THE TWIN FRONTIERS OF CLIMATE CHANGE AND AI IN THE POST-HUMAN AGE

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Abstract: In the 21st century, the primary frontiers that Man confronts pertain to climate and technology. In a world that is planetarized through economic, technological and political linkages, these frontiers are intimately entwined. Rapid advancements in AI promise to radically alter (or at the very least, augment) the political possibilities available to us in combatting climate emergency. AI is already being incorporated into climate change policies. Its capacity for predicting weather patterns and real-time monitoring, as well as for mapping deforestation, greenhouse emissions, icebergs, carbon footprints, optimal crop selection, etc. continues to improve at an exponential rate. However, AI does not exist in abstraction: it relies on very real, physical infrastructures, maintaining which entails enormous expenditure of energy. In other words, its relationship with the environment, climate change, and sustainable development, is a double-edged sword. This calls for policy frameworks that can regulate AI development, and facilitate its energy efficiency.

Doomsayers monger fears regarding AI singularities, which dovetail perfectly with climate apocalyptism. It is important to quell such secularized eschatologies, which undermine more sober and pragmatic efforts at combatting climate change. AI, it has been argued, is a product of man's historical endeavor to automate and algorithmize labor, i.e. AI is a product of human *technics* (i.e. his technical 'tactics of living'). It will not by itself 'solve' anything – as a tool, it must be wielded with hands guided by adequate policies, holistically taking into account resource exploitation and consumption patterns.

To this end, we must interrogate and reevaluate our general relationship with nature and technology. Man has historically 'enframed' nature, as resource to be quantified, classified, and exploited. This Cartesian dualism continues to frame nature as something to be acted *upon* by Man. This anthropocentrism, a product of modernity inaugurated by the Renaissance and the Enlightenment, enabled Man and Man's enterprise to become History's engine. Such metanarratives have since been destabilized; the emergent *post*-human epoch threatens to decenter Man altogether. Newer paradigms must be devised. Keeping this in mind, we seek to reconcile these disparate taxonomies of Nature, Man and Technology within (*post*-dualist, if not *non*-dualist) planes of immanence, emphasizing relationality, potentialities and becomings (cf. Sloterdijk's insight that 'change' is simply what classical philosophy termed 'becoming'). It is upon this ontological ground that our policy-making and regulatory frameworks can be meaningfully oriented towards a sustainable future.

Keywords: Artificial Intelligence, agriculture, Braidotti, climate change, Deleuze, Heidegger, philosophy of technology, posthumanism, technics, technology, Vedanta, Yuk Hui.

"Humans, the first general intelligences to exist on Earth, have used that intelligence to substantially reshape the globe—carving mountains, taming rivers, building skyscrapers, farming deserts, producing unintended planetary climate changes. A more powerful intelligence could have *correspondingly larger consequences*."

– Nick Bostrom & Eliezer Yudkowsky[1]

[1] Bostrom, N. & Yudkowsky, E. 'The ethics of artificial intelligence,' *The Cambridge Handbook of Artificial Intelligence,* ed. Frankish, K. & Ramsey, W. Cambridge University Press, 2014, pp. 331. Emphasis added.

INTRODUCTION

In the 21st century, the primary frontiers that Man confronts pertain to climate and technology. In a world that is planetarized through economic, technological and political linkages, these frontiers are not disparate, but rather intimately entwined. Escalating geopolitical turbulence, coupled with environmental fluctuations and untenable consumption patterns, leaves the world as a whole vulnerable to future shocks. Planetary climate crisis represents perhaps the most critical challenge to mankind's long-term prospects, compounded and amplified by what is broadly termed the Anthropocene. By the middle of the 20th century, it was deemed pertinent to note that "Human beings are now carrying out a large-scale geophysical experiment of a kind that could not have happened in the past nor be reproduced in the future."[2]

Things have come to a pass where globally coordinated planetary regulation, taking the form of a climate leviathan[3], has become the *de facto* formation to combat climate change. Various technological solutions have been proposed and adopted on this front. Rapid advancements in AI promise to radically alter (or at the very least, augment) the political possibilities available to us in combatting climate emergency in the 21st century. The United Nations Environmental Programme has endorsed the use of AI to, among other things, map gratuitous sand-dredging and chart methane emissions.[4] AI is already being incorporated into climate change policies by governmental and private entities alike: its capacity for predicting weather patterns and real-time monitoring, it has been suggested, can benefit policy-making immensely. Weather forecasts by AI-enabled predictive models continue to improve at an exponential rate; this is also the case with mapping deforestation, greenhouse emissions, icebergs, ocean litter, carbon footprints, optimal crop selection, etc.

