

A EUROPEAN VIEW ON THE ETHICAL USE OF ARTIFICIAL INTELLIGENCE (AI)

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Abstract: Artificial intelligence (AI) is one of the most exciting technology topics of recent years. It has the potential to fundamentally change the way we work, study, and use modern technologies in many areas, such as text and image generators. However, as the use of AI becomes more widespread, it is also worth being aware of the potential problems it brings. Given the increasing dependence of our systems on AI, how we address these dilemmas could have a key impact on the future of society. Among AI industry specialists, China (Taiwan) is said to produce the components for AI development, the United States is said to research and develop AI technologies, and Europe is said to implement the regulations surrounding it. In this article, we will present the ethical dilemmas that AI research and use bring, with a focus on the relevant regulations introduced by the European Union.

Keywords: Artificial Intelligence (AI), ethical issues of AI use, European Union regulations on AI.

1 Introduction

The roots of artificial intelligence (AI) as a field of research are usually traced back to a workshop held in 1956, in New Hampshire (USA), at Dartmouth College (McCarthy et al., 1955), when mathematicians, computer scientists, and neuroscientists met to test the hypothesis that any aspect of learning or any other characteristic of intelligence could be described so precisely that a machine could be built to simulate it (Kaplan, 2022).

Some notable examples are Turing's seminal paper on computing machinery and intelligence (Turing, 1950), the program called Logic Theorist that could prove mathematical theorems using symbolic logic (Newell, Simon, 1956), the first neural network machine in 1951 (Crevier, 1993), and early efforts at a self-taught checkers player (Sammut, Webb, 2010).

Outside of the United States (US) and the UK, Japan began to invest in the field (Shapiro, 1983). This period saw a great deal of interest in knowledge representation and a resurgence of interest in neural networks (McCorduck, 2004). The period is also characterized by a sharply growing commercial interest. However, commercial providers failed to develop viable solutions to real-world problems. The late 1980s and early 1990s also saw hundreds of AI companies close and funding for AI decline dramatically (Newquist, 1994). AI research was revitalized in the late 1990s and accelerated during the new millennium.

The 21st century has seen the evolution of AI into an integral part of our daily lives. From personalized recommendations on streaming services to virtual assistants in our smartphones, the applications of AI are vast and diverse. This era has seen AI innovations in areas such as healthcare, finance, and autonomous vehicles. The integration of AI with other technologies such as the Internet of Things (IoT) and big data analytics has further expanded its capabilities and applications, making it a cornerstone of the current technological landscape.

2 Important features of AI

Artificial intelligence (AI) is a branch of computer science that develops computational systems capable of exhibiting human-like behavior to perform tasks such as learning, planning, knowledge presentation, problem solving, and creativity (European Commission High-Level Expert Group on Artificial Intelligence, 2018). Using algorithms and rules, AI programs analyze large amounts of data of different nature, allowing to reduce the elements of reality to binary codes, with the aim of

initiating the corresponding appropriate actions, either through human interventions or autonomously, through the systems themselves (Sadin, 2019). Artificial intelligence systems are able to adapt their way of acting by analyzing the effects of previous actions and working autonomously. Artificial intelligence technology, defined as integral, is designed to be applied to all aspects of individual and collective life, in the relationship with ourselves, with others and with the surrounding environment, in the organization of cities, transportation, work, healthcare, banking, finance, justice, etc.

When it comes to AI, it is easy to confuse it with machine learning, which is the use and development of computer systems that can learn and adapt without following explicit instructions, using algorithms and statistical models to analyze and draw inferences from patterns in data. Technically, machine learning is a branch of artificial intelligence, but AI has grown so much that it is no longer a branch of artificial intelligence. Unlike machine learning, what AI does is teach computers how to do what we humans do best (Domingos, 2016). Until recently, AI was confined to research laboratories, but in recent years it has disrupted our daily lives. The promise of growth and development that this new technology brings seems endless, as does the possibility of each of its myriad areas of application becoming more reliable.

3 Impact of Artificial Intelligence (AI) on society

The impact of artificial intelligence on society, the economy and even the environment is set to become more widespread. Starting from definitions, we want to better understand the areas of its impact on human life. Artificial intelligence (AI), as defined by the European Commission's High Level Expert Group on Artificial Intelligence, refers to systems that exhibit intelligent behavior by analyzing their environment and taking actions, with a certain 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 facial recognition systems) or AI can be embedded in hardware devices (e.g. advanced robots, autonomous cars, drones or Internet of Things applications). As a scientific discipline, AI includes several approaches and techniques, such as machine learning (of which deep learning and reinforcement learning are specific examples), machine reasoning (which includes planning, scheduling, knowledge representation and reasoning, search, and optimization), and robotics (which includes control, perception, sensors and actuators, as well as the integration of all other techniques into cyber-physical systems).

