Chapter 1
Philosophical Review of Artificial Intelligence for Society 5.0

Ggaliwango Marvin , **Micheal Tamale** , **Benjamin Kanagwa** ,
and Daudi Jjingo

1 Introduction

Artificial intelligence has come a long way since its inception 60 years ago, and it continues to evolve and change the world in ways we couldn't have imagined. Today, AI has reached new heights and has a wide range of applications, from playing complex games to language processing, speech recognition, and facial recognition [1–3]. With its exponential growth and its increasing presence in an ever-growing number of sectors, AI is well on its way to becoming a source of significant economic prosperity. But as AI continues to evolve, it poses major policy questions for policymakers, investors, technologists, scholars, and students. AI ethics are critical to its development, and it is essential that ethical standards be established to ensure that AI meets a certain standard of public justification and supports citizens' rights, promoting substantively fair outcomes when deployed [4–7]. The use of AI in everyday life also raises ethical collisions, and human rights principles and legislation must play a key role in addressing these ethical challenges [8–10]. The rapid development of AI presents many opportunities and challenges for the human race. As AI becomes more autonomous and intelligent, it has the potential to greatly improve the performance of manufacturing and service systems, as well as contribute to social development and human life [2, 11, 12, 13]. However, the hardware and software of a fully autonomous, learning, reasoning AI system must mimic the processes and subsystems that exist within the human brain [14, 15].

The future of AI is rapidly changing the way we interact with machines. AI has already achieved the capability to interact with humans and build relationships

G. Marvin (✉) · B. Kanagwa · D. Jjingo
Makerere University, Kampala, Uganda
e-mail: ggaliwango.marvin@mak.ac.ug

M. Tamale
Kabale University, Kabale, Uganda

through conversations, and the next generation of autonomous technology will make many decisions autonomously [16]. AI is not just about technology; it also involves philosophical and psychological issues. It is imperative that we integrate AI ethics into AI education and development and continue to study the social psychology of intelligent machines [5, 17, 18]. Therefore, the rapid development of AI presents both opportunities and challenges, and it is up to us to ensure that it benefits the human race and contributes to social development and human life. The AI community is continuously exploring and discussing the potential of AI and its implications, and it is important that we stay informed and up to date on the latest developments in this field [10, 19–21].

One of the most respected fathers of AI include Alan Turing and John Searle appreciated for the Turing test and Chinese Room Argument. In the context of Society 5.0, the Turing Test and the Chinese Room Argument are important concepts in the philosophy of AI [3, 22, 23]. The Turing Test aims to determine if a computer is capable of thinking like a human being, by having the computer mimic human responses in a specific subject area and format. The test has been updated with variations, such as the Reverse Turing Test, Total Turing Test, and Minimum Intelligent Signal Test, to make it more relevant. The Chinese Room Argument, on the other hand, is a thought experiment introduced by John Searle, which debates whether a machine can truly understand language and cognition, or if it is just simulating the ability [13, 24–26]. This argument raises important ethical and moral questions about the development of AI in Society 5.0, such as the extent to which AI can replace human intelligence and what the implications of that would be [10, 11, 27]. The discussions and debates surrounding these concepts will continue to play a significant role in shaping the development and implementation of AI in Society 5.0 [22, 29].

We observe that the philosophy of artificial intelligence (AI) is a field that encompasses the ethical, philosophical, and existential implications of AI's development and increasing presence in society. It involves the study of fundamental concepts such as intelligence, knowledge, and artificial intelligence, and how they impact human existence [23]. The development of AI raises important questions about the relationship between humans and machines, the future of humanity, and the need for ethical standards and governance mechanisms [18, 30, 31]. The philosophical foundations of AI are essential in guiding the development and use of AI in Society 5.0 [22, 29]. This future society is envisioned to be a harmonious co-existence between humans and AI, where technology serves to enhance human capabilities and improve the overall well-being of society while preserving human values and dignity. The philosophy of AI plays a crucial role in ensuring that AI systems are developed in a responsible and ethical manner, aligning with the values and aspirations of society, and contributing to a better future for all [22, 32–34].

Some of the key philosophical foundations of AI include the study of mind–body dualism, the nature of intelligence and knowledge, the limits of AI and its impact on human existence, the relationship between humans and machines, the ethical implications of AI, and the need for ethical standards and governance mechanisms [18, 31, 35, 36]. These philosophical foundations help to provide a foundation for reflecting on the fundamental questions and issues that arise from AI's growing presence and

influence in our lives [10, 37, 38]. Critical evaluation of AI applications and implications is extremely important. This can be achieved through interdisciplinary dialog and research in order to gain a better understanding of AI impact on humanity and the world in general. This is what makes deep understanding of AI philosophies very crucial since it provides a baseline for evaluating ethical and moral principles. It is through this that AI philosophy guides AI development in Society 5.0. By examining these philosophical foundations [27, 28, 31, 39–41], we can gain a deeper understanding of the impact of AI on human and social existence, and ensure that AI technologies are developed in a responsible and ethical manner that aligns with the values and aspirations of society [11, 34, 37].

