How data fuels the move to smart manufacturing

Why Humans are Chasing Data Driven Manufacturing?

Smart manufacturing has become the buzzword of the decade and will continue to prevail as the NEXT best thing of the future. **But why does it matter?**

With so many vast manufacturing industries being set up, each having a complex set of processes, it is next to impossible for humans to go through all the different manufacturing and design scenarios.

But how to fuel the digital transformation move?

Powered by a combination of artificial intelligence and industrial data, the move of smart manufacturing is on its way. To get the job done, AI comes to aid with a potential to transform the manufacturing continuum, end-to-end. This includes all the design and implementation stages such as early stage ideation, flexible production, predictive maintenance, and finished goods. To develop a seamless workflow, both data and computational models must be deployed together using AI, to reach optimal outcomes. There are four major ways to combine data and AI to power the movement of IIoT.

1. **Using AI for process design, planning, and execution**

After setting specific goals or parameters for a certain aspect of the process, countless possibilities can stem out for the right manufacturing process or product design from it. For instance, an engineer may provide different designs for a dashboard based on core requirements, to create a conceptual design. But in the real world, the engineer may face multiple limitations in creating a number of designs. Contrastingly, in the world of AI, engineers can simply outsource their tasks to the software to do the heavy computations and chalk out different designs. The expert only needs to provide the different parameters, such as weight, costs, strength targets, etc., which are used by the software to produce variable possibilities of the design with different viable candidates.

AI can do the same for process planning and execution methods that are used to create the dashboard. Teams can use AI-based technologies to run through various simulated events and scenarios to identify which systems and materials will deliver the items in the most efficient and productive manner by building full-scale 3D and behavioral models of shop-floor machinery.

The main task for the engineers is to set the goal and let the AI run its analysis so that an automated process of conducting the manufacturing event in the most efficient manner is panned out.

1. **Collecting data from its source of origin**

With the advent of the movement of the Fourth Industrial revolution, the aim was to connect manufacturing equipment and machines together through IIoT to let the machine-driven communication lead the automation and insights process. Yet, much effort is needed due to ambiguity around the shop floor goals and data complexity.

According to experts, edge platforms must be integrated right at the shop floor to spontaneously collect industrial data and mix it with business data for analysis. The data store in different locations, in silos, must then be normalized along with providing a context for it. This forms a crucial step in the smart manufacturing process as it makes the data more readable by the shop floor leaders. By doing so, the level of efficiency in process analytics increases to greater levels.

1. **Marry business requirements with the shop floor requirements**

The main obstacle in accomplishing digital transformation is faced due to the large gaps in the expectations of the C-suite leaders and the factory managers. On the one hand, the executives look at data-driven manufacturing

to develop new business models. On the other hand, the shop floor managers look at resolving specific challenges such as transitioning over a line or increasing the uptime.

The gaps majorly exist as leaders at these different levels do not interact often, which leads to missed opportunities for continuous improvements close to the areas where the problems arise. Simply marrying the right skill sets of shop floor experts to the right technology can create enhanced ROIs.

1. **Establish a future with machines and humans working in a collaborative manner**

Within a plant, the tooling and fixtures are numerably variable and the parts are geometrically complex which makes it practically impossible for workers to go through all possible events on their own. Also, with the increasing demands of flexibility within manufacturing, humans can't possible run the entire system without the help of AI or manufacturing intelligence and connectivity platforms. With each passing day and increasing manufacturing needs, the operations need to become hybrid in nature.

The dynamic duo of machines and humans is going to be a must as humans will bring in judgement, dexterity, and flexibility, while machines will bring in precision, repeatability and strength. The combination will not only lead to developing things better, but also creating new things in a better way at the same time.