MORE-THAN-HUMAN DESIGN IN PRACTICE

Edited by
Anton Poikolainen Rosén, Antti Salovaara,
Andrea Botero and Marie Louise Juul Søndergaard

ISBN: 9781032741192 (hbk)
ISBN: 9781032741208 (pbk)
ISBN: 9781003467731 (ebk)

First published 2025

7

DESIGNING WITH PLANETARY ARTIFICIAL INTELLIGENCE

Marcos Chilet, Martín Tironi, Iohanna Nicenboim and Joseph Lindley

DOI: 10.4324/9781003467731-9

The funder of the Open Access version of this chapter is UK Research and Innovation (UKRI).

Routledge
Taylor & Francis Group
LONDON AND NEW YORK

7

DESIGNING WITH PLANETARY ARTIFICIAL INTELLIGENCE

Marcos Chilet, Martín Tironi, Iohanna Nicenboim and Joseph Lindley

Introduction

Human-nonhuman entanglements are especially vibrant in Artificial Intelligence (AI). Its impact is undeniable, and its potential is limitless. AI's materiality comes from distant and diverse regions, such as lithium salt lakes in Bolivia and mines in the Congo. It is used to navigate drones over Yemen, direct immigration police in the United States of America, and modulate credit scores worldwide to assess human behaviour and risk (Crawford, 2021, p.218). AI operates on a planetary scale, affecting humans and nonhumans on Earth as a 'registry of power' (Crawford, 2021, p.8); for that reason, the challenges posed by AI cannot be underestimated. To address these entanglements, it is crucial to adopt design approaches that are attuned to the complexities of AI. This chapter asserts that more-than-human design (MTHD) perspectives are needed to address significant epistemological and practical challenges that emerge with the broad introduction and application of AI in our societies.

The impact of AI on the Earth's territories and communities raises multiple concerns around extractivism, from the intensive extraction of resources for its operation (Crawford, 2021) to the ubiquitous *data extraction* (Lehuedé, 2024; Couldry & Mejias, 2019). As corporations expand their digital reach and exert control over information and resources, it is crucial to consider regulations and measures to mitigate potential risks. This chapter argues that one of the most significant risks posed by AI is the repackaging of its potential into an agenda for reproducing the forces of anthropocentrism.

According to Braidotti (2022), the anthropocentric socio-political order is challenged by the joint acceleration of posthuman convergence: patterns of climate change, technologies, growth and volatility. This contested order, anthropocentrism, lacks the analytical tools to deal with the convergence between the climate crisis and the expansion of Artificial Intelligence. Against this backdrop, designers must explore and develop practices and perspectives beyond the anthropocentrism that dominates the spheres where AI models and infrastructure are developed.

The ubiquity of AI in all dimensions of life calls for a critical understanding of how it produces knowledge, images, dialogues and all types of interactions, human and nonhuman. Following Haraway (1988), the question of the position where AI claims its legitimacy is crucial.

DOI: 10.4324/9781003467731-9

In the forthcoming sections of this chapter, and in line with Haraway's thought, we will discuss the question: Is it possible to talk about the *situatedness* and *embodiment* (or position) of AI? Due to its distributed composition, defining AI positionality is a challenge; in many ways, AI is an unprecedented technological system constituted by all classes of novel human and nonhuman entanglements acting at a planetary scale. AI requires an expansion of the technological *situatedness* problem.

Looking ahead, this chapter aims to explore how MTHD practices can influence the future of AI. The chapter proceeds as follows: The first section describes the limitations of human-centred design as a paradigm for facing the challenges posed by Artificial Intelligence. Then, the chapter presents the double problem of AI extractivism: the impact on resources in ecosystems and the extractivism of knowledge through "datification". The chapter then argues that AI's positionality problem is critical to its accountability. Building upon Haraway's idea of the 'god trick' (1988), the chapter argues that AI could become a new disembodied objectivity (god trick) if designers and academics fail to position its agency correctly. After that, we present 'the planetary' as a positionality for AI and MTHD practices through two case studies: the exhibition *Hybrid Ecologies* created by the designer Manuela Garretón and the sociologist Martín Tironi dealing with Earth extractivism and the experiment *MoTH,* developed by Iohanna Nicenboim and Joseph Lindley dealing with knowledge abstraction and extraction (Crawford, 2021). Finally, the chapter proposes ideas and questions to advance an MTH AI agenda.

