SMART FACTORY

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INTRODUCTION

Without the intelligent networking of production and value chains using information and communications technologies, modern industry is unimaginable. Digital procedures are creating new opportunities in an industry where efficiency is a major focus. It is now possible to automate manufacturing processes all the way up to the Smart Factory thanks to artificial intelligence (AI) and big data.

Using high-speed networking, a smart factory is an industrial setting where your sensors are able to communicate with IT-level programmes and a centralized data foundation. By using this data, the manufacturing process can be streamlined and end-to-end visibility into the technology architecture of the plant is made possible. This led to enhanced collaboration, focused maintenance, improved output, and functional upgrades. Smart factories connect the physical and digital worlds using industrial internet and the cloud, resulting in flawless amalgamation of cyber-physical systems at all levels and enabling full production process monitoring.

The Fourth Industrial Revolution, often known as Industry 4.0, is a technology revolution that includes smart manufacturing and smart factories. The fourth revolution is currently being fueled by clever automation and digital transformation.

Benefits of Smart Factory

Through the use of interconnected machinery and gadgets, smart factories maximize productivity and efficiency throughout the manufacturing process.

In the industrial sector, implementing an agile, iterative production process can increase the capabilities of both personnel and equipment, resulting in lower costs, fewer downtimes, and less waste.

Efficiency and output can be increased without a significant investment in new resources by identifying and then minimizing or eliminating underutilized or inappropriate production capabilities.

Planning, quality assurance, product development, and logistics are among the advantages of digitalizing a factory because each is evaluated and optimized based on actual customer feedback.

Additionally, incorporating machine learning into the process will have long-term advantages. In order to prevent production line shutdowns, it is possible to schedule preventive and predictive maintenance based on reliable real-world data by gathering and analyzing data.

Technologies for Smart Factories

Technologies for smart factories are quite flexible. There are practically limitless opportunities to scale, adjust, and adapt as needed as digital transformation activities within organization gain traction.

Cloud connectivity: Whether public, private, or hybrid, a smart factory's data and information pass through the cloud. Business-wide and worldwide cloud connectivity means

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that all operations are conducted with real-time data and that all connected systems and assets within the supply chain are immediately visible.

Artificial intelligence: Operational systems that use AI technology have the quickness, strength, and adaptability to not only collect and examine various data sets, but also to offer timely insights and suggestions. In a smart factory, artificial intelligence is constantly improving and informing the automated procedures and intelligent systems.

Machine learning: The ability of machine learning to do advanced predictive maintenance is one of the most important advantages it delivers to the smart factory. Ahead of a system failure, alarms can be sent by tracking and analyzing production processes. Depending on the circumstance, automate maintenance may be carried out or, if required, human involvement may be advised.

Big Data: Large, reliable data sets enable predictive and sophisticated analytics in a smart factory. Companies have long recognized the premeditated significance of big data, but up in anticipation of recently, they frequently lacked the infrastructure required to exploit it effectively. Big Data insights have created a world of opportunity for organizations to improve and innovate leveraging supply chains and smart factories' digital transformation.

Industrial Internet of Things (IIoT): In a smart factory, an IIoT network is made up of equipment and devices that have been given only one of its kind identifiers and the capability to send and be given digital data. Still decades-old analogue machines can be upgraded using IIoT gateway devices to bring them up to swiftness. Modern machinery may already have digital gateways. In essence, data given to the contrivance controls and automates its dealings and workflows, while data sent from the contrivance reports on its condition and activities.

Digital twins: A machine or system's digital twin is a precise, virtual reproduction of it. It permits the most creativity and innovation while posing the fewest operational risks. Without ever running the risk of harming people or wasting valuable resources in the real world, a digital twin can be stretched to its absolute limits, customized in a variety of implicit ways, or tested to see if it works with an existing system.

Additive printing: also referred to as 3D printing, enables intelligent mechanization for on-demand built-up in smart factories. This is especially important when a supply chain is suddenly disrupted or when there is a spike in product demand. Virtual inventories, however, can significantly reduce risk and waste even when things are going according to plan by enabling just-in-time manufacturing.

AR and VR applications in the smart factory include "being capable to lash collectively environmental state of affairs, inventory levels, process state, and assembly error data, deployment, and throughput indicators in a context-dependent manner (where you look or walk.

Block chain: Fortunately, security solutions are developing at the same rate as smart industrial technology. Smart factories use industrial internet and the cloud to link up the real and virtual worlds, resulting in flawless integration of cyber physical systems at all echelons, permitting the whole production process to be monitored.

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Modern database: The "brains" underpinning Industry 4.0, all smart factory, and able supply chain solutions are in-memory databases and contemporary ERP systems.
The extensive data managing and analytics capability required to operate smart factories and contemporary supply chains pushes legacy, disk-based databases to their breaking point frequently.

Steps Involved in Creating SMART Factories

Know your needs and objectives: Simply stating the objectives is insufficient. A manufacturer must reflect on his tactics and choose a course of action based on a specific vision. The "WHYs" set the groundwork for ensuring that you allocate your resources correctly?

Start Little

Start where you can gain the biggest advantages: with the most delicate parts. Be flexible and adjust to market demands and changes. Your technological systems should be adaptable to be able to accommodate the updates and alterations as part of continuous improvement since you need to change your business strategy every five years or fewer. You need to be careful not to overpay on industrial resources and to keep an eye on them.

First, Look to Your People

Deploying smart technologies may not be simple at initially because most manufacturing facilities still use outdated technology. While tearing down and replacing archaic systems with cutting-edge solutions might result in significant CapEx and OpEx, having a staff that is less digitally proficient can prove to be an additional expense. Consequently, it is essential to hire competent workers and upskill the existing workforce.

Consider Security

Every day, cybercriminals get smarter. The threat to data security grows in importance as there are more IIoT devices connected to the network. A factory should promptly install updated security measures to protect it from unwelcome security risks.

Be ready to Make New Investments

The factory environment needs to be improved, necessitating some new investments. The essential requirements for setting up and operating your smart factory will probably be sensors and displays. These, however, are insufficient to guarantee enhanced performance. Prepare for infrastructure changes such as greater bandwidth and more intelligent platforms to store, handle, and analyse the vast amounts of collected data.

Work with a Data Analyst

Data collection and storage are useless for this. The capabilities should be expanded to dive deeper into the gathered data to uncover meaningful trends and patterns that can serve as the foundation for important management decisions.

If you want your industrial data to be useful and valuable, you might need to engage a data analyst.

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Tolerance for Change

Factories that are adaptable and flexible can function in a changing environment. Industrial automation needs to be adaptable enough to market changes and new technology.

Maintain Your Smart Factory Implementation Upgrades.

A step-by-step strategy is the best way to use smart manufacturing technology. The smart technology should be regularly expanded to new areas of your facility.

Each stage of a project for a smart factory depends on the manufacturer's level of maturity. No matter which approach you select, the end-to-end integrated enterprise will achieve the desired outcome.

Adopt a smart manufacturing strategy while incorporating a research-based approach. Measurements can be made at the beginning with real-time data collection, which includes manufacturing intelligence dash boarding and MES installation.

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