

Artificial Intelligence and the Environment

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Abstract

Artificial intelligence (AI) can create new knowledge by analyzing large amounts of data, by recognizing patterns in the data sets via machine learning to create new knowledge about ecosystems. In addition, environmental balances can be created in the process, which can be used as a basis for decision-making. Due to the large amounts of data, complex feedback mechanisms can be balanced and the costs of decisions can be made transparent. Despite these opportunities for resource-saving handling of nature, AI balancing should not be allowed to become an automatic decision-making process. For sustainable environmental action, an emotional connection to the environment is also important. This cannot be achieved by AI, here it is the task of natural intelligence to recognize its embedding in a larger natural context and to develop from it a lifestyle in an environmental virtue ethics perspective.

Keywords: artificial intelligence (AI), machine learning, ecosystems, environmental balances, environmental virtue ethics

Introduction

The idea of using intelligent technology to make human life easier has always moved people. In the *Iliad*, it is the golden servants who are at Hephaestus' service. He (Hephaestus)

put on a chiton, took his cane and limped to the door.
where two servants rushed to support their master.
all cast in gold, they looked like living girls;
not only could they speak and move their limbs.
they also possessed understanding and had learned from the immortals
the most versatile skills (Homer XVIII, V.415ff.)¹

Aspects that have already been mentioned here are extremely topical. Care robots, for example, should support elderly people in their everyday lives and be able to adapt to new situations through machine learning. The use of robots is supposed to relieve the nursing staff through activities such as distributing food or medication or emptying rubbish bins and at the same time support elderly or disabled people in their independence for longer.² The acceptance of these robots is to be increased by a certain human resemblance and by characteristics such as learning ability and autonomy. In addition, AI-supported speech recognition in care can relieve the burden of routine activities such as documentation and administration. Technically, this is based on forms of machine learning, which are considered a central subfield of artificial intelligence (AI). But in this context, the actual term “intelligence” often remains fuzzy, but can generally be seen as the extent of the problem-solving ability of artificial systems. Numerous AI systems are now firmly established components of the reality of many people's lives; be it in learning preferences in music or films or in purchasing behavior. Approaches of weak AI, which are used here, serve to solve concrete application problems. Such approaches do not attempt to reproduce all the characteristics of human intelligence, but rather focus on a subarea that can be mastered through fast computing operations. Different machine learning methods are important approaches to weak AI. Statistical dependencies and patterns are determined from large amounts of data, which can be used for prediction or classification purposes. The quality of these applications depends on the quantity and quality of the input data.

In the following, we will address the question of whether and to what extent artificial intelligence can help to master the increasingly worsening global ecological crisis. After all, knowledge about the destruction of nature and the environment has been around for many decades and the idea of nature conservation has a long history.

¹ Raoul Schrott, *Homer Ilias* (Frankfurt am Main: S. Fischer, 2011).

² Oliver Bendel, Ed., *Pflegeboter* (Wiesbaden: Springer, 2018).

In Germany, the Drachenfels near Königswinter is considered the first nature reserve, established in 1836. However, this was intended to preserve a romantically charged symbol rather than primarily untouched nature. Nature conservation has always also served to protect cultural landscapes. The world's first national park (Yellowstone in 1872, followed by Yosemite in 1890) then led to an increased awareness of protecting areas as habitats for animals and plants.³ With "Pfisters Mühle" (Wilhelm Raabe 1884), the first German environmental novel appeared in the same period, a testimony to the pollution of water by sugar factories in the early days. Thus, an awareness of the need to protect nature and landscapes has been present in western countries for well over 100 years. In 1914, Ludwig Klages described the situation in an equally impressive and topical manner: "An unparalleled orgy of devastation has seized humanity, 'civilization' bears the marks of unleashed murderousness, and the bounty of the earth withers before its poisonous breath. So, this is what the fruits of 'progress' look like!"⁴ Framed within this destruction is also the emergence of pandemics, for intervention in hitherto barely touched ecosystems can open new transmission routes for zoonoses and initiate pandemics. This idea can also be found in Klages' work: "and so it goes on until the worse setbacks of the wounded nature of exotic countries in the form of those terrible epidemics that attach themselves to the heel of the 'civilized' European."⁵ More than 100 years later, it is no longer only the "civilized" Europeans who must struggle with the consequences of human interventions in little-touched ecosystems. The fact that humans ultimately harm themselves by destroying nature has also met with great public response in recent environmental history with the publication of Rachel Carson's non-fiction book *Silent Spring* in 1962. The knowledge of the urgency to implement effective climate and nature protection globally has thus been accessible to a broad public as well as decision-makers for decades. Consequently, there is not so much a lack of environmental knowledge or environmental awareness, but a lack of environmental being, of environmental action.

