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How (not) to communicate about the environmental implications and impacts of AI technologies

Abstract
This article reviews environmentally-oriented publications from 2022-2024 related to the rise of AI technologies in order to discuss the burden AI is considered to exert on the climate and energy resources. Given the scarcity of texts that discuss it, the topic could be seen as an example of agenda cutting or discursive silencing at play. Such a review helps to determine how the recommendations by environmental experts are being accommodated to the needs of different publics and policy-makers, based on the interdisciplinary research that maps the ways to use AI responsibly and sustainably and regulate the industry to keep its environmental impact in check. Finally, it lists examples of the ways in which AI technologies can help in the mitigation, adaptation and protection from climate changes and energy crises. The findings demonstrate that while there are some promising uses of AI to diminish the environmental burden and to help in climate change adaptation, the problem of AI energy demands and emissions is far from solved, and environmental communicators should take this issue up.

Keywords: AI, energy consumption, sustainability, media discourse, agenda cutting.

Jak komunikować kwestie wpływu technologii sztucznej inteligencji na środowisko

Streszczenie
Artykuł zawiera przegląd publikacji popularno-naukowych z lat 2022–2024 na temat negatywnego wpływu technologii SI na środowisko. Ze względu na małą liczbę tekstów medialnych podejmujących tematykę energii czy klimatu w kontekście SI, można mówić o odwróconym procesie ustanawiania agendy lub o dyskursywnym wyciszaniu tematu. W przeglądzie sprawdzamy, w jaki sposób problematyka zasobów i emisji jest przedstawiana różnym publicznościom i jakie rekomendacje są proponowane na podstawie interdyscyplinarnych badań na temat sposobów odpowiedzialnego i zrównoważonego wykorzystania technologii SI. Przegląd zamykają przykłady zastosowań SI w celu usprawnienia działań na rzecz adaptacji do zmian klimatycznych i uchronienia się

od kryzysów energetycznych. Rezultaty przeglądu wskazują jednak, że, pomimo obiecujących zastosowań technologii SI w działaniach ochronnych, nie ma jeszcze skutecznych sposobów ograniczania jej negatywnego wpływu na środowisko. Kwestia ta powinna być przedmiotem komunikacji ekologicznej.

Słowa kluczowe: SI, zużycie energii, zrównoważony rozwój, dyskurs medialny, odwrócony proces ustanawiania agendy.

Introduction

Environmental communication draws from science dissemination and academic debate about issues that impact environmental conditions and natural resources, mapping the risks of climate change and pollution, or promoting sustainability solutions[1]. Environmental discourse may be seen as a hybrid that transverses scientific information, policy making, public deliberation, activism, and even popular culture[2]. Environmental communicators often aim to "accommodate science" to the needs of media consumers in order to raise wider public awareness and mobilize action on topical environmental issues[3]. One of such recent issues is the prospective negative impact of the rapid development of artificial intelligence (AI) on the environment – a topic that, arguably, has not been communicated very successfully, due to the hype that ensued the 2022 release of popular AI-based applications that can increase productivity and simplify laborious tasks.

AI as an umbrella term for a wide variety of technologies that relate to a computer system's capacity to perform tasks normally requiring human intelligence[4]. Generative AI, exemplified by text, image and code producing systems and applications, such as ChatGPT, DALL-E and Midjourney, would be a subfield of AI within machine learning that involves the creating of new data based on a given set of input data. Other definitions of AI invoke the concepts of automation, algorithms, deep-learning or neural networks that denote aspects of intelligence. AI's have the ability to process, interpret, identify, categorize and find patterns in complex and/or large amounts of data in such a way that resembles intelligent or "human-like" operations[5]. The server units in data centres where these operations take place, where algorithms are trained, and where

[1] S. Depoe, *Environmental communication as nexus*, "Environmental Communication" 2007, No. 1, pp. 1–4.
[2] K. Molek-Kozakowska, *The hybrid discourse of the 'European Green Deal': Road-mapping economic transition to environmental sustainability (almost) seamlessly*, "Critical Discourse Studies" 2023, No. 21(2), pp. 182–199.
[3] J. Fahnestock, *Accommodating science: The rhetorical life of scientific facts* [in:] *The Literature of Science*, ed. M.W. McRae, pp. 17–36, University of Georgia Press, Athens 1993.
[4] N.J. Nilsson, *The quest for artificial intelligence: A history of ideas and achievements 1933–2009.* Cambridge University Press, Cambridge NY 2010.
[5] C. Beckett, M. Yaseen, *Generating change: A global survey of what news organizations are doing with AI,* https://www.journalismai.info/research/2023-generating-change (accessed on: 15.05.2024).

on-demand processing tasks are realized need to be powered and cooled with large amounts of electricity (and water).

