

Round-table summary at Field Service Forum Amsterdam “Artificial Intelligence for Automated Service Management”

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Dear Roundtable attendee

First I would like to thank you for the round table discussions on the 5th June at the Field Service Forum. They really got me thinking and inspired a more general article which if you are interested you can read using this link: <https://serviceinindustry.com/2019/06/13/is-ai-the-intelligent-way-forward-to-a-sustainable-future/>

Also a number of you mentioned the importance of moving from manual to digital processes before you can think about moving to using AI type technologies. If this is relevant to you, then this short article might be a good read: <https://serviceinindustry.com/2019/05/16/digital-servitisation-an-experience-based-review-of-how-successful-industrial-companies-develop-digital-infrastructure-to-enable-outcome-based-service/>

I promised to give you a flavour of the two roundtables as a source of reflection on the role AI can play in your business. In total we spoke with 22 service professionals from a very wide range of industries from appliances, earth moving equipment, elevators, printing....

Perhaps it is interesting to start with the wide range of topics that you wanted to discuss. Here is a snapshot across both round tables:

- How do we build a road map for the use of AI
- How analytics adds value / drives results
- From Data Analytics to AI?
- Product and Process improvement through AI – what are realistic expectations
- AI for trouble shooting / Automated customer help desk / Predictive
- Is there such things as an AI library?
- AI and augmented reality
- Impact of AI on staff/people
- AI to automate standard services
- What to do with my data

We can see that there was a wide range of questions, so we started in both round tables with “What is Artificial Intelligence”

And in both groups, there was a difficulty in articulating how AI could impact automation, so I read out a definition from Wikipedia

Artificial intelligence is the science and engineering of automated problem solving. The object is to generate solutions by using computers to mimic the cognitive functions associated with deliberative thought, including perception, reasoning, and learning.

What struck me is that the term and even concept of Artificial Intelligence does not help you automate your processes and even answer the questions you raised. As one attendee commented “AI is so overwhelming, it is blocking peoples thought processes”

Only when we look at the next level of detail, which are the technologies that are bundled under the umbrella of AI, did most of you start to recognise potentially how AI can help you solve business problems. For example, we discussed a definition of Machine Learning from Wikipedia, where the most important feature is that it is a mathematical technology that can recognise patterns in large data sets

Machine learning is the most prevalent means by which the potential of artificial intelligence is being exploited. The term refers to the ability of computers to detect **patterns in large data sets** through the application of algorithms. In addition to uncovering potentially powerful insights in the data, computers can be programmed to train themselves to make data-driven predictions.

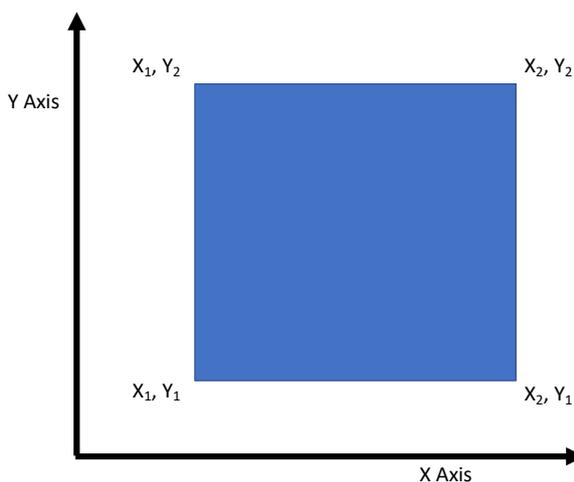
At this point the group discussions diverged as the 2nd round table contained companies with more experiences of working with Advanced Analytics / AI.

First Round table

- We had a discussion around what is a machine learning algorithm and I gave an example which as a non-mathematician has helped me get some notion of the concept.

A square can be represented as a shape in two dimensions ‘X’ and ‘Y’, by plotting 4 points.

If you can now imagine a shape that is drawn against multiple dimensions, i.e. x, y, z, a, b, c.....axis you get a very complex surface or multi-dimension model which academia describe as a manifold. When a piece of data is identified as being outside or off this manifold, it can be said to be an error. In payment systems this could be a suspected fraudulent transaction or in a mechanical system this could be a potential breakdown situation.