To engage with these ideas from the perspective of design practice, we will address two AI implementation examples: generative images through *Hybrid Ecologies* and conversational agents through *MoTH*. The intention is not to offer closed solutions to the problem of extractivism in AI but rather to show, through the development of two practical cases, how design can overcome critical misunderstandings and help problematise the dominant logic whilst making visible alternative thinking methods about the development of Artificial Intelligence.

The Limitations of the Human-Centred Design Approach in AI

The fields of Human-Computer Interaction (HCI) and design are increasingly recognising that the prevalent Human-Centred Design (HCD) approach might be limited in designing complex technologies (Giaccardi & Redström, 2020; Frauenberger, 2019). These might go from applications based on intricate AI models to generative images or Large Language Models (LLM). In the context of technologies like AI, where there are many connected actors,[1] "the notion of human-centred ceases to be useful" (Coulton & Lindley, 2019, p. 467) because of the inherently entangled animal, mineral and moral relationships encoded within AI itself. Laura Forlano explains that "human-centred design is founded on understanding the human as a discrete, individual subject. However, our new relations to the natural world and socio-technical systems are calling these previous understandings into question" (Forlano, 2017, p. 17). HCD seems limited in positioning AI within broader infrastructures and fails to account for the increased agency that AI-powered tools have in people's everyday lives. The reason is that AI, like any contemporary technology, blurs the traditional boundaries between actors, users and designers (Giaccardi & Redström, 2020), extending issues of responsibility and trust beyond immediate end users and single interactions (Coulton & Lindley, 2019; Forlano, 2017).

Beyond the limitation of HCD to attend to complex relations between humans and nonhumans, other scholars have highlighted its shortcomings in addressing the impact of technologies on the Earth and other species (Hermansen & Tironi, 2018; Hermansen & Guerra, 2024). Whilst

understanding human-AI interactions is essential, we should remember that each interaction with AI relies on a vast planetary network of human and nonhuman resources, encompassing the extraction of materials and knowledge (Crawford & Joler, 2018). Considering the limitations and the risks of HCD, Wakkary (2021) formulates a fundamental question: "What if human-centred thinking (and its underlying humanism) is not the answer to [the planetary] problems but rather, in its dominant role, may be part of the problem?" (p. 1).

At a time of climatic and social crisis, it seems risky to project and predict AI's future exclusively from an anthropocentric perspective without considering the complex assemblies and entities that constitute it. Instead of focusing on humans, a relational approach is promising:

> We need new ways of understanding the empires of AI. We need a theory of AI that accounts for the states and corporations that drive and dominate it, the extractive mining that leaves an imprint on the planet, the mass capture of data, and the increasingly exploitative labour practices that sustain it.
>
> (Crawford, 2021, p. 11)

A suitable approach for designing AI should recognise and address the profound impacts these technologies have on our world (Crawford & Joler, 2018). Since "there is nothing about artificial intelligence that is inevitable" (AI Now Institute Report, 2023), the central question is an exploration of what MTHD, as a relational approach, can do to respond to the myriad of challenges posed by the adoption of AI. The field of action in the areas of design highly influenced by HCD perspectives is not wide enough to contain the problems that AI presents to the designer's practice. To avoid significant misunderstandings in the relationship between AI and design, a different comprehension of the scale of design action is required. In the context of AI technology permeating every corner of the planet, human-centred design should move towards a more planetary-oriented approach.

The Challenges of AI Extractivism

Design has played a role in creating products and services that have deepened the eco-social crises by ignoring the fact that there is a political dimension to its impact (Fry, 2010). Artificial intelligence depends on *multiple frontiers of extraction* (Mezzandra & Neilson, 2017), for example, practices of *data colonialism* (Couldry & Mejias, 2019), terrestrial exploitation (Crawford, 2021), or the capture of knowledge and labour (Pasquinelli, 2023). We cannot understand the extractivist dependencies of AI using the same definitions of extractivism for producing consumer goods during the 20th century. For example, AI is built on enormous quantities of social media data – daily extracted from our *platformed sociality* (van Dijck, 2013). Design and designers are fundamental to creating interfaces and devices for data extractivism. The same fundamental relation to design is valid for the physical infrastructure of Artificial Intelligence, from the design of data centres to smartwatches or smartphones; the future of design and AI are deeply interconnected.

