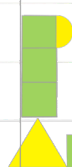


ENVISIONING OUR FUTURE WITH ROBOTS & AI

Opportunities & challenges



Robots and AI are considered game changers and key drivers of economic growth and wealth in the coming decades. However, critical voices emphasise that these technologies are also accompanied by ethical and legal challenges and forecast fundamental changes in society.

But not only experts, also citizens are ambivalent about robotics and AI. But not only experts, also citizens are ambivalent about robotics and AI.

The majority of people think that robots should be used to take over dangerous work like exploring space, and many of us would use robots to clean our flats, but only a minority think that robots should take care of our elderly and our children. California, one of the first US states to allow high autonomous cars on its streets, has recently experienced “robo-rage” in which humans attack self-driving cars on the street.

But not only experts, also citizens are ambivalent about robotics and AI. The 2017 Eurobarometer survey reveals that 72 percent of EU citizens fear that robots will take their jobs. ¹ A representative public opinion poll on robotics and AI in Austria found that the half of citizens have a positive attitude towards robotics, while the other half are sceptical or worried about it (see Glancing and Hacker, 2017).

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THE UTOPIAN SCENARIO

People live in safe cities and communities. Social robots support educators and instructors in developing children's individual capabilities and giving everyone access to information, education and life-long learning.



DATA MONOPOLY'S DARK FUTURE

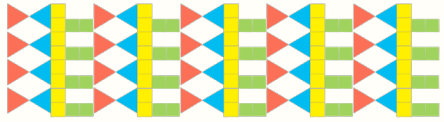


Furthermore, the simulated emotions and symbolic actions of robot companions hold the prospect of controllable personal relations.

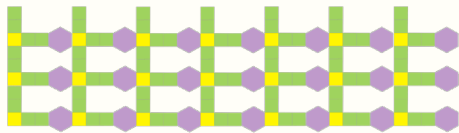
Automation and robotic technologies have cut the number of jobs by more than 50 percent since 2020.

ETHICAL CHALLENGES

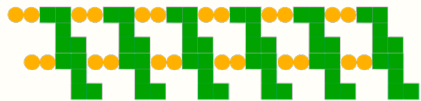
Financial market crashes :



Self-driving accidents :



Medical robot errors :



Privacy issues :



AI bias :



Enter "App-titude"
together !



As robots become increasingly autonomous, who should bear ethical or legal responsibility is unclear.

If an AI system operates on the financial markets and causes a crash, who is responsible?

