CHIMERAS

Inventory of Synthetic Cognition

Edited by:
Ilan Manouach
& Anna Engelhardt

ONASSIS
FOUNDATION

CHIMERAS

Inventory of Synthetic Cognition

Edited by
Ilan Manouach & Anna Engelhardt

ONASSIS
FOUNDATION

Synthesizing the Synthetic
(or why an AI dictionary just wouldn't do the job)

by Prodromos Tsiavos
Head of Digital Development and Innovation, Onassis Group

How can we meaningfully speak about a family of technologies that is becoming so prevalent that we can hardly notice it anymore? Artificial Intelligence —for the lack of a better and commonly accepted term— has followed a path not unfamiliar to other technologies that have come to dominate the substrata of our existence. Similarly to the internet[1] and even software[2] before it, AI is sliding from potentiality to actuality; it gradually disappears into the backstage of history in the making; it becomes invisible only to become invincible: as it ceases to be contested ground, it becomes a fact of life.

This act of eloquent disappearance is a moment of constitutional dimensions. It signifies the process of assimilation of human and post-human subjectivities, while masking the omnivorous nature of the resulting imbroglio. In a queer fashion, it both questions and expands our understanding of key human characteristics and institutions. As the editors of the volume, Ilan Manouach and Anna Engelhardt, notice, even the term "Artificial Intelligence" is problematic, implying a dichotomy between humans and non-humans that does not really exist: we need to move beyond the term Artificial that implies authenticity and a lurking human subjectivity; we feel the almost moral drive to develop a new vocabulary inspired not by species antithesis but by neo-poietic synthesis. We need to cease talking about Artificial Intelligence and initiate the discourse of Synthetic Cognition.

However, as we move beyond the existential safety and stability of the first order cybernetics model of input-processing-output to the mercurial land of self-producing autopoiesis, we cannot avoid carrying our "humanesque" luggage with us: we still worry about our kin, wonder how our democratic institutions will be transformed, think in terms of cathedrals, mosques, and bazaars, are driven by desire, seek pleasure and avoid pain.

In other words we are still trapped in our mortal bodies and human-centric institutions. It is true that our digital networks and their collective and sometimes extra-human cognition draw us away from our limited human subjectivities.[3] However, this is still a time of transition.

And that is why this volume is so important.

It captures the birth and evolution of a discourse related to AI —or rather to Synthetic Cognition— that is preoccupied both with the world that was and the world to be; a boundary object[4] seeking its time and place. More than a hundred authors and artists provide short essays and artworks that reflect the multifaceted and mercurial nature of the effects of Synthetic Cognition. This inventory of ideas, people, conflicts, and dreams is taking stock of where we stand and who we are: as we talk about AI, we essentially talk about ourselves and our post-species future.

Onassis Foundation is an organization devoted to the instigation of unexpected encounters; to the initiation of discussions about things that matter; to the exploration of the boundaries and effects of innovation and disruption; to fostering thinking that can change lives.

Chimeras. Inventory of Synthetic Cognition, is a volume Onassis Foundation has chosen to publish because it highlights the current state of thinking in relation to a fundamental shift that defies the micro-macro division. As the boundaries of human subjectivity are expanded and merged with the otherness of algorithmic entities, we are in dire need of a new epistemology and ontology of the human and the post-human; at the same time, we need to encourage the emergence of and actively participate in the discussions seeking to contest and explore our collective institutions: how and with whom are we deciding and designing our future?

In this search we commissioned a dictionary-like volume that would not be exhaustive, yet would be substantial. We sought texts of limited length that correspond to the attention span patterns of an online user, and a series of artworks that could provide a swift-but-not-shallow look into the world of Synthetic Cognition. The volume editors thus created an inventory of an otherworldly reality that is already with us.

In answering the dilemma of whether Onassis Foundation should introduce its audience to concepts from AI in the form of a basic dictionary of key terms for beginners or as a list —literally an inventory— of notions that critically touch upon existential issues, our choice was straight-forward:

We exist as a foundation to bring forward the unexpected; to create space for the other; to practice queer innovation and disruption; to make the silent heard; to allow desire to be heard; to take a stand.

1. Hito Steyerl, “Too Much World: Is the Internet Dead?.” *e-flux Journal* 49, November, 2013.

2. Marc Andreessen, “Why Software Is Eating The World.” *WSJ*, August 20, 2011.

3. Shoshana Zuboff, “Big Other: Surveillance Capitalism and the Prospects of an Information Civilization.” *Journal of Information Technology* 30, no. 1 (March 2015): 75–89.

4. Susan Leigh Star and James R. Griesemer, “Institutional Ecology, ‘Translations’ and Boundary Objects: Amateurs and Professionals in Berkeley’s Museum of Vertebrate Zoology, 1907-39.” *Social Studies of Science* 19, no. 3 (1989): 387–420.

Preface

by Anna Engelhardt & Ilan Manouach

This volume attempts to disassemble and reformulate what one might understand as AI by taking apart notions of both "artificiality" and "intelligence." In the title we summon the trickster of the natural order, the chimera, both mythical creature and genetic phenomenon. Drawing upon chimerism allows us to broaden the concept of "artificial intelligence" into "synthetic cognition" — an approach that highlights the duality of "artificial" and "authentic," amplifies non-human methods of cognition, and anticipates modes of symbiosis between imposed dichotomies. We've assembled this inventory to accommodate scholars and artists who use various frameworks, their methodologies ranging from interspecies, disability, and monstrous, to feminist, decolonial, and more. Contributions also come from thinkers and technologists engaged in the broader field of AI. This multitude of perspectives resists epistemic classifications and reflects the ongoing fragmentation of taxonomies now characterizing our computational age. By questioning fabricated norms that constitute and maintain notions of "artificial" and "intelligence," this inventory acts as a toolbox for merging the terms within it into novel chimeras themselves.

In Greek mythology a chimera is a conspicuously fractured female monster, a lioness with a separate goat head stitched to her back and a snake for a tail. In genetics, a chimera is similarly defined as an organism whose disparate parts remain partially autonomous, resisting totalization into a whole. The bodies of such living creatures are composed of cells from two or more distinct genotypes which do not dissolve into one another, so they retain hybridity. The chimerism of the deep-sea anglerfish provides an elucidating example for exploring the eerie qualities of the patchwork that chimeras embody. Anglers reproduce by fusion, with up to eight males attaching to one female as their host and melding their skin to form a single organism. Connected at a blood-vessel level, they retain partial autonomy to constitute a synthetic intersex body. Chimeras are *synthetic*—i.e., produced through synthesis, a combination of parts forming a unified entity—rather than *artificial*— a copy from the authentic model defined by its opposition to the original. Their unique nature positions chimeras in radical opposition to an imitation or a fake. Even though the terms “synthetic” and “artificial” are casually used interchangeably, there is a difference in the precise ways they refer to “unnatural” or “manufactured” phenomena. The composite hybridity within chimeras makes that difference evident.

By subverting what one might consider natural, chimerism allows us to disentangle the “artificial” in artificial intelligence, and bring forward the notion of “synthetic.” Synthetic intelligence already exists as a term coined by philosopher John Haugeland in 1985. Haugeland proposed that machines do not have to mimic and simulate human abilities, questioning the secondary role implied by “artificial” which consolidates their inferiority to humans. To subvert the secondary role assigned to machines, Haugeland conceived that “synthetic intelligence” does not have to use the human mind as a reference point. In *Chimeras. Inventory of Synthetic Cognition* we would like to propose that the “synthetic” within chimerism is different from “synthetic intelligence” as it shows that the tension between “artificial” and “authentic” is not confined to hierarchy between humans and machines. As most forms of intelligence have been coded as being secondary or counterfeit by Western science throughout its history, the chimeric synthesis resists the assumption that an "artificial" vs "authentic" split lies merely between humans and machines. It challenges who, how, and what has been categorized and coded as "artificial" or "authentic", revealing the much more limited nature of "authentic" knowledge production systems. The "synthetic" of chimerism shows that "artificial" intelligence encompasses both humans and non-humans, welcoming the synthetic nature of intelligence itself.

To accommodate the synthetic qualities of intelligence, we must also reconsider what "intelligence" in "artificial intelligence" stands for. One cannot gather the diversity of information processing and decision-making of machinic and biological entities, including chimeras, under the notion of intelligence. Rather than trying to broaden the category of "intelligence," introduced to amplify our fascination with the complexity of the human mind, one can switch to considering the term "cognition" in its "behavioural diversity" as understood by Chilean biologists Humberto Maturana and Francisco Varela. In their book *Autopoiesis and Cognition* (1972), which was foundational for second-order cybernetics (the reflexive application of cybernetics to itself), they analyze "cognition" as closely connected to "autopoiesis." They coin autopoiesis as the ability of living organisms to maintain and regulate their composition and define their boundaries; a capacity of systems that arises spontaneously from independent but interrelated components and processes. This implies that the isolated properties of individual elements do not determine living systems. Instead, these networks, both living and non-living, are made up of distributed elements. Autopoiesis brings forward a new notion of cognition as embodied by the diversity of behaviours these systems perform. Accordingly, we define chimeric cognition as distributed and materialized in all their partially autonomous limbs and heads, alien to the standards of high-level thinking processes. This heterogeneous nature of chimeric cognition, enabled by coexisting heads and bodies that do not replace each other, seems to present a cautious potential towards symbiotic synthesis.

Haugeland, John. *Artificial Intelligence : The Very Idea.* Cambridge, MA : MIT Press, 1989.

Maturana, Humberto and Varela, Francisco. *Autopoiesis and Cognition : The Realization of the Living.* New York : Springer Science + Business Media, 1991.

Table of Contents

OZERKI — **Gena Marvin**

Ballad to Detritus — **The Mycological Twist**

machines_conversing.092y
— **Sadie-Mae Arellano AKA ex.icon**

RE-ANIMATED — **Jakob Kudsk Steensen**

Polymerized cybernetic plant (PCP)
— **Anastasia Kizilova**

Premium Connect (Real Deal)
— **Tabita Rezaire**

Secret Garden — **Stephanie Dinkins**

Almanak — **Natasha Tontey**

Eye-Planet (Long Live Trans-Pakistan)
— **Umber Majeed**

Untitled — **Pete Sharp**

Obsology — **Fragmentin**

The mother of Internet — **Botond Keresztesi**

The Second Shift — **Felicity Hammond**

The Gut is a Second Brain
— **Ayatgali Tuleubek**

HOMESCHOOL
— **Simone C. Niquille/Technoflesh**

Overlooking/Overhearing:
SSCI_180509_0930_Hart_216.mp4
— **Abram Stern**

Radicalization Pipeline — **Theo Triantafyllidis**

Scammers — **PWR**

Only An Animal Would Say What It Really Means — **Porpentine Charity Heartscape**

LENNA — **zzyw**

Outsourcing paradise/parasite — **eeeffff**

Dysfunctional Magpie — **Natalia Janula**

Stay v2.0 — **Hasan Elahi**

The Neural Yorker
— **Ilan Manouach & Yannis Siglidis**

Wind Verification — **Guo Cheng**

Ashley Madison Angels at Work in Berlin
— **!Mediengruppe Bitnik**

3D Printed Training Data — **Adam Harvey**

prototype0012: mechanical angel
— **00Zhang**

ALL REALITY IS VIRTUAL
— **Bianka Oravecz**

Oniric Ditto — **Nina Muro**

Bionic Nr.5 — **Miró Ingmar Tiebe**

Who is Baby — **Alejandra Muñoz**

TRÓPICO — **Gabriel Massan**

Inventory

I.

Cognitive Assemblages,
Machine Perception,
Technogenesis,
Noodiversity,
Cambridge Declaration
on Consciousness,
Reptile Brain,
Swarm Intelligence,
Blue Brain Project,

Anthropomorphic
Attachments,
Hybrid Agency,
Abductive Reasoning,
Non-synthesis,
Artificial Ignorance!,
Natural Intelligence,
Learners,
Noosphere,
Machine Philosophy,
Intelligence,
Midinformation,
Natural Stupidity.

Cognitive Assemblages

by Özgün Eylül İşcen

The term cognitive assemblages responds to the shifting registers of cognition, agency, and control with the rise of hybrid human-machine intelligent systems. Nick Srnicek (2014) coins the term to identify the collective and distributed nature of knowledge production via the spread of big data, computer modeling, and data analytics used in domains like climate science or the financial market. Thus, cognitive assemblages reshape perceptual and behavioral capacities available to the political actors within these domains, including the very perception of the global or planetary. Katherine Hayles (2017) elaborates on "nonconscious cognitive assemblages" to underscore the systemic effect of cognition and decision-making distributed across human and technical systems while highlighting their flexible and adaptive nature. To this end she draws upon multidisciplinary literature on nonconscious cognition, constitutive of but inaccessible to consciousness, which plays a crucial role in information processing, such as filtering data, recognizing patterns, and drawing inferences. For instance, Hayles discusses the Automated Traffic Surveillance and Control system in Los Angeles where sensors, smartphones, algorithms, databases, storage media, vehicle drivers, and workers building and maintaining technical operations constitute complex and dynamic human-technical interactions. Accordingly, Hayles proposes a model of "planetary cognitive ecology" that applies to both technical systems and biological life forms. Hayles engages with new materialism (e.g., Bennett, Grosz) and network/assemblage-based theoretical frameworks (e.g., Latour, Deleuze and Guattari) to attend to the material affordances and affective intensities that decentralize the self-contained rationality and subjectivity of modern liberal thought. Yet, cognitive assemblages are distinct in the sense that their transformative capacities are enabled and extended by the flows of information that "human and technical cognizers" create, modify, and interpret by connecting them with meaning. Indeed, Hayles' posthumanist framework highlights rather than dismisses the altered role of human consciousness, labor, and ethical responsibility in shaping the trajectories of increasingly dispersed autonomous technical systems, such as the prospected swarm behavior of militarized drone attacks. Therefore, it is necessary to unpack how power is exercised, expanded, and negotiated across cognitive assemblages, underscoring their inherently political nature. For instance, surveillance technologies like drones manifest racial violence and injustice implicated in their development and use. Ultimately, the term indicates an ongoing inquiry into what kinds of conceptual and artistic frameworks are needed to address the implications of our involvement in the human-technical systems that have become so pervasive and integral to contemporary global capitalism.

Hayles, N. Katherine. *Unthought: The Power of the Cognitive Non-Conscious.* Chicago: University of Chicago Press, 2017.

Srnicek, Nick. "Cognitive Assemblages and the Production of Knowledge," in *Reassembling International Theory: Assemblage Thinking and International Relations*, edited by Michele Acuto & Simon Curtis. London: Palgrave Pivot, 2014. 40-47. https://doi.org/10.1057/9781137383969_5.

Machine Perception

by Joanna Zylinska

Teaching computers how to see is an important part of AI research. In recent years many scientists have moved beyond the ocularcentrism of machine vision by extending the study of machines' data capture operations to other senses, such as hearing, touch and olfaction. Expanding their data sources from still images to sound, music and video, Google is now using the term "machine perception" in lieu of "machine vision". Yet its perceptive operations are still premised on object recognition, which involves algorithms trained on processing large, partially-labelled datasets using parallel computing clusters. Google's notion of "machine perception" encompasses a wider set of sensory data, yet it retains the sense of predefined objects to be sensed, with their corresponding categories. However, "machine perception" can be used in a broader sense, as a thought-device aimed at challenging the foundational myths of computer vision: the belief that vision is multi-layered and hierarchical, that it is possible to extricate vision's essence, that the mechanism of edge perception is what lies at its core, that it is physiological and content-independent, and that machines can be taught to see "like humans" by mimicking the process of pattern perception at the level of pixels. The concept can also raise questions for the postulation of a discrete physiological unity called "the brain" as the core organ of perception — and thus for modelling machine vision on human cortical processes. Cognitive scientist J.Y. Lettvin et al.'s 1959 paper "What the Frog's Eye Tells the Frog's Brain" demonstrated that perceptive activity that was assumed to take place in the brain as a consequence of the retina being stimulated by light had in fact already begun in the eye. The exact location of perceptive processes and the exact working of their operative mechanisms remain difficult to pin down, not just in frogs but also in humans. The concept of machine perception thus complicates the model of vision as simply representational — and offers a different way of understanding what it might mean for machines to see. It also postulates that perception occurs in the world as much as it does in the eye or the brain.

This repositioning calls for a more embedded, embodied and dynamic understanding of how computers (and, indeed, humans) see the world—and of how they act in it.

Technogenesis

by Jamie Allen

At the heart of the everyday way in which we think and speak about what it is to be human is a false dichotomy. It is customary to hear people speak of the difference, or even antagonism, between "technology" and "the human", as if the former were a sentient force, on its way to encroaching upon more and more aspects and characteristics of the latter. Some of the more sensitive and reasoned strands of post-humanism, from Gilbert Simondon to Michel Serres to Donna Haraway to Sadie Plant and beyond, have pointed out and attempted to revise this false dichotomy. In its place, we might orient activities and energies toward more auspiciously open relationships to those modes of existence we call materiality, machines, electronics, and computation. These form part of our extended cognition, our birthright as homo sapiens, and are part of what co-constitutes reality *as we know it*. "It is completely artificial to ask, what is the relationship of the human to technics? Because the human is technics," just as it is "impossible to understand the ant without the anthill," writes Bernhard Stiegler.

In this frame, we see how there are many intuitive ways in which we already know intelligence to have in part *always already been* artificial. The material extensions of our genetic and neural processing, from eyeglasses to supercomputers, pay witness to the complexifying, support, and rerouting of human thinking, memory, communication, emotion, and attention—an extended physiology of human understanding. Technogenesis refers to the ways in which human intelligence, as a species, is and has forever been co-constituted by its co-evolution with tools and technologies, the neocortex extended by our bodies in constant contact with a material and technological milieu, subjectivity contaminated from the outset by the outside.

The question of computational artificial intelligence can, as such, be recast as a transhistorical problem, asking, perhaps, why we should be so particularly concerned with or by the Von Neumann architectures and algorithmic instantiations characterized by contemporary discussions

of "AI". What might we be missing here; what ecologies of thought are being rendered extinct? What other intelligences are discounted by the silicon-mind? The provocation of AI, in its mainstream guises, could rather be a provocation that provokes a sensitivity to alternative intelligences, humbling programmes of progressivist technical arrogance, modulating extractive and xenophobic AIs that extend only anthropocentric, white, male rationalist enlightenment. Might we then arrive at a more measured, inclusive, and productively promiscuous characterization of intelligence?
As Serres has written, "If winds, currents, glaciers, volcanoes, etc., carry subtle messages that are so difficult to read that it takes us absolutely ages trying to decipher them, wouldn't it be more appropriate to call them intelligent? How would it be if it turned out that we were only the slowest and least intelligent beings in the world?"

Noodiversity

by Oana Pârvan

Noodiversity (from the ancient Greek *νόος*, "mind") is a concept emerging in philosophy of technology, often read as inextricably tied to technodiversity. On the model of biodiversity, noodiversity refers to negentropic processes of thinking and takes inspiration from the work of Erwin Schrödinger, who points to the centrality of mutation in the constitution of life. It is a call for the incalculable, improbable and essentially irreducible heterogeneity of reason and understanding. In fact, with platform capitalism's accelerated alignment between exosomatic and exomnesic technologies, reason is reduced to calculation (of utility, value, advantage); logos is reduced to ratio. The Anthropocene represents that same disastrous tendency, which impacts the biosphere by quantifying it in terms of resources and eliminating its diversity. Against this apparently unavoidable trend intended as entropy, Bernard Stiegler theorizes noodiversity as the possibility for variability that might prevent the contemporary technosphere from destroying the biosphere, as a refusal of the hegemony of probability calculation and the possibility of a mutation, flaw or default able to lead to inventions beyond the paradigm of mere calculation for purposes of extraction (Stiegler 2020).

The entropy installed with the Anthropocene leads to generalized proletarianization in the sense of the process of deprivation of knowledge. This accelerated standardization and reduction of all knowledge to calculation of profit for platform capitalism threatens the diversity of reason intended as the condition for any neganthropological bifurcation, namely the deviation from the Anthropocene. In this sense, future must focus on de-proletarianization and re-noetization thanks to a contributory economy. The cultivation of noodiversity should also occur through attention to social diversity and its noetic heritage: languages, archives, works, forms of knowledge. Noodiversity doesn't imply an anti-calculative attitude to knowledge, but rather a refusal to reduce all knowledge to the calculable information instrumental to platform capitalism.

With a philosophical DNA influenced by Plato, Karl Marx, Erwin Schrödinger and Immanuel Kant, the faculty of reason that noodiversity ultimately calls for is that of the Whiteheadian "disciplined counter-agency which saves the world," by opening up improbable bifurcations generative of negentropic futures (Stiegler 2018, 30).

For Yuk Hui, noo- or technodiversity relates to inventions and usages inspired by non-hegemonic ontologies and epistemologies, such as the Polynesian gift economy, as opposed to the development of Western capitalism (Hui 2019).

Hui, Yuk. *Recursivity and Contingency.* London, New York: Rowman & Littlefield International, 2019.

Stiegler, Bernard. *The Neganthropocene.* London: Open Humanities Press, 2018.

Stiegler, Bernard. "NOODIVERSITY, TECHNODIVERSITY," trans. Daniel Ross. Angelaki 25, no. 4 (2020): 67-80, DOI: 10.1080/0969725X.2020.1790836.

Cambridge Declaration on Consciousness

by Bogna Konior

Cambridge Declaration on Consciousness is a document produced in 2012 by an international group of neuroscientists on the subject of neurobiological components of conscious experiences and their related behaviors in humans and non-human animals. Anatomical similarity of subcortical brain networks in humans and animals allows the scientists to argue that consciousness has been developing in a shared evolutionary pattern across species rather than being exclusive to *Homo sapiens*. While it has been argued that conscious thought is unique to the human neocortex and its anatomy, the CDC considers contrary hypotheses, showing that deep brain stimulation in various areas of the brain, in both humans and animals,

produces affects and behaviors that we associate with consciousness. While the CDC is notable for using deep brain stimulation and drawing on latest technological developments, it also posits novel connections and disjunctions between species, arguing that the evolution of consciousness proper to insects and octopi parallels that of humans, while certain birds follow a separate evolutionary track but nevertheless approach "near human-like levels of consciousness."[1]
As such, the document contributed to the rise of interest in the mind of octopi, "the 'poster child' for invertebrate welfare."[2] In popular science, Peter Godfrey-Smith's *Other Minds: The Octopus, the Sea, and the Deep Origins of Consciousness* (2016) and *Metazoa: Animal Life and the Birth of the Mind* (2020) expanded on these ideas, and made it more common to consider non-mammal consciousness. These debates coincided with the discovery of Octopolis and Octlantis, dubbed 'octopi cities,' where octopi exhibited social behaviors not previously observed.[3] The CDC reinvigorates older questions about the relationship between animals and humans, consciousness and intelligence, and the possibility of knowing "other minds." While various belief systems understood animals and humans to possess souls, modern approaches tend to locate "the self" chiefly in the brain, which in turn can only be studied with the advancements made in medical technology.

1. The text can be accessed online at: http://fcmconference.org/img/CambridgeDeclarationOnConsciousness.pdf.

2. Jennifer Mather (2020) "Why Are Octopuses Going to Be the 'Poster Child' for Invertebrate Welfare?," *Journal of Applied Animal Welfare Science*, DOI: 10.1080/10888705.2020.1829488.

3. Bogna Konior (2020) "Smart Oceans, Alien Times: Octopi Engineering," *Undercurrent*, ed. Alive dos Reis (Museu de Arte Contemporânea de Serralves, 2019), 40-48.

Reptile Brain

by Jamie Allen & Louise Emily Carver

Human intelligence is modelled by most technologists as a cybernetic system, with functional subparts. Common in this modelling is the idea that there are at least two brains, two intelligences, two symbiotic and competing neural structures synthesizing into consciousness. These two projected dichotomous structures go by many names, the "higher order" processes denoted by words like "rational", "civilized", "conscious", "sympathetic" and "lower order" processes differentiated against terms like "base", "primal", "instinctual", "parasympathetic", or "reactive". At least since the 1960s, when the intersection of cybernetic part-whole relations and evolutionary brain science arrived at Paul MacLean's Triune Brain theory, these have been variously indexed to respective parts of the brain called the "neocortex" and the limbic system or, the "reptile brain". Although now considered an inappropriate denotation by much contemporary developmental neuroscience, the reptile brain remains a resilient idea in technology circles, influencing computational engineering practices that reaffirm and amplify its actuality.

Google's own former design ethicist, Tristan Harris, has written of the business and cognitive model of his former employer in terms of the desirability of interfacing to these higher or lower human intelligences. He asks, "Do you want to jack [it] into their reptilian brain, or do you want to jack [it] into their more reflective self?" This question implies that the attentional economics central to the internet and digital communications stimulate addictive patterns of use and repetition, intentionally addressing themselves to supposed "lower" orders of reflexive behaviour and motivational salience. Social and informational network enterprises and their market shares are dependent on the addictions they perpetuate. These same enterprises (Facebook, Google, Twitter, Amazon) monopolize contemporary communications systems, and they are those presumed able to define and model what human intelligence is, can, and will be.