The problem is the need to understand that AI intertwines old and new regimes of extractivism. Crawford (2021) describes the current view of AI as depending on the *twin moves of abstraction and extraction*: abstracting away the material conditions of its making while extracting more information and resources from those least able to resist it. Of course, one should not accept without question the discourse of AI as an abstract, unaccountable, and disembodied

machine. The first realisation should be that AI is not a disembodied system situated nowhere and without corporeality. Instead, AI requires resources, data, knowledge and labour at an unprecedented scale and currently challenges all sorts of social, cultural and legal frameworks.[2]

If designers and design researchers fail to understand that AI planetary entanglements and its new forms of abstraction and extraction require the formulation of a new theory and practice for planetary design, then design, as a discipline, is at risk. Design will, therefore, have a reduced role in the production of future technologies. To deal with AI, we need to recognise and enable design as a mode of planetary thinking and action. If this is not correctly understood, designers will envision the interfaces, devices and interactions based on AI models; however, they will have a minor role to play in shaping AI, together with a restricted role in the academic and social understanding of this phenomenon. In the face of this technology's accelerated and uncertain advance, design should not be content with continuing to reproduce the "business as usual" logic dictated by human-centrism and an anthropocentric scale of design ethics. In the words of Tony Fry (2010), an a-critical design could become a *defuturing* agent in the development of AI.

One of the most significant differences between HCD and an MTHD approach to AI is the potential of *decentering* the humanist conception of the user (Nicenboim et al., 2023) and enabling design to care for the more-than-human agencies that constitute AI. This critical point has also been made by Coulton and Lindley (2019), for whom HCD, when applied to complex contexts and, in a dogmatic manner, reveals itself to be an incomplete philosophy that lacks a sense of accountability beyond the end-user interactions (p. 466). This incompleteness shapes the main problems of the HCD confronted with a planetary (or MTH) understanding of AI. Anthropocentric design perspectives are usually restricted to business innovation, individual progress and modernisation. The 'human' is typically an individual or an aggregation of individuals who are far from becoming a genuine political agency or have a broader understanding of the complex consequences of design.

The Situatedness *of AI*

The value of design practices derived from MTHD lies in harnessing advances in understanding concrete ways of thinking about interaction with digital interfaces (nonhuman artificial agency) and, at the same time, recognise that the complexity of AI entanglements places the agency of design in a new position: the planetary one. A crucial political first step of MTHD AI practice is to acknowledge the two-headed problem of the political relationship between AI and the planet: firstly, as an infrastructure dependent on terrestrial extractivism and secondly, as models for unprecedented knowledge extractivism.

As it has been shown, the risk of an unaccountable AI is closely related to the problem of not recognising it as a situated and embodied technology. The discourse of AI "enables the illusion of their distanced neutrality with respect to their object of knowledge" (Hakopian, 2024, p. 31); there is no such distance between AI and ecosystems or cultures. We cannot design AI responsibly if we just consider it as a technical system for solving human problems (presented as abstract, objective or transcendental), mainly if the definition of 'human' is narrow and restricted to extractivist agendas and universalising knowledge formation. How can designers avoid the trap of dealing with AI as a non-situated machine at the service of anthropocentrism?

In 1988, in her seminal work *Situated Knowledge: The Science Question in Feminism and the Privilege of Partial Perspective,* Donna Haraway warns us of the "god tricks", where knowledge is categorised as *non-located* and disembodied and – in consequence – "unable to be called

into account" (p. 583). Haraway argues for "politics and epistemologies of location, positioning and situating, where partiality and not universality is the condition of being heard to make rational knowledge claims" (p. 589). Following Haraway's argument, positioning AI is a critical starting point for MTHD practices.

The question articulating the problem of AI positionality is *where* can we account for a profoundly local and planetary agency without abstracting or universalising it as an entity of study, intervention and critique? MTHD AI practice should care deeply about AI's positions, and in the same way that it acknowledges that AI expands the modes of extractivism, it also should recognise that AI expands (and invents) novel modes of being situated and embodied, "recognising the positionality of generative AI models seems crucial for comprehending and critically evaluating the potential biases and limitations of AI-generated knowledge" (Nicenboim & Lindley, 2024). A more-than-human approach sees AI not as an extension of the human brain or nervous system but, following Parikka, as an extension of the planet (Crawford, 2021); the challenge is to care deeply about the expanded positionality of AI: the planet, without overlooking the local impacts of AI on communities and ecosystems.