2 Literature Review

To identify relevant studies for this philosophical review of the philosophy of artificial intelligence, the following search strategies will be employed. Electronic database searches: Searches were conducted in relevant databases such as PubMed, Web of Science, and Google Scholar. The search terms included "artificial intelligence," "AI," "philosophy of AI," "ethics of AI," and "singularity." The reference lists of relevant review articles and other key studies were manually searched to identify additional studies that may not have been identified through the electronic database searches. Gray literature sources such as conference proceedings and technical reports will be searched using the same search terms as in the electronic database searches.

Inclusion criteria covered studies written in English, studies that were peer-reviewed articles, book chapters, or technical reports, studies published between 1973 and 2022, and studies that were relevant to the philosophy of artificial intelligence and Society 5.0. Exclusion criteria limited studies not written in English, studies that are not peer-reviewed, studies published outside of the specified time frame, and studies that are not relevant to the philosophy of Artificial Intelligence. Data were extracted from the selected studies using a standardized data extraction form that includes information about the study design, sample, data sources, and main findings. Data were synthesized using a narrative synthesis approach, with a focus on identifying trends, patterns, and differences among the studies [1, 16, 42, 43]. The results are presented in a structured manner in this paper to illustrate key points.

2.1 Philosophical Review

The field of artificial intelligence (AI) is rapidly expanding and has significant implications for society and humanity. As AI continues to shape our world and impact our daily lives, it is essential to critically evaluate its philosophical foundations and ensure that its development aligns with human values and goals [30, 39, 40].

Being complex and multi-layered, the philosophy of AI provides a 360 window for understanding development and deployment of AI with existential, ethical, and philosophical underpinnings for humanity.

The nature of intelligence is one of such foundational underpinnings of AI philosophy. It ignites various questions that are extremely essential for defining intelligence. Particularly, "What does it mean to be intelligent?" This makes AI engineers and developers to think deeply of whether intelligence is just a matter of processing information or there could be a lot more constituting it [40, 41]. Where as the requirement of consciousness and self-awareness is what most philosophers argue for [31, 36], others claim that certainty in AI intelligence is provable by its ability to successfully execute tasks that required real human intelligence before [25, 26, 44].

The relationship between machines and humans is the other fundamental philosophical foundation that requires maximum attention. The increasing sophistication and capabilities of AI systems most especially in domains where they completely outperform human beings make the relationship extremely sensitive. This performance of machines fundamentally ignites questions for justifying the role of humans in a machine dominated world. This gets us human beings thinking about our human values, their importance, and relevance in operating the world [45]. Values like human creativity and empathy not only get doubted by also require real justification of their importance today. This opens up various questions about AI ethics. We need to examine and contextualize the human concerns about ethical standards and governance. Most essentially, the mechanisms for implementing standards of AI systems that respectfully fit into human interests for example already defined human rights [6, 31, 36].

The implications of rapid AI development like Large Language Models are another issue tickling the philosophy of AI, it is causing uncontrollable paradigm shifts for the future of humanity [44, 46], a world to live in where everything is connected. This is what ignites the concept of Society 5.0. This concept is defining the future of technology and society in which everything that is technology driven plays a very critical role in improving the quality of life. The concept of Society 5.0 speaks to the importance of paying undivided attention to the importance of understanding AI impact on social existence and humanity [37, 38, 47]. Therefore, ethical and responsible considerations of AI development are one of the most critical aspects that are essential for shaping the future of Society 5.0 through examining the philosophical underpinning of AI development, deployment, and monitoring.

Knowledge and intelligence manifest a very sensitive relationship that requires critical philosophical examination. That relationship provides another AI philosophical foundation for understanding the meaning or AI capabilities to process vast amounts of information without having the ability to know anything. So, it ignites questions like "What does it mean for AI to truly "Know" something" ? This is also a very complex research challenge particularly the knowledge representation problem thus how knowledge can be represented in a computer. This is still a very huge challenge in AI research [4, 42, 43]. Whereas some philosophers still argue that AI-driven systems can never truly represent knowledge in the same sense as humans do, others believe that the aspect of knowledge representation in AI can be

developed in real world true understanding and reasoning [14, 15, 48]. It is also not yet clear how AI can be able outperform humans without a clear true understanding of knowledge representation.

The other philosophical foundation of AI is the question of consciousness. This conspiracy makes some philosophers believe that AI can never be conscious. Other philosophers argue that it is very possible to create consciousness in machines [39, 40]. Whereas human beings have not yet justified the source of their consciousness, we cannot rule out the fact that it is not possible for machines to be conscious. This mysterious phenomenon of consciousness has been a long-term debate by philosophers for centuries, and these debates are not yet over. What complicates the debate is the unclear distinction and relationship between consciousness and intelligence [46, 49]. We shall let you know when we find out.

The mind–body problem is another AI philosophical question that is rooted in the complex relationship between the mind and the physical world. "The mind is simply a product of the brain", that is what some philosophers claim. Others believe "There is more about the mind, than just being a product of the brain". These arguments have very huge implications on the development and deployment of AI. The doubt created by the mind–body problem even affects the viability of creating truly intelligent machines with capabilities of experiencing and understanding the world in the same way humans do [7, 25, 35, 48].

