

AI TECHNOLOGY FOR PEOPLE

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ai
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interview

Frank van Harmelen



CV

Frank van Harmelen

29-10-1960, Bussum

- **1978-1983** mathematics and computer science studies, University of Amsterdam
- **1985-1989** PhD research into meta-level reasoning, University of Edinburgh
- **1990-1995** postgraduate AI researcher, University of Amsterdam
- **1995-2001** AI researcher with focus on semantic web and knowledge representation, VU University Amsterdam
- **2001-present** professor of Knowledge Representation and Reasoning, VU University Amsterdam
- **2019-present** principal scientist Hybrid Intelligence: augmenting human intellect, alliance of six Dutch universities, winner Gravitation subsidy

'We want AI to be a fully-fledged colleague'

Frank van Harmelen is one of the initiators of the largest AI research project in Dutch science history: Hybrid Intelligence. His mission: to develop computers that can make plans and solve problems.

Text: Tamara van 't Woud
Photography: Bob Bronshoff

You are Professor of Knowledge Representation and Reasoning. What makes reasoning difficult for a computer?

'Reasoning requires knowledge. How do we represent knowledge in such a way that a computer can reason with it? Things that are very easy for people are very difficult for a computer – and vice versa. In AI, we call this

Moravec's paradox, named after a researcher who observed this back in the 1980s.

A standard example of this is having a conversation in a natural way: hearing what you say, understanding the language, understanding the context so well that you give it the correct meaning, and then giving an answer that is tailored to the listener. I talk to you differently than I talk to my colleagues. I know pretty much what you know, and I tune my answers to that. The conversation has a purpose. And I know that you know

that I know what the purpose is. A toddler of four can assess that as well. But for a computer, that's very difficult.'

That sounds very practical, that people are good at what computers are bad at and vice versa. Why are we afraid that computers will replace people?

'The basic idea underlying the Hybrid Intelligence project is precisely that people and computers can complement each other. We want to work towards a hybrid team of people and computers working together.

We think such a team is better at some tasks than a team of just people or just computers.

Within the HI project, everyone contributes on a different level. In Delft, for example, they are good at the social side of computers, so they work on the collaborative aspect. A colleague from the VU is working on language

ge technology, which is about the communication between computers and humans. In Groningen, there is a team member who works together with cognitive scientists. And a UvA colleague is working on self-learning computers. Each participating university has its own role. The two universities in Amsterdam are leading the project, and the other four are contributing expertise that we don't have.'

What do you expect from the future of AI?

'I think we're dropping the science fiction film-like idea of computers being intelligent in the same way that people are, and we are focusing more and more on human-computer collaboration. To do that, we have to study other AI questions than we've done up to now.'

Such as?

'Computers are a little autistic now. People are constantly thinking about each other's knowledge, objectives, and motivations. This enables us to work well together in teams. Computers have to get better at this. So far, this is an underexposed aspect of AI, which is why it is so good that six Dutch universities are going to work on this in a collaborative venture.'

You sketch an optimistic scenario, but the world consists of more than well-meaning scientists.

What is the pessimistic scenario?

'Uneven distribution of the benefits of technological revolutions in society. We saw the same thing happen with the Industrial Revolution: initially factory owners became very rich, and the workers became very poor. It took a hundred years before the benefits were distributed a little more evenly. There are concerns that this will be the case with AI.'

How do the results of the Gravitation Project reach society?

'Our particular focus is on application in education and healthcare. For example, a colleague is experimenting with robots in children's hospitals. They can provide information if a child asks when mom and dad will be visiting, or why they need to be in hospital. A robot like that would be part of the hospital staff.'

The challenge for us is to become the first team to publish a scientific article of which AI – which we have already christened AI-nstein – is a co-author. That means AI must have contributed to every step of the process, from the formulation of the hypothesis to the final publication. We want AI to join the team as a fully-fledged colleague.'

Including lunch breaks?

'That could be the hardest thing of all.' ■

column

Fundamental centre of development

VU University and its (Amsterdam) partners are making dizzying progress in various fields of science using artificial intelligence (AI) and data science. What I find striking about our research, to which more than twenty VU professors and their research groups are contributing, are three things.

First of all, on the basis of a fundamental structure, our research is making astonishing contributions to many applications. In the field of health and care, for example, we are developing care robots, AI for the prevention of suicide, and the development of AI-driven therapies to support people with depression. With regard to (business) organisations, our research ranges from the development of an instrument for the police that predicts misconduct and crime to an AI instrument to manage successful recruitment and selection at companies.

A second notable feature of our research is that it often focuses on hybrid intelligence, that is how artificial and human intelligence complement each other. The aim is optimal collaboration between people and machines instead of replacing people by machines. Intended applications here are the use of robots as teaching assistants in the classroom, robots as buddies for children in hospitals, and AI as a collaborative partner of scientists.

Finally, it strikes me that we are working together so much in this field of science. Not only with other knowledge partners, in Amsterdam and internationally, but also with other organisations on a large scale. And research teams are not only made up of hard scientists, but also scientists from other disciplines, such as linguists, business experts, doctors, psychologists, criminologists, and human movement scientists.

All in all, I am enormously proud of the rapid growth of our research and education in this field. Although this sometimes makes a new building too small at its opening, our contribution to social challenges based on often multidisciplinary and translational research is spectacular. It is, therefore, logical that we see artificial intelligence and data as a fundamental centre of development of the VU University Amsterdam.

Mirjam van Praag

President of the Vrije Universiteit Amsterdam

