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Artificial Intelligence Tools in Animal Protection

ABSTRACT

The tools of artificial intelligence have also appeared in the field of animal protection, raising the question of how the preservation of the animal world can be reconciled with the challenges posed by AI, what connections exist between them, and whether these are progressive or represent yet another source of risk created by humanity. This paper seeks to explore the relationship between these two issues, which, at first glance, appear to be completely unrelated. Does AI have an influence on animal protection efforts, and if so, does it have a primarily positive or negative effect on them? In relation to certain aspects of the impact of artificial intelligence on animal protection (e.g. animal testing, education, robot animals, animal behavior), I also examine the legal responses arising from the new challenges, the impact of AI-generated videos featuring animals, and the issue of recognizing the independent legal personality of animals and robots.

Keywords: animal protection ■ artificial intelligence ■ independent legal personality
■ robots ■ education

I. INTRODUCTION, RELEVANCE OF THE TOPIC

One of the most pressing issues and tasks of our time is the protection of wildlife, which encompasses the preservation of living organisms, their habitats, and biodiversity, ensuring the functioning of natural processes and ecosystems, and protecting endangered species and areas. Unfortunately, the preservation of our protected natural values and wildlife also faces enormous difficulties due to humanity's excessive economic greed, as well as general efforts to protect animals.

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Artificial intelligence, which has been widely available for a few years now, has also appeared in diverse areas of animal protection, raising the question of how the protection of animals and the challenges posed by artificial intelligence can be reconciled, what connections exist between them, and whether these are progressive or represent yet another source of risk created by humanity. This study seeks to identify the relationship between these issues, which, at first glance, appear to be completely unrelated. Does artificial intelligence have an influence on animal protection efforts, and if so, does it have a primarily positive or negative effect on them? In connection with certain aspects of the impact of AI on animal protection (e.g. animal testing, education, robot animals, understanding animal behavior, veterinary science, prevention of animal cruelty), I will also discuss the legal responses arising from the new challenges, the impact of videos containing animals generated by AI, and the issue of recognizing the independent legal status of animals and robots.

II. ANIMAL PROTECTION VS. ARTIFICIAL INTELLIGENCE

Before examining the relationship between animal protection and artificial intelligence, it is important to define the goals and tools of each areas.

According to the introductory provision of Act XXVIII of 1998 on the Hungarian Protection and Welfare of Animals^[2], the purpose of animal protection is to “promote the protection of individuals of the animal world, increase people’s sense of responsibility for the humane treatment of animals, and define the basic rules for the protection of animals.” Animal protection, therefore, aims to protect individual animals and draws attention to human responsibility, given that achieving these goals can be achieved through people’s commitment.^[3] Based on the objective of the law, it can be stated that “humans have a moral duty to protect animals and to be kind to animals, it is necessary to increase people’s sense of responsibility, and it is extremely important to develop additional legislation serving animal protection, which will contribute to increasing the efficiency of animal protection.”^[4]

The term artificial intelligence was first used by American computer scientist John McCarthy in his 1955 paper „A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence”^[5]: „The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to

[2] Act XXVIII of 1998 on the Protection and Welfare of Animals, Section 1.

[3] Vetter, 2024, 20. See also Csintalan – Fodor – Gyertyán – Ózsvári – Visnyei, 2016, 10.

[4] Paulovics – Jámbor – Vetter – Turkovicsné Koncz – Ritó, 2023, 30.

[5] McCarthy – Minsky – Rochester – Shannon, 1955, 2.

simulate it.”^[6] To this day, there is no single definition of artificial intelligence, but several definitions are used. One of the most comprehensive analyses of the topic is Stuart Russell and Peter Norvig’s work ,Artificial Intelligence: A Modern Approach^[7], which groups the concepts according to different aspects. In connection with the topic of my paper, I would like to highlight two definitions: „The art of creating machines that perform functions that require intelligence when performed by humans.”^[8], and “AI ... deals with the intelligent behavior of artificial objects.”^[9]

Artificial intelligence, therefore, refers to the human-like abilities of machines, including reasoning, learning, planning, and creativity.^[10] Basically, we can distinguish two main types: software-based artificial intelligence (virtual assistants, image analysis software, speech and facial recognition systems) and physical artificial intelligence (robots, drones).^[11]

Artificial intelligence is a new technology created by man, and we must ask whether this innovation is compatible with the objectives of protecting individual animals.

In the following, I will analyze how the protection of animals and the challenges caused by artificial intelligence can be reconciled, what connections exist between them, and whether these are positive effects, or instead lead to our alienation from wildlife and animals.

