Franziska, Pilling

f.pilling@lancaster.ac.uk
Lancaster University, UK

Paul, Coulton

p.coulton@lancaster.ac.uk
Lancaster University, UK

Biography

Franziska Pilling is a PhD Design Candidate at Lancaster University. Her research, funded by the PETRAS IoT hub, is concerned with making algorithmic intelligence and its associated systems, processes and misconceptions, more legible to users and designers through alternative design practices such as Speculative Design with Philosophy.

Paul Coulton is the Chair of Speculative and Game Design in the open and exploratory design-led research studio Imagination Lancaster. He uses a research through design approach to create fictional representations of future worlds in which emerging technologies have become mundane.

Carpentered Diegetic Things: Alternative Design Ideologies for AI Material Relations

Abstract
This paper considers a More-than Human-Centered design approach that presents Artificial Intelligence (AI) and data as materials for design by utilizing the non-anthropocentric philosophy of Object-Oriented Ontology (OOO) and the related thesis of Alien

Phenomenology. This paper also explores methods of making AI operations, functions and impacts legible through the speculative design practice of Design Fiction by adopting a perspective that acknowledges the independent perspectives and interdependent relationships of human and non-human actants. The structure of this paper is as follows; first, we will give a brief account and understanding of AI technology, with reference to our philosophical guinea pig - Amazon's AI assistant Alexa and Skills service. Second, we will unpack the theory of OOO detailing the related theories to develop an alternative perspective of AI technology. Further, it will posit how adopting a More-Than Human-Centered design approach can assist in negotiating the complexities of AI and move towards possible implementation solutions. Third, and finally, we demonstrate this alternative approach by utilizing the philosophical theories of OOO, and a Design Fiction as World Building approach to philosophically carpenter a Diegetic Thing - Amazon's AI assistant Alexa which speculatively transcends Alexa's current skills into functions of legible AI.

Keywords: *Artificial Intelligence; Object-Oriented Ontology; Design Fiction; Legibility; More-Than Human-Centered Design*

1. Introduction

Thinking about AI requires us to think ecologically as everything is interconnected[1]. This type of thought requires us to 'join the dots'[2], embedding and meshing together complex interdependent relationships and independent perspectives of both human and non-human things[3] as active actants of power and efficacy[4]. To adequately design for and represent the emergent complexities of AI, necessitates a break from the ethos that we, as human beings are the primary things to consider and thereby question and critically examine the limitations of

---

[1] Morton, *The Ecological Thought*.
[2] Morton, 1.
[3] Coulton and Lindley, 'More-Than Human Centred Design'.
[4] Bryant, *Onto-Cartography: An Ontology of Machines and Media*.

Human-Centered Design (HCD). This alternative design approach responds to what is currently an obscured and multiplicitous system that hinders the understanding and legibility in AI technology by users and designers alike. The emergence and proliferation of both the Internet of Things (IoT) and AI technology have brought about a complex network ecology, described as the '*electrosphere*'[5]. Therefore, expanding and unfolding contemporary ecologies of virtual and physical beings; adding a 'layer of code to much of the physical world' forming an ecology of 'Atoms and Bits' and thereupon a design challenge of ensuring user perception and legibility of the things under consideration[6].

2. A Brief AI Encounter

AI has its roots in Turing's seminal question - "Can machines think?"[7]. The field of AI has since experienced many peaks and troughs in terms of popularity and technological development. In the current era, the sociotechnical landscape has become more infused with AI, driven by the growth in the availability of large data sets, significant progress in cheap computational power and developments in data science. These advancements have permitted powerful algorithm-based technologies and methods which are dubbed AI but are implemented through Machine Learning (ML), Deep Learning and Neural Networks. AI and data collection are integral activities within the cloud-based services enabling smart thermostats, streaming services and AI assistants such as Alexa. These services facilitate detailed monitoring of users' behaviors through data, often without explicit consent or knowledge[8] - thus diminishing user agency. Furthermore, the data collected is used to train these systems, which can imbed biases

---

[5] Dunne, *Hertzian Tales: Electronic Products, Aesthetic Experience, and Critical Design*.
[6] Coulton, 'Sensing Atoms and Bits'.
[7] Turing, 'Computing Machinery and Intelligence'.
[8] Zuboff, *The Age of Surveillance Capitalism*.

that may be present in the data[9], which then appears in the subsequent predictions and decisions of these systems[10].

