ORIGINAL PAPER

The impacts of AI futurism: an unfiltered look at AI's true effects on the climate crisis

Paul Schütze[1]

Abstract

This paper provides an in-depth analysis of the impact of AI technologies on the climate crisis beyond their mere resource consumption. To critically examine this impact, I introduce the concept of *AI futurism*. With this term I capture the ideology behind AI, and argue that this ideology is inherently connected to the climate crisis. This is because AI futurism construes a socio-material environment overly fixated on AI and technological progress, to the extent that it loses sight of the existential threats ahead. In that way, the perceived significance of the planetary reality is softened, and the unsustainable paths charted by the AI industry remain opaque. To make this argument the paper unfolds in two main sections. (1) It delves into the ideology of AI futurism and its discursive impact on the societal perception of the climate crisis. (2) It employs a materialist perspective to elucidate the tangible effects of the AI industry on the climate crisis, and to show what is going on behind the façade of AI futurism. Adding to a critical theory of AI and the climate crisis, this paper starts a realistic conversation about the challenges posed by the intersection of these transformations.

Keywords Critical AI · Climate crisis · Critical theory · AI & Climate · Sustainable AI · Ethics of AI

Introduction

In this paper, I provide an unfiltered look at AI's true implications on the climate crisis, beyond its mere resource consumption. I write this paper from a particular perspective: that of a scholar working in the humanities at a University in Germany and dealing with AI news and advancements within this context. This means that my attention falls towards AI primarily in Anglophone and European contexts. From this localized experience and knowledge, I observe a troubled trajectory towards the future. The social, environmental and economic harms of the machinery surrounding AI and the general impact of the AI industry on societal organization is widely underestimated. Instead, from my perspective I observe an imbalance in societal discourse: while a recent comprehensive study shows that "Earth is now well outside of the safe operating space for humanity" (Richardson et al., 2023), Europe and North America are busy debating AI technologies and their regulations; with the European Commission even adopting the narrative that there is a real "risk of extinction from AI" whose mitigation "should be a global priority" (European Commission, 2023a).

I argue that recent debates about AI are emblematic for a larger socio-cultural shift in which the future is portrayed as a technological necessity while the urgency of the planetary crises is pushed to the back. To me this presents a concerning outlook. Consequently, the following develops a clearer understanding of this issue by introducing the term of '*AI futurism*'. In essence, AI futurism describes the socio-cultural sentiment that AI systems will inexorably shape and transform the societies of the future. The according attitude towards the climate crisis seems to be: this crisis is ultimately solvable; all it requires are the appropriate (technological) solutions. As long as we continue advancing technology, systems such as ChatGPT will save the day.[1]

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[1] A recent interview with Ex-OpenAI-Manager Zack Kass perfectly resembles this sentiment (Fulterer, 2023). He states: "If you ask ChatGPT how we can take CO_2 out of the atmosphere, the answers are already quite good. Extrapolate that and add the fact that robotics is getting cheaper, and the future is very promising!" (Fulterer, 2023) This shows how the most influential companies and people regarding AI follow this line of argument and push this into public debates and shape public opinion. Further, this resembles the long-grown tradition of modern capitalist technological progress (for various analyses and

✉ Paul Schütze
   paul.schuetze@uos.de

1   Ethics and Critical Theories of AI, University of Osnabrück, Postfach 44 69, 49069 Osnabrück, Germany

In short, the main argument of the paper is as follows: the ideology of AI futurism and the climate crisis are inherently connected. This is because AI futurism is central to maintaining the narratives outlined above, both explicitly—through active promotion of AI as a solution to climate change—and implicitly—by fostering a socio-material environment overly fixated on AI and technological advancement, to the extent that it loses sight of the existential threats ahead. In that way, the perceived significance of the planetary reality is softened and the unsustainable paths charted by the AI industry remain opaque.

To lay out this argument the paper proceeds in a twofold structure. First, I turn towards the ideology of AI futurism: The section on "AI Futurism and the Planetary Reality" elaborates what this ideology is all about, and reveals its *discursive* impacts on the climate crisis—namely that AI futurism cushions the perceived gravity of the planetary reality. Second, I spell out what lies behind this ideology: The section on "AI's True Impact on the Climate Crisis" employs a *materialist* perspective. It breaks down the fundamental dynamics at work behind AI futurism. Here, I specifically show how this ideology brings with it material and structural changes that negatively impact the climate crisis. In sum, by adding to a critical theory of AI and the climate crisis, this paper encourages a realistic conversation recognizing the gravity of the challenges at hand.

AI futurism and the planetary reality

In the summer of 2023 the U.S. opened 'cooling centers' for people to seek shelter and not die from the unbearable heat (Nolan, 2023). The planetary climate is getting to the point where humans, especially those most vulnerable and already marginalized, can only stay alive in concealed spaces. It is a dystopia becoming the new reality. At the same time, in the news and public debates this appears next to discussing regulations of data collection or the problems of Chatbots and LLMs in higher education. While such issues are important, surely there is a difference in urgency and consequence. And so, a dystopian reality of climate emergency (literal 'cooling centers'!) is slowly becoming the new normal. The summerly wildfires and heat domes, the news on all-time high ocean temperatures and the ever-closer predictions of the stoppage of pivotal ocean currents, are now merely ordinary news. These events settle in and become routine, and because 'life goes on', the constantly renewing possibilities of the latest technologies must be negotiated—this is what

the AI futurist ideology tells us sitting in Europe or the U.S. After all, if the heat is too much, you can now go to a cooling center. And just as if everything was proceeding routinely, tech-entrepreneurs, Silicon Valley elites, academics and politicians alike can continue debating the latest technological developments, their impacts, harms and possible regulations—sitting in cooled offices.

Of course, debates on AI policies and industry regulation are important, AI harms and the impact of big tech is not to be underestimated.[2] Quite the contrary, stronger regulations and critical engagements are all-around essential, and we definitely need more of this. And surely governments and policy bodies can do multiple things at once. AI regulation and climate regulation do not exclude each other. This is clear.

However, my argument is not about different realms of political or societal intervention and how these realms might obstruct each other. Instead, I argue that it is necessary to recognize the deep socio-economic influences of the AI futurist ideology. With the tech corporations at its heart, it has created a reality in which technological advancements appear as a welcome (perhaps the only) path towards the future. All the while, issues such as tackling food security, water scarcity and the deathly impacts of heat waves appear as solvable problems on the sidelines. Hence, the ideological structures surrounding AI have produced a socio-cultural sentiment which suggests that climate solutions will eventually sprout from technological progress.[3] The subsequent sections will break down this argument in more detail.

