The automation industry has its sub-genres one might say, and these range from fixed automation to flexible automation to programmable automation. You could flip a coin and debate on either side about automation and end up with a burning sense of wonder because they ease the burden placed upon manual labor yet at the same time, would being 100% consistent kill the soul of the product? That unfortunately is not the topic at hand today and so let's have a word about fixed automation now.

TECH ZONE

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THE LEGS OF
AUTOMATION

BY HARSHITH NARAYANA DOGGA
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If you've ever seen those memes about robots stealing humans' jobs, you'd better be ready to wipe that goofy grin off your face because reality truly is stranger than fiction. Let me at least try to explain myself before you ignore this wall of seemingly boring text shall I? Industrial automation! That's the name of the game our species have seemingly been swirling about on, from terms like plc to misleading machinery like raspberry pi.

The automation industry has its sub-genres one might say, and these range from fixed automation to flexible automation to programmable automation. You could flip a coin and debate on either side about automation and end up with a burning sense of wonder because they ease the burden placed upon manual labor yet at the same time, would being 100% consistent kill the soul of the product? That unfortunately is not the topic at hand today and so let's have a word about fixed automation now.

Fixed automation, also known as hard automation, is the representation of what people generally imagine a factory to look like, a cacophony of gears, wires and cams that go Mach 3 on production and give returns swiftly doing justice to their high initial cost and time required. Unfortunately, hard automation isn't designed for changes or adaptability so a change in the product or the process requires time and money. This issue however isn't as prevalent in programmable automation.

Programmable automation is an awe-trancing concept because coming to terms with the fact that we've programmed machines that can take inputs and use plc also known as programmable logic controllers to decide on the optimal output does slowly pave the concepts of a machine-driven future eh? A plc put simply is an industrial computer that'll run whatever processes it is programmed for, like automatic sorting systems using image processing which is basically like using Redstone hoppers to sort your chests in Minecraft but on a grander scale. Plc's are also used for dam shutter control systems and smart elevator control systems which give off cyberpunk vibes if you ask me.

Last yet equally intriguing is flexible automation, an extension of programmable automation that tackles the time-related constraints of programmable automation, because reprogramming a massive computer every time a change has to be made will put strain and a clock of capitalist loss Ticking on the programmer's head, so flexible automation devices have multiple processes that they can be set to, almost like the buttons on a hairdryer. An example for this would be a robot arm that can drill holes, mesh wires and weld.

In conclusion, I believe the industry of automation is one akin to Pandora's box, filled to the brim with opportunities and outcomes and the genius behind their inner workings entrances me. Dropping down this rabbit hole would be one entertaining effort.

THE FUTURE OF
INDUSTRIAL AUTOMATION

BY RAJA MUNEESH KANTH
[BTECH_2025 CSE]

As a result of limited production quantities and a wide variety of applications, industrial automation uses new technologies produced in other industries. Automation firms are famous for customizing products to meet unique specifications and applications. In this way, tailored applications drive innovation, not hot, new technologies. Since the 1950s, industrial automation has seen new growth spurts due to some advances: Dick Morley and others created the programmable logic controller (PLC) to replace relay logic, which has gained popularity in applications that are difficult to construct and modify custom logic. I have found the PLC far more reliable than relay contacts, and I have also found it simpler to program and reprogram. Changing models of automobiles required frequent reprogramming of autotest installations. After nearly three decades of success, the PLC has become a commodity, which is understandable given its long and fruitful existence.

The PLC was followed shortly thereafter by computers for controlling systems, the second wave of innovation. Honeywell pioneered distributed control systems (DCS) with the TDC 2000, which replaced big central mainframes in control rooms. They were not truly "distributed", though, due to the fact they were still enormous chunks of computer equipment and cabinets filled with I/O connections.

Low-cost PCs and low-cost software made DCS functions more affordable and simplified, making DCS functionality cheaper and easier to use. These are not fundamentally new innovations; they are inventive extensions of technology developed for other large markets and then modified and adapted for use with industrial automation.

It is no longer useful to use automation software. The trend hasn't changed. It is unlikely that new independent innovations will arise in the future as the software will be embedded in products and systems. It is possible to achieve considerable results using the variety of manufacturing software solutions and services, but only when used with other system developers. In general, innovation and technology will be able to re-establish growth in the automa-

tion industry. But, there won't be any technological innovations that will generate the next Cisco or Apple, or Microsoft.

