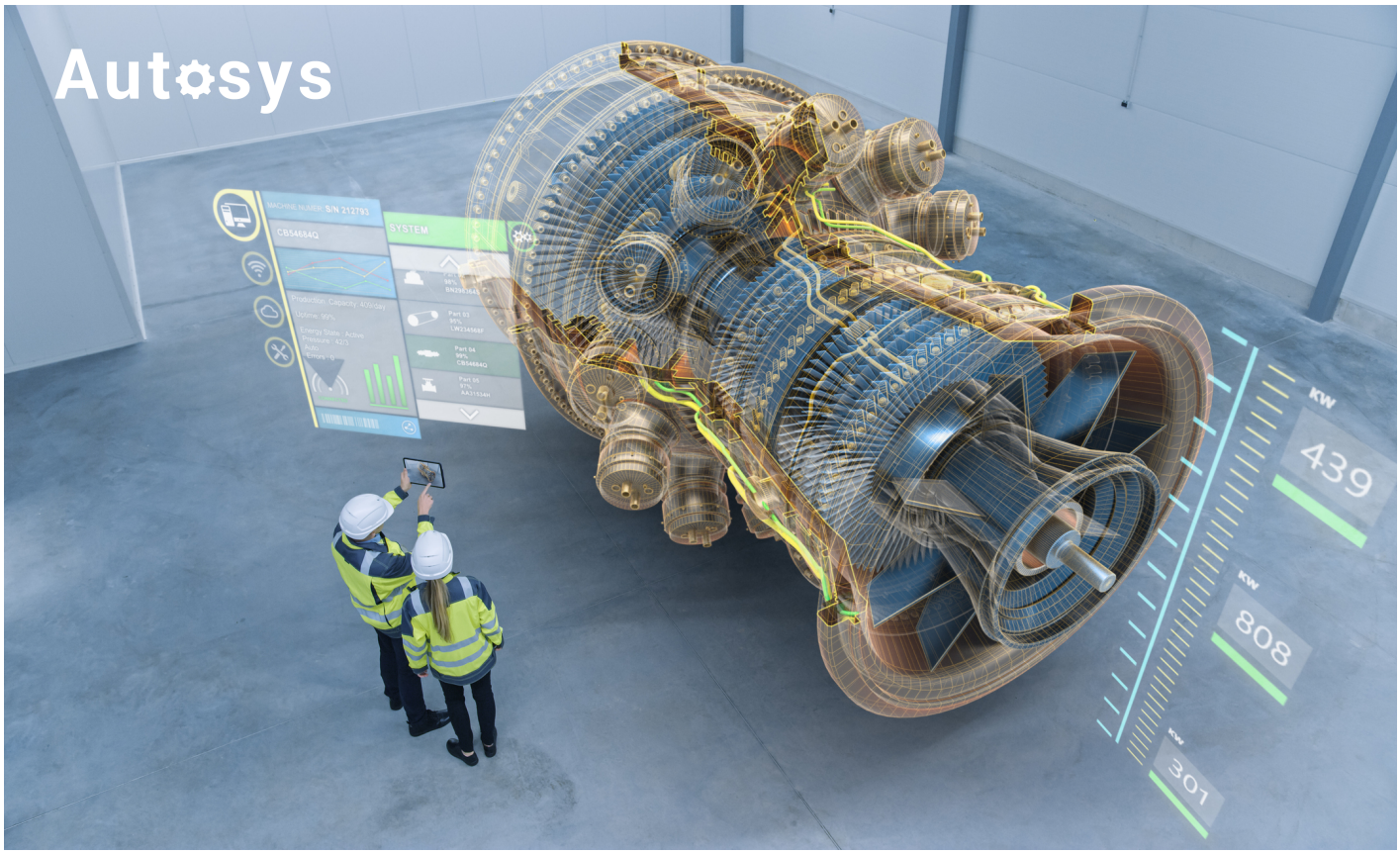
AUTOSYS INDUSTRIAL SOLUTIONS PRIVATE LIMITED 1 MARCH 2023

Quad Newsletter

Understanding components of Industry 4.0



Understanding the components of Industry4.0

Empowering a smarter future and disrupting the conventional manufacturing processes with Industry 4.0

The Fourth Industrial Revolution or Industry 4.0 is rapidly transforming the way we live and work. It is characterised by the integration of digital technologies, automation, and artificial intelligence into manufacturing and other industries. The ultimate goal of Industry 4.0 is to improve efficiency, productivity, and profitability while enhancing customer experience. It is a term used to describe the integration of digital technologies, automation, and artificial intelligence into manufacturing and other industries.

It represents a new era of innovation, where advanced technologies are reshaping the way we live and work. The ultimate goal of Industry 4.0 is to create smart factories and businesses that can operate more efficiently, reduce costs, and enhance customer experience.

Digitisation and Data Analytics

One of the key features of Industry 4.0 is digitisation, which involves converting manual and analog processes into digital ones. This can be achieved by using sensors, connected devices, and other IoT technologies to collect real-time data from machines and equipment.