What is AI futurism?

Cooling centers and AI futurism go hand in hand. Both are the business-as-usual answer to the changing planetary conditions. No societal shock, no discussions on the drastic changes this new reality should warrant. Instead, the solution lies in the establishment of cooling centers, enabling continuity without disrupting the status quo. In the process, AI futurism delivers the business-as-usual ideology.[4] Yet,

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histories of this see e.g. Daub, 2020; Elish & Boyd, 2018; Geoghegan, 2023; Joque, 2022; Morozov, 2013; Pasquinelli, 2023).

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[2] See Shoshana Zuboff's book on "Surveillance Capitalism" (Zuboff, 2019), Ruha Benjamin's "Race after Technology" (Benjamin, 2019), or Cathy O'Neil's "Weapons of Math Destruction" (O'Neil, 2016) for examples of this.

[3] For a detailed analysis of the affective nature of this socio-cultural sentiment see e.g.: (Schütze et al., 2022; Slaby, 2023).

[4] I adhere to a Marxist perspective with the concept of 'ideology', particularly influenced by Louis Althusser. According to Althusser, ideology is the system of ideas and conceptions that governs the mindset of a person or a social group in relation to certain real conditions. In other words, ideology serves as a mediator in shaping their understanding of these conditions (Althusser, 2010/1970, p. 71). Different ideologies offer different lenses through which the world is made sense of. Simultaneously, a certain ideology is always connected to certain practices and institutions, and it thus has a material

what precisely is this ideology? And why is it connected to the planetary crisis? To answer these questions, it is necessary to examine the interplay between AI technologies and ideology more closely. To do so, I draw on Benedetta Brevini's work on the political economy of AI and its hegemonic discourses, as well as on Sheila Jasanoff's work in Science and Technology Studies (STS) and her concept of 'socio-technical imaginaries'.

The myth of AI as a necessary and transformative force

In essence, AI futurism can be succinctly characterized as the latest capitalist and techno-optimist ideology which puts (AI) technologies at the center of societal progress. This perspective has notably gained influence particularly in European and North American contexts, where it has created a near mythological and deterministic view of AI (see e.g. Brevini, 2021a). The widespread belief posits that AI is not just a technological inevitability but a necessity, wherein its advantages must be harnessed, while its potential harms must concurrently be mitigated. In these contexts, AI technologies are even posited as the panacea for significant societal challenges—they supposedly are the "the technological savior, whose advent is ineluctable" (Brevini, 2021a, p. 155).

These ideas gain traction via the process of "myth-making" as Benedetta Brevini describes (Brevini, 2021a, pp. 151–155). She elaborates, with reference to the field of critical political economy of communication, how "modern myths" have historically constructed the "discourses around digital technologies … decorated with allusions to utopian worlds and new possibilities" (Brevini, 2020, p. 2). In the context of AI technologies this means that myths are the accompanying rhetoric and imagery that are used to solidify and legitimize their further development (Brevini, 2021a, p. 146). Thus, myth-making can be described as the process by which the guiding ideas about AI are spread and then settled—ideas about what AI technologies can and should do, or how they are to be developed and employed.[5] In this manner, Brevini illustrates how myths are employed to influence political debates and to de-politicize otherwise contentious

issues related to AI. As a consequence, they establish a hegemonic framework and shape perspectives on how AI technologies can (and cannot) be conceptualized (Brevini, 2021a, p. 146). With reference to political theorist Antonio Gramsci, Brevini explains that the mythical narratives of technological possibilities—i.e. the tales of 'how AI will be one day' or of 'how AI should be developed'—effectively "normalize conventional wisdom into 'common sense'" (Gramsci, 1971/1947 as quoted in Brevini, 2021a, p. 145). This means that the myths and tales about AI, commonly told by policy makers, corporations or academics, eventually turn into common sense and thereby construct a dominant position that influences and shapes public discourse (Brevini, 2021a, p. 147).

This process can distinctly be observed, for instance, in the corporate visions of Google, who "believe that AI is a foundational and transformational technology that will provide … benefits to people and society" (Google AI, n.d.-b). Their proclaimed goal is to "bring the benefits of AI to everyone" (Google AI, n.d.-a), for example, by leveraging their resources "in AI to accelerate innovation that can tackle climate change." (Google Sustainability, n.d.)[6] Most prominently and with striking clarity, the usage of myth-making within the AI futurist ideology can be observed in Google's recent promotion video of its newly developed flagship AI system 'Gemini'. In the video, they state their deep belief that "AI would be the most beneficial and consequential technology for humanity", and that within their mission to make the world a better place for everybody, they felt like they needed to "have a deeper [technological] breakthrough to make progress" (Google, 2023). Very clearly Googles creates a picture of AI that originates from their own interests, which is far from settled, but which is contingent and may indeed be questioned. Thus, they construe a mythological idea about AI which feeds into the narrative of AI technologies as a necessity for progress and as a savior for major societal problems.

Similar framings and myth-making can also be observed in recent policy debates informed by the High-Level Expert Group on AI from the European Commission (European Commission, 2023b; High-Level Expert Group on AI, 2019). Specifically, this can be seen in the EU AI Act, which aims to make the EU "a place where AI thrives from the lab to the market", and ensures that AI works for the people and is a force for good in society (European Commission, 2023b). Here the conclusion is that "to be a global power means to be a leader in AI" (European Parliament, 2022).

Footnote 4 (continued)

existence in virtue of these characteristics (Althusser, 2010/1970, p. 80). For the concept of *AI futurism* this means that it *describes the hegemonic and (materially) institutionalized set of ideas and conceptions that mediate societal understanding of AI technologies.*

[5] Brevini goes into much more detail in this regard. She picks out three common myths present in the discourses on AI in Europe: (1) "Artificial Intelligence as a Solution for Humanity and Capitalism's Biggest Challenges", (2) "Creating Urgency and 'Preparing' Society – AI as Ineluctable", (3) "AI Surpassing Human Intelligence". These myths legitimize the dominant neoliberal discourse, which depoliticizes technological development and makes alternative paths virtually unthinkable (Brevini, 2021a, pp. 151–155).

