

# Artificial Intelligence and the *conditio humana* of Knowledge Pursuit

New Year's Speech

by the President of the Deutsche Forschungsgemeinschaft  
(DFG, German Research Foundation)

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Check against delivery!

Ladies and Gentlemen, Excellencies, Distinguished Guests,

A new year has begun and it is a great pleasure for me to welcome you and celebrate this new year together with you. I sincerely hope that you had the opportunity to enjoy the festivities with your family and friends.

The beautiful backdrop of the Leibniz Hall of the Berlin-Brandenburg Academy of Sciences and Humanities almost belies the fact: we live in uneasy times. War and terror are inflicting suffering on Israel and Ukraine. We continue to stand in full solidarity with both countries and our sympathy goes to *all those* who are suffering.

Yet, even in this country, the all-too-loud calls for simple solutions and the growing echoes of the darkest hours of the past century fill me with major concern. The marks on the pillars around us send a clear message.

In these times, 75 years after the proclamation of our Basic Law and 35 years after the Peaceful Revolution, we *must* take a stand for our open, diverse and democratic society in which any form of discrimination, antisemitism, racism and violence has no place.

And we must be committed to freedom of thought, freedom of speech as well as to free and knowledge-driven research, because they are essential preconditions for overcoming the complex and interwoven global challenges.

Science has been working on the topic of artificial intelligence for almost 70 years<sup>1</sup>. AI methods have long been used for the benefit of society – we only need think of AI-supported medical diagnostics, for example. Yet, as you are all aware, the increasing spread of generative AI triggered a controversial social debate about a year ago. Here, we have clearly seen that an unreflective approach to AI is inappropriate given the opportunities and risks it presents to people.

After all, it has long been obvious that artificial intelligence is here to stay. For Germany as a centre of research and industry, helping to shape the further development of AI is a question of future viability, security and attractiveness as an international partner. What is more, ethically responsible AI is important for our society's digital sovereignty and resilience – not least in counteracting societal uncertainty and disadvantage.

For this reason, we welcome the fact that the European Union has reached a provisional agreement regarding the regulation on artificial intelligence. The "AI Act" protects European values and the security and fundamental rights of people and companies in the digital space. What is more, it strengthens free, knowledge-driven research, both where the focus is on AI itself and where AI is used as a tool for research.

From the point of view of research – and I firmly believe this applies to all areas of society – a responsible approach to AI is crucial in order to be able to be more effective in harnessing its potential and minimising its risks. We need innovative solutions, especially when it comes to sustainability: data centres alone consume enormous amounts of energy, accounting for around 4–5% of global electricity consumption – and the trend is rising.<sup>2</sup> Ideally, AI should help make the entire digitalisation process more sustainable.

In order to make AI not only more efficient and sustainable but also safer and more transparent, a clear distinction has to be drawn in its development and use between desired outcomes and actual risks of misuse. Safeguarding against human rights violations and disinformation campaigns, as well as in the area of cyber security is particularly important. Meanwhile, positive changes are desirable in the world of work, public administration, education and healthcare.

Research is facing up to these challenges – and so is the DFG. Generative models in particular are still far too unreliable and imprecise for use in scientific research. Bernhard Schölkopf recently characterised them as "fiction machines" – systems optimised to tell stories that are as

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<sup>1</sup> Inauguration of the research field in 1956: "Dartmouth Summer Research Project on Artificial Intelligence".

<sup>2</sup> Including digital technologies such as smartphones and laptops, it is estimated that this figure could even be as high as 8%. Figures according to Prof. Dr. Ralf Herbrich (HPI Potsdam, Chair for Artificial Intelligence and Sustainability), *Die Welt*, 24.10.2023.

plausible as possible.<sup>3</sup> Last year, the DFG Executive Committee published its first guidelines for the use of generative models in the research context, emphasising how important it is to safeguard good research practice and the quality of scientific results.

Furthermore, the DFG's funding activities aim to further strengthen Germany as a centre of research and industry in the field of AI, too. Long before the current debates on generative AI, we launched a strategic funding initiative to promote AI research. The focus here was on funding Emmy Noether Independent Junior Research Groups and Research Units, supplemented with trilateral AI basic research projects with partners in France and Japan.

The DFG also funds cutting-edge, knowledge-driven AI research through various funding programmes – whether basic research into algorithms and models of AI and machine learning, or the use of these tools in scientific research. The social, political and economic implications of the use of AI in almost all areas of life are of particular interest, too.

As a groundbreaking future-oriented and key technology, AI benefits from highly dynamic global competition between research and industry. Established research institutions and the development departments of large corporations compete with each other across numerous areas, ranging from basic research to the development of large-scale AI models. And each side has its own strengths to contribute – brilliant minds on the one hand and gigantic computing infrastructures on the other.

In order to succeed as an attractive base for research and industry in this global contest, we must join forces as we think ahead to the future. We need to develop artificial intelligence in such a way that sets it apart from existing approaches: in other words, AI that is technologically at the forefront, made in Germany and tailored to European standards, as well as being ethically responsible, socially acceptable and sustainable. But there is no time to lose. Networking, exchange and collaboration are the order of the day – not only between individual areas of research but in particular between research and the corporate world.

By engaging in sound, trusting and responsible cooperation, we can minimise social risks and find solutions for the urgent need to improve the resource efficiency of AI. Such an approach will also ensure that European AI solutions safeguard fundamental personal rights, copyright and data protection rights as well as our constitutionally guaranteed freedom of research.

