Tech Accelerator
A guide to artificial intelligence in the enterprise

FEATURE

10 AI use cases in manufacturing

Manufacturing companies are turning to AI to streamline the way they do business and increase efficiency. Here are 10 common use cases.

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A factory filled with robot workers once seemed like a scene from a science-fiction movie, but today, it's just one real-life scenario that reflects manufacturers' use of <u>artificial intelligence</u>.

Manufacturers can benefit from AI implementations in several ways. Here are 10 examples of AI use cases in manufacturing that business leaders should explore now and consider in the future.

1. Cobots work with humans

Collaborative robots -- also called <u>*cobots*</u> -- frequently work alongside human workers, functioning as an extra set of hands.

While autonomous robots are programmed to repeatedly perform one specific task, cobots are capable of learning various tasks. They also can detect and avoid obstacles, and this agility and spatial awareness enables them to work alongside -- and with -- human workers.

Manufacturers typically direct cobots to work on tasks that require heavy lifting or on factory assembly lines. For example, cobots working in automotive factories can lift heavy car parts and hold them in place while human workers secure them. Cobots are also able to locate and retrieve <u>items in large warehouses</u>.

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2. RPA tackles tedious tasks

While manufacturing companies use cobots on the front lines of production, robotic process automation (RPA) software is more useful in the back office. RPA software is capable of handling high-volume or repetitive tasks, transferring data across systems, queries, calculations and record maintenance.

RPA software automates functions such as order processing so that people don't need to enter data manually, and in turn, don't need to spend time searching for inputting mistakes. In this way, RPA has the potential to save time and labor.

RPA is also known for being able to handle server issues and downtime. In the event of these types of complications, RPA can reboot and reconfigure servers, ultimately leading to lower IT operational costs.
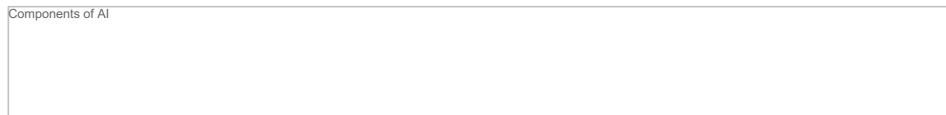
Components of AI

Manufacturers are increasingly adding AI components into their processes to boost efficiency while lowering costs.

3. Digital twins help boost performance

Companies can use digital twins to better understand the inner workings of complicated machinery.

A digital twin is a virtual model of a physical object that receives information about its physical counterpart through the latter's smart sensors. Using AI and other technologies, the digital twin helps deliver deeper understanding about the object. Companies can monitor an object throughout its lifecycle and get critical notifications, such as alerts for inspection and maintenance.

As an example, sensors attached to an airplane engine will transmit data to that engine's digital twin every time the plane takes off or lands, providing the airline and manufacturer with critical information about the engine's performance. An airline can use this information to conduct simulations and anticipate issues.

4. Predictive maintenance improves safety, lowers costs

Manufacturing plants, railroads and other heavy equipment users are increasingly turning to AI-based predictive maintenance (PdM) to anticipate servicing needs.

If equipment isn't maintained in a timely manner, companies risk losing valuable time and money. On the one hand, they waste money and resources if they perform machine maintenance too early. On the other, waiting too long can cause the machine extensive wear and tear. The latter can also expose workers to safety hazards.

PdM systems can also help companies predict what replacement parts will be needed and when.

5. Lights-out factories save money

An AI in manufacturing use case that's still rare but which has some potential is the lights-out factory. Using AI, robots and other next-generation technologies, a lights-out factory operates on an entirely robotic workforce and is run with minimal human interaction.

Manufacturers can potentially save money with lights-out factories because robotic workers don't have the same needs as their human counterparts. For example, a factory full of robotic workers doesn't require lighting and other environmental controls, such as air conditioning and heating. Manufacturers can economize by adjusting these services.

Robotic workers can operate 24/7 without succumbing to fatigue or illness and have the potential to produce more products than their human counterparts, with potentially fewer mistakes.

6. Machine learning algorithms predict demand

AI systems that use machine learning algorithms can detect buying patterns in human behavior and give insight to manufacturers.

For example, certain machine learning algorithms detect buying patterns that trigger manufacturers to ramp up production on a given item. This ability to predict buying behavior helps ensure that manufacturers are producing high-demand inventory before the stores need it.

7. Inventory management prevents bottlenecks

Some manufacturing companies are relying on AI systems to better manage their inventory needs.

AI systems can keep track of supplies and send alerts when they need to be replenished. Manufacturers can even program AI to identify industry supply chain bottlenecks.

For example, a pharmaceutical company might use an ingredient that has a short shelf life. AI systems can predict whether that ingredient will arrive on time or, if it's running late, how the delay will affect production.

8. AI boosts supply chain management

One strong AI use case in manufacturing is supply chain management. Large manufacturers typically have supply chains with millions of orders, purchases, materials or ingredients to process. Handling these processes manually is a significant drain on people's time and resources, and more companies have begun [augmenting their supply chain processes with AI](#).

For example, a car manufacturer might receive nuts and bolts from two separate suppliers. If one supplier accidentally delivers a faulty batch of nuts and bolts, the car manufacturer will need to know which vehicles were made with those specific nuts and bolts. An AI system can help track which vehicles were made with defective hardware, making it easier for manufacturers to recall them from the dealerships.

9. AI systems detect errors

Manufacturers can use automated visual inspection tools to [search for defects on production lines](#). Visual inspection equipment -- such as [machine vision](#) cameras -- is able to detect faults in real time, often more quickly and accurately than the human eye.

For example, visual inspection cameras can easily find a flaw in a small, complex item -- for example, a cellphone. The attached AI system can alert human workers of the flaw before the item winds up in the hands of an unhappy consumer.

10. AI systems help speed product development

Some manufacturers are turning to AI systems to assist in faster product development, as is the case with drug makers.

AI can analyze data from experimentation or manufacturing processes. Manufacturers can use knowledge gained from the data analysis to reduce the time it takes to create pharmaceuticals, lower costs and streamline replication methods.

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