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[6] For the corporate, but also publicly shared, narratives regarding technology and progress see also the latest video by Apple called "Mother Nature", which is a prime example of capitalist myth creation (Apple, 2023).

Other recent regulatory advances by the U.S. Biden administration (The White House, 2023), or the discussion paper from 2023 AI Safety Summit hosted by the UK (UK Department for Science, Innovation & Technology, 2023) show similar narratives. They follow a view of AI technologies as inevitable: it is important to "seize the opportunity, and realize their transformative benefits" (UK Department for Science, Innovation & Technology, 2023, p. 28). Even in many academic debates there is the prevailing belief that while "AI technologies cannot solve all problems", nonetheless, "they can help to address the major challenges, both social and environmental, facing humanity today" (Cowls et al., 2021, p. 114). For this, societies only need "to harness the potential of AI", while doing this "in ways that are ethically sound", and while minimizing "AI's carbon footprint" (Cowls et al., 2023, p. 299).

Of course, Google's slogans are not adopted verbatim in public debates, neither are the concrete contents of policy documents widely known. Myths are not set in stone, nor are they consciously reproduced. But, they substantiate a structural hegemonic framework of what news are reported about AI, which problems are discussed, or how AI systems are thought of in the first place. Processes of myth-making delineate the space for possible discussions and they set what may and may not be described as common sense about AI (Brevini, 2020; see also Mosco, 2014). More fundamental questions, for instance, regarding whether such technology is even needed, seldomly find space within this framework. The emphasis remains steadfast on progress and innovation, while mitigating potential harm. As such, myths about AI are primarily construed by powerful players who thereby consolidate their interests into a hegemonic position. Brevini emphasizes that this reinforces existing power dynamics by establishing a discursive framework that makes it exceedingly challenging to contemplate alternative paths (Brevini, 2021a, p. 147).

The socio-technical imaginary of AI

Myths not only influence how certain technologies are seen, but they are also situated within and reproduce a wider hegemonic ideology. This connection between technology and ideology is notably captured by Sheila Jasanoff's concept of "socio-technical imaginaries" (Jasanoff, 2015). She defines socio-technical imaginaries as "a collectively held, institutionally stabilized and publicly implemented vision of desirable futures, animated by shared views on forms of social life and social order, attainable through and supportive of advances in science and technology" (Jasanoff, 2015, p. 4). With this concept we thus see how the seemingly small-scale myths become embedded in a larger imaginary that informs the societal understanding of AI technologies. This means that the myths about AI never just stand alone, but they simultaneously arise out of and reproduce a rich set of beliefs and conceptions about this technology—the socio-technical imaginary of AI.

Crucial for this imaginary is that AI does not denote a unified set of technological methods; rather, it functions as an opaque placeholder encompassing a diverse array of technological manifestations. These include data-based applications, algorithms, or automated systems, and even encompass various business ventures that hinge on any potentially transformative technological breakthrough.[7] This is because "the term 'Artificial Intelligence' (AI) means many things to many people" (Rooij et al., 2023, p. 1).[8] And in its ideological function, it is used interchangeably to cater to the respective discursive needs.

As M. C. Elish and danah boyd describe, AI works as a category of technology which "always waivers between the real and the imaginary" (Elish & Boyd, 2018, p. 62)—between what it actually can do, and what it promises to be. While the 'real' methods of machine learning and deep learning are at the core of what is usually described as AI, there is always an 'imaginary', mythological touch to invoking 'artificial intelligence'. Both the real and the imaginary constitute the common sense understanding of AI. Thus, with the concept of the socio-technical imaginary we see how current AI developments (the real) are already always turned into future visions (the imaginary). This means that within the imaginary of AI always already lies a move towards the future.

The orientation towards the future is an essential part of myth-making and the creation of a socio-technical imaginary. This can clearly be observed within the myths put forward by powerful companies or policy makers, which are always geared towards construing a common-sense idea of a *collectively favored future* regarding AI technologies (Brevini, 2021a, p. 147; Jasanoff, 2015). In short then, the socio-technical imaginary of AI is defined by the myths painting AI technologies as a necessity, as a transformative leap towards progress, and as techno-fixes for societal issues where benefits can be leveraged and potential harms must be minimized.

The ideology of AI futurism

The socio-technical imaginary of AI is itself part of a larger ideological frame, namely that of late neoliberal capitalism and its accompanying socio-cultural developments such as

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[7] This can be seen, for instance, in the aftermath of the publication of ChatGPT, and Google's as well as Microsoft's scrambling to put 'AI' into all of their products (Love & Alba, 2023).

[8] See Rooij et al. for a detailed description of how AI is used in contemporary public and academic discourses (Rooij et al., 2023).

techno-futurism and techno-solutionism. So far, we have seen how AI technologies are constantly construed as "the solutions to otherwise intractable social, political, and economic problems, and seem to promise efficiency, neutrality, and fairness" (Elish & Boyd, 2018, p. 74). While the 'real' manifestations of AI tell an entirely different story (as will be discussed further below),[9] its imaginary has become the flagship of capitalist myth-making, constantly being painted in the colors of future progress.

This is the central theme of the socio-technical imaginary of AI: its technologies carry the unspoken hope that "when the artificial machine arrives—in this future/present which is always inevitably imminent—it will manifest as a superior intelligence" which will "outsmart humans" and mend all of our problems (Brevini, 2021a, p. 155). Here, the connection to the larger ideological frame of AI futurism becomes apparent. Within the imaginary of AI lies a reverence for the power of technology at large. In that sense, this imaginary is fundamentally rooted in the late capitalist narratives of *techno-solutionism* and *techno-determinism* (see Morozov, 2013).[10] What the AI imaginary adds to these techno-narratives, is an almost mythological view of 'all-things-AI', of "the magic tool to rescue the global capitalist system from its dramatic failures" (Brevini, 2021a, p. 149). With this, AI futurism becomes the latest, and perhaps more potent version of these previous ideologies.

This is because, AI futurism follows a long tradition of techno-solutionist ideology, and can even be viewed within the fairway of the early *techno-futurist* movement in the twentieth century (Puzio, 2022, pp. 28–31; see also Krüger, 2021). Crucial here are the historically rooted enthusiasm for technological progress as well as the belief that societal problems should be solved through this progress (Puzio, 2022, p. 58). These developments run parallel to the twentieth century technological evolution of industrial capitalism and its imperative to push technological solutions to socio-economic problems (Joque, 2022; see also Dyer-Witheford et al., 2019). The recent AI myths sketched above clearly resemble these beliefs. Thus, we see how the imaginary of AI is situated within a larger frame of historical trajectories and presents a continuity to their underlying assumptions.