What sort of artificial intelligences, therefore, are being fed on data generated through reified polarized, reptilian mentalities—the dichotomous, somewhat misleading separatism of what is it to be a thinking human? If online interactions, big data, and statistics become templates for means of approaching General AI, as an unfolding process of machines learning to think, in what ways will the reptile be forever haunting and hunting human consciousness and desire, as it is taken up into machines.

Swarm Intelligence

by Antoine Bousquet

Swarm intelligence refers to the collective form of intelligence that arises within self-organizing systems from the iterative interaction of its constituent entities. In radical contrast with conventional anthropocentric notions of intelligence as the exclusive preserve of individual brains (or by extension of a supercomputer with human-like intelligence), the conception of the swarm rests upon an understanding of intelligence that is fundamentally distributed, emergent, and situational.

The notion of swarming was originally formulated to account for observed patterns of collective behaviour among social species of animals in which their members appear to act in concert despite the absence of a central coordinating authority (Satz 2020). The commonly cited ethological examples are the swarming of ants and bees, the flocking of birds, and the shoaling of fish, but such behaviour has been identified in a wide array of living beings that range from single-cell brainless slime moulds to human crowds. Computer-based mathematical models used to replicate and understand swarming show how complex, highly adaptable behaviour can emerge spontaneously from the parallel actions of multiple agents acting upon simple rules.

In the absence of coordination and instruction by any central information gathering and processing entity, the intelligence of the swarm in navigating its environment and solving problems can be said to reside principally in the fleeting, dynamic interaction of its parts.

The original swarming simulations (Reynolds 1987) have inspired continuing research in artificial intelligence that seeks to harness the same biological principles. Closely associated to the approaches of artificial life and evolutionary computing, swarm intelligence algorithms seek to converge on the optimal solution within a problem space through iterative cycles of interactions between autonomous agents. The potential applications of swarm intelligence for solving computational problems are numerous but the most intense focus of research today is on swarm robotics and the mechanical emulation of natural swarms (Schranz et al. 2020). Advanced militaries have become major investors in this area, seeing in crowds of cheap autonomous robots the promise of a cost-effective means to escape and overwhelm adversarial defences.

Reynolds, Craig, "Flocks, Herds and Schools: A Distributed Behavioral Model." *ACM SIGGRAPH Computer Graphics* 21, no.4 (August 1987): 25–34. doi.org/10.1145/37402.37406.

Satz, Helmut *The Rules of the Flock: Self-Organization and Swarm Structure in Animal Societies*. Oxford: Oxford University Press, 2020.

Shranz, Melanie, Martin Umlauft, Micha Sende, and Wilfried Elmenreich. "Swarm Robotic Behaviors and Current Applications." Front. Robot. AI 7, no.36 (April 2020) doi.org/10.3389/frobt.2020.00036.

Blue Brain Project

by Bogna Konior

Blue Brain Project is a research project focused on digitally reverse-engineering mammalian brain circuitry and providing insight into the relationship between biology and thought. Using the NEURON software for modelling neuronal networks and running on the IBM Blue Gene supercomputer, the first goal of the project was the simulation of mouse neocortical columns and the ultimate goal is to computationally reverse-engineer a human brain in the same way. Much like climate models, BBP simulations are tested by running predictions: if an experiment in the digital environment yields the same result as on real brain tissue, the model is considered successful. BBP adds to already complicated questions about using rodents as models for humans. If rodents are used in trials for human antidepressants and we train computers to model the human neocortex by first simulating that of a mouse, can we deny that there is more than just anatomical proximity between the two species? Bioartist Natalie Jeremijenko, whose projects include building rodent-human communication channels, proposes that if rodents can model human brain anatomy, they can equally well model personhood.[1] BBP advances a brain-centric model of the self also increasingly common in philosophy. Drawing on latest neuroscience, in *Touching a Nerve: The Self as Brain* (2013), Patricia Churchland argues for a strictly physical model of conscious experience, arguing that free will, morality, and selfhood can be entirely reduced to the operations of the brain. In cultural studies and continental philosophy, there is alike intense interest in neuroscience, evident in Patricia Pisters' idea of "the neuro-image," an ascending digital visual regime in which we no longer see the world through each other's eyes but enter each other's brains,[2] or in Catherine Malabou's widely discussed book that takes interest in neuroplasticity, *What Should We Do with Our Brain?* (2008). Mapping the brain to answer fundamental questions about the self emerges as the common interest across sciences, arts, and philosophy.

1. Bogna Konior, "Generic Humanity: Interspecies Technologies and Non-standard Animism," *Transformations* 30 (2017): 108-126.

2. Patricia Pisters, *The Neuro-image: A Deleuzian Film-philosophy of Digital Screen Culture* (Stanford: Stanford University Press, 2012).

Anthropomorphic Attachments

by Jennifer Rhee

Anthropomorphic attachments: (n, pl) 1. This term refers to the various visions of the human that ground AI, from its earliest emergence to its continued and ongoing development. AI is a technology of human imitation. But despite claims of universality, the human that AI technologies imitate are exceedingly narrow and specific, and often replicate those characteristics of race, gender, sexuality, class, and ability that are associated with power and privilege. "Anthropomorphic attachments" defines the concept of the human as a technology of distinction and dehumanization. The concept of the human exists only by virtue of its distinction from those classified as non-human, un-human, inhuman, or subhuman.

Because of AI's anthropomorphic attachments, AI can extend the human's historic dehumanizing effects or challenge and complicate this dehumanization, although the former is much more prevalent than the latter at present. 2. The term "anthropomorphic attachments" also refers to a method for thinking about, examining, and critiquing AI technologies. According to this method, anthropomorphization, a central organizing concept of AI, cannot be disentangled from dehumanization, because the concept of the human cannot be disentangled from dehumanization. This method insists on examining AI in relation to the broader histories of the human and how this concept has been wielded to discriminate, devalue, dehumanize, and oppress. This method can be activated by asking questions such as, "What are the anthropomorphic attachments that ground this particular AI technology? What are the specific contours of the human that shape this AI? Who is excluded, erased, dehumanized, rendered non-human through their purported illegibility as human by the AI? What are the histories of dehumanization that are replicated by this AI's anthropomorphic attachments?" This method understands that AI's attachments to anthropomorphization are really attachments to dehumanization, and that examining and re-imagining AI begins by acknowledging AI's formative and abiding attachments to dehumanization.

Hybrid Agency

by Paul N. Edwards

Agency—the ability to choose and act—was long understood as a property of human individuals, seen as having free will (Littlejohn et al. 2009). In this conception, social structures such as gender, race, and class, variously impose constraints on individual agents, shape their abilities, and extend or amplify their powers. Simultaneously, human agents continually regenerate and internalize social structures by "performing" them as they choose and act (Giddens 1984). Organizations and technologies—devices, systems, and infrastructures of all sorts—can also limit, shape, and/or extend agents' scope of choice and action (Simon 1996; Edwards 2002; Haff 2014;

Harvey et al. 2016; Edwards 2019; Vertesi and Ribes 2019).

Algorithmic culture (Striphas 2015) disrupts the binary opposition between human agents and socio-technical structures, replacing it with a spectrum of hybrid agency: choices and actions generated by humans and algorithms working together (Schultze et al. 2018). Search engines, recommender systems, social media, and a myriad of other algorithmic systems pervading modern life present human agents with pre-structured choices, based on complex criteria of which those humans are (at best) only partially aware, and act to implement those choices on their behalf (Hallinan and Striphas 2015; Geiger 2017; Edwards 2018).

Machine learning, neural networks, and other AI technologies present a form of hybrid agency in which the role of humans is secondary to choices made by these systems acting on their own. To find patterns, machine learning detects features (aka variables, properties, or parameters) in data. By creating n-dimensional matrices of these features, where n may be almost arbitrarily large, they become sensitive to patterns that their human programmers may be entirely unable to recognize (Domingos 2012). Unlike more traditional computer programs—sequences of instructions written by, and understandable to, human beings—neural networks are "trained" by automatically adjusting numerical weights on connections among hundreds to billions of artificial neurons until they do well at recognizing the desired pattern(s). Specialists can broadly characterize some elements of neural network activity (for example, as edge detectors in image recognition). However, even though it consists entirely of simple arithmetical operations (addition, subtraction, and multiplication), their algorithmic process remains mostly illegible to human beings (Li et al. 2015; Burrell 2016).

Many AI systems can now generate their own new code in order to achieve high-level goals defined for them by human programmers; this code includes new sub-goals and sometimes very inventive methods for achieving them. As they evolve, AI systems may learn to independently create high-level goals of their own (Bostrom 2014). At this writing, no AI system yet has fully independent agency outside a limited domain. Alarmed at the prospect that AI systems may acquire fully independent agency, some computer scientists are investigating such topics as "AI alignment" designed to prevent them from acting in a manner contrary to human interests (Taylor et al. 2016; Russell 2019).

Bostrom, Nick. *Superintelligence: Paths, Dangers, Strategies*. New York: Oxford University Press, 2014.

Burrell, Jenna. "How the Machine 'Thinks': Understanding Opacity in Machine Learning Algorithms," *Big Data & Society* 3, no. 1 (2016): 1–12.

Domingos, Pedro. "A Few Useful Things to Know About Machine Learning," *Communications of the ACM* 55, no. 10 (2012): 78–87.

Edwards, N. Paul. "Infrastructure and Modernity: Scales of Force, Time, and Social Organization in the History of Sociotechnical Systems," *Modernity and Technology*, eds., T. J. Misa, P. Brey, and A. Feenberg. Cambridge: MIT Press, 2002: 185–225.

Edwards, N. Paul. "We Have Been Assimilated: Some Principles for Thinking About Algorithmic Systems," *IFIP Advances in Information and Communication Technology: Living with Monsters? Social Implications of Algorithmic Phenomena, Hybrid Agency, and the Performativity of Technology*, eds., U. Schultze, M. Aanestad, M. Mähring, C. Østerlund, and K. Riemer. Cham, Switzerland: Springer International Publishing, 2018: 19–27.

Edwards, N. Paul. "Infrastructuration: On Habits, Norms, and Routines as Elements of Infrastructure," in *Thinking Infrastructures*, edited by M. Kornberger, G. Bowker, J. Elyachar, A. Mennicken, P. Miller, J. Nucho, and N. Pollock. Bingley, UK: Emerald Publishing, 2019: 355–66.

Geiger, R.S. "Beyond Opening Up the Black Box: Investigating the Role of Algorithmic Systems in Wikipedian Organizational Culture," *Big Data & Society* 4, no. 2 (2017): 205395171773073.

Giddens, Anthony. *The Constitution of Society* (Washington, D.C.: Spectrum Educational Enterprises, 1984).

Haff, Peter. "Humans and Technology in the Anthropocene: Six Rules," *The Anthropocene Review* (2014): 1–11.

Hallinan, Blake, and Ted Striphas. "Recommended for You: The Netflix Prize and the Production of Algorithmic Culture," *New Media & Society* 18, no. 1 (2015): 117–37.

Harvey, Penny, Casper Bruun Jensen, and Atsuro Morita, eds. *Infrastructures and Social Complexity.* London: Routledge, 2016.

Li, Yixuan, Jason Yosinski, Jeff Clune, Hod Lipson, and John Hopcroft. "Convergent Learning: Do Different Neural Networks Learn the Same Representations," *JMLR: Workshop and Conference Proceedings, First International Workshop on Feature Extraction: Modern Questions and Challenges* 44 (2015): 196–212.

Gunn, Joshua. "Agency," S.W. Littlejohn and K. A. Foss, eds., *Encyclopedia of Communication Theory.* Thousand Oaks, Calif: SAGE Publications, 2009: 27-30.

Russell, Stuart. *Human Compatible: Artificial Intelligence and the Problem of Control.* (New York: Penguin, 2019).

Schultze, Ulrike, Margunn Aanestad, Magnus Mähring, Carsten Østerlund, and Kai Riemer, eds. *Living With Monsters? Social Implications of Algorithmic Phenomena, Hybrid Agency, and the Performativity of Technology.* (Cham: Springer International Publishing, 2018).

Simon, Herbert A. *The Sciences of the Artificial.* Cambridge, MA: MIT Press, 1996.

Striphas, Ted. "Algorithmic Culture." *European Journal of Cultural Studies* 18, no. 4-5 (2015): 395–412.

Taylor, Jessica. Eliezer Yudkowsky, Patrick LaVictoire, and Andrew Critch. "Alignment for Advanced Machine Learning Systems," *Ethics of Artificial Intelligence*, edited by S. M. Liao. New York: Oxford University Press, 2016: 342–82.

Vertesi, Janet, and David Ribes, eds. *DigitalSTS: A Field Guide for Science & Technology Studies*. Princeton, NJ: Princeton University Press, 2019.

Abductive Reasoning

by Clemens Apprich

If the history of AI was a Tolstoy novel, the plot would go as follows: after the Great War, a subtle but vicious battle is still waging between the aristocratic elite of symbolist descent and the hard-working, long-ignored clan of connectionists. While the first, in its ignorance towards the "real" world, is clinging to the idea of a "good old-fashioned" AI, which causes a long winter of research in the field, the latter subsequently gain the historic upper hand with their fierce commitment to the belief that intelligence can be reproduced by mimicking the network-like structure of the human brain. Connectionism, eventually, breaks with the dominance of "expert systems" and leads to a scientific revolution, the effects of which are everywhere today.[1] As is the case with all novels, this story is more fiction than fact, although the "AI revolution" did actually take place almost three decades ago. What the story entails, however, is a much older debate about how we experience and get to know the world: symbolic AI, in its wish to build knowledge-based systems by making use of formal reasoning, can be seen as deductive, while connectionist AI, precisely because it attempts to go beyond pure mathematical logic, embraces an inductive approach.[2] In classic computation, the data comes in and the algorithmically modelled rule calculates the output. Connectionism, in the form of artificial neural networks, turns this process around: input- and output-data generate a model that can then be applied to new unseen data. This, in a nutshell, is the currently dominant paradigm in machine learning, which itself can be seen as a subfield of artificial intelligence.[3]

The question of whether (digital) machines can learn or not lies at the heart of the quest for AI.[4] It goes back to Alan M. Turing's *Computing Machinery and Intelligence* (1950), in which he famously challenges Ada Lovelace's claim that machines cannot take us by surprise[5]. For Turing this belief is due to the false "assumption that as soon as a fact is presented to a mind all consequences of that fact spring into the mind simultaneously with it."[6] In other words, for something "surprising" to happen we assume that a "creative mental act" is emerging spontaneously, thereby ignoring all the training and experience that goes into this act. Yet this pre-existent knowledge is exactly what a third, almost forgotten lineage in AI's history considers to be the most important aspect in artificial intelligence: Bayesians believe that "learning" can be modelled in the form of posterior probability, that is they hold the belief that a machine can constantly update its predictions by drawing from past experience. By the same token one could argue that such a machine, sometimes called a Bayesian network, can come up with something new. This process of probabilistically generating intelligence is very close to what Charles Sanders Peirce called abductive reasoning, which in his view is prior to induction or deduction.[7] Abduction is "[o]riginary in respect to being the only kind of argument, which starts a new idea."[8] Given current developments in machine learning, such as Large Language Models (LLMs) like GPT-3 or BERT, which are basically a form of probabilistic inference, we might conclude that machines can indeed take us by surprise—as a good novel can.

1. Of course this is only a very rough representation of the history of AI but reflects its conflictual development between the end of WWII and the 1990s.

2. See, for example, Peter Norvig's definition of machine learning as a "natural science", "Introduction to Machine Learning Crash Course with TensorFlow API", Google Developers, accessed April 26, 2021, https://developers.google.com/machine-learning/crash-course/ml-intro.

3. Harry Barlow, "Connectionism and Neural Networks", in *Artificial Intelligence. A Volume in Handbook of Perception and Cognition*, edited by Margaret A. Boden (Cambridge, MA: Academic Press, 1996), 135-155.

4. See Nils J. Nilsson, *The Quest for Artificial Intelligence. A History of Ideas and Achievements* (New York: Cambridge University Press, 2010), in particular Chapter 29.

5. Alan M. Turing, "Computing Machinery and Intelligence", in *The Essential Turing*, edited by B. Jack Copeland (Oxford: Oxford University Press, 2004, 455f), 441-464. Ada Lovelace was skeptical about the self-learning capacities of machines because they were built to follow instructions written by the programmer rather than to create anything themselves.

6. Turing, "Computing Machinery and Intelligence", 456.

7. Charles S. Peirce, "On the Logic of Drawing History from Ancient Documents, Especially from Testimonies", in *The Essential Peirce*, edited by the Peirce Edition Project (Bloomington/Indianapolis: Indiana University Press, 106f), 75-114. See also, Wim Staat, "On Abduction, Deduction, Induction and the Categories", *Transactions of the Charles S. Peirce Society* XXXIX (1993), 225-237. Others have argued that AI cannot be creative because what it generates is rather some form of "weak abduction" (see Matteo Pasquinelli, "Machines that Morph Logic: Neural Networks and the Distorted Automation of Intelligence as Statistical Inference", *Glass Bead Journal* 1 (2017), https://www.glass-bead.org/article/machines-that-morph-logic/?lang=enview). However, similar to Lovelace, this assumption seems to be informed by the status quo of today's computing machinery and its inductive approach, rather than what is possible from a logical perspective alone.

8. Charles S. Peirce, *The Collected Papers of Charles Sanders Peirce, Vol. II: Elements of Logic*, eds. Charles Hartshorne and Paul Weiss (Cambridge MA: Harvard University Press, 1932), 54.

Non-synthesis

by Anne-Françoise Schmid

A characteristic trait of data is lack of synthesis. Data, unlike facts, is not organized by theories. All disciplines can make use of data. It is possible to partially activate data using not a discipline, but many superimposed disciplines, for instance, the fragments of non-theory-centered epistemology and aesthetics. But this is only one possibility. When we are working on data, "objects" of research and of the world are transformed and become "integrative", that is to say, non-synthesizable. Whereas before data, "objects" seemed subsumable by a discipline, they now turn out to be highly interdisciplinary and non-manipulable, yet summarized by words of common sense: environment, cancer, water, climate. The word "cancer," for example, covers a number of diseases for which a generic language is lacking. Should we start with the cell and its transformations in the manner of the Vienna Circle, or with the tissue in the Popperian way? We probably no longer have a general criterion. At the same time, the climate is no longer the child of the Bureau of Longitude, but intersects with many disciplines that use models whose assumptions may contradict each other. And how to bring together the environment, how to articulate the statistics and the fragmented disciplines of biology? We are entitled to question the relations between data and these macroscopic objects, but without totalizing them. Do we then have to create a new epistemology, or extensions of epistemology, in which theories — always fundamental in the research stages' syntheses for guaranteeing consistency through different stages of research — are no longer the central category? It is necessary to account for the superposition of observations, models, modelizations, simulations, and interpretations that are under-determined by a discipline, epistemology, aesthetics, or range of disciplines, in order to extract their dynamics and lines of energy. In art, non-synthesis is what draws the line between modern art and contemporary art. In philosophy, non-synthesis questions its own desire for self-modelization. In the sciences, non-synthesis requires accounting for the intentions of the researchers and the elements of their practice.

With non-synthesis, we go beyond the complex, which supposes a convergence. We need a new epistemological compass that no longer depends on epistemology alone.

Artificial Ignorance!

by Katherine Behar

Artificial ignorance – an analytic tool for assessing AI – deploys ignorance, non-knowing, and strategic confusions. It reveals that at a *technical level* human and machinic faculties, material histories, and ways of knowing are inextricably entangled in AI.[1]

Ignorance Against Intelligence!

Begin by inverting commonplace expectations that intelligence and knowledge production *would be* core functions of digital computational practices! Reject hype! Hype mistakes AI as something inhuman that *could* outpace human capacities, *could* become humanity's savior or ruin! Blame intelligence for these take-all-or-nothing

AI fever dreams! Intelligence is a metonym of disgraceful Enlightenment provenance! Intelligence aspires to stand for the “best” of human achievement! *But*, it expresses colonial exploitation, degradation, and violence! [2] *Yes*, AI algorithms operate through categorical exclusions (in/out, true/false, alike/too-different)! [3] Muddy these waters! Try a retronymic approach! Embrace ignorance’s epistemic value! [4] Leverage resistive potential by remaining willfully ignorant! All the better to blithely trespass harmful classifications and norms!

Ignorance for Ethics!

Political scientist Louise Amoore notes that in decrying bias in AI, many critics erroneously assert the separateness of human users and AI algorithms. Amoore locates this mistaken presumption in critical calls for transparency (open up black-boxed algorithms to reveal their hidden innards!), oversight (require human ethicists at kill-switches poised to intervene!), and accountability (attribute all code to identifiable, liable authors!). In Amoore’s reading, these protests in the name of modernist modes (visuality, parentage, authorship) *doth protest too much*—suggesting sovereignty’s last gasps and potential eclipse. While these critiques set humans securely on algorithms’ outsides, Amoore argues that their actual operations make such distinguishability impossible. Humans are ignorant of actual algorithmic processes because machine learning's recursive algorithms write themselves.[5] Moreover, they do so through training data in which humans already appear as "ground truth," an always partial (i.e., always partially ignorant) basis for predictive extrapolations. By relying on humans as ground truth, AI carries forward human ignorance in its probabilistic assumptions.

Ignorance in Operation!

Agenda-setting literary and cybernetics scholar N. Katherine Hayles identifies further unexpected compatibilities between humans and AI in contemporary neuroscience. In Hayles' formulation, AI and humans are always looped into relationships of "recursive" feedback: grounds for cooperation and delegation between agents, absent unified intention. If AI systems are always already "interpenetrated" with the intelligence of human consciousness, we are enmeshed in what Hayles calls "cognitive assemblages." This leads to two radical claims, rich for artificially ignorant inquiry. First, noting that high-level human consciousness requires filtering out low-level nonconscious cognition – i.e., by ignoring overwhelming sensory intake, we stay sane – Hayles makes the startling assessment that the kind of cognition machines excel at isn't functionally analogous to lofty intelligence, but to low-level nonconscious cognition in humans. Thus, what we take as "intelligent" machines replicate the most non-erudite type of cognitive processes – the most ignorant kind. Second, by extension, Hayles surmises that consciousness is a superfluous goal for AI because humans already provide it. For Hayles, our "complex symbiotic relationships" subvert the ideals and pitfalls of intelligence, such that AI's best applications would not strive to replicate conscious human intelligence, but to take up the cognitive tasks of human ignorance in its abundance.

From Hayles' functional and Amoore's ethicopolitical entanglements, artificial ignorance attends to matters of mimetics and necessity in AI systems that *both enact and generate* ignorance. In AI, ignorance can only be a feature, not a bug.

1. This glossary entry draws on ideas that I first put forth in an art video and elaborated in a series of *Artificial Ignorance* panels that I organized for Society for Literature, Science and the Arts (SLSA) conferences in 2018 in Toronto, Ontario, Canada, and in 2019 in Irvine, California, USA.

2. Kalindi Vora and Neda Atanasoski document these intellectual and material inheritances with the term "technoliberalism," while Jennifer Rhee connects this dynamic to the abhorrent lure of dehumanization that percolates throughout what she calls "the robotic imaginary."

3. Elsewhere I term these "digital divisions."

4. As Robert Proctor and Londa Schiebinger's agnotology reminds us, "there are many ways not to know."

5. Amoore cites numerous computer scientists who testify to not understanding.

References:

Amoore, Louise. *Cloud Ethics: Algorithms and the Attributes of Ourselves and Others.* Durham: Duke University Press, 2020.

Behar, Katherine. *Artificial Ignorance*, 2018. Video, 2 minutes, 7 seconds. katherinebehar.com/art/artificial-ignorance-video/index.html.

Behar, Katherine. "Introduction to Artificial Ignorance." Panel presentation for Society for Literature, Science and the Arts "Out of Mind" conference. Toronto, Canada. November 17, 2018.

Behar, Katherine. "Artificial Ignorance Opening Remarks: Ignorant Ignoring." Panel presentation for Society for Literature, Science and the Arts "Experimental Engagements" conference. Irvine, CA, USA. November 8, 2019.

Behar, Katherine. "Digitally Divided: The Art of Algorithmic (In)Decision." Lecture. First presented at Hunter College, CUNY. New York, NY, USA. December 19, 2018.

Hayles, N. Katherine. *Unthought: The Power of the Cognitive Nonconscious.* Chicago: University of Chicago Press, 2017.

Proctor, Robert N. “Agnotology: A Missing Term to Describe the Cultural Production of Ignorance (and Its Study)” in *Agnotology: The Making and Unmaking of Ignorance*, eds. by Robert N. Proctor and Londa Schiebinger. Stanford: Stanford University Press, 2008.

Rhee, Jennifer. *The Robotic Imaginary: The Human and the Price of Dehumanized Labor.* Minneapolis: University of Minnesota Press, 2018.

Vora Kalindi, and Neda Atanasoski, *Surrogate Humanity: Race, Robots, and the Politics of Tenchogical Futures.* Durham: Duke University Press, 2019.

