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Artificial Intelligence and Social Security

Transparency creates Trust
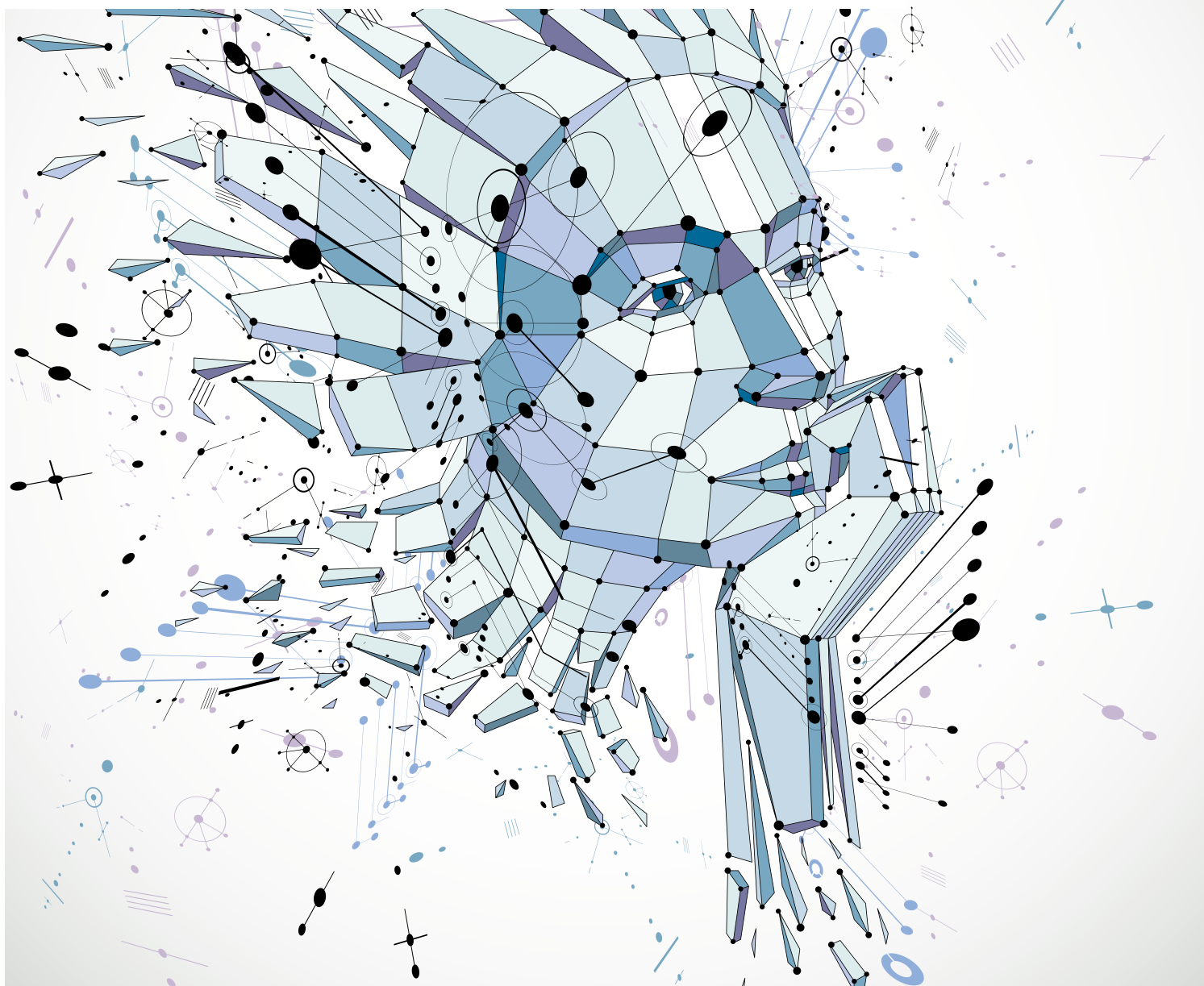
Dear Reader,

Our understanding and perception of artificial intelligence lies somewhere between 'technological revolution' and 'attack of the algorithms'. These notions are often diffuse, driven by our fascination of possibilities and technical complexity on the one hand, and by scepticism and mistrust on the other, because it seems that our control over technology is slipping away. So, it comes as no surprise that the topic of artificial intelligence is on the political agenda. After all, artificial intelligence is already reality; it is being used, tested, researched and further developed in a wide variety of areas. The challenge now is to create the framework conditions for this system to develop its potential but within the limits that we humans set.