Before we proceed, however, we must establish basic definitions: What is AI?

DEFINING AI

"Like the steam engine or electricity in the past, AI is transforming our world, our society and our industry. Growth in computing power, availability of data and progress in algorithms have turned AI into one of the most strategic technologies of the 21st century."

– European Commission[5]

[2] Revelle, R. & Suess, H. 'Carbon Dioxide Exchange Between Atmosphere and Ocean and the Question of an Increase of Atmospheric CO2 during the Past Decades,' *Tellus* 9, no. 1, 1957, pp. 19–20.

[3] See Mann, G. & Wainwright, J. *Climate Leviathan: A Political Theory of Our Planetary Future.* Verso Books, 2018.

[4] United Nations Environmental Programme. 'AI has an environmental problem. Here's what the world can do about that.' September 21, 2024. https://www.unep.org/news-and-stories/story/ai-has-environmental-problem-heres-what-world-can-do-about

[5] European Commission, 'Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions: Coordinated Plan on AI.' EUR-Lex, 18 May 2022. https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52022DC0230. Access 4 December 2024.

In 1858, Karl Marx, perusing William Thompson, imagined an automatic 'general intellect' through the coordination of technical knowledge and social intellect, with "a number of mechanical and intellectual organs, so that the workers themselves can be no more than the conscious limbs."[6] It was in 1956 that John McCarthy coined the term 'artificial intelligence.'[7] Several definitions, all circling around the same conceptualities, abound. Brevini boils it down to "the ability of machines to mimic and perform human cognitive functions [including] reasoning, learning, problem-solving, decision-making, and even the attempt to match elements of human behaviour such as creativity."[8] For Pasquinelli, "the 'intelligence' of technological innovations [to] the imitation of abstract diagrams of human praxis and collective behaviours."[9] These are the parameters that will inform this paper's engagement with AI.

There is no doubt that AI is demonstrably efficient and quicker at a wide variety of tasks (even if it is far from achieving 'general intelligence'): "information tracking, navigation, complex predictions, and supply chain logistics, assisting in these tasks and removing some of their drudgery."[10] Utopian theorists have taken such technological advancements to augur a leisure society[11], a post-historical future of abundance where humans will be free to indulge in creative pursuits. At the same time, we must appreciate the relevance of the Marxian idea of alienation (more on this later) to the conditions being created by AI's introduction to professional, educational and social spaces. From the realm of speculation, the AI epoch has entered a radical phase of actualizations.

MAN AND MACHINE

All throughout history, Man's epistemological efforts have consistently sought to consolidate the edifice of Man and Man's enterprise as the center of the universe. When the Copernican heliocentric cosmos decentered the earth, and with it, Man, Cartesian rationalism sought to reinstate Man and Man's mind as the seat of reason, knowledge, certitude—as the 'measure of all things.' In response to 'the crisis of the European Sciences,'[12] Husserl's phenomenological method similarly sought to retain Man's subjectivity as the arbiter of empirical inquiry. Latour notes that modernity's conceptual construction relies on the opposition between a 'foreign, forever remote and hostile' Nature on the one hand, and the constructed, constituted, cultured Society on the other[13]— corresponding to Agamben's distinction between ζωός (*zoe*), i.e. animal life or 'bare life', and βίος (*bios*), i.e. qualified, political, social life.[14] Indeed, the two are defined explicitly in mutually negative terms: βίος

[6] Marx, Karl. *The Grundrisse.* Translated by David McLellan, Harper Torchbooks, 1971, pp. 132.

[7] John McCarthy et al., 'A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence', 31 August 1955, reprinted in *AI Magazine* 27, no. 4 (2006).

[8] Brevini, Benedetta. *Is AI Good for the Planet?* Polity Press, 2022, pp. 35.

[9] Pasquinelli, Matteo. *The Eye of the Master: A Social History of Artificial Intelligence.* Verso 2023, pp. 11.

[10] Edited by Gaudet, M., Herzfeld, N., et al. *Encountering Artificial Intelligence: Ethical and Anthropological Investigations.* Pickwick Publications, 2024, pp. 208-209.

[11] Per Aristotle, it is leisure, rather than work or play/recreation, that is the ultimate good in life, with philosophical contemplation being the highest form of leisure.

[12] See Husserl, Edmund. *The Crisis of European Sciences and Transcendental Phenomenology.* Translated by David Carr. Northwestern University Press, 1970.

[13] See Latour, Bruno. *We Have Never Been Modern.* Translated by Catherine Porter. Harvard University Press, 1993, pp. 30.