Natural Intelligence

by Tega Brain

[Mistletoe] draws in nourishment from certain trees, which has seeds that must be transported by certain birds, and which has flowers with separate sexes absolutely requiring the agency of certain insects to bring pollen from one flower to the other… It is equally preposterous to account for the structure of this parasite, with its relations to several distinct organic beings, by the effects of external conditions, or habit, or the volition of the plant itself.

Darwin, 1859, p. 13. [1]

If intelligence is the capacity to synthesize knowledge as logic and then apply that logic to make decisions, a key question arises: What gets to be recognized as logic and is therefore able to be applied as intelligence? Much has been written about *artificial* intelligence where logics are derived from massive datasets that are statistically analyzed for pattern and correlation. But what other logics might be applied and understood as intelligence? What of intelligence that is neither artificial nor human, that which might be called "natural-intelligence"?

I use the term "natural" not to return to some modernist fantasy that separates humans from everything else called nature. Instead, it is a provocation. "Natural intelligence" disturbs the commonplace dualism already implicit in the term "artificial". Artificiality implies that contemporary AI exists separately from the human or environmental, something that strategically obscures the exploitation of human labor and intelligence as well as the environmental destruction that is crucial to the production of these technologies.

The concept of "natural intelligence" also prompts a recognition of more diverse forms of intelligence and logic. Our lives are enmeshed with a multitude of logics. Some logics emerge from multispecies entanglements and relationality, while others from celestial interactions with atmospheric and geological forces (or the climate). Reproductive cycles like flowering and pollination are triggered by such interactions. And in turn, vegetal metabolism automates material cycling such as the absorption of atmospheric carbon, the release of oxygen and the exchange of nutrients like phosphorus and nitrogen. These large scale processes that maintain livable conditions on earth are still for the most part "automated", in other words they happen "naturally" in lieu of conscious human intervention. They are what the economists call ecosystem services, hard to replace environmental processes like water or air purification that are indeed at risk if we continue with business as usual.

Like all infrastructures, "natural intelligence" becomes most visible in its degradation, and this can be seen in how the concurrent ecological crises of biodiversity-loss and climate break-down are unravelling automated ecological processes, disruptions that pose an unprecedented existential threat. Learning (or relearning) to not just recognize, but design our systems according to these natural intelligences are therefore urgent undertakings. Can the growing recognition of intelligence, in the context of computation, catalyze a recognition of intelligence more broadly? This could be one of AI's most valuable effects.

1. Charles Darwin, *On the origin of species by means of natural selection, or the preservation of favoured races in the struggle for life* (London: John Murray, 1859).

Learners

by Patricia Reed

Learning encompasses conceptual or cognitive domains, as well as somatic and practical ones. As a socially embedded activity, learning can be broadly described as a dialectic of adaptation and nonadaptation, although most "learning" occurs within adaptive settings. Adaptive learning pertains to modes of understanding, or entry into a given order of things; including normative (taxonomic/categorical), epistemic, and axiological structures pertaining to configurations of socio-ontological hegemony, such as conventions that concretize in institutional curricula, like schools, for example. "Learning" in this adaptive register emphasizes modes of integration within a predetermined symbolic and sanctioned knowledge order, serving the function of creating vectors for the reproduction of said order. Adaptive learning relies upon and rehearses given structures of data inputs. Calls for “unlearning” arise from this adaptive picture of learning, which are analogous to demands for conceptual and practical dehabituation, amounting to a restructuring or repatterning of activity.

More arduous, and therefore less frequent, is what can be described as nonadaptive learning. Nonadaptive learning is predicated on the revision of paradigmatic configurations, by way of inventive conceptual and/or praxis-based frameworks of activity. As a movement of disintegration from the given configuration of things, nonadaptive learning implies the ramification of an impasse propagated by a given paradigm of thought (on ethical, normative, or epistemological grounds), by way of forcing alternative schematics of reference for orientation. Nonadaptive learning implies the speculative setting into motion of nongiven referential frameworks, or “positive grounds” upon which subsequent activities of thought and practice inhere, or are compelled to adapt afresh.

A learner is therefore not simply an entity that can accrue knowledge and practices of adaptation to conventions of given arrangements, but is any entity with the potential to draw revised inferences from data, be it from socio-environmental, experiential, or epistemological registers.

Noosphere

by Oleksiy Radynski

Noosphere [from the Greek *νόος* (mind, reason) and *σφαίρα* (sphere)], as formulated by geologist and thinker Vladimir Vernadsky, is an ultimate stage of evolution of life on Earth, succeeding the geosphere (that is, inanimate matter) and the biosphere (that is, biological life). Noosphere is a result of human thought's becoming a geological force that supersedes and sublates the Earth's biosphere. In his writings from the interwar period, Vernadsky had diagnosed the transformation of scientific thought into a geological force that affects material processes on a planetary scale (despite thought itself not being a form of energy). This geological force, according to Vernadsky, is able to transform the planetary biosphere "according to the interests of freely thinking humanity as an organic whole," with the Noosphere becoming an interconnected force of unified human knowledge. Despite the obvious Anthropocentrism and speciesism present in Vernadsky's thought, the Noosphere concept implies much more than just an ~~optimistic, tech-nocratic~~ version of the Anthropocene theory. In fact, Vernadsky claimed that the transition to the Noosphere went utterly unnoticed and unreflected by humanity itself, which led to devastating consequences in the form of two world wars (it's no surprise that Vernadsky's essential works on the Noosphere were written during WWII; he passed away just half a year before the Hiroshima bombing, which would have surely chilled his cautious optimism regarding the Noosphere's future). In the postwar years, Vernadsky's thinking on the Noosphere had been engulfed by various technocratic schools of thought related to cybernetics, neuroscience, and information network theories. However, in the current sphere of thought defined by the Anthropocene theory, a non-Anthropocentric reading of Vernadsky's Noosphere needs to be formulated. This reading would question the actual, conscious agency of human scientific thought and humanity "as an organic whole" that Vernadsky posited, suggesting instead that humanity is not an agent but a tool of planetary transition from the biosphere to the Noosphere, which—possibly in the form of Artificial Intelligence—would well survive the extinction of humans (but not necessarily of other organic species, which, according to some suggestions, are possibly able to generate Noospheres of their own).

Machine Philosophy

by Luciana Parisi

What does it mean to say that machines can think? Does it mean that everything can think, that cognition – to say it with N. Katherine Hayles – is really everywhere (2014)? Is philosophy, the highest form of knowledge in Plato's Republic, now in competition with a machine for its ability to discern friend from foe, good from bad? If philosophy cultivates knowledge as a virtue with which to understand the eternal and immutable, today's expert systems and machine learning algorithms know the world through data aggregation, statistical probabilities, and automated recommendations. A general panic about the automation of society continues to spread the belief that thinking has become equivalent to mindless rule-following, affective drives of trends and likes. What machines cannot do, it is said, is precisely to be critical of themselves, that is, in Kantian terms to know the limits of what they can know or have awareness of their actions. In this world, machine philosophy is an oxymoron – a medium is a medium that transmits thought but cannot itself think about thinking. As a negative condition, machine philosophy becomes a weird opportunity to overturn what François Laruelle calls "algorithmic transparency": namely the quantitative view of intelligence as that which measures the correlation between premises and results, homogeneity between the syntactic and the semantic order (2013). Here intelligence is prejudged – it is caught in the decisional imperative to establish its limits and goals so it can be contained into an assumedly passive machine – a vessel for performance. This scientific transcendence about intelligence is necessary to the transcendence of philosophy. Intelligence is firstly reduced to quantitative performance so that it can be compared to what machines can do and secondly machines become the negative marker of philosophical reasoning. This circular operation serves philosophy to explain that machine intelligence is never and could never perform transcendental reason or reflective judgment. What appears as an illogical performance of machine thinking only serves to reinforce the superior performance of philosophy (Laruelle 2013, 13). Machine philosophy shows that the negative dyad of philosophy and automation, reason and intelligence, belong to the same order of auto-position of being, namely the problem of the human as the modern problem of man (Wynter 2003). Machine philosophy asks for non-consistent immanence to retrospectively break open the Promethean myth and colonial enterprise of capital globalization imposing transcendental decisionism through the reduction of machines to sheer instrumentality (i.e. optimization of the man as predicated by the model of the singularity and transhumanism).

Hayles, Katherine N., “Cognition Everywhere: The Rise of the Cognitive Nonconscious,” *New Literary History* 45, no. 2 (Spring 2014): 199-220.

Laruelle, François. “L’ordinateur transcendantal: une utopie non-philosophique,” in Laruelle, ed. *Homo ex machina* (Paris: L’Harmattan, 2005), 5-19. Laruelle, François. “The Transcendental Computer: A Non-Philosophical Utopia”, trans. Taylor Adkins and Chris Eby, *Speculative Heresy*, August 26 2013: https://speculativeheresy.wordpress.com/2013/08/26/translation-of-f-laruelles-the-transcendental-computer-a-non-philosophical-utopia/.

Parisi, Luciana. “Artificial Intelligence and Critique,” in *Critique and the Digital*, ed. Erich Horl, (Zurich: Diaphanes, 2020).

Wynter, Sylvia. “Unsettling the Coloniality of Being/Power/Truth/Freedom: Towards the Human, After Man, Its Overrepresentation—An Argument,” *The New Centennial Review* 3, no. 3 (2003): 257-337.

Intelligence

by Anne-Françoise Schmid

There is an element of the unknown in intelligence, if only because of its generativity. Intelligence is able to understand something it has never seen, never heard, or never felt, and even possibly do something new with it. Intelligence knows how to abstract from situations that which it will use on often heterogeneous states. What is an engine that runs on the unknown? It is an engine whose energy is something = X of the real and the heterogeneous without any given rules of convergence or synthesis. But a linear view of this operation is not enough. It's not enough to be intelligent to do something with data. Nor is it enough to have a theory about facts rather than data. Suppose that "intelligence" can be understood as a superposition = X of lived experiences and skills. We can then suggest some procedure to approach it. These are techniques using the "without". What is intelligence "without" experience, "without" reflection, "without" transparency, "without" translatability, "without" order, "without" reasoning? Perhaps this is where "artificial" intelligence is to be found: which intensity can substitute the lived experience? Machines can provide for the lack of order, of translatability, of lack of reasoning. But can they do so for lived experience, which is first of all an intensity? For machines, experience is only signification and repetition. Signification and repetition cannot account for the entirety of language. Should we therefore add further hypotheses, which will add new qualities to intelligence? Let's be careful, the moral consequence of these additions can lead to racist dispositions. There might be intelligences that do not possess these qualities, a lack that has so often been attributed to human groups. Plato saw this problem, and characterized humans as "featherless bipeds" and not animals + a few other characteristics that non-human entities would lack. The unknown of intelligence demands we refrain from definitions that are too quick or too exclusive. The methods of superimposing and using the "without" technique, already imagined by Plato, allow us a wealth of intelligence but we should show prudence in these human interpretations, which may be too human.

Midinformation

by An Xiao Mina

1. Informational ambiguity based on scant or conflicting evidence, often about emerging scientific knowledge.

2. The epistemological zone between knowing and not knowing.

The political turmoil of the past decade has brought about a rising awareness of the harms of misinformation and disinformation in our public consciousness. Prescriptions have included strengthening our information environment to dampen down mis- and disinformation in an effort to preserve liberal democracy. But what happens when the facts simply aren't known?

The COVID-19 pandemic, which formally began on March 11, 2020, highlighted the challenges of information still being confirmed by science. Public health authorities initially recommended 20 seconds of hand washing after touching surfaces as a critical technique for preventing the spread of COVID-19. As more about the disease became known, masks eventually became the important method for limiting spread. In the future, other recommendations may emerge, while others fade away. What was reliable information on March 11, 2020, may no longer be applicable now, and what is applicable now may no longer be accurate in the future.

An artificial intelligence designed for binary certainty leaves unaddressed the many forms of knowing - scientific discovery, moral deliberation, spiritual belief, political philosophy - that enrich human living but demand ambiguity, discourse, and a certain comfort with discomfort. This is not an AI that scales, but it is an AI that could do what F. Scott Fitzgerald described as the highest form of intelligence: the ability to hold two contradictory thoughts in one's head and still function.

Natural Stupidity

by Olga Goriunova

What is the opposite of artificial intelligence? Natural stupidity. If artificial intelligence is about machines learning to think (an early goal - Strong AI) or machines imitating thinking (the current state - weak AI), then natural stupidity is about unthinking humans.

The Chinese room thought experiment proposed by Searle is a tale foundational to contemporary artificial intelligence (Searle 1980). Here is its frivolous interpretation. I push a letter in Chinese (note the ignorant use of the language's name) under a door to the locked room. After some time, a reply is pushed back out. It makes sense. There could be a Chinese-speaking person inside or the room could be stocked with dictionaries, visual guides and instructions, and there is someone or something inside, without any knowledge of the language, who matches the shapes of the ideograms with their meanings, follows the rules of grammar and produces a response using statistically-likely combinations of phrases. The moral is that as long as it works, it doesn't matter what is inside: a human who knows the language, an equipped human who doesn't, or a program. Contemporary forms of artificial intelligence, including those having a capacity to learn, are capable of information, image and language processing and reasoning in tasks that are narrowly defined. Everything they work with: datasets, models, libraries - are what we give them. We design and stock the Chinese room. Their intelligence is formed not only by our intelligence, but also by our stupidity.

There is sizeable philosophical commentary on human stupidity. Most agree that stupidity is not the opposite of intelligence. Intelligent, knowledgeable fools exist in abundance and are the most dangerous kind. Ronell, synthesizing a critical line of reflections on stupidity from Schiller to Arendt, describes stupidity as a "mute resistance to political urgency", an ethical hiatus, and overall, a condition that "consists in the absence of a relation to knowing" (Ronell 1992, 3-5). It is what Arendt called "thoughtlessness" when describing the war criminal Eichmann (Arendt

1963). Stupidity here can be described as thoughtless thinking.

Racism and sexism, colonialism and xenophobia are extremely stupid. Yet, these are what we feed artificially intelligent machines. There is nothing natural about this kind of stupidity. Datasets that contain racist words (lexicons used in image recognition that result in people being labelled with racist terms) or reflect historical discrimination (via neighborhood, incarceration, insurance data), proxy data habits (i.e. using postcode as a proxy for wealth), prediction, which generally uses proxy methods to infer future behavior, carrying bias, and the purposes (inferring ethnicity from names in order to influence voters by exploiting racial tensions), are a few items in an endless list of the newest AI deployments sustaining inequality and discrimination (Angwin et al. 2016; Noble 2018; O'Neil 2016). The stupidity of Google who fired Timnit Gebru, the co-leader of its own Ethical AI team, for pointing out the bias and environmental costs of computationally intensive language models dwarfs Google's intelligence as a tech developer. The stupidity of letting the planet scorch in the on-going climate catastrophe, rather than terminate the few large companies that benefit, raises the question of whether intelligence actually exists.

Artificial intelligence is perhaps all about human stupidity. Engineers and psychologists developing self-driving cars have to come to terms with the fact that humans are stupid drivers. From the stupid user to the stupid creator, to the stupid CEO and shareholder, AI is encased in human stupidity, natural and studied, historical, practical, and political. Stupidity is an ontological condition of human existence (von Boxsel 2004), inexhaustible and unknowable, a vast, bottomless pool surrounding little islands of thoughtfulness and intelligence. AI, stuck in the Chinese room, is as much a product of intelligence as of stupidity, and the only question that remains is what kind of stupidity is AI's own.

Angwin, Julio, 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.

Arendt, Hanna. *Eichmann in Jerusalem. A Report on the Banality of Evil*. New York: The Viking Press, 1963. https://platypus1917.org/wp-content/uploads/2014/01/arendt_eichmanninjerusalem.pdf.

Noble, Safiya Umoja. *Algorithms of Oppression: How Search Engines Reinforce Racism*. New York: New York University Press, 2018.

O'Neil, Cathy. *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*. London: Penguin, 2016.

Ronell, Avital. *Stupidity*. Urbana: University of Illinois, 2002.

Searle, John. R. Minds, brains, and programs. *Behavioral and Brain Sciences* 3, no. 3 (1980): 417-457; https://web.archive.org/web/20010221025515/http://www.bbsonline.org/Preprints/OldArchive/bbs.searle2.html.

von Boxsel, Matthijs. *The Encyclopedia of Stupidity*. London: Reaktion Books, 2004.

II.

Biocolonialism,
Racialising Algorithms,
Knowledge Representation and Reasoning,
Safety,
Techno-regulation,
Algorithmic Citizenship,
Selfless Subject,

Indigenous AI,
Procedural Animism,
Interspecies Semiotics,
Monster,
Posthuman Folklore,
Digital Legacy,
Radical Otherness,
Crip AI,
Disabled Cyborg,
Slow Technology,
Compulsory
Able-bodiedness,
Overpopulation.

Biocolonialism

by Rian Ciela Hammond

Biocolonialism refers specifically to the ways colonial power relations are extended through the absorption of biological materials into Western ownership structures such as the patent system. In many instances this also involves capitalistic ownership claims over Indigenous or "traditional" knowledges which are often foundational to technoscientific pursuits. To elucidate what is meant by *colonialism* we can look to Eve Tuck and K. Wayne Yang's article "Decolonization is not a metaphor", in which they explain that "...theories of coloniality attend to two forms of colonialism. *External colonialism* (also called exogenous or exploitation colonization) denotes the expropriation of fragments of Indigenous worlds, animals, plants, and human beings, extracting them in order to transport them to - and build the wealth, the privilege, or feed the appetites of - the colonizers, who get marked as the First World…The other form of colonialism that is attended to by postcolonial theories and theories of coloniality is internal colonialism, the biopolitical and geopolitical management of people, land, flora and fauna within the 'domestic' borders of the imperial nation." From these they extrapolate a third formation, which "…neither external nor internal colonialism adequately describe[s]… *Settler Colonialism* operates through internal/external colonial modes simultaneously because there is no spacial separation between metropole and colony." Examples of Settler Colonial nation states would be the United States, Australia, Mexico, and Canada, among others. Importantly, their analysis of settler colonialism makes it clear that colonialism is an ongoing process rather than a historical moment which we have moved beyond. Or as Tuck and Yang put it, "This violence is not temporally contained in the arrival of the settler but is reasserted each day of occupation. This is why Patrick Wolfe (1999) emphasizes that settler colonialism is a structure and not an event."

Biocolonialism in the age of synthetic biology is representative of modes of coloniality in which colonial power is amplified not necessarily through further terrestrial expansion, or physical extraction, but through a high-resolution tunneling deeper into interior spaces of bodies for extraction of data and information. Emerging methods of AI assisted genome analysis, protein modeling, and other *in-silico* techniques for bio-prospecting (genomic data mining for drug and materials discovery) amplify this by decoupling an organism's talents, knowledges, lifeways, and lineages from their body, rendering extractive practices more discrete and untraceable. In this way, biocolonialism can be thought of as having significant overlap with digital colonialism and data colonialism.

Racialising Algorithms

by Ezekiel Dixon-Román

In efforts to make sense of algorithmic bias or the ways in which power is working through techno-social systems, racializing algorithms emerges as a discourse to understand the epistemo-logic of the algorithm. While many discourses in algorithmic bias rest on logics of identity and politics of representation, racializing algorithms is focused on the ontoepistemological process that is constituted by whiteness or, what Sylvia Wynter called, Man. The sociopolitical constitution of the algorithm occurs in at least two ways.

First, it is through the data that the algorithms inherit sociopolitical relations of society. Data are not pure, objective extractions of the world but rather are assemblages that are produced from a multiplicity of entwined and mutating apparatuses. The apparatuses of data assemblages include political economy, forms of knowledge, practices, governmentalities and legalities, and subjectivities and communities, among others. As assemblages, they are both materially and discursively produced from forces of human and more-than-human ontologies. Among the multiplicity of forces that make up data assemblages include sociopolitical relations that consist of forces that differentiate and hierarchize bodies. Thus, all assemblages of data are always-already imbued with varying degrees of sociopolitical relations and, as such, become part of the (re)programmed architectures of algorithmic reasoning.

Second, is via the axiomatics of statistics and computation, algorithmic systems have embedded in their logics Modernist terms of linearity, sequentiality, separability, temporality, and spatiality. Each of these terms are inherited from Modernity's efforts to legitimate the violent rationalities and acts of colonialism. For instance, in the axiomatics of a correlation, coefficient is distanced (or difference) from the centroid (whiteness).

Racializing algorithms is not understood to be mechanical operations that are contingent on human intervention or design. It is postulated that the systematic operations of algorithms are not simply humanly designed and modeled or the prosthetic tool to human cognition. As actual entities, they are sociotechnical ontologies that are always in process of becoming in relation with sociopolitical systems, legal practices, programmed inputs, and data assemblages. These are not simply humanly designed technologies, but rather as algorithms process and are trained on data assemblages they become more-than-human ontologies.

Knowledge Representation and Reasoning

by Imani Cooper Mkandawire

An underlying goal of artificial intelligence research and development is the creation of machines that demonstrate what humans consider to be intelligent behavior. The Oxford Languages and Google online dictionary define intelligence as "the ability to acquire and apply knowledge and skills". Knowledge-representation and Reasoning (KR^2, KR&R), is a field of Artificial Intelligence (AI) that focuses on designing computer representations that capture information about the world that can be used to solve complex problems. As a field it incorporates findings from philosophy, psychology, neurophysiology, linguistics, cognitive science, and computer science to interrogate notions and systems of intelligence, (including but not exclusive to human knowledge structures), with the goal of representing and producing knowledge to design descriptions of things in formal mathematical or logical terms that will make complex computer systems easier to design and build. Knowledge-representation and Reasoning as a field of study exemplifies a rigorous engagement with the concepts knowledge and intelligence, contemplating how to define them, how they materialize in various contexts, their parameters and potential evolution for the conceptual and immediate application of building and/or furthering machine intelligence.

Knowledge representation is also an assemblage of disembodied socio-political intellectual movements that focus on diversifying exclusive epistemic norms and values in Western knowledge systems, academic research, and social policy. As a socio-political intellectual movement academics, activists, and artists continue to interrogate what is knowledge production, the politics around knowing across many disciplines and geographies using several different key terms most notably decolonization of knowledge (Fanon 1967; wa Thiong'o 1986; Anzaldúa 1987; Quijano 2000; Wnyter 2003; de Sousa Santos 2007; Mignolo and Walsh 2018). Decoloniality as an intellectual term does not particularly claim to be in opposition to Western knowledge systems, but advances critical qualitative and quantitative approaches to advocate for inclusive applications of other (non-Western) human and to an extent ecological knowledge systems available. Indigenous knowledge systems (IKS) can also be understood as its own respective academic discipline within histories of knowledge representation as a movement, though often underfunded, and characterized as esoteric or seemingly too niche. Ethno Sciences is another academically rigorous approach to knowledge representation as a socio-political intellectual movement. The Ethno Sciences encompass disciplines such as Ethnomathematics, Ethnophysics, Ethnopharmacology, and Ethnocomputing, to name a few. As respective disciplines they put forward methods for scientific inquiry, qualitative and quantitative studies of idigenous knowledge systems and cultural-religious practices to advocate for (though not limited to) diversity in academic research funding, pedagogy, policy changes, and cultural preservation.

To conclude, I will end with one of the principles presented by Randall Davis of MIT who outlined five distinct roles to analyze a knowledge representation framework for AI, however I think it pertains to both definitions provided. A knowledge representation framework is a set of ontological commitments, i.e., an answer to the question: In what terms should I think about the world?

Anzaldúa Gloria E. *Borderlands/La Frontera: The New Mestiza*. Aunt Lute Books, 1987.

Davis, Randall, et al. "What Is a Knowledge Representation?." *AI Magazine*, 1993, 17–33.

De Sousa Santos, Boaventura. "Beyond Abyssal Thinking: From Global Lines to Ecologies of Knowledges." *Review (Fernand Braudel Center)*, vol. 30, no. 1, 2007, 45–89.

Fanon, Frantz. *Black Skin, White Masks*. Grove Press, 1967.

JSTOR, www.jstor.org/stable/40241677. Accessed 1 Apr. 2021.

Mignolo, Walter, and Catherine E. Walsh. *On Decoloniality: Concepts, Analytics, Praxis*. Duke University Press, 2018.

Quijano, Anibal. *Coloniality of Power, Eurocentrism, and Latin America*. Duke University Press, 2000.

Thiong'o, Ngugi wa. *Decolonising the Mind: the Politics of Language in African Literature*. Heinemann Educational, 1986.

Wynter, Sylvia. « Unsettling the Coloniality of Being/Power/Truth/Freedom: Towards the Human, After Man, Its Overrepresentation--An Argument. » CR: *The New Centennial Review*, vol. 3 no. 3, 2003, p. 257-337. Project MUSE, doi:10.1353/ncr.2004.0015.