People's trust in artificial intelligence can only be gained through transparency, understanding and common guidelines. It must be clearly defined who is liable if an AI-supported system makes wrong decisions. People must be able to understand why and how decisions are made. They must be able to reject decisions. There must be a common understanding of the values on which artificial intelligence is based. In areas where decisions have a direct impact on people, especially in the health sector, it must always be possible to have control.

It's time to face these issues together. At European level, there are a number of initiatives dealing with the topic. 29 European countries have declared that they will work together to develop the issue and find solutions. This has to be done the right way, because artificial intelligence knows no national borders.

In the current issue of ed*, we outline the potential of artificial intelligence for social security – with all its possibilities but also questions that need to be answered.

We hope you enjoy reading this month's ed*!

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Director

The future is already here

Artificial intelligence and social security – potential, opportunities, limitations

The technological development of artificial intelligence (AI) and its potential use appear to be difficult to assess at present. One thing is certain: in the future, algorithms will increasingly assist people in making decisions or will be able to make them themselves. This raises questions about how to control them effectively and about a legal and ethical framework – especially when AI-supported decisions have a direct impact on people.

AI – no longer a dream, it's reality

The topic of artificial intelligence is currently high on the agenda at both European and national level. In April 2018, 25 European countries, including Germany, declared that they would cooperate on the most important issues relating to AI. A further four countries have since followed. The focus is on how to ensure Europe's competitiveness in the research and use of AI, as well as on social, economic, ethical and legal aspects of AI. At the same time, the Commission presented its Communication on 'Artificial Intelligence for Europe'.[1] The initiative is based on three elements. Firstly, boosting the EU's technological and industrial performance and the uptake of AI across the economy, both in the private and public sectors. Secondly, preparing for the socio-economic changes resulting from AI. Thirdly, ensuring an appropriate ethical and legal framework based on the values of the Union and consistent with the Charter of Fundamental Rights of the European Union. Member States are invited to draw up national AI strategies or programmes by mid-2019.

Artificial intelligence will play a bigger role in our everyday lives.

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[1] Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions of 25/4/2018, Artificial Intelligence for Europe, COM(2018) 237.

What is Artificial Intelligence? A question that still doesn't have a clear answer after 60 years of research.

Germany published its 'Artificial Intelligence Strategy' in November 2018. As part of its strategy, the Federal Government also wants to check for gaps and loopholes in the existing legal framework with regard to algorithm-based and AI-based decisions, services and products and adapt them where necessary.[2] This is because it believes that the increased number of decisions made by AI affects political, cultural, legal and ethical issues. Federal Justice Minister Katarina Barley and Federal Labour Minister Hubertus Heil explained that clearer rules and legal certainty are needed if algorithms are to prepare or take over an increasing number of tasks and decisions for people. Otherwise there will be no trust in the applications of AI.[3]

What is artificial intelligence?

Artificial intelligence has a long history. In a test he developed in 1950, mathematician Alan Turing described a system as intelligent if its answers and reactions are indistinguishable from those of a human being.[4] However, after more than 60 years of research, there does not seem to be a uniform definition of AI. One reason for this could be that AI is an open term that refers to a wide range of products and applications.[5] The European Commission's High-Level Expert Group on Artificial Intelligence developed a working definition of AI in April 2018: 'Artificial intelligence (AI) refers to systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals. AI-based systems can be purely software-based, acting in the virtual world (e.g. voice assistants, image analysis software, search engines, speech and face recognition systems) or AI can be embedded in hardware devices (e.g. advanced robots, autonomous cars,

Machine learning – the core of artificial intelligence.