Furthermore, the socio-cultural strands of techno-futurist and techno-optimist ideas have resulted in the trend to depoliticize the societal issues of technological development.

This is due to their dominant portrayal of technology as the only path towards societal progress and human well-being (see e.g. Dyer-Witheford, 1999; Feenberg, 1999; Geoghegan, 2023). AI futurism continues and extends this trend.[11] Proponents and critics alike now grapple with the supposedly technological necessity of AI and its disruptive effects. The near universal agreement seems to be that AI technologies will profoundly transform the societies of the future, whether you like it or not.

Again, this points towards the larger ideological frame of AI futurism in which the socio-technical imaginary of AI is situated. To put it with the renowned Philosophy of Technology scholar Andrew Feenberg, behind the technology always lies an entire cultural horizon, or an ideological superstructure (Feenberg, 1999). The imaginary of AI did not emerge recently and neither did its ideological horizon, but it is deeply rooted in the above-mentioned traditions. Feenberg emphasizes that all technological choices emerge out of hegemonic power relations and specific socio-cultural conditions (Feng & Feenberg, 2008, pp. 111–112). This means that AI futurism describes the set of historically grown cultural, economic and political values and practices, which now have AI technologies at their forefront (for further insights into this see e.g. Geoghegan, 2023; Joque, 2022). The myths and narratives described above are essential in shaping society's collective perception of what ought to be regarded as desirable and of what is rendered as unthinkable (Jasanoff, 2015, p. 4). Through them, and following in the steps of a techno-solutionist history, AI technologies are presented as a self-evident and necessary step of progress and socio-economic advancement (see also Feenberg, 1999; Feng & Feenberg, 2008).

In short, AI futurism is the latest hegemonic narrative of what critical political economics scholar Stefania Barca has called the "capitalist/ industrial modernity" which posits "Western science and industrial technology as the key driver of human progress and well-being" (Barca, 2020, p. 1).

AI futurism and the climate

"Is it fair … that the residents of the Maldives (likely to be underwater by 2100) or the 800,000 people in Sudan affected by drastic floods pay the environmental price of training and deploying ever larger English LMs", such as ChatGPT (Bender et al., 2021, p. 612)? Clearly it is not. Yet, this is

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[9] For works on this (see e.g.: Eubanks, 2018; Kröger et al., 2021; Mühlhoff, 2019, 2020; Noble, 2018; O'Neil, 2016).

[10] Already in 1992 Bruce Berman analyses how AI is used as an ideology to facilitate capitalist interests. He describes "AI as a potential technological paradigm that remains in the historical confines of capitalist ideology"; and Berman goes on to point out that "AI constitutes an ideological discourse about power focused on problems of order and control" (Berman, 1992, pp. 111–112).

[11] Anna Puzio has written an encompassing analysis of this history and the socio-cultural movement of techno-futurism and transhumanism, as well as their connection to modern AI developments. See her book "Über-Menschen" for a comprehensive overview (Puzio, 2022). Oliver Krüger's book "Virtual Immortality" is also highly relevant for this historical perspective of techno-futurism and the connections to transhumanist as well as post-humanist thought (Krüger, 2021).

the trajectory of capitalist modernity braced by AI futurism. Since Emily Bender et al. have written the infamous paper "On the Dangers of Stochastic Parrots" (2021) critiquing the resource consumption of LLMs (large language models), not much has changed on a global scale, and as we have seen above, this can largely be attributed to the AI futurist narratives. So, why is this the case? What is the connection between AI futurism and the climate crisis?

Postponing planetary boundaries

In a notable text called "Planetary Intelligence" critical media scholar Orit Halpern elaborates the connection between the socio-technical imaginary of AI and the planetary conditions in striking clarity (Halpern, 2021). Halpern explains how the widespread use of AI technologies has resulted in a new socio-cultural paradigm which she calls "the smartness mandate" (Halpern, 2021, p. 228).[12] This paradigm is essentially the historical footing of what I call AI futurism here. With the smartness mandate she describes an epistemological regime that is fed by the modern data economy in conjunction with predictive algorithms and their underlying infrastructure. According to her, the last few years in particular have shown that data analysis, automation and AI have become fundamental components of social organization: disease patterns are predicted using massive amounts of data, research into medical treatments and vaccines is accelerated by machine learning, and social contacts as well as labor relations are now mediated via online platforms and their algorithms (Halpern, 2021, p. 228). Every aspect of human life is increasingly subject to the imperative of becoming more networked and optimized, to be all around 'smarter'. This process is mediated by AI technologies as well as the constant urge to collect ever more data to progress and achieve ever more accurate predictions.

As an example of this regime, Halpern points to the Atacama Desert in Chile. This is a major mining site for rare earths, such as lithium, and other resources, like copper, which are needed to build the hardware of AI technologies. For these needs, entire areas in the desert are being devastated and exploited (Halpern, 2021, pp. 238–241). In addition to this destruction of nature (see Sect. 3.2), what is particularly relevant in regards to the ideology of AI futurism is the discursive change Halpern observes based on the mining processes in the desert. She notes that with the widespread use of AI technologies there comes a shift in orientation towards the mined resources. Where previously they had simply been extracted from the ground, it is now all about optimizing this process. This because of course there are limits to these resources and their mining becomes more laborious with their perishing deposits. However, while it is clear that the resources are finite—the water for extraction and machinery will run out and rare earths are dwindling—AI technologies now make this reality seemingly malleable. The limits of the desert can be relegated to the background, as AI technologies are employed to prolong the end of resources, creating the illusion of an indefinite continuation of extraction (Halpern, 2021, pp. 241–246).

The ever-improving algorithms make it possible to find even the last and smallest deposits of lithium and promise to reduce water consumption to the last drop. Using the latest algorithms and mathematical models, permanent feedback from thousands of sensors makes it possible to make the most accurate predictions and decisions on how to best ventilate, dig, dispose of and clean the mines (Halpern, 2021, p. 242). Through the availability of such optimizing methods, the extraction of finite materials appears to be expanding into infinity (at least this may be the hope). If the goal is to continue producing hardware for the algorithms, extraction must not stop. And so, to sustain business-as-usual, mining operations need to be optimized to ensure continuity.