The fact that people do not react immediately and affectively to environmental crises is due on the one hand to the fact that the damage to people often occurs asynchronously in space and time, and on the other hand to the fact that people build up a "hiatus" in their actions between the immediate satisfaction of needs and a necessary everyday action. This "indirectness of lifetime" may be one reason for the massive discrepancy between knowledge and action in regional and global environmental discourse.⁶ In addition, the aspect of defense against fear can be cited as a repression mechanism against apocalyptic scenarios. If knowledge is available,

³ On the history of nature conservation in Germany, see, Barbara Stammel & Bernd Cyffka, *Naturschutz* (Darmstadt: WBG, 2015).

⁴ Ludwig Klages, *Mensch und Erde*, in *Sämtliche Werke, Band 3, Philosophie III*, ed. Ernst Frauchiger (Bonn: Matthes & Seitz Berlin, 1914, 1974), 619.

⁵ Ludwig Klages, *Mensch und Erde*, in *Sämtliche Werke*, 619.

⁶ Arnold Gehlen, *Der Mensch. Seine Natur und seine Stellung in der Welt* (Wiesbaden: Athenaion, 1978).

there is also selective inattention and self-numbing.⁷ This may be another reason why we do not behave appropriately despite our immense knowledge about the state of global ecosystems.⁸ Overall, ecological knowledge and action remain only loosely coupled to each other; via cognitive dissonance, this also applies to particularly environmentally aware people. Cognitive dissonance arises when the attitude, opinion or norm does not match the actual action.⁹ People strive to reduce such states of tension. To this end, arguments are often sought in ecological discourse to justify one's own actions, for example through constraints, institutional incentives, and other necessities. The example of German sustainability researchers shows how they justify their growing ecological footprint by using such arguments.¹⁰ However: the emission of greenhouse gases remains unaffected. Another explanation for such behavior could be described as moral licensing.¹¹ Especially environmentally conscious people, since they stand up for the cause of the good, then, as it were, debit an imaginary environmental account, e.g., a flight, for which there are certainly good constraints. Mental rebound effects can then lead to increased resource consumption. This describes effects that result in the original savings potential not being realized or only partially realized, for example due to efficiency increases. This can have the consequence that in the overall ecological balance, the attitude of standing up for an ecologically good cause then replaces, as it were, the overall sustainable action. In short: there is no lack of good will: "Good will is fortunately abundant; it demonstrates itself everywhere," there is no lack of "attitude."¹² But the life worldly consummation of the conscious shows itself less in the truthfulness of the attitude than in the energy of action. But despite all this, even in everyday life it is often not so easy to determine which decision entails the least consumption of resources. Here, however, AI could provide a valuable decision-making aid.

⁷ Hans Peter Dreitzel, *Reflexive Sinnlichkeit: Mensch Umwelt Gestalttherapie* (Köln: EHP, 1992).

⁸ In detail on the "motivation problem" in environmental action, See, Christoph Baumgartner, *Umweltethik—Umwelthandeln: Ein Beitrag zur Lösung des Motivationsproblems* (Paderborn: Brill—Mentis, 2004).

⁹ Leon Festinger, Cognitive dissonance, *Scientific American* 207 no. 4, (1962): 93-107.

¹⁰ Isabel Schrems and Paul Upham, "Cognitive Dissonance in Sustainability Scientists Regarding Air Travel for Academic Purposes: A Qualitative Study," *Sustainability* 12 (2020): 1837, doi:10.3390/su12051837.

¹¹ Michael Halla, "Believing in climate change, but not behaving sustainably: Evidence from a one-year longitudinal study," *Journal of Environmental Psychology* 56 (2018): 55–62.

¹² Hermann Lübbe, *Politischer Moralismus. Der Triumph der Gesinnung über die Urteilskraft* (Münster: Lit, 2019).

The Paradox of Environmental Knowledge

The “paradox in environmental knowledge” describes a phenomenon of different spatio-temporal scales.¹³ For on a global level, the requirements for achieving effective nature conservation in a comprehensive sense have been clearly identifiable for many decades: for example, the reduction of greenhouse gas emissions, land consumption, habitat fragmentation, large-scale deforestation, intensification of land use or overfishing in the oceans. Despite this body of knowledge, the “great acceleration”¹⁴ shows that the main indicators of the state of global ecosystems continue to show accelerating trends in a negative direction, despite regional (and, in the case of the ozone layer, global) improvements. Apparently, knowledge about the ecological crisis is insufficiently relevant for action. One reason for this is that in individual behavior on a local level, it is often not at all clear what is really the more ecological alternative in terms of the complex consequences of a decision. The “paradox of environmental knowledge” shows that (not only) on an individual level, supposedly ecologically sustainable decisions can turn out to have complex negative effects. The organic carrot from Israel bought in Germany may be “organic,” it is certainly not “eco.” But is the regional product generally more ecologically sustainable than one from more distant regions where it can be grown more efficiently with less resource input?

In addition, a monetary perspective can be added: A bamboo toothbrush may be more sustainable than a plastic toothbrush that costs only a third of the price. However, in the perspective of effective altruism, the money saved could be used for environmental protection measures and thus provide an overall greater ecological benefit.