The other philosophical underpinning of AI is the Concept of the Mind. This is focused on addressing the relationship between human behavior and the nature of mental states. Experts in the AI domain argue there is a possibility of replicating human intelligence within machines. They also argue that machines can develop subjective experiences on their own. We have actually observed this in Large Language Models like ChatGPT, where the model hallucinates to give incorrect links to citations. We think this may be the same for some facts spilled out by such models. However, this raises the question about the meaning of consciousness. It also raises a question about machine abilities to experience the world as humans do [7, 23, 25, 35, 50]. We actually argue that machines could have some human experiences, and this can only be rejected if humans could scientifically justify the sources of their dreams or why they lie.

Another AI philosophical foundation is the theory of computation. This theory examines computational problems in the context of the relationship between computational processes and computational algorithms. The relationship examination gives a basis to understand possible limitations and capabilities of Intelligent Algorithms and AI systems. Understanding of such relationships is what guides the development and deployment of novel AI technologies that work [18, 35, 51–53]. With this, we clearly understand that AI is a buzz word today but it doesn't mean that AI can solve everything; therefore, AI should not be hyped and all traceable limitations of AI systems should be clearly documented and reported. This is part of what makes them ethical and responsible.

The other critical and sensitive foundation of AI is AI Ethics. These focus on cross examining the moral and ethical implications and underpinnings of AI development and deployment [10, 45, 54]. Ethics of AI ignite questions about AI impact in

relation to human rights, values, and responsibility of AI systems through the entire development and deployment processes [11, 28, 55]. This peaks the essence of AI Ethical standards for ensuring utilization of AI in responsible, respectful, and human dignity keeping human interests in context [56–58].

Another important foundation for AI philosophical thinking is the philosophy of science. This mainly focuses on underpinning the nature of scientific knowledge. It also underpins the methods of creating or generation and validating scientific knowledge [44, 46]. In AI, this philosophy gives a clear basis for evaluation of valid and reliable AI methods and models. It provides original scientific principles for ensuring that AI systems are built on sound scientific methods and ideologies [49, 59].

Philosophy of Language is another important AI philosophical foundation that looks at the relationship of meaning with the nature of language. It is extremely important building and deploying intelligent systems that require effective communication with humans based on language understanding. Examples of such technologies included conversational AI models like ChatGPT and other Language models [48, 60, 61].

We cannot ignore the fact that the rate at which deeper questions about the future of humanity are rising is directly proportional to the rate of AI development. And we can no longer ignore the need for interdisciplinary research engagements to understand humanity and society today [37, 38, 58, 62]. The philosophy of AI provides a foundation for reflecting on the fundamental questions and issues that arise from AI's growing presence and influence in our lives and is critical to shaping the future of Society 5.0. There are many philosophical foundations that are relevant to AI and Society 5.0. It is important to note that each of these philosophical foundations is complex and multifaceted, and there are many different perspectives and interpretations of each [63, 64]. However, by considering these philosophical foundations, we can gain a deeper understanding of the challenges and opportunities posed by AI and Society 5.0, and work toward developing AI systems that are aligned with human values and promote the well-being of society as a whole [64, 65].

3   Results and Discussion

3.1   Results

From literature, we observe that the various philosophies of AI boil down to a multidisciplinary field that encompasses ethics, epistemology, metaphysics, and the philosophy of mind [25, 45, 66]. Some of the most significant philosophical foundations of AI that shape our understanding of the field and its impact on society include.

Firstly, the ethics of artificial intelligence which is an essential aspect of AI philosophy that addresses the moral implications of creating and using intelligent

machines. AI raises complex ethical questions regarding accountability and responsibility, human dignity, and privacy. The trolley problem, a classic example in ethical philosophy, is an illustration of the ethical dilemmas posed by AI. It asks whether it is ethical to sacrifice one person's life to save several others in a hypothetical scenario, where a runaway trolley is headed toward a group of people, and a lever must be pulled to divert the trolley toward one individual [28, 56, 57, 64–67]. The use of AI in autonomous weapons and decision-making systems that prioritize certain lives over others also raises ethical concerns about the use of AI in military applications.

The second important philosophical foundation of AI is the epistemology of artificial intelligence, which is concerned with how AI systems acquire and utilize knowledge. AI systems rely on vast amounts of data to make predictions and decisions, and the question of how AI systems acquire and use knowledge is a critical one. The nature of knowledge representation, the role of prior knowledge, and the relationships between AI systems and human experts are all topics of inquiry within the epistemology of AI [66, 68]. For example, the concept of explainability in AI refers to the extent to which AI systems can be transparent about their decision-making processes and the factors that influence their outputs.