NEW TECHNOLOGY DIRECTIONS

Innovators are recognizing new technology inflection points like nano-technology and nanoscale assembly systems; MEMS and nanotech sensors (tiny, low-power, low-cost sensors) that can measure anything; and the ubiquitous Internet, machine-to-machine (M2M) networking, and industrial internet. Automation can and will generate explosive growth.

Multiprocessing and complex adaptive systems will replace real-time systems. Wireless everything, wireless sensors, and distributed peer-to-peer networks will become universal. Wireless sensors and distributed

Peer-to-peer networks will become tiny operating systems in wireless sensor nodes. In the future, it will be major new software applications to connect nodes together as an adaptive system of advanced sophistication. That's what's going to happen.

THE FULLY AUTOMATED FACTORY

Automation factories and processes must be extremely adaptable and versatile since it is too expensive to rebuild them when they are modified or altered. They need direct access to many of the control elements - switches, valves, motors, and drives - for proper maintenance. And reconfigure a whole manufacturing line or process down to a fine degree of detail.

Using computerized transactions, customers place orders online, and robots and sophisticated equipment produce a variety of customized products on-demand based on batch

quantity (sometimes as low as one), price, size, and color.

Remote-controlled automation's promise is finally being realized in Production and maintenance applications.

The classic machine-based vision of automation -- strong,

Self-sufficient Super-robots without human control -- undervalued the role of communication. In production and maintenance, Remote-controlled automation is finally realizing its potential.

The decades-old machine-based vision of automation — Strong super-robots With no one to look after them, they Undervalued the role of communication. But, in today's world,

it's all about networked intelligence, which is well-developed and freely available.

Several sensors, high-performance networks, and diagnostic software have been developed to automate processes, all with high levels of reliability and widespread access to hierarchical diagnosis and treatment. Error-correction

Industrial Automation
AI, Automation and Control
The Future Starts Here...

recommendations through centralized operations.
The automation software is no longer useful and will not be used in the future. The software will be embedded into products and systems, with no cliffhanger to be found. The plethora of manufacturing software solutions

INDUSTRIAL
AUTOMATION

BY APOORVA NIMMAGADDA
B.TECH DS & AI

WHAT IS INDUSTRIAL AUTOMATION ?

One can say that the utilization of control devices like PLCs,Pacs/Pc,like robots or computers and such information technologies for handling various processes and machinery in an industry to switch somebody's being . Simply ,we can say it's the technology by which a process is performed with minimum human efforts

INDUSTRIAL AUTOMATION TOOLS

-Programmable Logic Controller (PLC)
A PLC is basically a digital industrial computer system that's pre-programmed to hold out automatic operations in industrial processes.It continuously monitors and receives information from input devices or sensors and processes the knowledge to trigger the connected output devices so as to complete the task within the process or machinery.

-Supervisory Control and Data Acquisition (SCADA)
SCADA systems control and monitor industrial processes. The system acquires and then processes the real-time data through direct interaction with devices, like sensors, and records events into a log file. It's utterly important for data analysis and enables effective
decision-making for optimization in industrial processes.

-Human Machine Interface (HMI)

An HMI could be a software application that helps interact and communicate between a person's operator and also the machine, or production system. It interprets complex data into accessible information, enabling better control of the assembly process and its various applications.

-Artificial Neural Network (ANN)

An ANN may be a computer system which is constructed just like the human brain, a network of interconnected neuron nodes. It simulates the way a person's brain analyses and processes information.

-Distributed system (DCS)

A DCS may be a central monitoring network that connects devices to regulate various elements within an automatic system.

-Robotics

Robots can efficiently perform tasks in complex and dangerous situations, improve production flow and quality, and increase safety for workers.On top like we all know, robots can make lifestyle way more comfortable or convenient.

WHO USES INDUSTRIAL AUTOMATION?

Because the name suggests, industrial automation is sometimes adopted by differing types of industries like pharmaceuticals, construction, computers, and more. herefore, industrial automation products effectively lower expenses , labor costs, increase productivity, and enhance product consistency

WHAT'S THE FUTURE FOR AUTOMATION IN 2021?

As 2021 begins ,technology is poised to play a fair bigger role in industrial operations.From assembly automation to robotic trends ,the industrial automation market is anticipated to grow to a $12.7 billion industry by 2023 .manufacturing automation is changing the landscape for

large-scale enterprises.and service level manufacturers.manufacturers adopting automation are seeing lower production costs,-less waste ,scrap and more efficient operations

Top automation trends emerging within the year ahead. FOCUS ON AGILE MANUFACTURING :
One thing we definitely understood during the pandemic is that the dire need to adapt quickly to changing requirements.flexible production on the workplace requires end-to-end management of the assembly pathway.Robotics,industrial automation and business process automation are visiting be highly essential tools to remain agile and competitive.