“Greenwashing” has a negative connotation and refers to the emphasis on the ecological advantages of products or processes without there being any basis for this in the overall consideration of all interactions. This is usually done by emphasizing selective aspects. For example, in the case of a T-shirt made of organic cotton, the high water consumption for cotton (in mostly dry regions), the land requirement and thus the competition for land, the transport or the use of fabric-dyeing substances, among other things, must be taken into account in an overall balance.

Another example could be the recycling of paper and cardboard. This behavior can bring about a certain environmental relief and even more strongly evoke the feeling of being a good environmentalist in the person acting. However, with the steadily increasing packaging waste due to the growing online trade, recycling is a smaller part of the solution; a reduction in the use of packaging and the quantity of

¹³ Joachim Rathmann, “Von der Naturkunde zur Umwelttugendethik: Ein möglicher Weg zur Überwindung der Diskrepanz von Umweltwissen und Umwelthandeln?,” *Comenius-Jahrbuch* 28 (2020): 97-120.

¹⁴ Will Steffen, “The trajectory of the Anthropocene: The Great Acceleration,” *The Anthropocene Review* 2, no. 1 (2015): 81-98.

orders would be more effective in terms of a truly significant reduction in environmental impact.¹⁵

Thus, bio-labelling and recycling run the risk of causing greater damage while at the same time increasing people's environmental awareness. They create the illusion of goodness, celebrate a triumph of sentiment, and fail to recognize the complexity of interrelationships, so that they can ultimately have a greater negative impact than is generally realized. The well-intentioned is not congruent with the good. For it is true for the use of resources in many products and processes that the interactions, even in different spatial and temporal manifestations, are so complex that the quick decision in favor of the supposedly more ecological product can be wrong. The resulting "unintentionality of the rapidly increasing burdens of civilization" should warn against the rampant moralism in ecological questions. For the burdens of civilization are too readily blamed on capitalism, the "system" and large corporations.

When weighing up ecological consequences of actions and purchase decisions, one could easily end up in the role of Buridan's donkey, which starves to death between two equally distant, equally large haystacks because it cannot decide which one to turn to. Analogously, detailed weighing in environmental decisions could lead to a deadlock situation in which both alternatives block each other, and a situation may seem hopeless. AI could come into play here and create a basis for decision-making by virtue of the calculation of large amounts of data and contribute to the transparency of the true costs and benefits.

Hoping for AI?

The rapid processing of large amounts of data by AI and the recognition of patterns in the data sets can create new knowledge about ecosystems and optimize their management. As a result, sustainable environmental behavior can be simulated by AI and the real use of ecosystems can fundamentally be made more resource-efficient and sustainable. In agriculture, for example, there are various fields of application for AI: agricultural processes can be controlled in real time according to location and need. The location-differentiated and targeted management of agricultural land is known as precision farming and is part of the digitalization of agriculture. This is also done using drones to collect precise data and create high-resolution images that help to monitor crops and at the same time help to optimize the use of resources and thus reduce the burden on the environment.¹⁶ This is because precision farming uses AI to develop

¹⁵ Hermann Lübke states that the understanding of one's own living conditions is decreasing and that we are therefore increasingly dependent on the "expertise" of experts; this can only be based on trust. The need to consider the side-effects of individual actions and to assess consequences is therefore increasing sharply.

¹⁶ Robert Finger "Precision farming at the nexus of agricultural production and the environment," *Annual Review of Resource Economics* 11 (2019): 313-335.

accurate and controlled techniques that help provide guidance and understanding for water and nutrient management, optimal harvesting and planting times, and crop rotation timing.

Further environmental relief in the agricultural sector could also come from vertical farming, where vegetables and lettuces are grown in closed systems in indoor farms. High productivity is ensured by the fact that the systems can grow in a space-saving manner over several stories (vertically) on artificial growing media or in nutrient solution. Proximity to consumers is another advantage. AI can precisely control the use of water, nutrients, light, energy, or humidity and optimally supply the plants without the use of pesticides.¹⁷

Another opportunity to improve the ecological status lies in the fact that AI can be used in the calculation of environmental impacts via life cycle assessments, climate assessments or the ecological footprint. The larger the incoming data volumes and the more interactions that can be considered, the more precise such calculations can be. AI has the potential to cope with these data volumes and, through processes of self-learning, to carry out the transferability of product assessments. This means that the respective “environmental consumption” of products and services can be quantified and used as a basis for decision-making. External costs can also be presented transparently. Customers would then be able to make an ecologically sustainable choice directly on the basis of comprehensive information when purchasing products. Multi-criteria decision analysis (MCDA) is therefore becoming increasingly widespread for many aspects of the energy and environmental sector.¹⁸ This is because the main decision-making problems arise when several objectives (multiple criteria) are pursued, and the decisions take place in a complex context. Frequently, the available information and goals are of a conflicting nature when it comes to balancing economic and social concerns with the demands of species and climate protection, as well as substantial consequences and long-term impacts in different spatial manifestations. Therefore, wrong decisions can no longer be revised so easily. Complex decisions are no longer trivial, and the pure computational capacity of AI can meaningfully contribute arguments for decisions. For the decision-maker, the situations are formalized by a multi-criteria decision analysis, in which information is organized to such an extent that the decision-maker can contribute to an improved decision-making process with the feeling of having taken the essential criteria into account.¹⁹ The aim is to provide technical support in complex problem situations, to make consistent, comprehensible, and more reasonable decisions or to support

¹⁷ Malex Al-Chalabi, “Vertical farming: Skyscraper sustainability?,” *Sustainable Cities and Society* 18 (2015): 74-77.