The mathematics which describes this process is the logic.

Software is used to run the logic/maths.

An algorithm = Logic (Maths) combined with the Software

This is a very simplistic way of looking at what is a machine learning algorithm but may help some of you get your head around the topic. Artificial intelligence is made up many different ways of doing the maths and running algorithms that achieve different types of outcomes with different types of data.

- The discussion then moved to how do you use these mathematical technologies to automate processes. And the conclusion was:
 - Start with the business problem or bottleneck in your processes
 - Understand the data you have and what kind of data solution might apply (for example are you look for patterns and trends, are you dealing with unstructured data)
 - Then look to the particular type of 'AI' solutions that might be applicable.

An example we discussed was from Zepplin, one of Caterpillar's major partners. They created a mobile solution for their Field Service organisation.

- They wanted to make it easier/faster for Service Technicians to complete their service report from their mobile phone (The Business Problem).
- They could do this if they could record the technician's words and convert this into written text (The data solution)
- They implemented an off the shelf voice recognition software (The AI solution), which has very sophisticated advanced analytics to make it work.

- That dealing with Data Solutions requires a flexible approach. We start with the question, but by the time we get to insights we might find we have to ask a new question. I shared this chart of the typical analytics process



- We also brainstormed some Service applications where advanced analytics and learning algorithms are making an impact
 - Scheduling: Learning the best routes, combining with FST schedules and external factors etc
 - Developing a standard time to do a specific task/job (i.e. looking for patterns)
 - Understanding customer preferences (i.e. looking for patterns)

In this discussion a key point was made, that to automate service management, first one must move from manual to digital processes.

Second Round Table

There were a number of companies who were more experienced in using these technologies and so the conversation was very different. Key points raised

- Start with addressing the business problem: To get buy in from management you have to take actions that will drive company performance, or otherwise you will not get funding and resources.
- It is important to **Start**: 2-3 managers spoke about how they created pilot projects around AI use cases. For example:
 - Do we have a big data opportunity where by analysing unstructured data such as text we might be able to find patterns that could be interesting?
 - Can we predict performance of a mechanical system (Digital Twin)?
 - How can we use augmented reality & Knowledge management (Augmented Knowledge)?
 - Where can we use Image recognition systems?

These types of pilot projects are very useful for understanding and learning how data can change your business. **NF comment: The danger with this approach is that it starts with technology rather than business/customer need, which can lead to a poor return on investment.** However, the valid point that was made was the importance to start the learning process.

- AI is not always the answer: The very valid point was made that these advanced mathematical technologies may not always be the best answers at this moment in time. Hence the importance of the 1st part of this conversation which was to be led by the business challenge which contains the 'Value' that will pay for the investment (as opposed to looking to technology first)
- Don't under estimate data quality: It is easy to focus on technology solution, but if the data is poor, then so will be the results. Do not under-estimate the amount of time required in cleaning data.
- Impact on Organisation: As your organisation becomes more data driven, the impact on the organisation can be profound in terms of culture, structure and capabilities. Key points raised were:
 - Culture:
 - 'Dare to fail': pushing the organisation to think more about the value of data means pushing outside the comfort zone. Failures will occur as part of the learning process and so leaders have to encourage this mind-set.
 - Do things differently: One leader from a leading elevator OEM mentioned how implementing machine learning into the design group led to a completely new rope-less design.
 - Organisational Structure: One manager commented that he had re-organised and created new teams so as to bring a greater focus to the specific initiatives they were looking to drive forward.
 - Capabilities & Competencies: Often new skill sets are needed around the use of advanced statistical techniques & bridging the gap to business professionals.
- One senior manager from a large global business commented on his experiences of introducing AI technologies into the business:
 - Go step by Step: Define where you want to go but be prepared to change the vision and direction as your understanding develops.
 - Understand the implications/opportunities in R&D
eg 3D printing into the supply chain /Service management processes
 - Opportunities for automation: for example, the stocking process within spare parts management
 - The deeper you go, the more you learn, the more you see that this change in mind-set is a game changer for the company