Natural language Processing (NLP) is the foundation of Alexa's operation and is a merger of ML and computational linguistics. NLP enables Alexa to analyze, understand and generate a response using data sent to Amazon's services for analysis. Located on the cloud, the Skill Service is coded by a developer to determine what actions to take in response to a user's request. The NLP that enables the skill is 'abstracted' from the developer, and their task is to define 'Intents' –answers expected from the user and 'Utterances' which predict the varying responses of anticipated intents. An expected intent triggers the 'intent handler' and returns a planned vocal response and output to the Echo device, which runs the program Alexa. This is by no means a comprehensive explanation of the operation of Alexa's AI, which is beyond the scope of this paper; however, it highlights why design solutions for AI legibility are required as current AI functions are often black boxed behind corporate firewalls.

Several factors further thwart an understanding of AI by users, most notably the various evolving expert definitions of AI. In particular the definitional dualism of AI; the reality of narrow AI juxtaposed with the inflated expectations of general-purpose AI, which is often presented in science-fiction as visions of sentient machines. AI based on ML exponentially expands through training data and its interrelation with thousands of weights and variables, eventually evolving beyond human intelligibility and accessibility. This opacity and subsequent lack of legibility within AI technology complicates the reality that there is no sense how or why a particular classification has been a product of the data inputs[11]. Furthermore, there are additional and distinct forms of intentional AI illegibility, which include; corporate concealment of technological property for protection, coding being a specialist skill, deliberate

[9] Amershi et al., 'ModelTracker: Redesigning Performance Analysis Tools for Machine Learning'.
[10] Angwin, et al., 'Machine Bias There's Software Used across the Country to Predict Future Criminals. And It's Biased against Blacks.'
[11] Burrell, 'How the Machine "Thinks"'.

user deception[12], products falsely advertising the technological advancements of AI[13] and lastly but not limited to, significant device activities intentionally obfuscated in the name of HCD as practiced in Human-Computer Interaction (HCI)[14]. To formulate a response to the current lack of understanding, legibility, and the increasing prevalence of AI, we turn to questions of ontology.

3. Object-Oriented Ontology towards Alien Phenomenology: The Non-Anthropocentric Turn

To develop an alternative design approach for AI, this section provides an overview of our characterization of OOO. OOO is a fledgeling philosophy which emerged from Speculative Realism - the reality outside of the mind existing independent of human experience. This is a rejection of correlationism – the view that being only exists as a correlate of the human mind[15]. Through this rejection, OOO seeks and validates the 'molten core'[16] of objects. This theoretical stance is the defining momentum for our adoption of OOO as an alternative design approach to AI, thus challenging the preconceptions of HCD. However, there are several philosophical interpretations and much debate about the nuances of OOO[17], for our purposes an object is 'any self-contained construct' be it discursive, physical, organic, technological or inorganic[18]. Despite variances in the theoretical stances, we have amalgamated OOO perspectives to formulate our understanding of OOO for design research. This may seem the undoing of any sound methodology, though as Law states 'if the world is complex and messy, then at least some of the time we're going to have to give up on simplicities'[19].

---

[12] Zuboff, *The Age of Surveillance Capitalism*.
[13] Commonly referred to as AI snake oil.
[14] Coulton and Lindley, 'More-Than Human Centred Design'.
[15] Meillassoux, *After Finitude: An Essay on the Necessity of Contingency*.
[16] Harman, *Guerrilla Metaphysics Phenomenology and the Carpentry of Things*, 254.
[17] Harman, 'Object-Oriented Ontology'.
[18] Bryant, *Onto-Cartography: An Ontology of Machines and Media*.
[19] Law, *After Method: Mess in Social Science Research*, 2.

OOO is constructed with and from the notion of phenomenology, particularly in challenging Heidegger's theory from *Being and Time* (1927) that 'things' or objects only make sense related to their purpose and human use. Harman's counterpoint to this is that things are not defined through human use alone but through any use, including object to object situations. The OOO fulcrum is that all things are equal in existence. A flat ontology or tiny ontology[20] recognizes the existence of everything where humans are not the monarchs of being[21] but do exist in the interconnectedness '*mesh*' of all living and non-living things[22].

With an understanding of OOO's uncustomary ontological positioning, we can start to theorize how non-human entities experience the world around them, to offer a non-anthropocentric perspective for designing solutions for AI legibility.