Importantly, this marks a discursive and epistemological shift induced by AI futurism: since the large-scale extraction of resources may no longer work in its usual manner, it is now a matter of perfecting this extraction to find the remotest deposits and use the last resources. Previously hard limits on resource consumption are receding into the distance. The end of resources or the end of extraction is no longer the focus. Instead, technological progress makes it possible to postpone their end and push it beyond the horizon, such that resource extraction can continue as long as possible (Halpern, 2021, pp. 241–246).

Driven by constant optimization, by ever more data, ever better models and algorithms, and ever more accurate predictions the 'hard' limits of the planet can supposedly be pushed into the distant future. This marks a victory of ideological thought. The smartness mandate has paved the way for a changing discursive landscape: from previously finite limits to a constantly optimizing horizon. This is where smartness mandate and AI futurism coincide. The idea of technology as the key driver of human progress and well-being, with AI at its latest forerunner, seems to make it possible to move the planetary boundaries backwards. Suddenly, AI futurism, in the fairway of a techno-solutionist history and the development of the smartness mandate, promises to postpone the planetary crisis. This ideology has made "it difficult to imagine running out of materials or suffering catastrophic events" (Halpern, 2021, p. 245). Constant optimization, the core business of AI technologies, seemingly makes it possible to worry about finite resources and planetary boundaries in a distant future. "Even as energy, water,

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[12] In a book called "The Smartness Mandate", Orit Halpern and Robert Mitchell elaborate on this term in more detail than is done here (Halpern & Mitchell, 2023).

and ore run out, the terminal limits to the [planetary] ability to sustain capital are deferred through financial algorithms and machine learning practices. … These practices make crisis an impossibility and blind us to the depletion of the ecosystem." (Halpern, 2021, p. 246).

Blind to the climate crisis

Of course, not all AI technologies are about making everything smart or about boundless optimization; not all are trying to postpone some planetary limit. Instead, there are many applications which genuinely seek to utilize AI for tackling the climate crisis (see among others: Cowls et al., 2023; Floridi et al., 2018; Floridi & Nobre, 2020; Vinuesa et al., 2020). Thus, one might say that in some cases AI technologies make the climate crisis even more visible and provide solutions, instead of pushing it to the back and being blinding. However, here it is important to come back to the socio-technical imaginary of AI (see Sect. 2.1.). The argument is not to deny the opportunities of AI technologies or claim that they cannot help with adaptation and mitigation of climate-related issues. Rather, it is about understanding the imaginary that is connected to the use and application of AI technologies.

Concretely, this means to acknowledge that the smartness mandate just as well as the many AI applications for climate issues all contribute to the imaginary of AI as a transformative force. The underlying conception sees AI as a vital component of capitalist/ industrial progress. This means that while the uses of AI may certainly help tackle climate issues, they nonetheless contribute to a socio-material environment which is overly fixated on technological advancement, to the extent that it loses sight of the existential threats ahead. The question here is not whether AI application are good or bad for the climate. Instead, we need to see the wider implications within economic, political, and social formations that the socio-technical imaginary of AI carries.

This points towards a second discursive paradigm within AI futurism: *a blindness towards the climate crisis*. The myths, narratives and visions elaborated above, in short the socio-technical imaginary of AI, has contributed towards a societal inertia regarding genuine climate action.[13] The
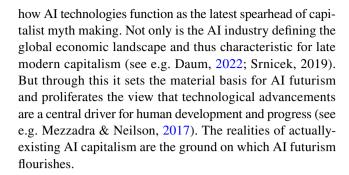
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[13] Of course, AI futurism is not the 'one' factor that contributes to this inertia. Rather, the continuation of business-as-usual is a complex multi-dimensional issue. There are a variety of influences coming together, such as the structures of fossil capitalism (Malm, 2016), historically-rooted ideas of private property (von Redecker, 2020), or accustomed ways of living in the countries of the Global North (Brand & Wissen, 2017), to name some of them. Understanding each one of these factors, which are of course interconnected, is important. In regards to AI, I argue that it is essential to better understand its socio-cultural and structural effects in the context of the climate crisis.

development of AI technologies has fed right into the historically settled ideas of techno-solutionism, and it has thus renewed and strengthened the faith in the progress of the capitalist/ industrial modernity. Ensuring and facilitating, as well as criticizing and regulating technological progress is a busy distraction from the planetary reality—for policy makers, academics and the public alike. This leads to a (partially involuntary) failure to realize that more fundamental questions about the organization of society would be needed, if the climate crisis were to be taken seriously. The result are socio-cultural conditions and an ideology which sustains the status quo, manifesting itself both explicitly through the active endorsement of AI as a solution to climate issues and implicitly by cultivating a socio-material environment not acknowledging the existential threats ahead.

AI's true impact on the climate crisis

AI futurism acts as a catalyst for the continuation of business-as-usual. Above we have seen how the ideology of AI futurism is connected to the planetary reality primarily through changing the societal perception of the climate crisis. However, while AI futurism obscures the climate emergency on a socio-cultural and discursive level, it also has concrete material impacts. The development, production and use of AI technologies is contributing to historically-grown capitalist processes of exploitation, expropriation and extraction (see e.g. Crawford, 2021; Mezzadra & Neilson, 2017). Rather than claiming AI is doing something entirely new to the climate, it is important to reveal how AI fits into established patterns, supporting the status quo while creating an ideological cover. In that way, this section outlines how AI futurism—in addition to its effects sketched above—maintains a system of global exploitation, and it points towards 'AI's true (socio-material) implications' for the climate crisis.

AI capitalism: the material basis of AI futurism

To understand how AI futurism impacts the climate beyond the effects sketched above, it is necessary to situate it within recent capitalist developments. Specifically, it is imperative to examine what lies behind the ideological façade of AI futurism, what its actual socio-economic manifestations are.

A notable perspective on this has been brought forward by Nick Dyer-Whiteford, Atle Mikkola Kjøsen and James Steinhoff. In their book "Inhuman power", they closely examine how AI technologies function within the modern economy, and capture this with the concept of *AI capitalism*. This term encapsulates the impact of AI technologies, such as data-based deep learning applications, on the existing economic landscape (Dyer-Witheford et al., 2019). Specifically,

Dyer-Whiteford et al. talk about *actually-existing AI capitalism* by which they describe the technologies and systems that currently define the material manifestation of AI.[14] With this, they explicitly highlight the importance of 'the real' within the socio-technical imaginary of AI technologies. Hence, understanding the concrete and material implications of AI futurism means to look at actually-existing AI capitalism. Especially regarding the climate crisis, this grounds the perspective presented above.