Back in 2019, a *New Scientist* article on the energy needed to make services like Google Translate operational opined that creating a stable AI would have much worse consequences for the planet than the damage done by the motor industry – the principal culprit in pollution and emissions[6]. Despite relatively worrisome estimates, the coverage of the carbon footprint, energy consumption or the polluting potential of AI in such top global science and technology popularisers as *Nature, New Scientist,* and *Scientific American* has not been particularly prolific throughout 2022–2024 (as we show below). It seems that the focus on business and science opportunities, rather than environmental risks seems to have prevailed[7]. We postulate that so far this could be seen as an example of agenda-cutting[8] or discursive silencing[9]. Such underreporting can also be explained by the topic being pushed down the agenda due to references to other major controversies that AI technologies stir, including their double-edged impact on the economy, transportation, the health sector, working conditions and even societal biases and cultural appropriations. All these concerns about AI developments, and speculations about its ever becoming sentient, seem to have largely overshadowed its environmental implications. Last but not least, bringing together the two complex and challenging fields of technology and environment in a way that appeals to public imagination and sensibility is not easy popularisers, especially at a time when commercial science communicators tend to avoid alienating their readers to drive up profits[10].

This article reviews a sample of environmentally-oriented articles related to the rise of AI technologies in order to survey the current state of knowledge and estimations regarding the actual and prospective burden AI is to exert on the climate and energy resources. It focuses on how the assessments and recommendations by environmental communicators are being accommodated to the needs of the various publics and policy-makers, particularly at a time when storytelling and sensationalism dominate popular journalism[11]. Secondly, we show that researchers representing various disciplines have started mapping the ways to use AI responsibly and suggesting preliminary ways

[6] D. Lu, *Creating an AI can be five times worse for the planet than a car*, "New Scientist" 2019, June 6, https://www.newscientist.com/article/2205779-creating-an-ai-can-be-five-times--worse-for-the-planet-than-a-car/ (accessed on: 24.03.2024).

[7] R. Radziej, (Un)safe visions of the future: A multimodal discourse analysis of mediated science communication on artificial intelligence. Presentation at DiscourseNet Winter School 8 Discourse studies and power from the margins at University of Valencia, 16–19.01.2024.

[8] Y. Buchmeier, *Towards a conceptualization and operationalization of agenda-cutting: A research agenda for a neglected media phenomenon*, "Journalism Studies" 2020, No. 21(14), pp. 2007–2024.

[9] K. Molek-Kozakowska, *Popularity-driven science journalism and climate change: A critical discourse analysis of the unsaid*, "Discourse, Context & Media" 2018, No. 21, pp. 73–81.

[10] K. Molek-Kozakowska, *Communicating environmental science beyond academia: Stylistic patterns of newsworthiness in popular science journalism*, "Discourse & Communication" 2017, No. 11(1), pp. 69–88.

[11] *Ibidem.*

to regulate the industry to keep the environmental impact of AIs in check[12]. Finally, there is also a number of ways in which AI technologies can help us in the mitigation, adaptation and protection from climate changes and energy crises, which were selectively taken up by science communicators and promoted in 2022–2024 coverage.

The observations presented here are part of a larger research project that involves the analysis of a purposively collected dataset of examples of science communication related to the social imaginaries of AI technologies. The larger project's dataset comprises 514 texts, published in late 2022, throughout 2023, and in the first half of 2024 in *Nature, New Scientist,* and *Scientific American,* which were selected based on the keyword "AI" in the title. Having conducted a content and discourse analysis of headlines and leads, we have established that the three top science popularization venues we selected devote on average only 5.2% of their AI coverage to linking AI technologies with environmental issues (27 texts out of 514). This finding, for us, is a preliminary indication of editorial agenda cutting or discursive silencing that we are trying to document and explain further[13]. Thus, to offer a more comprehensive argumentation, in this article we also refer to recent articles in *the Guardian, the Economist* and *the New York Times* that featured "AI" together with "environment," or "climate" in the title or as tags.