4. Alien Phenomenology

The philosopher-programmer Bogost introduced the theory of Alien Phenomenology (AP) or what's it like to be a thing[23], to represent his OOO thinking, expanding traditional phenomenology to investigate non-human ways of encountering the world. This practice is comparative to other exploratory methods of experience such as Second Order – to observe how the world is presented to another thing[24], and Ethology with Uexküll's theory of Umwelt - seeking to observe the world as experienced by animals[25]. However, as AP stems from the board church of OOO, the practice has the opportunity to explore any being from trees, bits, atoms, games, institutions and how they encounter the worlds about them[26]. For this reason, it can be argued that OOO is 'rated high' in a taxonomy of non-anthropocentric theories as its

[20] Bogost, *Alien Phenomenology, or, What It's like to Be a Thing*, 19–22.
[21] Bryant, *The Democracy of Objects*.
[22] Morton, *The Ecological Thought*, 28.
[23] Bogost, *Alien Phenomenology, or, What It's like to Be a Thing*.
[24] Luhmann, *Social Systems*.
[25] Uexküll, *A Foray into the Worlds of Animals and Humans: With A Theory of Meaning*.
[26] Bryant, *Onto-Cartography: An Ontology of Machines and Media*, 62–74.

viewpoint is all-encompassing, encouraging experimentation and appropriation with the ability to nest other theories without undermining either position[27].

Nevertheless, being presented with the idea of attempting to understand what it is like to be an AI, in our case Alexa, will be met with objection similar to Nagel's stance; that we cannot know the 'subjective character of experience' for a thing[28]. Bogost's AP accepts that the experience of a thing can never be fully known rather; the only way to perform AP is via analogy; for example, the bat can be considered to operate like a submarine[29]. For Bryant, he expands upon this idea towards making an *inference* about what 'flows' a thing is structurally open to, with our knowledge of 'flows' growing daily with the invention of instruments to detect flows invisible to us such ultraviolet, radiation[30] and WIFI receivers. AP goes a step beyond the epistemic closure of human aims to investigate the aims, if any, of non-human things. Though it is not a call in denying our own aims and goals, as ultimately, by adopting AP our aim is to design the best results for humans using AI technology. To change the influence and interactions we have with AI, AP can provide an alternative perspective of how things encounter the world to devise strategies and design leverages within and in the remit of the thing in question. The call to action, once we have practiced AP, is how do we map a thing's world?

5. Constellations with a side of Onto-Cartography

Bogost encourages us to 'understand objects by tracing their impacts on the surrounding ether'[31]. To trace objects and their ecological relations using OOO has previously been framed metaphorically for designers using the concept of 'constellations' for considering contexts like

[27] Coulton and Lindley, 'More-Than Human Centred Design'.
[28] Nagel, 'What Is It Like to Be a Bat?'
[29] Bogost, *Alien Phenomenology, or, What It's like to Be a Thing*, 64.
[30] Bryant, *Onto-Cartography: An Ontology of Machines and Media*.
[31] Bogost, *Alien Phenomenology, or, What It's like to Be a Thing*, 33.

the IoT[32] and AI[33]. Metaphorical terms are commonly used to evoke the 'shapeless and faceless, everywhere and nowhere'[34] of things like AI[35] and the IoT[36] in design, which is also emulated in Bogost's thesis of AP. The metaphor 'constellation' originated from the notion 'ideas are to objects as constellation are to stars'[37], describing how the perspective of things changes depending on the observer's perspective, magnifying and changing scope dependent on influences such as culture and awareness. Individual aspects of constellations can be out of view, such as a 3rd parties influence on data collection. Just because one cannot see a thing does not mean it has a significant impact on another thing's operation. Aperture and depth of field for constellations can be modified to include objects that are of importance for any context or situation. Though, in practice context specific perspectives are the focus in constellations to remain a beneficial insight for design purposes[38].

Constellations can be considered a form of Onto-Cartography, developed in Bryant's homonymous thesis where the practice attempts to map the way assemblages, and relations of and between things organize social relations or ecologies. In other words, onto-cartography highlights power structures, functions and derived formations, to provide an ontological framework to consider political and ethical questions. Without attentiveness to these things, we are unable to consider the manifestations of things and interactions within a constellation thoroughly.

In summary, by observing an AI constellation (Figure 01), designers can speculate different interactions required to make Alex's operations more apparent, such as notification of personal user data monitoring. The role of OOO through the scope of constellations brings forth multiple

[32] Coulton and Lindley, 'More-Than Human Centred Design'.

