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Cognitive computing: Can you get your head around it?

Posted By **Niek De Greef**
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Cognitive computing is a great term, but I have a hard time getting my head around it. Some sources talk about it in terms that remind me of the days of artificial intelligence in the late 1980s. Others puzzle me when they talk about mimicking the hardware architecture of the human brain. It's not just IBM that predicts that **cognitive computing** will become a reality in the **next five years**. And we are no longer only looking into a crystal ball, but there are real cognitive systems appearing and being applied to real-world problems.

But what is all this fuss about? First, what is it cognitive computing? Is it old wine in new bags? Or is it really something new?

Becoming cognitive

So what does that word ***cognitive*** mean? Is short, it is the process of how you get to know things through intellectual concepts like thinking and reasoning. In the **cognitive computing** context, it is the process of learning the computer tricks. In cognitive computing we want to go beyond telling the computer what to do when, but instead let the computer find out itself what to do and how to respond.

Artificial intelligence, the department in computer science that studies this topic, has greatly progressed with decision-tree driven knowledge applications. Cognitive systems, in contrast, are self-learning systems that are probabilistic instead of deterministic. These systems are equipped with natural language processing technology and can interpret sensory information, put it in context and learn from the situation.

Systems like **IBM Watson** can already interpret large amounts of information and put that in context to solve real-world problems. Other technologies that have developed recently are **big data** technologies that provide the base infrastructure to analyze large volumes of (transient) data. This allows software solutions to access a large amount of information, put it in context and learn from it.

Like a brain

A second stream that I would call the "hardware" leg of cognitive computing is researching the way the brain operates in order to learn from that and create brainlike computers. The goal is to create a different type of computer system that is better geared toward building learning systems. These types of systems, like the brain, should be able to take large volumes of raw sensory and other forms of data and find information and associations in that data and base complex decisions on these interpretations.

IBM Research is working with collaborators from Columbia University; Cornell University; University of California, Merced; and University of Wisconsin-Madison on a program called Systems of Neuromorphic Adaptive Plastic Scalable Electronics (**SyNAPSE**), in which they are looking to reproduce the working of the brain. SyNAPSE is looking at the way the brain receives sensory input, ties functional components together, adapts these connections and transmits output—all with the goal to create computing systems with the same computing efficiency as the brain, but also with a size and power usage similar to the brain. This project combines the fields of nanoscience, neuroscience and supercomputing as part of a multi-year cognitive computing initiative.

A reality today and much more to come

What is so exciting is that this whole development now makes intelligent computers a reality. Big data technologies provide a basis to feed cognitive systems with data to be turned into knowledge. With **Watson's results in Jeopardy!** we have witnessed a real breakthrough of new computing applications. Watson is now being applied to real-world applications, like in **medicine and healthcare** to improve treatments and in **finance** to improve risk management.

Cognitive computing will remain an exciting area for the coming years, where we will see brain-like cognitive functions and brain-like cognitive and sensory processing capabilities come together.

What do you think about the future of cognitive computing? Leave a comment below.

Niek de Greef is an Executive IT Architect working for IBM in The Netherlands. Niek has more than 20 years of experience in IT. His areas of expertise include technology strategy, enterprise architecture, application integration, software engineering, and infrastructure architecture. You can reach him on Twitter **@NdeGreef1**.

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