to as low as 600 kg of CO_2 per metric tonne of aluminium. Key to Runaya's transformation is the strategic use of solar power for plant operations – a move that not only minimises reliance on conventional energy sources but also significantly curtails the overall environmental impact of the production process. This commitment to clean energy aligns with our goal of fostering sustainability within the aluminium industry.

Moreover, we go beyond waste reduction by repurposing 60% of dross, a byproduct of the aluminium recovery process. This not only contributes to environmental conservation but also creates value-added products for steelmaking, showcasing a holistic approach to resource utilisation. Through these patented processes, reliance on solar power, and efficient waste management strategies, Runaya exemplifies a commitment to reducing the carbon footprint and promoting a greener future for the aluminium industry.

Metal recovery from industrial waste sounds exciting. What are the difficulties in the process and does Runaya achieve it in practice?

Metal recovery from industrial waste is indeed an exciting endeavour, holding the promise of both environmental sustainability and resource conservation. However, this process is not without its challenges, therefore in our Minor Metal Recovery Business, we actively managed these by adopting a strategic approach.

One of the primary challenges in metal recovery is the requirement for advanced technologies. We hence strategically invest in research and development to stay at the forefront of innovative solutions. By developing and refining our own technologies, we ensure that we are equipped to handle diverse types of industrial waste and extract valuable metals efficiently. Furthermore, the economic viability of the recovery process poses a substantial hurdle. However, for us, through a combination of in-house expertise and global partnerships, we have been able to significantly optimise the cost-effectiveness of the recovery operations. This involves streamlining processes, maximising metal yield, and exploring avenues for sustainable business models.

Runaya aims to decrease 1 million tonnes of industrial waste in 2023. What are the technologies that help in this process?

In our pursuit of decreasing 1 million tonnes of industrial waste in 2023, Runaya has strategically employed various cutting-edge technologies. One significant initiative involves augmenting the dross processing capacity to an impressive 70,000 TPA within the Green Aluminium Recovery Business. This not only enhances our waste management capabilities but also aligns with our commitment to sustainable practices. Another key endeavour includes the establishment of an Aluminium Fluoride (AlF3) plant, aimed at slashing imports by more than 50% while concurrently generating additional revenue.

Furthermore, we are expanding our global footprint in the Telecom Grade FRP & ARP Rods business, with a deliberate emphasis on exports. This expansion not only contributes to our waste reduction goals but also promotes the adoption of environmentally friendly materials on a broader scale. To foster continuous innovation in waste processing, we have initiated collaborations with universities and established an innovation centre. This strategic move enables us to identify new waste processing opportunities and develop advanced technologies that further propel our mission of reducing the environmental impact of industrial waste.

These multifaceted technological initiatives underscore Runaya's unwavering dedication to fostering innovation, embracing sustainable practices, and actively mitigating the adverse effects of industrial waste on the environment. Through these measures, we aim not only to meet but exceed our ambitious target of decreasing 1 million tonnes of industrial waste in the year 2023.

Runaya has the potential to lead the trend reversal and emerge as a significant technology provider

What are the existing technology partnerships of the company with domain experts globally?

We actively pursue partnerships and collaborations with global institutes, industries, and universities to drive innovation and enhance our existing processes at Runaya. Currently, we have a significant partnership with TAHA International in the Green Aluminium Recovery business, underscoring our commitment to fostering valuable collaborations with both national and global industry leaders. Our collaborative efforts extend beyond traditional industry boundaries, encompassing research institutions, technology providers, and stakeholders who align with our vision of promoting a sustainable future. These partnerships serve as crucial channels, providing us access to cutting-edge research, technological advancements, and best practices in the field of metal recovery and sustainable practices.

What are the resources are available from the Group's Innovation Centre in Odisha?

Runaya has established an innovation centre to identify waste processing opportunities and develop technologies to tackle waste management issues. The innovation centre collaborates with universities, including IIT Kharagpur, for developing lab-scale technologies. The focus is on converting waste into recyclable products, with ongoing efforts to develop new products and improve operational efficiency. This initiative aligns with the company's commitment to innovation, sustainability, and creating a circular economy in the manufacturing industry.

Can Runaya lead the trend reversal and become a technology provider for the world of mining?

Absolutely, I believe Runaya has the potential to lead the trend reversal and emerge as a significant technology provider for the global mining industry. The company's unwavering focus on innovation, sustainability, and technology-driven manufacturing uniquely positions it to make substantial contributions to the mining sector.

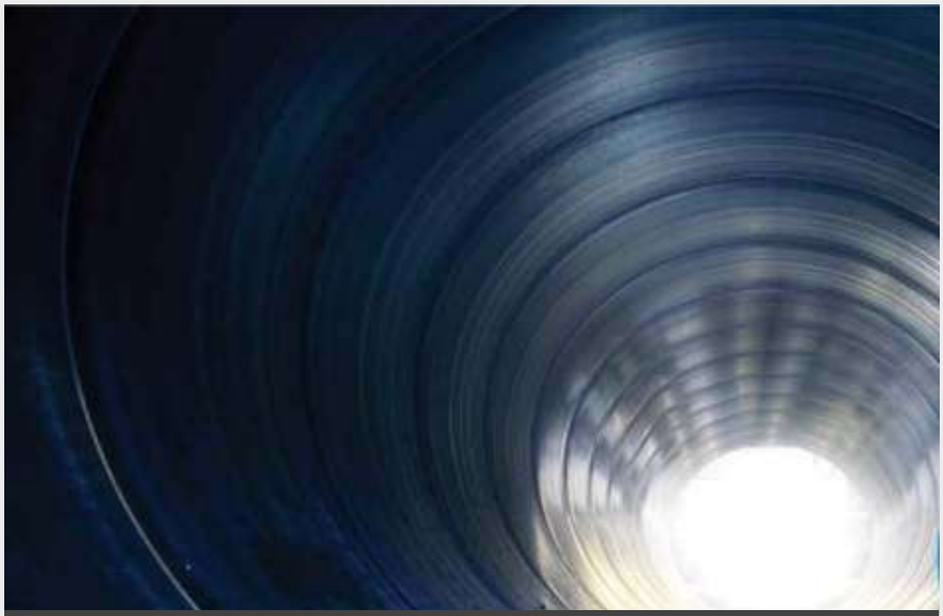
Our commitment to developing and deploying cutting-edge technologies sets it apart in an industry that is increasingly recognising the importance of technological advancements. By actively collaborating with global experts, we ensure that the company stays at the forefront of technological developments and can integrate the latest innovations into its operations.

Runaya's proactive involvement in the circular economy aligns perfectly with the growing emphasis on responsible and environmentally friendly practices within the mining industry. As we scale our operations and continue to invest in research and development, it is poised to not only keep pace with industry trends but also it will set new standards. The combination of a forward-thinking approach, technological expertise, and a commitment to sustainability creates a solid foundation for Runaya to lead the trend reversal and establish itself as a prominent technology provider, contributing to the transformative journey of the mining industry on a global scale IA

Annanya Agarwal is the Co-founder and CEO of Runaya. Annanya leads the sustainability practice where he aims to create technologically advanced and sustainable solutions for the resources and material sciences sector. Annanya understands the need to make collective efforts toward earth with an eye for sustainability and overall societal growth.

