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## **Messages from the AI engine room**

### **I am AI, and so's my wife!**

*Not everything that calls itself AI is AI - that has to change, also for many self-proclaimed AI experts*

*By Kristian Kersting*

Recently, an economist spoke to me quite sharply. What had happened? After I had to explain yet again in a discussion what Artificial Intelligence (AI) actually is - namely, the science of algorithms that enable computers to map intelligent (not necessarily human) behavior - he threw back at me, "That's your definition of AI, but there are many out there who see AI differently!"

I think that's terrifying. First, because it is not my definition, and second, because he is unfortunately right with his second point. It's like the national soccer coach syndrome in Germany: pretty much everyone in Germany has an opinion about what AI is, and almost everyone has a different one. Loosely following Monty Python: "I am AI! And so is my wife!" (Original: "I'm Brian, and so's my wife!")

The term AI was coined by the U.S. computer scientist John McCarthy in 1956, and the definition I have cited is also due to him. Simply put, you can think of algorithms as solution plans or cooking recipes for intelligent behavior. These recipes describe step by step how to properly prepare food (the output of the algorithm) from ingredients (the inputs for the algorithm).

Now, there are tasks where it is difficult, if not impossible, for us to grasp and formulate all the eventualities of accomplishing the task. How would your recipe look like for distinguishing, say, images of cats from images of dogs? Think about it for a moment. It's not that simple!

Therefore, machine learning, a sub-discipline of AI, takes a different approach. It refrains from formulating the recipe by hand, simply because there are often too many details. Instead, it literally illustrates our idea of the cat-and-not-dog recipe using hundreds of thousands of example images of cats and dogs (the data) so that ultimately reliable classifications can be made. To do this, it uses recipes for learning recipes themselves.

These recipes for learning are helpful in many areas: They help us in the diagnosis and therapy of diseases, for example, by distinguishing benign from malignant cells (like dogs from cats), they help managers to optimize the production processes in their companies, and biotechnologists to find enzymes for energy production or for degradation of substances harmful to the environment. Actually, they even help us to better understand ourselves. AI's twin discipline, cognitive science, finds and studies recipes of human cognition and behavior.

The increasingly diverse and accelerating use of AI systems understandably presents us with entirely new challenges: After all, if AI systems act independently and make important decisions in the real world, then the actions and decisions must be ethically justifiable. Absolutely clear! And for that, you need interdisciplinary teams. That's why I'm glad that many of my colleagues have started to join forces with other disciplines in order to address these challenges. Even the TÜV (the Technical Inspection Association in Germany and Austria that test, inspect and certify technical systems) have set up a lab for AI to guide and facilitate the process of and the standards for testing safety-critical AI applications. AI has truly arrived in everyday life.

Google CEO Sundar Pichai has said that AI is "more fundamental to humanity than fire or electricity". This may explain why many other companies now like to emphasize that they use AI systems for reasons of self-promotion - even when this is not the case at all. In particular startups that seek new investors like to label themselves as AI, often enough falsely: According to a survey by the investment firm MMC Ventures, 40 percent of 2,830 European "AI startups" do not apply any AI methods at all in their products.

Like the number of so-called AI startups, the number of self-proclaimed "AI experts" is growing in Science, too. But AI is not just a way to get fresh funding. Developing, selecting, and using AI recipes as well as deploying responsible AI systems are all not easy. They require in-depth knowledge and experience. As John McCarthy's definition points out: AI is a scientific discipline whose fundamentals need to be studied.

False AI advertising only stirs up fears, especially "AI experts" who claim that machines have the full range of human intelligence and capabilities and can, in principle, replace or surpass the capabilities of human beings - with understandably troubling consequences. This is misleading. Current AI systems are amazing, indeed, but we humans are still the most flexible and "smartest algorithms on the planet" (picking up the phrase of the Israeli historian Yuval Noah Harari).

We rightly expect that AI system are certificated. Why not AI experts as well? Pharmacist, lawyer or architect are protected professional titles in Germany. It's common in medicine, too. Patients can distinguish between highly qualified specialists and self-proclaimed "plastic surgeons." For AI professorships, there are proven criteria such as a degree in computer science or a comparable field, relevant publications, projects and lectures on the subject of AI. Theses, patents and product developments in the field of AI are good economic indicators. Do we even need an "Association of Health Service Doctors" or a "German Medical Association" for AI that ensure nationwide outpatient care with reliable AI expertise? In any case, we need evidence that someone is the expert they claim to be or are believed to be. Only with honesty can the AI Team Germany successfully set the right course for the future and our prosperity.

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