Thirdly, metaphysics of artificial intelligence concerns the fundamental nature of intelligence and the relationship between human and machine intelligence. The doubt on true intelligence and possession of consciousness by machines is a long-term AI philosophical question and unresolved debate. Whereas some philosophers believe in human intelligence simulation rather than true intelligence that constitutes consciousness for machines, others argue possibilities of machine surpassing human intelligence and discredit the necessity of consciousness for true intelligence. The debate has had and still has substantial implications on the understanding the potential future of AI and the human mind [13, 40, 69]

Finally, the philosophy of the mind. It grounds the human perspectives on the viewing, interpreting, and handling the nature of mental states and processes [35]. This philosophy illuminates the extent of mental state possession and utilization by machines. It provides a better reflection of possessing true experience, subjective emotions, and feeling. It ignites questions like "can machines cave a sense of self if they simply executed pre-programmed instructions" ?

The above four philosophical underpinnings are just a tip of the iceberg for a wide-ranging scope of philosophical questions arising from rapid AI development. Other basic essential philosophies include the philosophy of mathematics, philosophy of science among others. All of these foundations are critical to understanding the impact of AI on society, and they help us to better evaluate the role that AI should play in shaping the future of humanity [37, 38, 47, 58, 62].

3.2 Discussion

It is crucial to understand that Society 5.0 is currently a theoretical concept, and its components may continue to change and evolve as technology and society advance.

While discussions of Society 5.0 often highlight its major components, it is important to note that these are not exhaustive and may overlap with different philosophies of AI. The categorization of various philosophies of AI according to Society 5.0 themes provides a general framework for understanding their relationship to the overarching concept of Society 5.0, but it is essential to recognize that not all philosophies may align with the goals and vision of Society 5.0 and may even be in opposition.

It can be noted that there are valid variations and subcategories of the categories. These different names can reflect different perspectives on the same philosophy, or can emphasize different aspects of the philosophy. For example, "Human-Centered AI" and "User-Centered AI" both reflect the idea that the development and deployment of AI should prioritize the needs and well-being of people, while "Ethical AI" and "Responsible AI" both emphasize the importance of ensuring that AI is developed and used in a way that is consistent with ethical principles and values. The clarification and refinement can be inferred from the cases presented by various philosophical relationships with theme of Society 5.0 theme. As presented in Table 1, they can greatly help inform responsible AI research methods for attaining Society 5.0.

The classification above not only informs a strategy to formulate responsible AI methods, it also underscores the need to consider ethical, social, cultural, and most importantly intersectional implications of AI. It provides a blueprint for developing and deploying human-centered, sustainable, and responsible AI technologies with an overall objective of attaining essential attributes of Society 5.0. Whereas the complexity of the relationships among overlapping categories seems recurrent, it is recommended that researchers and practitioners to focus on specific themes of Society 5.0 instead of multiple but choose underlying philosophies that make their projects scalable and compatible with other Society 5.0 themes. This is what makes an appropriate responsible AI methodology or approach. The overlapping categories also demonstrate the need to consider wider context of Society 5.0 in both the development and evaluation roles and implications of resultant AI technologies. It is also very important to be mindful of resultant philosophical relationships from overlapping categories and themes of Society 5.0. This is particularly important for establishing responsible AI methods, evaluation frameworks, deployment, and monitoring strategies that do not conflict with themes of Society 5.0.

Categorizing philosophies of AI in Society 5.0 contexts is a constantly evolving process, like ways the responsible AI methods derived from them. It is very possible that new classes and subclasses may emerge as the AI field continues to grow. However, it is extremely essential to comprehensively understand the various AI philosophies underpinning AI methods and relationships with the Society 5.0 themes [55, 64, 65]. This is particularly important for developing and utilizing AI in ways that align with values and goals of Society 5.0. These embrace human well-being enhancement, prioritization of ethics, sustainability promotion, and most importantly collaborative encouragement among humans and machines [56, 57]. By classifying the philosophies of AI within the Society 5.0 framework, we can be sure of developing and deriving relevant responsible AI methods to achieve the inclusive

Table 1 Matching AI philosophies to Society 5.0

Clusters of philosophies of AI that fit into Society 5.0	Types of AI technologies arising philosophies of AI that fit into Society 5.0	Specific relationships to Society 5.0 themes	Overlapping categories between the variations of AI philosophies and their relationship to Society 5.0 themes
Human-centered AI: this cluster includes philosophies that focus on the development of AI systems that prioritize the needs and well-being of humans [45, 54, 70, 71]	Human-driven AI, human-centered AI, and human-guided AI	User-centered AI People-centered AI Human-friendly AI	Human-centered AI and empowered AI: both categories focus on the role of AI in improving the lives of people and making technology accessible and inclusive for all
Empowered AI: this cluster includes philosophies that seek to empower individuals and communities through the deployment of AI [70, 71]	Empowering AI, democratic AI, and free AI	Inclusive AI Accessible AI Participatory AI	
Ethical AI: this cluster includes philosophies that emphasize the ethical and moral responsibility of AI [27, 28, 30, 34, 45, 54, 71–73]	Ethical AI, Transparent AI, and Accountable AI	Responsible AI [9] Moral AI [27], 28 Fair AI [8]	Ethical AI and Reliable AI: Both categories focus on the responsible and safe use of AI, ensuring that AI systems are secure, stable, and do not cause harm
Reliable AI: this cluster includes philosophies that prioritize the reliability and stability of AI systems [17, 28, 30, 34, 45, 54, 71–73]	Robust AI, safe AI, and verifiable AI	Stable AI Secure AI Safe AI	
Harmonizing AI: this cluster includes philosophies that aim to balance and harmonize human and machine intelligence [67, 74, 75]	Integrative AI, hybrid AI, and harmonizing AI	Synergistic AI Complementary AI Balancing AI	Harmonizing AI and collaborative AI: both categories focus on the collaborative relationship between AI and humans, promoting cooperation, balance, and social intelligence
Collaborative AI: this cluster includes philosophies that emphasize the collaborative and cooperative nature of AI systems [5, 8, 71]	Collaborative AI, collective AI, and cooperative AI	Cooperative AI [8] Collaborative intelligence [71] Social AI [5]	