[14] See Agamben, Giorgio. *Home Sacer: Sovereign Power and Bare Life.* Translated by Daniel Heller-Roazen. Stanford University Press, 1998.

is "life, i.e. not animal life (ζωή), but mode of life."[15] The privilege of Life (as opposed to life) is only extended to Man, the *anthropos*.

It is this binary construction that has sustained Man's historical sense of exceptionalism: that the world is merely staging ground and standing reserve for Man's enterprise, thus historically legitimating the acquisitive, competitive logic of conquest, colonialism, limitless productivity, as indeed the Anthropocene (while also Othering those who do not measure up to this worldview as uncivilized, savage, regressive, etc.). With the rise of colonial and postcolonial modernities, and globalized technologization, these discourses have achieved planetary hegemony ("The twentieth century was a century of orienting (erörteren) Heimat within the planetarization of European modernity."[16])

Martin Heidegger's engagement with technology was concerned with its 'enframing' (*Gestell*) of the world as 'standing reserve,' vis-à-vis its instrumentality, utility. It is this 'enframing' that forms the essence of technology: 'man's ordering attitude and behaviour,'[17] which strives to quantify, classify and control. Oswald Spengler praise for Man's *technics* (from *tekhne*— τέχνη— 'art, skill, craft'), for his inherent 'tactics of living,'[18] his technical-technological aptitude, was informed by a similar framework. Through man's *technics,* domesticated horses, cows, and then the steam engine, electricity, digitalization, etc., have served to reduce the tedium of labor with increasing efficiency and autonomy.[19] "What many still call 'artificial intelligence,'" Pasquinelli exclaims, "is just a technique of mathematical optimisation."[20] (Indeed, Pasquinelli locates AI within the continuum of the algorithmization and automation of mankind's labor, traced back to the ancient ages). In other words, AI's relation to human labor is that of codifying, automating and perfecting it; *homo faber's* competencies are externalized and appropriated by machines. Indeed, the very architecture of machine learning algorithms resembles biological neuronal structures (insofar as the network's 'nodes' connect with other nodes, the 'brain' developing through training).

However, even as Man acts upon and technologizes the world (conceptualized as Nature, resources, 'standing reserve'), this technologized world enacts a change on Man's self-essentialization. Over time, the intensification of this process of technologization, rationalization and disenchantment has decentered the life-worlds that hitherto oriented and anchored mankind. This has taken place on a planetary scale: even though people continue to exist within their specific local life-worlds, these contexts are themselves integrated into a Heideggerian world picture— "The fundamental event of modernity is the conquest of the world as picture."[21]— that is scientific, rationalized, empiric, disenchanted, quantifiable.

The classical organism is replaced with the cybernetic machine; the world, imagined as Gaia, "an active adaptive control system able to maintain Earth in homeostasis,"[22] is superimposed with the Internet of Things— "The global economy is

[15] Liddell, H. & Scott, S. *A Greek-English Lexicon.* Edited by Sir Henry Stuart Jones. Oxford University Press, 1940, pp. 41.
[16] Yuk Hui. *Post-Europe.* MIT Press, 2024, pp. 13.
[17] Heidegger, Martin. 'The Question Concerning Technology,' *The Question Concerning Technology and Other Essays*, pp. 21.
[18] Spengler, Oswald. *Man and Technics: A Contribution to the Philosophy of Life*. Translated by Charles F. Atkinson. Greenwood Press, 1976, pp. 18
[19] Ibid.
[20] Pasquinelli, pp. 215.
[21] Heidegger, Martin. 'The Age of the World Picture,' *The Question Concerning Technology and Other Essays.* Translated by William Lovitt. Garland Publishing, Inc, 1977, pp. 134.
[22] Lovelock, J. & Margulis, L. 'Atmospheric homeostasis by and for the biosphere: the gaia hypothesis.' *TELLUS XXVI* (1974), 1-2, pp. 3.

post-anthropocentric in that it ultimately unifies all species under the imperative of the market."[23] To grasp technology in terms of man's *technics* ('his tactics of living') is to understand technologization as a historically recurring phenomenon; what is unique to our age is simply the unprecedented scale and intensity of the process.

The destabilization of Man, his reason, and his enterprise as a universal metanarrative has been charted through postmodernist discourses. Yet again, the unity of Man stands on shaky grounds in the emergent post-humanist epoch. With successive leaps in industrial and now computational technologies, Man is confronted with an unprecedented obsolescence: where the machine once simply eased Man's labor, now it "itself becomes the organizer of information and the human is no longer at the center."[24] Where technology once rid Man of physical and cognitive toil, it now seemingly stands to usurp the role of decision-maker and controller altogether.