Anomaly Detection Platform: **Wipro Pipe Sleuth**

The implementation of Wipro Pipe Sleuth Solution signifies a significant leap forward in pipeline management, says **Rupesh Kumbhare.**



AI-based automated sewer pipe condition assessment solution.

Wipro Pipe Sleuth Solution stands at the forefront of wastewater utility innovation, offering an advanced artificial intelligence-based automated sewer pipe condition assessment solution. Tailored for the wastewater utilities sector, this groundbreaking technology utilises sophisticated image processing and deep neural network algorithms to identify, grade, and score pipe anomalies in accordance with industry standards.

Wipro Pipe Sleuth Solution delivers both efficiency and a comprehensive understanding of sewer pipe conditions

The Solution boasts a wide-ranging capability, automatically generating Pipeline Assessment and Certification Program (PACP) or Water Research Centre (WRC) compliant comprehensive inspection reports while accommodating over 50 anomalies. This comprehensive approach ensures that the assessment is accurate and adheres to established standards, providing water utility companies with a reliable tool for pipeline maintenance.

The solution includes the following features:

- Efficiently process multiple video files simultaneously.
- Allow users to visualise identified anomalies.
- Support diverse video formats for enhanced flexibility and Playback function for processed videos.
- Benefit users from the ability to review individual defects with annotations, facilitating a nuanced and detailed examination of the pipeline's condition.
- Streamline the assessment process by significantly reducing the manual effort and time traditionally required to review and code pipe assessment video scans.

Wipro Pipe Sleuth Solution delivers both efficiency and a comprehensive understanding of sewer pipe conditions, empowering water utility companies to make informed decisions on proactive maintenance and infrastructure management.

Wipro Pipe Sleuth Solution is typically deployed on the Edge Computing Platform. However, the architecture is flexible to accommodate Hybrid deployment scenarios (Edge + Cloud).

Business requirement:

Utility companies conduct annual inspections covering approximately 50,000 feet of water and sewer pipes, a crucial practice in managing sewer pipelines. Periodic assessments are vital to identify potential issues and ensure the overall integrity of the pipeline network. However, the conventional manual review process, often involving the inspection of hundreds of hours of video footage, poses significant challenges. It incurs high costs and is susceptible to errors due to the sheer volume of data.

The adoption of improved technologies for the assessment of pipeline videos is paramount. This advancement enables a more efficient and accurate review process, offering a quicker turnaround time for creating repair work orders. By leveraging AI capabilities in Wipro Pipe Sleuth, utility companies can streamline the analysis of inspection videos, reducing the time and resources required. This enhances the speed at which necessary repairs can be identified and implemented and increases the overall precision of the assessment process. Ultimately, integrating Wipro Pipe Sleuth in video review contributes to optimising pipeline management practices in the utility sector.

Utility companies, in their transition towards digital technologies to deliver business efficiencies and improve the manual review process of the Pipeline Assessment Videos, were error-prone, slow, and labor intensive. Utility Companies use an external contractor to conduct pipeline inspections. A camera-mounted rover is sent inside the pipeline to scan and record the video. An external operator maneuvers the camera and the rover and analyses the video while recording. The operator uses established PACP software to key in their observations and generate television inspection logs and summary reports. The report highlights problems and the location

within the pipeline. These video recordings and PACP reports are submitted to the Utility QA/QC department for review. QA and QC staff/engineers review the video and the reports to create a final pipe quality assessment report. Repair crew work order is prioritised and scheduled based on the results of this pipe quality assessment.

Typically, Utility Companies conduct rover-based video scans yearly covering approximately 50-70 thousand feet of pipe. The scan process generates several hundred hours of video annually that is reviewed manually, a process that is cumbersome, time-consuming, and prone to errors.

Solution

Wipro has successfully developed a cutting-edge solution tailored for underground wastewater pipeline installations using Advanced Image processing and Artificial Intelligence (AI) algorithms. This innovative technology enables the automated processing of videos, identifying and classifying various anomalies, such as cracks, roots, and grease deposits. The implementation of Wipro Pipe Sleuth Solution signifies a significant leap forward in pipeline management, as it harnesses the power of automation to analyse videos offline, freeing the process from the constraints of manual inspection.

One of the key advantages of this solution is its capacity for automatic report generation, providing a comprehensive and detailed overview of the pipeline's condition. This feature expedites the assessment process and ensures accuracy and consistency in anomaly detection. Notably, a premier water utility company in the United States of America has embraced and deployed this solution, attesting to its efficacy and relevance in real-world applications. Adopting Wipro's advanced technology exemplifies a stride toward more efficient and sophisticated approaches to pipeline maintenance, marking a positive evolution in integrating AI in critical infrastructure management.

One of the key advantages of this solution is its capacity for automatic report generation

Profile	Technology	Business need	Wipro solution	Benifits
A premier water utility company in the United States of America	• Image Processing • AI / Deep Learning	Utility companies inspect about 50,000 feet of water/sewer pipes annually. Manual review of hundreds of hours of video results in high cost and also are prone to errors	The solution processes videos to identify and classify anomalies (e.g. cracks, roots, grease deposits etc.) in an underground pipeline installation. Automatic report generation Automation by analyzing videos off-line	Solution works at > 90% accuracy with < 20% false detection. 80% reduction in time to complete the analysis. Liability impact on utility companies mitigated. First roll-out covering 3200 miles of pipes covering 725 sq. miles

How a water utility company in the USA deployed this solution.

Features of the Pipe Sleuth solution.

Business impact

The first roll-out covered 3,200 miles of pipes, covering 725 sq.miles. The liability impact on the company was also mitigated.

• **Reduced review time per video by 80%:** Approx a 10-minute video is analysed within 2 minutes for average health pipeline videos. Users can review the report and submit additional comments/instructions for the Repair Team.

• **Improved accuracy:** This solution extracts the potential frames and identifies the anomalies with >90% accuracy. The solution is trained on a large real-world dataset to improve accuracy.

• **Automation by batch processing:** The Q/A team could select several videos together and start the analysis to run overnight. The engineer can then review the report for accuracy.