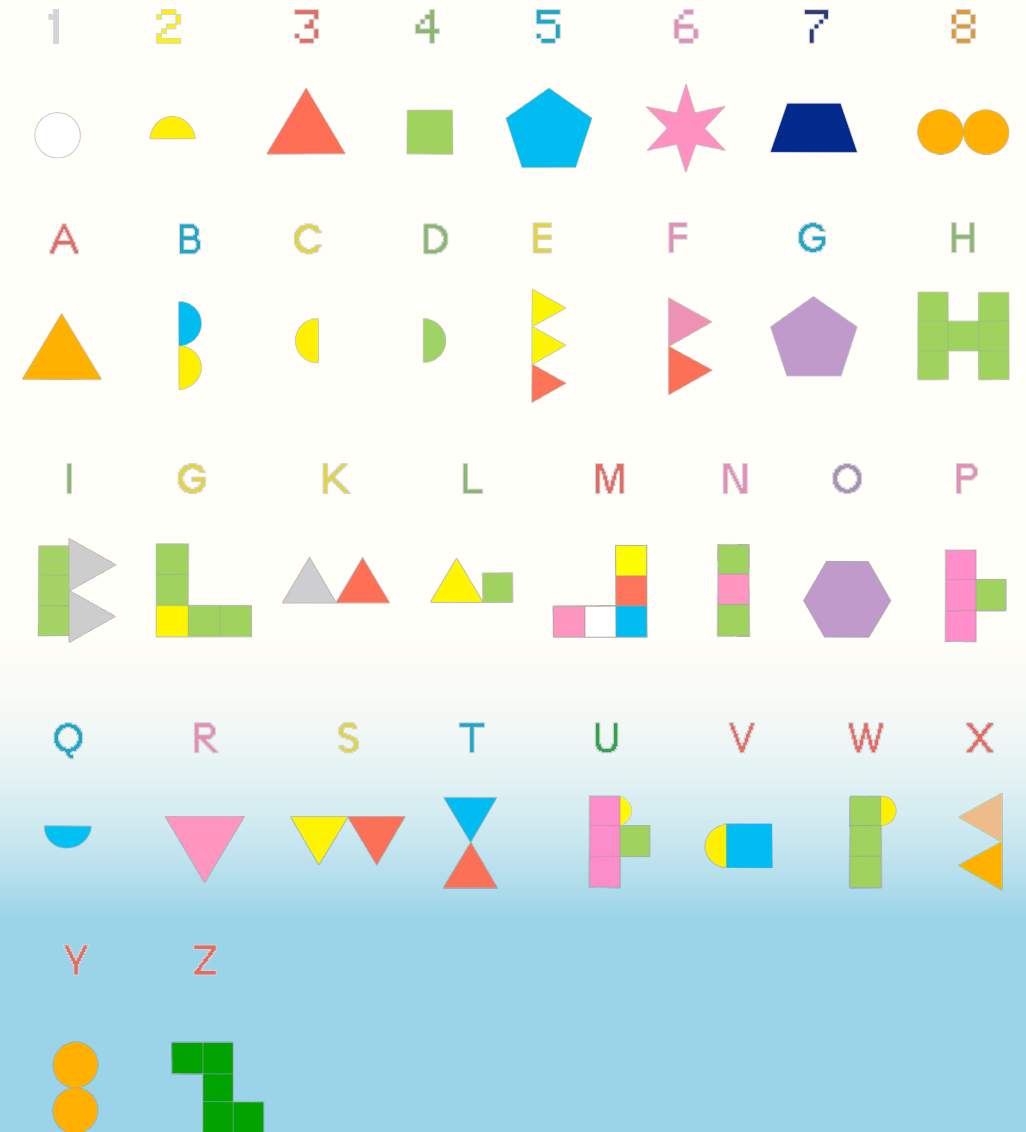
If a healthcare robot gives the wrong medication to a patient, is this the human nurse's responsibility?

Another challenge is privacy. We may interact with a robot but not know what the robot records and where the data goes. Does it go to the robotics company?

Is the data sold to a third party or even a government?

APP — TITUDE

The Life of AI Identity Sequence

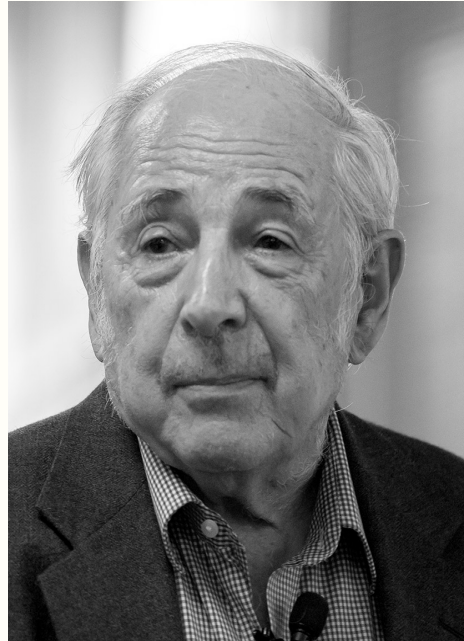


SCIENCE AND FICTION

HOW FAR IS SCIENCE FROM FICTION?

Contemporary AI systems fall—without exception—into the category of narrow AI.

John Searle argued in the “Chinese room argument” that while a computer can manipulate symbols, it cannot truly understand them.