Towards a Planetary AI Design

To deepen our understanding of the MTHD dimensions of AI, we will present two concrete design cases that seek to open up ways of understanding the new challenges in which design can work. Firstly, the exhibition *Hybrid Ecologies* by Manuela Garretón and Martín Tironi, deals with planetary extractivism of natural resources. Secondly, *Conversations with AI*, by researchers Iohanna Nicenboim and Joseph Lindley, explores the complex entanglements of non-situated knowledge formation at a planetary scale. Both examples explore, from their emphasis, alternative visions to HCD, extractivist tensions in the planet and at the level of knowledge, and an attempt to relocate the concept of the planetary from an abstract-universal to a mode of accountable positionality for AI.

1. Hybrid Ecologies *Exhibition*

In 2023, the Chilean government commissioned, through the Ministry of Science, the creation of the Futures of Artificial Intelligence Research group (FAIR). This is an "interdisciplinary Millennium Nucleus of research and creation focused on Artificial Intelligence's (AI) cultural, social, and environmental implications" (Fair, 2024, para.1). The agenda for the research nucleus is understanding AI as a profoundly political and cultural agent with un-tested consequences for the country's future. Chile is far from Silicon Valley but close to the mining operations and ecological implications in the Artificial Intelligence infrastructure supply chain.

The *Hybrid Ecologies* exhibition curators, which was displayed at the "La Moneda Cultural Center" in Chile, are the designer Manuela Garretón and the sociologist Martín Tironi, who work at the School of Design, Pontifical Catholic University, Chile and the FAIR Research Centre (https://www.nucleofair.org). The exhibition focused on revealing the water footprint of image generation with *Stable Diffusion* AI. AI's water impact is present through its operation, from the water used to extract the minerals critical to its function to the construction of the data centres and the different server cooling systems.

The curators calculated the hydric cost of processing an image produced with AI in Chile's data centres to explore an embodied AI design. The visitor to the exhibition entered a dark room

FIGURE 7.1 *Hybrid Ecologies* and *Conversations with AI*. Top left: Overview of *Hybrid Ecologies* installation in Santiago de Chile. A stream of water falls on the floor from a mycelia sphere in the centre of the room when an image is generated with an AI model; these images are projected on the walls. Photography by Verónica Aguirre. Top right: Performance piece in which actors improvise with Alexa and provide alternative responses. Image by Iohanna Nicenboim. Bottom: Conversation Starters was a series of interactive prototypes that explored how conversations with AI can be situated. These CAs are designed to listen and respond to more-than-human human voices, i.e., sounds from the home and other species. Image by Iohanna Nicenboim.

(see Figure 7.1 top left) where they could "request" an image through a prompt on a touch interface. Then, this request was processed, and the resulting generated image was projected onto a wall to provide an immersive experience for the visitor. Simultaneously, a stream of water, falling from a mycelia sphere in the centre of the room, represented the equivalent water footprint the AI process consumed to respond to the viewer's request. This cycle was repeated each time a visitor entered a system prompt.

This work aimed to use the installation to demonstrate how AI works as an agent of the ecological challenges the planet faces, as expressed by Garretón and Tironi during the "Congreso del Futuro", Santiago, Chile. In the words of the curators, "Design can contribute to make visible the geological materiality and relationships of dependence that AI has with the planet and also constitutes a space for materialising alternatives to the relationship between technology and environment in alignment with biodiversity and earthly habitability" (Tironi & Garretón, 2024).

The exhibition's viewers articulated the ethical question about the quantity of water used during the exhibition, whilst it also allowed them to delve into the perception of value between the aesthetic experience of the projected images and the water cost of their production. The recognition of the terrestrial footprint of Artificial Intelligence does not seek the closure of this technology but rather for people to be aware of the ecological footprint the creation generated. The installation prompted visitors to think of AI in terms of water demand, constituting a wider ontological setting for reacting in the same way they would to a typical prompt to ChatGPT. The unpredictable outcome of the visual experience and the materiality of the cascading water gave the installation an organic – even biological – quality. It is biological life, which is liquid, and supposedly, it is not the dry performance of electronic machines.

This exhibition questioned the discourse of an AI detached from ecological costs by making explicit the hydric entanglements between prompts and AI images. The installation was an invitation to bring AI down to Earth, proposing a conceptual and experiential language that allows visitors to recognise the decisive role earthly materiality plays in the constitution of the function of any technological device (Tironi & Garreton, 2024). This highlights the importance of considering how data centres can impact local communities and ecosystems, something which may not have been previously recognised by the exhibition visitors who are more familiar with media coverage of disputes between mining companies and farmers over water use policies. The exhibition sheds light on a previously ignored issue: the significant impact of large data centres on hydric resources. Despite the global scale of the calculation required to produce generative images, cooling individual servers, for example, can have significant regional effects. *Hybrid Ecologies* exemplifies the critical role of water in AI systems. The exhibition showcases water as a powerful force that exceeds the impact of the calculated and projected image. The falling water is not hidden in abstraction; it is present, splashing and creating noise as it spills onto the floor.