Consider the idea of Man as a rational agent: it is undermined by the presence of biases, context-dependence, preferences, and fundamental cognitive limits. AI, on the other hand, combines data collection, analytics, preprocessing, prediction, etc. at a superhuman scale to offer (or at least, claim to offer) decisions that are algorithmically optimized. Although Umberto Eco confidently asserted "No algorithm exists for the metaphor,"[25] what AI can do is handle, organize and analyze vast quantities of data, effectively outmoding many jobs involving cognitive, logistical labor. This is indeed the actual crux of AI: not as the apocalyptic premonition of self-conscious xeno-intelligent synthetic beings, but the very real, imminent reconfiguration of our social and professional life-worlds by technologies that are far more efficient and quicker than the human intellect, precisely in calculating 'the statistical distribution of a pattern'—AI as "a *nooscope*, a device that maps and perceives complex patterns through vast spaces of data."[26] (At the same time, it is true that training data can perpetuate biases in decision-making and analytics against marginalized groups.[27] Three types of biases can be sketched out: world bias, data bias, algorithmic bias.[28]) Newer paradigms must be devised.

A POST-HUMAN FRAMEWORK

Situated within Man's evolving *technics*— from the wheel, the steam engine, the computer, the rocket, from the organic to the cybernetic organism— AI can be said to represent less of a fundamental ontological paradigm change than it does another shift in a relational, interlinked, multiple, continuous field of assemblages (Braidotti has spoken of "expanding the notion of Life towards the non-human or ζωός – *zoe*,"[29] while Latour follows Lovelock in conceptualizing the Earth-as-Gaia as 'an active adaptive control system'). Sloterdijk recently remarked that 'change' is simply what classical philosophy

[23] Braidotti, Rosi. *The Posthuman.* Polity Press, 2013, pp. 63.
[24] Yuk Hui. 'ChatGPT, or the Eschatology of Machines.' *E-flux,* issue #137, June 2023. https://www.e-flux.com/journal/137/544816/chatgpt-or-the-eschatology-of-machines/
[25] Eco, Umberto. *Semiotics and the Philosophy of Language,* Indiana University Press, 1986, pp. 127.
[26] Pasquinelli, Matteo. 'How a Machine Learns and Fails.' *Spheres Journal # 5,* 2019, pp. 5.
[27] See, for instance, Roche, C., Wall, P.J. and Lewis, D. 'Ethics and diversity in artificial intelligence policies, strategies and initiatives.' *AI and Ethics* 3(4), 2023, pp. 1095-1115.
[28] Pasquinelli. 'How a Machine Learns and Fails,' pp. 9-10.
[29] Braidotti. *The Posthuman*, pp. 50.

termed 'becoming.'[30] Intelligence is no longer classified as the property of individuals (whether human or non-human), but is rather diffused across systems and networks, human, non-human, even *in*human. Rather than reinforcing the idea of Man as a fundamental universal essence, this forces us to reckon with the possibility of 'Man,' 'intelligence,' 'reason,' as contingent, shifting sign-systems, produced and conditioned by, and adapting to historical contexts and knowledges processes.[31] Man, as individual and collective, is *individuated* out of and retains a metastable system of relations, tensions and possibilities: "Le viant conserve en lui une activité d'individuation permanente."[32] Life is imagined "as process, interactive and open-ended,"[33] rather than the exclusive domain of the human. This extends to the technological, digitized world, "digital life being a second nature."[34]

In opening up these discrete taxonomies to posthuman (and *post*-dualist, if not *non*-dualist) planes of immanence, emphasizing relationality, linkages, continuities, potentialities and becomings, 'Life' comes to encompass Man, Nature, Technology (Braidotti's *zoe/bios/techno*) as part of a homeostatic continuum (Haraway's 'naturecultures'[35]), rather than in discrete competing registers. To this end, traditional metaphysical motifs, such as *maya* (illusion) or *lila* (sport, play), can be repurposed as potent discursive tools to conceptualize such paradigms. Indeed, a wide variety of theories and doctrines—ranging from *Advaita Vedanta*, Spinozist monism, to Marx's 'general intellect' and Deleuze's work on immanence, rhizomes, assemblages— can be availed in service of this task, to understand our relationship with technology in general, and artificial intelligence in particular. Eschewing discrete, differentiated entities, the Upanishads say: "Know then that Nature is Maya, and that the great God is the Lord of Maya. The whole world is filled with beings who form His parts." [36] (SV IV.10) Indeed, posthumanists like Braidotti offer 'a materialist, secular, grounded and unsentimental'[37] analogy to these same metaphysical-philosophical doctrines. If language indeed constructs our social reality, such discursive frameworks can reify such posthuman schemas in mainstream conversation meaningfully.