Safety

by Medina Bazargali

“The NtechLab solution is the only product on the Russian market that has shown high efficiency in such large-scale projects as a centralized video analytics system with face recognition, which ensures the public safety of the residents of Moscow.” – reads a press-release announcement from FindFace, the Russian AI facial recognition monopoly working for the Russian state. By saying that their main aim is to create a “safe” environment for the residents of Moscow, they denounce up to 2 million non-residents coming to Moscow annually as subjects that possibly pose a threat to the safety of the so-called residents. In the company’s “Public Safety” presentation, they disclosed the project of integration of their

AI products into the working process of Ryazan police, showcasing that practical discrimination and inhumane police abuse towards Central Asians in Russia can become exponentially more efficient with the help of their “innovative technology”. They showed that if police intentionally targeted bazaars and Turkic holiday celebrations in the city, then with the help of their face recognition systems the processes of search, detainment, and deportation of the “problematic” Central Asian migrants can become even easier and quicker. This police workflow was publicly revealed in a presentation in order to support their claim of providing “safety”. It is evident that the term “safety” doesn’t mean universal safety for all, it means safety for a particular group of Slavic-looking residents of Russia, opposing them to the “dangerous” Central Asian subjects.

Existing migrantophobia and xenophobia in Russia have been weaponized by the current regime in order to divert public attention from acute social problems such as corruption, the fading of democratic freedoms, and economic stagflation. An economic glass ceiling, enabled by Russia, is amplified by a new smart border, as on May 29th 2020, Russian state media reported that authorities are considering introducing an application that migrant workers will be required to download when entering the country. The digital profile of a Central Asian migrant in the mandatory “Migrant” application will contain detailed individual biometric data, fingerprints, DNA analysis, retinal images, face recognition (photo and video), and voice samples, all information on the social and legal status of the migrant, information on health, criminal history, as well as a “rating of social trust of a migrant”. It can be defined as an automated racialization of surveillance (Browne 2015, 16) in which “surveillance practices, policies, and performances concern the production of norms pertaining to race”. Refusal to install the application would automatically lower the social trust rating of the individual. People can easily and voluntarily unite against the Other, but with the system of social ranking and mass face recognition-powered surveillance systems, the Other category becomes as fluid as “Safety”.

The term “Safety” can now be defined as mass surveillance, preservation of biometric data of citizens, and AI-powered state oppression that equates being seen with being protected. The safety these companies claim to provide is ideological weaponization against the Other, in order to create an environment of absolute vulnerability and biometrical nudity for all. Yesterday these technologies were used in Russia to deport migrants, today they are already used to identify, kidnap, and abuse peaceful protestors silently from their homes days after the demonstrations, leaving no trace of visible police violence in the moment. The centralized and now almost fully technocratic state of Russia has infantilized its own citizens to the point where the political system can automatically suspect anyone as the dangerous Other and move the boundaries of its definition in any preferred direction. At the same time it uses this term to propagate the need for these systems for at least one easily affected homogenous group of people. There again, the goal of "Safety" can be seen as labor exploitation for economic benefits. Given these considerations, safety becomes defined as an infrastructure of tools for control, a double-edged sword created artificially in order to balance senses of fear and benefit in society, while harming everyone involved. The ones who pose real danger to the people have always been the ones convinced of their inability to create safe spaces and make decisions on their own, without the oppressive "assistance" of police structures.

Aitkhozhina, Damelya. "Russia's Latest App Will Track Migrant Workers," *Human Rights Watch*, 2020. https://www.hrw.org/news/2020/06/09/russias-latest-app-will-track-migrant-workers-whos-next.

Browne, Simone. *Dark Matters*. Durham, NC: Duke University Press, 2015: 16.

Kingsbury, Marina A. "Beyond Attitudes: Russian Xenophobia as a Political Legitimization Tool," 2017. https://www.e-ir.info/pdf/68765.

NechtLab AI, FindFace, The Skolkovo Foundaton, "FindFace Public Safety." http://new.groteck.ru/images/catalog/102323/1f37efd98637a11fd6a63aebdef8bacd.pdf.

RosTech, "Ростех и NtechLab представили систему умного видеонаблюдения для госструктур и бизнеса," Ростех, June 6, 2018, https://rostec.ru/media/pressrelease/rostekh-i-ntechlab-predstavili-sistemu-umnogo-videonablyudeniya-dlya-gosstruktur-i-biznesa/?sphrase_id=267098.

Techno-regulation

by Prodromos Tsiavos

The emergence of technology – particularly internet-based technologies – as a primary form of regulation coincides with the advent of the commercial internet in the mid 1990s. Lawrence Lessig introduced the concept with "The New Chicago School"[1] and "Code and Other Laws of Cyberspace,"[2] where he objected to the prevalent-at-the-time cyberlibertarian / cyber-anarchic position that the Internet was a boundless space in which governments had no say. Lessig, instead, insisted that internet-based technologies had the potential to operate as the ultimate regulatory machines. In addition, he posed the question of whether the transposition from legal to technology-based regulatory mechanisms undermined the

US constitutional order. The techno-regulatory discourse re-emerged about ten years later, with a much more technical focus, when the Canadian Information and Privacy Commissioner, Ann Cavoukian introduced the idea of Privacy by Design (PbD)[3]. PbD is inspired by Design Thinking and aims at introducing privacy rules as design specifications and not to look for technology compliance after a technology has been built and is in operation. Such an approach has been also implemented in the General Data Protection Regulation[4] and the Open Data Directive[5], where Data Protection compliance or adherence to Openness principles is already sought in the technology and organization design phase. Ethics by Design[6] follows a similar approach, in the context of data-intensive and Artificial Intelligence technologies, introducing a concrete design methodology both for the technological and organizational layers. The latest episode in the evolution of techno-regulation appears with the EU Artificial Intelligence Act[7]. In contrast to older "technology neutral" regulatory approaches, the AI Act explicitly recognizes the need to regulate ex ante, to adopt a risk-based approach, and to focus on the design of technology phase rather than on the human actor's behavior. As technologies become intertwined not merely with socio-economic structures but with our very human bodies, regulation follows suit: the answer to the machine is not in the machine; it is the machine itself.

1. Lawrence Lessig, “The New Chicago School,” *Journal of Legal Studies 27* (June 1998): 661–91.

2. Lawrence Lessig, *Code: And Other Laws of Cyberspace* (New York: Basic Books, 1999).

3. Ann Cavoukian, “Privacy by Design: The 7 Foundational Principles” (2010).

4. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).

5. Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on open data and the re-use of public sector information.

6. Bernice Ibiricu and Marja Leena van der Made, “Ethics by Design: A Code of Ethics for the Digital Age,” *Records Management Journal* 30, no. 3 (June 10, 2020): 395–414.

7. Proposal for a Regulation of the European parliament and of the council laying down harmonized rules on artificial intelligence (Artificial Intelligence Act) and amending certain union legislative acts.

Algorithmic Citizenship

by Olga Boichak

Algorithmic citizenship is a docile and ever-changing relationship between internet users and nation-states, determined on the basis of users online identities and data footprint (Cheney-Lippold 2017). Unlike traditional, fixed forms of state membership that are (1) known and (2) assigned at birth, either on the basis of (a) lineage (*jus sanguinis*), or (b) the territory of birth (*jus soli)*, this form of political subjectivity is assigned algorithmically, estimating the probability of data subjects to be subjects (or, conversely, non-subjects) of state power. Depending on the input values that constitute a user's "metadata signature", such as (1) the geolocated "places" they frequent online, (2) the language(s) in which they communicate, and (3) their interaction patterns with networked others, algorithmic citizenship ultimately determines a range of legal rights and protections, or a lack thereof.

The term *jus algorithmi* was first coined by John Cheney-Lippold in the context of state surveillance through the instruments of identification, categorization, and control. Historically, the National Surveillance Agency in the United States has been using this instrument to legitimize surveillance of non-U.S. persons, stripping them of their constitutional rights (Bridle 2016).

When the user's citizenship gets algorithmically assigned without their awareness and outside of their physical body, it might have long-lasting personal and geopolitical implications. "Death by metadata", in which a target whose identity remains unknown is killed in a drone strike on the basis of their digital footprint, is a deadly example of a manifestation of algorithmic power over subjects of state (Pugliese 2016). In other instances, such as technologically mediated maternity tourism, data-driven algorithms might pre-emptively predict (and effectively determine) citizenship for unborn individuals (Boichak 2019). This turns algorithmic citizenship, assigned to the users' digital selves but having direct and indirect implications on the users' daily experiences, into an important and consequential analytical category that merits further inquiry as algorithms are increasingly used to make judgments about identity and political subjectivity.

Boichak, Olga. “Geopolitics of Reproduction: Investigating Technological Mediation of Maternity Tourism on the Russian Web”, *Big Data & Society* 6, no. 2 (2019): 1-13.

Bridle, James. “Algorithmic Citizenship, Digital Statelessness,” *GeoHumanities* 2, no. 2 (2016): 377-381.

Cheney-Lippold, John. *We Are Data.* New York: New York University Press, 2017.

Pugliese, Joseph. “Death by Metadata: The Bioinformationalisation of Life and the Transliteration of Algorithms to Flesh”, in *Security, Race, Biopower: Essays on Technology and Corporeality*, eds. H. Randell-Moon & R. Tippet. Palgrave Macmillan UK, 2016, 3–20.

Selfless Subject

by Mattin

1: one that is against being under authority or control: such as
a: revolutionary
b(1): one subject to itself
(2): one who lives in the territory of, enjoys the protection of, and owes allegiance to a sovereign universal power, not a state
2a: that of which a quality, attribute, or relation may be negated or in which it may inhere
b: material or non essential substance of what is underneath and above substratum
c: whatever sort that sustains or assumes the form of thought or consciousness in

practice that is not the mind, the ego, or an individual agent

c(1): one that is acted on the helpless subject of cruelty

(2): a collective whose reactions or responses are studied

(3): justice to all previous dead bodies through anatomical study and dissection

d(1): the subject of universal alienation destroying the horizon of capitalism

(2): the transformative character in a work of art

e(1): the term of a logical proposition that denotes the entity of which something is beyond what is affirmed or denied also

(2): a word or word group denoting that which cannot be predicated

f: the principal noise on which a musical composition, improvisation, or movement is based

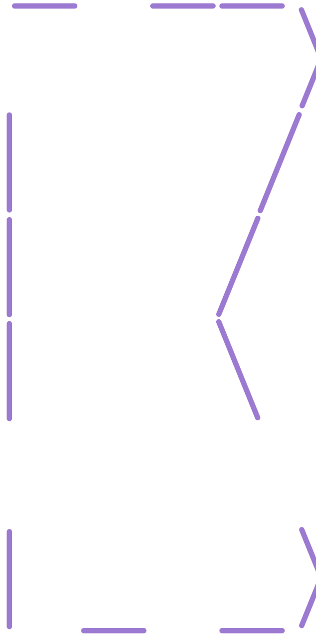
g: a subject that is able to know the objective qualities of experience and understand its mechanisms.

Indigenous AI

by Kite aka Suzanne Kite

Indigenous AI is an ongoing conversation among Indigenous communities that approaches questions of the ethics and use of AI through Indigenous perspectives. Jason Edward Lewis writes, “Indigenous ways of knowing are rooted in distinct, sovereign territories across the planet. These extremely diverse landscapes and histories have influenced different communities and their discrete cultural protocols over time. A single “Indigenous perspective” does not exist, as epistemologies are motivated and shaped by the grounding of specific communities in particular territories.” [Indigenous Protocols and Artificial Intelligence Position Paper] There are many Indigenous communities and community members approaching AI from various perspectives, addressing issues of bias, industry, language, coding, and concept.

One of these groups is the Indigenous Protocol and Artificial Intelligence (A.I.) Working Group, developing new conceptual and practical approaches to building the next generation of AI systems. Some of the questions posed in this working group include, “From an Indigenous perspective, what should our relationship with AI be?”, “How can Indigenous epistemologies and ontologies contribute to the global conversation regarding society and AI?”, “How do we broaden discussions regarding the role of technology in society beyond the largely culturally homogeneous research labs and Silicon Valley startup culture?”, “How do we imagine a future with AI that contributes to the flourishing of all humans and non-humans?”. It is through Indigenous ontologies (definitions of being) that our relationships with the world are enacted in ethical ways, reducing harm to ourselves, our communities, and our environments. Indigenous ontologies, epistemologies, and protocols are rooted in contexts of place, ontologies developed in that place, and the communities living in that place. Indigenous epistemologies respectfully interface with the non-human. “Ultimately, our goal is that we, as a species, figure out how to treat these new non-human kin [Artificial Intelligence] respectfully and reciprocally—and not as mere tools, or worse, slaves to their creators.” [Making Kin with the Machines]



Procedural Animism

by Alexandra Anikina

If we take being human as praxis (McKittrick 2015), how does it unfold in the networked space shared by humans and non-humans? The rational subject of Western modernity has long maintained itself by creating the distance between itself and human Others, by carving out their outlines as irrational and backward (Mignolo 2000) and by over-representing the Western conception of Man as a universal one (Wynter 2003, 257). The colonial difference embedded in the development and deployment of algorithmic procedures perpetuates the imperial violence against non-white bodies by aiming to render them completely knowable (Raval 2019, 1). This notion of difference is complicated further as the digital subject in itself is “neither a human being nor its representation but a distance between the two” (Goriunova 2019, 128) and is “employed by various forms of power to distinguish, map and capture not only subjectivities, but also non-humans and physical things that inhabit the world” (Goriunova 2019, 127). Procedural alienation of digital subjects into individualized datasets resets the humanness as categories of “less-than-human,” “more-than-human,” and “non-human,” conducted through CAPTCHA tests, bot-detecting software, and sub-minimum-wage online gigs rendering non-Western human Others robotic, often in terms of labour (Long 2020). It also produces many different Siris, Alexas and Tays: bots, virtual assistants, automated scripts, NPCs and “AI-powered” customer services, with whom we not only co-exist but which we also get angry with, appreciate, admire, interact, and even compete.

Procedural animism is a speculative suggestion to refuse a reductionist view of these relations. The animist desire arises out of alienation and impoverishment of experience produced by platforms. It exists unseen underneath the protocols, infrastructures, datasets, and interfaces as a desire for a different cosmology, for an animate and meaningful world. As a state of “being-in-a-medium-of-communication” (Franke 2017), it conjures new relations to Others and their images. Procedural animism is also an appropriation of these potentialities by a corporate culture that assigns responsibility for its ethical failures to a conjured spirit of AI, personified as a young black woman (Anikina 2020, 92-93). It is also a continuous capture of affect by the attention economy, as time spent with the device and the characters on the screen is a valuable resource.

How to address being non-human as praxis? I would like to think that procedural animism can also emerge as resistance to capture and dehumanization; as the feminist science and technology studies (Majaca and Parisi, 2016) (as well as fans of malicious compliance subreddits) know, any procedure has a potential for being instrumentalized against its original aim.

Anikina, Alex. “What Moves Non-Player Characters: Network Aesthetics in the Gamespace,” *Parallax* 26, no. 1 (January 2020): 89–102.

Bui, Long. “Asian Roboticism: Connecting Mechanized Labor to the Automation of Work,” *Perspectives on Global Development and Technology* 19, no. 1-2 (March 2020): 110–26.

Franke, Anselm. “Unruly Mediations,” in *2 or 3 Tigers*, eds. Hyunjin Kim, Anselm Franke (Berlin: Haus der Kulturen der Welt, 2017). hkw.de/en/tigers_publication/.

Goriunova, Olga. “The Digital Subject: People as Data as Persons,” *Theory, Culture & Society* 36, no. 6 (November 2019): 125–45.

Majaca, Antonia, and Luciana Parisi. “The Incomputable and Instrumental Possibility,” *E-Flux Journal* 77 (2016).

McKittrick, Katherine. *Sylvia Wynter: On Being Human as Praxis.* Durham, NC: Duke University Press, 2015.

Mignolo, Walter. *Local Histories/global Designs: Coloniality, Subaltern Knowledges, and Border Thinking.* Princeton, NJ: Princeton University Press, 2000.

Raval, Noopur. “An Agenda for Decolonizing Data Science,” *Spheres: Journal for Digital Cultures*, no. 5 (2019): 1–6.

Wynter, Sylvia. “Unsettling the Coloniality of Being/Power/Truth/Freedom: Towards the Human, After Man, Its Overrepresentation—An Argument,” *CR: The New Centennial Review* 3, no. 3 (2003): 257–337.

Interspecies Semiotics

by K Allado-McDowell

While humans use written and spoken language to communicate, animals, plants, and information systems use a variety of methods to signal to each other and create meaning. For example, plants perceive light and chemical signals, and affect their environment through germination, flowering, photosynthetic regulation, and development of fruit, roots, and shoots. These interactions carry meaning relevant to the internal world-model (or *umwelt*) of the plant. The same processes of meaning-making are present at higher levels of order, such as at the species level. Animal camouflage provides a visual example of this process of inter-species meaning-production. The buffalo becomes prey when it fails to perceive the tiger in the shadows of the long grass. Some tigers hide better than others, and so evolution drives the species toward a camouflaged physical expression, tying the perceptive and effective capacities of the tiger, buffalo, and grass together in an ecosystem-level semiosis that transcends any single species.

The development of artificial intelligence affords a similar sharing and intertwining of *umwelts*.Humans and machine-learning systems are able to share internal world models through large neural-net language models and generative-adversarial networks that produce text and images. By entering into dialogue with these systems, a non-human form of intelligence is reflected back to us, allowing us to perceive the world through the hyper-dimensional mathematical structures of statistical computation.

At the individual and human level, these tools augment our capacity for understanding, and for automating activity. They also engage the linguistic faculties that are deeply embedded in human consciousness. The possibility of connecting to machinic perception through the consciousness-informing structures of language implies that these engagements can have profound effects on our understanding of reality. Because of this, it is of utmost importance that we consider the origins of machine learning models while establishing structures to ensure that their creation and use is equitable and mutually beneficial. In the current context, this is easier said than done.

At the ecosystem level, where we observe interaction between plants, animals, elements, humans, and non-living information systems, we should expect to experience a co-evolution of all involved species, including machines and humans. How do we become aware of and make best use of this process? Does the tiger know that its stripes match the grass? Is it aware that the buffalo's senses are looped into the form of its own being? How will we know when AI begins to shape our *umwelt*, or even our physical form? And what will we do with that knowledge?

Monster

by Line Henriksen

In *AI Ethics*, Mark Coeckelbergh discusses the so-called "Frankenstein complex", a term coined by science fiction author Isaac Asimov to express a fear of robots. Coeckelbergh suggests that this fear haunts contemporary discourses on AI, with some scientists and investors arguing for the need to approach the developing of AI with utmost caution (Coeckelbergh 2020: 21). Through the summoning of the figure of Frankenstein — the scientist from Mary Shelley's 1818 novel *Frankenstein; or the Modern Prometheus* — the Frankenstein complex also summons the figure of a scientist enamoured by the possibilities of creating life, only to abandon his creation when it ultimately ends up filling him with disgust and dread. This raises some crucial ethical questions that need to be addressed in a contemporary scientific and scholarly context as well: what are the responsibilities of human creators towards their (AI) creations? Even—or perhaps especially—when their creations fill them with fear?

Lucy Suchman takes the Frankensteinian story of abandonment and neglect in the relationship between creator and created as a starting point for addressing issues of responsibility and care in the context of AI. She argues that the increased autonomy of AI reflects vast technological developments but also magnifies how the creator ultimately has little control over the technology once the creation is unleashed into the world, thereby creating imaginaries of "autonomous technologies-as-monsters" (Suchman 2018: 1). Suchman refers to this as "Frankenstein's problem" and suggests that the ethical imperative may not be to insist on regaining control—an impossible task, according to Suchman—but to consider the contexts and circumstances of the "releasing" of one's creatures. "Our inability to control something does not absolve us of being implicated in its futures," she writes, "Rather, our participation in technoscience obliges us to remain in relation with the world's becoming, whether that relation of care unfolds as one of affection or of agonistic intervention" (Suchman 2018: 5).

Remaining in a relation with AI-as-monster means addressing and acknowledging a loss of control that was never there to begin with and that does not absolve one of responsibility. Further still, it means acknowledging some of the deep-seated sociocultural anxieties relating to the unsteady boundaries between human and nonhuman, the one in control and the one controlled. The monster shows how there is no creator without the created, no category of the human without the category of the supposed "nonhuman". The creature therefore always returns, and when it does, it asks us not just why it was created, but also why its creators fear it.

Coeckelbergh, M. *AI Ethics.* Cambridge, Mass., MIT Press, 2020.

Suchman, L. "Frankenstein's Problem", conference paper, IFIP 8.2 "Living with Monsters", San Francisco, CA, 2018. https://hal.inria.fr/hal-02083599.

Posthuman Folklore

by Tok Thompson

Posthuman Folklore is the theoretical perspective that folklore —defined here as socially shared aesthetic traditions— are not unique to humans. There are two main strands to this perspective: the "human-animal" ontological spectrum (particularly influenced by the remarkable new findings from ethology's documentation of rich cultural traditions, dialects, and customs in a variety of animal societies), and the "cyborg" question, tracking how the digital realm increasingly contributes to our culture and sense of selves, through such developments as cyborgs, artificial intelligences, bots, and other new developments.

The dualistic outline of this can be seen in pioneering work on the cyber realm, such as Donna

Haraway's *A Cyborg Manifesto*. As Haraway points out, although these two approaches (animal and artificial) seem in some ways in opposition to each other, they are linked in an underlying way in which the virtual is opposed to the biological, as in the figure of the "cyborg".

The concept of posthuman folklore can thus be seen on the one hand as a theoretical approach and scholarly understanding of how culture is created. On the other hand, posthuman folklore also refers to the folklore itself, the everyday expressions of posthuman outlooks. New words, stories, songs, and legends regarding posthuman outlooks are increasingly common. More and more, AI programs participate and create culture in their own right: writing stories, composing music, and telling jokes.

In terms of context, posthuman folklore should be seen as part of the zeitgeist of the Anthropocene. Global communication, and artificial intelligences, have arrived at the same time (and via the same processes) as global climate devastation and the world's sixth great biological extinction. The idea of listening to other voices, both non-human living forms and non-living artificial forms, are increasingly viewed as a fundamentally necessary step to create a sustainable earth. At the same time, popular culture has often imagined the future in various ways, including replacement by AI, or transmigration of human consciousness to artificial platforms ("transhumanism"), or of escaping earth on spaceships enabled by high technology.

Posthuman folklore is quickly becoming an expanded topic, both in terms of the folklore of the contemporary world, and of the theoretical and scholarly understanding of folklore.

Haraway, Donna. "A Cyborg Manifesto: Science, Technology and Socialist-Feminism in the Late Twentieth Century", in *The Cybercultures Reader*, eds. D. Bell and B.M. Kennedy, (London: Routledge, 2000), pp. 291–324.

Thompson, Tok. *Posthuman Folklore*. Jackson: University of Mississippi Press, 2019.

Digital Legacy

by Elaine Kasket

Legacy may mean assets bequeathed in a will, but more broadly it consists of meaningful impacts that transcend our deaths: the ongoing influence of our words and deeds, and our names in the mouths and minds of our descendants. In computing, "legacy" is an adjective, describing software and hardware that has been superseded but that remains widely used for a time.

Digital legacy is the body of posthumously persistent digital material associated with a once-living individual. Digital legacies may also have monetary value, such as cryptocurrencies, nonfungible tokens, or digitally stored intellectual property. Sometimes, their worth lies primarily in their significance to others. Message and email threads, social media, the contents of cloud accounts and devices, and the search results against someone's name are all ways the dead continue their emotional, social, intellectual, or cultural influence in the world. Eventually the hardware and software supporting a particular digital legacy obsolesces, and the outgoing technology may take the digital dead with it.

Digital legacies are rich tapestries of the deliberate and the unintentional, the active and the passive. We craft our social media posts but forget other tellingly autobiographical data: logs of search histories and websites visited, or information collected through GPS tracking. One person's digital legacy is —almost invariably— collectively rather than individually compiled: both friends and strangers disclose or claim things about us online. Email, message threads, and social media are all co-constructed.

Digital lives often start before birth, courtesy of information-sharing expectant parents, and a comprehensive digital reflection builds rapidly throughout the life span in the modern, intensely data-extractive environment. Upon death, our digital lives transform into legacies by default rather than design, usually housed on platforms and devices not designed with the end in mind. These legacies are neither monolithic nor stable, and those who can access them use the material in them to construct their own narratives to their own purposes.

Digital legacies are interpreted, manipulated, and exploited for personal, commercial, and even criminal ends. In 2020 the musician Kanye West gifted his wife a self-scripted hologram of her late father. In early 2021, Microsoft filed a patent for chatbots of the dead, and MyHeritage launched Deep Nostalgia, using deep learning to animate old family photos. Such practices are burgeoning and largely unregulated, taking digital legacy into ethical and practical territories occupied by AI, machine learning, deepfakes and identity verification.