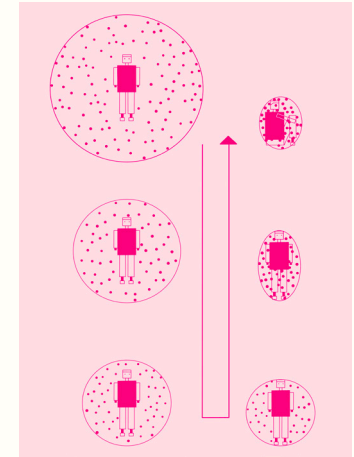


Predictions about AI development have often been overconfident, showing little correlation with actual progress.



John Searle
Chinese Room
Argument (1984)

The *Narrow AI*

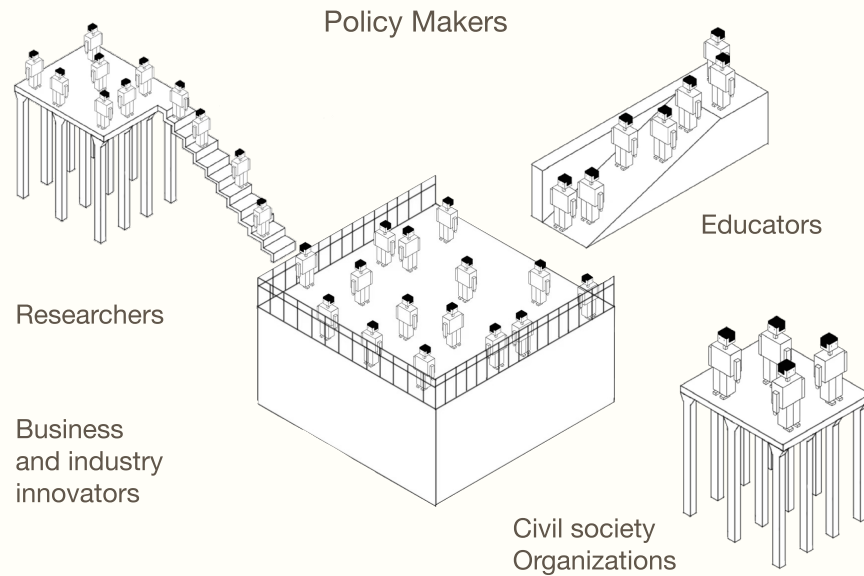


Contemporary AI systems fall—without exception—into the category of narrow AI. They perform well on a relatively small portion of the tasks that humans are capable of. However, even now, some systems can outperform humans in very specific tasks, e.g., computer programs have beaten the world’s best chess and GO players, defeated humans in the television quiz show Jeopardy! and surpassed the capabilities of humans in image recognition . What is more, robots and AI programs today are able to converse in natural language, and with machine-learning capabilities, AI systems are able to learn tasks autonomously from scratch without having to be programmed by a human beforehand.