EXCHANGING ESCHATOLOGY FOR ETHICS

"Instead of elaborating a vision of the future in which artificial intelligence serves a *prosthetic* function, the dominant discourse treats it merely as challenging human intelligence and replacing intellectual labor."

– Yuk Hui[38]

The 19th century's 'Machinery Question' was driven by fears that the advent of industrial machinery would leave factory workers unemployable, prompting agitations and riots. Simondon noted that this recurring impasse between Man and

[30] Borrud, Gabriel. 'Humans are not prepared to protect nature.' *DW,* June 23, 2020. https://www.dw.com/en/how-do-we-change-peter-sloterdijk-environment-coronavirus-on-the-green-fence-climate-change/a-53533840
[31] For more see Singh, G. & Sharma, M. 'An Ethical Approach to AI in a Post-Human Epoch.' *Journal of Information and Knowledge*, Vol 61(5), October 2024, p.271-278. DOI: 10.17821/srels/2024/v61i5/171588
[32] Simondon, Gilbert. *L'individuation psychique et collective.* Aubier, 1989, pp. 16.
[33] Braidotti, pp. 60.
[34] Braidotti, Rossi. 'A Theoretical Framework for the Critical Humanities.' *Theory, Culture & Society,* Vol. 36(6) 31-62, 2019, pp. 40.
[35] See Haraway, Donna. *The Haraway Reader.* Routledge, 2004.
[36] *Svetas'vtaropanisad.* Translated by Swami Tyagisananda. Sri Ramakrishna Math, Mylapore, Madras, 1949, pp. 87.
[37] Braidotti. *The Posthuman,* pp. 60.
[38] Yuk Hui. 'ChatGPT, or the Eschatology of Machines.' Emphasis added.

Machine is predicated upon our inability to meaningfully integrate the technical reality of machines. In turn, as Hui notes, this antagonism encourages a reactionary turn towards caricatures of primitivism, tradition, 'natural living,' etc.[39] The Machine is seen as an antagonist, a competitor for Man's position as Master; AI's ability to organize information with breakneck speed and efficiency threatens to radically restructure the workforce, portending radical changes in employment and workspace trends, rendering many workers and their skill-sets obsolete. Given the immense commercial incentives, businesses are certain to employ these technologies on a massive scale.

The effect this displacement has on humans is essentially what Marx describes as alienation: if the worker is to gain a sense of self through labor, the repetitive tedium of industrial work has the effect of alienating him from his own labor. "Workers will no longer get commands from other humans, but from machines who´s only goal is to run efficient production, and therefore consequently feel even more removed from what they create."[40]

Indeed, the techno-optimism of 'unconditional accelerationism' also reinforces a similar absolutized, essentialized, eschatological relation between Man and Machine, wherein one must dominate and/or replace the Other. Moreover, juxtaposed with the world's limited, dwindling energy reserves, and Big Tech's monopoly, such discourses of AI advancement carry the unspoken presumption of inequitable, lopsided access to 'the future.' This turns the creative human, who may enjoy the fruits of a leisure society, into a passive consumer, reduced to *ζωός*, 'bare life,' under a techno-surveillance panopticon.

Resorting to such teleological, apocalyptic rhetoric, however, only encourages fear, antagonism, and passivity. Incidentally, such apocalyptic doom-mongering dovetails perfectly with climate apocalyptism. It is important to quell such secularized, deterministic eschatologies, which undermine more rational, sober, pragmatic efforts at combatting climate change. AI will not by itself 'solve' anything – it is but a tool that must be wielded with hands conditioned by adequate policies and decision-making, geared towards a holistic revaluation of resource exploitation and consumption patterns. Man creates technology; at the same time, technology rearranges (revises, re-produces) the contours of Man's self-image – a recursive process of individuation. The Machinery Question was ultimately resolved through measures aimed at policy, pedagogy, production and regulation. The emergent post-human epoch must similarly be engaged with proactively, centering issues such as climate justice, labor, equitable technological access, etc.

Hui advocates for, among other things, "suspend[ing] the anthropomorphic stereotyping of machines and develop an adequate culture of prosthesis . . . [i]nstead of mystifying machines and humanity." We must renegotiate our epistemic grounds in order to "experiment with ethical ways of living with machines and other nonhumans."[41] It is upon such conceptually clarified grounds that the question of AI, and its various impacts, can be holistically assessed.