To better understand the new challenges and opportunities that Artificial Intelligence presents to us, it is useful to examine the prospects of its development in three areas of the world that become crucial for its future development. China is investing heavily in the development of AI technology with massive investments (Jochheim, 2021). Among the most recent steps in AI, in addition to the New-Generation Artificial Intelligence Development Plan of 2017, we find the government's allocation of 2 billion dollars in research and development and another investment of 2.1 billion dollars in the Beijing AI technology park in 2018. The government has also made huge amounts of data available and liberalized access to these sources. It is also fair to highlight the investments in AI research by Chinese giants such as Baidu, Alibaba and Huawei, as well as investment companies (such as Sinovation Ventures and others). To date, however, China has stated that it wants to become the world's largest AI power by 2030 to make AI applications and technologies internationally competitive. China plans to expand AI into many areas of manufacturing, governance and defense by that date (Roberts et al., 2021). Even today, the country is still in second place worldwide in AI, even if it still has to overcome significant challenges, especially in terms of talent and production of highly sophisticated semiconductors, which are mostly produced in Taiwan (considered by China as its own

territory and subject to potential invasion). With this precise objective, it is starting to attract researchers from other parts of the world to increase research that is currently very focused on computer vision while lacking in language processing and knowledge representation. The investment in training and research is impressive, even if the number of citations of articles at an international level denounces a still not very international approach and a lack of collaboration with other realities (Arcesati, 2023). Government support is constant and important even at the startup level. The funds are considerable and aim to enable the diffusion of solutions to transform cities, the transport system, payments, distribution and education. In China there are also much fewer hesitations to apply AI systems in consideration of privacy protection regulations or other individual protection regulations.

The United States has maintained its leading role in AI research and development. Important premises that position the USA as one of the countries with a strong immigration of talents thanks also to salaries and competitive conditions. The USA appears as a leader in the international competition on AI for the consolidated structure of the academic world that boasts a long tradition of interdisciplinary laboratories and the tendency to create collaborations at a global level.

The development of AI in the United States of America is characterized, on the one hand by an economy increasingly based on market giants such as Google, Amazon, Microsoft, Apple or Facebook, and on the other by a strong military capacity represented by the government agency of the Department of Defense of the United States of America (Defense Advanced Research Projects Agency - DARPA).

Today, the main focus of the US Department of Defense is "common sense reasoning", that is, the basic ability to perceive, understand and judge themes and subjects of discussion that are commonly shared and that can be reasonably predicted. A skill not yet within the reach of current AI constructs and that represents a significant step forward also in the ability of machines to explain their behavior, one of the main limits of current deep neural networks.

In recent years, there has been a strong increase in funding for research and commercial initiatives on AI (Mousavizadeh et al., 2021). On July 29, 2021, the National Science Foundation (NSF) announced the creation of 11 new NSF National Artificial Intelligence Research Institutes. The combined investment of 220 million dollars expands the reach of these institutes to include a total of 40 states and the District of Columbia (U.S. National Science Foundation, 2021). This step marks an effort to advance the development of AI research for decades to come. Also significant is the role played by DARPA, which has formulated a 2 billion dollars strategic plan for AI with the goal of overcoming the limitations of current technologies and achieving what is called Contextual Adaptation.

If we want to consider the European approach to AI, we must consider that Europe is still a fragmentation of States. So far, investments in the European AI ecosystem have not managed to reach the global competitiveness of "AI made in Europe". They have been insufficient in terms of size and poor focus. Europe's dependence on AI made in other countries is increasing rapidly, which is eroding European economic, strategic and cultural sovereignty. There is clearly no common strategy, of aggregation of research centers capable of consolidating industrial research. Added to all this is a lack of vision on the part of companies that is causing not only a brain drain but also and above all one of the most significant critical issues. To date, the Eurozone is focusing on data protection rules that represent a significant source of knowledge for algorithms to learn. Regulation without innovation will not solve the problem of the effectiveness of AI development at a global level. This approach could prove detrimental in terms of market and research growth, unless solutions are found that protect people's data and their rights, without weakening the possibility of using them for the common good. Europe, despite having the highest level of scientific production and international collaboration, has witnessed in

recent years a significant loss of talent in the world of research who emigrate to countries with greater career and salary opportunities (USA and China). A rather worrying trend because if it is not reversed soon, it will lead Europe to quickly lose its ability to compete in the field of AI.