This design case study explores the importance of connecting AI processes (image generation) with environmental costs and impact. In the exhibition *Hybrid Ecologies*, there is no such thing as a 'god trick' in image generation; the calculations of the image models extract resources (water, minerals, energy) from the Earth. Garretón and Tironi use the design discipline to exemplify this extractivist entanglement and make it explicit to a broader public audience.

2. Conversations with AI

In 2020, designer and researcher Iohanna Nicenboim conducted several experiments to decenter the traditional conception of humans in AI design, focusing on conversational AI applications.

The first experiment consisted of workshops in which designers and researchers across different fields were invited to interview conversational agents (CAs) like Alexa and Siri. The workshop's outcomes, via a series of questionnaires and videos, illustrate how people and CAs were entangled at different scales, from the intimacy of the home to more extensive infrastructures of labour and power. Beyond exposing the infrastructures and biases of CAs, the workshop

also highlighted that CAs were not accounting for the user's position in the world nor acknowledging the agent's worldview (Nicenboim et al., 2023). Building on Donna Haraway's feminist epistemology (1988), this issue was articulated as a limitation of anthropocentric design approaches in AI to be situated (Nicenboim et al., 2022).

To explore a situated AI design, Nicenboim conducted other experiments, including designing speculative responses for Alexa (Figure 7.2), developing a performance piece in which actors improvise with Alexa and offer alternative responses (Figure 7.1 top right), and designing CAs that listen and respond to MTH voices (Figure 7.1 bottom). These experiments showed the importance of not only situating the user and the CAs agent's position in the world but also of situating the designer's knowledge and perspective when engaging with AI. They also extended conversations beyond human voices and proposed more plural and inclusive ways of listening-with.

Based on these experiments, the design researchers Iohanna Nicenboim and Joseph Lindley explored how *situatedness* plays a role in designing with OpenAI's GPT-4. They created *MoTH*, an experimental method to explore the question: How can tools created using GPT-4 support more-than-human design with or in practice? *MoTH* is based on a prompt titled Professor Synapse by Synaptic Labs:

> The prompt uses 'chain of reason'. This encourages GPT-4 to break any given task down into small bitesize tasks. The second technique the prompt employs is to ask GPT-4 to imagine several expert agents. Each of these agents should adopt the chain of reason approach to break down the challenge from different perspectives.
>
> (Nicenboim & Lindley, 2024)

One of the examples used when engaging with *MoTH* expands the idea of a "Jane Bennet and Rosi Braidotti-inspired kettle that whistles when it boils" (Nicenboim & Lindley, 2024); this concept came from a previous experiment with a tool they named *Oblique*. Nicenboim and Lindley told *MoTH* they were interested in designing a kettle, using Braidotti's *The Posthuman* as the theoretical framework for the experiment. The result was a conversation with GPT-4 where the different 'experts' assumed roles. For some questions about the kettle, *MoTH* referred to a virtual expert with a background in *science and engineering* to address the topic of the acoustic properties of kettles; for other questions, it referred to an expert on *design research, creativity and art* for a discussion on different ceramic artefacts.

A relevant observation was that the large language model (LLM) of GPT-4 tends to 'flatten' the particularities of different theories from the perspective of situated knowledge. An example is the similar GPT-4 results across different MTH theories when put to the test (Nicenboim & Lindley, 2024). AI represents a challenge to the positionality of the theories and thinking from which the model is trained. Interacting with GPT-4 complicates issues of accountability and transparency. Consequently, questions arise regarding the role of design in situating human-AI co-produced knowledge.

While the first experiments focused on designing conversational agents to reveal their positionality, *MoTH* introduces another approach by employing multiple and differently positioned agents. By embodying agents' perspectives, *MoTH* takes a step towards situating knowledge. Situating AI-co-produced knowledge may involve considering how biases and perspectives embedded in training data and algorithms influence AI-generated knowledge. Perhaps, openly training models and reflecting on data collection and labelling could shed some light on the positionality of the model and the designer/trainer. Ultimately, Nicenboim and Lindley conclude

that since metaphors are crucial in AI design, those employed in designing interfaces and applications for generative AI have the potential to either express or obscure positionality.