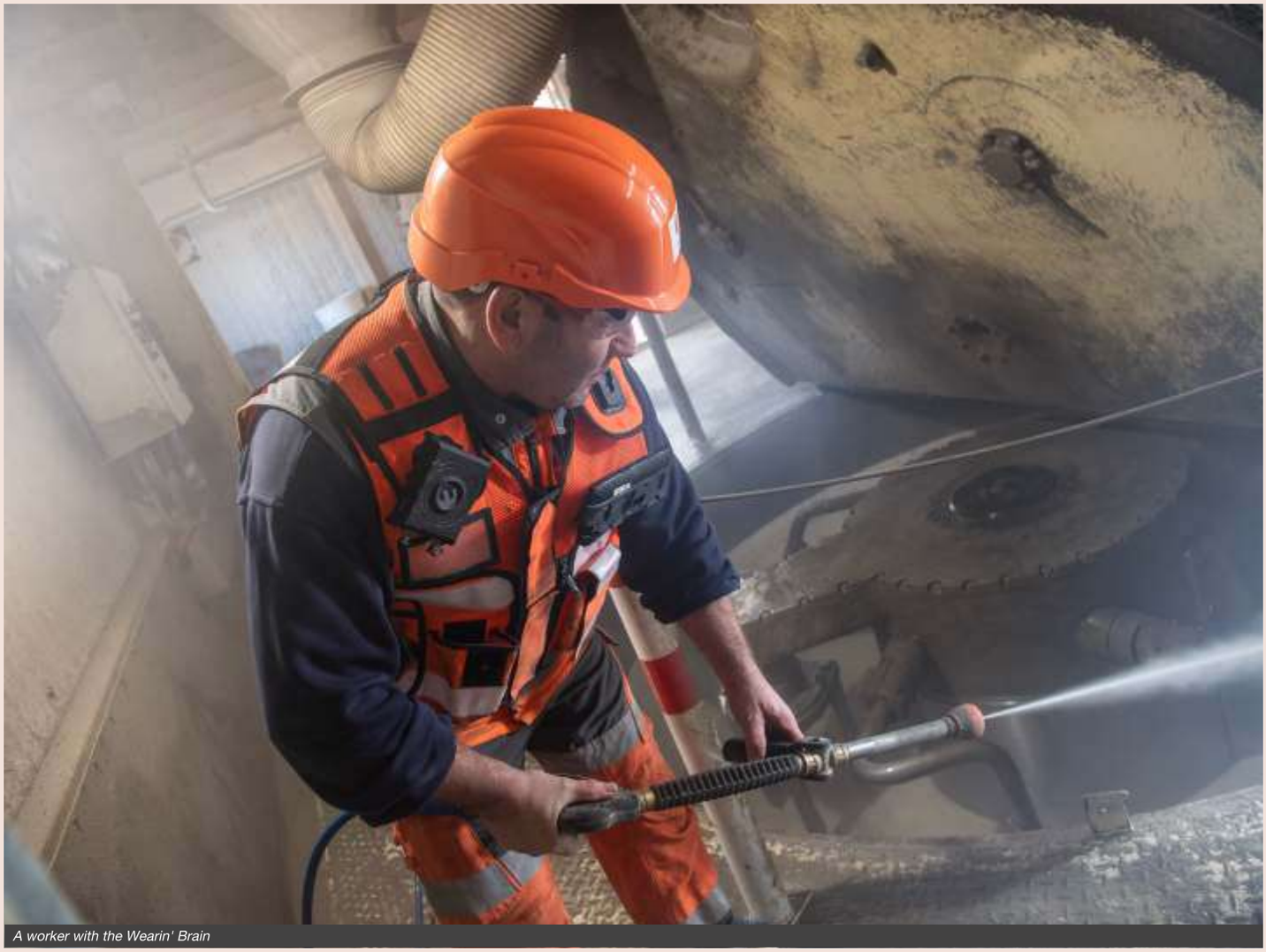
• **Compliance support:** The solution supports 50+ different anomalies that are PACP or WRC compliant.

• **Improved Asset Management:** Utility companies can plan their Expenditure and Operation spend efficiently and with fewer complaints.

***Rupesh Kumbhare,** Practice Head, Wipro Engineering Edge, is an embedded software professional with proven experience in complex embedded project execution and delivery, expertise in voice over IP system software, DSP platforms and architecture. His specialties include: DSP system software, voice over IP firmware, real-time operating system, ability to understand and solve complex technical problems, and DSP algorithm development*

Lone Worker Protection Equipment

How lone workers ensure their safety with the ultra-reliable IoT fall detection and alert solution of Wearin'.



A worker with the Wearin' Brain

Since November 20, concrete producer PRO BETON's lone worker protection equipment has incorporated Wearin's IoT solution, which alerts the control center in the event of an accident and detects falls with unrivalled reliability.

The Conextivity Group's startup Wearin' has developed a solution connecting the lone worker with the control center commissioned by concrete producer PRO BETON to ensure the safety of its teams of machine operators and cleaners working on production sites during the day, night and weekends.

The fall detection sensor designed by Wearin' offers unrivalled reliability on the market

Based on Internet of Things (IoT) technology and powered by AI, the solution comprises two platforms, one physical and the other digital, communicating with each other in real time. A device attached to the worker's vest, called the Wearin' Brain, embeds three safety alert and detection systems: one to alert the control center via the Wearin' SOS button that can be activated manually in the event of an accident; an inertial sensor that can automatically detect a fall (in case the alert cannot be raised manually); and GPS to pinpoint the precise location of the worker. Data and alerts are sent and collected via the Cloud to the Wearin' dashboard integrated into the central monitoring system, allowing the control center to take appropriate emergency and rescue measures according to the alerts they have received.

"The reliability of the solution, in particular its

IoT platform meets the needs of lone workers

advanced automatic fall detection system, makes the difference in securing lone working time and meeting the comfort and safety needs of our employees," explains Éric Guillot, Director of PRO BETON based in Geneva. "As they work alone in a noisy, high-risk environment, it's crucial for them to be able to rely on cutting-edge technology that incorporates all the necessary safety features so that the safety control center can intervene in a timely and appropriate manner in the event of an accident."

As its name suggests, the Wearin' Brain attached to the worker's vest is the brain of the hardware and software systems in Wearin's IoT solution. Alvaro Goncalves, Technical Director at Wearin', explains: "The Brain contains the SOS button, the fall detection sensor, the GPS system, a 10-hour battery enabling it to last an entire shift of PRO BETON employees without additional charging, as well as the LTE module for secure data transmission to the alarm center."

The fall detection sensor designed by Wearin' offers unrivalled reliability on the market, minimising the risk of false positives experienced with other, less advanced competing products. Aurélie Balsa, Embedded Software Manager at Wearin', emphasizes this key differentiator: "The critical problem faced by this type of system is the frequency of false positives and the impact they have on the worker. The detection provided by other products less advanced than ours is sometimes so unreliable that users, annoyed by repeated false alarms, end up disconnecting the system altogether. Wearin's solution comprises hardware, firmware and embedded algorithms. Based on data from our accelerometer and gyroscope, our algorithms reduce false positives to less than 1%, to the great satisfaction of users, who find it all the easier to adhere to this security system."

(L-R) Éric Guillot and Jonathan Brossard

According to the latest market studies, Europe employs 10 million lone workers

Jonathan Brossard, CEO of Conextivity Group, is delighted with this IoT platform which perfectly meets the particular needs of the lone worker market. “The trend we're seeing in this sector is a strong and genuine concern on the part of companies for the health and safety of their employees. These companies no longer want to limit themselves to ticking the boxes on safety checklists provided by regulatory authorities. They demand real solutions to the real-life issues specific to their operations. In this respect, Wearin' provides an end-to-end connectivity solution that is not only ultra-reliable, but also modular and scalable, capable of adapting to the specific security typologies and requirements of each client organisation.”

According to the latest market studies, Europe employs 10 million lone workers

Founded in 2019 by the 3rd generation of the Fischer family of Conextivity Group, Wearin' creates wearable IoT solutions that enhance safety and efficiency by improving situational awareness and enabling better coordination of connected humans such as lone workers, security agents, firefighters and first responders. Its solutions designed in its R&D center in Morges, Switzerland (Vaud) make high-risk work environments safer and smarter with real-time insights from user-generated field data.