The Confederation of Laboratories for Artificial Intelligence Research (<https://cairne.eu/>) initiative seems valuable, which in Europe was born from a grassroots movement of researchers, laboratories and scientific associations. The primary objective consists in strengthening research and innovation by creating a confederation of laboratories for AI research capable of including a network of centers of excellence and an infrastructure operating as a central hub. In detail:

- focus on AI applications for humans that do not aim to replace them but to support and facilitate them; increase the funds dedicated to ongoing research, new opportunities and key interests for the continent.
- attract stakeholders to find mechanisms for the participation of citizens, industry and the public sector together with innovative startups.
- define and solve challenges in various sectors and in a wide range of applications, including health, manufacturing, transport, scientific research, financial services and entertainment.

4 European guidelines - AI Act

According to the European Parliament Resolution on AI (2017), legal responsibility for the action (or inaction) of an AI is traditionally attributed to a human actor: the owner, developer, manufacturer or operator of an AI, for example. However, issues arise when considering the involvement of third parties and advanced systems such as self-learning neural networks: if an action cannot be predicted by the developer because an AI has changed sufficiently since its design, can a developer be held liable for that action? Furthermore, the current legislative infrastructure and lack of effective regulatory mechanisms pose challenges in AI regulation and attribution of blame, argue Atabekov and Yastrebov (2018), with autonomous AI in particular raising the question of whether a new legal category is needed to encompass their characteristics and limitations.

Lo sviluppo dell'IA in un vuoto normativo ed etico ha innescato una serie di dibattiti sulla necessità del suo controllo legale e della sua supervisione etica. L'impatto delle attuali tecnologie di IA sul godimento dei diritti umani, dalla libertà di espressione, alla libertà di riunione e associazione, al diritto alla privacy, al diritto al lavoro e al diritto alla non discriminazione alla pari protezione della legge, deve essere attentamente esaminato insieme al potenziale dell'IA di esacerbare le disuguaglianze e ampliare il divario digitale.

The development of AI in a regulatory and ethical vacuum has triggered a series of debates on the need for its legal control and ethical oversight. The impact of current AI technologies on the enjoyment of human rights, from freedom of expression, freedom of assembly and association, the right to privacy, the right to work and the right to non-discrimination to equal protection of the law, must be carefully examined alongside the potential of AI to exacerbate inequalities and widen the digital divide.

With regard to the presence of AI in various living environments, European public opinion (European Parliamentary Research Service, 2020):

- agrees with the use of robots and digitalisation in work sectors that present risks or difficulties for humans (such as space exploration, manufacturing and the military);
- seems concerned that automation and digitalisation could lead to job losses and is unsure whether they would stimulate and increase job opportunities across the EU;
- does not approve of the use of robots in sectors that involve caring for vulnerable members of society (elderly, ill or undergoing medical procedures);

- expresses concerns about accessing and protecting their data and information online;
- is not willing to drive a driverless car (only 22% would be happy to do so);
- distrusts social media (only 7% consider stories published on social media to be "generally trustworthy");
- does not believe that widespread use of robots will occur in the short term, assuming this is a scenario that will occur at least 20 years from now.

Given the potential of AI to act autonomously, its enormous complexity, the lack of transparency and the uncertainty surrounding its functioning have called for a comprehensive regulatory response to prevent the ever-expanding applications of AI from causing social harm between individuals and social groups. Given the potential of AI to act autonomously, its enormous complexity, the lack of transparency and the uncertainty surrounding its functioning have called for a comprehensive regulatory response to prevent the ever-expanding applications of AI from causing social harm between individuals and social groups (Slezáková, 2024). In the European Commission, in addition to those invited to monitor the development of AI systems, there are increasingly frequent calls for the adoption of rules that address, on the one hand, the ethical design of AI and, on the other, the ethical use of the results of its development (Villani, 2018).

The 2017 European Parliament resolution on civil law rules on robotics – comprising a 'code of ethical conduct for robotics engineers', a 'code for research ethics committees', a 'licence for designers', and a 'licence for users' can serve as a governance model for a detailed process-based architecture of technology ethics in the AI field. The charter on robotics contained in the resolution combines an ex-ante ethics-by-design approach with a reflexive framing and a meta-ethical analysis of the governance process employed for the embedding of ethics into the structures for the development of this disruptive technology (European parliament, 2017). Finally, the European Commission adopted a communication on 'Artificial intelligence for Europe' on 25 May 2018, laying down the European approach to benefiting from the opportunities offered by AI and addressing the new challenges AI poses. The Commission proposed a three-pronged approach: increasing public and private investment, preparing for socioeconomic changes brought about by AI and ensuring an appropriate ethical and legal framework.