How energy intensive is AI and how is it presented by science communicators?

Studies on energy demands of heavy computing are showing that the energy use of AI is rapidly growing, rising 100-fold from 2012 to 2021[14]. According to International Energy Agency, data centres account for up to 1.5% of global electricity production and 1% of greenhouse gases emissions[15]. Due to the increasing demand, many of those data centres are now expanding their operations to involve more servers devoted to AI-related computing. It is estimated that, if the trend of building AI server units continues at this pace, by 2027 the demand for energy may increase tenfold. This will mean reaching the equivalent of the energy demands of a country such as Argentina, the Netherlands, or Sweden[16]. Most studies exclude cryptocurrency mining from their AI energy and emissions estimates.

[12] A. Hansen, *Communication, media and environment: Towards reconnecting research on the production, content and social implications of environmental communication*, "International Communication Gazette" 2011, No. 73(1–2), pp. 7–25.
[13] R. Radziej, *(Un)safe visions of the future...*
[14] M. Sparkes, *Analogue chips can slash the energy used to run AI models*, "New Scientist" 2023, Aug. 23, https://www.newscientist.com/article/2388005-analogue-chips-can-slash-the-energy-used-to-run-ai-models/ (accessed on: 25.03.2024).
[15] International Energy Agency, *Data centres and data transmission networks*, https://www.iea.org/energy-system/buildings/data-centres-and-data-transmission-networks (accessed on: 16.09.2024).
[16] D. Erdenesanaa, *AI could soon need as much electricity as an entire country,* "New York Times" 2023, Oct. 10, https://www.nytimes.com/2023/10/10/climate/ai-could-soon-need-as-much-electricity-as-an-entire-country.html (accessed on: 15.09.2024).

Increased energy use is due to expanding AI server farms, which need the electricity to power the new data processing infrastructures. Graphic processing units, like those from Nvidia are in high demand globally, making the company rise to the position of the third most profitable tech company in 2023 after Microsoft and Apple and before Google, Amazon and Meta[17]. In early 2024 market capitalization of Nvidia was periodically noted as having the highest score of all big tech companies, but the indicators tend to fluctuate. The processing units are used to deliver computations for thousands of AI-driven applications with millions of queries an hour. The infrastructures also need constant cooling, which increases the electricity bills by between 10% to even 50% in some locations[18].

Apart from the energy needed for constant intense computing and server cooling, some estimates are available as to how much energy has been consumed to train the algorithms that now seamlessly generate statistically accurate outputs based on large language models (LLMs), some with millions (or billions) of parameters. For a better understanding of the environmental impact of training a model even before it is released, the carbon footprint can be compared to other emission-intensive technologies. From the service providers themselves, we know that the training of GPT-2 produced a carbon footprint roughly equivalent to 150 flights around the world. The training of GPT-3 (with 175 billion of parameters) produced a carbon footprint that is equivalent to 123 gasoline-powered passenger vehicles driven for a year. The information about the costs of training subsequent LLMs from OpenAI was not made available[19].

As we are now induced into the culture of routinely using ChatGPT for daily business, educational or academic tasks, it is important to consider the issue of sustainability. ChatGPT alone boasted over 100 million active users and over 1.5 billion visits in March 2023. That is only one application using a trained LLM, but now there are dozens of tech companies around the world and hundreds of developers training their models and providing similar training services for AI-boosted applications[20]. While medical, industrial, governmental or corporate use of even energy-intensive AI computing seems justifiable, things become more problematic with non-necessary uses, especially of generative AI. As reported by CBC "while we may have fun creating filters for ourselves or asking questions of generative AI like ChatGPT, it comes with a cost in terms of emissions. In fact, one study suggests that every time AI generates

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[17] Companies Market Cap, *Largest tech companies by market cap*, https://companiesmarketcap.com/tech/largest-tech-companies-by-market-cap/ (accessed on: 16.09.2024).