Here we find a global economic system comprised of the largest and most valuable corporations (Steinhoff, 2021). In recent years, actually existing AI technologies, such as data-based machine learning applications in industry and platform work, have led to a rapid growth in 'AI-companies' which are mainly located in the U.S. and China. In the U.S., major tech players are Google, Amazon, Meta, Apple, and Microsoft (so called 'GAMAM'), but also older firms such as IBM along with newer startups are growing into the AI sector (Steinhoff, 2021, p. 136). The largest AI companies in China are Baidu, Alibaba, and Tencent, in addition to some startups such as SenseTime (Steinhoff, 2021, p. 136). What is particularly noteworthy in the AI industry is its rapid growth. In 2023, it generated approximately 200 billion USD in global revenue, and experts predict that by 2030, this figure will soar to approximately 1.8 trillion USD (Bloomberg Business, 2023; Statista, 2023). This demonstrates that AI technologies today are often associated with ambitious future projections, especially in terms of revenue generation. Essentially, this reflects how actually-existing AI capitalism is closely connected to an imaginary idea of an even 'shinier future'. Dyer-Whiteford et al. describe this future vision of AI capitalism as being defined by yet-to-be-developed technologies such as fully autonomous vehicle, smart cities, digital personal assistants and even general artificial intelligence (Dyer-Witheford et al., 2019, p. 51).

It is precisely this tension between real and imaginary that supports the ideological frame of AI futurism. Within this the true impacts of the AI industry often remain hidden. Specifically, it remains underestimated how AI futurism constitutes a mode of societal organization which hides the global material realities of actually-existing AI capitalism behind the curtain of promising projections. Here, we see concretely

how AI technologies function as the latest spearhead of capitalist myth making. Not only is the AI industry defining the global economic landscape and thus characteristic for late modern capitalism (see e.g. Daum, 2022; Srnicek, 2019). But through this it sets the material basis for AI futurism and proliferates the view that technological advancements are a central driver for human development and progress (see e.g. Mezzadra & Neilson, 2017). The realities of actually-existing AI capitalism are the ground on which AI futurism flourishes.

AI's role in reproducing and advancing capitalist relations

AI futurism reproduces a socio-economic system that exploits and expropriates planet and peoples on many levels. In order to unravel this claim, I turn towards Nancy Fraser's recent book "Cannibal Capitalism" in which she describes the social and political conditions of capitalism in great detail (Fraser, 2022). Important for the current paper is that Fraser strongly emphasizes how capitalism is much more than just an economic order. She points out how it is a cultural logic, a way of organizing societies, of relating people and even of reordering planetary conditions. Hence, this understanding of capitalism as "an institutionalized societal order" (Fraser, 2022) bridges the gap between AI futurism and actually-existing AI capitalism. Neither ideology nor material manifestations stand alone. They go hand in hand. AI futurism is the ideology to AI capitalism, and vice versa. Necessarily, both notions have to be understood together. As we have seen above the 'real' and the 'imaginary' are essentially two sides of the same coin. Exactly this connection, this dialectical view, is achieved by bringing in Fraser's work. In order to understand the 'true implications of AI', we must *comprehend the kind of societal order the AI industry is currently building braced by its concurrent ideology.*

In her book, Fraser describes the non-economic conditions which are fundamental to capitalism's functioning. For the purpose of this paper, I focus on three of these conditions and connect them to AI's impact on the climate crisis: (1) AI's exploitation of nonhuman nature, (2) AI's expropriation, and (3) AI's cultural and social reproduction. With this, the aim is to show that besides AI futurism's ideological effects, it also facilitates socio-economic processes that influence the climate crisis. Behind the cover of AI futurism, AI technologies are part of an extractive economy that exploits the planet and its peoples (Crawford, 2021).

AI's exploitation of nonhuman nature

The capitalist societal order, as Fraser explains, inherently depends on "a large fund of free or very cheap inputs from *nonhuman nature*" (Fraser, 2022). In other words, the

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[14] With the term "actually-existing AI capitalism" Dyer-Whiteford et al. capture the influence of contemporary (already developed) AI technologies, such as platform algorithms or semi-autonomous decision-making systems, on the economy. This is opposed to what they call fully developed "AI capitalism", which is characterized by not yet developed technologies, such as Artificial General Intelligence or fully autonomous vehicles (Dyer-Witheford et al., 2019, p. 51). This once more shows the move from 'real' (actually-existing) to 'imaginary' (fully developed) within the conception of AI technologies. But it also underscores the importance of taking a closer look at what is actually going on, at actually-existing AI capitalism.

continuous exploitation of planetary resources is the fundamental fuel for the capitalist economy as well as its socio-political order. Capital requires a relationship towards nature which is grounded in the assumption that nature must be 'used'. For capitalism the planet serves as a tool to make profits: "On the one hand, the system's economy is constitutively dependent on nature, both as a tap for production's inputs and as a sink for disposing its waste. At the same time, capitalist society institutes a stark division between the two "realms"—constructing economy as a field of creative human action that generates value, while positioning nature as a realm of stuff, devoid of value, but infinitely self-replenishing and generally available to be processed in commodity production." (Fraser, 2022).

AI systems reproduce and intensify this condition. Their hardware and continuous functioning, depend on the exploitation of natural resources; the AI industry is an extractive industry at heart (see Crawford, 2021). The fact that artificial intelligence technologies are dependent on massive amounts of energy and resources has recently attracted heightened attention. Thus, it should not come as a surprise that their success is built upon the exploitation of nonhuman nature. In her book "Is AI Good for the Planet?" Benedetta Brevini describes the vast impacts of the AI industry on the planet and climate (2021b). The training of algorithms and the storage of increasing amounts of data continuously demand more energy and water to run the data centers and provide the computational power needed to sustain the running systems (Brevini, 2021b, p. 64). In addition to that, the use of AI applications contributes to a "mounting accumulation of electronic waste, much of it non-biodegradable and some of it toxic" (Brevini, 2021b, p. 80). This waste is unloaded onto nonhuman nature, for instance in giant landfills or by ending up in the oceans. As Brevini further points out, these planetary costs of AI technologies are not only tightly linked to capital's inherent dynamics, but also to the expropriation and dispossession of marginalized communities (Brevini, 2021b, pp. 65–66). The exploitation of nonhuman nature largely benefits just a few people within the AI industry situated in technology hubs such as Silicon Valley. While large parts of the world do not benefit from the latest AI developments, they are also not responsible for the rise in resource and energy consumption. Yet, indigenous communities and peoples in countries of the Global South are most affected by the climate crisis, which is also worsened by the impacts of the AI industry.