¹⁸ Danae Diakoulaki et al., “MCDA and energy planning,” in *Multiple Criteria Decision Analysis: State of the Art Survey*, ed. José Figueira et al. (Berlin: Springer, 2005), 859-897.

¹⁹ Valerie Belton, Theo Stewart, *Multiple Criteria Decision Analysis: An Integrated Approach* (Dordrecht: Springer, 2002).

compromise negotiations based on the possibility of weighing up several alternatives in a flexible way by selecting, comparing, and ranking different attributes.

Limits and Risks of AI

AI-supported decision analyses in environmental issues can hardly bridge the fundamental discrepancy between environmental knowledge and action. Any decision support requires implementation by the decision-maker. However, the environmental discourse of the past decades shows that the knowledge of how to improve the ecological situation on a global but also on a local scale does exist. Factual knowledge alone is a necessary but not sufficient vehicle to bring about global change. Factual knowledge, even that of an AI-generated decision-making aid, hardly touches people's lives, it remains external to them.²⁰ AI can calculate the “what” in ecological matters, but for the question of the “why,” natural intelligence is needed.²¹

In addition, information is often embedded in a certain framing; for the AI there is initially no difference whether a glass is half-full or half-empty, but for a human decision it is all the same. Purely logical weighing is blind to intuition, individual or socio-cultural embedding of decisions. Finally, the purely instrumental reason of AI needs to be supplemented, otherwise there is a danger of “technical perfection with complete failure of moral reflection.”²² For the human conscience, in its necessary weighing, prevents the judgements of the AI from becoming executioner's verdicts and man from ultimately becoming a slave to the digitalized world. For the corporeality of the ego as a person prevents the world from being perceived only from a spectator's perspective. AI, however, is an expression of scientism in the tradition of Francis Bacon. There is a danger that ultimately the “worst of all possible worlds” will be constructed.²³ For “representationality is then equated with availability—an equation that amounts to the abolition of object and representationality [. . .]. The opposite is true. The totally unavailable object is most object—the PERSON (understood as human or superhuman). In it, and only in it, is a maximum of depth realized.”²⁴ In this way, natural intelligence also eludes artificial intelligence, from which it differs in manifold ways. AI is at best a “simulation of narrowly defined areas of human intelligence.”²⁵ For essential aspects such as life, consciousness or perspective-taking

²⁰ Rathmann, “Von der Naturkunde zur Umwelttugendethik: Ein möglicher Weg zur Überwindung der Diskrepanz von Umweltwissen und Umwelthandeln?,” 97-120.

²¹ Helmut Kuhn, *Der Weg vom Bewußtsein zum Sein* (Stuttgart: Klett, 1981).

²² Hermann Lübbe, “Scientific Practice and Responsibility,” in *Facts and Values: Philosophical Reflections from Western and Non-Western Perspectives* (Dordrecht: Springer Netherlands, 1986), 9.

²³ Kuhn, *Der Weg vom Bewußtsein zum Sein*, 352.

²⁴ Kuhn, *Der Weg vom Bewußtsein zum Sein*, 353.

²⁵ Thomas Fuchs, *Verteidigung des Menschen: Grundfragen einer verkörperten Anthropologie* (Berlin: Suhrkamp, 2020).

cannot be generated by algorithms.²⁶ Life takes place in life itself and cannot be substituted by modelling; life always means relating affectively and emotionally to others. For: “the boundless objectification of the people of our day is gradually eating away at the forces that are necessary to maintain a mere material culture and merely technical operations, e.g., imagination, creativity, listening to the sources of life that roar in the depths. Why does contact with nature refresh us? Because for once we are alone with ourselves and can therefore also have contact with ourselves.”²⁷ This ability to bond could turn out to be a central aspect in overcoming the ecological crisis. But this is where the limits of AI become apparent, because empathy has a bodily component that cannot be represented by it, despite a “fictional empathy” that can also arise towards computer figures or robots.²⁸ An “as-if” empathy that is devoid of meaning and has migrated into the virtual world loses depth and commitment, however.