Table 1 (continued)

Clusters of philosophies of AI that fit into Society 5.0	Types of AI technologies arising philosophies of AI that fit into Society 5.0	Specific relationships to Society 5.0 themes	Overlapping categories between the variations of AI philosophies and their relationship to Society 5.0 themes
Autonomous AI: this cluster includes philosophies that advocate for the development of autonomous and self-governing AI systems [40, 50, 54, 67]	Decentralized AI, distributed AI, and self-organizing AI	Self-Determining AI Independent AI Sovereign AI	Autonomous AI and intelligent AI: both categories focus on the advancement and cognitive capabilities of AI, enabling AI to be independent and advanced in its decision-making abilities
Intelligent AI: this cluster includes philosophies that focus on the development of intelligent and advanced AI systems [13, 15, 24, 50, 67]	Intelligent AI, advanced AI, and evolutionary AI	Advanced AI Cognitive AI [24] High-Performance AI	
Sustainable AI: This cluster includes philosophies that prioritize the sustainability and long-term impact of AI systems [7, 8, 37, 54, 67]	Sustainable AI, green AI, and responsible AI	Eco-friendly AI Green AI Climate-friendly AI	Sustainable AI and eco-friendly AI: both categories focus on the environmental impact of AI, promoting eco-friendly and climate-friendly approaches in AI development and deployment
Human–machine integration: this cluster includes philosophies that focus on integrating human and machine intelligence [7, 19, 25, 35, 43, 70, 76]	Human–machine integration, integrative AI, and hybrid AI	Human–machine synergy Human–machine fusion Human–machine cooperation	

goal of creating intelligent and AI-driven systems for human life enhancement and contribution toward a better future for all.

4 Conclusion and Philosophical Questions

4.1 Conclusion

In order to create responsible AI methods toward Society 5.0, understanding the philosophies of AI is a mandatory requirement today. The future where various technologies AI are driving quality life improvement for all is what constitutes the vision for Society 5.0. This ongoing process constitutes an effort to solve complex social and environmental problems. This is where AI philosophical underpinnings aid formulation of moral and ethical principles for guiding responsible development and utilization of AI technologies toward Society 5.0. By continuously evaluating the alignment of AI systems with human values, responsible AI methods founded on appropriate philosophies ensure a better future for all.

The philosophy of AI which provides the best responsible AI methods requires constant engagement of multiple disciplines for a research dialog for AI development and deployment in a way that promotes humanity [30, 58, 62, 65]. This means that the most appropriate AI philosophy is likely multifaceted, complex, and constitutes aspects of ethics, metaphysics, ontology, and epistemology [8, 71, 77]. These are extremely important for understanding limits, abilities, ethical, and social implications of AI development and utilization [55, 56, 78, 79]. Therefore, human values and goals for equitable benefits are achievable with examination of behavioral and co-existence of humans and machines [7, 25, 35, 54]. This is easily archivable through AI transparency, fairness, accountability, trustworthiness, and explainability [37, 47].

This chapter provided a foundation for critical reasoning and reflection behind AI impact, harmonious co-existence of AI, and humanity and deep understanding of AI philosophies. We provided a philosophical reflection on critical aspects of free will, social economics, superintelligence, security, ethics, artificial life, responsibility, mind–body dualism, inclusiveness, bias, teleology, human nature, privacy, superintelligence, and various AI philosophies. We also provided a benchmark for formulating responsible AI methods based on AI philosophies. This work plays a crucial role in shaping the future of Society 5.0 by guiding responsible and ethical AI development and use.

The philosophical review of artificial intelligence for Society 5.0 highlights several research gaps that need to be addressed in order to ensure the responsible and ethical development and use of AI technologies [7, 69, 73, 80]. Additionally, there is a need for the development of domain specific guidelines and regulations that govern the development and deployment of AI systems, to ensure that they do not perpetuate biases or discriminate against certain groups of people. To address these gaps, further research and reflection on the ethical and philosophical implications of AI in Society 5.0 is necessary.

4.2 Philosophical Questions

This basically leaves us with about 10 important philosophical questions.

