



Cognitive Computing and the Internet of Things



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When this subject hits the typical midsize corporation in Europe confusion and hype dominate the discussion. As a result, we see fear and a reluctance to exploit the potential of the available technology. In contrast to previous technological revolutions, we experience close correlation between the technological changes and new business models. There are clear dependencies but also cross-fertilization to a much higher degree as with previous discontinuities.

Unlike the past our present and future is massively influenced by the fact that most of us feel surrounded by more technology than ever and clearly more than we even see or understand. The world we live in is populated by so many connected devices and every day life becomes so much supported by “intelligent” devices and gadgets that it is hard for the average person to keep track, be educated and knowledgeable and benefit from all the smart items that surround and support us.

Digital revolution has become a mainstream topic. We expect that our homes become smart homes, our cities turn into smart cities and it is supposed to automate processes on factory floors, ecommerce, tourism, and healthcare end-to-end. Digital disruption seems to accelerate the use of

machine learning, cognitive computing and artificial intelligence.

Information technology has experienced so many revolutions, mainframes dominating between 1950s and into the 70s, followed by Minicomputers, which became a victim of powerful PCs. The Internet started to revolutionize our lives at the turn of the century leading into the age of wireless connectivity and cloud computing, which are definitely drivers and enablers of the Internet of Things.

Working in this space for quite some time now we see however a few important differences between previous IT revolutions and the digital disruption happening now.

1. For the first time we see all enablers really play together in a powerful scheme. It is not just one discipline, cognitive computing or the World Wide Web, cloud computing or wireless connectivity – all of these cross-fertilize and leverage each other in an unprecedented way.
2. Disruption does not stop at the technical level. For the first time revolution in the labs happens hand-in-hand with a radical business transformation.

IoT40 Systems has been assisting customers with digital transformation in several areas, for example retail, preventive maintenance and security. We learned that our “Connect – Detect – Act” paradigm can be applied for all projects.

Being able to easily connect all sensors, ranging from data provided by machinery, cameras but also environmental sources is a must. Challenges are mainly routed in combinatorial complexity when collecting information from all possible sources.



In many cases one can get started very easily and at little cost as soon as we recognize how effortless valuable information can be collected and utilized.

Assume you want to protect a valuable asset, like a kiosk, ticket dispenser or any other piece of machinery. In the past we used video surveillance and poor guys had to watch screens in a central monitoring room to make sure they recognize early enough, when someone tampers or vandalizes that piece of equipment. Today we can connect the asset itself to – what we call - the cognitive connector and benefit from knowledge, like how likely vandalism is at the location of the asset and the time of day to sharpen the senses of our system. The system is obviously able to “see” (using video surveillance and image understanding algorithms built in) if someone is just standing in-front of the asset or if the asset reports being used (properly or not).

But not only time of day and location are important input in the “detect” phase. Other publicly available information is also important, like the weather or the fact that we have a high probability of hooligans roaming the streets at a specific time because the system “knows” (through the Internet) that a soccer game took place in the area. And when we have “connected” and “detected” such a system also provides the ability to act – typically faster and in many cases more precise than a person tired from watching computer and video screens for hours. A system working 24/7 “watching” over a large number of assets will never get tired.

And such a system tracks, records and gathers data. And this data can be used to analyze and learn to improve and become more and more efficient in our reactions over time. The Internet of Everything provides us with capabilities that challenge our ability to use sensor information which already exist. Not time, money or technical feasibility is the limit. It is often a lack of fantasy and out-of-the-box thinking that limits what our clients do.

We also learned to never forget the human factor. Human beings must be part of the equation when “connecting – detecting and acting”. We learned that there are areas where systems work all day without human

intervention. Industry 4.0 is often understood as “robots replace human labor”. We experience rather those automatic function supports human beings, in offices and on the shop floor alike. Humans are valuable sensors that also need to be “connected” when we gather information. Compliance and regulatory requirements often dictate that humans are part when we “detect” are “act”.

It is important that systems supporting the digitizing processes must provide the ability to gradually shift from human function and judgment to a more and more automated process over time. Organizations want to develop a level of trust in a fully automated environment before they commit to fully automated function.

In a nutshell we can say:

- The availability of affordable, omnipresent computing power in combination with global connectivity allows us to apply a “connect – detect – act” paradigm almost everywhere and for every business or function;
- The ability to “connect” with minimal effort existing and new infrastructure, be it sensors or actuators is a prerequisite. Everything may be a sensor and valuable information, wherever it may reside or come from;
- Utilizing knowledge to “detect” and thus determine which “action” is appropriate is key. But knowledge has many different sources. It may exist based on human experience, may come from almost trivial sources or it may build up over time by analysis, leading to machine learning.
- Humans are a very important piece of the equation, during our “connect” and data gathering phase, even more so when we “detect” what we are dealing with and obviously also when we “act”.

Humans have always invented tools and machines to extend our abilities. The tools have become more and more sophisticated over time and the areas where we are supported by machines have definitely expanded. So far fear has often reigned when looking forward, but it is also a historical fact that it has always been to our benefit looking back.

So why be pessimistic and wait?



Short CV of the author: Dr. Raetzsch is CEO at IoT40 Systems AG. He has managed research and development divisions of large corporations and grew startups to significant size by inventing and building high tech product portfolios, specializing on mission critical cloud applications. These products are today used by thousands of customers and millions of users. Dr. Raetzsch has served several terms as a member of Microsoft’s ISV Partner Advisory Council, and IBM’s Center of CIO Leadership. He is currently the

Technology & Business Strategy advisor for several European high tech companies and is a lector at Universities. He has been an affiliate of the Stern School of Business, University of New York. Dr. Raetzsch has founded TTAGroup, a cross-industry community for technical and market development of safety-related architectures used for drive- and fly-by-wire. He is a founding member, was elected Vice Chairman and is now a fellow of the Workflow Management Coalition (WfMC).