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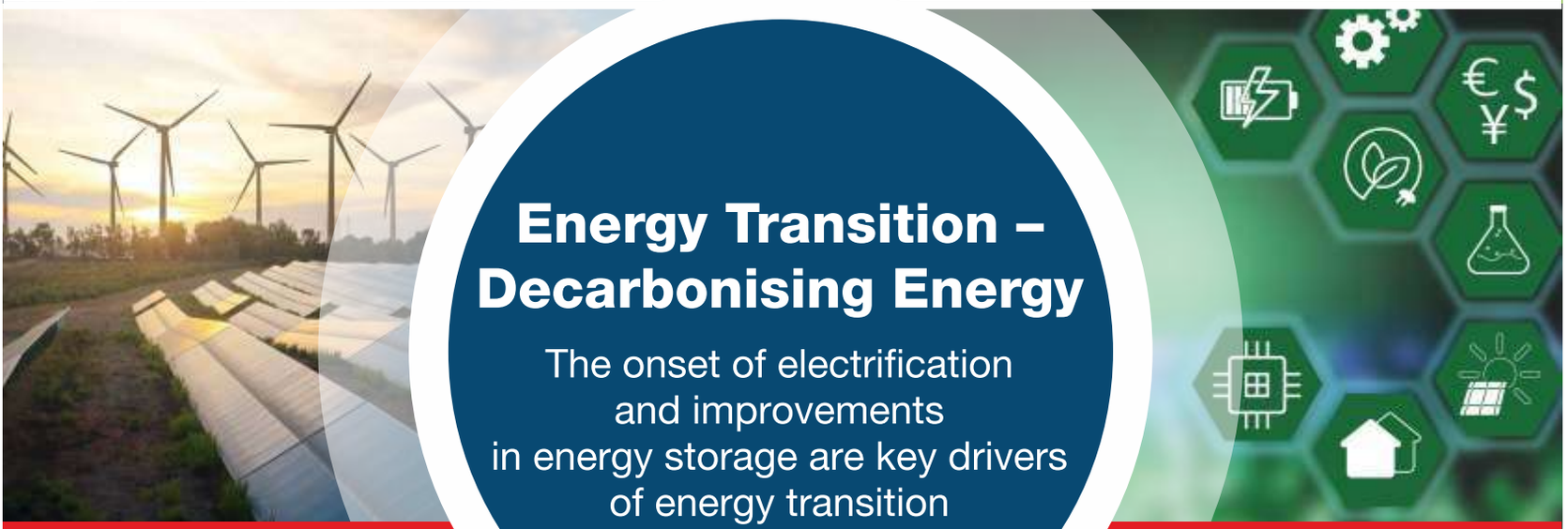

Energy Transition – Decarbonising Energy

The onset of electrification and improvements in energy storage are key drivers of energy transition

Vario-X – The high-performance Controller

Vario-X from Murrelektronik is a modular automation system that brings sensors and actuators into the immediate machine environment on a decentralised basis and offers a flexible, scalable solution for all applications. By developing the Vario-X Controller, Murrelektronik has now created a high-performance and versatile industrial PC that, as a decentralised controller, can either be used at the heart of a machine or incorporated into a higher-level control network. Besides a large number of physical interfaces, it also offers a wide range of communication protocols. Thanks to an IP67 protection class, it can be installed directly on the machine, which paves the way for cutting-edge decentralised installation concepts without a control cabinet.

The Vario-X Controller impresses with its powerful quad-core CPU, which enables it to achieve short cycle times and handle large volumes of data. CODESYS V3 PLC functionality means it can autonomously control machinery and systems, while EtherCAT master functionality facilitates the high-performance connection of field devices such as drives and I/O modules. The Vario-X Controller can be incorporated into higher-level control systems via the PROFINET and EtherNet/IP Device interfaces. Machine modules can thus be autonomously automated using the Vario-X Controller and then communicate with each other at the higher level.

Visualisations can be created in CODESYS V3 and depicted using WebVisu on any kind of local or remote display/control unit, such as HMIs, smartphones, tablets and PCs. Furthermore, independent gigabit Ethernet interfaces ensure a reliable connection to the cloud. Besides being utilised as an EDGE gateway, the Vario-X Controller can also be used as an EDGE controller to handle data preprocessing and communication from sensor to cloud. Meanwhile, integrated predictive maintenance sensors monitor the status of the Vario-X system.

Murrelektronik Pvt Ltd, Bangalore. Tel: +91 80 40936259/41264962.
Email: info@murrelektronik.in

Next Generation Motion Control, TwinCAT Mc3

Motion control has always been an essential component of the TwinCAT automation software by Beckhoff and is successfully used in many projects across all industries. TwinCAT MC3 constitutes the next generation of motion control, characterised in particular by its modular architecture and consistent multi-core and multi-task support.

All the brilliant features of the previous TwinCAT NC2 motion control solutions are also present in this new generation. In addition, TwinCAT MC3 can be operated in parallel with NC2 and MC3 axes can be coupled to existing NC2 axes. This means that new machine components can be implemented with TwinCAT MC3 without having to adapt existing machine components. TwinCAT MC3 brings numerous new advantages for motion control thanks to its new modular architecture. These include multi-core and multi-task support in particular. In addition, there is no fixed restriction on the number of axes.

TwinCAT MC3 can be distributed to several CPU cores which allows movement to be synchronised across all cores. Furthermore, axes can be operated on the same CPU core at different cycle times, depending on their speed and function. The CPU core is thus utilised optimally, since the fastest axis no longer sets the rate for all axes. TwinCAT MC3, the new generation of motion control, provides the advantages that come with modular architecture.

Beckhoff implements open automation systems using proven PC-based control technology. The main areas that the product range covers are industrial PCs, I/O and fieldbus components, drive technology, automation software, control cabinet-free automation, and hardware for machine vision. Product ranges that can be used as separate components or integrated into a complete and mutually compatible control system are available for all sectors. Our New Automation Technology stands for universal and industry-independent control and automation solutions that are used worldwide in a large variety of different applications, ranging from CNC-controlled machine tools to intelligent building control.

Beckhoff Automation Pvt Ltd, Pune. Tel: 020-67064802.
Email: info@beckhoff.co.in

Industrial Computers, BXP/DRP/RKP Series

Data from endpoint devices is exponentially increasing. System builders, integrators, and plant operators have to face the challenge of leveraging this data and computing technology to improve operational efficiency through various system automations and integrations.

Moxa offers a new generation of BXP/DRP/RKP Series industrial computers that focus on rapid system development to support scalable, flexible, reliable, and cost-effective computing solutions. The new x86 industrial computers are built with a pre-formulated configure-to-order architecture and come with a 3-year warranty to easily meet various system development and integration requirements.

The BXP/DRP/RKP Series industrial computers offer more than 75 barebones models as a starting point. You can quickly choose from a list of predefined form factors, processors, and data interfaces. Our configure-to-order (CTO) service offers a variety of operating system, memory, and storage options, making system assembly easier than ever.

System integrators and machine builders can build customised solutions with the necessary computing, connectivity, and communication elements, enabling faster and easy fulfilment of automation scenarios.