THE TANGIBLE COST OF AI

[39] Ibid.
[40] Flatebø, Av Tiril. 'Artificial Intelligence and Alienation.' *Universitetet I Oslo,* March 9, 2020. https://www.uio.no/studier/emner/matnat/fys/HON1000/v20/studentblogg/artificial-intelligence-and-alienation.html.
[41] Yuk Hui, 'ChatGPT, or the Eschatology of Machines.'

Having briefly surveyed the conceptual contours of Man's relationship with AI, we must remember that AI does not exist in abstraction. It relies on very real, physical infrastructures, maintaining and expanding which entails enormous expenditure of energy (not to speak of the e-waste generated). Training a deep learning natural language processing model, for example, can contribute upto 600,000 lb of carbon dioxide emissions (Strubell et al. 2019),[42] which is equal to the lifetime carbon emissions of five cars.[43] In addition, the use of AI exerts as much expenditure as training it does: generating a single image through such models uses up as much energy as fully charging a smartphone.[44] Training Google's AlphaGo Zero program generated 96 tonnes of CO2 over forty days.[45]

In addition to these large models' carbon footprint, AI also "act[s] as a catalyst for consumerism and thereby intensif[ies] its environmental costs."[46] Consumption patterns and energy expenditure, already high in developed nations, have undergone a rapid acceleration in the Global South as well, especially in developing nations like India and China. AI intensifies consumerist tendencies, augmenting already-existing addictive online behaviors, which in turn require data collection that demands 'storage in clouds and server farms.'[47]

In the Global South, 'ghost workers' engage in precarious on-demand low-wage work; tasked with training and improving the accuracy of these technologies, they engage in flagging media online, translation, rating search engine results, etc. As invisibilized workers behind the machine, removed from sight, they power the machines' façade of autonomy (Gray & Suri, 2019).[48] Further, such technological infrastructure is sustained through resource plunder and exploitation of labor. The cost of manufacturing advanced computer chips, for instance, is borne out through the atrocious working conditions that allow for such minerals to be easily procured: take, for instance, reports of children as young as seven forced to mine cobalt in Congo, "subjected to violence, extortion and intimidation."[49] To add insult to injury, Brevini warns that "AI is currently augmenting the efficiency of resource extractionism in both mining and agriculture,"[50] compounding pressure on dwindling resources.

Hence, AI's relationship with the environment, labor, and the prospects of sustainable development, is a double-edged sword. It is reasonable to wonder if it would not instead be more ethical to, say, heating a home. Do the pros outweigh the cons? Do they justify the horrific working conditions that form the basis of AI's evolving hardware? Such questions require policies that can regulate AI development, facilitate its energy efficiency, and ensure a fair working conditions that AI's

[42] Strubell, E., Ganesh, A., McCallum, A.: Energy and Policy Considerations for Deep Learning in NLP. In ArXiv :1906.02243 (2019).
[43] Ibid.
[44] Heikkilä, Melissa. 'Making an image with generative AI uses as much energy as charging your phone.' *MIT Technology Review*, December 1, 2023. https://www.technologyreview.com/2023/12/01/1084189/making-an-image-with-generative-ai-uses-as-much-energy-as-charging-your-phone
[45] van Wynsberghe, Aimee. 'Sustainable AI: AI for sustainability and the sustainability of AI,' *AI and Ethics (2021) 1:213-218.* Pub: 26 February 2021, pp. 216. https://doi.org/10.1007/s43681-021-00043-6
[46] Brevini, Benedetta. *Is AI Good for the Planet?* Polity Press, 2021, pp. 64.
[47] Brevini, pp. 64.
[48] Gray, Mary L. & Suri, Siddharth. Ghost Work: How to Stop Silicon Valley from Building a New Global Underclass. Boston: Houghton Mifflin Harcourt, 2019
[49] Kelly, Annie. 'Children as young as seven mining cobalt used in smartphones, says Amnesty.' *The Guardian,* January 19, 2016. https://www.theguardian.com/global-development/2016/jan/19/children-as-young-as-seven-mining-cobalt-for-use-in-smartphones-says-amnesty
[50] Brevini, pp. 65.

material infrastructure relies on— without stifling its potential for positive change (by overregulating a technology without a clear idea of its implications or scope[51]). Fledgling steps have already been taken in this direction in the EU, the USA (and nascently, in India), as well as big-tech corporations like Google. According to Henderson, Hu, et al., there already exist two tools for calculating AI carbon emissions: the 'Machine Learning Emissions Calculator,' and the 'experiment-impact tracker' framework.[52] Further mechanisms are required to make the environmental and energy costs of the AI industry transparent to all stakeholders. Given the rapid advancement and adoption of AI models in the big tech sector, such efforts are found lagging.