Empathy

The increasing presence of digital media, sign systems and fictions may have led to a decline in perspective taking and primary empathy as well as psychological well-being in recent years. A well-received meta-study, based on data compiled from nearly 14,000 students in 72 studies from 1979 to 2009, finds a decline in empathy over this period.²⁹ This decline is particularly evident after the year 2000. The index used is the Interpersonal Reactivity Index (IRI), which indicates the extent to which someone can put themselves in the shoes of another person or of characters in films or books to understand them. The willingness to adopt a perspective has decreased in the last years of the study period, while the values for imagination have remained constant. This decrease correlates positively with the common contemporary diagnosis of “narcissism.”³⁰ This study ultimately asked about attitudes towards empathy and did not observe the actual (empathic) behavior itself. Certainly, one can also critically ask whether, with such a long period of investigation with the same questionnaire between 1979 and 2009, shifts in meaning and different associations do not occur among the respondents. But despite all the fundamental methodological criticism, it could be that an old cultural pessimistic lament is seeking confirmation here, because “after all, it was already claimed a good 200 years ago that the new media would corrupt young

²⁶ Cf. Tab. 1 Fuchs, 59f.

²⁷ Eduard Spranger, *Gedanken zur Daseinsgestaltung*, Ausgewählt von Hans Walter Bähr (München: R. Pieper, 1962).

²⁸ Fuchs, *Verteidigung des Menschen: Grundfragen einer verkörperten Anthropologie*, 125ff.

²⁹ Sara Konrath “Changes in dispositional empathy in American college students over time: A meta-analysis,” *Personality and Social Psychology Review* 15, (2011), 180-198.

³⁰ Rathmann, “Von der Naturkunde zur Umwelttugendethik: Ein möglicher Weg zur Überwindung der Diskrepanz von Umweltwissen und Umwelthandeln?,” 115.

people and lead to narcissism. At that time, the new media were the novels that we now wish young people would read more of.”³¹ Nevertheless, less empathy and more narcissism seem to be particularly evident in social media, and this also has a negative effect on health: young people’s psychological well-being decreases when they spend a lot of time in front of a screen or smartphone (social media, internet, games, etc.) compared to people who do more activities beyond a screen (direct personal contact, sports, church activities, etc.). This was shown in a nationwide survey from the USA over a period of 15 years between 1991 and 2016.³²

However, an evaluation of the (alleged) decline in empathy depends on how the strongly positively connoted term³³ is to be filled in terms of content. Empathy as empathy is different from compassion with caring. For Bloom argues against this and shows that empathy, as mere empathy, can justify terrible situations.³⁴ Conflict can be amplified by empathizing with certain groups. A mere perspective-taking, an empathy with others is also possible in the case of perpetrators of violence, because empathy describes the ability and the tendency to feel the feelings that one believes the other person feels.³⁵

Lipps has already elaborated the double-sidedness of perspective-taking in the concept of “empathy.”³⁶ He distinguishes between positive empathy “colored by pleasure” and negative empathy “not colored by pleasure.” Positive empathy is “the taking in of that which penetrates me, or it is the becoming one of the grasping I, as it is in itself, with that which penetrates it.”³⁷ Negative empathy, on the other hand, is described as that against whose penetration “contradiction” arises. It rejects itself as “incompatible” with itself.³⁸ Implicitly, this ambivalence is also found in Bloom’s work, in that he distinguishes aspects such as “kindness” and “compassion” from empathy and its negative sides, which he explicitly appreciates positively, as well as the positive

³¹ Fritz Breithaupt, *Die dunklen Seiten der Empathie*, (Berlin: Suhrkamp, 2019), 71. Since leaving the Garden of Eden, the “O tempora o mores!” remains the accompanying melody of the Anthropocene. More modernly, Szymborska formulates this in the poem “Not Reading:”

“We live longer, but less precisely, and in shorter sentences, We travel faster, more often, further. And instead of memories, we bring back photos.” Wislawa Szymborska, *Glückliche Liebe und andere Gedichte* (Suhrkamp: Berlin, 2014), 65

³² Jean Twenge, *Emotion* 18/6, (2018): 765-780: Decreases in psychological well-being among American adolescents after 2012 and links to screen time during the rise of smartphone technology.

³³ For de Waal, the ability to feel connected to others is the bonding agent that positively connects people and peoples. For him, “empathy for “other peoples” [. . .] is the raw material the world needs even more urgently than oil” Frans de Waal, *Das Prinzip Empathie. Was wir von der Natur für eine bessere Gesellschaft lernen können* (Darmstadt: Hanser, 2011), 263.

³⁴ Paul Bloom, *Against Empathy. The Case for Rational Compassion* (London: Ecco, 2018).

³⁵ Breithaupt uses numerous examples to show the “dark sides of empathy.” This is intended to sharpen the view that a central characteristic of human life, developing empathy, can also have negative consequences. Fritz Breithaupt, *Die dunklen Seiten der Empathie* (Berlin: Suhrkamp, 2019).

³⁶ Theodor Lipps, *Fühlen, Wollen und Denken. Versuch einer Theorie des Willens* (Leipzig: Johann Ambrosius Barth, 1907).

³⁷ Theodor Lipps, *Fühlen, Wollen und Denken. Versuch einer Theorie des Willens*, 236.