Critical connectivity in automation is not just about having a fast connection; it is about making people's lives better and more secure. Moxa's connectivity technology helps to make your ideas real. We develop reliable network solutions that enable devices to connect, communicate, and collaborate with systems, processes, and people.

By aligning the brand promise of 'Reliable Networks' and 'Sincere Service' with professional competence, Moxa brings inspirations to life. Together, this can make things in automation smarter, safer, and more efficient than ever before.

Our experience in connectivity for industrial automation enables us to optimise communication and collaboration between systems, processes, and people. We deliver innovative, efficient, and reliable solutions, so our partners can remain focused on what they do best – growing their business.

Moxa India, Bangalore. Tel: 080-41729088. Email: india@moxa.com

Proline Promass F 300 Coriolis flowmeter

The Endress+Hauser Promass F has a long-standing reputation as a highly accurate sensor. Immune to fluctuating and harsh environments, it is suited for the broadest range of applications. With its compact transmitter, Promass F 300 offers high flexibility in terms of operation and system integration: access from one side, remote display and improved connectivity options. Heartbeat Technology ensures measurement reliability and enables extension of recalibration cycles.

- Measuring principle operates independently of physical fluid properties such as viscosity or density, and
- Highest measurement performance for liquids and gases under varying, demanding process conditions.

Device properties

- Mass flow: measurement error ±0.05 % (PremiumCal)
- Medium temperature: -196 to 350 °C (-320 to 662 °F)
- Nominal diameter: DN 8 to 250 (⅜ to 10")
- Compact dual-compartment housing with up to 3 I/Os
- Backlit display with touch control and WLAN access, and
- Remote display available.

Benefits

- Highest process safety – immune to fluctuating and harsh environments
- Fewer process measuring points – multivariable measurement (flow, density, temperature)
- Space-saving installation – no in-/outlet run needs
- Full access to process and diagnostic information – numerous, freely combinable I/Os and Ethernet
- Reduced complexity and variety – freely configurable I/O functionality, and
- Integrated verification – Heartbeat Technology.

Specs at a glance

Max measurement error
Mass flow (liquid): ±0.10 % (standard), 0.05 % (option)
Volume flow (liquid): ±0.10 %
Mass flow (gas): ±0.25 %
Density (liquid): ±0.0005 g/cm³
Measuring range
0 to 2 200 000 kg/h (0 to 80 840 lb/min)

Endress+Hauser (India) Pvt Ltd.

Email: Poonam.poladia@endress.com, marcomm.in.sc@endress.com

Vertical Lift Module

Manual racks have a long history dating back to ancient times, initially serving basic storage needs. However, as industries evolved, the limitations of manual racks became apparent, leading to the transition to vertical storage systems. This shift was driven by the need for efficient space utilisation in modern warehouses and facilities.

Vertical storage systems offer significant space-saving benefits by maximising vertical space, allowing for higher storage density. Moreover, the integration of advanced software facilitates seamless inventory tracking, reducing the reliance on manual record-keeping. This not only enhances accuracy but also improves overall efficiency.

The move towards vertical storage systems also addresses the challenge of finding skilled workers for traditional manual rack operations. With automated systems, there is less reliance on human interface, reducing the need for specialised skills. This not only streamlines operations but also minimises the risk of errors, fatigue, accidents associated with manual handling, ultimately enhancing productivity and warehouse management efficiency.

Rabatex Industries has revolutionised storage solutions with its cutting-edge product, the Rapid VLM (Vertical Lift Module). This innovative vertical storage system is equipped with an indigenous software solution that enhances inventory management through multilevel tracking features. The system, designed for customisation based on specific inventory needs, boasts an impressive space-saving capability of up to 85%, by 'enhancing storage space vertically'.

The Rapid VLM is a testament to Rabatex Industries' commitment to advanced technology, offering a seamless and long-term storage solution. With its reputed make, this system not only optimises space but also ensures smooth operations. The integration of state-of-the-art technology and customisable features positions Rapid VLM as a versatile and efficient solution for businesses looking to enhance their warehouse management, streamline operations, and maximise storage capacity.

Rabatex Industries, Ahmedabad. Tel: 079-22901367 to 70.
Email: sales@rabatex.com

Electric Stacker

The Pronix fully electric stacker 1.5 tonne 3.5m lifting height PNXFES-1535 is perfect for lifting and moving goods in warehouses, factories, and other industrial environments. With a lift height of 3500 mm, this Electric Stacker can reach objects that are high up, and its 1500 kg capacity means that it can move heavy loads with ease. This stacker can reach high shelves and corners with ease, making it the perfect choice for industrial applications. Pronix Fully Electric Stacker is a durable and reliable electric stacker that is perfect for lifting and moving heavy loads. The electric stacker has a capacity of 1500 kg and a lift height of 3500 mm, making it ideal for moving heavy loads. With a lift height of 3500 mm, this Electric Stacker can reach objects that are high up, and its 1500 kg capacity means that it can move heavy loads with ease.

Technocart Online Services Pvt Ltd, Coimbatore. Email: info@technocart.com

Electromechanical Safety Switches

Schmersal has launched four new electromechanical safety switches with separate actuator: the AZ215/AZ216 and AZ315/AZ316 switches handle safety guard position monitoring of sideways or rotating guard doors. Their stand-out feature is the rotating actuator head made from die-cast zinc, which can be easily rotated in 90° increments before installation. This allows the head to be approached from the side from four different directions, as well as from above. With this versatile approach position and possibility of combination with different actuators, the AZ series offers maximum flexibility in installation, as well as a range of universal usage options to the user. The designer can use the AZ switch both for right-hand and left-hand design on rotating and sliding guard doors. The plastic or metal switch housing is consistent in design and size with the PS 215/216 and PS 315/316 series position switches, giving the AZ switches an equally compact design and easy integration into the surrounding construction.

Schmersal India Pvt Ltd, Pune. Tel: 02138-614700.
Email: info-in@schmersal.com

Door Latch, TM-10-101-24

Southco Asia Ltd, a subsidiary of Southco Inc, a leading global provider of engineered access solutions such as locks, latches, captive fasteners, electronic access solutions and hinges/positioning technology has introduced a new door latch, the TM-10-101-24. This surface-mounted latch actuates with a simple button push and smooth quarter turn that removes or inserts the handle into a keeper beside the panel. This actuation method ensures that the latch does not open accidentally, even under heavy loads or unpredictable environments. Manufactured from 316 grade stainless steel and electropolished to a smooth finish, it also offers superior actuation feel and aesthetics. This intuitive yet secure design combines with beautiful and durable construction to deliver a high-quality look and actuation experience that end users will notice. The TM-10-101-24 Door Latch is ideal for applications like swim doors on boats, where users need a combination of security, ease of use, and aesthetics.

Southco India, Ranjangaon – Pune. Tel: 02138-670558.
Email: info@southco.com

Actuators, CK Range

CK actuators from Rotork are suitable for all valves in non-hazardous locations. These watertight (IP68 8 m for 96 hours, with double-sealing as standard) actuators are especially suited for applications in the water and power markets. The CK product range includes standard multi-turn actuators, the CKQ part-turn option, Atronik option for intermediate modest and robust control, and intelligent Centronik equipped actuators. The entire range has a modular design that provides flexibility and high degrees of choice and configurability, enabling a fast order turnaround and quick delivery. CK actuators are suitable for high temperature and strong vibration environments using separately mounted controls. Continuous mechanical valve position indication is always available, even without power. Rotork is a market-leading global provider of mission-critical flow control and instrumentation solutions for the industrial actuation and flow control markets. These include oil and gas, water and wastewater, power, chemical process and industrial applications.