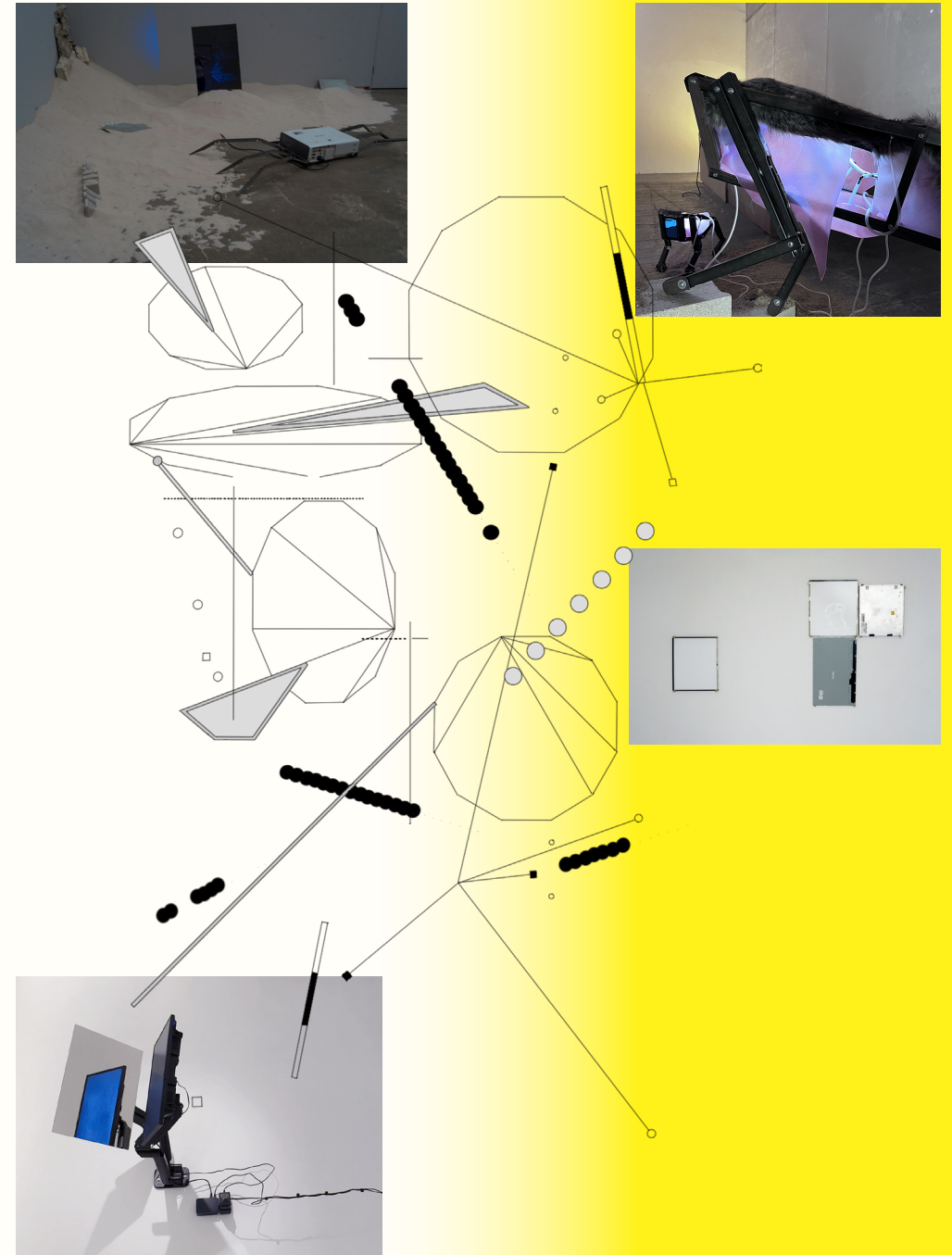
Nevertheless, it does not seem feasible for a robot to win a chess game and then move on to mow the garden and help with tidying up—all while asking you how your day was.

The last issue about superintelligence raises an old but fundamental fear of humankind: machines could takeover complete control and enslave us. This fear has been addressed in various science fiction movies, including the very famous Matrix things.” But how far is science from superintelligence?

Robotics and AI technologies will undoubtedly shape our future and deeply impact our society. Existing and emerging technologies in the field of robotics and AI clearly present great opportunities for innovators, industry, and citizens in Austria and in Europe. This field will transform countries' economies and lead to interesting new products and services. More smart objects will be deployed in industry but also at work and at home, including robotic and AI systems. This is likely to benefit many people. However, some of these benefits may not be clear yet, and it is essential to address the ethical and societal issues now.



HOW TO REALISE OPPORTUNITIES WHILE MITIGATING CHALLENGES?

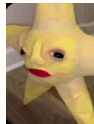


In 2016, the European Parliament called for ethical and legal councils to support national policymakers in the development of appropriate AI and robotics policies. These policies should not only aim to raise advantage of the opportunities but also consider ethical and cultural values.


The aim

should not be to mitigate the harm and negative effects of robots after they have already been introduced into society but instead to proactively take stock of the impact of this technology in advance. In

Austria, the Federal Ministry for Transport, Innovation

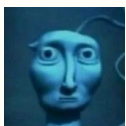


and

Technology  responded to this call by nominating experts for the Austrian Robotics Council in 2017. Members of this council come from various disciplines, including philosophy, psychology, engineering, computer science, law, the social sciences and economics and also include representatives of the Austrian Chamber of Labour and the Austrian Federation of Industry.