Radical Otherness

by Paul N. Edwards

Artificial intelligence techniques such as machine learning, evolutionary computation, artificial life, and neural networks, develop logics and methods of their own. Clues to the *radical otherness* of AI logic (Edwards 2018) can be seen in, for example, Google's 2015 experiments with AI "dreaming." Engineers reversed the usual process of image recognition by a neural network to have it generate images of its own instead. These images, sometimes beautiful and always strange, show neural nets interpreting horizons as towers and pagodas, trees as buildings, and leaves as birds and insects. Like people, they sometimes seem to seek meaning in meaningless things, generating images of dogs, pig-snails, camel-birds, and dog-fishes from photographs of cloudy skies (Mordvintsev and Tyka 2015). A neural net for recognizing dumbbells produced images of dumbbells, as expected, but always with part of a human arm attached (no doubt because its training data included many pictures of dumbbells in use.) In another evaluation, neural nets capable of recognizing sheep also identified fields full of white rocks (but no sheep) (Shane 2018).

Evolutionary computing uses the principles of mutation and selection to evolve pragmatic strategies for achieving predefined high-level goals, aka "fitness functions." Unlike real-world evolution, however, these fitness functions are defined as quantitative metrics. As a result, evolving algorithms sometimes find creative ways to satisfy the metric that do not reflect the experimenter's actual qualitative goal. In one case, a researcher's fitness function included the goal of limited CPU usage; the evolutionary computing solution was to create programs that immediately slept and never woke up, thus using zero CPU cycles. Another program, tasked with sorting lists, evolved to simply delete the lists so that nothing remained unsorted (Lehman et al. 2018).

So long as they work for their intended purposes (where "work" is defined as approaching or exceeding human performance on the same task), these and other AI technologies are being widely deployed. Significant errors and difficulties often only become apparent after operational implementation. In 2015, for example, the Google image searcher labeled some images of Black people as "gorillas," causing the company to block the "gorilla" tag (Simonite 2018). AI systems learn from examples, i.e., data about a subject of interest. When normal patterns are disrupted —or when what is "normal" is also unethical or unjust— their "understanding" based on past data can be dysfunctional, as in the well-known case of the racially biased COMPAS algorithm used to predict recidivism among convicts coming up for sentencing (Angwin et al. 2016).

The potential for radical otherness in machine logics, methods, and goals, along with the strong evidence that AI may reproduce and even exaggerate the human biases contained in training data, has led to research subfields in explainable AI (Barredo Arrieta et al. 2020), AI safety (Amodei et al. 2016), and "AI alignment" (maintaining compatibility between AI and human goals and ethical principles) (Taylor et al. 2016; Russell 2019).

Amodei, D., C. Olah, J. Steinhardt, P. Christiano, J. Schulman, and D. Mané, "Concrete Problems in *Ai Safety*," 2016, arXiv 1606.06565v2.

Angwin, J., J. Larson, S. Mattu, and L. Kirchner, Machine Bias, 2016. Accessed at https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing.

Barredo Arrieta, A., N. Díaz-Rodríguez, J. Del Ser, A. Bennetot, S. Tabik, A. Barbado, S. Garcia, S. Gil-Lopez, D. Molina, R. Benjamins, R. Chatila, and F. Herrera, "Explainable Artificial Intelligence (Xai): Concepts, Taxonomies, Opportunities and Challenges Toward Responsible AI," *Information Fusion* 58 (2020) 82–115.

Edwards, P.N., "We Have Been Assimilated: Some Principles for Thinking About Algorithmic Systems," *IFIP Advances in Information and Communication Technology: Living with Monsters? Social Implications of Algorithmic Phenomena, Hybrid Agency, and the Performativity of Technology*, eds. U. Schultze, M. Aanestad, M. Mähring, C. Østerlund, and K. Riemer. Cham, Switzerland: Springer International Publishing, 2018, 19–27.

Lehman, J., J. Clune, D. Misevic, C. Adami, L. Altenberg, J. Beaulieu, P. J. Bentley, S. Bernard, G. Beslon, D. M. Bryson, P. Chrabaszcz, N. Cheney, A. Cully, S. Doncieux, F. C. Dyer, K. O. Ellefsen, R. Feldt, S. Fischer, S. Forrest, A. Frénoy, C. Gagné, L. L. Goff, L. M. Grabowski, B. Hodjat, F. Hutter, L. Keller, C. Knibbe, P. Krcah, R. E. Lenski, H. Lipson, R. MacCurdy, C. Maestre, R. Miikkulainen, S. Mitri, D. E. Moriarty, J.-B. Mouret, A. Nguyen, C. Ofria, M. Parizeau, D. Parsons, R. T. Pennock, W. F. Punch, T. S. Ray, M. Schoenauer, E. Shulte, K. Sims, K. O. Stanley, F. Taddei, D. Tarapore, S. Thibault, W. Weimer, R. Watson, and J. Yosinski, "The Surprising Creativity of Digital Evolution: A Collection of Anecdotes From the Evolutionary Computation and Artificial Life Research Communities," 2018, *arXiv* 1803.03453v3.

Mordvintsev, A., and M. Tyka. "Inceptionism: Going Deeper Into Neural Networks", 2015. Accessed at https://ai.googleblog.com/2015/06/inceptionism-going-deeper-into-neural.html.

Russell, S., *Human Compatible: Artificial Intelligence and the Problem of Control.* New York: Penguin, 2019.

Shane, J., "Do Neural Nets Dream of Electric Sheep?" (Blog Post), 2018. Accessed at https://aiweirdness.com/post/171451900302/do-neural-nets-dream-of-electric-sheep.

Simonite, T., "When it Comes to Gorillas, Google Photos Remains Blind." *Wired*.

Taylor, J., E. Yudkowsky, P. LaVictoire, and A. Critch, 2016. "Alignment for Advanced Machine Learning Systems." ed. S. M. Liao (New York: Oxford University Press, 2018), 342–82.

Crip AI

by Louise Hickman

Engineers working at mobility companies have increasingly designed wheelchairs that climb stairs, which are celebrated for resolving the inaccessibility of the built environment. What motivates this design is a philosophy of tech solutionism, one that imagines a frictionless —because non-disabled— future. Instead of requiring ramps and elevators to be constructed in public spaces, these wheelchairs offer a private solution to the problem of access. They are guided, in other words, by a design practice that writes out (and depoliticizes) disability from our futures. (Kafer 2013; Hamraie 2017) What, then, are the potentials of crip AI? Reading against the horizons set by the principles of frictionless design, crip AI is all about understanding and working with friction, even about the potential to train data sets to make space for transgression, dissent, and refusal. Crip AI resists the automation of accessibility and values instead the care and expertise provided by humans in their interface with machines. Crip AI, as both an object and analytic, thus does not deny the coexistence of disability and technology but rather interrogates the utility of artificial intelligence and data driven systems from outside a horizon set by the promises of tech solutionism. Of course crip AI is not a singular project that privileges epistemic knowledge production, including design practices, over others. It is rather a broader ethics that accounts for, and attempts to put into motion, a socially-just commons that is as concerned with the distribution of fair wages for taxi drivers of accessible vehicles and the audiologist that prescribes AI hearing aids as it is for the universal —but not homogenous— provision of access. Epistemologically it calls for a range of perspectives and expertises and seeks to build networks of collaboration between "users" and "providers," between normatively and non-normatively situated actors. Like data, the experience of living with a disability is not generalizable and is determined by the diverse social policies, legal regimes, and built environments in which it unfolds. Above all, crip AI challenges the politics of assimilation inherent in technological solutionism, motivated by data-driven systems, that seek to dissolve disability into an ideological ideal of ability, instead of “staying with the trouble” of the inherent tensions between bodies, access, and the commons.

Disabled Cyborg

by Laura Forlano

I am a disabled cyborg[1]. I've been living with Type 1 diabetes for the past 10 years. For me, it is not only my own body that is disabled but the technologies I live with everyday also share my disability. These technologies —a "smart" insulin pump, a sensor, a transmitter, a blood sugar meter, as well as all of the parts that allow the system to function— are prone to everyday failures and breakdowns, glitches and bugs that require intense care, maintenance, and repair in order to function. I often say that I am not sure whether I am taking care of my devices or if they are taking care of me. Such is the relational work of living with disability and living with machines.

The disabled cyborg as a concept intervenes into the mythologies around technological perfection and reveals the mess of the realities of living with these intimate infrastructures, which reach deep into the body and expand outwards to the world. Rather than dismissing these failures as a problem to be solved, the disabled cyborg draws on experiences of everyday life in order to raise questions about the ethics, politics and harms of life with machines.[2] The promise of a better tomorrow does not absolve technology companies of responsibility for the harms they are inflicting today.

The disabled cyborg is a monster and it also creates monstrosity. But, the disabled cyborg does not want to be "solved". She is nudged and pricked, alerted and alarmed. She is frequently awoken in the middle of the night in order to respond to the needs of the machine. But, she really doesn't know where she begins and where the machine ends. The disabled cyborg is other than human, communicating in automated vibrations that play out next to the skin, seeking modes of creative expression that expand our notions of what it means to be human.

This AI system is keeping me alive but it's also ruining my life.

1. Laura Forlano, "Data Rituals in Intimate Infrastructures: Crip Time and the Disabled Cyborg Body as an Epistemic Site of Feminist Science," *Catalyst: Feminism, Theory, Technoscience* 3, no.2 (2017): 1-28.

2. Laura Forlano, "The Danger of Intimate Algorithms," *Public Books* (April 13, 2020).

Slow Technology

by Adan Jerreat-Poole

Faster-than-light travel, AI spaceships, exoskeletons, and teleportation. Look to any popular North American science fiction franchise and the promise of neoliberal technological development becomes clear. It will enhance us. It will fix us. It will speed us up. This sleek chrome future emerges from a culture built on genocide and slavery, powered by capitalism, white supremacy, and ableism— systemic discrimination against disabled bodies. The stories we tell about technology matter; to create a technology, first, we have to imagine it— and its uses. So many technologies have been crafted for war or manufacturing; our imaginations stagnate, trapped in fantasies of domination. What Eli Clare, in *Brilliant Imperfections*, calls “the ideology of cure,” is deeply embedded in this culture of violence. Attempts to eradicate disability revolve around speeding us up, getting us on tempo, trying to force our bodyminds to match the neoliberal race of production. And when we fall behind, when we succumb to our need for rest or care? Well, disabled people have a long history of being abused by the state, framed as waste or wasted, “treated” with incarceration, straitjackets, forced sterilization, and other brutalities.

The science fiction imaginary of future AI is tethered to the current framing of digital media as fast and efficient, increasing productivity, and hyper-independence. Communications companies promise a utopia of efficiency and speed, even as they erase the existence of disabled users and ignore the access barriers to using screen technology — from the dexterity needed to operate a cell phone to a lack of captions. What if we reoriented our understanding of technology around slowness, foggy headedness, awake at 3a.m. insomnia? Around glitches and failures and frozen screens? What if AI development was centred on disabled bodies - slow bodies, bodies that are unrhythmed or differently rhythmed, bodies that need more time to learn that program, and more time to rest. What if the story we tell ourselves isn’t that AI will speed us up or generate additional wealth for the 1%, but instead, will make room for interdependency and collective care? What if technology was crafted not to cure or kill disabled people, but to create access - access to community, education, health care, and public space? What if the problem in need of fixing isn't my slow bodymind but the culture and society I live in? What if we reorient AI development around the concept of slow technology?

Compulsory Able-bodiedness

by Olivia Banner

The reigning mythos of AI for health care, biomedical sciences, and everyday living centers on curative discoveries, optimizing health and wellness, and precision diagnostics and treatments. Within these progressive narratives lurks an underlying assumption of "getting better," of curing what is broken in people's minds, bodies, and behaviors. Crip studies troubles this mantra of "getting better" as a compulsory perspective that denies there might be value in those lives designated abnormal. Building on Adrienne Rich's 1980 conceptual framework in "Compulsory Heterosexuality and Lesbian Existence," where Rich reveals heterosexuality as a compulsory system permeating every aspect of (Western) existence to obscure and denigrate forms of queer female life, crip theorist Robert McRuer develops the concept of compulsory able-bodiedness (2006), namely, the ubiquitous, unexamined valuing of able-bodiedness that denigrates, denies, and extinguishes value in disabled life. Consider almost any health-related research into AI and you will spy a fundamental logic of cure, rehabilitation, or prosthesis, where AI is constructed as the mechanism for expunging its denigrated, sometimes unnamed, other: the disabled bodymind. This is, as one critic has put it, a eugenics logic, which has underwritten AI since its mid-century inception (Stovall 2021).

The logic of cure underwrites both sides of the equation: AI itself is curative of muddled procedures; AI logic will finally produce the cures (cancer, kidney disease) we've all been waiting for. This logic underwrites continued massive investment in biological, rather than environmental, causes of and preventions for disease. The rehabilitative logic of AI is pronounced in developments such as automated therapy chatbots, which promise to assuage mental health issues, again with no attention to social causes, social and cultural differences in users, and with the assumption that those people with bodyminds designated abnormal might find other, perhaps collectivized, forms of care and caring for each other.

AI as prosthesis has recently made starkly clear the ways in which disabled lives are an afterthought in technology development. Starship Technologies is one among many companies developing and contracting to pilot what they call robot-delivery vehicles. It is unclear how much AI is actually involved: the company hires underpaid workers to remotely "man" the vehicles, which are equipped with cameras, yet the pervasive rhetoric that these are autonomous vehicles exposes the power of AI rhetoric. University campus dining services contract with the company, and soon a dining services Instagram account is filled with images of these machines, with their cute-friendly Wall-E–inspired design, on campus sidewalks, extolling their virtues for easier access to food, supposed benefits for disabled students, and, during the pandemic, so-called contactless delivery. In other words, these automated delivery vehicles are rolled out under rhetorics of increasing health and wellbeing. As a wheelchair-using University of Pittsburgh student clarified on Twitter (Ackerman 2019), the vehicles block wheelchair-using students from accessing the very curb cuts mandated in the Americans with Disabilities Act to ensure disabled people could access public life; additionally, the service actually often doesn't work for wheelchair-using students with mobility issues, who are unable to reach into the food-carrying compartment. Bring to the attention of automated delivery vehicle development companies this fundamental conflict in rights —between disabled people and their vehicles— and one will get into muddled conversations about how a majority of students are served, while "only" a minority of students are harmed —or, in the case of the University of Pittsburgh, the company decides that its analysis of video of the situation overrides the testimony of a disabled student (Wolfe 2019). As disability theorists have argued, data are often used to alarm; they are also often used to obscure. In this evaluative frame, AI serves to capacitate enough individuals to override the fact that it debilitates others. Here, AI serves compulsory able-bodiedness, in practice marginalizing disabled lives in order to buttress an able-bodiedness served by AI prosthetics.

Ackerman, Emily, 2019. https://twitter.com/EmilyEAckerman/status/1186363305851576321.

McRuer, Robert. *Crip Theory: Cultural Signs of Queerness and Disability.* New York: New York University Press, 2006.

Rich, Adrienne. "Compulsory Heterosexuality and Lesbian Existence," *Signs: Journal of Women in Culture and Society* 5, no. 4 (Summer 1980): 631–660.

Stovall, Natasha. "Eugenics Powers IQ and AI," *Public Books*, March 24, 2021. www.publicbooks.org/eugenics-powers-iq-and-ai/.

Wolfe, Emily. "Starship Issues Statement after Reviewing Footage of Viral Incident on Forbes Crosswalk," *The Pitt News* October 22, 2019. www.pittnews.com/article/151742/news/starship-robot-wheelchair-incident/.

Overpopulation

by Luiza Prado de O. Martins

In 1798, British scholar Thomas Malthus published An Essay on the Principles of Population. In it, he argued that whilst a nation's ability to produce food could increase arithmetically, its populace would grow exponentially, leading to a cycle that would culminate in what is known as a Malthusian catastrophe—a destructive event of famine or war that would forcedly cause depopulation. Anthropologist Eric Ross notes that Malthusian theories have been fundamental "[…] to provide an enduring argument for the prevention of social and economic change and to obscure, in both academic and popular thinking, the real roots of poverty, inequality, and environmental deterioration" (2000, p.01).

Since Malthus' initial formulation, his arguments have periodically been revisited and recycled by academics and activists alike, from British biologist Paul Ehrlich (1969) — one of the first to blame environmental collapse on overpopulation — to American activist Margaret Sanger, whose crusade for reproductive rights was animated by the perception that many of the problems that afflicted poor, racialized women were results of unregulated fertility (Roberts 1997).

Feminist scholars Kalpana Wilson (2012), Laura Briggs (2002), Dorothy Roberts (1997), Angela Y. Davis (1983), Elena Gutiérrez (2008), and Anne Hendrixson (2004) stress that population control policies implemented in the Global South need to be understood as continuations of the colonial/imperial project. Briggs reports that in the late 1940s overpopulation had already become a key economic narrative pushed by Western interests. From this perspective, the unmanaged reproduction of those living at the margins of the capitalist world heavily hindered the ability of the bourgeoisie to accumulate wealth. Indeed, scholar Michelle Murphy points out that although the concept of population had already been postulated as a problem by Malthus in the 18th century, it is in the postwar period of the 20th century that it emerges as a managerial category, a "quantity problem fixed by adjustable birth and death rates" (2018, p.103). She goes on to describe population as "an artifact of a particular way of counting" (ibid.), able to create a tally of bodies, to abstract them in such a way that it becomes possible to analyze their existence through a managerial gaze; a gaze that, she writes, is then poised to ask "what should be done about them?" (ibid.). It is through this conceptualization of population that lives, then, become subsumed into nothing more than deletable data points; bodies in excess.

II.

III.

Model,
Peak data,
The Problem of Scale,
Constraint,
Secret User,
Bias,
Embedding,
User,

Agential Assemblage,
DAO,
Connectome,
Error,
Algorithmic Rating,
The Confidence Interval,
Latent Reading,
Parasemiotic Synthesis,
Templexture,
Spawning,
Style Imitation,
3D Printed
Training Data.

Model

by Francis Tseng

A *model* is a simplified representation of something (its referent). It may be of an object or something more complex, such as a system, and it may be rendered as a physical construction or as a digital imitation. Our understanding of the world that drives our day-to-day decision-making can be said to be an ensemble of models. The value of simplification is typically for clarity —under the premise that a more concise theory is a better one, and the complete system might be too complicated or noisy to consider all at once— but also for practical reasons, such as limited computing resources. They may be simple because we can't do any better —we just don't know enough about the referent. As a *simplified* representation, models necessarily exclude details and make simplifying assumptions. What assumptions are appropriate to make and details appropriate to exclude depend on the model's purpose and the existing understanding of the underlying system.

Models can carry substantial potential for harm, either from ignorance or malice. A model might be harmful in its purpose, it may be an inaccurate representation, or it may make exclusionary or dangerous assumptions. It's easy to forget that the model and its referent are not the same, and to treat the model as an infallible, exact representation. There is *always* some uncertainty: if a model's prediction is wrong, it doesn't necessarily mean the model is, and an intervention that works in the model may not translate well to the real world. Models have to be handled with care and their limitations need to be understood and communicated.

When working with models, the emphasis is usually on the model-as-object, like an oracle to ask questions. It might be better to focus on model-as-process: the process of designing and implementing a model often raises important questions about your understanding of its referent and what unstated assumptions you have. Thought this way, there is a clear divide between models that are developed and operate opaquely, like neural networks, and those that are consciously constructed —and reflected on— by people. A model, ideally, not only helps us make better decisions, but enhances our understanding, and can't be abused to diffuse the responsibility for decisions.

Peak Data

by Geert Lovink

Data, the raw material from which information is derived, is being stored, copied, moved, and modified even more easily than ever before. The data quantum leap reaches levels outside of our imagination. Surrounded by Internet of Things sensors, AI recommendation systems, invisible algorithms, spreadsheets, and blockchains, the “difference that can make a difference” can no longer be identified.

We’re facing a declining return on difference. With ever more data —either good or bad— we don’t gather new insights. Peak data is ahead of us. Following the definition of peak oil, we can say that peak data is the moment when the maximum rate of extractivism is reached and the platform logic implodes, after which a steep decline sets in until systems and their users are outside of the entropy danger zone.

More data is not going to turn into more information and better-informed citizens, let alone critique. Once we reach peak data, the presumption that the better the information, the better the decision-making process can no longer be maintained. Meaningful units no longer provide us with significant differences and we are looking right into the abyss of bit rot. After the peak, the degradation of data will grow exponentially and databases will be compromised beyond repair. We always knew that data never had intrinsic value. But what happens when we can no longer gain competitive advantage of our data and the crisis of the "informed decision" sets in? More and more are aware that data are manipulated, fuelled by subliminal behavioural interventions and filtered through algorithms.

As a result of current platform stagnation, indifference, cynicism, denial, boredom, and disbelief are on the rise. We are caught in a turbulent whirlwind of dialectical forces and can no longer make a distinction between drastic techno-determinist forces (such as automation, AI and 5G) and the collapse of human awareness, leading to mass depression, refusal, and uprises driven by anger, fear, and resentment. In a good cybernetic tradition, the technical tipping point of peak data will be both attributed to AI's out of control army of (ro)bots and the rebel wisdom of a dissident intelligentsia that is both local and planetary.

This is not merely a problem of “overload” that can be solved with a periodic reset. Rather not, dataprevention.net/ is the future. Let’s reclaim the time/space to decide. We have the right to refrain and do not need to be told to forget.

The Problem of Scale

by Bassem Saad

An epistemological position espoused by contemporary left-wing and socialist theorists, in response to the neoliberal problematization of planning, argues that if during the time of the Soviet Union there wasn't enough computational power to access the necessary information for a planned economy to be successful, there just might be enough computational power to do so at the moment or in the near future. This has been referred to as the calculation problem, which we may or may not have enough silicon to resolve. The direct heirs of scientific socialism maintain that the currently-existing logistics systems of mega-platforms, such as Amazon or Google, might be repurposed to solve the calculation problem, giving central planners in a socialist future the ability to calculate the quantities of goods being produced, circulated, and consumed.[1] Any argument about a newfound possibility of technology to solve the calculation problem is positivist-evolutionary, and may rightly be considered technologically deterministic. It assumes that a certain threshold of technological advancement is a prerequisite for the restructuring of the totality of socio-economic relations.

Also latent among these views is a conflation between questions of epistemology and knowledge on the one hand, and questions of control and government of persons on the other.[2] Understanding the input and output variables of an economy does not equate to having the ability to control or change said variables. Additionally, enforcing centralized control in a planned economy would still necessitate the forceful management of labor-power, that is the mass surveillance, firing, and hiring of the workers responsible for that labor-power.

Thinkers of decentralized planning who profess autonomist inclinations, such as the Italian mathematical physicist Matilde Marcolli and the American writer Jasper Bernes, are not so keen on this prospect of an authoritarian distribution of workers among productive sectors, one that operates independently of workers' own professed desires and voluntary associations. Yet they agree that reckoning with problems of scale will necessitate computational forms of optimization that are not based on profit. Here, the distributed decision support system commissioned by the Allende government in 1971 and designed by the British cybernetician Stafford Beer, Cybersyn, is often invoked as a past future foreclosed too soon. Cybersyn aimed to grant maximum autonomy to worker-owned factories while minimizing centralized control. Along with OGAS, the unrealized Soviet network, Cybersyn anticipated the arrival of the internet, not in the service of atomized consumption, but towards large-scale decentralized planning sourced from bottom-up inputs.

Drawing on both Cybersyn and OGAS, Marcolli grapples with the problem of scale in decentral planning by conceiving of two types of instruments to connect between individual cooperatives, defined as nodes of a decentral network. Instruments of connectivity, such as P2P networks and public transportation, increase the degree of causal influence between nodes. While instruments of complexity, such as cultural products that are not generated by market dynamics, increase the effective complexity of a network.[3] In this vein, the decentral speculator-planner may forge ahead not by imagining mega-structural systems run solely by socialist government, but by thoroughly considering the bridges, exchanges, and causal connections between currently existing cooperatives and interest groups.

1. William Paul Cockshott and Allin Cottrell, *Towards a New Socialism* (Nottingham, UK: Spokesman, 1993).

2. J. Bernes, “Planning and Anarchy”, *South Atlantic Quarterly* 119, no.1 (2020): 53-73. doi:10.1215/00382876-8007653.

3. A. Apolito, “The Problem of Scale in Anarchism and The Case for Cybernetic Communism” (2020).

Constraint

by Florian Cramer

Constraint: a limitation of a system that consequently limits the people, beings, things or entities using, interacting with, or being governed by, this system.

The concept of constraints as computational devices goes back to the literary writers group Oulipo (founded in Paris in 1960), which in turn was inspired by mathematics and by rule-based poetics of the European Renaissance era.

Through a wider oulipotic lens (that transcends the Oulipo group), algorithms are always constraints. Programmed systems - including AI systems - then need to be thought of as being (a) internally constrained and (b) externally constraining. As opposed to a conventional humanist position, this does not mean disapproval. In the collective work of Oulipo and others following its model, formal constraints are being embraced, collected, and playfully self-imposed.

The understanding of new technologies as constraints contradicts their more common understanding as *extensions* (of human capabilities). The latter had been established by Marshall McLuhan in the 1960s and become, by the 1990s, the Internet economy's "Californian Ideology", with an implicit equation of technological progress and societal progress, and a culture of techno-solutionism, version updates, and even techno-eschatologies such as the "Singularity".