[33] Pilling and Coulton, 'What's It like to Be Alexa? An Exploration of Artificial Intelligence as a Material for Design.'

[34] Pierce and DiSalvo, 'Dark Clouds, Io&#!+, and [Crystal Ball Emoji]'.

[35] Dove and Fayard, 'Monsters, Metaphors, and Machine Learning'.

[36] Cila et al., 'Products as Agents'.

[37] Benjamin, *The Arcades Project*, 34.

[38] Coulton and Lindley, 'More-Than Human Centred Design'.

perspectives and power structures to highlight the interdependent relationships and independent perspectives within the Alexa assemblage.
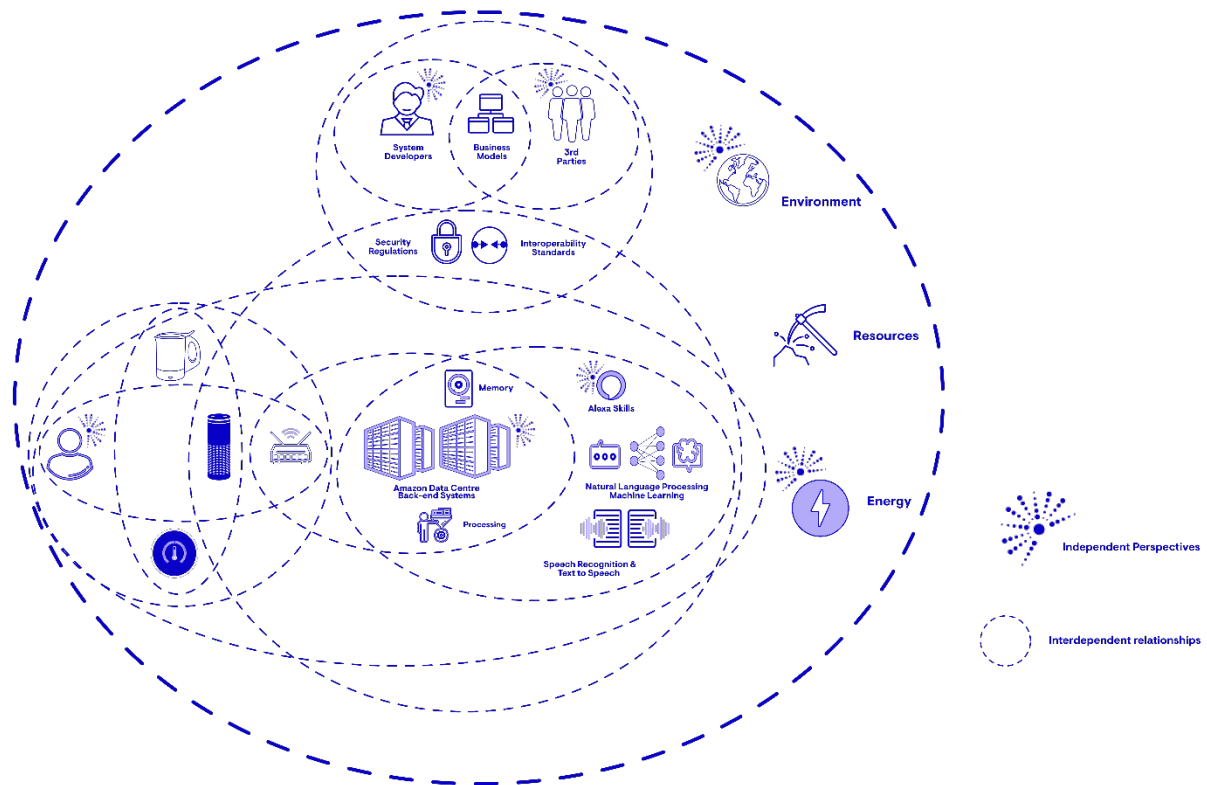

Figure 01. An example of the many possible Alexa constellations noting some of the possible Independent perspectives and interdependent relationships. Image by the author Franziska Pilling.

6. Carpentry: Revealing the Phenomenology of Things through Design Fiction

Another of Bogost's neologisms is Carpentry – the 'making of things that explain how things make their world'[39]. A practical philosophical method to reveal the phenomenology of things. An intuitive method for design given its tangible, hands-on approach to a problem. Carpentry fabricates artifacts as a 'mediator'[40] between things to expose the thing's ontology. For example, software can be 'hacked' into and code written to expose the unit operations or being of that software.