In recent years, a proliferation of ethics principles and guidelines for AI have been adopted. On 12 February 2019, the European Parliament adopted a resolution on a comprehensive European industrial policy on artificial intelligence and robotics. On 8 April 2019, the High-Level Expert Group on AI, established by the European Commission, presented Ethics Guidelines for Trustworthy Artificial Intelligence (European Commission. High-Level Expert Group on AI, 2019). An assessment checklist to help assess whether the AI system being developed, deployed, purchased or used meets the seven requirements of trustworthy artificial intelligence:

1. Human agency and oversight: AI systems should empower human beings, allowing them to make informed decisions and fostering their fundamental rights. At the same time, proper oversight mechanisms need to be ensured, which can be achieved through human-in-the-loop, human-on-the-loop, and human-in-command approaches;
2. Technical Robustness and safety: AI systems need to be resilient and secure. They need to be safe, ensuring a fall back plan in case something goes wrong, as well as being accurate, reliable and reproducible. That is the only way to ensure that also unintentional harm can be minimized and prevented;
3. Privacy and data governance: besides ensuring full respect for privacy and data protection, adequate data governance mechanisms must also be ensured, taking into account the quality and integrity of the data, and ensuring legitimised access to data;

4. Transparency: the data, system and AI business models should be transparent. Traceability mechanisms can help achieving this. Moreover, AI systems and their decisions should be explained in a manner adapted to the stakeholder concerned. Humans need to be aware that they are interacting with an AI system, and must be informed of the system's capabilities and limitations;
5. Diversity, non-discrimination and fairness: Unfair bias must be avoided, as it could have multiple negative implications, from the marginalization of vulnerable groups (Urbančok, 2023, 20-28), to the exacerbation of prejudice and discrimination. Fostering diversity, AI systems should be accessible to all, regardless of any disability, and involve relevant stakeholders throughout their entire life circle;
6. Societal and environmental well-being: AI systems should benefit all human beings, including future generations. It must hence be ensured that they are sustainable and environmentally friendly. Moreover, they should take into account the environment, including other living beings, and their social and societal impact should be carefully considered;
7. Accountability: Mechanisms should be put in place to ensure responsibility and accountability for AI systems and their outcomes. Auditability, which enables the assessment of algorithms, data and design processes plays a key role therein, especially in critical applications. Moreover, adequate an accessible redress should be ensured.

Finally, the European Community has prepared guidelines on AI, considering the opportunities and risks associated with it. In particular, on 19 February 2020, the "White Paper on Artificial Intelligence: a European approach to excellence and trust" (European Commission, 2020) was published, outlining policy options on how to promote the adoption of artificial intelligence (AI) and address the risks associated with certain uses of this new technology.

In April 2021, the European Commission proposed the AI Act which underwent a process of approvals and significant amendments, in particular following the spread of generative Artificial Intelligence systems at the end of 2022. The Council and the European Parliament reached a political agreement on the wording of the regulation in December 2023, and the official approval by the Parliament came on 13 March 2024. The EU AI Act is the first comprehensive legal framework in the world on artificial intelligence. It reflects European values by focusing regulation on risks that can be identified today and in the near future and by promoting responsible innovation based on artificial intelligence in Europe. The AI Act also aims to make a substantial contribution to the development of global rules and principles, respecting fundamental human values and rights.

The AI Act will officially come into force in the first half of 2024, with the implementation of its provisions taking place gradually:

within 6 months: prohibited AI systems will have to be banned from member states;

within 1 year: the rules for general-purpose AI systems will come into force;

within 2 years: the rest of the AI Act will be applicable;

within 36 months: the obligations for high-risk systems will come into force.

The AI Act encompasses and harmonizes the efforts made so far, it is therefore a set of rules that aim to protect the rights of citizens, imposing a "human-centric" approach to anyone who develops or uses Artificial Intelligence systems. The ultimate goal of the legislation is to ensure that AI systems placed on the Union market are safe and respect citizens' rights.