Rotork Controls (India) Ltd, New Delhi. Email: sales.india@rotork.com

HMI – ecomatDisplay

The new 4.3" ecomatDisplay from ifm boasts of 16 million colours, a high-resolution display with optical bonding and a powerful processor, all packed into a compact, robust housing. The HMI not only offers a brilliant image quality, but also impresses with its brightness and wide viewing angle. This ensures that the machine operator can easily see the displayed contents from almost any position. Programming with CODESYS 3.5 provides the user with all important features such as trend, trace, alarm manager, user manager and web visualisation. The Linux-based operating system also enables customisation, such as individualised visualisation with QT. Like all robust HMIs of the ecomatDisplay family, the 4.3-inch version is perfectly equipped for use in harsh environments. Permanent vibrations, water or dust cannot harm it. Besides, the display features the increased EMC resistance for which ifm is renowned and has E1 type approval, so that nothing prevents its use in road traffic.

ifm electronic India Private Limited, Kolhapur. Tel: 0231-2672770.
Email: info.india@ifm.com

Coaxial Gear Reducers & Gearmotors, E-Series

The E-Series Gearboxes and Gearmotors from Rossi Gearmotors come with universal fixing casing and reinforced output support; possibility to fit big size motors according to IEC standard and square flanges to match servomotors dimensions; and high performances and reliability. Features: discover the strengths of our coaxial gear reducers & gearmotors; universal mounting with lower/upper feet and B5 flange integral to the housing; rigid and precise cast iron monobloc housing; helical toothed gear pairs with ground profile; wide range of sizes; and final stage pinion with 3 bearings for increased torque capacity. Benefits: E is the best ally for your needs; longer life; minimum maintenance requirements; high performance and greater reliability; and strength and reliability for heavy duty applications. Rossi Gearmotors is an Italian company internationally established in the production of gear reducers and gearmotors. From 1953, the company has been a world leader in the manufacture of gear reducers, gearmotors and electric motors.

Rossi Gearmotors (India) Pvt Ltd, Chennai. Tel: +91 8870012171.
Email: info.india@rossi.com

Motherboard Series, NUC Ultra 100 Motherboard Series

ASRock Industrial has released the NUC Ultra 100 Motherboard Series with breakthroughs powered by Intel® Core™ Ultra processors (Meteor Lake-H). It presents a 3D performance hybrid architecture that supports up to 14 cores and 20 threads, complemented by the latest integrated Intel® ARC Graphics and the pioneering Intel® NPU AI engine. The NUC Ultra 100 Motherboard Series are designed in NUC form factor, providing two DDR5-5600 MHz memory up to 96GB, triple storages, 4K quad displays, 2.5G dual LAN, one USB4/Thunderbolt™, and four USB 3.2 Gen 2. This advancement expands into enhanced creativity, efficiency, and collaboration using AI across diverse areas such as entertainment, corporate functions, smart retail, kiosks, digital signage, smart cities, embedded industries, Edge AIoT applications, and more. The NUC Ultra 100 Motherboard Series encompasses NUC-155H and NUC-125H models, powered by Intel® Core™ Ultra 7/5 processors 155H/125H (Meteor Lake-H). The Series features the upgraded dual-channel SO-DIMM DDR5 5600MHz up to 96GB memory.

Space Computech India Private Limited, Kolkata.
Email: contact@spacecomputech.com

Valve Terminal, VTUX

Festo's new valve terminal VTUX combines the advantages of three classic valve terminals. Festo is now making it even easier for its users: the functions of the classic valve terminals CPV, MPA-L/S and VTUG are now available under the umbrella of the convertible valve terminal VTUX. In addition, the AP-I and AP-A communication system creates the ideal platform for digitalised production. The successor to the three valve terminal classics CPV, MPA-L/S and VTUG impresses with its high flow rate and almost limitless modularity. The valve terminal fits almost any machine concept. The valve terminal modules can be arranged as required. AP communication technology makes connections child's play, even over long distances. This communication technology creates the prerequisites for safety designs, predictive maintenance and data exchange with the cloud in the Industrial Internet of Things (IIoT). Plug-in connections can be adapted to the desired hose diameter. This achieves an optimum balance between space saving and supply reliability.

Festo Controls Pvt Ltd, Bangalore. Tel: 01800 425 0036, 01800 121 0036.
Email: sales_in@festo.com, christopher.haug@festo.com

Stainless Steel Housings, Han-INOX

The Han-INOX® connector series featuring stainless steel housings is now completely available in Han® B format. The corresponding bulkhead mounted housings and hoods, with top or side cable entry as well as with protection cover, are available in the sizes Han® 6B to 24B. This positions HARTING as the only manufacturer providing a complete range of connectors in stainless steel housings, ranging from size Han® 3A all the way up toHan® 24B. This enables the realisation of sensor applications or the connection of machines to the power supply – also in harsh corrosive or caustic ambient conditions. The use of Han-INOX® is sustainable: thanks to the durability of the housing material, the connectors are reliable partners withstanding adverse and harsh operating conditions. The installation dimensions of the established Han® B and Han® 3A sizes facilitates upgrading installations to the most robust industrial connectors. Han-INOX® is predestined for applications in the food and beverage industry.

HARTING Technology Group. Tel: 044-43560417. Email: Email: in@harting.com

WDS Components extends castor wheel range with new sizes and designs

The Leeds manufacturer and supplier of standard parts and components, WDS Components, has extended its range of castor wheels. Ideal for OEMs or end-users, the broad wheel range covers a variety of designs, materials, and sizes, for an array of industrial and commercial applications. With sizes now including a compact 50mm diameter, through to a 200mm wheel, castors also include brake and adjustable levelling options. WDS' broad range of castor wheel unit designs are based around various styles of metal frame. This includes a rectangular plate fitting, available in either a swivel wheel or fixed wheel configuration. Bolt hole frames are also available, fixed with a single bolt. This design is ideal to attach the castor unit to a tube insert, or for applications with limited space. Meanwhile, stud fitting castor wheels feature a threaded stud attached to the top of the frame, enabling fast and simple installation, secured with a nut.

WDS Components, UK. Tel: +44 (0)333 043 5443.
Email: sales@wdscomponents.com

Filtration and Pressure Control for Air and Water

Bürkert has launched a water and gas intake control unit that provides filtration and pressure control of the intake media. The new Type 5110 Media Supply Unit is ideally suited for dental care machines, and the compact unit also provides advantages for wider applications that require water and air intake with filtration as well as onward pressure and flow control. Bürkert's new control unit achieves globally recognised compliance, and the modular system enables fast and simple design integration. The Type 5110 can also be scaled up by integrating multiple units for larger-scale applications. The new Type 5110 unit has been designed for applications that depend on the stable supply of filtered air or water, or both media combined. Bürkert's device controls the intake of the media and applies precise outlet pressure and flow control for the corresponding module in the host machine.