- What is the nature of intelligence and how can it be artificially replicated?
- What is the relationship between humans and AI, and how can we ensure ethical and moral alignment between the two?
- What are the implications of AI on human values and the future of humanity?
- How can we ensure that AI systems are transparent, accountable, and respectful of privacy and data protection laws?
- What is the impact of AI on job displacement, income inequality, and the role of humans in a world dominated by AI systems?
- How can we ensure that AI is developed in a responsible and ethical manner, aligned with human values and aspirations?
- How can we evaluate the social and economic impact of AI and ensure its positive contribution to society?
- What is the role of human cognition and decision-making in an AI-driven world? What are the philosophical implications of AI becoming super intelligent?
- How can the philosophy of AI shape the future of Society 5.0 and contribute to a better future for all?

References

1. Kilani A, Ben Hamida A, Hamam H (2017) Artificial intelligence review. In: Encyclopedia of information science and technology, Fourth edn. IGI Global, pp 106–119
2. Koptseva N (2022) KROO Commonwealth of Enlighteners of Krasnoyarsk. Modern research in the field of the sociology of artificial intelligence: basic approaches. Part 3. Sociol Artif Intell3(2):7–22. https://doi.org/10.31804/2712-939x-2022-3-2-7-22
3. L Sias 2021 DePaul University. Ideology AI Philosophy Today 65(3):505–522 https://doi.org/10.5840/philtoday2021514405
4. Soranno DE, Bihorac A, Goldstein SL, Kashani KB, Menon S, Nadkarni GN, Neyra JA, Pannu NI, Singh K, Cerda J et al (2022) Artificial intelligence for AKI! Now: Let's not await Plato's Utopian republic. Kidney360 3(2):376–381. https://doi.org/10.34067/KID.0003472021
5. Резаев АВ, Трегубова НД (2021) Artificial intelligence and artificial sociality: new phenomena and challenges for the social sciences. Monit Public Opin Econ Soc Changes (1). https://doi.org/10.14515/monitoring.2021.1.1905
6. Kazim E, Koshiyama AS (2021) A high-level overview of AI ethics. Patterns 2(9):100314. https://doi.org/10.1016/j.patter.2021.100314
7. L Floridi J Cowls M Beltrametti R Chatila P Chazerand V Dignum C Luetge R Madelin U Pagallo F Rossi 2018 AI4People-an ethical framework for a good AI society: opportunities, risks, principles, and recommendations Minds Mach 28(4):689–707. https://doi.org/10.1007/s11023-018-9482-5
8. Benthall S, Goldenfein J (2021) Artificial intelligence and the purpose of social systems. In: Proceedings of the 2021 AAAI/ACM conference on AI, ethics, and society. ACM, New York
9. IR Nourbakhsh 2021 AI ethics: a call to faculty Commun ACM 64(9):43–45. https://doi.org/10.1145/3478516.doi:10.1145/3478516

10. Artificial intelligence and society: Summit of the G7 science academies. Trends Sci 24(9):9_107–9_109. https://doi.org/10.5363/tits.24.9_107
11. Abdulllah SM (2019) Artificial intelligence (AI) and its associated ethical issues. Islam and Civilisational Renewal 10(1):124–126. https://doi.org/10.52282/icr.v10i1.78
12. S Ziesche R Yampolskiy 2018 Towards AI welfare science and policies Big Data Cognitive Comput 3:1–2. https://doi.org/10.3390/bdcc3010002
13. World L (2005) AI and philosophy: how can you know the dancer from the dance? IEEE Intell Syst 20(4):84–85. https://doi.org/10.1109/mis.2005.61
14. Stock O, Schaerf M (2006) Reasoning, action and interaction in AI theories and systems: essays dedicated to Luigia Carlucci Aiello. Springer, Berlin
15. Dietrich E (2006) Artificial intelligence, philosophy of. In: Encyclopedia of cognitive science. Wiley, Chichester
16. Mijwil MM, Abttan RA (2021) Artificial intelligence: a survey on evolution and future trends. Asian J Appl Sci 9(2). https://doi.org/10.24203/ajas.v9i2.6589
17. Mathew D, Shukla VK, Chaubey A, Dutta S (2021) Artificial intelligence: hope for future or hype by intellectuals? In: 2021 9th international conference on reliability, infocom technologies and optimization (trends and future directions) (ICRITO). IEEE
18. Mamina RI, Pochebut SN (2022) Artificial intelligence in the view of philosophical methodology: an educational track. Discourse 8(1):64–81. https://doi.org/10.32603/2412-8562-2022-8-1-64-81
19. Neapolitan RE (2012) Contemporary artificial intelligence. Chapman and Hall/CRC
20. Fulcher J (2008) Computational intelligence: an introduction. In: Studies in computational intelligence. Springer, Berlin, pp 3–78
21. S Rasmussen MJ Raven GN Keating MA Bedau 2003 Collective intelligence of the artificial life community on its own successes, failures, and future Artificial Life 9(2):207–235 https://doi.org/10.1162/106454603322221531
22. Omohundro S (2012) Rational artificial intelligence for the greater good. In: The frontiers collection. Springer, Berlin, pp 161–179
23. F Bruneault AS Laflamme 2021 AI ethics: how can information ethics provide a framework to avoid usual conceptual pitfalls? An overview AI Society 36(3):757–766. https://doi.org/10.1007/s00146-020-01077-w
24. Lektorsky VA (2021) On the philosophical issues of artificial intelligence and cognitive studies. Философские науки 64(1):7–12. https://doi.org/10.30727/0235-1188-2021-64-1-7-12
25. V Schiaffonati 2003 Minds and Machines 13 4 537 552. https://doi.org/10.1023/a:1026252817929
26. V Akman 2000 Introduction to the special issue on philosophical foundations of artificial intelligence J Exp Theoret Artif Intell: JETAI 12(3):247–250. https://doi.org/10.1080/09528130050111419
27. I Gabriel 2022 Toward a theory of justice for artificial intelligence Daedalus 151(2):218–231. https://doi.org/10.1162/daed_a_01911
28. Boddington P (2020) TPM: The philosophers' magazine. The ethics of AI and the moral responsibility of philosophers. Philosophers Mag (89):62–68. https://doi.org/10.5840/tpm20208940
29. KS Gill JM Artz 1987 Artificial Intelligence for Society IEEE Expert 2(2):108–108. https://doi.org/10.1109/mex.1987.4307076
30. E Moczuk B Płoszajczak 2020 Artificial intelligence—benefits and threats for society Humanit Soc Sci Q. https://doi.org/10.7862/rz.2020.hss.22
31. Waelen R (2022) Why AI ethics is a critical theory. Philos Technol 35(1). https://doi.org/10.1007/s13347-022-00507-5
32. Rashid MAN, Mullah M, Zain ZM (2020) Application of artificial intelligence: a review. Int J Adv Eng Res Sci 7(3):316–321. https://doi.org/10.22161/ijaers.73.47
33. Wang N, Yan L, Wang Y (2019) Review of theoretical research on artificial intelligence. DEStech Trans Comput Sci Eng (iciti). https://doi.org/10.12783/dtcse/iciti2018/29138

