

"The hype around artificial intelligence is exaggerated"



Prof. Torsten Kröger from KIT explains why machine learning is currently the top topic of robotic research, but the current hype of artificial intelligence is exaggerated.

Source: KIT

What are currently the dominant trends in robotics research?

Especially exciting is the interface between machine learning and robotics. The aim is to reduce the programming effort for robots. After all, it is no secret that today that the robot itself and the associated hardware are not the cost drivers at implementation of robot applications with common robot systems, but the programming effort.

What ideas and approaches exist to simplify programming?

On the one hand, graphical interfaces that simplify programming, with which you intuitively move symbols together on a tablet to create more or less a flow chart. There are already very specific solutions here, for example, from ArtiMinds in Karlsruhe and Drag&Bot from the Fraunhofer IPA. And the cobots Franka Emika and Sawyer have a similar principle. As a result, simple tasks can be implemented easily, but rather complex applications, such as difficult joining tasks, can only be realized using these approaches with greater effort. At this point, the approaches of the machine learning come into play.

What kind of machine learning is this?

You must fundamentally distinguish between perception and actuatorics, i.e., movement. In terms of perception, there are currently enormous breakthroughs in machine learning. There are new records to report almost every week, for example, machine vision recognition of static images is now better than that of humans. In three to five years, we will probably be able to extract depth information from a 2D image with machine learning algorithms, in the same way as a person with only one eye can grab a cup. And, of course, there are enormous advances in speech recognition – consider Google Home and Amazon Alexa.

And what about the machine learning for actuators?

The actuator is the critical point in robotics. Because robotics means you're physically interacting with the world. There are initial approaches in research to teach robots data-driven. Robots should learn like small children by trying things out. This already works in the laboratory in an application-specific manner quite well, for example, with bin picking where robots independently improve using learning methods. But we are still very far away from a generic solution. This is especially the case since learning by experimenting in robotics has its limits.

To what extent?

You learn especially well when you make mistakes. In robots, however, nothing should go wrong in the learning phase, depending on the application of course. Robots shouldn't break parts or hurt people. You can't put robots in an automobile factory that first have to learn how to build cars. Only when we make it possible for robots first to learn in a simulation and then in the real world can learning robots be used much more universally. But we are not that far yet, at least today.

Consequently, the current hype about machine learning and AI is exaggerated?

Absolutely. The topic really needs to be taken back down to earth. Even if there are large breakthroughs in the image and speech recognition, we are still very far from breakthroughs with actuators, i.e., when systems move and physically interact with their environment. We do not even know whether the current methods of machine learning are the right ones here, because the methods aren't currently scalable. The Hollywood-influenced expectations of intelligent, autonomous robots cannot be fulfilled in the short and medium term in any way. Ultimately, you should also be careful with the concept of artificial intelligence: Machine learning simply refers to software algorithms that learn from data. Nothing else. This has nothing to do with artificial intelligence or even human intelligence.

Does this mean that we will never have generic autonomous and intelligent robots?

I would never say that; it would be too pessimistic. But I am not sure that I will experience in my lifetime. At least from today's perspective.

You were Head of the Robotics Software Division on Google [X] for a long time. What is the Silicon Valley brewing up in terms of robotics?

Difficult to say. Although there are 100 robotics startups in Silicon Valley and a lot of venture capital, nothing threatening has been developed in Silicon Valley, which is certainly also due to the mentality of the investors. The investors in Silicon Valley think in a two-year period. But it is simply difficult to build certified and safe robot control in two years, no matter how much money and manpower you have. In addition, the topics of quality and safety are often rather neglected in Silicon Valley. People still employ the "Android philosophy" too much there. If an error occurs on an Android smartphone, then the app crashes or the call is interrupted. In a robot, a mistake can cost human lives. These are two completely different consequences, which therefore require different approaches. With this Android philosophy, of course, you can achieve "much faster initial results and shoot a sexy video after a few months where the robot does fantastic things. But if you want to convert this into marketable products, you sometimes run the danger of ending up in a dead end.

Will the next big thing come from China?

That's much more likely. First of all, the Chinese have recognized the issue of safety and take it seriously now, unlike two or three years ago. And also in the topic of machine learning, the Chinese are equal or even superior to the Americans – at least on the academic side. There are currently more scientific papers from China than from the USA on the topic of machine learning. A whole new generation of engineers is developing in China, who understand machine learning. In addition, the government is strategically controlling the topic. And for strategically important topics, China provides such resources that it would not surprise me if we see some exciting robotics innovations from China in five years.

Prof. Torsten Kröger is one of the most successful German robotics researchers. He has a doctorate from Braunschweig University of Applied Science and founded the multi-award-winning startup Reflexxes, which was purchased by Google rather quickly. He was Head of the Robotics Software Division at Google [X] and also coordinated research activities in robotics and machine learning between DeepMind, Google Research and Google [X]. He also worked as a guest scientist at Stanford University. Since 2017, Prof. Kröger has been Head of the Institute for Anthropomatics and Robotics (IAR) as well as Intelligent Process Automation and Robotics (IPR) at KIT in Karlsruhe.

Prof. Kröger will speak about what is happening in the robotics field in Silicon Valley in the automatica forum at 14:30 on Tuesday, June 19.

Source: KIT
