The IoT Show delves into topics on Industrial Internet of Things (IIoT) and touches on the broader Internet of Things (IoT). We pick engaging, hot topics, and ask our speakers to advise on situations, opportunities, recommendations and gotchas so that listeners can benefit from the experiences and insights of others.

This document is not intended to be a complete representation of views of either the host or participants or a more formal white paper on topics discussed; it's more an aide memoire of comments made by show participants. To watch this episode in full, please go to this page.
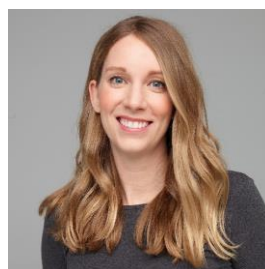
In Episode 4 we're discussing the subjects of Analytics, AI, Machine Learning and Business Insights in the IIoT. The host and three guests were:

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What are analytics in the world of IIoT?

Truth be known, it's much to do with the value of your end devices; how much control and the (industrial) benefits you can achieve from the varieties of data from these devices. Industrially, this means that you can gather information that's pertinent to your specific organization and define how it's to be used. For example, to better understand the inflows of raw materials to your company or for a process, and the quality of products leaving the line or your plant/facility.

The world of industrial analytics (AI/Machine Learning etc.) lets you to define methods to gain insights from what is otherwise raw data, or data streams. Allowing you to better visualize information and situations, perhaps using machine learning algorithms to improve your products, processes and services over time.

In short, with industrial analytics, AI and Machine Learning you're better able to gain insights on your assets and processes to improve your business. These insights will help drive (decisions that move) your company forward.

Are there some common insights?

It's all about using data to deliver better business outcomes. For example, by using image recognition techniques to train quality systems on what's normal (and abnormal).

We're not just talking about data from the shop floor or devices it's about using ALL your data to drive algorithms and analytics; data can come from many sources including from ERP, SCM, PLM etc.

The opportunity is to reveal situations that were previously invisible, using sensors to gather information; optimizing processes and products as never before. In real time and not just asynchronously (via spreadsheets, for example) as we did previously. There has been an explosion in the types of sensors one can use and this in turn allows you to observe and optimize around totally new dimensions.

Benefits are not solely focused on 'just data'. One can gain better understanding on business and product processes, departmental interactions, and (hopefully) improve on them.

What advice can you offer?

AI is a marketing term used to (generally) describe computers doing things humans did in the past. It's not a technology. Having said that, there are technologies associated with AI, the one with the

most possibilities is that of Machine Learning (ML). This basically refers to algorithms that improve themselves based on (more) data (over time).

This isn't solely a technological play, it's an opportunity for companies to take a step back and rethink some of their processes. For example, companies can use their insights (resultant from their data) to improve their customer's experience.

Much analysis is data science; data scientists working with data exploration tools. What's different in today's evolution of these technologies is that those using algorithms and ML paradigms don't require the deep skill sets of (past) data scientists. 'New users' will be more focused on understanding how outputs and/or insights may change processes, activities and the business as a whole. This group may also be tasked with sharing benefits and learnings with the broader super-set of (company) users.

Lest we forget, we're just getting started in AI. We need to improve our domain understandings and the accuracy of systems and models. At the same time, we need to reduce the cost of systems and their time-to-value. It still takes too much time and effort to train (ML) systems and there's a lot of (human) effort that's expended getting models to a point where they're valuable.

What about investments?

There's a lot of hype around Analytics, AI and ML. The key thing is to start small!

The more practical (easy) applications are where you might find complex repetitive decisions that need to be carried out hundreds or thousands of time per day. Examples would be in areas of preventative maintenance, predictive analytics and logistics problems (perhaps understanding whether supplies are going to be in time, or not).

ML is about having something that's easy to learn, and that means having things that are easy to frame investments around; perhaps using pictures to advise on what's normal and/or abnormal?

Other good use cases are in safety, perhaps protecting people. Better understanding of your assets; track and trace for example, in both equipment and individuals, perhaps on the shop floor.

There's much benefit in areas where you can augment (possibly even replace) an industry expert's knowledge. An example of this is in traversing (very) large amounts of information to provide real-time insights; humans just don't have the bandwidth (or speed) to do this.

What can we learn from others?

Find people in your own organization that are interested in these sorts of technologies and/or domains; for example, those that might be interested Machine Learning or in predictive maintenance. You may also find you have some in your company that are particularly interested in looking at new types of sensors and measurements.

Gathering and combining the RIGHT data is essential, and this has always been somewhat hard. No matter what data you use, you may find it valuable to try and integrate your sensor data with that from more traditional enterprise systems. For example, from ERP, PLM and SCM. You might be advised to do this in a way that's appropriately governed. There are new methods of data pipelining that provide for more simple/effective governance, and more consistent and auditable ways of moving information around.

Once companies have buttoned down their technology issues, they tend to find that they have (many more) business model issues. These are sometimes much harder problems to solve but solve them one must.

Preventative maintenance and safety are two big topics in (some of the) companies. Anything that helps to keep machines running and reduces downtime delivers (very short term and) huge cost savings.

Use existing sensors and data. Take advantage of what you already have in place. Any additional infrastructure increases cost and may extend your time to value.

These (new) methods are all about self-improvement. For example, continuously measured taxi data helps improve taxi availability throughout a city. Extending this to bus and other public transports improves the experience (and the ecology) among a broader range of transportation services. The city is now full of cameras and sensors. All this data is now fed into a ML model that helps to optimize 'city' traffic; taking into account, for instance, sporting events and school holidays. And this model is getting better all of the time. How's that for a powerful story?

Data governance is a big thing whether it's between or intra-organizations. It's especially sensitive when connecting different systems where some of the data is not time-series driven. (For instance with in-house ERP, CRM and SCM systems).

Projects in advanced analytics and ML have led to many customers uncovering confusion on who owns, controls, uses and updates their data 'truth'; importantly who has responsibility and accountability for it.

The algorithms and results of ML activities are becoming assets in themselves. Companies may want to consider ways to manage, version and control access to these 'new' assets, perhaps via an asset management system of some description. They may also want to better understand how these new (asset management) practices and procedures may affect their other processes.

If you're on the fence?

Do it now! Barriers to entry are low and there are lots of API's available for ML (for example) on the web. Get your hands dirty and try it out. The learnings from those exercises will help you better understand how to apply these types of technologies in your own business.

Most are trying (or using) these technologies now. If you do your research, you'll find this is true.

Some final words

Start with small, diverse agile (development) teams. And start with small ideas. These technologies are mature enough to deliver big opportunities.

Look for interested individuals in your own companies to spearhead your efforts. You'll be surprised at how people will be prepared to invest their own time to help. Think of using internal (and external) hackathons to incite your employees to participate. Think diverse teams, this helps to prevent bias.

Business opportunities are not necessarily the be all and end all. You might want to start with topics you're interested in finding out more on. Learn and expand. At the end of the day it may not (just) be about AI.

Learn and spread the word. Build on what you've learnt in the past and engage your (extended set of) people.

Capitalize on the internet and social media. There's (possibly too) much useful information, freely available. Follow some key influencers and see what they're doing and what they're talking about.

Ask for help from vendors and consultants but remember that these are a lot of open source tools that can help you get going and learn.

Have a look at what others are doing. Importantly, look what's happening across industries. These types of technologies blur traditional boundaries and a lot of the techniques, insights and benefits one can achieve are industry independent.

Have fun learning and benefiting from these technologies!