Artificial Intelligence

Machine Learning

Deep Learning
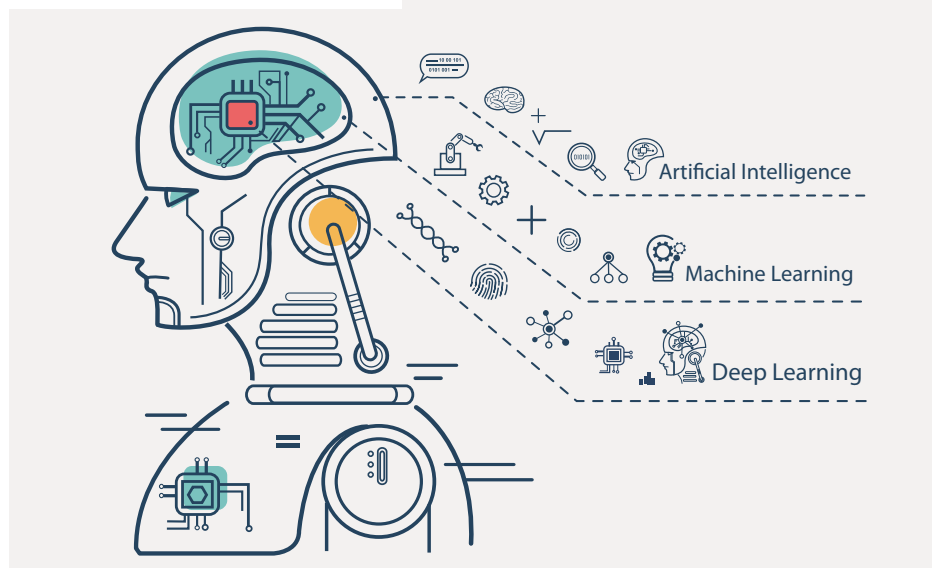
AI can't replace a doctor, but it can help with diagnosis.

The potential for AI systems as intelligent assistants in healthcare is significant.

drones or Internet of Things applications).'[6] AI can be divided into two forms: strong (general) AI and weak (narrow) AI. Strong AI refers to systems that are intended to have the same intellectual abilities as humans, whereas weak AIs are systems that have been programmed to perform a few specific tasks.

The use of AI in social security

The potential applications of AI in the field of social security are enormous. This includes medical care, adaptive systems in robots carrying out dangerous activities in the working world, communication with insured persons and management of benefits. For example, considerable importance is attached to the use of AI in the early detection and treatment of chronic diseases. A reduction in healthcare expenditure in the hundreds of billions is forecast. A study looked at the use of AI with regard to three widespread diseases: obesity, dementia and breast cancer. By 2027, a savings potential of 90 billion euros is expected through the prevention of obesity in children, eight billion euros through the early detection of dementia, and 74 billion euros through the early detection and customised treatment of breast cancer.[7]

[2] See German Federal Government's Artificial Intelligence (AI) Strategy (in German), November 2018, p. 38.

[3] See guest commentary in the Handelsblatt online: https://www.handelsblatt.com/meinung/gastbeitraege/gastkommentar-spd-minister-barley-und-heil-kuenstliche-intelligenz-braucht-klare-regeln/24232094.html.

[4] Künstliche Intelligenz, Grundlagen und Herausforderungen, Prof. Dr. Klaus Mainzer, in Technik in Bayern, Regional Magazine for VDI and VDE, March 2018, p.6.

[5] See Artificial Intelligence ante portas: Legal & ethical reflections, Mihalis Kristos, European Parliamentary Research Service, European Union, March 2019, p.1; In response to a proposal from the European Parliament, the Commission has launched a pilot project on the challenges and opportunities of algorithmic decision-making. A 16-month study, launched in March 2018, is part of this project. It will provide an in-depth analysis of the role of algorithms and clarify how they shape, filter or personalise intermediary information flows.: https://www.algoaware.eu/.

[6] A Definition of AI, Independent High-Level Expert Group on Artificial Intelligence, April 2019, p.1.

[7] See Sherlock in Health, How artificial intelligence may improve quality and efficiency, whilst reducing healthcare costs in Europe, PwC, June 2017, p.10 ff; see also PwC Deutschland, https://www.pwc.de/de/gesundheitswesen-und-pharma/wie-kuenstliche-intelligenz-das-gesundheitssystem-revolutioniert.html.

Could AI be the answer to staff shortages in long-term care?