The Austrian Robotics Council's mandate is to provide expertise and policy recommendations to the federal minister with regard to the

development



of an appropriate robotics and AI strategy.

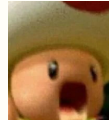
The work of this council builds on various existing international initiatives, including the Foundation for Responsible Robotics ; the

IEEE  rganisation, which published a comprehensive report on ethics and AI at the end of 2017; and the European Initiative for

Responsible Research and Innovation.



But responsible technology development in this area is not only a matter of academic experience, but also a new approach to human rights and its ability to create an inclusive dialogue among

all stakeholders  : researchers and educators, business and industry innovators, and civil society organisations and policymakers. Moreover, responsible robotics takes a proactive approach, which already thinks about ethical and societal challenges when and before the technology is developed.

The main pillars of a responsible robotics and AI strategy are responsible research, education, law and regulation, and collaboration.

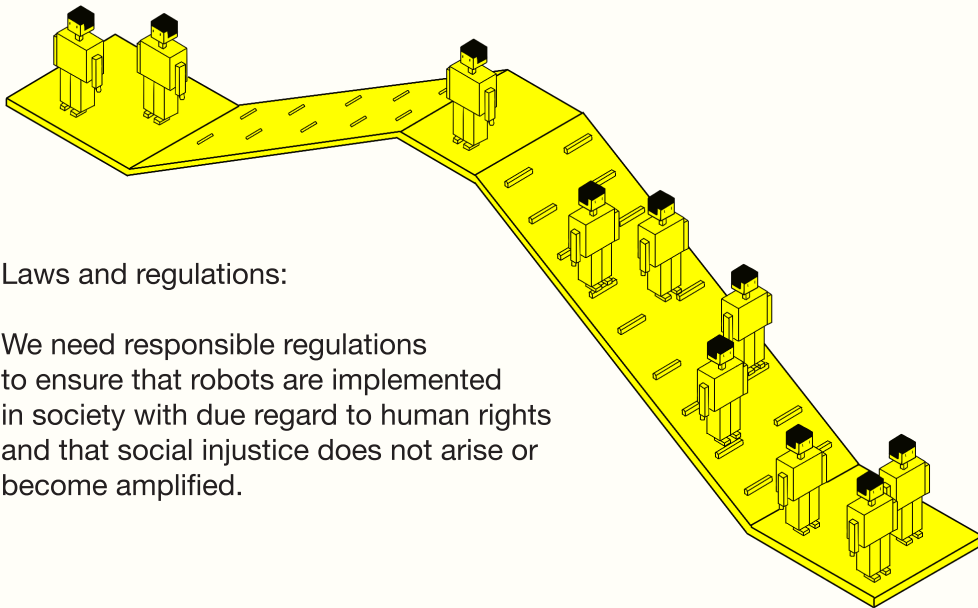
A RESPONSIBLE ROBOTICS STRATEGY

Responsible research:

A responsible and sustainable robotics and AI strategy therefore requires interdisciplinary research programs drawing upon engineering, the natural and computer sciences, and humanities and social sciences alike.

Education and information:

A responsible robotics strategy needs to raise awareness and promote public consideration and inclusive dialogue – preferably also with more democratic participation – on issues concerning the development and use of robotics and artificial intelligence in Austria.



Laws and regulations:

We need responsible regulations to ensure that robots are implemented in society with due regard to human rights and that social injustice does not arise or become amplified.

Collaboration:

many of the problems related to robotics, autonomous systems and artificial intelligence can only be solved through extensive cooperation among the relevant interests and stakeholder groups within each individual country but also within the EU and its institutions.