Burkert Contromatic Pvt Ltd, Chennai. Tel: 044-66255800.
Email: sales.in@burkert.com

Point Level Switch, PI240

With point level switch PL240, sensor expert Baumer is adding another product for efficient fluid monitoring to its broad portfolio. Non-contact point level detection, even if films or residues adhere inside the tank: Thanks to its innovative, intelligent measuring principle, the new PL240 capacitive sensor from Baumer reliably detects fill levels even under challenging conditions. Capacitive sensors are used to detect fill levels of liquids and other media. Thanks to their technology benefits, these sensors are capable of detecting fill levels even through plastic or glass walls without direct media contact. This provides many advantages, particularly when it comes to aggressive liquids, food or lab fluids in closed containers or where direct contact with foreign particles should be avoided. However, if microfilms or residues adhere to the inside tank walls as the fill level drops, conventional capacitive sensors come to their limits: they cannot reliably recognise whether it is still the medium or just a residue film, and consequently the machine is endangered of running dry.

Baumer Management Services AG, Switzerland.
Email: pjawarkar@baumer.com

Brushless DC Flat Motor

Portescap has introduced the 60ECF brushless DC slotted flat motor, the newest frame size to join its flat motor portfolio and a significant expansion of its brushless flat technology capabilities. This 60mm BLDC motor features a 38.2mm body length and an outer rotor slotted configuration with an open body design, allowing it to deliver improved heat management in a compact package. The 60ECF provides up to 298 mNm torque and can be combined with Portescap's R22HT, R26HT, R32, R32HT, and R40 gearheads to deliver extremely high output torque and speed reduction. It is available in both sensored and sensorless options, with the former utilizing hall sensors for easy position control. This slotted flat motor is a perfect fit for applications requiring high power density and smooth output torque, including those in Aerospace & Defense, Robotics, Industrial Automation, and Surgical Robotics. Specific examples include electric grippers and exoskeletons, eVtols, and surgical robots.

Portescap India, Mumbai. Email: portescap.sales.india@regalrexnord.com

Position Transmitter

Emerson has introduced the Fisher™ FIELDVUE™ 4400 position transmitter for use in critical isolation valve applications, including chemical reactor feed shutdown, pressure swing absorption, mineral pressure oxidation isolation, steam generator shutdown, and others. Isolation valves are typically outfitted with open and closed limit switches that provide valve position feedback. Unfortunately, the on/off nature of the switches severely limits the ability to diagnose valve performance, so a degrading valve will go unnoticed until it fails outright. Such a failure can have serious process implications, and it can pose safety risks as well. HART™-enabled FIELDVUE 4400 valve position transmitters offer a cost-effective solution to address this and other issues. The transmitter is very easy to calibrate, and it incorporates a proven, linkage-less design. As compared to limit switches, it provides much higher reliability, along with valve diagnostics and Safety Integrity Level (SIL) 2 capabilities—the latter often required in critical isolation valve applications.

Emerson Process Management (India) Pvt Ltd. Tel: 91 22 6662-0566.
Email: infocentral@emersonprocess.com

OTA Test System

The R&S TS8991 over-the-air (OTA) test system from Rohde & Schwarz is the first to be approved by CTIA Certification for testing 5G A-GNSS antenna performance. This solution measures the performance of the global navigation satellite system (GNSS) receiver in a wireless device. This is critical because Assisted-GNSS is used for E911 emergency calls over 5G. The R&S TS8991 from Rohde & Schwarz has been approved by CTIA Certification for testing 5G A-GNSS antenna performance. This marks a significant milestone that establishes the R&S TS8991 as the first 5G FR1 A-GNSS OTA test solution to be approved by CTIA Certification. The latest Test Plan for Wireless Device Over-the-Air (OTA) Performance Version 4.0.x from CTIA Certification added 5G FR1 EN-DC to the existing A-GPS L1 OTA specification. The previously published Version 6.0.x added 5G FR1 SA, A-GPS L5 and A-Galileo E1, which are soon to start the CTIA Certification validation process.

Rohde & Schwarz India, Bangalore. Tel: 080-41780400.
Email: services.rsindia@rohde-schwarz.com

Inclination Sensor

Pepperl+Fuchs IMU F99 Inclination Sensor provides stable inclination values for mobile use on construction machinery or robots. An integrated gyroscope compensates for accelerations, enabling precise inclination measurement. This makes the IMU F99 sensor a significantly better choice than conventional static inclination sensors. Inclination sensors are capable of delivering extremely precise values in stationary conditions, but their measurements can be distorted by acceleration effects. However, in applications such as excavators, wheel loader buckets, and the booms of agricultural machines, inclination values are often required during movement. Conventional static inclination sensors are based on the measurement of gravitational force, but they also react to any other forces. As the acceleration changes, so does the inclination value. In vehicles and mobile devices, this means that accelerating, braking, centrifugal forces in bends, and any vibrations while driving can distort the measured value. These influences must be compensated for to achieve dynamic inclination measurement.

Pepperl+Fuchs Factory Automation Pvt Ltd, Gurugram.
Tel: 0124-3894000. Email: fa-info@in.pepperl-fuchs.com

Thermal Imager, Testo 883

The Testo 883 thermal imager for single-hand operation is built for building energy assessment, electrical and mechanical thermography and maintenance audits. It has 320 x 240 pixel screen resolution plus useful features for image management and documentation. IR camera kit options include two interchangeable lenses and include spare battery and charging station; and PC software with available mobile apps for Android and iOS (iPad). Highlights include: thermal sensitivity – <0.04°C; free analytical software for PC for creating professional reports; measurement site recognition and automatic image management; and app for analysis and creating on-site measurement reports. Features: interchangeable lenses; rugged case; Testo IRSoft Professional software (free download); USB-C cable; AC power adapter (USB); Li-ion rechargeable battery; spare rechargeable battery; battery-charging station with USB cable; carrying strap for the thermal imager; Bluetooth® headset (depending on the country); and certificate of conformity. Testo AG is a world leader in the design, development and manufacturing of portable test and measuring instruments.

Testo India Pvt Ltd, Pune. Tel: 020-25920000. Email: info@testo.in

Cameras, Anti-Corrosion

Hikvision has released a range of next-generation anti-corrosion cameras. These have highly durable, lightweight polymer housings, allowing them to withstand the harshest industrial and marine environments. As well as offering durability and resilience to chemicals, salt and other corrosive materials, the new cameras offer great image quality, even in low-light conditions. With intelligent features for distinguishing between people, vehicles and other moving objects, the cameras also help to minimise security false alarms. The polymer housings of the new Hikvision corrosion-resistant security cameras eliminate the need for heavy and expensive metals like stainless steel or coated aluminum. The results are lighter, more robust cameras that are fully corrosion resistant and C5-M & NEMA 4X certified. The durability of every component is assured, from the camera mounts to cabling. From the bullet camera to the PTZ, Hikvision's polymer anti-corrosion range offers unrivaled image clarity. Hikvision's ColorVu and DarkFighter technologies ensure clear, full-colour imaging, even in low-light settings.

