

Industry 4.0 – Where are we now and where are we heading



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Just a few years ago, Industry 4.0 was a buzzword that had more of an ideal and visionary connotation than concrete clear content associated with it. If you asked five different people what it means, you would likely get five different answers. But now that the dust has settled, we can see clearly the dramatic changes that it is creating and how it is shaping the future of the industrial world.

From the get go, Industry 4.0 was associated with process digitization and the collection of massive amounts of data on the production floor. The elimination of paper and the ability to log everything on the shopfloor constitutes a dramatic step forward from traditional industrial practices. There is clear evidence that industries from all markets are going there. We can safely say now that going paperless, and 100% traceable production processes, are a must for anyone who

wants to remain a relevant player in the next decade. Customers now mandate the existence of a fully-traceable thread to root cause any quality issue and any deviation from specifications.

Identifying defects and problems early

Manufacturing is not expected to be perfect but the ability to identify defects before customers are affected by them is crucial and the same goes with identifying problems before they grow into bigger problems.

Even if you have a good employee updat-

ing the procedure in place, it represents a massive overhead in costs, efficiencies and throughput. Add to the mix a material that is time, temperature or humidity sensitive, such as prepreg composites, and the issue magnifies tenfold. Even highly trained teams with well-defined processes in place are scrapping expensive materials on a daily basis because they cannot keep up with real-time updates of shelf-life or miss expiration events. Trying to track these constantly updating properties inflates the volume of data streaming into the system furthermore.

So the real challenge is how to use this massive amount of data collected to optimize production floor operations. In other words, how to present the right information at the right time to the right person on the production floor.

The abundance of data streaming in real time from newly created sources such as IIoT, reporting stations or scanners is a new challenge by itself. Think about the intellectual power needed to process this data while it is still relevant.

The AI challenge

AI (Artificial Intelligence), growing in presence and capabilities at a rapid pace today, delivers great promise to this challenge. AI is not threatened by any amount of data. On the contrary, more data collected means more accurate predictions.



AI-based Industrial IoT optimization

The next phase of the industrial revolution is highly dependent on AI and its ability to use the data collected and draw insights and actions to improve and optimize manufacturing. Often times mistakenly perceived as a way to replace humans, AI should look as a way to handle, analyse and use massive amounts of data that humans just cannot deal with. AI is shaping the future not in the sense of human intelligence replacement by an artificial one, but rather in the fortification of decision-making abilities of humans by intelligent real-time processing of data. To make the best decision in real time, an abundance of detailed information needs to be considered. The data streams are constant and require a high-level view of the entire production floor while diving into the smallest details that might render the decision irrelevant or even erroneous. Processing such a huge amount of data in real time is an almost impossible mission for humans no matter how experienced they are. The traditional methodologies of controlling production using humans are no longer adequate for today's business environment and pose a serious threat in terms of competitiveness.

Even in factories that have implemented paperless procedures, you can still find that production cannot scale because the decision making is entirely dependent on human processing of information flowing from the floor.

Surprisingly, it is still rather common in factories that have only started to deploy a computer-based control mechanism that the entire shopfloor activity is managed by a single person. The shopfloor production manager or shift manager could have dozens of workstations and tens of employees and is the only entity that can be relied on to schedule work considering work orders, suppliers' delivery, material shelf-life, priority and employees' availability. This entity rarely has a proper back-up and affects productivity so much that they are rarely able to take time off or even a sick day.

It can be astonishing to discover how dependent factories are on the people holding these roles. But that by itself is not so problematic as much as the inability to scale. Business opportunities are turned down due to the extra load on the system

and the fear of collapse.

Business growth should normally be welcomed. However, the ability to scale with business is mandatory if a company wants to be able to welcome more revenues.

So how can such scalability be built into the daily workload without expanding the workforce?

Digital assistants

The key here is to harness AI methods and the availability of accessible computing power to solve complex problems and offer factory staff recommendations based on the production data collected. That is what the promise of Industry 4.0 is all about.

Just imagine that managers and staff have a digital assistant that follows them on the shopfloor, updates them in real time on the progress and status of everything and provides them with alerts on anything that seems to be not in line with the normal process of things.

Now on top of that, imagine that this digital assistant can process the data and provide insights and recommendations on how to resolve these issues, and offer staff a few options as well as risk assessment for each option.

These types of solutions are not a far-fetched futuristic vision. They do exist today. Digital assistants exist and, for those who use them, they provide a real-time view of the entire shopfloor: who is doing what, where and with which tool and material. What is the progress of a work order, what material is at risk of expiring, which tool needs maintenance and where quality issues could arise. If there are possible bottlenecks expected, they will not only alert you, but also provide possible actions and solutions that could prevent them.

Data processing

The processing of the data is aimed at analysing the data to learn what works well and what does not, provide alerts on what is predicted to happen if no action is taken and, finally, recommend the appropriate action to prevent the undesired outcome. The use of newly available mobile and wearable accessories expands these capabilities even further.

With the advance of visual and speech recognition, wearables (like Google Glass Enterprise Edition) are now an active part of the production floor management. This allows the digital assistant to take an even more natural form allowing the user to interact with them using voice or just by pointing their look towards an object.

Imagine project alerts projected into your eyes in real time.

You can choose between options or get a risk assessment to action you might propose. If your hands are busy you can use your own language and they will intelligently interpret what you say to provide you with the right information. The glasses will also respond vocally as well as visually in your language and provide you with guidance.

This is not science fiction. It is here. At the 2018 Google Next conference in San Francisco, Plataine – a leader in AI-based manufacturing automation and optimization company – and Google Cloud demonstrated this exact technology.

This really takes manufacturing and its control to the highest possible level. With this kind of technology, even the busiest employee can now increase his capacity dramatically and make better decisions at any scale of production.

Helping shape the future

Industry 4.0 is a big promise. The digitization of manufacturing operations and the collection of massive amounts of data is an idea that has several opportunities for materialization. Not only is the industrial world marching quickly in this path and heading to new levels of quality and efficiency, but also, the adoption of new emerging technologies like Cloud Computing, AI and IIoT, as well as new tools like mobile phones and wearables, is creating a smart fully-networked environment for production in which real-time optimization and decision making is maximized. New emerging applications using these technologies help shape the future and push the envelope of production beyond anything that could have been envisioned previously. □

More information:

www.plataine.com/application/glass-enterprise-edition/