[18] D. Patterson, J. Gonzalez, Q. Le, C. Liang, L.M. Munguia, D. Rothchild, D. So, M. Texier, J. Dean, *Carbon emissions and large neural network training*, arXiv, "Computer Science" 2021, https://arxiv.org/abs/2104.10350 (accessed on: 25.03.2024).

[19] J. Naughton, *Why AI is a disaster for the climate*, "The Guardian" 2023, Dec. 23, https://www.theguardian.com/commentisfree/2023/dec/23/ai-chat-gpt-environmental-impact-energy--carbon-intensive-technology (accessed on: 25.03.2024).

[20] J. Hsu, *Shifting where data is processed for AI can reduce environmental harm*, "New Scientist" 2023, July 13, https://www.newscientist.com/article/2381859-shifting-where-data-is--processed-for-ai-can-reduce-environmental-harm/ (accessed on: 11.09.2024).

an image, it's using enough energy to charge a cellphone"[21]. Obviously, it is beyond the scope of this article to discuss what constitutes justifiable and desirable level of public and private application of AI technologies, as particular domains and sectors need to establish their own professional sustainability standards, best practices and policies.

Moreover, research is being done on the actual and possible energy costs of developing and mainstreaming AI-supported smart appliances and full-scale Internet-of-things. Appliances with embedded AI modules constantly compute and improve the "smartness" of provided services, be that lawn mowing, keeping the right indoor temperature, ordering warehouse supplies, or keeping up the cybersecurity defences against new malware threats[22]. As these technologies are in the making, it is extremely hard to estimate their energy needs and environmental burdens, especially that they also commonly require other resources from rare metals to water[23].

Science communicators are tasked not only with accommodating scientific facts to make them available to the public, but also with interacting and managing public knowledge in a highly complex circuit where certain ideologies (capitalism vs. degrowth), interests (private tech companies vs. the public interest) and agendas (resulting from profit-driven publishing and media businesses) interact[24]. In a current climate and energy crisis, environmental communication is prone to being a tool for powerful interest groups to set the agendas that are compatible with their interests. In fact, by interrogating various social imaginaries of fossil-fuel, nuclear and renewable energy, communication scholars have illustrated how biases, stereotyping, irrational emotionality, or even sophistry are injected into environmental communication[25]. This is especially problematic when the communicator's aim is to capitalize on the oscillation between "euphoric" and "dysphoric" arguments. For some, AI is a revolutionary technology that will save us from the consequences of climate change; for others, it is disastrous both for the planet and for the just transformation of societies[26].

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[21] N. Mortillaro, *AI is increasingly being used to deal with climate change, but it has its own emissions problem*, CBC 2024, Jan. 27, https://www.cbc.ca/news/science/ai-climate-change-emissions-1.7094616 (accessed on: 25.03.2024).

[22] Y. Strengers, K. Dahlgren, S. Pink, J. Sadowski, L. Nicholls, Digital technology and energy imaginaries of future home life: Comic-strip scenarios as a method to disrupt energy industry futures, "Energy Research & Social Science" 2022, No. 84, pp. 102366, https://doi.org/10.1016/j.erss.2021.102366.

[23] J. Coleman, AI's climate impact goes beyond its emissions, "Scienfitic American" 2023, Dec. 7, https://www.scientificamerican.com/article/ais-climate-impact-goes-beyond-its-emissions/ (accessed on: 15.09.2024).

[24] V. Salvador, *The social debate on energy sources and climate change representations, argumentation and the emotional dimension* [in:] *Discursive Approaches to Sociopolitical Polarization and Conflict*, eds. L. Filardo-Llamas, E. Morales-López, A. Floyd, Routledge, London 2021.

[25] K. Molek-Kozakowska, *Communicating environmental science...*, V. Salvador, *The social debate on energy sources...*

[26] V. Salvador, *The social debate on energy sources...*

What do we know about how to use AI tools responsibly and sustainably?