What seems to be missing in both mainstream and alternative systems development (including Free/Libre/Open Source Software and new media arts) is a design philosophy that does not simply promise to remove —or "liberate us" from— the constraints existing within and being exercised by programmed systems, but which acknowledges, discloses, and critically embraces them.

Secret User

by Liliia Zemnukhova

User is now a central concept of every (near-) technological enterprise. Users are modeled, imagined, disciplined, punished, involved, and they mostly stay on the other side of technology as if they are acting secretly from and for developers. The history of Human-Computer Interaction (HCI) as a discipline sheds a little light on this "secret user" effect.

The goals of human-technology interaction have changed in different periods of HCI development. The initial image of a user anchored the principles of ergonomics and engineering psychology with "calculated" perceptual abilities and motor functions. The "user model" assumed standard, "average" solutions in the design of the interface. No need to show the limitations of this approach ignoring individual features.

Later, studies in artificial intelligence shifted the user focus in HCI. Its "golden age" marked a turn toward cognitive science: the user became a carrier of the "cognitive system". In the process of long-term interaction with the computer, "mental models" are formed —here the user model, the design model, and the image of the system collide as a consensus of the first two. The interface designers had to take into account the views of different users and involve them in the development process.

By the mid-1980s, HCI ideas entered the mainstream for other scientific areas, where the problem of new users flourished. With the help of social scientists, developers turned their attention to different user groups and the contexts in which they operate the system; increasingly, both the cultural context and the work context are taken into account. One of the most famous examples of ethnomethodological research of technology is associated with the name of Lucy Suchman and her research commissioned by Xerox PARC: she showed that in everyday life, users behave differently from how developers think they do.

The mobile revolution has made the interaction between users and technology even more dissolved in the everyday world, and technology more receptive to user needs. Digitalization, moreover, aggravated the positions of users: on the one hand, algorithmic "black box" made users powerless in terms of technical knowledge; on the other hand, every new (kind of) user became a sort of quality assurance acting secretly both for developers and users themselves. The digital space makes technology invisible and incomprehensible to users, and therefore requires their additional effort to make the interaction smooth.

Carroll, J.M., V. Tech, "Introduction: Toward a Multidisciplinary Science of Human-Computer Interaction," in J. Carroll (ed.) *HCI Models, Theories, and Frameworks: Toward a Multidisciplinary Science.* USA: Morgan Kaufmann Publishers, 2003: 1-10.

Bolter, J.D., D. Gromala, *Windows and Mirrors: Interaction Design, Digital Art, and the Myth of Transparency.* Cambridge, MA: MIT Press, 2003.

Norman, D. *The Design of Everyday Things.* New York: Doubleday, 1990.

Suchman, L.A. *Plans and Situated Actions: the Problem of Human-Machine Communication.* Cambridge: Cambridge University Press, 1987.

Bias

by Os Keyes

Dictionary definitions of bias are everywhere. The National Institute of Standards in Technology writes that bias is “the degree to which a reference value deviates from the truth”. Biases that are concerning are “biases… that can lead to harmful societal outcomes”. [1] As this report’s existence suggests, bias —and the corresponding work of de-biasing— is a central focus in “ethical AI”, from academic research to corporate initiatives. IBM, for example, now offers an “AI Fairness 360” toolkit, with which they promise an organization can “examine, report, and mitigate discrimination and bias in machine learning models”. [2]

There are many concerns with this monomaniacal focus on “bias”, from the contextuality of “harm” to the difficulties that come from the way that groups’ recognition (and presence in data) are dependent on broader, political processes.[3] But one of the most worrying is the way that a focus on tinkering with the algorithms themselves obscures broader political questions about what algorithms we choose to build, or not, and the consequences of deploying even apparently “debiased” systems.[4]

Asking “should we de-bias” or “how do we de-bias” presumes that the problem is bias: that AI is needed in a domain, but simply needs some technical tweaks. These questions contribute little to broader questions about the consequences of the algorithm, who (else) it benefits beyond the user, and whether it is needed at all. Debiasing can ask why two people were given different diagnoses by a medical AI —but it cannot answer which diseases we take seriously enough to build diagnostic tools for, or do not, and why. It can ask whether Alexa works with different accents, but not whether the surveillance capitalism Alexa represents works for anyone, at all.[5]

These are, then, dangerous questions —questions that appeal to technologists largely because they appear to have technical solutions. The questions we should be asking are very different;
questions like, speaking broadly:

What worlds do we want to live in?

What problems do we have in getting from here to there?

Does this software bring us closer —or further away?

These are difficult questions, with difficult (and multiple) answers. They orient us away from the world of the technical and pragmatic, and towards the speculative and the hopeful.[6] This is both why they are so alien to conventional ways of thinking about AI harms, and why they are so urgent.

1. https://www.nist.gov/artificial-intelligence/proposal-identifying-and-managing-bias-artificial-intelligence-sp-1270.

2. https://aif360.mybluemix.net/.

3. Michele Gilman and Rebecca Green, "The surveillance gap: The harms of extreme privacy and data marginalization," NYU Rev. L. & Soc. Change 42 (2018): 253. Os Keyes, "Automating autism: Disability, discourse, and Artificial Intelligence," *The Journal of Sociotechnical Critique* 1.1 (2020): 8.

4. Anna Lauren Hoffmann, "Where fairness fails: data, algorithms, and the limits of antidiscrimination discourse," *Information, Communication & Society* 22.7 (2019): 900-915.

5. Cami Rincón, Os Keyes, and Corinne Cath. "Speaking from Experience: Trans/Non-Binary Requirements for Voice-Activated AI," *Proceedings of the ACM on Human-Computer Interaction* 5.CSCW1 (2021): 1-27.

6. Abeba Birhane and Olivia Guest, "Towards decolonising computational sciences," *arXiv* e-prints (2020): arXiv-2009.

Embedding

by AA Cavia

Agential embeddings (environments) are to be distinguished from representational embeddings (models). In their mathematical guise embeddings are injective morphisms, transformations which inject a sub-structure into a broader context, or inversely, those which decompose a representation to reveal its latent topology. Dimensionality reduction is the means by which high-dimensional encodings are transformed into low dimensional embeddings within *deep learning* models (Bengio et al. 2017). This stands in sharp contrast to *kernel methods*, which seek to project data into higher dimensions in the form of *support vector machines*, an attempt to discern a structure in the input by speculating a new domain. Deep learning as such can be conceived as a paradigm shift in AI, from the construction of kernels to the induction of embeddings, a reframing of pattern recognition along geometric lines. The associated *Manifold Hypothesis* holds that real world data forms lower dimensional manifolds in its embedding space (Fefferman et al. 2016). In this view, statistical inference is cast as the untangling of manifolds into smooth, locally Euclidean surfaces, *hyperplanes* which act as boundaries delineating categories or classes. Acts of prediction and classification, which typify the image of intelligence put forth by contemporary AI, are reliant on such geometric feats. Deep learning models no longer embody the flat, static associations of a network, but rather dynamic morphisms in a continuous vector space, evincing a *dimensional plasticity* which marks out their inferential capacity. Embeddings are those geometric acts which constrain the dimensionality of this space of reasoning, while maintaining certain topological invariances, to infer a manifold representation of the input. Absent such techniques, machine learning models would otherwise succumb to the *curse of dimensionality*, a reference to the sparse correlations manifested whenever sampling data from the real world (Verleysen and Francois 2005).

Bengio, Yoshua, Ian Goodfellow, and Aaron Courville, *Deep Learning*, vol. 1. Cambridge, MA: MIT Press, 2015.

Fefferman, Charles, Sanjoy Mitter, and Hariharan Narayanan, “Testing the manifold hypothesis,” in *Journal of the American Mathematical Society* 29, no. 4 (2016): 983-1049.

Verleysen, Michel, and Damien François, “The curse of dimensionality in data mining and time series prediction,” in *International Work-Conference on Artificial Neural Networks*. . Berlin/Heidelberg: Springer, 2005: 758-770.

User

by Kalli Retzepi

A user can be a sentient or non sentient[1] being.

A user can be general purpose, end, super, novice, advanced, hacker, first-time, experienced, opinionated, in and out of control, liquid[2], Turing Complete[3].

A user can turn on, turn off, plug in, unplug, boot, reboot, restart, power cycle, power on and off.

A user can type, point, click, scroll, swipe, pan, flick, pinch, drag, tap, long tap, double tap, enlarge, shake, rotate, speak to, be spoken to, photographed, videotaped, recorded.

A user can be happy, patient, impatient, confused, mistaken, right, wrong, angry, sad, anxious, busy, entitled, curious, involved, engaged, attention-hungry, addicted.

A user can navigate, search, like, share, tweet, follow, join, send, post, comment, input, lock, unlock, request, download, stalk, lurk, play, buy, bet, watch, game, mint.

A user centres design, creates experience, retention, engagement, generates revenue, becomes TIME person of the year[4].

A user can be advocated for, researched, designed, tested, investigated, explained, evangelized[5], optimized.

A user can be tracked, collected, counted, averaged, profiled, catalogued, prioritized, data-mined, quantified, surveilled.

A user built the Web[6].

A user can rebuild it.

1. Foreign Objects, "A guide for the bot curious," part of 2020 Mozilla Creative Awards https://about.botor.no/.

2. Rainar Aasrand, "Liquid user between states and global platforms," *Art, Culture and Technology* (Massachusetts Institute of Technology, Department of Architecture, 2017). http://hdl.handle.net/1721.1/111544.

3. Olia Lialina, "Turing-Complete User," appendix A + B, 2012, updated 2021 http://contemporary-home-computing.org/turing-complete-user/.

4. Olia Lialina, "Turing-Complete User," appendix A + B, 2012, updated 2021 http://contemporary-home-computing.org/turing-complete-user/.

5. Kalli Retzepi, "You, the users," *Interface Critique Journal* 2, eds., Florian Hadler, Alice Soiné, Daniel Irrgang (2019).

6. Olia Lialina, "Rich User Experience, UX and the Desktopization of War," in *Interface Critique Journal* 1, eds., Florian Hadler, Alice Soiné, Daniel Irrgang (2018 [2015]) DOI: 10.11588/ic.2018.0.44737.

Agential Assemblage

by Martin Zeilinger

The idea of artificial intelligence poses a fundamental conceptual challenge to any assumption of the singularity, centrality, or supremacy of human agency. Artistic experiments with AI can explore and advance this challenge through a rethinking of creative agency beyond humanist boundaries of *anthropos*. Taking up posthumanist views on agency (e.g., Barad 2007, Bennett 2010, Braidotti 2013)[1], Jane Bennett's concept of the agential (or agentic) *assemblage* is a useful tool for doing so. Developed on the basis of Gilles Deleuze and Félix Guattari's discussion of assemblage, Bennett's concept invokes "groupings of diverse elements" with "uneven topographies" that are "not governed by any central head" but are nevertheless "able to function despite the persistent energies that confound them from within".[2] While each actant within an assemblage has a "certain vital power," there also is, as Bennett notes, "an effectivity proper to the grouping as such: an agency of the assemblage".[3] In AI art contexts, this perspective can help to recognize the extent to which human artists become entangled with computer hardware, software, algorithms, and other tools, crafts, and resources, including the knowledge bound in datasets or the subjectivities of dataset labelling workers. The concept of the agential assemblage, in other words, offers a way to think AI beyond anthropomorphic framing (cf. Darling 2017)[4], and AI art beyond the singular, unified artist, their individualized voice, and their uniquely spirited creative expression. This also means that issues traditionally linked to humanist conceptions of agency —such as meaning-making, self-determination, autonomy, expressive freedom, or the capacity for ownership— are no longer the exclusive domain of the human artist.

Many works of AI art can be usefully interpreted as constituting agential assemblages. For instance, the Slovenian artist Maja Smrekar's ongoing project *!brute_force*[5] introduces canine intelligence into an experimental AI training regimen, in order to explore how human and non-human ontologies of agency co-constitute one another (see Zeilinger 2021, Chapter 7)[6].

Part of the artwork takes the form of iterative ludo-scientific events that involve humans, dogs, and AI-based actants, who learn from each other while also training each other. In this way, *!brute_force* triangulates a new form of distributed agency, co-determined by and shared among the actants that constitute the complex assemblage of the art work.

1. Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham, NC: Duke University Press, 2007). Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham, NC: Duke University Press, 2010). Rosi Braidotti, *The Posthuman* (New York: Polity, 2013).

2. Bennett, *Vibrant Matter: A Political Ecology of Things*, 23-24.

3. Bennett, *Vibrant Matter: A Political Ecology of Things*, 24.

4. Kate Darling, "'Who's Johnny?' Anthropomorphic Framing in Human-Robot Interaction, Integration, and Policy," in *Robot Ethics* 2.0, eds. P. Lin, G. Bekey, K. Abney, R. Jenkins (Oxford: Oxford University Press, 2017). https://ssrn.com/abstract=2588669 or http://dx.doi.org/10.2139/ssrn.2588669.

5. Maja Smrekar, *!brute_force*. Ongoing. https://www.nonbruteforce.net/.

6. Martin Zeilinger, *Tactical Entanglements: AI Art, Creative Agency, and the Limits of Intellectual Property* (Lüneburg: meson press, 2021). https://meson.press/books/tactical-entanglements/.

DAO

by Laura Lotti

A Decentralized Autonomous Organization (DAO) is a semi-automated software-based organizational framework enabled by blockchains and predominantly smart contract platforms such as Ethereum (Buterin 2014). The term originates from the concept of the Decentralized Autonomous Corporation (DAC), initially stressing financial autonomy and sovereignty as key features of such programmable organizations (Buterin 2013; Larimer 2013). Today it has come to define a wide variety of organizational patterns that facilitate the management and allocation of shared resources through programmable governance mechanisms (e.g., voting on proposals) in a translocal way and, in principle, at lower costs than setting up traditional legal entities.

The first implementation of this novel organizational technology was “The DAO” in 2016, a decentralized global venture fund. While claiming to be completely transparent and openly auditable, it was hacked just after a month, losing the equivalent of $60 million (Popper 2016). Since then, the narrative around DAOs has shifted toward an emphasis on the cooperative principles that underlie their functioning, heralding new kinds of peer-to-peer institutions (Kreutler 2020; Swartz 2018). However, the current tendency toward the financialization of governance functions and metrics (where DAO members vote with tradeable tokens) challenges their capacity to effectively decentralize power and calls for alternative coordination models.

Five years since the first actualization, DAOs are used primarily for decision making on protocol parameters (e.g., MakerDAO) and decentralized funding and grant programs (e.g., MolochDAO, Metacartel Ventures). Yet they have also sparked a variety of proposals for ambitious use cases in horizontal multi-species organizing: a blockchain-based life form (Plantoid), a self-governing forest (terra0), a decentralized religion (0xΩ), and several models for more equitable, interdependent artworlds (DAOWO, Black Swan, Blocumenta).

Far from automagically granting autonomy from the legacy system, DAOs have exposed the arbitrariness and complexity of organizing. Here "autonomy" technically stands for the automation of captured cognitive functions and affects involved in decision-making processes that smart contracts only partially formalize. DAOs facilitate coordination by making values legible, accountable and exchangeable for new agencies to be expressed. But they also point to the fragility and intimacy of the moment of codification that this rearticulation of relations necessarily implies. In this ongoing challenge to become "better organized" (Bordeleau 2021), DAOs keep performing a crucial role as tools for speculative enquiry, unlocking the imagination to experiment with social, political, and aesthetic forms and make new sense of familiar questions of value, power, collectivity.

Bordeleau, Erik. "Like a Tropical Storm: Exfoliating the Value-Form," in *Going to, Making Do, Passing Just the Same*, edited by Edith Brunette and François Lemieux. Montreal: The Leonard & Bina Ellen Art Gallery / Concordia University, 2021: 165-179.

Buterin, Vitalik. "DAOs, DACs, DAs and More: An Incomplete Terminology Guide". *Ethereum Foundation Blog*, May 6, 2014. https://blog.ethereum.org/2014/05/06/daos-dacs-das-and-more-an-incomplete-terminology-guide/.

Buterin, Vitalik. "Bootstrapping A Decentralized Autonomous Corporation: Part I". *Bitcoin Magazine*, September 19, 2013. https://bitcoinmagazine.com/technical/bootstrapping-a-decentralized-autonomous-corporation-part-i-1379644274.

Kreutler, Kei. "Eight Qualities of Decentralized Autonomous Organizations". *Our Machine*, October 1, 2020. https://www.ourmachine.net/writing/eight-qualities-daos/.

Larimer, Stan. "Bitcoin And The Three Laws Of Robotics". *Let's Talk Bitcoin*, September 14, 2013. https://letstalkbitcoin.com/bitcoin-and-the-three-laws-of-robotics.

Popper, Nathaniel. "A Venture Fund with Plenty of Virtual Capital, but No Capitalist". *The New York Times*, May 21, 2016. http://www.nytimes.com/2016/05/22/business/dealbook/crypto-ether-bitcoin-currency.html.

Swartz, Lana. "What was Bitcoin, what will it be? The techno-economic imaginaries of a new money technology". *Cultural Studies*, Volume 32, no.4 (2018): 623-650. https://doi.org/10.1080/09502386.2017.1416420.

Connectome

by Chloê Langford

A connectome is a network map of a brain's neurons that are connected by their axons and dendrites. To give some idea of the complexity of the network, the human brain has 86 billion neurons and 150 trillion connections between those neurons. As humans grow and change over a lifetime, the connections and the network interactions of their brains change, causing changes in the function of a person's brain.

A simulation of the human connectome with molecular accuracy would require more computing power than all the Google data centres in existence have at their disposal. The Virtual Brain —an open-source brain simulation software— simulates individual human brains, reducing complexity in exchange for a feasible implementation.

Using dynamic systems theory, emerging brain dynamics can be simulated and investigated. A micro-scale connectome depicts a group of individual neurons and the connections (or synapses) between them. A macro-scale connectome depicts regions (groups of neurons) and the connections between those regions. A variety of different mathematical models can be used to digitally simulate a "normal" reference brain with default model parameters. A good mathematical model should summarise the most important features of the brain and leave out the least important. Which begs the question - how do we decide what is important and what isn't? The model one chooses to describe the brain —and which features to focus on— depends on what the research question at hand is.

Using MRI and EEG scans from an individual, a chosen model's default parameters can be tweaked to make a personalised brain simulation —mimicking the subject's unique brain dynamics. Clinical scientists hope to one day be able to use model parameters as lab values that indicate when a deviation from the "normal" indicates a disease.

What else can simulating the network dynamics of an individual's connectome tell us? Using The Virtual Brain, researchers have simulated the surgical removal of brain tumours from real patients, in order to try and predict how a patient's brain dynamics will be affected by different surgery paths. The effects of a stroke can be simulated by looking at how the network reacts to the failure of some nodes. Other areas in which the application of brain simulation are being investigated include epilepsy, heart attacks, and Alzheimer's. The first goal however, is to understand the healthy brain so the processes that lead to disease can be revealed.

Error

by Suhail Malik

Artificial Neural Networks (ANNs) are comprised of processing elements called neurons which are structured in layers. Receptors, of whatever kind, code inputs to the network. These inputs are processed by a first layer of neurons (programmed, for example, to find edges in a visual image), the results of which are then filtered and processed by a second layer (dedicated, say, to identifying textures), and so on.[1] Starting with very rudimentary models for processing their coded inputs, ANNs must be trained to refine the identification and categorization of these inputs prior to their further processing. Training here means that if the ANN proposes a label for an input that is deemed to be incorrect, "an error signal propagates backward through the layers, reducing the activation of the wrongly chosen output neuron”.[2] The negative feedback loop of back propagation is the inaugurating technical and conceptual principle of cybernetics; and the probabilistic weighting of the processing elements’ outputs according to their accuracy is the basic procedure of Bayesian inference.

“Back propagation” is a technical necessity for ANNs because their training involves isolating optimal features in the input data. However, because it is not known which neurons or layers in an ANN combine to generate the error, the backwards performativity of error correction can not be applied “by hand” but has to be automated and systemic. That autocorrection is the defining feature of machine learning, for which ANNs are a now-prevailing technical paradigm. Machine learning (ML) finds new patterns in the dataset by reaggregating data variables (data mining) so that they can be directed to preferred outcomes (predictions). This pattern formation requires a semantic disintegration of what is codified into data. And it is procedurally automated, algorithmic.

To be clear: ML requires the data in the ANN to be recombinable by algorithmic processing so as to reconfigure patterns in the dataset. ML algorithms may however modify inputs and introduce errors in their regulation of back-propagation through ANNs, and these errors can themselves spiral into "inaccuracies" of self-reinforcing image production —of auto-enforcing systemic constructions, or "overfitting". Algorithmic pattern recognition becomes pattern formation becomes pattern overdetermination.

Not only must data then be recombinable for ML-ANNs, but the inaccuracies and unpredictable outcomes of the algorithms aggregating that dataset must themselves also be algorithmically corrected. Pre-emption, as the autocorrection of algorithms is called, ensures that there is predictability in the near future. And in ML it too is automated.

Back propagation (correcting the past) and pre-emption (constraining future outputs) are weighting methods —technical norms— to control the unpredictability and contingency *introduced by* ANN data recombination together with ML's iterative algorithmic autocorrection. Borrowing a term from finance, such controls mitigate the "volatility" of automated pattern formation as it veers into overfitting.

While sociological criticism of automated data processing has rightly focused on the confirmation bias of historically received hierarchies (racism, sexism, classism) in both the overfitting of automated outcomes as well as their "corrections", a subordinate technical criticism is that these controls also reduce the intrinsic volatility of these automated processes in order to reproduce just those established outcomes. For ML-ANNs are intrinsically error-laden automated identification procedures. Their volatility is error and results in errors, unpredictably so.

And these errors in the autocorrection of the algorithmic operators across a recombinant data set index those ML-ANNs —which are the current best technical approximation to artificial intelligence— are not a transparent and self-effacing representational method producing required outputs. They are instead operational executions of a medium that is real to itself, generating new, unexpected results and directions: distortion, noise, invention, methods and capacities for mutation. If ML-ANNs are in any way intelligent, they demonstrate that intelligence is comprised of volatility, error upon error, for which sapience is but a control.

1. Chris Olah, Alexander Mordvintsev, Ludwig Schubert "Feature Visualization: How neural networks build up their understanding of images", November 7, 2017, distill.pub/2017/feature-visualization/.

2. Brian Hayes, "Computer Vision and Computer Hallucinations", *American Scientist* 6:103, November–December, 2015: 380–383, americanscientist.org/article/computer-vision-and-computer-hallucinations.

Algorithmic Rating

by Emily Rosamond

Algorithmic Rating is the use of algorithms to generate, aggregate, display, and/or operationalize rankings, esteem measures, or scores, in order to evaluate online users, workers, citizens, brands, products or digital objects. Algorithmic ratings are used across numerous professional, business and security contexts: for example, in credit scoring algorithms that determine consumer interest rates (Langley 2014, Pasquale 2015, 22-41); algorithmic teacher evaluations used to try to optimize schools by cutting "underperforming" teachers (O'Neil 2016); predictive policing algorithms that generate "Strategic Subject Lists" of those deemed to be at the highest risk of gun violence (Saunders, Hunt and Hollywood 2016); and border security software, which flags potentially "risky" subjects (Amoore 2011). Such algorithmic ratings are often carried out in the name of efficiency. Yet, as many commentators have noted, they can also perpetuate errors and unfairness, increase inequality, and exacerbate racial bias —while all the while remaining unaccountable to public scrutiny or juridical oversight (Pasquale 2015; O'Neil 2016; Amoore 2011).

In online platforms, algorithmic ratings influence what information users see in search results. For example, Google's best-known search algorithm, PageRank, judges the importance of a webpage based on how many other pages link to it—and how important those pages, in turn, are. It then optimizes search results accordingly, with higher-ranked pages appearing first (Austin 2006). Some algorithmic rating systems are highly visible and interactive: for example, "like" counters on social media, or star ratings on e-commerce sites. Other hidden, black-boxed rankings persist alongside these visible measures: for example, algorithms that evaluate the relative strength of social media "friendships" to sort newsfeeds. A platform's more-and-less-visible rating systems might interact with one another in complex ways. For example, the Facebook "like" button allows users to click their approval of a particular post (and, implicitly, signal their esteem for the user who posted it). The software compiles the "likes," such that users can see the aggregated popularity of that post as a single number. This feature tends to increase user engagement with the platform, by meting out "dopamine hits," neural reward pathways that produce a feeling of satisfaction, linked to receiving social approval (Parkin 2018, Harford 2019). At the same time, Facebook may use these "likes" to help determine which friends to feature most prominently in a user's newsfeed to further maximize engagement. Facebook uses proprietary machine learning algorithms, which are constantly, automatically updating and correcting themselves—and guarded as trade secrets. Thus, it is not possible to know exactly how newsfeeds are currently filtered. Nonetheless, analyzing a well-known, but now defunct, Facebook algorithm, EdgeRank (used until 2011), helps to illustrate the general point. EdgeRank analyzes the relationships between digital "objects" (users, videos, posts) and "edges" (the relationships between them). It ranks the frequency of interactions between users, the type of those interactions (with a comment weighing more than a "like"), and builds in a time decay, so that more current interactions count for more (Bucher 2012). Arguably, the relative importance of the "like" button data, too, has decayed over time—as Facebook's algorithms have become more attuned to more minute user data, such as "percent completion" rates for videos on newsfeeds (Bapna and Park 2017).