³⁸ Theodor Lipps, *Fühlen, Wollen und Denken. Versuch einer Theorie des Willens*, 236.

sides that empathy also shows. However, according to Bloom, empathy can also motivate indifference or even cruelty, because empathy is based on a certain short-termism, since it focuses on a specific counterpart; in doing so, there is a danger of overlooking longer-term consequences and the suffering of those who are not the current counterpart. Charity runs the risk of blinding the love of the farthest.³⁹ Nietzsche's *Zarathustra* recommends: "I do not advise you to love your neighbor: I advise you to love your neighbor from afar."⁴⁰ Nicolai Hartmann sees in Nietzsche, despite all exaggeration, the "positively seen [. . .]"⁴¹ and describes the love of the farthest as love "that knows no love in return, that only radiates."⁴² Admittedly, love at a distance begins with the neighbor, but in a sense sees him as a means to a higher (future) end. Often, love at a distance can be carried out without effort. Signing a petition for refugees or against the deforestation of the rainforest provides self-affirmation to stand up for the good, but picking up the rubbish by the roadside is comparatively uncomfortable. Therefore, the starting point of action must first be empathy with the immediate environment. The binding of the I in the Thou is not simply a projection of one's own in the Other; as an experience of love, it is an assurance of priority towards the Thou in loyalty, otherwise responsibility would remain "a free-floating ought."⁴³

Even though moral decisions are essentially shaped by empathy, it is important to recognize that negative consequences can also result. Compassion is therefore a more appropriate way to contribute to the betterment of others, since it does not simply understand the feelings of the other person, but through sympathy, the motivation to promote the well-being of the other person grows by feeling for the other person. This also comes close to the concept of empathy that Goleman cites in the context of "ecological intelligence." On the one hand, this includes knowledge of ecological connections and, on the other hand, the insight "to learn from experience and to act meaningfully."⁴⁴ For him, this is linked to a form of empathy that encompasses everything "that lives."⁴⁵ This implies compassion when ecosystems

³⁹ Bloom sums it up in a short equation: "Self + Close People + Strangers=100%" (p. 162). Which shares (time, money, commitment, emotions) are invested in which sub-area and to what extent? Whereby it is clear that there are resources that diminish with use (e.g., money) and those that even increase with use (e.g., love and affection). In this regard, Alexander Batthyány, notes that "having comforted or encouraged a person does not mean that we will eventually run out of words of comfort or encouragement for the neighbor in need of comfort or encouragement." Love and affection therefore go beyond the model of resources, in that by giving, the subject gains and loses wealth if the possibility of giving is not realized. Alexander Batthyány, *Die Überwindung der Gleichgültigkeit. Sinnfindung in einer Zeit des Wandels* (München: Kösel, 2017), 89.

⁴⁰ Friedrich Nietzsche, *Also sprach Zarathustra*, in *Kritische Studienausgabe*, ed. Giorgio Colli, Mazzino Montinari, Vol. 4 (dtv: München, 1999), 79.

⁴¹ Nicolai Hartmann, *Ethik* (Berlin: Walter de Gruyter, 1962).

⁴² Nicolai Hartmann, *Ethik*, 490.

⁴³ August Vetter, *Natur und Person. Umriss einer Anthropognomik* (Stuttgart: Klett, 1949), 224.

⁴⁴ Daniel Goleman, *Ökologische Intelligenz: Wer umdenkt, lebt besser* (Droemer: München, 2009).

⁴⁵ Goleman, *Ökologische Intelligenz*, 50.

“suffer” and to derive from this an action that seeks to reduce this suffering. In a deep ecological perspective, the perspective also expands to the inanimate: “think like a mountain,” Aldo Leopold’s dictum, makes it clear that the idea of protection also goes beyond the animate world.⁴⁶ For Berry, too, the idea is central that human bodies are closely interwoven with the surrounding nature and that only contact with the “wilderness” brings experiences—“to receive the awareness, at one humbling and exhilarating, grievous and joyful, that we are part of Creation, once with all that we live from and all that, in turn, lives from us.”⁴⁷

Abram opens the perspective that: “the perceiving being and the perceived being are of the same stuff, that the perceiver and the perceived are interdependent and in some sense even reversible aspects of a common, animate element, or Flesh, that is at once both sensible and sensitive.”⁴⁸

For Abram, this reciprocity of the sensuous extends directly to non-human life, which extends on a continuum into the landscape. For him, this explicitly includes remote love: “If the surroundings are experienced as sensate, attentive, and watchful, then I must take care that my actions are mindful and respectful, even when I am far from other humans, lest I offend the watchful land itself.”⁴⁹

This is immediately followed by the question of the good life. From a deeper (not necessarily a deep ecological) ecological perspective, it is obvious that the meaning of a good life can only be found in a measured and reverent treatment of our environment.

Compassion as Virtue-Ethical Potential

In the face of global ecological challenges, the question of the practicability of ethical action arises with new urgency. In the perspective of norm ethics, an established norm finds its application in a specific case. However, in the complexity of ecological-social systems with ever new feedbacks and rebound effects, the need to maximize adaptation possibilities becomes apparent. A virtue ethics perspective opens the possibility of strengthening personality traits that help to meet all concerns in complex situations.