Data analytics tools can then be used to analyse this data and gain insights into the performance of the equipment and processes. These insights can be used to identify inefficiencies, reduce downtime, and improve overall productivity.

Predictive Maintenance

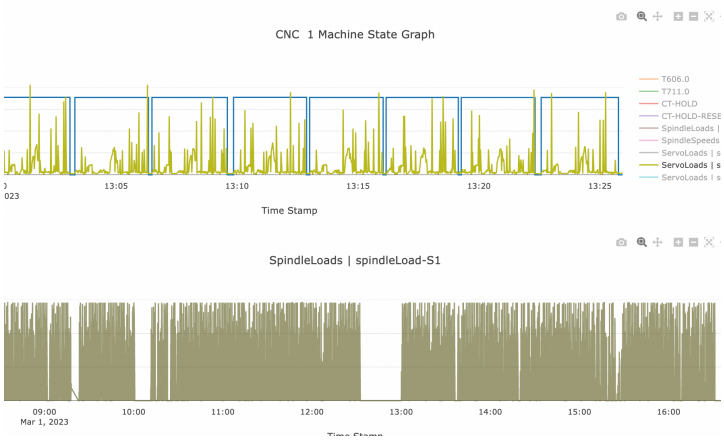
Predictive maintenance is an essential practice in Industry 4.0 that involves using real-time data to predict when equipment is likely to fail. This enables maintenance teams to schedule repairs before equipment breaks down, reducing downtime and minimising repair costs.

Predictive maintenance can be achieved by using sensors to monitor equipment performance, collecting data on factors such as temperature, pressure, and vibration. Machine learning algorithms can then be used to analyse this data and predict when maintenance is required.

Collaborative Robots

Collaborative robots or cobots are robots that can work alongside humans. They are designed to be safe, flexible, and easy to program, making them ideal for performing tasks such as assembly, pick-and-place, and quality control.

Cobots can help businesses improve efficiency, reduce costs, and enhance worker safety. They can work around the clock, allowing businesses to operate 24/7, and can perform repetitive tasks with greater accuracy and speed than humans.



Condition Based Monitoring

Condition based monitoring (CBM) is a maintenance strategy that involves using real-time data to assess the condition of equipment and predict when maintenance is required. CBM is a proactive approach to maintenance, which aims to prevent unexpected failures and minimise downtime, thereby improving productivity and reducing maintenance costs.

CBM involves the use of sensors and other measurement devices to collect data on the performance of equipment, such as vibration, temperature, pressure, and noise. This data is then analysed to identify patterns and anomalies that may indicate a problem with the equipment.

By monitoring the equipment condition continuously, maintenance teams can detect changes that may indicate wear or damage and schedule maintenance activities before the equipment fails. This approach allows maintenance activities to be performed at the optimal time, reducing the likelihood of costly repairs or replacements.

Condition based monitoring can also be extended and applied for quality assurance on line. Process parameters can be mapped with the control plan to ensure there is no variation or tampering of the same.

Manufacturing Execution System

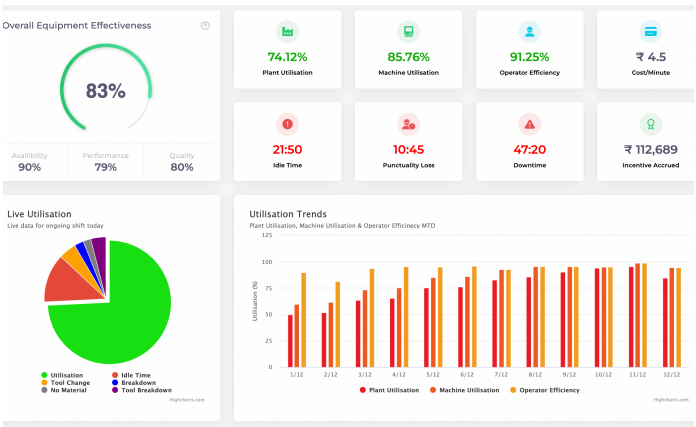
A Manufacturing Execution System (MES) is a software system that manages and tracks the production process on the shop floor in real-time. It provides a comprehensive view of the manufacturing process and provides assistance to manufacturers to monitor and control production activities, ensuring that production is as per the required specifications. MES systems typically integrate with other software systems, such as Enterprise Resource Planning (ERP) systems, to provide a complete view of the manufacturing process.

Robotic Process Automation

Robotic Process Automation (RPA) is a technology that uses software robots to automate repetitive and rule-based business processes. RPA robots are designed to perform tasks that are typically performed by humans, such as data entry, data processing, and other routine tasks.

RPA robots interact with applications and systems in the same way that humans do, using user interfaces such as screens, forms, and buttons. The robots are programmed to perform specific tasks, and they follow a set of rules to ensure that tasks are completed accurately and efficiently.