---

[39] Bogost, *Alien Phenomenology, or, What It's like to Be a Thing*, 93.
[40] Harman, *Guerrilla Metaphysics Phenomenology and the Carpentry of Things*.

A tool to hand, for Carpentry to be enacted, is the practice of Design Fiction (DF), defined by design theorist and science-fiction writer Sterling as 'the deliberate use of diegetic prototypes to suspend disbelief about change'[41]. There are many interpretations of what and how to practice DF. The one we adopt is DF as World Building – 'a collection of artefacts, that when viewed together build a fictional world'[42], or in this case, an ontological sandbox. Here we also view DF as a type of engine to kindle a speculative reality to perform Carpentry on Alexa's skill service, our appropriated *Diegetic Thing*.

The constellation (Figure 01) was an important means of identifying the relevant actants and focal points from which to consider the material relations, their potential impact and gather intel for an accurate representation of Alexa's operations for our DF. Such as the Amazons Web Services (data centers), back-end AI services such as Automatic Speech Recognition, the existence of various provider's business models. The constellation also provided the means to highlight the unknown ambiguous qualities of things, that is unlikely to be established or solutions that would provide greater legibility and agency for the user. In a generative manner, the process of mapping the constellation catalyzed the idea to appropriate the skills function and utilize the already established voice interaction. Thereby facilitating the speculative application of communicating salient and consequential information to the user. An act recognized through OOO of balancing the practical constraints against possible 'better' design choices[43].

From the overview of the constellation, we were able to progress our DF world by devising entry points utilizing an advertisement campaign and how-to manual for the Alexa skill (Figure 02) providing a palpable means to explore and attempt to answer the question – if it were possible to conserve with Alexa's being what would it say about it's ontology?

[41] Bosch, 'Sci-Fi Writer Bruce Sterling Explains the Intriguing New Concept of Design Fiction'.
[42] Coulton, Sturdee, and Stead, 'Design Fiction as World Building'.
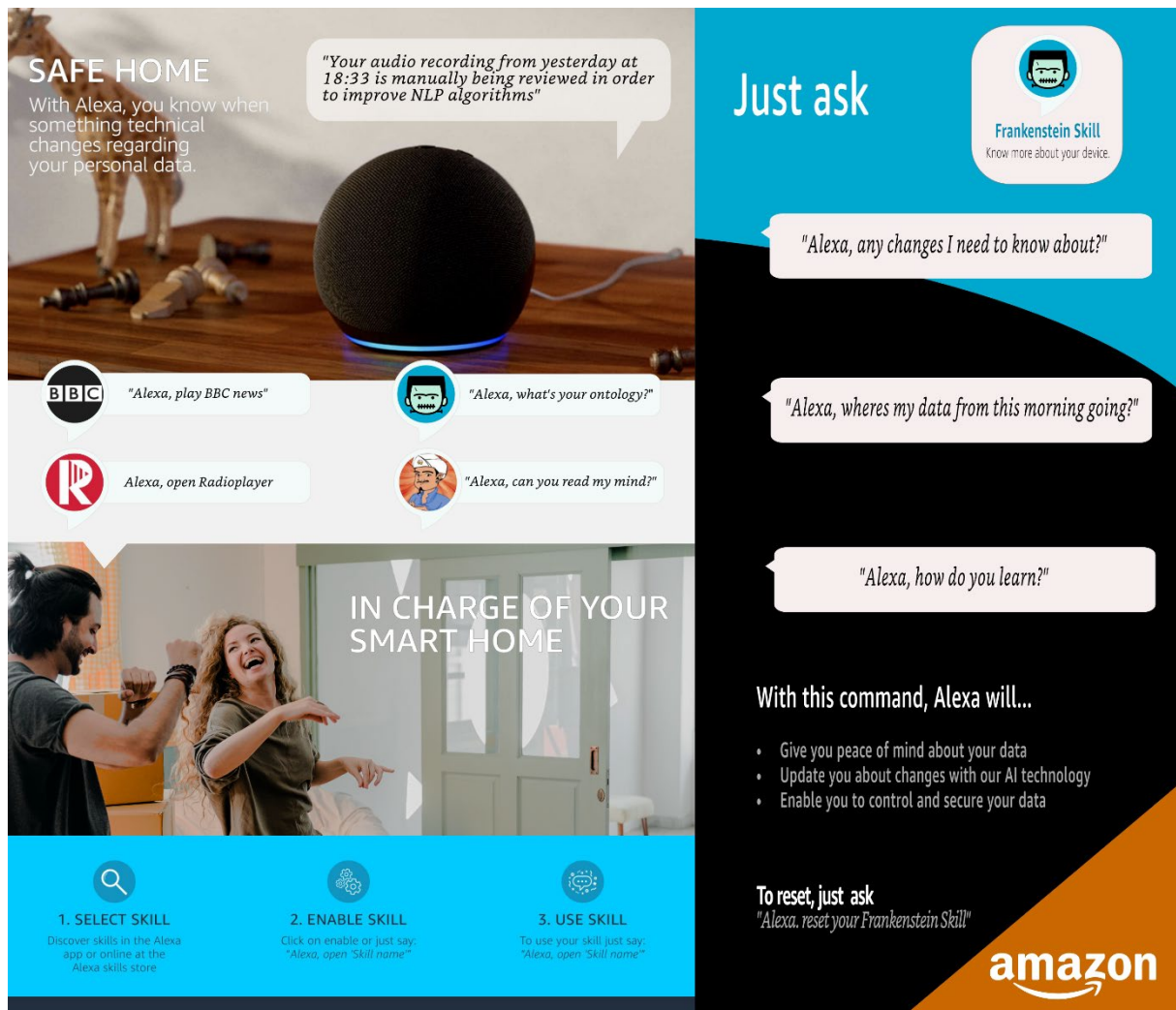[43] Lindley, Akmal, and Coulton, 'Design Research and Object-Oriented Ontology'.