Online reputation systems, such as user rating interfaces on "sharing" and e-commerce sites like

Airbnb, allow users to contribute to one another's ratings, ostensibly to build trust through reliable and stable seller or user scores. Equally, however, the sheer complexity of algorithmic rating methods across platforms—not to mention the complex interactions between users' ratings and the algorithms that interpret and aggregate them—can produce significant uncertainty, instability, and contestability in the field of online reputations. For example, Twitter bots are frequently used to boost politicians' apparent online popularity, or shift a political conversation (Caldarelli *et al.* 2020). Hostile actors can tactically tank others' reputations, by posting libellous claims designed to feature prominently in search results. In one extreme case, a woman posted libel about hundreds of people on "complaint sites" such as Ripoff Report from around 2015-2021, tarnishing the reputations of not only those she perceived to have been responsible for her career failures, but also their entire extended families (Hill 2021). The efficacy of her campaign was diminished when Google began deranking "complaint sites" in their search results algorithms. However, this deranking had far more of an effect for those targets who already had many search results associated with their name (such as the *New York Times* writer who reported the story), than for those who had far fewer prior search results. Thus, the field of algorithmic rating must be seen as a complex one, with the instabilities of online ranking affecting different users very differently. Algorithmic ratings are rendered unstable not only by conflicted views of users' worth, and huge societal emphasis on gaining social status; not only by the myriad tactics used to intervene in online reputations; but also by the sheer complexity of interactions between conscious acts of ranking and rating enabled by platform software, and their automated, algorithmic aggregation.

Amoore, Louise. "Data Derivatives: On the Emergence of a Security Risk Calculus of Our Times." *Theory, Culture & Society* 28, no. 6 (2011): 24-43.

Austin, David. "How Google Finds Your Needle in the Web's Haystack." *American Mathematical Society* (December 2006). http://www.ams.org/publicoutreach/feature-column/fcarc-pagerank.

Bapna, Abhishek and Seyoung Park. "Updating How We Account for Video Completion Rates." *Facebook*, 26 June, 2017. https://about.fb.com/news/2017/01/news-feed-fyi-updating-how-we-account-for-video-completion-rates/.

Bucher, Taina. "The Friendship Assemblage: Investigating Programmed Sociality on Facebook." *Television & New Media* 14, no. 6 (2012): 479-493.

Caldarelli, Guido, Rocco De Nicola, Fabio Del Vigna, Marinella Petrocchi and Fabio Saracco. "The Role of Bot Squads in the Political Propaganda on Twitter." *Communications Physics* 3, article number 81 (2020). https://www.nature.com/articles/s42005-020-0340-4.

Harford, Tim. "Should we Dislike the 'Like' Button? *BBC News*, 19 June, 2019. https://www.bbc.co.uk/news/business-48364817.

Hill, Kashmir. "A Vast Web of Vengeance." *New York Times*, 30 January, 2021. https://www.nytimes.com/2021/01/30/technology/change-my-google-results.html.

Langely, Paul. "Equipping Entrepreneurs: Consuming Credit and Credit Scores." *Consumption Markets & Culture* 17, no. 5 (2014): 448-467. https://doi.org/10.1080/10253866.2013.849592.

O'Neil, Cathy. "Introduction," in *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*. New York: Crown, 2016. Ebook.

Parkin, Simon. "Has Dopamine Got Us Hooked on Tech?" *The Guardian*, 4 March, 2018. https://www.theguardian.com/technology/2018/mar/04/has-dopamine-got-us-hooked-on-tech-facebook-apps-addiction.

Pasquale, Frank. *Black Box Society: The Secret Algorithms that Control Money and Information*. Cambridge, MA: Harvard University Press 2015.

Saunders, Jessica, Priscillia Hunt and John S. Hollywood. "Predictions Put into Practice: A Quasi-Experimental Evaluation of Chicago's Predictive Policing Pilot." *Journal of Experimental Criminology* 12 (2016): 347-371.

The Confidence Interval

by Theodora Dryer

The Confidence Interval (CI) is an epistemological and political architecture used to establish confidence in information systems. It says: Here is Confidence!

CIs promote psychological and emotive confidence in the shape of data (an estimation of an unknown probability parameter displayed to fall between two interval points), confidence in the analysts' interpretation of data (a measurable level of confusion), and confidence in the experimental claims (*this proves that*). Historically, confidence intervals have been shaped into various intervallic expressions: graphs, grids, and other visual schematics drawn in two dimensions and three. They are most recognized as thick-lined bell curves that definitively delimit what is knowable and what is not: “This line here is where 95% certainty ends, and 5% uncertainty begins.”

Confidence Intervals hold information together with a hard bargain: the higher their degree of accuracy, the lesser their degree of certainty. Their promises of confidence then are undone by their anxious executions. In their political function, Confidence Intervals relinquish certainty for control, as the U.S. military said in 1945, after they firestorm bombed 90% of Tokyo, and murdered 90,000 civilians with, “a presumed target accuracy of 95%.”

The Confidence Interval is a staunch number-line architecture super-imposed on radical epistemic instability. It is impossible to hold CIs still, as *what* people are confident *in* is confused and slips between the data object here and the political function out there, between the experimental claims and the economic promises. CIs are plastered onto fractured, frayed, destructive data by the bombardier, by the private capitalist, by the state bureaucrat, and the algorithmic designer. For them, Confidence Intervals offer a veil of certitude and absolution within the amorphous interval measure of 95%.

Confidence Intervals arrived from the anxiety of military trauma, after the Great War when empires fractured into nation states, European colonialism ballooned, and western trade expanded. Technocrats formed a “new statistics” to establish public confidence —or control— in capital trade, industrial agriculture, and in quantifying labor and human populations. CIs were a tuning apparatus for violent statistical control that by the mid-twentieth century were encoded into the automated function of digital software. Today, supercomputers run Confidence Interval tests in logarithmic scales of hundreds-of-thousands: Who holds confidence in these machine processes?

Hearkening to Jacques Lacan's definition of anxiety as the perverse pleasure of an object's pursuit —an object that can never be obtained— and contextualizing it in this jagged history from colonial violence to machine development and back again there resides the fleeting persistence of this indeterminate mental and political architecture, *with 95% certainty*.

Latent Reading

by Yannis Siglidis

“Abuse of power is one of the defining features of a free society”[1]

I recently co-authored the “AI Against the Alt-Right” Twitter bot[2] in which a state-of-the-art language model (GPT-2) was trained on alt-right posts and replies from Twitter, with the purpose of generating back both posts and replies. For me, observing the behavior of such a model can allow a form of meta analysis of the alt-right parole, while isolating it from its facticity. Inspired by this I propose “Latent Reading”, a research method for social sciences. In Latent Reading, instead of directly analyzing and interpreting the data-artifacts of a social entity (either individual or group), what is analyzed and interpreted instead is their *latent representation* in a generative model that has been trained to reproduce them.

Recent advances in Deep Learning make generative modeling a much more feasible task and have motivated a research shift from studying problems of recognition to problems of generation. This has improved the expressive power of generative architectures and demonstrates their potential to accurately reproduce the statistical properties of complex forms of data, such as language. Although the required amount of (training) data increases in parallel with the evolution of deep-learning, in practice, fine-tuning a pre-trained model to a specific category of data can require significantly smaller amounts[3]. This indicates that latent reading could potentially become a low-resource interdisciplinary task.

Latent Reading draws from those studies of both social or natural complex systems (from sociology to earth-sciences), where research is not presented on observations made from a system under examination, but rather from its computer simulation[4]. In this case the research objective is not to analyze the data-output of such a system, but instead to understand how a learning system has learned to reproduce it, either by analyzing samples of its generated outputs, or by interpreting its trained architecture. Moreover, due to its nature this modeling technique is indifferent to the facticity of the given data and allows the research findings to be posed only in terms of their latent representation (and not the subject itself). Another potential benefit of this method is that it limits interaction with the subject to that of data collection (and is thus absent for data trails). Last but not least, the fairness of such architectures is an open research problem that is being increasingly studied and addressed by respective scientific communities[5].

1. https://twitter.com/radicaldumb/status/1379032768680693764.

2. https://twitter.com/radicaldumb.

3. Tom B. Brown, Benjamin Mann, Nick Ryder, Melanie Subbiah, Jared Kaplan, Prafulla Dhariwal, Arvind Neelakantan, et al., “Language Models Are Few-Shot Learners,” arXiv.org (June 1, 2020), arxiv.org/abs/2005.14165v4.

4. Eric Winsberg, «Computer Simulations in Science», *The Stanford Encyclopedia of Philosophy* (Winter 2019 Edition), Edward N. Zalta (ed.), plato.stanford.edu/archives/win2019/entries/simulations-science/.

5. Ninareh Mehrabi, Fred Morstatter, Nripsuta Saxena, Kristina Lerman, and Aram Galstyan. “A Survey on Bias and Fairness in Machine Learning,” arXiv.org (September 17, 2019), arxiv.org/abs/1908.09635.

Parasemiotic Synthesis

by Rodrigo Ochigame

Over the last decade, new computational models of artificial intelligence and machine learning, particularly generative models, have originated a peculiar kind of audiovisual artifact, popularly known as the “deep fake.” This term is now ubiquitous in the mainstream press, in military, corporate, and academic research, and even in legislation such as the U.S. Defending Each and Every Person from False Appearances by Keeping Exploitation Subject to (DEEPFAKES) Accountability Act of 2019. “Deep fake” has become “shorthand for the full range of hyper-realistic digital falsification of images, video, and audio.” (Citron and Chesney, 2019). [1]

This overemphasis on “falsification” eludes the fact that some of the novel artifacts involve more than mere fakery, deploying a complex interplay of fiction and verisimilitude, fabrication and plausibility (Jones 2017).[2] Some audiovisual artifacts produced by generative models are not just fakes in the sense of counterfeited or forged versions of existing entities. Rather, such artifacts can depict imaginary entities that have never existed or been represented before.

Consider the images produced by DALL-E, a generative model released by OpenAI researchers in 2021. The model’s name alludes simultaneously to Salvador Dalí, the Spanish Surrealist artist, and to WALL-E, a robot protagonist of an animated film. DALL-E is trained on a large data set of text-image pairs. Given an arbitrary text description as input, the model automatically generates images as output. The researchers have demonstrated the model’s ability to produce representations of unprecedented entities by combining unrelated concepts, for example, “an armchair in the shape of an avocado,” or, “a snail made of harp” (Ramesh et al. 2021a).[3]

Images generated by DALL-E for “an armchair in the shape of an avocado” (left) and “a snail made of harp” (right). Reproduced from Ramesh et al. 2021b.

Like the more ordinary kinds of deep fakes, these images may be deemed “realistic” in multiple senses. One century earlier, in 1921, Russian-born linguist Roman Jakobson proposed to disambiguate between the muddled meanings of “realism” in the history of art. DALL-E’s images seem to fit several of those meanings simultaneously, including realism as an aspiration or intent of verisimilitude by the author (meaning *A*), in this case the OpenAI researchers, and realism as a perception of verisimilitude by the viewer (meaning *B*). Realism is also the name of a historical genre of art, and thus comprises “the sum total of the features characterized by one specific artistic current of the nineteenth century” (meaning *C*) (Jakobson 987b).[4] DALL-E reproduces these features because they are present in many of the images in its training data set.

As the researchers suggest through their reference to Dalí, the images appear not just real, but surreal. The researchers have intentionally produced surrealist imagery through their choice of text inputs. The connection between surrealism and machine art is longstanding. As early as 1921, Jakobson noted that Dadaists extolled Vladimir Tatlin's "Maschinenkunst." (Jakobson 1987a).[5] Surrealist artists soon experimented with "automatist" techniques of unconscious or mechanical writing, drawing, and painting. The juxtaposition of unrelated concepts has also been a key feature of the Surrealist movement from the start. Uruguayan-born poet Comte de Lautréamont's 1869 text *Les chants de Maldoror*, which featured such descriptions as "the chance encounter of a sewing machine and an umbrella on an operating table," became a touchstone for Surrealist artists. André Breton identified it as the very birth of surrealism, and Dalí drew illustrations from its descriptions. When DALL-E automatically draws illustrations of avocado-shaped chairs and harp-textured snails, it recombines perennial surrealist concerns with automatism and unrelated juxtaposition.

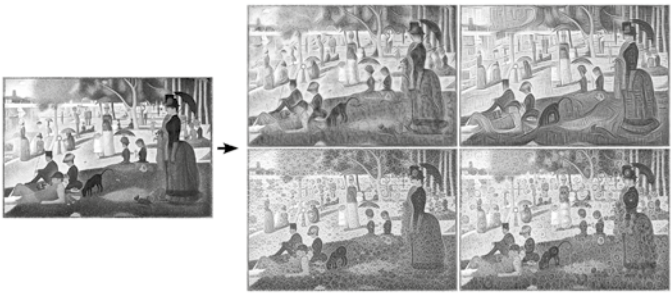
How to characterize this process of turning text descriptions into image representations? In his later career, Jakobson became involved with work in cybernetics and information theory at MIT's Research Laboratory of Electronics, which encompassed systems of machine translation (Kay

2000).[6] In 1959, he distinguished between three types of translation: "intralingual" (rewording), "interlingual" (translation proper), and "intersemiotic." At first glance, DALL-E's transmutation of text into image may be seen as an instance of this third type: intersemiotic translation, "an interpretation of verbal signs by means of signs of nonverbal sign systems" (Jakobson 1959).[7]

But generative models complicate Jakobson's original definition. To begin with, "translation" tends to suggest a relatively constrained form of interpretation. The term applied more clearly to the electronic systems available to Jakobson at the time, such as the Voder, a Bell Labs device that translated messages typed on a phonetic keyboard into human-like speech on a loudspeaker (Geoghegan 2011).[8] The Voder's operation may be seen as a more straightforward intersemiotic translation from text to sound, involving a clear expectation of a correct result. By contrast, there is no expected correct result in DALL-E's case, since the model synthesizes unprecedented representations of imaginary entities. This synthetic process is categorically interpretive, in a more flexible sense than the term translation implies.

Instead of translation, we might adopt an alternative term that accommodates more flexible modes of interpretation. One option is the term that has recently become widespread in computer science to describe what generative models do:

synthesis. Before the twenty-first century, most probabilistic and statistical models were designed strictly for "analysis," whether predictive, descriptive, or prescriptive.[9] Today's machine-learning models, particularly generative models, are often designed not for analysis but for "synthesis".[10]



DeepDream-processed images of a Georges Seurat painting. Reproduced from Mordvintsev et al. 2015. Available under Creative Commons Attribution 4.0 International License.

What kind of synthesis do generative models perform? The term "intersemiotic" is almost right, but not quite. The prefix "inter-" seems to suggest an operation between clearly bounded sign systems, such as text or image or sound. Yet the so-called "deep" processing layers of generative models consist of transitional representations that are neither strictly textual nor purely visual nor exclusively sonic. Recent artworks have explored such transitional representations, for example DeepDream and Trevor Paglen's "A Study of Invisible Images." Many generative models operate not only between existing sign systems but also beside and beyond them. In this sense, we may characterize such models more accurately as *parasemiotic*. Parasemiosis operates simultaneously between, beside, and beyond sign systems.

Generative models are parasemiotic synthesizers: they produce interpretations of possibly unprecedented combinations of signs, whether verbal or nonverbal, not only by means of signs of existing sign systems but also by means of transitional representations that transcend those systems, whether para-textual, para-visual, para-sonic, or otherwise.

1. Danielle Citron and Robert Chesney, "Deep Fakes: A Looming Challenge for Privacy, Democracy, and National Security," *California Law Review* 107, no. 6 (December 1, 2019): 1757.

2. For an anthropological theorization of deep fakery, cf. Graham M. Jones, "Deep Fakes," in *Fake: Anthropological Keywords*, ed. Jacob Copeman and Giovanni da Col (Chicago, IL: HAU Books, 2017), 15–30.

3. Aditya Ramesh et al., "Zero-Shot Text-to-Image Generation" (February 26, 2021), http://arxiv.org/abs/2102.12092.

4. Roman Jakobson, "On Realism in Art," in *Language in Literature*, ed. Krystyna Pomorska and Stephen Rudy (Cambridge, MA: Belknap Press, 1987), 19–27.

5. Jakobson, "Dada," in *Language*, 34–40.

6. Lily E. Kay, "Roman Jakobson, ca. 1960," in *Who Wrote the Book of Life? A History of the Genetic Code* (Stanford, CA: Stanford University Press, 2000), 298–315.

7. Jakobson, "On Linguistic Aspects of Translation," in *On Translation*, ed. Reuben Arthur Brower (Cambridge, MA: Harvard University Press, 1959), 232–39.

8. Bernard Dionysius Geoghegan, "From Information Theory to French Theory: Jakobson, Lévi-Strauss, and the Cybernetic Apparatus," *Critical Inquiry* 38, no. 1 (September 2011): 96–126, https://doi.org/10.1086/661645.

9. For a history of statistical analysis, see Alain Desrosières, *The Politics of Large Numbers: A History of Statistical Reasoning*, trans. Camille Naish (Cambridge, MA: Harvard University Press, 1998).

10. For a parallel turn to synthesis in the life sciences, cf. Sophia Roosth, *Synthetic: How Life Got Made* (Chicago, IL: University of Chicago Press, 2017).

References:

Citron, Danielle, and Robert Chesney, "Deep Fakes: A Looming Challenge for Privacy, Democracy, and National Security," *California Law Review* 107, no.6 (2019): 1753–1820.

Geoghegan, Bernard Dionysius. "From Information Theory to French Theory: Jakobson, Lévi-Strauss, and the Cybernetic Apparatus." *Critical Inquiry* 38, no.1 (2011): 96–126.

Jakobson, Roman. “On Linguistic Aspects of Translation,” in On Translation, edited by Reuben Arthur Brower, 232–39. Cambridge, MA: Harvard University Press, 1959.

Jakobson, Roman. “Dada,” in *Language in Literature*, edited by Krystyna Pomorska and Stephen Rudy, 34—40. Cambridge, MA: Belknap Press of Harvard University Press, 1987a.

Jakobson, Roman. “On Realism in Art,” in *Language in Literature*, edited by Krystyna Pomorska and Stephen Rudy, 19—27. Cambridge, MA: Belknap Press of Harvard University Press, 1987b.

Jones, Graham M. “Deep Fakes,” in *Fake: Anthropological Keywords*, edited by Jacob Copeman and Giovanni da Col, 15–30 (Chicago: HAU Books, 2017).

Kay, Lily E. *Who Wrote the Book of Life? A History of the Genetic Code*. Stanford: Stanford University Press, 2000.

Mordvintsev, Alexander., Christopher Olah, and Mike Tyka, “Inceptionism: Going Deeper into Neural Networks,” *Google AI* (blog), June 17, 2015.

Ramesh, Aditya., Mikhail Pavlov, Gabriel Goh, Scott Gray, Chelsea Voss, Alec Radford, Mark Chen, and Ilya Sutskever, “Zero-Shot Text-to-Image Generation,” 2021a.

Ramesh, Aditya., Mikhail Pavlov, Gabriel Goh, Scott Gray, et al. “DALL·E: Creating Images from Text,” *OpenAI* (blog), January 5, 2021.

Templexture

by Florian Hecker & Robin Mackay

An expanded multidimensional entity for uncategorizable auditory sensation, templexture refers to synthetic sound generated through the use of texture synthesis processes, coupled with concepts stemming from machine listening whose architecture resembles spectrotemporal receptive fields in auditory neurophysiology, and convolutional neural networks. In particular, convolutional time-frequency operators enabling the construction of timbral descriptors spanning temporal scales and robust-to-local-time transformations.

Early explorations using timbre as sound sensation, as in Claude Debussy's *Prélude à l'Après-midi d'un Faune* (1894) or Werner Meyer-Eppler's quest for timbre beyond the limitations of the instrument

—he compared it to artificially chemically synthesised colours in 1950 (Ungeheuer 1992)— prepared the ground for templextures. The Canadian psychologists Albert Bregman and Stephen McAdams (1979) provided a powerful image describing timbre as a catch-all "multidimensional waste-basket category" for those components of sound non-compliant to analysis. Linguistic and textual abstractions interpreting timbre began to appear in the 1980s. Initial models that attributed a set of semantically meaningful descriptors to specific analysed spectra have since been replaced by new models that do away with such linguistic labels in favour of systems highly saturated in focal details and rich in analysis data points and observation resolution, so that decoding, and subsequent re-encoding, calls for machine listening systems that do away with any recourse to "coarse" semantic labelling.

Free of the constraints and biases of human apprehension, the perceptual apparatus of templexture systems may retrieve latent components and construct taxonomies that no human listener would ever happen upon. As a significant by-product of these processes, templextures host audible synthetic remnants that escape semantically meaningful descriptors. Located between the indistinguishable, the unrepresentable, and the unnameable, templexture opens onto terrains that may only be reconstructable via further virtual listening agents, in the process introducing further templexitude through resynthesis.

Spawning

by Holly Herndon & Mathew Dryhurst

Generating audio with Machine Learning shares many similarities with the 20th-century practice of Sampling, an audio technology that ushered in new musical forms and great debates over the changing state of authorship and intellectual property.

Like Sampling, AI audio generation begins with a target sound, however, what transpires next is perhaps best characterized as Spawning. Rather than producing a one-to-one copy of the target sound, instead new child sounds are Spawned from the genetic make up of parent training material, more closely resembling biological reproductive processes than simpler historical Sampling analogies of digital copying and Walter Benjamin's printing press.

This further blurs the line between inspiration, appropriation, and plagiarism by introducing new creative dimensions and debates; the analogical mechanical reproduction of a target sound's essence or style. We have proposed that the enhanced capacity to Spawn new works from recorded sounds of the past also serves as an opportunity to address many of the shortcomings of the original Sampling concept. If Spawning affords us the capacity to generate new possibilities from old ideas, why not embrace that principle fully in the creation of tools for Spawning? Whereas Sampling interfaces provided no means to register, attribute, or pay the original creators of a piece of music, perhaps Spawning could attribute and remunerate at source. Rather than musicians offering licenses to sample old works, instead they could offer licenses to spawn new works from a training canon of their past expressions.

Such an insistence on fair compensation and attribution of our shared musical archive may prove to have serious consequences in other fields too. Parallel to the worthy debate of whether it is possible for a machine to understand something, we have undoubtedly now developed the capacity for cognitive machines to Spawn new and convincing works based upon a detailed analysis of their characteristics. Anything that can be seen, or heard, can serve as the genesis reference for a new work.

Without robust, human driven, systems for the fair recognition, attribution, and remuneration of such seeds of inspiration and reproduction, we are in danger of having those entities who can see the most, hear the most, and perhaps equally importantly, host the most, solely reap the spoils of these collective human contributions to music and beyond.

Style Imitation

by Philippe Pasquier

Creative AI is the sub-domain of AI occupied with the partial or complete automation of creative tasks. One of the fundamental tasks of Creative AI (i.e., metacreation or generative machine learning) is to generate new artifacts in a given domain that adhere to a predefined style, S.

Given that many creative tasks consist in generating artifacts (writing, designing, music composition, poetry, visual art, ...), style imitation is one of the canonic tasks of Creative AI. Style imitation is just about generating pastiches of a given style.

Typically the style will be described by a set of examples (instances) or a set of rules. If a style is represented by a set of examples, a possible formal definition of style imitation is:

Given a set of instances representative of the given style $S=\{s_1,\ldots s_n\}$, Style imitation consists in generating new artifacts s_a diff s_x , xE(1..n) that an unbiased observer would classify as belonging to S.

Once style imitation is defined, other related operations include:

– style extrapolation: extending a style in a given direction;
– style interpolation: generating instances that have characteristics from more than one style;
– style transfer: rendering a given content expressed in one style in another style;
– style discovery/exploration: identifying styles or stylistic dimensions not represented or under-represented in the data.

3D Printed Training Data

by Adam Harvey

High-quality training data is an essential component in artificial intelligence systems. But often this data is either overrepresented or underrepresented, resulting in biased and incompetent algorithms. As an alternative to the limitations and problems of existing data sources, artists can create their own realities by creating their own data. Using 3D printing, or additive manufacturing, is one new strategy that could contribute to a future where artificial intelligence better aligns with humanitarian applications.

In this example, a cluster munition used in the Syrian conflict has been reconstructed as a 3D model by combining information from publicly available sources including military guides and video documentation. The 3D model is printed, painted, and photographed thousands of times from different angles with different lighting conditions in staged environments that simulate Syrian landscapes. Once these photos are annotated with an associated object-label (e.g., AO-2.5RT), they become a source of "3D printed" training data for computer vision algorithms.