34. Nascimento AM, Bellini CGP (2018) Artificial intelligence and industry 4.0: the next frontier in organizations. BAR—Braz Adm Rev 15(4). https://doi.org/10.1590/1807-7692bar2018180152
35. VC Müller 2012 Introduction: philosophy and theory of artificial intelligence Minds Mach 22(2):67–69. https://doi.org/10.1007/s11023-012-9278-y
36. Zhang Y (2022) A historical interaction between artificial intelligence and philosophy. https://doi.org/10.48550/ARXIV.2208.04148
37. BJ Grosz P Stone 2018 A century-long commitment to assessing artificial intelligence and its impact on society Commun ACM 61(12):68–73. https://doi.org/10.1145/3198470.doi:10.1145/3198470
38. Burukina O, Karpova S, Koro N (2019) Ethical problems of introducing artificial intelligence into the contemporary society. In: Human systems engineering and design. Springer, Cham, pp 640–646
39. Vernon D, Furlong D (2007) Philosophical foundations of AI. In: 50 years of artificial intelligence. Springer, Berlin, pp 53–62
40. Müller VC (2016) New developments in the philosophy of AI. In: Fundamental issues of artificial intelligence. Springer, Cham, pp 1–4
41. McCarthy J (2008) The philosophy of AI and the AI of philosophy. In: Philosophy of information. Elsevier, pp 711–740
42. E Hilker 1986 Artificial intelligence: a review of current information sources Collect Build 7(3):14–30. https://doi.org/10.1108/eb023192
43. What is (artificial) intelligence? In: Playing smart. The MIT Press (2019)
44. S Colombano 2000 AI's philosophical underpinnings IEEE Potentials 19 3 23 25. https://doi.org/10.1109/45.876893
45. García-Vigil JL (2021) Reflections around ethics, human intelligence and artificial intelligence. Gaceta medica de Mexico 157(3):298–301. https://doi.org/10.24875/GMM.M21000561
46. Causey RL (1994) Book review: philosophy and artificial intelligence by Todd C. Moody (Prentice Hall, 1993). SIGART Newsletter 5(1):52–54. https://doi.org/10.1145/181668.1064814
47. L Deng 2018 Artificial intelligence in the rising wave of deep learning: the historical path and future outlook [perspectives] IEEE Sign Process Mag 35(1):180–177. https://doi.org/10.1109/msp.2017.2762725
48. McCarthy J, Hayes PJ (1981) Some philosophical problems from the standpoint of artificial intelligence. In: Readings in artificial intelligence. Elsevier, pp 431–450
49. Cordeschi R (1989) Philosophical assumptions in artificial intelligence: a tentative criticism of a criticism. In: Informatik-Fachberichte. Springer, Berlin, pp 359–364
50. Copeland BJ, Proudfoot D (2007) Artificial intelligence. In: Philosophy of psychology and cognitive science. Elsevier, pp 429–482
51. David D (2021) Artificial Intelligence as solution in facing the age of digital disruption 4.0. JUDIMAS 1(1):107. https://doi.org/10.30700/jm.v1i1.1090
52. JM Górriz J Ramírez A Ortíz FJ Martínez-Murcia F Segovia J Suckling M Leming Y-D Zhang JR Álvarez-Sánchez G Bologna 2020 Artificial intelligence within the interplay between natural and artificial computation: advances in data science, trends and applications Neurocomputing. 410:237–270. https://doi.org/10.1016/j.neucom.2020.05.078
53. S Tuinen Van 2020 PHILOSOPHY IN THE LIGHT OF AI: Hegel or leibniz Angelaki: J Theor Humanit 25(4):97–109. https://doi.org/10.1080/0969725x.2020.1790838
54. Jain A (2021) Artificial intelligence and human society: Inteligencia artificial y sociedad humana. South Florida J Develop 2(4):4963–4989. https://doi.org/10.46932/sfjdv2n4-003
55. JJ Bryson 2020 The artificial intelligence of the ethics of artificial intelligence: an introductory overview for law and regulation MD Dubber F Pasquale S Das Eds The oxford handbook of ethics of AI Oxford University Press 1–25
56. Liao SM (2020) Ethics of artificial intelligence. Oxford University Press
57. Muhlenbach F (2020) A methodology for ethics-by-design AI systems: dealing with human value conflicts. In: 2020 IEEE International conference on systems, man, and cybernetics (SMC). IEEE