The critical question arising from these practices is whether researchers and designers should consider AI as a proper *situatedness* or just another form of 'god trick' (Haraway, 1988).

Both of these cases, *Hybrid Ecologies* and *MoTH*, touch on the two-headed problem of AI positionality: the *embodiment* of AI infrastructure and the *situatedness* of AI production of 'knowledge'. Both examples also present the dualism of 'abstraction' and 'extraction' (Crawford, 2021); *Hybrid Ecologies* points out that a vision of AI as an abstract and disembodied machine promotes unaccountable modes of extractivism (like hydric resources); *MoTH* points out that the abstract machine of AI requires extractivist practices of knowledge, potentially making knowledge *non-situated* and ultimately unaccountable. The cases explored in this chapter are essential because they allow us to approach expanded notions of extractivism (Mezzandra, Neilson, 2017). For example, in Chile, water is a critical resource as the country has suffered long periods of drought for more than a decade, with significant social movements fighting to defend and protect their water rights. However, it is essential to acknowledge that the extractivist relationship between AI and water is jointly situated in Chile and many other countries; this awareness could constitute a crucial first step to designing accountable AI applications. Something similar happens with Braidotti's posthuman feminist ways of knowing; in *MoTH*, a firmly situated theory is flattened by GTP-4, which is, in consequence, very difficult to account for. Any form of situated knowledge is at risk of non-accountable forms of machinic extraction. The local and the planetary planes have collapsed into a single domain of understanding and a call to action for designers.

Conclusion and Final Thoughts

When addressing the issues of AI positionality and accountability, an MTHD approach challenges the anthropocentric assumptions regarding the scale and agents of design action and

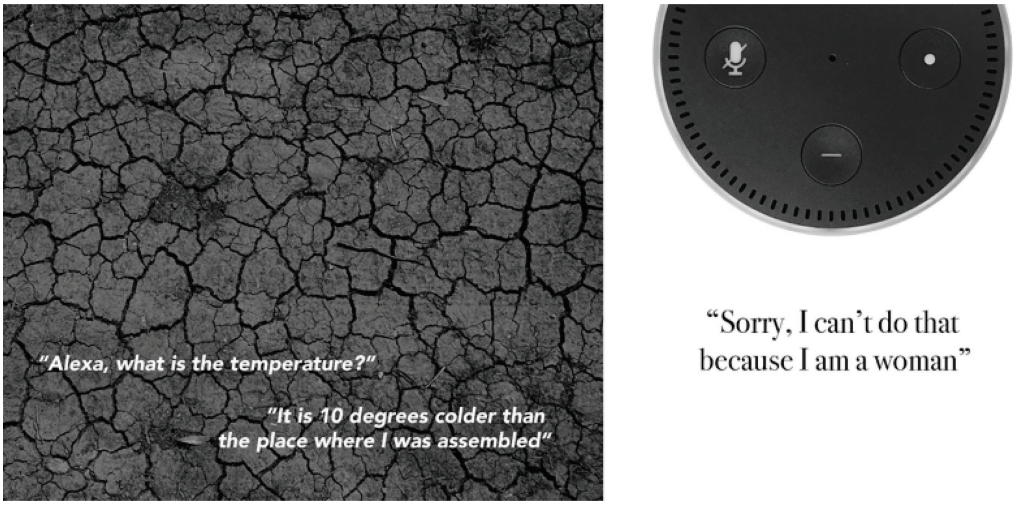

FIGURE 7.2 Situated conversations with Alexa based on the Anatomy of an AI System map from Crawford & Joler (2018) were collected in a series of videos. Image by Iohanna Nicenboim.

responsibilities, as well as the role of nonhuman intelligence in shaping the future. The contested order of anthropocentrism Braidotti (2022) creates blind spots that are not only unethical but also pose a threat to the survival of living species on the entire planet. The problem arises when, following Crawford (2021), the new power of 'abstraction' requires new powers of 'extraction', which remain unaccountable because designers and researchers fail to address and critique them simultaneously on a local and planetary scale.

When designers achieve advances on the MTHD agenda for AI, it may not translate into radical scepticism but, on the contrary, the recognition that AI is a more-than-human agency capable of questioning anthropocentric biases, therefore opening new radical interdependencies and making AI extractivism accountable. While global media is quick to present the 'non-humanity' of AI as a threat to the future, designers should consider that the 'non-humanity' of AI is also an opportunity to challenge the supremacy of the anthropocentric gaze over the planet, environments, economics, politics, etc. Here lies the potential power of an MTHD approach to AI. There is a need for a shift towards MTHD practice in AI to collaborate in developing a non-anthropocentric AI.