III. KEY ASPECTS OF THE IMPACT OF AI ON ANIMAL WELFARE

1. Animal testing

Artificial intelligence offers innovative alternatives to traditional animal testing in medicine discovery. These alternatives (such as machine learning, organ-on-a-chip platforms, in silico testing^[12]) allow for the accurate simulation of complex biological systems^[13] without subjecting animals to unnecessary suffering. Based on scientific results, the combined use of these alternatives (in

[6] McCarthy – Minsky – Rochester – Shannon, 1955, 2. „An attempt will be made to how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves.”

[7] Russell – Norvig, 1995, 2.

[8] Kurzweil, 1990, 1.

[9] Nilsson, 1998, 1.

[10] Európai Parlament: Mi az a mesterséges intelligencia és mire használják?, 2020.

[11] Európai Parlament: Mi az a mesterséges intelligencia és mire használják?, 2020.

[12] Madden – Enoch – Paini – Cronin, 2020, 1.

[13] Gangwal – Lavecchia, 2025, 1.

vivitrosi)^[14] can provide a reassuring replacement for animal testing, with AI technologies delivering exceptional results in joint evaluations. Their use is also in line with the 3R principle (replace, reduce, refine) applicable to animal testing, i.e., that animal testing should be replaced with alternative systems or simpler organisms whenever possible, while minimizing the number of animals and developing testing techniques to improve animal welfare.^[15]

The use of these alternative methods is an important achievement from both an ethical and animal welfare perspective and contributes significantly to the reduction of animal testing, a trend that is now evident worldwide. In 2015, the US National Institutes of Health (NIH) ended research on chimpanzees, and it is now possible to submit a new medicine approval application without animal testing.^[16] This was a huge step forward, given the previous provisions of the Federal Food, Drug, and Cosmetic Act of 1938, which required that drugs be tested on animals before they were marketed. Significant changes have also taken place in Europe in the field of animal testing, with the European Parliament voting to phase out animal testing in 2021 and the Organisation for Economic Co-operation and Development (OECD) prioritizing the development of alternative testing methods^[17] to replace^[18] animal testing, and cosmetic products or their ingredients to be marketed in the European Union (EU) can no longer be tested on animals.^[19] It is important to emphasize that although animal experiments have previously produced many extraordinary results^[20] and were essential, the unnecessary suffering of animals and today's possibilities highlight the need for more precise and ethical alternatives.

2. Education

An important aspect of the study of animal protection and artificial intelligence is the role of AI in education. Education combines the use of software-based

[14] Caloni – De Angelis – Hartung, 2022, 1935. „In this article, we give an overview of the state of the art of alternative methods and IATA in toxicology for regulatory use for various hazards, outlining future orientation and perspectives. We call on leveraging the synergies of integrated approaches and evidence integration from in vivo, in vitro and in silico as true in vivitrosi.”

[15] Gangwal – Lavecchia, 2025, 3.

[16] Gangwal – Lavecchia, 2025, 4. „The FDA Modernization Act 2.0 now permits drug developers to submit non-animal safety and efficacy data for drug approval, overturning the 1938 federal mandate requiring animal testing for all new drugs.”

[17] Gangwal – Lavecchia, 2025, 4. „Animal testing became integral to drug development in the late 1930s, spurred by a public health crisis. A pharmaceutical company released an antibiotic elixir containing toxic diethylene glycol, resulting in over 100 fatalities. This tragedy led to the 1938 Federal Food, Drug, and Cosmetic Act, mandating animal testing for drug safety prior to market approval.”

[18] Gangwal – Lavecchia, 2025, 4.

[19] Madden – Enoch – Paini – Cronin, 2020, 1.

[20] „Animal research has since driven key medical breakthroughs, including skin and organ transplantation and the development of the polio vaccine, which nearly eradicated the disease with testing on monkeys.” See Gangwal – Lavecchia, 2025, 4.

and physical artificial intelligence systems, which makes it possible to make animal robots or extinct animals speak and thus draw attention to the protection of species.