Empathy is not moral at first because of the ambivalence of perspective-taking. However, empathy as compassion and as love allows further dimensions to be strengthened, because adopting the perspective of others enriches one’s own feelings and perception with new perspectives. Complemented by empathy with others, the

⁴⁶ Bill Devall, Die tiefenökologische Bewegung, in: *Ökophilosophie*, ed. Dieter Birnbacher (Reclam: Stuttgart, 1997), 17-59.

⁴⁷ Wendell Berry, *Essays 1969-1990*, ed. Jack Shoemaker (New York: Library of America, 2019). 336.

⁴⁸ David Abram, *The Spell of the Sensuous: Perception and Language in a More-than-Human World* (Pantheon Books, 1997), 67.

⁴⁹ Abram, *The Spell of the Sensuous*, 69.

sensual dimension of perception is enlarged. This gives empathy an aesthetic quality because sensory perception is broadened to include other subjects and new perspectives are opened.⁵⁰ The perception of the world becomes richer and at the same time more complex through an increased sense of empathy. The co-experience of other perspectives can create closeness, trust and thus a new bond. In an environmental virtue ethics approach, co-experiencing is of course not limited to fellow human beings. Empathy with the sense of caring ultimately builds the bridge between the ethical and the aesthetic.⁵¹

At the same time, this enriching experience makes it possible to practice moderation in one's own life, since an additional empathetic experience overcompensates for it. This is a perspective towards an environmentally relieving behavior in the individual. Another advantage of a virtue ethics approach is that it does not have to define the circle of entities to be considered morally (anthropocentrism, pathocentrism, biocentrism, holism) and can thus avoid the demarcation problem in the view of environmental ethics. For a narrow anthropocentric position can be presented that only includes one's own individual (egoism), expanded to include all persons (personalism or humanism, all people present and future), finally the sphere of entities to be considered morally can be expanded to include all animals capable of suffering (pathocentrism), all living beings (biocentrism) and all of nature (holism). Holism argues that all entities in nature should be accorded their own value; nature is to be protected for its own sake.⁵² Regarding the problem of demarcation, Gorke believes that only the most comprehensive position of holism is self-evident, "the answer of holism is . . . [the] only one [that] needs no further explanation."⁵³ In this way, Gorke believes he escapes the burden of justifying which entities can be ascribed an intrinsic value, because all other concepts of environmental ethics must in turn be able to conclusively explain why they exclude certain entities from the circle of beings to be considered morally. Consequently, one would have to ascribe to objects a value of their own that cannot be derived from human or animal consciousness and thus represents a counter-concept to instrumental value, hence an objective value. For the core question that anthropocentric arguments must face is whether it is: "really appropriate [. . .] to subordinate the more than three-billion-year-old process of biological evolution and the self-organization of ecosystems completely to the interest calculations of *Homo sapiens*."⁵⁴

⁵⁰ Breithaupt, *Die dunklen Seiten der Empathie*, Suhrkamp, 209ff.

⁵¹ Ludwig Wittgenstein, *Tractatus logico-philosophicus*, in: Werkausgabe Bd. 1 (Frankfurt am Main: Suhrkamp, 1997), 6.421: "Ethics and aesthetics are one."

⁵² Angelika Krebs, *Naturethik*, ed. (Suhrkamp: Frankfurt am Main, 1997), 342ff.; Michael Gorke, *Eigenwert der Natur* (Hirzel: Stuttgart, 2010), 23f.

⁵³ Gorke, *Eigenwert der Natur*, 97.

⁵⁴ Gorke, *Eigenwert der Natur*, 95. Also see, Holmes III Rolston, "Werte in der Natur und die Natur der Werte," in *Naturethik*, ed. Angelika Krebs (Suhrkamp: Frankfurt am Main, 1997), 247-270, 264.

But even for holism, the danger remains that an anthropocentric view is implicitly extended to non-human entities and that ultimately an attribution of human characteristics is made after all. In a virtue ethics perspective, however, the problem of demarcation is not central, so such attributions, as well as moral status attributions, can be easily circumvented. At the center of virtue ethics is precisely an acting person who is motivated by eudaimonistic reasons. Central to a virtue ethics approach is individual action, and especially in environmental discourse, the discrepancy between knowledge and action has emerged as a central pivotal point. For in environmental decisions, dilemmatic situations such as those described above occur again and again. Every action has harmful side effects and a person acting causes environmental damage. This speaks for a virtue-ethical approach, which derives effectiveness from the strengthening of relevant virtues. In environmental behavior, moderation is a central virtue that can be strengthened through regular contact with nature.⁵⁵

The Sense Dimension

Humans, unlike AI, are beings in need of meaning and must be touched in their essence in order to act. Therefore, the increasing environmental knowledge, the constant influx of ecological data on rising greenhouse gas concentrations and declining biodiversity remains external to many people and does not affect their existential being-in-the-world. Morton puts it in a nutshell: “data dump mode is just enhancing the incapacity of things to mean anything anymore to us.”⁵⁶ People must consequently be addressed in their dimension of meaning as a central motivating factor, because: “There is probably no evil that man would not be prepared to endure if he were able to see a meaning to this suffering; but there is certainly no earthly good whose enjoyment would not become stale to man in the long run if he could not perceive the holding on to it as meaningful.”⁵⁷