AI systems can assist and speed up people's decisions by quickly providing relevant information regardless of the location, and by revealing hidden connections.[8] An example of this is the EU-funded Smartnurse project. One of the aims of this project was to explore new forms of human-machine collaboration that can be integrated into real-life educational situations for the healthcare sector. One of the project's experiments illustrates how students, trainees and patients can be assisted. During a simulated resuscitation, nursing students were equipped with a portable intelligent assistant. This assistant can assess chest compression techniques during a resuscitation attempt and provide feedback in real time. On request, it provides further information, including suggestions on how to proceed, answers to medical questions, and information on hospital regulations.[9]

In view of the ageing society and the shortage of nursing staff, the use of AI is also being increasingly considered in the area of long-term care. Japan, for example, wants to increase the use of robots and artificial intelligence in long-term care because of its rapidly ageing society. The Japanese government estimates that there will be a shortage of around 370,000 people in the long-term care sector by 2025.[10]

These are just a few examples of how AI can be used in social security. The European market for AI is expected to grow from around three billion euros in 2019 to 10 billion euros in 2022, according to estimates by the digital association Bitkom. Healthcare is one of the most prominent fields for the application of artificial intelligence.[11] However, AI systems can also be used in areas other than medical care. They can help to more accurately evaluate

Humans and machines complement each other's abilities.

Algorithms as smart auditors.

Artificial intelligence also has potential for social security outside of medical care.

the billing of services and more effici-
ently make fact-based decisions, for
example in hospital invoice auditing.[12]
Manual processes can be automated
by virtual processing, which classifies
correspondence, prioritises it and
forwards it to the relevant 'human
processor'. AI could also be used to
identify and select cases of judicial
recourse in the fight against fraud.[13]

The use of AI systems that can assist
people in their decision-making or
even surpass it in terms of accuracy
and speed is already a reality. The
path to harnessing the full potential
of AI – making autonomous decisions
with limited human intervention – is no
longer that far away.

[8] See Zukunftsmarkt Künstliche Intelligenz, Potenziale und Anwendungen, Fraunhofer-Allianz Big Data, 2017, p.42.

[9] Information on the project: https://cordis.europa.eu/project/rcn/209422/factsheet/en. See also: http://ec.europa.eu/research/infocentre/article_en.cfm?id=/research/headlines/news/article_19_01_23_en.html?infocentre&item=Infocentre&artid=49882.

[10] Aerzteblatt.de, Japan setzt verstärkt auf Pflegeroboter und künstliche Intelligenz, March 2019, https://www.aerzteblatt.de/nachrichten/sw/K%FCnstliche%20Intelligenz?nid=101731.

[11] Bitkom e.V., https://www.bitkom.org/Presse/Presseinformation/Europaeischer-KI-Markt-verfuenffacht-sich-binnen-fuenf-Jahren. The information is based on a study 'AI in Europe - Ready for Take-off'. The study was conducted by the European Information Technology Observatory (EITO).

[12] Künstliche Intelligenz in der Krankenversicherung, Steffen Hehner, Manuela Martin, McKinsey&Company, September 2017.

[13] See GKV 4.0 – Trend-Monitor, The Boston Consulting Group, November 2017.

Is it possible to effectively control algorithmic decisions despite their complexity?

Humans and Machines – who controls whom?

Humans vs. Machines – who controls whom?

These developments and examples show that the enormous potential of AI also shifts the balance of power between human and machine. The feeling of being 'powerless' can only be countered with transparent AI. What sounds like science fiction, preventing algorithms from taking power, has long been the subject of discussions in science and politics, including at European level. The European Parliament has published a resolution entitled 'A comprehensive European industrial policy on artificial intelligence and robotics'. It calls for people to have a right to know, a right of appeal and a right to redress when AI is used in decisions that may pose a significant risk to or harm the rights and freedoms of individuals.[14] The underlying fear is that the ability of AI systems to deal with complex data sets and autonomous learning could lead to decisions that they make no longer being fully understood and controlled by humans. In the field of social security, this could have

Transparency is the foundation of trustworthy AI.

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considerable consequences for insured persons. It is a matter of having adequate human control of AI and the right legal and ethical framework conditions necessary to ensure this.