THE INTERNET OF THINGS (IOT).

Technically ,it's a network of interrelated computing devices and digital machines.It isn't a replacement concept but presently it's of more common.The potential to bring disparate pieces of apparatus together for control and monitoring enhances operations and efficiency.sensors and IoT controls have become standard practice in internal control to manage complex builds,such as additive manufacturing and in other industrial operations.

From integrated drives to innovative PLM software, The industry is on the edge of the fourth historic period. Automation is being followed by the digitalization of production. The final word

goal is to level up a rise of productivity, efficiency, speed, and quality, leading to higher competitiveness for companies thanks to the longer term of industry.

To conclude, Automation historically was viewed as far too futuristic by manufacturers and might I add , as a threat to human capital by the workforce. However, one must quite agree that it alleviates the error related to masses.Further more ,Adding automated data collection can allow one to gather key production information, improve data accuracy, and reduce your data collection costs. Which provides them with the facts to create the proper decisions when it involves reducing waste and high improvement .All in all, advancement in industrial automation is kind of a cherry on top for the industries in relevance safety issues ,as it makes the assembly line safe for workers by deploying robots to handle hazardous conditions.

INDUSTRIES have advanced a long way since the days when punching machines were deemed cutting-edge technology to today's computerized bar code scanners. The majority of technology at the time was mechanical equipment that required regular human attention and was notoriously unreliable at best. However, comprehensive automation in infrastructure technologies is already the norm. This progress has resulted in increased efficiency and cost savings for businesses that use these technologies. Artificial intelligence plays a critical role in the more automated workplace of the future.

Despite the fact that many firms recruit hundreds of production workers for up to three shifts to run the production for the utmost length of time, the facility must still be closed for renovation and vacations. Industrial automation helps the corporation achieve its goal by allowing it to operate a manufacturing facility 24 hours a day, seven days a week, and 365 days a year. This results in a huge increase in the firm's profitability. Furthermore, automation reduces the mistake associated with a human being. And, unlike humans, robots do not experience exhaustion, resulting in items of uniform quality generated at different times.

INDUSTRY AUTOMATION

BY MAATRIKA P B.TECH (AI & DS)

By using automated data collection, you may collect critical technical documentation, enhance data accuracy, and lower data collection expenses. This gives you the information you need to make sound decisions about eliminating waste and enhancing your operations. Moreover, introducing a new task to a production line necessitates training with a human operator; however, robots may be configured to perform any operation. This increases the manufacturing process's flexibility.

Workers are typically opposed to any type of automation program. Workers are concerned that the adoption of automation would result in job losses. The immediate impact of automation is a decrease in the demand for operational and clerical workers. Simultaneously, a greater number of managers are required to run the automatic plants. Automation also produces jobs, first by requiring technicians to develop, service, and support the new equipment, and then by introducing new crafts that require technically talented and well-trained workers. Automation has a significant influence on the country's economic growth level. However, implementing automation is difficult since it necessitates the investment of adequate capital as well as the expenditure of working capital for equipment upkeep.

That being stated, before deciding to deploy automation in factories, we must consider the influence on the firm's profitability, utilization of the existing workforce, and contribution to societal well-being. Workers' resistance should also be given due consideration. Therefore, automation should be introduced only when absolutely essential. Computers or electronic data processing devices should not be added only to appear trendy.

PROGRAMMING
IS EVERYTHING
BY VIGNESH
B.TECH CSE

The use of control systems, such as computers or robots, as well as information technology to control various processes and equipment in the industry to replace human beings is known as industrial automation. It is the second largest step in the field of industrialization.

Systematic automation allows machine configuration and sequence of operations that can change based on signals sent from electronic controls. With a systematic automatic system, products can be produced in batches by mechanical processing and sequencing. The products created in this process are usually bulk collections, and these collections can be as small as just a few products and can be up to thousands of units produced at a time. The automated production line process cannot continue while redesign and switching processes occur. After these changes, the production of

collection is running. Since these factory automation processes can be changed frequently, automated switching systems usually cost less than fixed system automation to operate over time. However, production costs are lower in structural automation than in automated automation due to the flexible design of the equipment, instead of being designed to work more efficiently in product selection. Organic switching systems are best used in settings with medium to high production level requirements as well as a variety of low-end products.