One such initiative was launched at the University of Cambridge's Zoological Museum, where animals (e.g. the extinct dodo, red panda, mallard duck) were anthropomorphized to make the loss of biodiversity more tangible.^[21] The animal species were taught to speak with the latest scientific knowledge that applies to them, so that, for example, the dodo can answer questions about its life, or even ethical questions, such as how it became extinct, or whether it would like scientists to bring it back to life through cloning.^[22]

To highlight the suffering of animals in Asia, PETA has developed an educational animatronic elephant, Ellie, to raise awareness of animals, and it was first introduced to a school in Mumbai.^[23] The elephant blinks, moves its ears and tells the story of how it was separated from its mother as a baby, the physical punishment it suffered in the circus and how it was eventually rescued.^[24]

3. Biometric data

Biometric data analysis can also contribute to achieving animal protection goals. In India, an AI-based monitoring system was set up in 2024 to prevent train accidents, and hundreds of elephants were saved in one year.^[25] Before the introduction of this technological innovation, elephants were frequently killed by trains, as the railway lines in India are extremely long and there are only a few places where elephants can safely cross.^[26] The system, which monitors the movements of elephants, detects the animals and warns railway controllers.^[27] The protection of elephants is particularly important as they are considered an endangered species, with only 40-50 thousand individuals registered in the wild in 2019.

Biometric data analysis can also help tackle the problem of stray animals. An AI-based application has been developed in the United States that identifies stray dogs based on their unique nose prints.^[28] The app NOSEiD uses the phone's camera to scan the dog's nose and turns the photos into a unique biometric identifier, similar to a human fingerprint.

[21] Makronom.eu: Halott állatok szólnak meg egy cambridge-i kiállításon, 2024.

[22] Kultúra.hu: A kihaltnak hitt dodó újra él, és még beszél is, 2024.

[23] PETA India: PETA India's Ellie the Animatronic Elephant Is Educating Children About Kindness.

[24] A book on the subject of elephant suffering and examining the issue of independent legal entity: Machado, S. – Machado, C.S. – Wise, 2023.

[25] ITBusiness.hu: Elefántokat ment a mesterséges intelligencia, 2024.

[26] ITBusiness.hu: Elefántokat ment a mesterséges intelligencia, 2024.

[27] ITBusiness.hu: Elefántokat ment a mesterséges intelligencia, 2024.

[28] Kreatív.hu: Itt az app, ami orrlenyomat alapján találja meg az elveszett kutyákat, 2021.

4. AI regulation and animal protection

In Hungary, the use of artificial intelligence technologies arises primarily in connection with livestock farming, animal husbandry, cattle identification, animal counting, and the use of this information.^[29] The Artificial Intelligence Strategy of Hungary (2025-2030)^[30] also highlights the possibilities of AI in connection with livestock farming, in the chapter on AI for society. The strategy emphasizes that the targeted introduction of AI-based solutions can reduce the ecological footprint of animal husbandry (e.g. feed optimization), enable the prediction of problems in animal husbandry (e.g. decline in milk production due to heat stress), and support preparation for the effects of climate change.^[31] Regulation (EU) 2024/1689 of the European Parliament and of the Council of 13 June 2024 laying down harmonised rules on artificial intelligence^[32] (hereinafter referred to as the AI Act) also highlights the role of AI-based monitoring in achieving animal protection objectives. According to paragraph 4 of the AI Act: “By improving prediction, optimising operations and resource allocation, and personalising digital solutions available for individuals and organisations, the use of AI can provide key competitive advantages to undertakings and support socially and environmentally beneficial outcomes, for example in healthcare, agriculture, food safety, education and training, media, sports, culture, infrastructure management, energy, transport and logistics, public services, security, justice, resource and energy efficiency, environmental monitoring, the conservation and restoration of biodiversity and ecosystems and climate change mitigation and adaptation.”^[33]

5. Robots–animals (robotic animals)

A noteworthy aspect of the topic is the analysis of the physical implementation of artificial intelligence in the field of animal protection.

In this regard, two emerging developments can be identified: the issue of robotic animals, and the other is the concept of independent legal personality, which is increasingly gaining prominence in legal scholarship in relation to both robots and animals, and which exhibits notable similarities.

a. Robotic animals

There are countless forms of robotic animals being developed today, two of which are highlighted in this study. The octopus robot, introduced in 2025,

[29] Tarr – Szabó, 2023, 1.

[30] Kormány.hu: Magyarország Mesterséges Intelligencia Stratégiája 2025-2030, 2025.

[31] Kormány.hu: Magyarország Mesterséges Intelligencia Stratégiája 2025-2030, 2025.

[32] Eur.lex.europa.eu: Az Európai Parlament és a Tanács (EU) 2024/1689 rendelete.