Figure 02. A Diegetic Thing, working on multiple levels, from the world building of a mundane lived experience to a platform for speculative ontological Carpentry, providing a theoretical solution within itself for AI legibility. Image by the author Franziska Pilling.

The figure represented here are entry points into this speculative world where the 'Alexa Frankenstein Skill' has been developed with the logic that Alexa would state its own ontological status via its own skills service, based on its evolving AI functions and operations resulting in legible AI. This DF enables us to speculate how it could be conceivable to implement interactions for legible AI, thereby resulting in more ethical and trustworthy AI operations while also highlighting what is presently missing from current AI-infused products. By reflecting on the initial constellation and the DF together, designers can further speculate what actants would need to evolve, or power structures be revised to encourage enhanced user agency. Furthermore, the application of world building offers a speculative, yet uncannily

tangible platform to consider the ontology of Alexa via Carpentry, thereby permitting a more-than human perspective of the thing in question, and an alternative insight towards possible solutions beyond the usual scope or rhetoric.

7. Conclusion and Future Research

This research paper is a starting point of a larger body of research, concerned with developing AI as a material for design. This paper uses OOO philosophy as a methodology to explore how design research can achieve a tangible, albeit uncustomary, perspective of AI. While it is noted that the DF has the opportunity to expand and develop, it is presented here as a means of highlighting that OOO can be a generative method and ideation tool by which to fabricate original ideas pertaining to the complex and obscured nature of AI. The facilitation of OOO provides a contemporary method of bypassing the dogmatic allegiance to the primacy of human perspectives in HCD and moves towards a more open and sympathetic view of all actants in a given context or ecology. We focused on the current lack of AI legibility; a culmination of varied motives, as noted in this paper, where designers have the freedom to adopt alternative design approaches to provide solutions to contest the opaque nature of AI. The use of OOO in design provides the means of making the intangible and complex qualities of AI and data into materials to design with while providing generative and analytical tools to design for non-human things. To respond to this challenge design and its metaphors need to evolve and keep pace with the rapidly evolving sociotechnical landscape - the adoption of OOO and alternative theories in design is an accessible way to accomplish this.

Bibliography

Amershi, Saleema, Max Chickering, Steven M. Drucker, Bongshin Lee, Patrice Simard, and Jina Suh. 'ModelTracker: Redesigning Performance Analysis Tools for Machine Learning'. In *CHI '15: Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, 337–346. Seoul, Korea, 2015. https://doi.org///doi.org/10.1145/2702123.2702509.

Angwin, Julia, Jeff Larson, Surya Mattu, and Lauren Kirchner. 'Machine Bias There's Software Used across the Country to Predict Future Criminals. And It's Biased against Blacks.' ProPublica, 2016. https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing.