For this to happen, AI discourse needs to be decentered from technological advancement, and linked to its social, environmental and political dimensions. More importantly, the oppositional binary of Man-Culture-Society/Nature must be deconstructed to allow for a holistic, relational understanding of Man not in terms of his *mastery* over Nature, but his place *within* Nature.

THE POLICY LANDSCAPE: SUSTAINABILITY, INNOVATION, JUSTICE

"The problem of AI has nothing to do with intelligence per se but with the manner in which it is applied to the governance of society and labour via statistical models – ones that should be transparent and exposed to public scrutiny."

– Matteo Pasquinelli[53]

Sustainable development, broadly defined, must "meet the needs of the present without compromising the ability of future generations to meet their own needs,"[54] triangulated by the three pillars of economy, society and environment. It follows that these concerns will also undergird any discourses on AI informed by sustainability. The question of expending exponential quantities of energy on training AI, in a world where almost six hundred million people live without access to electricity, certainly carries ethical weight. A balance must be maintained between "AI innovation and equitable resource distribution,"[55] as well as the three pillars. Even if utilized in service of social justice, the cost of tuning and recalibrating AI models only compounds the matter of calculating cost and energy proportionality.

Governmental bodies across the world have been pursuing actionable policy frameworks and regulatory measures in response to AI's emergent potential. More than sixty nations have come up with national strategies with regards to AI.[56] For instance, the European Union passed 'the world's first comprehensive AI law' in March 2024: the simply titled AI Act seeks to ensure that 'the AI systems used in the EU are safe, transparent, traceable, non-discriminatory and environmentally

[51] See Collingridge, David. *The Social Control of Technology*. Frances Pinter, London, 1980.
[52] Henderson P., Hu, J., Romoff J., Brunskill, E., Jurafsky, D., Pineau, J. 'Towards the Systematic Reporting of the Energy and Carbon Footprints of Machine Learning.' ArXiv :2002.05651 (2020).
[53] Pasquinelli. 'How a Machine Learns and Fails,' pp.3.
[54] Mensah, J. 'Sustainable development: meaning, history, principles, pillars, and implications for human action: literature review.' *Cogent. Soc. Sci.* 5(1), 1653531 (2019), pp. 8. https ://doi. org/10.1080/23311886.2019.1653531
[55] van Wynsberghe, pp. 217.
[56] Vats, Anil & Natarajan, Nikhila. 'G20.AI: National Strategies, Global Ambitions.' *ORFOnline,* July 5 2022. https://www.orfonline.org/research/g20-ai-national-strategies-global-ambitions

friendly' (European Parliament, 2023).[57] To this end, it classifies AI into four categories on the basis of risk: Social Scoring, Cognitive behavioural manipulation, Real-time and remote biometric identification systems, Biometric identification, etc. are deemed unacceptable-risk.[58] Similarly, the Algorithmic Accountability Act was introduced by the United States in February 2022. Canada's Artificial Intelligence and Data Act (AIDA) of June 2022 advocates for risk management and information disclosure.

In 2018, the European Commission (EC)'s 'Declaration of Cooperation on AI' was signed and endorsed by the EU's Member States.[59] In 2019, Japan published the Social Principles of Human-Centric AI, which provided a triangular ethical framework for AI use: human dignity, diversity and inclusion, and sustainability.[60] (For more, see Singh, G. & Sharma, M. 2024) A recent UNEP report has emphasized measures such as "e-waste recycling, energy-efficient data centres, renewable energy adoption and responsible resource management" to mitigate AI's environmental impact, while also highlighting the disparities between the Global North and the Global South, both in terms of access and ethical-practical modalities. Combining innovation with 'exnovation,' i.e. "actively discarding outdated, inefficient, or harmful technologies, practices and norms,"[61] has been actively propagated as a useful strategy in pursuit of sustainable futures (Again, the disruption this entails frequently prompts resistance, ranging from localized protests to populist movements). To this end, governments are gradually introducing measures to phase out fossil fuels, vehicles, etc.[62]

Policy papers and reports have championed AI's ability to 'distil raw data into actional information,' 'improve predictions,' and facilitate accurate scientific modelling.[63] AI-enabled precision agriculture, using 'automated tools that are responsive to variability within a crop,' has also been suggested to increase efficiency and mitigate emissions.[64] Further, it can help "process data on temperature change and carbon emissions, predict extreme weather events and energy use, transform transportation systems, monitor oceans, and assist geo engineering."[65]

Thus, it is apparent that state and non-state regulatory bodies are cognizant of the social, ethical, pedagogical as well as environmental contingencies of the emergent age of AI (so to speak), positive as well as negative, and seek to pre-emptively gauge the parameters of this age. Eschewing primitivist discourses of degrowth, anti-capitalism, rewilding, etc., most mainstream voices have instead favored technocratic solutions: it is imagined that developments in the renewable energy sector and green capitalism will be able to overcome environmental crisis. However, the technologically determinist idea that AI might, in one go, solve the contradictions and failures inherent to the neoliberal order must be treated with scrutiny. AI optimization is, after all, driven more by the logic of profit than any broad societal altruism.