[33] Eur.lex.europa.eu: Az Európai Parlament és a Tanács (EU) 2024/1689 rendelete.

and which imitates animal behavior, represents a promising direction for future developments. The octopus-imitating robot, introduced under the name Octoid, changes its color while moving, combining the movement and camouflage capabilities of the giant octopus for the first time in a single device.^[34] The physical structure and nervous system of the giant octopus operate according to completely different principles than those of land animals.^[35] The soft robotic system inspired by the octopus integrates structural color modulation and programmable shape change.^[36] The materials used to make the robot may enable breakthroughs in areas such as deep-sea rescue, the monitoring of marine ecosystems, and healthcare robotics.^[37]

Also in 2025, a robot dog was developed in Japan^[38] that looks like a dog stripped down to its muscles, with every movement clearly visible. The goal was to create a more “lifelike” robot, consisting of artificial muscles that operate pneumatically and closely mimic the biological muscular system, imitating the physical structure of real living creatures.^[39]

b. The independent legal personality of robots and animals

I illustrate the efforts to recognize the independent legal personality of robots and animals by examining two landmark cases, which were among the first in the world to address the question of legal personality in this context.

The animal case Sandra the orangutan was the first to be granted “non-human personhood” status in an Argentine court.^[40] Sandra’s case was initiated by an Argentine animal rights organization, AFADA (Association of Officials and Lawyers for Animal Rights).^[41] The 2015 ruling by the Buenos Aires court is a milestone in the recognition of the independent legal personality of animals, because it determined that Sandra is legally not an animal, but a non-human person, and therefore entitled to certain rights, including the right to life, the right to liberty, and freedom from disease, as well as better living conditions.^[42] The court thus recognized a new category of person, and as a non-human person,

[34] PCWplus.hu: Az új robotpolip még a színét is változtatja, 2025.

[35] PCWplus.hu: Az új robotpolip még a színét is változtatja, 2025.

[36] Hui Han et al., 2025, 9.

[37] PCWplus.hu: Az új robotpolip még a színét is változtatja, 2025.

[38] See Suzumori Endo Lab, a laboratory of the Tokyo Institute of Science; Rakéta.hu: Hátborzongató robotkutya jelent meg Japánban, 2025.

[39] Rakéta.hu: Hátborzongató robotkutya jelent meg Japánban, 2025.

[40] See Center for Great APes: Sandra. I discussed the topic in detail in my recent study, see Lénárdné Miletics, 2024.

[41] Center for Great APes: Sandra.

[42] Hirado.hu: Egy argentin bíróság szerint egy orangutánnak is joga van a szabadsághoz, 2024. „Sandra has the right to enjoy the highest possible quality of life in accordance with her specific and individual situation, i.e. to avoid any suffering that may be caused by human interference in her life.” Interestingly, in September 2019, Sandra the orangutan finally arrived in the United States and became a resident of the Center for Great Apes in Florida. She lost the special legal status she had obtained in Argentina, but she was able to live in conditions that fully met her needs.

Sandra the orangutan was granted recognition of her interests in relative freedom.^[43] Elena Liberatori, the judge who delivered the ruling, said: “With that ruling I wanted to tell society something new, that animals are sentient beings and that the first right they have is our obligation to respect them.”^[44] The judge argued that the animals’ new legal status did not conflict with Argentine law.^[45] Sandra the orangutan became the first non-human subject to be granted such rights, resulting in the court approving her transfer to an animal sanctuary in the United States, where her well-being and freedom would be guaranteed.^[46] In September 2019, Sandra the orangutan finally arrived in the United States and became a resident of the Center for Great Apes in Florida, thus losing the special legal status she had been granted in Argentina, but she was able to live in conditions that fully met her needs.^[47] Sandra’s case was later used as a precedent by other Argentine and international judges to grant animals legal personality, or recognize them as having legal personality.^[48]

The recognition of robots as having independent legal personality is often compared to the recognition of animals as sentient beings. New developments in artificial intelligence and robotics may pave the way for the creation of rational and sentient automata.^[49] The question is whether robots could ever become truly sentient or rational beings in manner analogous to humans, and if so, will they be able to make moral decisions?^[50] With the development of robotics, people are increasingly inclined to consider robots as sentient beings rather than mere machines due to the sophistication of their functions and their integration into human life.^[51]

The first robot in the world to be granted „citizenship” was Sophia, a female humanoid robot created by Hanson Robotics in Hong Kong. She was granted citizenship in Saudi Arabia in 2017. Since her creation, Sophia has become the world’s most well-known humanoid social robot, appearing at various events around the planet as a symbol of the shared future of humans and technology.^[52] The citizenship was announced in Riyadh at the Saudi-sponsored Future Investment Initia-

[43] Comstock – Lerner – Montes Franceschini – Singer, 2022, 5.

[44] „With that ruling I wanted to tell society something new, that animals are sentient beings and that the first right they have is our obligation to respect them,” she told The Associated Press.

[45] Fasel – Butler, 2023, 140.