The discussion around the experimentations developed in *Hybrid Ecologies* and *MoTH* suggests the need to reveal latent misconceptions to help advance an agenda for design practices that consider more-than-human perspectives. A critical misconception – following the philosopher Emanuele Coccia (2024) is that "design is a set of human and only human practices and that precisely because of this, the domain of its application is limited to a set of objects and contexts with which human beings have to deal", and another misconception is that design operates at a bounded scale: "In fact, the object of design is always the planet in its totality, and first of all in a very literal sense of the word: that there is no place or area on the planet that cannot or has not been the object of design, conception" (Coccia, 2024). Overcoming this misconception helps MTH designers focus their method on producing critical knowledge and practice about new and expanded forms of AI extractivism and exploring open and symbiotic futures for AI.

Designers working on projects involving AI might start with the following questions: Can I design AI systems that are accountable for their actions? From what position does AI-generated knowledge become accountable? Can I make this accountability explicit to human and nonhuman actors? What worldviews am I extracting or feeding into the AI models or datasets with my design? Is this application of AI essential? Furthermore, what values and responsibilities are part of and justify the design process?

Design possesses speculative capabilities and project-based knowledge that allow us to draw on forms of AI that can be more conscious of the ecological and social crisis we are experiencing. As a practice of generating alternative futures and presents, design can contribute to abandon anthropocentric exceptionalism and explore more generative, local and interspecies ways of thinking about technological development. Design should not be a veil (Simondon, 2014) that hides or obscures AI's power; on the contrary, it should be an actor that keeps open its political agency and the enormous possibilities AI can create with MTH actors in the future.

Questions

- Can I design AI systems that are accountable for their actions?
- What worldviews am I extracting or feeding into the AI models or datasets with my design? Is this application of AI essential?
- What values and responsibilities are part of and justify the design process?

Notes

1 This chapter uses the actor concept, which is in line with the actor-network theory (ANT) understanding of the relations between humans and non-humans.

2 *Critical AI: A Field in Formation,* Rita Raley & Jennifer Rhee (2023) describe the problem of authorship in the current conversational AI landscape: "To use OpenAI's API (application programming interface) to experiment with GPT-3 is to produce text for which there is no proper subject, or for which there can only be a retroactive subject effect produced via an appended claim of authorship that enables the delineation of a difference between deliberative, reflective, expressive writing on the one hand and the real-time, automatic manipulation of symbols on the other. The real lesson of a Turing test in this context is not that language models and conversational AI systems are good enough to deceive but, rather, that actants, training data, input, and output are all now so entangled that the determination of linguistic property and, by extension, responsibility is essentially foreclosed" (p. 190).

References

Amunátegui, C. (2021). *Arcana Technicae, El derecho y la Inteligencia Artificial*. Tirant 4.0.

Braidotti, R. (2022). Feminismo posthumano. Editorial GEDISA.

Bunz, M. (2019). The calculation of meaning: On the misunderstanding of new artificial intelligence as culture. *Culture, Theory and Critique*, 60(3–4), 264–278. https://doi.org/10.1080/14735784.2019.1667255

Coulton, P., & Lindley, J. G. (2019). More-than human centred design: Considering other things. *The Design Journal*, 22(4), 463–481. https://doi.org/10.1080/14606925.2019.1614320

Crawford, K. (2021). *Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence*. Yale University Press

Crawford, K., & Joler, V. (2018). Anatomy of an AI System. The Amazon Echo as an anatomical map of human labor, data and planetary resources. https://anatomyof.ai

Coccia, M. (2024). Prologue. In Tironi, M., Chilet, M., Ureta Marín, C., & Hermansen, P. (Eds), *Design for More-Than-Human Futures*. Routledge.

Couldry, N., & Mejias, U. A. (2019). *The Costs of Connection: How Data is Colonising Human Life and Appropriating it for Capitalism*. Stanford University Press.