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[57] European Parliament. 'EU AI Act: first regulation on artificial intelligence.' June 8, 2023. https://www.europarl. 17 europa.eu/topics/en/article/20230601STO93804/eu-ai-act-first regulation-on-artificial-intelligence. Accessed November 26, 2024.
[58] Ibid.
[59] Brevini, pp. 19.
[60] Habuka, Hiroki. Japan's Approach to AI Regulation and Its Impact on the 2023 G7 Presidency. Center for Strategic and International Studies (CSIS), 2023. JSTOR, http://www.jstor. org/stable/resrep47347.Accessed 28 June 2024, pp. 1.
[61] United Nations Environment Programme, & International Science Council. 'Navigating New Horizons: A global foresight report on planetary health and human wellbeing.' 2024. DOI: https://doi.org/10.59117/20.500.11822/45890
[62] The issue of the uncertain frontiers of lethal automated autonomous warfare, is also a relevant to contemporary conversations.
[63] Clutton-Brock, P., Rolnick, D., et al. *Climate Change & AI: Recommendations for Government Action.* GPAI, November 2021, pp. 18.
[64] Ibid, pp. 21.
[65] Coeckelbergh, M., and Sætra, H. 'Climate change and the political pathways of AI.' *Technology in Society,* Vol. 75. November 2023. https://doi.org/10.1016/j.techsoc.2023.102406

These motivations are still rooted in the same essentialist, anthropocentric, enframing standpoint as discussed above, reinforcing developments reinforce the relationality between Man and the World as mutually alien, as Others. Man's historical 'enframing' of nature, as something to be acted *upon* ("an objectification of the Earth as artifact, as something subject to engineering and design"[66]), means that he can only engage with it as exploiter or savior. Capitalism, even if garbed in 'green,' nevertheless retains the logic of market-mediated profit and accumulation, which cannot be tempered through simple 'incentive alignment' or 'credible commitment.' US energy companies have been consistent in promoting climate scepticism, and in lobbying against the carbon tax.[67] Moreover, these trends reinforce the role of private technocratic actors at the expense of democratic accountability and transparent decision-making, invisibilizing the common citizen as environmental stakeholder. In this light, the role that AI may play in terms of consensus formation, propaganda and advertising, requires closer scrutiny and regulation as it evolves. AI is not necessarily transparent; it has emerged primarily through Big Tech's ecosystem of unregulated, unaccountable monopolies, and all technology carries the particular forms of knowledge, biases and limits that condition its creation: "technology in itself is nothing neutral; it carries particular forms of knowledge and practice, with which it obliges its users to comply."[68] To paraphrase Guattari, AI too is connoted as "hyper-developed and hyper-concentrated forms of certain aspects of human subjectivity."[69]

CONCLUSION

Thus, any approach to policy-oriented ideation and decision-making must foreground an ontological basis for mankind's relationship with nature and technology in general, and artificial intelligence in particular. Technology must be *integrated* into our life-world, allowed therein to realize its 'prosthetic function,' thus leaving mankind free to realize its own leisurely potential. From this frontier, policy-making can be approached with AI as neither antagonist nor tool; rather, "a culture of prosthesis recognizes the organological value of machines and goes beyond the instrumentality of machines."[70]

AI is a product of human technics, his technical 'tactics of living.' It will not by itself 'solve' anything – it must be wielded with hands guided by adequate policies, holistically taking into account resource exploitation, consumption patterns, social justice and practicable conceptual frameworks, while also acknowledging the ways it effects Man's own individuation. The frontier of climate change, which grows ever more daunting, will be reckoned with through a posthuman standpoint: the world confronted not as Other, but within the relational flux of a self-same, self-organizing homeostatic system.

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[66] Yuk Hui. *Machine and Sovereignty: Towards a Planetary Thinking.* University of Minnesota Press, 2024, pp. 5.

[67] Mann & Wainwright, pp. 98-99.

[68] Yuk Hui. *Post-Europe*, pp. 84.

[69] Guattari, Felix. *Schizoanalytic Cartographies.* Translated by Andrew Goffey. Bloomsbury, 2013, pp. 1-2.

[70] Yuk Hui, 'ChatGPT, or the Eschatology of Machines.'

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