Benjamin, Walter. *The Arcades Project*. Translated by Howard Eiland and Kevin McLaughlin. Cambridge, MA and London: Harvard University Press,1982.

Bogost, Ian. *Alien Phenomenology, or, What It's like to Be a Thing*. Posthumanities 20. Minneapolis: University of Minnesota Press, 2012.

Bosch, Torie. 'Sci-Fi Writer Bruce Sterling Explains the Intriguing New Concept of Design Fiction'. *Slate*, 2012, 5.

Bryant, Levi R. *Onto-Cartography: An Ontology of Machines and Media*. Edinburgh University Press, 2014.

———. *The Democracy of Objects*. 1. ed. New Metaphysics. Ann Arbor, Mich: Open Humanities Press, 2011.

Burrell, Jenna. 'How the Machine "Thinks": Understanding Opacity in Machine Learning Algorithms'. *Big Data & Society* 3, no. 1 (5 January 2016): 205395171562251. https://doi.org/10.1177/2053951715622512.

Cila, Nazli, Iskander Smit, Elisa Giaccardi, and Ben Kröse. 'Products as Agents: Metaphors for Designing the Products of the IoT Age'. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*, 448–59. Denver Colorado USA: ACM, 2017. https://doi.org/10.1145/3025453.3025797.

Coulton, Paul. 'Sensing Atoms and Bits'. In *Sensory Arts and Design*. Bloomsbury, London, 2017.

Coulton, Paul, and Joseph Galen Lindley. 'More-Than Human Centred Design: Considering Other Things'. *The Design Journal* 22, no. 4 (4 July 2019): 463–81. https://doi.org/10.1080/14606925.2019.1614320.

Coulton, Paul, Miriam Sturdee, and Mike Stead. 'Design Fiction as World Building', 2019, 4230036 Bytes. https://doi.org/10.6084/M9.FIGSHARE.4746964.

Dove, Graham, and Anne-Laure Fayard. 'Monsters, Metaphors, and Machine Learning', 2020, 17.

Dunne, Anthony. *Hertzian Tales: Electronic Products, Aesthetic Experience, and Critical Design*. Cambridge: MIT press, 2005.

Harman, Graham. *Guerrilla Metaphysics Phenomenology and the Carpentry of Things*. Open Court, 2011.

———. 'Object-Oriented Ontology'. In *The Palgrave Handbook of Posthumanism in Film and Television*, edited by Michael Hauskeller, Thomas D. Philbeck, and Curtis D. Carbonell, 401–409. London: Palgrave Macmillan, n.d. https://doi.org/10.1057/978113743.

Law, John. *After Method: Mess in Social Science Research*. London: Routledge, 2004.

Lindley, Joseph, Haider Ali Akmal, and Paul Coulton. 'Design Research and Object-Oriented Ontology'. *Open Philosophy* 3, no. 1 (24 January 2020): 11–41.

Luhmann, Niklas. *Social Systems*. Translated by John Bednarz and Dirk Baecker. Stamford, California: Stamford University Press, 1995.

Meillassoux, Quentin. *After Finitude: An Essay on the Necessity of Contingency*. London: Continuum Books, 2008.

Morton, Timothy. *The Ecological Thought*. Harvard University Press, 2010.

Nagel, Thomas. 'What Is It Like to Be a Bat?' *The Philosophical Review* 83, no. 4 (October 1974): 435–50.

Pierce, James, and Carl DiSalvo. 'Dark Clouds, Io&#!+, and [Crystal Ball Emoji]: Projecting Network Anxieties with Alternative Design Metaphors'. In *Proceedings of the 2017 Conference on Designing Interactive Systems*, 1383–93. Edinburgh United Kingdom: ACM, 2017. https://doi.org/10.1145/3064663.3064795.

Pilling, Franziska, and Paul Coulton. 'What's It like to Be Alexa? An Exploration of Artificial Intelligence as a Material for Design.' *In Proceedings of Design Research Society Conference 2020*, 2020. https://doi.org/doi: https://doi.org/10.21606/drs.2020.218.

Turing, Alan. 'Computing Machinery and Intelligence'. *Mind* 236 (October 1950): 433–60.

Uexküll, Jakob von. *A Foray into the Worlds of Animals and Humans: With A Theory of Meaning*. Translated by Joseph O'Neil. Minneapolis: University of Minnesota Press, 2010.

Zuboff, Shoshana. *The Age of Surveillance Capitalism*. London: Profile Books Ltd, 2019.