It is estimated that one AI chatbot query for information is equivalent to 4 or 5 search engine queries in terms of energy use. Hence, at least theoretically, AI saves energy on intensive web search. However, if now (or soon) most software packages, applications and search engines have an AI component integrated into them, the carbon footprint would increase exponentially[27]. For example, if the 9 billion Google searches a day would be turned into chat interactions, Google would need the energy supply of that of powering the whole of Ireland for its search engine operations alone, not to mention other AI-supported Google services[28].

There are a few principles and recommendations emerging from research and simulations that should be widely known regarding the direction of technology development, individual AI use and energy sustainability:

- generative tasks are more energy-intensive than discriminative tasks;
- generating images, presentations and videos is more energy-intensive than generating text, code or even speech;
- scheduling time for energy-intensive interactions and algorithm trainings when renewable energy is available reduces the energy burden;
- using analogue chips can reduce energy costs[29].

Apparently, IBM's analogue computer chip can run an AI speech recognition model 14 times more efficiently than traditional chips, potentially offering a solution to the growing energy use of AI.

Here is what we should know about the sustainability of AI-related service providers and data centres:

- sparsely activated neural networks consume less energy that integrated ones;
- geographical location of data centres matters, as some do not require that much cooling or have access to renewable energy rather than fossil-fuel produced electricity;
- greener data centres are equipped with more modern infrastructures, better processors, and tend to use cloud computing;
- server farms and data centres that are equipped with machine-learning oriented accelerators, rather than off-the-shelf units, are greener.

Preliminary research indicates that these issues may play a role in increasing efficiency and reducing the energy costs from 100 to 1000 times[30].

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[27] A. de Vries, *The growing energy footprint of artificial intelligence*, "Joule" 2023, No. 7(10), pp. 2191–2194.

[28] K. Saenko, *A computer scientist breaks down generative AI's hefty carbon footprint*, "Scientific American" 2023, May 25, reprint from "The Conversation US".

[29] M. Sparkes, *Analogue chips can slash the energy used to run AI models*, "New Scientist" 2023, Aug. 23, https://www.newscientist.com/article/2388005-analogue-chips-can-slash-the-energy-used-to-run-ai-models/ (accessed on: 25.03.2024).

[30] D. Patterson, J. Gonzalez, Q. Le, C. Liang, L.M. Munguia, D. Rothchild, D. So, M. Texier, J. Dean, *Carbon emissions and large neural network training*, arXiv, "Computer Science" 2021, https://arxiv.org/abs/2104.10350 (accessed on: 25.03.2024).

Public opinion should also push for more transparency on energy requirements for modelling and upkeep of services from developers, as well as for more sharing and open access to solutions. Some organizations are campaigning for industry standards in making data centers greener, perhaps by labelling the energy efficiency class of outputs, as indicated by some concerned experts[31]. The state of California – a forerunner in some environmental initiatives – has now adopted laws that will soon require all major AI-intensive companies to disclose their carbon impacts and carbon risks[32].

In addition, providers can start to redistribute AI workloads among data centers to minimize the environmental impact on regions experiencing water shortages or fossil fuel pollution. Societies will continue to have thousands of power-hungry computing servers, but the environmental damage could be reduced by redistributing the demands to different locations more effectively, e.g., from Arizona to Finland, where most energy comes from renewable sources[33]. Unfortunately, most AI training still relies on electrical grids primarily powered by coal and gas rather than low-carbon sources, according to an analysis of 95 AIs. Less than 25 per cent of AIs use low-carbon energy sources such as hydroelectricity and nuclear power during training[34]. The future energy demands of cryptocurrency mining, block chain technologies and Internet-of-things computing are being estimated in a variety of research projects[35].

How can AI technologies be deployed in the current environmental crisis?

It is reasonable to expect that AI technologies could be harnessed to address the environmental crisis, not only to perpetuate it. If so, there are a few dimensions of positive impact of AI tools on climate and pollution modelling, safeguarding against extreme weather incidents and enabling social resilience and environmental justice related to climate change. These positive impacts are selectively taken up and promoted by such science popularisers as *Nature, New Scientist*, and *Scientific American* to showcase that AI technologies could arguably prevent loss of life and property due to environmental disasters and enable a just transition to neutrality.