In its resolution, the European Parliament stresses that the development of AI systems must respect the principles of transparency and accountability with regard to the algorithms used, so that their activities can be understood by humans.[15] However, this poses a problem, because it is no longer just the general public that lacks an understanding of how algorithmic systems work. This is the conclusion of a study proposing various policy measures for transparency and accountability.[16] It calls for awareness-raising and capacity building to better understand the functioning of algorithmic systems and their basic selection and decision-making criteria. Other measures relate to transparency and accountability in the use of such decisions in the public sector, including social security institutions. Here, an algorithmic impact assessment (AIA) should help to explain where such systems are used and evaluate their intended use and implementation.

However, the financial and administrative burden of such an impact assessment could be disproportionate in the private sector, especially for smaller, low-risk applications. The resolution proposes creating a legal liability framework that would provide for reduced transparency and impact assessment requirements in return for more extensive liability. It is proposed to establish a regulatory authority with expertise in the analysis of algorithmic systems and a network of external advisory experts.

Can algorithmic systems still be controlled?
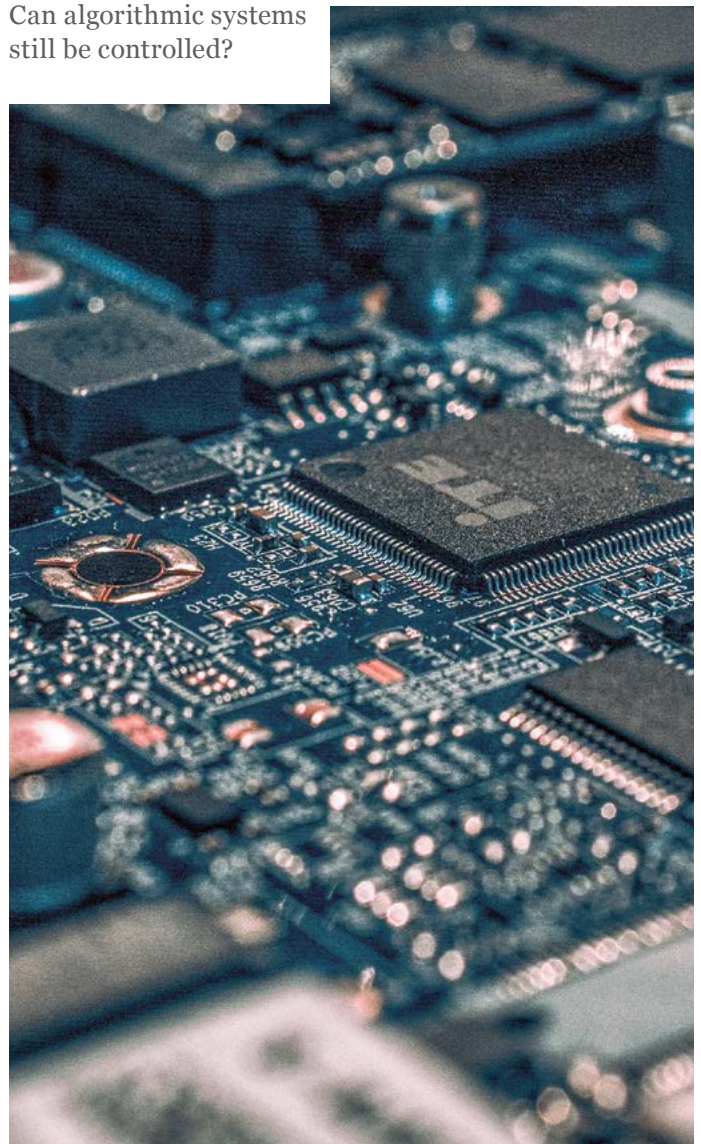
[14] European Parliament Resolution of 12 February 2019 on a comprehensive European industrial policy on artificial intelligence and robotics (2018/2088(INI)), Point 153.

[15] European Parliament Resolution of 12 February 2019 on a comprehensive European industrial policy on artificial intelligence and robotics (2018/2088(INI)), Point 158.

[16] See A governance framework for algorithmic accountability and transparency, A. Koene, C. Clifton, Y. Hatada, H. Webb, R. Richardson, European Parliamentary Research Service, 2019, S. 69ff.

Do we need to revise our legal framework?