These effects on the planet are accompanied by the alliance between AI and capital and their mutually reinforcing dynamics. For instance, Brevini highlights how AI applications uniquely drive "uberconsumerism" as they contribute to "the production of an increasing range of commodities and services" (Brevini, 2021b, p. 77). Through data-driven targeted advertisements products can more effectively be brought to the consumers. The dynamics on social media platforms are explicitly aimed at keeping users engaged as long as possible. And the constant development and launch of new high tech and smart products drive consumers to buy with an increased frequency. All of this, Brevini states, leads to the growing consumption of products and thus continues the extraction and exploitation of planetary resources (Brevini, 2021b, pp. 63–91). Here, the AI industry with its products perfectly extends and fuels the dynamics that Fraser also describes in regards to capital's nature. "Capital", she says, "is also a relation to nature", and it is "a cannibalistic, extractive relation, which consumes ever more biophysical wealth in order to pile up ever more 'value,' while disavowing ecological 'externalities.'" (Fraser, 2022). Exactly this relation is intensified by AI technologies, which, in capital's shoes, continue the exploitation of the nonhuman world.

As Fraser highlight, the climate crisis is a multi-dimensional issue. It is not only linked to resource use or greenhouse gas emissions. But it is the assemblage of diverse yet interconnected systemic issues, including racism, sexism, and class conflicts, forming a mutually reinforcing cycle (Fraser, 2022; see also Schütze & Haueis, 2023). This means that when talking about AI futurism and the climate crisis, it is important to acknowledge how this ideology is part of maintaining the system that produces these issues. Hence, the impacts of AI technologies on the climate crisis reach beyond their resource consumption.

AI's expropriation

Connected to the exploitation of nature is a second socio-economic condition of the capitalist societal order described by Fraser. This "is a large fund of wealth *expropriated* from subjugated peoples" (Fraser, 2022). By this Fraser points towards how capitalist production depends on the dispossession of natural resources and indigenous lands, as well as the expropriation labor, especially from racialized peoples. The important point here is the *expropriation* of labor and land, as opposed to the exploitation of the same. While workers at employed in capitalist production, e.g. in factories, are exploited, Fraser specifically highlights capitalism's dependency on the dispossession of labor on the edges of capitalism, e.g. during colonialism (see also Bhattacharyya, 2018).

The functioning of AI technologies depends on expropriated labor, and the dispossession of peoples on the margins of capitalism.[15] This dynamic of AI capitalism has often been captured under the headings of *algorithmic colonialism* (Birhane, 2020) and *digital or data colonialism* (e.g. Coleman, 2019; Couldry & Mejias, 2019b; Kwet, 2019).
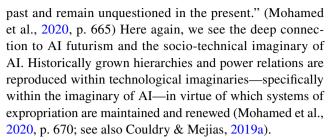
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[15] For a detailed description of how this unfolds see e.g.: (Barca, 2020; Bhattacharyya, 2018; Fraser, 2022).

These concepts highlight the continuing expropriation of peoples along the lines of historical structures of dispossession connected to colonialism. For instance, large Western tech companies, such as Google, Uber, or Netflix, control the digital infrastructures and communication networks in many African countries (Birhane, 2020; Coleman, 2019). In the same way as Fraser describes the process of historical dispossession, algorithmic colonialism today takes the expropriated data to generate profits and feed predictive algorithms (Birhane, 2020; Coleman, 2019, p. 422). Users are dispossessed of their right to control their own data, which in turn is used to maximize and privatize profits (Thatcher et al., 2016, p. 5). The collected information about social and private life is "quantified and privatized, not in the hands of those who generated it, but of those who created the application" resulting in a "transfer of ownership" by practices of expropriation (Thatcher et al., 2016, p. 7). This practice is especially damaging in countries such as South Africa (Kwet, 2019), that have limited infrastructures, weak data protection laws, and little competition. These countries were also subjected to years of social, political, and economic power imbalances, making them vulnerable to exploitation by foreign tech companies (Coleman, 2019, p. 424).

Here we see how algorithmic colonialism is intertwined with the ideology of AI futurism. As Abeba Birhane describes in her work on algorithmic colonialism: "Political, economic, and ideological domination in the age of AI takes the form of 'technological innovation', 'state-of-the-art algorithms', and 'AI solutions' to social problems. Algorithmic colonialism, driven by profit maximization at any cost, assumes that the human soul, behavior, and action is raw material free for the taking." (Birhane, 2020, p. 391) The capitalist narrative of technology as the key driver of human progress and well-being leads to a "sheer enthusiasm" towards data and AI, and makes "one think that any social, economic, educational, and cultural problems are immutable unless Africa imports state-of-the-art technology." (Birhane, 2020, p. 404) While much of the AI industry and even its regulations reside in North America and Europe, the AI futurist ideology and its narratives are emanating from there. If countries such as "South Africa integrate big tech products into their society, the United States will obtain enormous power over their economy and create technological dependencies that will lead to perpetual resource extraction." (Kwet, 2019, p. 6) With Fraser we have seen that, historically, capital is built on the dispossession of indigenous communities and racialized peoples, and in virtue of AI techniques these practices now seem to continue.

In their notable paper on "Decolonial AI", Mohamed et al. describe these processes with the term "digital-structural coloniality" (2020). With this, they capture how "sociocultural imaginations, knowledge systems and ways of developing and using technology … persist from the [colonial] past and remain unquestioned in the present." (Mohamed et al., 2020, p. 665) Here again, we see the deep connection to AI futurism and the socio-technical imaginary of AI. Historically grown hierarchies and power relations are reproduced within technological imaginaries—specifically within the imaginary of AI—in virtue of which systems of expropriation are maintained and renewed (Mohamed et al., 2020, p. 670; see also Couldry & Mejias, 2019a).