58. Makhamatov TM (2019) Philosophy of artificial intelligence. Humanit Bull Univ Finance 9(4):52–56. https://doi.org/10.26794/2226-7867-2019-9-4-52-56
59. Pratt I (1993) Book review: foundation of artificial intelligence by David Kirsh (ed) (Cambridge, MA: MIT Press). SIGART Newsletter 4(2):11–14. https://doi.org/10.1145/152941.1064727
60. McCarthy J (1989) Artificial intelligence, logic and formalizing common sense. In: Philosophical logic and artificial intelligence. Springer, Dordrecht, pp 161–190
61. PH Schönemann 1985 On artificial intelligence Behav Brain Sci 8(2):241–242 https://doi.org/10.1017/s0140525x0002063x
62. Gittinger JL (2019) Ethics and AI. In: Personhood in science fiction. Springer, Cham, pp 109–143
63. AA Hopgood 2003 Perspectives—artificial intelligence: hype or reality? Computer 36(5):24–28. https://doi.org/10.1109/mc.2003.1198233
64. Honavar V (2007) Symbolic artificial intelligence and numeric artificial neural networks: towards a resolution of the dichotomy. In: The springer international series in engineering and computer science. Springer, Boston, MA, pp 351–388
65. Artificial intelligence: a philosophical introduction (1994) Choice (Chicago, Ill.) 31(08):31–4403. https://doi.org/10.5860/choice.31-4403
66. Meyer J-JC, Hoek van der W (1995) Epistemic logic for AI and computer science. Cambridge University Press
67. Horvitz E (2017) AI, people, and society. Science 357(6346):7. https://doi.org/10.1126/science.aao2466
68. Philosophy and AI: essays at the interface (1992) Choice (Chicago, Ill.) 30(01):30–0219. https://doi.org/10.5860/choice.30-0219
69. Feng T (2019) Artificial intelligence's turn of philosophy. IOP Conf Ser: Mater Sci Eng 646(1):012008. https://doi.org/10.1088/1757-899x/646/1/012008
70. BC Stahl A Andreou P Brey T Hatzakis A Kirichenko K Macnish S Laulhé Shaelou A Patel M Ryan D Wright 2021 Artificial intelligence for human flourishing—beyond principles for machine learning J Bus Res 124:374–388. https://doi.org/10.1016/j.jbusres.2020.11.030
71. Lunkov AS (2020) Institute of philosophy and law of the Ural branch of the Russian academy of sciences. The ethics of artificial intelligence: from philosophical discussions to technical standardization. In: VIII Information school of a young scientist Central Scientific Library of the Urals Branch of the Russian Academy of Science. Central Scientific Library of the Urals Branch of the Russian Academy of Sciences
72. Liu F, Shi Y (2018) Research on artificial intelligence ethics based on the evolution of population knowledge base. In: Intelligence science II. Springer, Cham, pp 455–464
73. Dubber MD, Pasquale F, Das S (2020) The oxford handbook of ethics of AI. Oxford University Press
74. VC Müller 2016 Fundamental issues of artificial intelligence Springer Cham
75. Müller VC (2013) Philosophy and theory of artificial intelligence. Springer, Berlin
76. J Keating I Nourbakhsh 2018 Teaching artificial intelligence and humanity Commun ACM 61(2):29–32. https://doi.org/10.1145/3104986
77. AI: the tumultuous history of the search for artificial intelligence (1993) Choice (Chicago, Ill.) 31(03):31–1555. https://doi.org/10.5860/choice.31-1555
78. Livet P, Varenne F (2020) Artificial Intelligence: philosophical and epistemological perspectives. In: A guided tour of artificial intelligence research. Springer, Cham, pp 437–455
79. J-G Ganascia 2010 Epistemology of AI revisited in the light of the philosophy of information Knowl Technol Policy 23 1–2 57–73. https://doi.org/10.1007/s12130-010-9101-0
80. D Schiff B Rakova A Ayesh A Fanti M Lennon 2021 Explaining the principles to practices gap in AI IEEE Technol Soc Mag 40(2):81–94. https://doi.org/10.1109/mts.2021.3056286