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AI AND THE DIGITAL TWIN

POWERFUL COMPANIONS

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Digital Twins bridge the gap between what is physical and virtual, with the growing emergence of the Internet of Things (IoT) enabled devices, can empower firms to realise value in completely new ways.

Digital Twins are a kind of advanced and living evolution of a traditional simulation, using real data from systems and providing an accurate and smart representation of processes, systems and equipment. They link these entities to connect people, processes, and equipment together in a cyber-physical environment. The entities that can be included in the makeup of Digital Twin design do not follow any strict set of rules, and are adaptable to any manufacturing environment that can be digitally enabled through smart sensors and IoT data connections. In a manufacturing environment, this living data-driven tool can be extremely powerful for manufacturers, especially when complimented by modern artificial intelligence (AI) technology.

Coupled with AI, a Digital Twin can offer a dramatic increase in capability and value offerings for any manufacturing firm. With a constant stream of data from an array of machines, equipment and process monitoring systems, the Digital Twin can recommend and drive actions and tasks that are needed at the operations level in the physical world. For example, engineering teams can enable the Digital Twin to simulate scenarios and so learn to problem solve on the fly. By using live data, the processing alternatives can be implemented to avoid bottlenecking and prolonged downtime, therefore maintaining manufacturing flow and output.

For daily and routine operations, the same technology provides value in instruction and guidance. Smart devices can provide operational staff access to interactive AI tutorials that are adaptable to the particular task at hand. These AI based tutorials can show an operator how to control or operate new equipment, or describe changes to work procedures, while the system simultaneously provides real-time logging and feedback.

For example, many manufacturing

environments require the careful, controlled use of specific cleaning solutions and hand tools for routine cleaning of sensitive tools and equipment. AI technologies can enable live guidance with environmentally-based prompting, to better enable the manufacturing operative to follow (often) complex work instructions. With this kind of augmented reality system assistance, the operator can reduce re-training time in the event of process changes, while also helping to eliminate costly human errors. These types of applications are only just beginning to be realised in industry, with a blue ocean of application opportunity on the horizon.

A core business function - as described above, is not yet common-place across all manufacturing industry. Companies wishing to realise value from these technologies need to understand that AI is rapidly becoming a core tool in the manufacturing engineering toolbox. To harness the true power and value within a Digital Twin makes access to such AI processing technology a requirement, not an option. Traditional computer simulations struggle to support, with large simulations often taking hours to days. The lack of speed and processing power required to simulate, handle large data, and give outputs in real time, sees AI as a necessity for modern real time simulations.

Expect to see an increasing focus placed on AI and the digital twin in the future, as manufacturing industry begins to truly realise the competitive advantages, efficiency gains, and the unrealised values that these new technologies can deliver.



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