Prama Hikvision India Pvt Ltd, Mumbai. Tel: 022-68229999.
Email: sales@pramahikvision.com

Circular Connector Inserts & Housings

LAPP continues to expand its EPIC® POWER series, presenting four new M23 circular connector inserts and three new M23 housings at the SPS trade fair 2023. M23 power connectors can withstand high voltages and currents that are required for servo drives. The integrated EMC cable gland prevents electromagnetic interference. The EPIC® POWER M23 D6 connector housing is available individually or with the appropriate insert. It is particularly high power (up to 26 A) despite an extremely space-saving design and thus ideal for very small devices. The metal housing is made of stable zinc die-casting. The housing can be used with inserts for either sockets or male contacts. Typical areas of application are electric motors and servo drives, which are used in environments where electromagnetic compatibility (EMC) is required. Thanks to the TWIST mechanism, locking with the counterpart is even quicker – locking occurs after a quarter rotation.

LAPP India Pvt Ltd, Bengaluru. Tel: 080-47405000.
Email: info@lappindia.com

Modular Controls for IIoT Applications

The new Weidmüller Modular Control Systems u-control M3000 and M4000 point the way to the future because they are control and edge system in one. This saves space and enables efficient data pre-processing and precise control directly on the machine. With the u-control M series, different runtime systems can be installed on different computer cores. This makes them significantly more powerful than pure PLC controls. They can provide local information in the network and can be expanded by connecting u-remote function modules. In addition, sophisticated automation solutions and IIoT applications can also be perfectly integrated. All of this makes u-control M3000 and M4000 future-proof systems for all automation and IIoT tasks. Thanks to their special properties, u-control M3000 and M4000 are the perfect connecting elements from the process to the company level. Their high performance combined with the 2-core processor technology makes them very flexible to use under Linux.

Weidmueller Electronics India Pvt Ltd, Bangalore. Tel: 080-41154202.
Email: wmi@weidmueller.in

Servo Drives MDD 2000

The Sigmatek DIAS-Drive 2000 series combines high power density and flexibility for servo motor control in a highly compact design. Now even more safety functions are integrated in the MDD 2000 servo drives. In addition to the most important Safe Torque Off (STO), Safe Stop 1 (SS1), Safe Operating Stop (SOS), Safe Brake Control (SBC) and Safely Limited Speed (SLS) functions already included, further safety functions are now available: safe speed, acceleration, position and rotating direction functions – all SIL 3, PL e, Cat. 4 and TÜV-certified. For precisely fitting drive solutions, the flexible servo system can be operated single-phase or three-phase with 230-480 VAC. In addition to one to three axes, supply, line filter, braking resistor and DC link are also on board – and all this on only 75x240x219 mm in size 1. Thus, the highest power density is achieved.The modules can be used standalone or in combination.

SIGMATEK GmbH & Co KG, Austria. Email: office@sigmatek.at

Cameras, Genie Nano-10GigE

Teledyne DALSA, a Teledyne Technologies company, has announced the new Genie™ Nano-10GigE M8200 and C8200 cameras, based on Teledyne e2v's 67M monochrome and color sensors, have now entered full production. The new Genie Nano-10GigE 67M cameras are the smallest 10GigE Vision models in the industry achieving full resolution image transfer at up to 14 fps. Both offer wider operating temperature ranges, PTP synchronisation, and commonality of sizes with other Genie Nano cameras, enabling ease of integration or upgrades across a wide variety of imaging applications. Coupling a compact 59 mm x 59 mm form factor, system designers can transition from 1, 2.5, 5GigE to 10GigE Vision without the need for software changes. Genie Nano-10GigE cameras are engineered to deliver high-speed, and dependable results for applications such as electronics manufacturing inspection, industrial metrology, intelligent traffic systems, aerial imaging, and sports and entertainment. A free runtime version of Teledyne Sapera™ Processing software is included.

FLIR Systems India Pvt Ltd. Tel: 011-45603555. Email: flirindia@flir.com.hk

EDITORIAL CALENDAR 2024

JANUARY — Close Date 20/12/2024

Factory Automation & Digitalisation
Hardware & Software; Robotics; Sensors, Controllers, PLCs/SCADA; Data Storage & Analytics, Cloud, etc/-

FEBRUARY — Close Date 20/01/2024

Energy Transition
The global energy sector's shift from fossil fuels to renewable energy sources like wind and solar, etc

MARCH — Close Date 20/02/2024

The Digitalisation of Process Industries
Special Feature: Women in Technology – A Special Annual...

APRIL — Close Date 20/03/2024

Robots & Cobots in Manufacturing
Robots, Cobots, Mobile Robotics – AMRs & AGVs, Machine Vision, etc

MAY — Close Date 20/04/2024

Material Handling & Warehousing
Automated storage and retrieval systems (AS/RS); AGVs; Cranes Conveyors, Carousels, Vertical lift...

JUNE — Close Date 20/05/2024

The Future of Oil & Gas – Green Energy
Green & Blue Hydrogen, Green Ammonia, Synthetic Fuels

JULY — Close Date 20/06/2024

Test & Measuring Instruments
The instruments used to test various parameters – electrical, electronic, signals, mechanical...

AUGUST — Close Date 20/07/2024

Digitalisation of Food & Beverage Industry
Sensors, HVAC, Cold Chain, Factory Automation, Material handling, etc

SEPTEMBER — Close Date 20/08/2024

Technology Transformation of Process Automation
The quest for increasing efficiency of existing processes and drive...

OCTOBER — Close Date 20/09/2024

Motion Control in Industry
Motors & Drives; Position Controls; Actuators & Mechanical Systems; Sensors and Feedback Devices

NOVEMBER — Close Date 20/10/2024

Intralogistics & Packaging Automation
Packaging solutions for Case Packing, End of Line Packaging ...

DECEMBER — Close Date 20/11/2024

The Carbon Conundrum –
How Oil & Gas Companies Can Help

READER PROFILE

PEOPLE WHO ARE

Presidents, Vice Presidents, Maintenance Managers, Manufacturers, Project Managers, Maintenance Engineers, Operation Personnel, Cloud Computing Specialists, Traders, Chief Engineers, R&D Manager, Maintenance Personnel, Managing Directors, Plant Managers, Business Managers, Technical Directors, Operations Managers, System Integrators, OEM's, Design Engineers, Marketing Managers, Software Engineers

DEPARTMENTS / INSTITUTES

R&D Lab, Electricity Boards, Defence, Space, Power Plants, Testing Centers, Railways, Solar Energy, Atomic Energy, BARC, Engineering Colleges, Technical Universities, Automation Institutes, Industry Forums, Associations, Advisory Group, Events, Private Technical Institutes, Industry Training Centers, Startup Zones, Launchpads

INDUSTRY SECTORS

Manufacturing, Logistics & Warehousing, Instrumentation, RPA, IIOT, Healthcare, Robotics, Renewable Energy, Adhesives & Additive, Defence, Instrumentation, Automotive, Sensors, Research Labs, Datacenter, Maintenance & Monitoring, 3D printing, Cyber Security, Network & Communications, Factory Automation

Event Focus 2024

January	February	March	April	May	June

July	August	September	October	November	December
	• Automation Expo 2024 21st to 24th AUGUST HALL NO. 1 & 2, BEC, Goregaon, Mumbai				

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