In regards to the climate crisis, this connects to issues of climate injustices (see e.g. Sultana, 2022), and the fact that AI technologies are central in perpetuating them. The burdens of the climate crisis are unfairly distributed among different countries and different peoples. Advancements in AI not only replicate but also enable such structures of worldwide inequality. The AI industry, on different frontiers and in virtue of data extractivism, continues capital's practices of expropriation, resulting in global power asymmetries. What use are AI technologies and the fast-growing AI industry to those who will lose their homes to sea level rise or floods? Algorithmic colonialism moves along and intensifies the same lines as the climate crisis does. Commonly, those who suffer the most from climate effects are also the ones exploited and expropriated by the AI industry. Hence, we see that AI futurism reproduces structures of climate injustices.

AI's social reproduction

AI futurism constitutes a world marked by climate injustices. This is also taking effect along gender and class dimensions. In her description of the non-economic conditions of capitalism, Fraser captures this under the dimension of reproductive work. She highlight that capital depends on "a sizeable fund of unwaged and underwaged labor devoted to *social reproduction*" (Fraser, 2022). This reproductive work is mostly done by women, and it is central to upholding the processes of production as well as the society at large. The entire social sphere, that is the co-existence of humans as social beings, their relationships as well as the cultures they are situated in are all built and upheld by care work. Work which capital needs in order to function, but which it does not recognize as such yet assumes as a backgrounded pregiven (Fraser, 2022).

Yet again, the AI industry upholds these structures of exploitation. In fact the tech industry is a prime example for gendered hierarchies of work, where social reproductive work, usually done by women and marginalized peoples, backgrounds 'real' or 'elite' work, usually done by white men (see e.g. Jarrett, 2022). The tech world is a male dominated world. The most programmatic example of the patriarchal narratives and visions that drive the tech world is the fact that the figures prevailing in the public discourse on AI are mostly men such as Elon Musk, Sam Altman or Mark

Zuckerberg (see e.g. the recent New York Times article on "Who's Who Behind the Dawn of the Modern Artificial Intelligence Movement", Moreno, 2023; see also Women TechNetwork, 2023).

The AI industry presents itself as a sphere in which the advanced jobs remain "out of reach for most women, as gender gaps in higher education, especially in advanced science, technology, engineering and mathematics (STEM) sectors, still remain unbridged and workplace sexism in technology companies continues to be the prevailing norm." (Gurumurthy & Chami, 2021, p. 4). AI companies create new gated and sealed off spaces where the supposed 'high-value' and future-deciding work is happening, and which are mostly populated by men (Jarrett, 2022, ch. 2; see also Steinhoff, 2021). Studies in 2019 found that "only 18% of authors at leading AI conferences are women" and that "women comprise only 15% of AI research staff at Facebook and 10% at Google" (West et al., 2019). Emily Chang has described the tech industry, and Silicon Valley in particular, as a "brotopia", a world in which sexism, discrimination and harassment are part of the functioning of the industry (Chang, 2019). Even more, as the AI Now Institute writes: "For black workers, the picture is worse. For example, only 2.5% of Google's workforce is black, while Facebook and Microsoft are each at 4%." (West et al., 2019) Emanating from these discriminatory spaces, AI applications are built to live up to the promises of AI futurism. The result are "AI systems founded upon individualistic and capitalist drives" (Birhane, 2020, p. 409), which are backgrounded by inequalities and a patriarchal culture.

In sum, the above has shown that with the AI industry and its socio-cultural environment genuine change is not in sight. Instead we can see how the production, usage and maintenance of AI technologies is at the forefront of reproducing capitalist modernity. *Algorithmic colonialism, the exploitation of social reproductive labor and the destruction of non-human nature are the true implications of AI futurism.* They mark what lies behind the façade of this ideology and highlight how the workings of actually-existing AI capitalism impact the climate crisis far beyond its mere resource consumption.

In the words of renowned climate scholar Farhana Sultana, the climate crisis is fundamentally shaped by "ongoing climate coloniality", "insidious racism", "dispossessions through colonial-capitalist extractivism and commodification", "rapacious displacement and destruction", and "creation of sacrifice zones" (Sultana, 2022, p. 4). As we have seen above, AI futurism is part of creating exactly these dynamics. This means that the discursive, ideological and material conditions attached to the development of AI technologies are facilitating a system of climate injustices and climate coloniality "where the colonial [and patriarchal] matrix of power persists" (Sultana, 2022, p. 4). Within this system "Eurocentric hegemony, neocolonialism, racial capitalism, and uneven consumption … are co-constitutive of climate [injustices]" (Sultana, 2022, p. 4). In short, AI futurism may be described as a neo-colonial and patriarchal ideology destructive to the planet.

Conclusion

Behind the curtains of AI futurism lie exclusionary and unsustainable capitalist dynamics. AI technologies fuel these dynamics and stretch them into the future, enabling a provisioned and secured continuation of the status quo. In essence, AI futurism undergirds a system that neglects the planetary future in favor of a technological one. This system has obscured the perception of the climate crisis, and pushed its effects into the background. AI futurism cushions the gravity of the planetary reality. More, it suppresses the mere option that things could be otherwise.

I argue that this marks a wake-up call for the people in Europe and the U.S., and specifically for those privileged enough to think, discuss and write about these issues (Schütze & Haueis, 2023). I rather want to imagine a world without AI (this might not look so bad after all) than imagining a world 2–3 °C hotter, with global crop failures and water shortages. Collectively, we could decide against participating in AI-futures and put a lid on tales of technological determinism. Perhaps, it is necessary to refocus our discussions and not get stuck on debating AI's mythological promises, harms and regulations, but to unveil the pressing societal and planetary issues. Yet, this thought and even the possibility that things could be otherwise appears outlandish from within AI futurism's framework.

Big tech companies do not have the exclusive right to shape the future solely through the rollout of generative AI or the next algorithm-driven social media app. Yet, AI futurism turns this into a rather bleak reality: cooling centers and AI technologies. *This ideological blow-up, the seemingly inevitable move towards the future, relegates environmental issues and hinders meaningful climate action.* But, when there is no more water to cool server farms, where will data-driven societies operate? Moreover, as the last reserves of minerals are depleted, what infrastructure will support the execution of algorithms? In regions where relentless wildfires make the summer air unbreathable without masks, will predictive algorithms save the day? And when crop yields are decimated by extreme weather and worsening droughts, how will AI technologies step in to fulfill basic needs?

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