RPA can be further extended for data flow from the MES to the ERP. Many routine processes on the ERP can be automated using RPA.



Artificial Intelligence

Artificial Intelligence (AI) is revolutionising the manufacturing industry by enabling more efficient and intelligent decision-making. The use of AI in manufacturing can improve product quality, reduce production costs, and increase productivity. Here are some examples of how AI is used in manufacturing:

- Predictive Maintenance
- Quality Control
- Supply Chain Optimisation
- Autonomous Manufacturing
- Process Optimisation

Overall, the use of Artificial Intelligence in manufacturing is transforming the industry by enabling more efficient and intelligent decision making. AI-powered technologies are helping manufacturers to reduce costs, improve product quality, and increase productivity.

Digital Twin

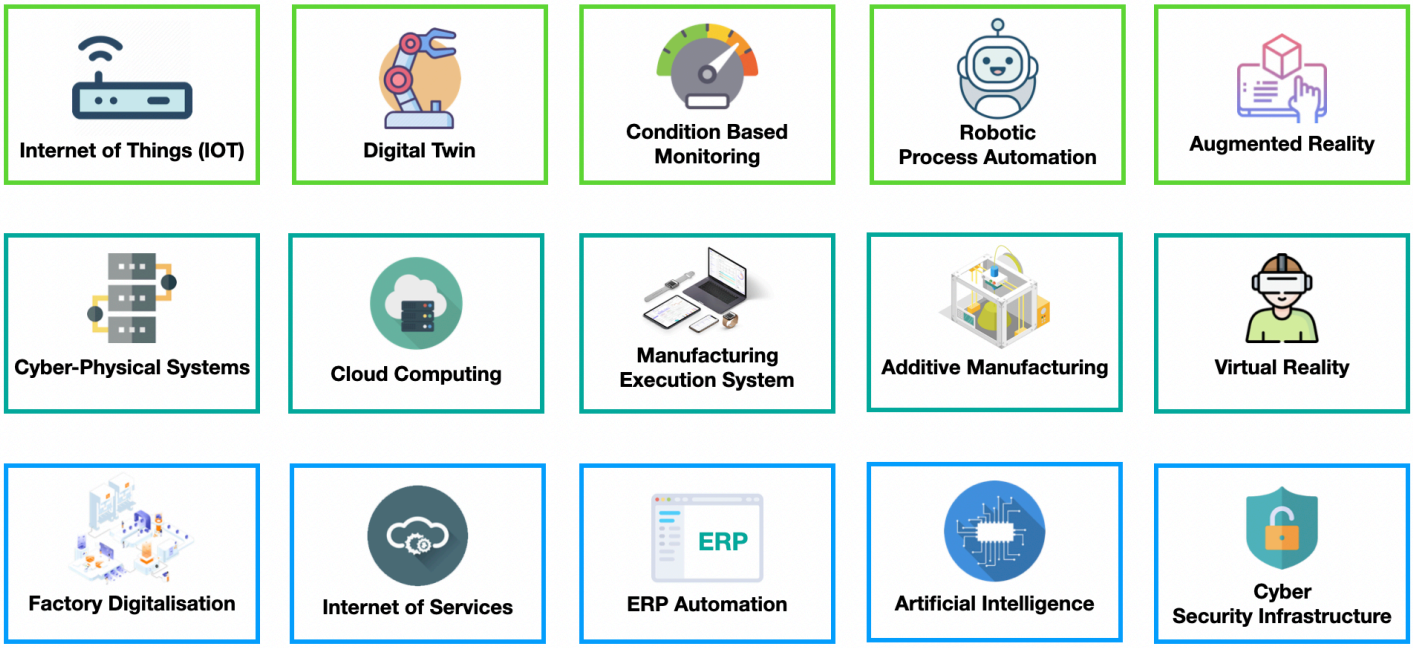
A Digital Twin is a virtual replica of a physical asset, system, or process. It is created using real-time data from sensors, machines, and other sources to simulate the behaviour and performance of the physical asset or system. Digital Twins are used in various industries, including manufacturing, healthcare, and transportation, among others.

The purpose of a Digital Twin is to provide real-time visibility into the performance of the physical asset or system, enabling predictive maintenance, troubleshooting, and optimisation. By simulating the behaviour of the physical asset or system, Digital Twins can help manufacturers identify potential issues before they occur, reducing downtime and improving productivity.

Summary of Components

The below diagram depicts the summary of various components of Industry 4.0

Industry 4.0 is transforming the way we live and work, and businesses that embrace its technologies and practices are likely to enjoy a significant competitive advantage. By digitizing processes, using data analytics, implementing predictive maintenance, deploying collaborative robots, and using augmented reality, businesses can optimise their operations and improve their bottom line. However, as with any emerging technology, businesses must be aware of the cybersecurity risks and implement appropriate measures to protect their operations.



Quad Play - True Digital Twin!

"Creating a virtual world that is useful and transparently relays all the information of the factory floor in real-time giving the widest possible positive impact"