[46] David, 2021.

[47] Hirado.hu: Egy argentin bíróság szerint egy orangutánnak is joga van a szabadsághoz, 2024.

[48] Comstock – Lerner – Montes Franceschini – Singer, 2022, 15. „For example, the judge that decided to recognize animals as rights holders and close the Marghazar Zoo in Islamabad and transfer the animals to sanctuaries cited Sandra’s case as an example of case law on animal rights.” See Islamabad Wildlife Management Board v. Metropolitan Corporation Islamabad, etc., (2020) WP No. 1155/2019 PLD (ISL) 1, 4 (Pak.).

[49] Ashrafian, 2015, 30.

[50] Ashrafian, 2015, 31.

[51] Kumar – Choudhury, 2025, 7.

[52] Riccio, 2021, 1.

tive, which was a symbolic act, suggesting that the female robot has more rights than female Saudi citizens.^[53] Sophia, without a headscarf, spoke at the all-male international symposium.^[54] The granting of citizenship was only of a symbolic nature, as it was emphasized that it had no legal status, international recognition or any value beyond public recognition.^[55] The female robot's "citizenship" has sparked controversy and attracted criticism to the company that developed it, as a machine promoted as a champion of human progress, has become a "citizen" of a country known for its human rights abuses and oppression of women.^[56]

6. Treating animals as objects

In my opinion, the negative impact of the rise of artificial intelligence will primarily be caused by a change in attitude towards animal protection. Robots, animal robots, AI-powered image and video creation programs (e.g. Midjourney AI, Dall E AI Art Generator, Copilot) will contribute to treating animals as objects that can be replaced and recreated. This tendency will ignore the fact that animals are sentient beings, the recognition of which is only beginning to gain broader acceptance in science and law.

The traditional, Roman law view of animals as mere property is being replaced in a growing number of countries by a new approach that acknowledges their distinct legal status. The range of animal species for which this distinct value is recognised continues to grow; while previously the ability to feel was recognized only in relation to vertebrate animals^[57], this category has now been extended to cephalopods^[58] and decapod crustaceans in some countries^[59], and even to honeybees in Norway.

This trend is being challenged by the possibility of AI-powered animal robots and fake images and videos of animals. There is a risk that future generations will no longer be able to tell the difference between a robot animal and a live

[53] Riccio, 2021, 66.

[54] Riccio, 2021, 67.

[55] Joanna Bryson, a renowned scholar of AI ethics at the University of Bath, was succinct: "It's obviously bullshit" See Weaver, 2017.

[56] Riccio, 2021, 67.

[57] Based on 1986 EEC regulations.

[58] According to a directive that came into force in 2010, vertebrates and cephalopods were also considered sentient beings in the European Union: Directive 2010/63/EU on the protection of animals used for scientific purposes. "The directive shall apply to all living vertebrates and to certain invertebrates (squid, octopus, etc.) which are likely to feel pain." See Eur.lex.europa.eu: A tudományos célokra felhasznált állatok védelme, 2024.

[59] In 2021, in the United Kingdom, alongside vertebrates and cephalopods, decapod crustaceans were also recognised as sentient beings based on scientific research: "The scope of the Animal Welfare (Sentience) Bill has today been extended to recognise lobsters, octopus and crabs and all other decapod crustaceans and cephalopod molluscs as sentient beings." See Gov.uk: Lobsters, octopus and crabs recognised as sentient beings, 2021.

animal, and will be satisfied with AI-powered videos of animals instead of protecting them from extinction, further alienating humans from nature.

IV. CLOSING THOUGHTS

Based on the aspects examined in my study, it can be concluded that the development of artificial intelligence will have a significant impact on animal protection efforts. As in any field shaped by new technological developments, these developments give rise to both positive and negative consequences. As with all dynamically developing innovations, such developments undoubtedly contain elements that contribute to animal protection efforts, particularly in connection with animal experimentation, the analysis of biometric data, and the use of AI tools for educational purposes.

In addition to the positive effects, however, it is important to draw attention to the risks. In my opinion, the primary challenges in animal protection are likely to stem from shifts in societal attitudes. In the world of robots, animal robots, AI-driven software, and image and video creation programs, animals are at risk of being objectified again. and we must ask ourselves how important the protection of living animals will remain for us. To what extent can the protection of animals retain its significance if artificial intelligence enables the creation of highly realistic videos or images that closely replicate real animals, including their sounds, and the development of animal robots that may eventually look almost exactly like living animals. Does the truth remain important, or will we be satisfied with the content produced by generative artificial intelligence rather than protecting animals?

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