Legal framework – robots as 'electronic persons'

The prospect that AI will be used more and more in sensitive applications raises not only the question of control but also the issue of an adequate legal framework. The interpretation and application of existing law to such situations is often fraught with uncertainty. There is hardly any case law to which reference could be made. Legal terms such as legal personality, responsibility and liability no longer seem to fit here.[17]

The European Parliament has already dealt with the issue of the legal nature of autonomous robots in its resolution 'Civil Law Rules on Robotics'. It called on the Commission to examine the impact of creating a specific legal status for robots as 'electronic persons', including robots that make independent decisions or otherwise interact independently with third parties.[18]

If there were to be an electronic person in that sense, the question arises as to who is responsible for their actions and who is liable if they cause damage. In its resolution 'A comprehensive European industrial policy on artificial intelligence and robotics', the European Parliament called on the Commission to monitor developments in the use of AI. If necessary, changes to the legal framework will be proposed to clarify the division of liability between those who use the robots/AI systems (e.g. doctors), those who make them, and the medical facility providing the treatment.[19] The underlying concern is that users, without taking into account their own professional judgement, would agree with

Who is liable for a mistake made by AI?

Do algorithms make fair decisions?

What values need to be taken into consideration when developing trustworthy AI?

the diagnosis or treatment proposed by AI, because they would otherwise fear being made liable.

One possible solution, according to the European Parliament, is to set up a compulsory insurance scheme. Similar to the system for motor vehicles, manufacturers or owners of robots would be obliged to take out insurance against damage caused by their robots. This could be supplemented by a compensation fund for damage caused by a robot which is not covered by insurance. It would also be conceivable to have a system of limiting the liability of the manufacturer, the programmer, the owner or the user if they contribute to this fund.[20]

The European Commission wants to investigate whether further amendments to the existing legislation are necessary, e.g. in the area of data protection which will not be discussed here, and intends to submit a report by the middle of the year.[21]

Ethical guidelines – which values are AI based on?

However, regardless of these legal aspects, AI also raises ethical questions; for example, with regard to potential bias

and discrimination in AI decision-making, or with regard to values such as self-determination, avoidance of harm, fairness and accountability, which must be taken into account as part of the development of an algorithm.

[17] See Robotik und Künstliche Intelligenz im Recht, Prof. Dr. Susanne Beck, in Technik in Bayern, Regional Magazine for VDI and VDE, 03/2018, p.13.

[18] See European Parliament Resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)), Recitals Z and AC, as well as Point 59.

[19] European Parliament Resolution of 12 February 2019 on a comprehensive European industrial policy on artificial intelligence and robotics (2018/2088(INI)), Point 77.

[20] See European Parliament Resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL)), Recitals Z and AC, as well as Point 59.

[21] Annex to the Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions of 7/12/2018, Coordinated Plan on Artificial Intelligence COM(2018) 795 final, p. 22.

The Commission tasked the High-Level Expert Group on Artificial Intelligence with developing ethics guidelines, which were presented as part of Digital Day 2019.[22] One of the basic principles of the guidelines is the development of integrated ethics, which would see ethical principles taken into consideration from the very beginning of the design process of AI products and services.[23]

Now that the main requirements for trustworthy AI have been identified, the Commission intends to launch a pilot project in summer 2019 and gather feedback on how to improve the assessment list. After the pilot phase, and based on the feedback received, the High-Level Expert Group will review the evaluation lists in early 2020 and propose any next steps to the Commission if necessary.

Artificial intelligence will also play an increasingly significant role in the field of social security. From the examples given, we can clearly see that AI can be used for a wide range of applications for social insurance that can benefit insured persons. But the limitations and risks of using AI must not be ignored. A legal and ethical framework for the use of AI, transparency, accountability and the effective monitoring of the decisions taken by AI can help to create acceptance and trust among insured persons.

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[22] See Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions of 25/4/2018, Artificial Intelligence for Europe, COM(2018) 237, p. 18; Commission Press Release: http://europa.eu/rapid/press-release_STATEMENT-19-2070_en.htm.

[23] Ethics Guidelines for Trustworthy AI, Independent High-Level Expert Group on Artificial Intelligence, April 2019, p. 14.

Contact

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