5 Ethical issues surrounding artificial intelligence

Ethical issues in AI are a complex and evolving field of interest. As AI technology continues to advance, it raises various ethical dilemmas and challenges. Here are some of the key ethical issues associated with AI:

- Bias and fairness: AI systems can inherit and even amplify biases present in their training data. This can lead to unfair or discriminatory outcomes, especially in hiring, lending, and law enforcement applications. Addressing bias and ensuring fairness in AI algorithms is a critical ethical concern;
- Privacy: The need for large amounts of data to train algorithms raises strong concerns about provenance and proper data collection. AI systems often require access to large amounts of data, including sensitive personal information (Urbančok, 2018 a). The ethical challenge lies in collecting, using, and protecting this data to prevent privacy violations;
- Transparency and accountability: Many AI algorithms, especially deep learning models, are often considered “black boxes” because they are difficult to understand or interpret. Ensuring transparency and accountability in AI decision-making is critical to user trust and the ethical use of AI (Urbančok, 2018 b);
- Autonomy and control: As AI systems become more autonomous, there are concerns about the potential loss of human control. This is particularly relevant in applications such as autonomous vehicles and military drones, where AI systems make critical decisions;
- The digital divide: While AI technologies are emerging rapidly in wealthier nations, developing nations may not have the infrastructure and knowledge to keep pace;
- Job displacement: AI automation can lead to job displacement and economic inequality. Ensuring a just transition for workers and addressing the social impact of automation is an ethical issue;
- Security and misuse: AI can be used for malicious purposes, such as cyberattacks, deepfake creation, and surveillance. Ensuring the security of AI systems and preventing their misuse is an ongoing challenge;
- Accountability and liability: Determining who is responsible when an AI system makes a mistake or causes harm can be difficult. Establishing clear lines of accountability and liability is essential to addressing AI-related issues;
- Ethical AI in healthcare: The use of AI in healthcare, such as diagnostic tools and treatment recommendations, raises ethical concerns about patient privacy, data security, and the potential for AI to replace human expertise (Šmidová, Šmid, Jamborová, Andraščíková, Trębski, Urbančok, 2023);
- AI in criminal justice: Use for predictive policing, risk assessment, and sentencing decisions can perpetuate bias and raise questions about due process and fairness;
- Environmental impact: The computational resources required to train and run AI models can have a significant environmental impact. Training complex AI models requires a significant amount of energy, which adds to carbon emissions. According to research from the University of Massachusetts Amherst, training several large, common AI models can produce the equivalent of nearly five times the emissions of a typical American car (and that includes the production of the car itself) (Hao, 2019). This means that AI development methods need to be more sustainable. Ethical considerations include minimizing AI’s carbon footprint and promoting sustainable AI development;
- AI in warfare: The development and use of autonomous weapons raises ethical concerns about the potential of AI to make life-or-death decisions in armed conflict;
- AI in education: The use of AI in education, such as automated assessment and personalized learning, raises concerns about data privacy, the quality of education

(Šmidová, Slezáková, 2023, 243), and the role of human educators;

Addressing the ethical issues raised by AI development requires a multidisciplinary approach involving technologists, ethicists, policy makers, and society at large. This involves developing ethical guidelines, regulations, and best practices to ensure that AI technologies are developed and deployed in ways that benefit humanity, minimize harm, and ensure fairness and accountability.

6 Conclusion

Scientific research and technological innovations are not neutral, but subject to cultural influences. The contemporary context seems to give primacy to an artificial intelligence that becomes increasingly subordinate to experimental technology and thus forgets that every science must always safeguard man and promote his effort towards authentic good. Stephen Hawking, a renowned cosmologist, physicist and mathematician, in his December 2, 2014 interview with the BBC, said: “The development of full AI could spell the end of the human race... it would take off on its own and redesign itself at an ever-increasing rate. Humans, who are limited by slow biological evolution, could not compete and would be overtaken. (...) Computers can, in theory, emulate human intelligence and surpass it. The success in creating effective AI could be the greatest event in the history of our civilization. Or the worst. We simply do not know. So we cannot know whether we will be infinitely helped by AI, or ignored and sidelined, or presumably destroyed by it. (...) The primitive forms of AI that we already have proven very useful. But I think the development of full AI could spell the end of the human race. If we do not learn to prepare for and avoid potential risks, AI could be the worst event in the history of our civilization. It brings with it dangers, such as powerful autonomous systems, weapons systems, or new ways for the few to oppress the many” (Cellan-Jones, 2014).

Without the full involvement of the companies that design and deploy AI systems, without a full awareness of the ethical and social implications of their management and operation, it will not be possible to ensure the safety of people in the digital environment. Ethics and AI are intertwined in a complex dance, requiring constant vigilance, collaboration and critical thinking. As AI continues to permeate our society, it is essential to address the ethical dilemmas it presents. The European Community’s effort to regulate the development and use of AI focuses on fairness, privacy, accountability and the safety of its use for citizens. Finding the right balance between technological progress and ethical considerations is essential to fully exploit the potential of AI for the betterment of our global community. AI should best accompany human potential and the highest human aspirations, not compete with them (Francis, 2024).

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