However, meaning cannot be simulated by algorithms and therefore represents a further distinguishing feature of human and artificial intelligence. In addition to the meaning that an individual can discover for himself, it is necessary to consider “natural beings outside the human being,” their “concepts of being and meaning, [. . .] which oblige us morally.”⁵⁸ For human existence is essentially constituted by relationships, thus relationally. Therefore, human beings face non-human life in “a solidarity of sense expectation with all living things; a solidarity that is felt by us in sympathetic

⁵⁵ See, Joachim Rathmann *Therapeutic landscapes: An Interdisciplinary Perspective on Landscape and Health* (Wiesbaden: Springer, 2021).

⁵⁶ Timothy Morton, *Being ecological* (Cambridge: The MIT Press, 2018), 154.

⁵⁷ Hans-Eduard Hengstenberg, *Sinn und Sollen. Zur Überwindung der Sinnkrise* (Ludgerus: Essen, 1980), 7.

⁵⁸ Hengstenberg, *Sinn und Sollen: Zur Überwindung der Sinnkrise*, 48.

resonance.”⁵⁹ “Man can only become fully human when he not only ‘takes’ all things utilitarian, but also conspiratorially ‘takes’ them in their own being for their own sake.”⁶⁰ For Hengstenberg, this corresponds to the imperative of objectivity to turn to non-human natural beings for their own sake. For him, this creates a “commitment in relation to all living things, not only to fellow human beings.”⁶¹ This “universal commandment of meaning” shows itself to be a sustainable basis for developing nature as a source of human meaning. In this context, the depth of meaning is not revealed in a continuous “more”; the development of meaning requires the courage to pause and recognize that concentrating on seeing less, experiencing less, doing less, increases the qualities of the little and lowers the need for more and more. A virtue-ethical approach is tied to a supposed limitation of the individual, which, however, turns out to be a qualitative gain. For in the many lies speed, superficiality, arbitrariness, but gain can be drawn from a qualitative relationship. Merton illustrates the idea with a visit to a museum:

A tourist may go through a museum with a Baedeker, looking conscientiously at everything important, and still come out less alive than when he went in. He was looked at everything and seen nothing. He has done a great deal and it has only made him tired. If he had stopped for a moment to look at one picture he really liked and forgotten about all the others, he might console himself with the thought that he had not completely wasted his time. He would have discovered something not only outside himself but in himself.⁶²

AI could structure the museum’s wealth of information, but without any prospect of making sense or contributing to a good life. It remains for natural intelligence to strengthen the qualitative dimension in life and derive motivation for action from it, because: “Most of us know or suspect quite precisely in our innermost being what would be worthwhile and meaningful and what would not. What seems to be lacking so far, however, is the knowledge of how to live in a concrete and realistic value- and meaning-oriented committed way; and also, the knowledge that meaning-oriented, responsible action not only enriches the world, but also ourselves.”⁶³ This also sets limits to a consequentialist way of thinking, which can be overcome through sustainable action, which lies in moderating people’s consumption and behavior. This builds a bridge from the sense dimension to an environmental virtue ethics approach, which has so far appeared too vaguely in environmental discourse. For a basic conception of virtue ethics approaches lies in the fact that a person develops himself or herself towards virtues or actions that are recognized as meaningful. Insights into

⁵⁹ Hengstenberg, *Sinn und Sollen: Zur Überwindung der Sinnkrise*, 49.

⁶⁰ Hengstenberg, *Sinn und Sollen: Zur Überwindung der Sinnkrise*, 50.

⁶¹ Hengstenberg, *Sinn und Sollen: Zur Überwindung der Sinnkrise*, 50.

⁶² Thomas Merton, *No Man is an Island* (New York & London: A Herevest/HBJ Book, 1955), 122.

⁶³ Batthyány, *Die Überwindung der Gleichgültigkeit. Sinnfindung in einer Zeit des Wandels*, 26.

the meaning of these virtues then guide individual action, as they evoke immediate personal concern. This can positively complement the lamentation about either the system, capitalism or large corporations that has accompanied the environmental discourse for decades with an insight into individual agency. In this way, the individual escapes a victim role and gains personal responsibility and from this another source for the good life.

Outlook

AI can help to present consequentialist approaches to environmental assessment at the political level. This can be used to determine the consequences of action and to set appropriate limits for resource use. The limits of AI in overcoming the ecological crisis lie in the fact that it remains rooted in the purely quantitative. However, the qualitative dimensions of human life cannot be simulated. This also applies to the contribution of the natural sciences because the conception of nature that still united empirical natural science and aesthetic enjoyment of nature was still present in Alexander von Humboldt's (1769-1859) work, but has been lost in more recent natural science, and this divisiveness appears to be intensified by AI. An environmental virtue ethics approach that builds on overcoming the modern tendency to divide man and nature can achieve a new appreciation for the environment and derived from this, an increased commitment to it in regular encounters with nature.