31 D. Erdenesanaa, *AI could soon need as much electricity as an entire country*, "New York Times" 2023, Oct. 10, https://www.nytimes.com/2023/10/10/climate/ai-could-soon-need-as-much-electricity-as-an-entire-country.html (accessed on: 15.09.2024).

32 New York Times, *California climate disclosure law,* https://www.nytimes.com/2023/09/17/climate/california-climate-disclosure-law.html (accessed on: 22.06.2024).

33 J. Hsu, *Shifting where data is processed for AI can reduce environmental harm*, "New Scientist" 2023, July 13, https://www.newscientist.com/article/2381859-shifting-where-data-is-processed-for-ai-can-reduce-environmental-harm/ (accessed on: 11.09.2024).

34 J. Hsu, *Artificial intelligence training is powered mostly by fossil fuels*, "New Scientist" 2023, Feb. 28, https://www.newscientist.com/article/2361343-artificial-intelligence-training-is-powered-mostly-by-fossil-fuels/ (accessed on: 12.06.2024).

35 C. Schinckus, *The good, the bad and the ugly: An overview of the sustainability of blockchain technology*, "Energy Research & Social Science" 2020, No. 69, pp. 101614, https://doi.org/10.1016/j.erss.2020.101614.

In fact, researchers are already exploring how AI can be repurposed to fight climate change through prediction, mitigation, and adaptation. Initiatives like Microsoft's planetary computer and NASA's Multi-Mission Algorithm Platform demonstrate that AI should be used to combine diverse global datasets of environmental data to address climate threats. Such crowdsourced networks are a powerful tool for environmental resilience and collective action due to active, timely and on-demand data input[36]. Google is also developing an AI in cooperation with the Environmental Defence Fund to identify methane emission from oil and gas plants. A special satellite uses AI technology to map the methane leaks around the world[37]. However, such information may help reduce gas emission only if policymakers and regulators will use it to take suitable actions against polluters. Additionally, AI has been applied to climate policy analysis. By using machine learning to examine 1,500 climate interventions across 41 countries, researchers can point out which policies led to significant emission reductions in which specific economic contexts[38].

Unfortunately, while big tech companies undertake initiatives and develop AI to address the climate crisis, some of them like Microsoft are simultaneously supporting oil giants by optimizing fossil fuel extraction with AI-supported technologies[39]. This dual approach raises significant ethical concerns, as the positive contributions to climate solutions are undermined by AI tools that make the very industries driving global emissions profitable. Some big tech companies continue to prioritize short-term economic gains over long-term environmental sustainability.

Other domains of AI technologies offer a variety of applications focused on addressing the consequences of climate change rather than its causes. For instance, one start-up is developing an AI "response tool" to trace the impacts of climate change-induced floods. This can enhance preparedness through data-driven predictions and early warnings[40]. The AI simulates future hurricanes and flood scenarios based on extensive datasets in order to provide more accurate forecasts and effective protection strategies for local communities. The tool facilitates decision-making, and helps come up with accountable, actionable strategies for flood management. Another AI tool is being designed to predict how sea ice in the Arctic will melt, integrating historical data with

[36] W. Dimock, *What AI can do for climate change, and what climate change can do for AI*, "Scientific American" 2022, April 5, https://www.scientificamerican.com/article/what-ai-can-do-for-climate-change-and-what-climate-change-can-do-for-ai/ (accessed on: 16.09.2024).

[37] J. O'Donnell, *A new satellite will use Google's AI to map methane leaks from space*, "MIT Technology Review" 2024, Feb. 14, https://www.technologyreview.com/2024/02/14/1088198/satellite-google-ai-map-methane-leaks/ (accessed on: 16.09.2024).

[38] X. You, *AI analysed 1,500 policies to cut emissions. These ones worked*, "Nature" 2024, Aug. 23, https://www.nature.com/articles/d41586-024-02717-7 (accessed on: 16.09.2024).

[39] J. Coleman, *AI's climate impact goes beyond its emissions,* "Scienfitic American" 2023, Dec. 7, https://www.scientificamerican.com/article/ais-climate-impact-goes-beyond-its-emissions/ (accessed on: 15.09.2024).