Loss of jobs. Since, most of the work is done mechanically, the need for manual labour is very small. All the jobs you want cannot be done using current technology. For example, products with unusual shapes and sizes are better left to assemble by hand. Higher level of maintenance is required. It is possible for automation to be used in a particular process namely high volume production, duplicate and durable products. The initial cost of using the automation system is very high. A team of skilled workers is always a necessity in caring and working. The work done by human operators involving tedious physical activity can be easily modified. Human operators can avoid operating in hazardous production facilities with extreme temperatures, pollution, alcohol or radioactive material. Tough tasks on a normal human operator can be easily performed. These activities include lifting heavy and heavy loads, working with very small items, and so on. Production is always fast and the cost of the product is very low (compared to the same handmade product). Several quality control tests can be combined with the production process to provide consistency and uniformity. The economy of the industry can be greatly improved, which has a direct impact on the quality of life.

THE ADVANTAGES AND PROSPECTS OF INDUSTRIAL AUTOMATION

BY SABAHAT SHAIK
B.TECH CSE

The use of intelligent machines and programmable logic to automate various industrial processes and reduce human intervention is referred to as industrial automation. Automation increases output efficiency and quality while maintaining consistency across industries' micro and macro-level processes. Because of the changing demands of end-users, it has become critical for businesses to maximize their productivity through automation.

By utilizing the potential of advanced industrial automation technologies, manufacturing companies can achieve a swift increase in output. To enhance output levels, manufacturers can hire a large workforce and have them work long hours. Nonetheless, the production plant must be closed for maintenance and repairs, as well as on vacations. This diminishes the likelihood of having a 100% production uptime. Industrial IoT automation enables close to 100% uptime around the clock, resulting in a huge improvement in output levels. Predictive maintenance based on IIoT further equips businesses to deal with outages and reduce operational downtime. As a result, industrial automation is extremely beneficial and economical in situations where a high level of accuracy is required, the task is physically demanding, or it takes place in hazardous areas. Using robots is indeed less expensive than using human labor. The only other expenditures spent are

for energy, maintenance, and repairs, in addition to the initial cost of establishing the industrial automation system. When compared to the annual salaries that must be paid for manual labor, this results in significant savings and ROI. Industrial automation allows for more output with fewer people. In some situations, employers must give substantial financial compensation in the event of work-related accidents or dangers. Industrial automation systems make the production line a safe place to work. All dangerous labor is easily handled by robots. A large range of new electronic systems and products will be manufactured and developed as a result of industrial automation. The market is seeing an increase in demand for customized and customized items. Increasing industrial automation on the assembly line through the use of sensors and customizable robots aids in the bulk production of things made to individual client requests and requirements.

Industrial automation has become a popular process in manufacturing companies, but with advancements in AI and remote communication, this practice is expected to skyrocket in the coming years. It is currently feasible to run an entire factory with only a couple of people, with the rest of the work performed by auto-

mated machines and robots. However, even the most finely tuned machine requires human intervention and correction to detect and prevent manufacturing failures. For an industrial automation system, several calculations and processes that human minds find complex can occur in real-time. While many people believe this means people will be replaced, it is hoped that it simply means they will be promoted to new and more critical roles.

TOTALLY
INTEGRATED
AUTOMATION

BY SWATHI KIRAN. P
B. TECH CSE

Automation describes a huge variety modern-day technology that restriction human interventions in strategies. Human intervention is decreased with the aid of predicting the terms present day the choice, sub-system relationships, and associated actions - and integrating that predetermination into machines. There are many types of Automation in industry some of them are listed below:

- Fixed Automation
- Flexible Automation
- Programable Automation
- Totally Integrated Automation

No matter how the world will keep to change, what technology for the destiny and improvement can be crucial day after today. All brand new that is already predicted nowadays with a TIA offer from Siemens, a step-by way of-step integrated and turning into an actual value addition to our clients in both special industries and methods.

TIA is the foundation brand new virtual company

Digitalization and automation are the principles modern day the enterprise to full fill destiny challenges. It'll be vital to make the maximum trendy the infinite information generated by using groups - from improvement to manufacturing, their gadget, and to our clients and companions. that is exactly what virtual corporation is doing, by way of integrating the real and digital global and seamlessly integrating the entire value chain from production to realization. everything turned into made possible with the aid of completely included Automation (TIA), an extraordinary automation concept from Siemens. And it's been doing this for many years! Incorporated Automation (TIA) is an open device architecture and has allowed seamless integration today's all converting additives, software concerned, and services since 1996. This is ensured by means of steady facts management, global requirements, and uniform verbal exchange from field level to company management level. Stop-to-cease consistency isn't always the end in itself, however it reduces expenses, saves time, and empowers the step to enter the next segment at the path to a digital enterprise with area for brand spanking new matters to return.