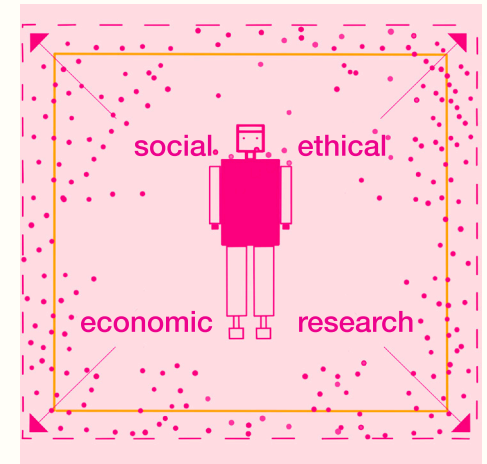
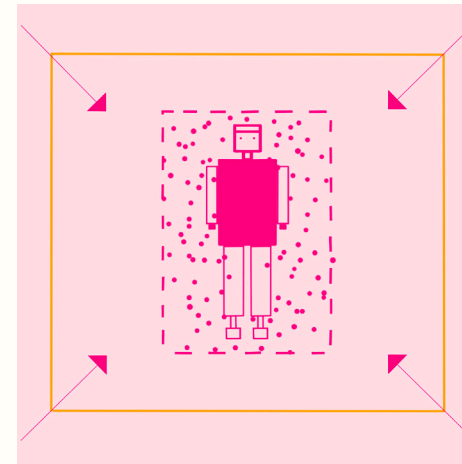
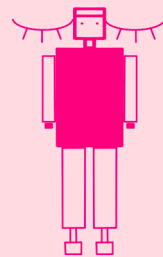


Another problem is that policymakers at the political level may only be interested in short-term issues and not have a long-term vision for robotics and AI. We need to think about ways to support the development of such a vision. What other actors need to be involved?

CHALLENGES & HURDLES FOR POLICYMAKERS ALONG THE WAY

In order to make robotics and AI more responsible, a number of challenges and hurdles need to be overcome. One of these problems has to do with the nature and different aspects of expertise. The kind of expertise needed to address these challenges is transdisciplinary in at least two senses. First, within academia, it is not enough to only have technical knowledge or only have expertise in the humanities or social sciences. To understand these problems, we need more people operating at the intersection of these fields. Second, we need to connect this academic expertise with what is going on in industry and policy. There is often a wide gap between the two spheres. We need to think about institutional bridges connecting the two.

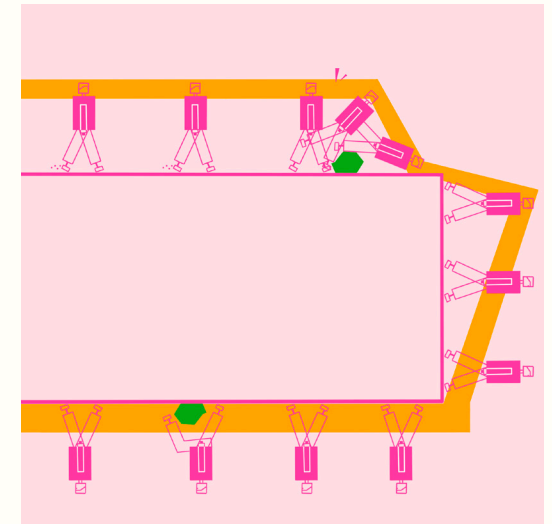
Technical Knowledge



CHALLENGES & HURDLES FOR POLICYMAKERS ALONG THE WAY

Given these challenges, we need to think about ways to support transdisciplinary research on robotics and AI and build bridges between academia and industry. We also need to make convincing arguments to policymakers about why they should take a long-term perspective on ethical problems and institutional challenges. This paper is a contribution to this. As mentioned above, we need to institutionalise participatory processes, rather than having them on an ad hoc basis. Policymakers need to collaborate with academics, civil society,

and other stakeholders such as industry to support a more inclusive and participatory decision-making process about the future of robotics and AI. Finally, policymakers could commission studies on ethical and societal aspects of robotics and AI that provide an overview of and draw upon existing work completed in various contexts. Here we have learned from work on responsible robotics.



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Typesetting & Editing by
Senyao Wang