[40] J. Schwartz, *How can AI help to prepare for floods in a climate-changed world?*, "Scientific American" 2018, Sept. 13, https://www.scientificamerican.com/article/former-fema-chief-uses-ai-to-prepare-for-hurricanes-and-rising-seas/ (accessed on: 16.09.2024).

advanced statistical modelling[41]. This improves forecasting accuracy and reduces risks, making marine travel safer in an increasingly unpredictable environment.

AI solutions are also used to estimate air pollution by analysing large volumes of photos taken in high-risk areas, particularly in South and East Asia. It is an alternative to expensive air pollution sensors, and one that makes accurate real-time estimates of air quality accessible to more stakeholders[42]. However, while this technology improves monitoring, it does not address the underlying causes of air pollution, such as industrial emissions and reliance on fossil fuels, which continue to go unchecked in parts of Asia.

Another crucial area where AI can support the fight against climate crisis is by countering climate misinformation[43]. Although fake news related to environment are said to spread fast across social media and other platforms, AI tools can be used to detect and combat false narratives. By analysing patterns, tracking sources, and identifying misleading content, AI can help ensure that accurate, science-based environmental information reaches the public. This is vital for fostering informed public discourse and building widespread support for the necessary climate action.

While these examples testify to the potential of AI technology to assist in mitigation and adaptation efforts and in fostering the understanding of the environmental burdens the humanity is faced with, the extractive, pollutative, and inequitable implications of developing AI-based solutions are backgrounded. Whether such coverage is sufficient, proportional or whether it signals an attempt at greenwashing is a matter of conducting more comprehensive and systematic analyses.

Summary and conclusion

In our case study on AI representations in top science communication outlets, *Nature, New Scientist,* and *Scientific American,* we established that only 5.2% of AI-related articles make a reference to environmental and energy issues related to the technology. While still relatively scarce in number, articles on AI technologies have started mentioning its climate and environmental burden. Some of them use language that is easy to follow, despite the alienating nature of the issue, or use relatable analogies, and evidence-based, constructive recommendations [44]. It is important for environmental communicators to keep an alarming, but not alarmist, tone to mobilize the public and policy-makers around new environmental risks. To work, these recommendations should not unduly

[41] E. Schewing, *As arctic sea ice breaks up, AI is starting to predict where the ice will go*, "Scientific American" 2023, Oct. 16, https://www.scientificamerican.com/podcast/episode/as-arctic-sea-ice-breaks-up-ai-is-starting-to-predict-where-the-ice-will-go/ (accessed on: 16.09.2024).
[42] A. Rutkin, *Pic-scanning AI estimates city air pollution from mass of photos*, "New Scientist" 2016, Feb. 5, https://www.newscientist.com/article/2076562-pic-scanning-ai-estimates-city-air--pollution-from-mass-of-photos/ (accessed on: 16.09.2024).
[43] F. Camacho, S. Waldman, E. News, *Climate misinformation is rampant. AI may be able to stop It*, "Scientific American" 2022, June 8, https://www.scientificamerican.com/article/can-ai-stop-climate-misinformation/ (accessed on: 16.09.2024).
[44] K. Molek-Kozakowska, *Story-ing AI...*

responsibilitize the ordinary recipients of environmental communication by stressing the need to limit non-necessary personal uses of AI technologies, but neither should they shift the whole burden of proper responses only to the AI providers and regulators[45]. While there are some innovations that allow us to cut the energy demands of AI technology, the problems are far from solved, and may be obscured by some coverage of AI technologies enabling mitigation and adaptation to the reality of (extreme) climate change.

Thanks to environmental communicators' sharing of emerging research on the environmental impacts of AI technologies, the regulators also have access to estimates and roadmaps how to plan the use AI responsibly, since the tech industry needs to be monitored to keep the environmental implications in check[46]. While fostering public knowledge of sustainable AI uses, environmental communicators should also expose the public to narratives on how AI technologies can offer protection from climate changes and energy crises. It is important to ensure that AI-related advances are not demonized and discontinued, but become oriented towards sustainability as soon as possible[47]. A wrong path to take for science communicators would be to cut environmental issues from AI coverage agendas altogether and continue the hype around them without a critical reflection on the actual environmental risks of AI technologies.

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