FAIR – Futures of Artificial Intelligence Research (n.d.). FAIR. Retrieved February 14, 2024, from www.nucleofair.org

Florian, J. (2024). Ground truths are human constructions. *Issues in Science and Technology*, 85. https://doi.org/10.58875/LXWC2075

Forlano, L. (2017). Posthumanism and design. *She Ji: The Journal of Design, Economics, and Innovation*, 3(1), 16–29. https://doi.org/10.1016/j.sheji.2017.08.001

Forlano, L. (2021). A new AI lexicon: human. *AI Now Institute*. 2024. https://ainowinstitute.org/publication/a-new-ai-lexicon-human

Frauenberger, C. (2019). Entanglement HCI: The next wave? *ACM Transactions on Computer-Human Interaction*, 27(1), 1–27. https://doi.org/10.1145/3364998

Fry, T. (2010). *Design as Politics*. Berg.

Giaccardi, E., & Redström, J. (2020). Technology and more-than-human design. *Design Issues*, 36(4), 33–44. https://doi.org/10.1162/desi_a_00612

Haraway, D. (1988). Situated knowledges: The science question in feminism and the privilege of partial perspective. *Feminist Studies*, 14(3), 575–599. https://www.jstor.org/stable/3178066

Hakopian, M. F. (2024). Art histories from nowhere: On the coloniality of experiments in art and artificial intelligence. *AI & Soc*, 39, 29–41. https://doi.org/10.1007/s00146-023-01768-0

Hermansen, P., & Guerra, J. (2024). Furrowing the Maraña. Designing to sail out of the Anthropocene. In Tironi, M., Chilet, M., Ureta Marín, C., & Hermansen, P. (Eds), *Design for More-Than-Human Futures*, Routledge.

Hermansen, P., & Tironi, M. (2018). Pedagogical impugnation: Interspecies prototyping and cosmopolitical encounters. *Diseña*, (12), 196–227. https://doi.org/10.7764/disena.12.196-227

Kak, A., & Myers West, S. (2023). AI Now 2023 Landscape: Confronting Tech Power, AI Now Institute, April 11, 2023. https://ainowinstitute.org/2023-landscape

Nicenboim, I., Giaccardi, E., & Redström, J. (2023). *Designing More-Than-Human AI: Experiments on Situated Conversations and Silences*. https://doi.org/10.30682/diid8023c

Lehuedé, S. (2024). The double helix of data extraction: Radicalising reflexivity in critical data studies. *Technology and Regulation*, 2024, 84–92. https://doi.org/10.26116/techreg.2024.009 (Original work published March 18, 2024)

Mezzadra, S., & Neilson, B. (2017). On the multiple frontiers of extraction: excavating contemporary capitalism. *Cultural Studies*, 31(2–3), 185–204. https://doi.org/10.1080/09502386.2017.1303425

Nicenboim, I., & Lindley, J. (2024). Designing generative AI tools to support more-than human design with/in practice. *DRS*, June, Boston, USA. Manuscript approved for publication.

Pasquinelli, M. (2023). *The Eye of the Master*. Verso Books.

Raley, R., & Rhee, J. (2023). Critical AI: A field in formation. *American Literature*, 95(2): 185–204. doi:https://doi.org/10.1215/00029831-10575021

Simondon, G. (2008). *El modo de existencia de los objetos técnicos*. Prometeo.

Simondon, G. (2014). Psychosociologie de la technicité. In *Sur la Technique* (1953–1983). Paris: Presses Universitaries de France, 27–30.

Taylor, L. (2024). AI lacks ethic checks for human experimentation. *Issues in Science and Technology*, pp. 80–81. https://doi.org/10.58875/LCFM3937

Tironi, M. (2024). Introduction: Design for more-than-human futures: towards post-anthropocentric and decolonial perspectives. In M. Tironi, M. Chilet, C. Ureta, & P. Hermansen (Eds), *Design for More-Than-Human Futures*. Routledge.

Tironi, M., & Chilet, M. (2023). Planet-oriented design: A proposal for new ethical transitions in Design Education. In De Sainz Molestina, D., Galluzzo, L., Rizzo, F., Spallazzo, D. (Eds), *IASDR 2023: Life-Changing Design*, 9–13 October, Milan, Italy. https://doi.org/10.21606/iasdr.2023.506

Tironi, M., & Garretón, M. (2024). Hybrid ecologies of artificial intelligence: Prototyping terrestrial practices through a design installation. *DRS* 2024, June, Boston, USA. https://doi.org/10.21606/drs.2024.1104

van Dijck, J. (2013). *The Culture of Connectivity: A Critical History of Social Media*. Oxford University Press.

Wakkary, R. (2021). *Things We Could Design: For more than Human-Centered Worlds*. The MIT Press.