This kind of AI – AI that is secure and capable of being used for research – is based on improved systematisation and more qualitative curation of its data basis. This is of key importance – not just for the further development of transparent and safe AI, but also in order to ensure

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<sup>3</sup> Bernhard Schölkopf, *Die kybernetische Revolution: symbolische, statistische und kausale künstliche Intelligenz*, Leopoldina Christmas Lecture, 07.12.2023, [www.youtube.com/watch?v=e\\_tGAtTY-bY](https://www.youtube.com/watch?v=e_tGAtTY-bY).

that the various ways in which AI works are explainable, and that its output is reliable and reproducible.

When it comes to AI regulation, freedom of research on and with artificial intelligence is thus not the only key factor: it is also essential for research to have free access to the latest AI developments and the underlying data sets. In order to be open and prepared for the sustainable development of this field in the future, over and above current trends, it is important to bear in mind the entire breadth of the dynamic research landscape.

Nonetheless, the key to the further research on and development of artificial intelligence lies in the researchers themselves. This is why something that in fact applies to every branch of research is crucial here, too: we need to attract the best and most creative minds and ensure that they are able to develop their excellent ideas for a free research system and put them into practice for the common good.

Excellent research requires precisely developed subject-specific or interdisciplinary methods. A particularly masterly use of AI may be one tool among many: in certain contexts, for example, hybrid teams can be a viable way of using co-creative processes with AI as a sparring partner, thereby accelerating the research process.

But how is it possible to assess hybrid research performance? Could research outcomes generated by AI be worthy of a Leibniz Prize? Research awards like the Leibniz Prize are usually granted to researchers for outstanding academic achievements, honouring brilliant minds who, driven by curiosity, have gained outstanding insights through excellence in research.

The DFG is currently observing how the use of AI in the research process impacts on how performance and success are attributed and evaluated within the reputational system of excellent cutting-edge research. When reviewing and assessing scientific excellence in particular, it might be crucial in the future to take a differentiated view of what AI has contributed and what an individual researcher has achieved. Whether in the DFG's statutory bodies, in the Senate Working Group on the Digital Turn or in dialogue with reviewers and the research communities: the essential point is to determine where researchers stand in relation to AI.

Artificial intelligence is capable of recognising patterns and learning from statistical probabilities within a given set of data. Humans, by contrast, are able to gain a deeper conceptual understanding of a given issue. Scientific curiosity, creativity and experience enable researchers to penetrate unknown dimensions of knowledge even where there is little or no data basis.

This mapping of scientific *terra incognita* in the search for knowledge is underpinned by the researchers' diversity of perspectives: the dialogue between the extensive expertise of experienced researchers and the fresh ideas of those in early career phases opens up new horizons. Essential qualities that drive any researcher are their desire to pursue knowledge, their deep understanding of the nature of things, and their ingenious innovation.

When brilliant minds jointly engage in the pursuit of knowledge, creativity breaks fresh ground, with individual personality traits and contradictory forces ultimately generating constructive friction. In this way, collaborative thinking potentiates scientific excellence and opens up new horizons in discourse, often "on the go" – something that would be difficult if not impossible for a machine to achieve. After all, ground-breaking innovations can arise throughout the entire course of a research process – whether as a heightened awareness of the problem, innovative approaches or questions leading to new ideas.

In this way, scientific knowledge is like a point of crystallisation that can itself give rise to fresh perspectives, conclusions and developments. For AI, the output marks the end point of its pursuit of knowledge; but from the researchers' perspective, knowledge only begins to unfold its actual potential in scientific discourse, and ultimately in our minds and actions.

Scientific knowledge can mature in human consciousness, leading to well-considered decisions and ultimately developing its enormous potential: knowledge expands our range of options for taking action and making decisions in society, business, politics and research itself. On a personal level, as researchers, it can awaken in us a need for reflection and reassurance; a need to ponder, to scrutinise our hypotheses and solutions, and to verify the results. But more than anything, knowledge can spark an enthusiasm in us as researchers – a desire that is both an incentive and a mandate for us to engage in further in-depth research. This mixture of caution and enthusiasm defines research as conducted by human beings rather than by machines.

Even if AI is designed to be mimetic and human-like traits are attributed to it, namely intelligence: it is not a subject that exercises agency in the philosophical sense. It tends to have difficulty with genuine empathy, ambiguity and aphorisms – indeed with humour, irony and the productive play on ambivalences in general. Such qualities are just as alien to it as the human capacity to arrive at solutions through misunderstandings that are neither intended nor anticipated. Though it is admittedly revolutionary and powerful, artificial intelligence remains a tool that we should shape and use in an ethical and responsible way.

This is particularly true for research, whose pursuit of knowledge has been driven and permeated by technology for centuries. The tools available to science and the humanities have always shaped the character of research activity at any given time in history, and this will continue to be the case in the future: just think of the printing press, Galileo's telescope, or the fact that genome sequencing – once the work of an entire lifetime – can now be performed on an automated basis within a very short period of time. Just as scientific tools expand the horizon of potential knowledge production, they also change our perception of excellence in research.

This dynamic is one of the threads that runs through the entire history of research and defines our constantly evolving knowledge society. Our capabilities shift with every technological milestone, often making us aware of talents we were previously not even aware of. Right now, it is artificial intelligence that is challenging us in our cognitive capacity to learn and access new knowledge. This opens up new possibilities for further development in an area that we have always experienced as a meaningful element of being human.

Artificial intelligence can support the pursuit of scientific knowledge and help resolve global human issues more quickly – and that makes me optimistic. *How* we humans shape our future with artificial intelligence is up to us. Research is investigating the ways in which we can make this instrument as efficient, transparent, trustworthy and safe as possible so that it can be used to the best possible benefit of all of us collectively on this planet.

Thank you very much!