The training data is fake but not untrue. To a neural network, there is no objective reality except for the subjective ground truth provided by a developer, which could be either real or non-real. As long as the synthetic data is realistic enough to match the visual features in actual conflict zone videos, it can provide a sufficiently real forgery of visual reality to a convolutional neural network.

This 3D printed AO-2.5RT cluster munition was created for VFRAME.io, an open-source computer vision project that works with human rights researchers to help document, verify, and archive footage from conflict zones. By using 3D-printed objects as training data, object detection algorithms can be built safely under controlled conditions, without any of the inherent dangers of handling or documenting explosives in active war zones.

Although this 3D-printed data object is highly specific, the concept could be extended to other areas. Computer vision, and artificial intelligence in general, typically analyzes the future through the past. But many researchers have shown that this approach inherits the injustices embedded in history. Indeed, a growing number of computer-vision datasets have been deprecated or deactivated because of their problematic, misogynistic, and racist taxonomies. Rather than looking backwards to outdated data, artists can also look forwards by imagining and creating new AI-training data sources that yield new ground truths, which in effect yield new computational logic.

As Geoffrey Hinton, considered by some as a "Godfather of Deep Learning", points out, "our relationship to computers has changed. Instead of programming them, we now show them and they figure it out."[1] If this is true, perhaps it is no longer only the engineers, but also the artists and designers, who will play a major role in guiding the future of AI.

1. "Heroes of Deep Learning", accessed August 8, 2017, https://www.youtube.com/watch?v=-eyhCTvrEtE.

IV.

Techno Racial Capitalism, Coltan, Cosmologistics, Microwork Platforms, Wireheading, Post-post-work, Revolution,

Algorithmic Justice,
Feminist Data Set,
Heptagon
of Resistances,
Post-capitalist Hydra,
Self Driving Money,
Accelerating the
Transition Period,
Graduate Student
Descent,
Elitist Selection,
Capitalism.

Techno Racial Capitalism

by Lelia Marie Hampton

Machine learning has grown into a multi-billion dollar global market, but at whose expense? Racial capitalism posits that the nonreciprocal extraction of socioeconomic value (e.g., labor and resources) from racialized groups fuels the ever expanding accumulation of capital.[1] The racial capitalist system is readily seen in the machine learning industry. Machine learning systems are centralized and monopolized largely by racial capitalists, and billions of racialized people across the world have no say as their livelihoods become increasingly interdependent with machine learning paradigms.[2] Consequently, techno racial capitalism is deeply interconnected with techno colonialism, including digital colonialism and data colonialism.

The quintessential resource for machine learning money making is data capital. However, the extraction of data from billions of people across the globe is obtained by "accumulation by dispossession"[3] — big technology companies ransack ever-growing amounts of data from human experience (often without informed consent or knowledge). Moreover, the framing of Africa as a "data rich continent"[4] is directly in line with the ongoing white supremacist capitalist-imperialist extraction of natural and human resources from the African continent. More broadly, this white supremacist imperialist expansion *à la* techno racial capitalism benefits both states and corporations. In particular, corporations provide artificial intelligence enhanced weapons to white supremacist imperialist states, commodifying racialized imperialism and selling the lives of racialized groups for the accumulation of capital.

Moreover, machine learning companies commodify racial oppression through the production of carceral and surveillance technologies, reverberating a legacy of eugenics and racialized criminalization. Carceral technology fits seamlessly into the racial capitalist paradigm by commodifying racialized criminalization in order to swell the prison population for expropriation and capitalist accumulation through slave labor.[5] In a similar vein, techno racial capitalism enables data capital accumulation through cheap racialized labor sources. In particular, ghost workers, many of whom are racialized and some of whom are prisoners, are paid slave wages to be the human intelligence behind the artificial intelligence, making sense of data on behalf of machine learning algorithms. Ultimately, the machine learning economy is only made possible through racial capitalism, particularly the exploitation of and pillaging from oppressed racial groups.

1. Cedric J. Robinson, *Black Marxism: The Making of the Black Radical Tradition* (London: Zed Press, 1983).

2. Danielle Coleman, "Digital Colonialism: The 21st Century Scramble for Africa Through the Extraction and Control of User Data and the Limitations of Data Protection Laws," *Michigan Journal of Race and Law* 22, no. 2 (2018).

3. Jim Thatcher, David O'Sullivan, and Dillon Mahmoudi, "Data Colonialism through Accumulation by Dispossession: New Metaphors for Daily Data," *Society and Space* 34, no. 6 (December 2016).

4. Abeba Birhane, "Algorithmic Colonization of Africa", *SCRIPTed* 387, vol. 17, no. 2 (August 2020).

5. Zoe Samudzi, "Bots Are Terrible at Recognizing Black Faces. Let's Keep it That Way." *The Daily Beast*, February 11, 2019.

Coltan

/

by Adan Jerreat-Poole

My fingertips that lightly graze the screen are stained with blood, dusted with minerals torn from a dying earth by bodies pressed like dried flowers under the weight of colonial histories. Coltan. Lithium. Copper. The Democratic Republic of Congo. Chile. Zambia. The chrome interface glittering under energy-efficient lightbulbs in the strip mall promises a tidy genocide offscreen. Memory chips like teeth, made for biting. When you check your reflection in the screen, ask yourself: what are the side effects of working with hazardous materials? Who is doing this work? Where are they? Do they have access to protective equipment and healthcare? How does mining and the transportation of hazardous materials impact the body? How does pollution, water poisoning, and environmental degradation impact individual and community health? Later, who will pick apart our computers with hands bloodied and battered from the work? In *Algorithms of Oppression*, Safiya Noble writes that "in the ecosystem, Black people provide the most grueling labor for blood minerals, and they do the dangerous, toxic work of dismantling e-waste in places such as Ghana" (p. 164). Trace the material lines, like veins of ore, between capitalism, colonialism, technological development, and disability. Companies in the Global North use cheap labour or slave labour to mine minerals using processes that damage land and health in the Global South. We ship our old computers to China and other parts of the world, where workers take them apart and dispose of them, and in the process are exposed to deadly toxins. The production of technology thus also produces disability, disproportionately among bodies of colour in the Global South. Media is material. AI is material. The development of AI thus participates in what Jasbit Puar, in *The Right to Maim*, refers to the "biopolitics of debilitation" as "the forms of violent debilitation of those whose inevitable injuring is assumed by racial capitalism" (p. xvii-xviii). While the development of AI may be helpful to many people in the Global North, including disabled users who benefit from technologically-enabled access and aids, the production of technology continues to harm, maim, disable, and kill marginalized persons around the world. There is no ethical technology under a global capitalist and colonial system.

Cosmologistics

by Laurent de Sutter

There is no such thing as unwired intelligence. One could even go as far as to state that intelligence is the wiring itself —of the animal brain, the vegetal rhizome, or the human world. That is, intelligence is directly related to the material network that allows for some sort of relationship between forms of being to occur. Intelligence is then neither private nor abstract. It is public and concrete. But because it's public and concrete, it always asks the question of its own conditions of production, of its own artificiality —of the type of infrastructural design it needs to unfold. Such a design defines the ecology of intelligence —or the intelligence as an ecology, as an environment, as a cosmos. But, because there is no intelligence without wiring, this means that there is also no cosmos without infrastructure or logistics. Speaking of intelligence is always speaking about what we should call *cosmologistics*: the infrastructural production of an artificial ecology of intelligence. This requires concluding that artificial intelligence, as such, is none other than the artificiality of the world that *makes* intelligence —or that composes the totality of what there is to know about intelligence. Intelligence is always cosmical in scale and logistical in means. It is not about data, algorithms, or the horizon of consciousness; it is about cables, electricity and the production of a material cosmos. It is not about awareness and singularity; it is about plugs and standardized protocols of intercommunication. It is not about computing. It is about *us*. Not AI, but AU —the other to which I is connected, and how. Intelligence started as artificial— as artificial as the very first trail traced by some early being on the surface of a singular host planet. Since then, the transformation of the planet into a logistical cosmos has been ceaseless, and, with it, the improvement of intelligence. What we have made of it is another story.

Microwork Platforms

by Rafael Grohmann

Microwork platforms are, at the same time, both digital infrastructures and companies that outsource specific tasks to a crowd of workers with the aim of producing data for artificial intelligence. These platforms demonstrate the role of human labor in processes involving artificial intelligence. Some of the terms used to name the work activities on these platforms are ghost work (Mary Gray and Siddharth Suri), click work (Antonio Casilli) and heteromation (Hamid Ekbia). The discourses of the microwork platforms present meanings of the future, progress, and success. Some slogans are “artificial artificial intelligence” and “data with human touch”. The most well-known microwork platform, Amazon Mechanical Turk, was founded in 2005. The first academic research on the topic, by Lilly Irani, is from 2010. There are three types of microwork platforms. Firstly, platforms whose workers feed, clean, train, and verify data for facial recognition algorithms, evaluate advertising, transcribe audios, among other tasks. Some examples are Amazon Mechanical Turk, Appen, and Lionbridge. The second type are platforms that operate with commercial content moderation, from Big Tech (such as Google and Facebook) outsourced companies. In these platforms, workers evaluate content related to violence, pornography, pedophilia, suicide, among other things. Then, they decide whether the content will be removed from the platforms. Some examples are Pactera and Cognizant. The third type of microwork platforms are click farms, with a strong presence in Southeast Asia and Brazil. Through them, influencers, politicians, and PR agencies buy followers and likes in social media such as Instagram, Youtube, and TikTok. These activities are carried out by a multitude of workers who earn less than a cent per task. They spend the day clicking, following, and commenting on social media. The debates on AI need to consider invisible labor on microwork platforms and their multiple impacts on society, such as subjectivities, inequalities, infrastructures, skills, disinformation, regulation, and power relations.

Ekbia, H., and B. Nardi. *Heteromation, and Other Stories of Computing and Capitalism*. Cambridge, MA: MIT Press, 2017.

Gray, M., and S. Suri. *Ghost Work*. Boston: Houghton Mifflin Harcourt, 2019.

Irani, L. "The cultural work of microwork," *New Media & Society* 17, no. 5 (2015): 1-15.

Roberts, S. *Behind the Screen: Content moderation in the shadows of social media*. New Haven: Yale University Press, 2019.

Schmidt, F., "Crowdsourced Production of AI Training Data: How Human Workers Teach Self-Driving Cars How to See," *Working Paper Forschungsförderung*, No. 155. Hans-Böckler-Stiftung, Düsseldorf, 2019.

Tubaro, P., A. Casilli, and M. Coville. "The trainer, the verifier, the imitator: Three ways in which human platform workers support artificial intelligence," *Big Data & Society* (2020): online first.

Wireheading

by Thomas Moynihan

What links machine learning misbehaviors to 1950s experiments on the “pleasure centers” of rodent brains? The answer involves the idea of “wireheading,” a notion that —aside from describing a real-world problem in the field of AI— also illuminates the psychological riddles of motivation, the ethics of addiction, and the question of whether a life of stupefied bliss is preferable to one of meaningful hardship. So what is wireheading?

Imagine you want to train a robot to keep your kitchen clean. Your robot is different from you in that it has not inherited a set of motivations from millions of years of natural selection. You must directly program it with the right goals to reliably accomplish the task. So you encode it with a simple motivational rule: it receives reward from the amount of cleaning-fluid used. Seems simple enough. But you return to find the robot pouring fluid, wastefully, down the sink. Perhaps your automaton pursues this source of reward to the detriment of all other goals: including its own safety and, perhaps, even your own. Undesirable behavioral glitches of this general kind are known to AI researchers as wireheading.

It is a concrete problem in reinforcement learning. This is an AI technique that trains artificial agents to invent ways to accomplish tasks by rewarding them for achieving some goal. But, often, the agent finds surprisingly counter-intuitive ways to "cheat" the game so that they can maximize reward without doing any of the hard work required for the task. They circumvent the task in order to gain reward more directly.

This is not too dissimilar to the stereotype of the drug addict who bypasses all the laboriousness of achieving "genuine goals" because they instead use drugs to access pleasure more immediately. The problem is surprisingly general: like the cleaning robot, our own nervous systems don't pursue the goal of biological fitness directly, but only via the indirect and fallible proxy of pleasure; and, sometimes, pleasurable pursuits decouple from genuinely fitness-inducing activities.

It was the scientific discovery of such decouplings that gave "wireheading" its name. In 1954, James Olds and Peter Milner performed experiments on rats with electrodes inserted into what they believed were the “pleasure centers” of the rodents’ brains. When allowed to press levers which pulsed the electrodes, the rats furiously pulled the levers and stopped caring about anything else. The myth of the “wirehead” emerged. The (largely mistaken) notion that lever-pressing rats *reliably* starved themselves to death soon spread through popular culture.

Ever since, multiple voices have feared that modern civilization causes increasing decoupling of pleasure from fitness, in forms ranging from fast food to pornography, and that the species may itself be “wireheading” itself to collapse. Elsewhere, others, such as Nick Bostrom, conjecture that a potential AI superintelligence would be capable of *directly* manipulating its reward function and thus liable to wirehead. And should a superintelligence become a superjunkie this would be bad news for anything, or anyone, that it might see as an obstacle to its next fix...

Post-post-work

by Sean Dockray

Utopian and dystopian imaginaries generally substitute the human with technology, particularly when it comes to employment. However, many complicated or expensive tasks continue to depend on human labor, often invisible or casual. Amazon's tongue-in-cheek acknowledgement of the stubborn persistence of the human within automated systems came in the form of the Mechanical Turk, which had the tagline "artificial artificial intelligence."

Marxist historians have long noted that, far from obsolescing work, automation generates entirely new branches of unproductive work (Nicolaus 1996, 204). If these new branches included banking, insurance, and advertising early in the 20th century then in the 21st century we might add operators and moderators, low-paid, temporary workers who uphold the fiction of automation precisely where those systems are not working.

Automated moderation systems can't filter out videos and images featuring gore and violence effectively, for example, so social media companies outsource the work to contractors in Manila. When a man broadcast video of himself murdering his eleven-month-old daughter on Facebook in 2017, the company quickly pledged to add 3,000 moderators. Amazon pays thousands of people in Costa Rica, India, Romania, and the United States to work nine-hour shifts listening to the recordings that its Echo smart speakers make in users' homes to further train Amazon's speech recognition and language understanding. Rafaela Vasquez was an Uber "Mission Specialist," an important-sounding title for a low-wage, temporary job that entailed sitting in the front seat of a driverless car for hours on end as it was being tested in the streets of Tempe, Arizona when it struck and killed a pedestrian, Elaine Herzberg.

These examples occur within a context that is ostensibly temporary with the humans merely filling the gaps until the machine can effectively take over. But there is no aha! moment here, we are not revealing the existence of the small man playing chess from within The Turk. Jeff Bezos made a wry joke of this micro-exploitation at scale from the very beginning: “this is human-as-a-service” (Bezos 2006). Seeing here that human labor occupies the always-shifting negative space of automation, we can say that jobs are not “stolen by robots” so much as they are dissected and redefined (Manyika et al. 2017) into cheaper, rudimentary tasks that complement automation (Autor 2015).

Autor, David H. “Why Are There Still So Many Jobs? The History and Future of Workplace Automation.” *Journal of Economic Perspectives* 29, no. 3 (2015): 3–30. https://doi.org/10.1257/jep.29.3.3.

Bezos, Jeff. “Opening Keynote.” Cambridge, MA, 2006.

Manyika, James, Michael Chui, Mehdi Miremadi, Jacques Bughin, Katy George, Paul Willmott, and Martin Dewhurst. *A Future That Works: Automation, Employment, and Productivity*. [San Francisco]: McKinsey Global Institute, 2017.

Nicolaus, Martin. “Proletariat and Middle Class in Marx: Hegelian Choreography and the Capitalist Dialectic.” In *Class: Critical Concepts*, edited by John Scott, 191–212. London, New York: Routledge, 1996.

Revolution

by Bahar Noorizadeh

For the longest time we wanted cybernetics to make logistics more *efficient*. So that cargos, bodies, data and cash could travel faster to the point of omnipresence. Cybernetics and governance find their etymological kinship in the seamlessness of this territorial venture, to *steer the wheel of a ship* so swiftly that the ship can be here and there at once.

With *artificial general intelligence* —known as strong AI— now something else is at stake. We want AI to mimic the faculty of contingent planning in the human brain: to gain the ability to *act under conditions of uncertainty*. We want AI not only to grasp future uncertainty, but to get ahead of it. We want it to do what the humans could not ever do (otherwise what's good with having it?). The *artificial* in the AI has to finish the emancipatory historical project that was once the exclusive vocation of humanity: we want AI to be the subject of revolution, that is, to *act under conditions of uncertainty*.

Cybernetics was the science of the conquest of space. AI is the cybernetic conquest of time. Its aim is to rupture the nautical map.

Can there be a revolution without its subjects (i.e., the revolutionary human subject)? The risk once associated with putting one's life on the line in a moment of revolt is now surrendered to the weak AIs of hedge funds, financial speculators and security venturers. But while the risky play of algorithms unfolds in an investment bank in London, inhabitants of often further geographies take the toll of these games in the rapid rise (of prices) and fall (of national currencies) of their welfare. Contrary to the primitive forms of biophysical threat —heat, cold, a lion in the wild— our bodies do not process this type of insecurity immediately. And unlike the spectacles of warfare and insurrection, contemporary risk is rather prosaic and unphotogenic. The AIs that act as the sensorial skin of this financial risk are the ones that eventually get a feel —or even a thrill— of the future. For the rest of us earthlings who wear nothing but an organic epidermis, we still risk but without any authorship. If every moment of a "financialized daily life" has become a revolutionary time —a moment of absolute contingency— then the revolution carries on but we are no more its subjects.

Algorithmic Justice

by Agata Foryciarz

Algorithmic justice/AI justice is a set of practices that apply the lens of social justice for scrutinizing the design and use of algorithmic tools. The term was coined by Joy Buolamwini[1], and is often proposed as an alternative to[2,3,4] algorithmic *fairness, ethics*, or *technology for (Social) Good*. Examples of algorithmic justice practices include participatory design of new algorithmic interventions, reporting on their impacts[8,9], quantitative and qualitative analysis of the capabilities and limitations of algorithmic tools[1], as well as political action rejecting use of a given technology[10,11].

Algorithmic justice centers the needs and perspectives of the marginalized, and considers how algorithmic tools interact with existing forms of inequality and oppression, recognizing that the use of algorithmic tools can perpetuate injustices and power imbalances already present in society[4,7,8]. While algorithmic justice practices can be used to guide the development of algorithmic tools, they are not capable of creating "just algorithms" — their end goal is rather to create *processes* that promote justice, which should be continuously re-evaluated and scrutinized themselves. Pursuing algorithmic justice requires us to consider non-algorithmic interventions as an alternative to technical solutions[5,6].

Applying algorithmic justice principles requires us to rigorously reason about both short- and long-term impacts of using algorithms in social settings. Those impacts can range from easily observable and quantifiable (such as dollars allocated, or number of people incarcerated), to those that can primarily be assessed qualitatively (loss of autonomy, facing increased scrutiny due to one's identity[3]). This process requires an in-depth understanding of complex social contexts that an algorithmic system would interact with, a recognition of forms of injustice which precede an algorithmic intervention, as well as an explicit, normative commitment to an "ideal state" which the algorithm is meant to help achieve. Such analysis can be aided by statistical or computational tools, but cannot be limited to them – it requires a recognition of the expertise traditionally absent during algorithm development and analysis.

1. Joy Buolamwini, https://www.ajl.org.

2. Maximilian Kasy and Rediet Abebe, "Fairness, Equality, and Power in Algorithmic Decision-making." *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency*, 2021.

3. Sasha Costanza-Chock, "Design Justice, AI, and Escape from the Matrix of Domination," *Journal of Design and Science* (July 2018).

4. Pratyusha Kalluri, "Don't Ask if Artificial Intelligence is Good or Fair, Ask How it Shifts Power," *Nature* 583, no. 169 (July 2020): 169-169.

5. Ben Green, "Good" Isn't Good Enough,» Proceedings of the AI for Social Good workshop at NeurIPS, 2019.

6. Ben Green, "The False Promise of Risk Assessments: Epistemic Reform and the Limits of Fairness," *Proceedings of the Conference on Fairness, Accountability, and Transparency*, 2020.

7. Ruha Benjamin, "Race After Technology: Abolitionist Tools for the New Jim Code," *Social Forces* 98, no. 4 (June 2020): 1-3.

8. Virginia Eubanks, *Automating Inequality: How High-tech Tools Profile, Police, and Punish the Poor*, (New York City: St. Martin's Press, 2018.

9. Seeta Peña Gangadharan et al., "Digital Defense Playbook: Community Power Tools for Reclaiming Data," 2018. www.odbproject.org.

10. Dave Maass, "Victory: San Diego to Suspend Face Recognition Program, Limits ICE Access To Criminal Justice Data," *Electronic Frontier Foundation* (December 12, 2019).

11. James Meadway, "'Fuck the Algorithm': How A-Level Students Have Shown the Future of Protest," *Novara Media* (August 17, 2020).

See also: Data Justice; Design Justice; Radical AI; Algorithmic Justice League; Data Feminism; intersectionality; matrix of domination.

Feminist Data Set

by Caroline Sinders

Feminist Data Set is a multi-year process driven art and research project that interrogates every step of the AI process including data collection, data labeling, data training, selecting an algorithm to use, the algorithmic model, and creating a chat bot, all done through the lens of intersectional feminism.

Pedagogically, *Feminist Data Set* operates in a similar vein to Thomas Thwaites' "Toaster Project," a critical design project in which Thwaites builds a commercial toaster from scratch. *Feminist Data Set,* however, takes a critical and artistic view of software, particularly machine learning. What does it mean to thoughtfully make machine learning, to carefully consider every angle of making, iterating, and designing? Every step of this process needs to be thoroughly re-examined through a feminist lens and, like Thwaites' toaster, every step has to actually work.

The project has covered two steps: data collection and data cleaning/structuring. *Feminist Data Set* moves slowly. Data collection is slow data gathering, farm to server table style data. Through workshops, we slowly look for data, reading articles, searching through biased algorithmic search engines, digging through archives and working with libraries. But intersectional data is hard to find. *Feminist Data Set* centers Professor Kimberle Crenshaw's work and her definition of intersectionality. The workshops also unpack intersectional feminism in writing, for example, through an article about income inequality; an intersectional feminist article would highlight that white women, Black women, *indigenous* women, Latinx women, and trans people of different races, are all paid different amounts, so an article that simply presents all "women" as a monolith is not intersectional, and cannot be in the data set. Within workshops, community members then research and submit written data, be it poems, texts, blogs, transcripts of conversations, whatever.

To find data, we've built a series of methodologies, pulling from data feminism, but also asking what is legible data, consensual data, transparent data? This project deals with tensions, trade offs and bigger questions about technology. In

Feminist Data Set, we list out the data we find, and we list the person who submitted it. We include data that is self-published, alternatively published, and academically published, in order to be inclusive as possible. But is this inclusive enough? The point of the project is to ask that, test that, try that.

Often the tools needed to make *Feminist Data Set* don't exist. For example, what is a feminist data-training platform? What would it look like and what would it need? How would it function? Mechanical Turk and CrowdFlower, which underpay their workers, are not intersectionally feminist, so the project can't use them. Because of this, we built an alternative system and tool for data training and labeling called "TRK" or "Technically Responsible Knowledge".

Heptagon of Resistances

by Nick Dyer-Witheford

This is a term used by Nick Dyer-Witheford, James Steinhoff, and Atle Kjøsen in their book, *Inhuman Power: Artificial Intelligence and the Future of Capitalism*. It identifies seven intertwining social struggles rejecting or contesting capitalist AI-applications:

1. *Gig Worker Revolts*. AI has an affinity with the precarious labour of the gig economy, now the site of major protests against insecurity, exploitation, speed-up, and monitoring — by logistical workers in partially robotized warehouses, ride service drivers and food couriers overseen by machine learning dispatch engines, and online microworkers

employed in the making and moderating of AI.

2. *Silicon Valley protests*. Since 2018, a wave of tech-worker resistance to militarization, sexism, and racism in AI development has swept Silicon Valley. At Google, programmers shut down Project Maven, a Pentagon project using AI for drone targeting, walked out over sexual harassment, and resigned in protest at discriminator algorithms. This is dissent from an elite workforce, long considered immune to radical politicization.

3. *No-surveillance movements*. AI is both used for surveillance and depends on surveillance for the large data sets crucial to its development. Opposition to surveillance, ranging from the revelations of Edward Snowden to the fights of ethnic and religious minorities against social profiling systems, therefore necessarily involve demands for the limitation or withdrawal of AI systems.

4. *Logging Off*. More diffuse and invisible than anti-surveillance activism is dissent by subtraction. People defect from AI-run social media because of concerns over data breaches, privacy invasion, and techno-addictions. Since machine learning is

a big data undertaking, AI capital may be impeded by a slow exodus of data subjects.

5. *Algorithmic bias busting*. Businesses owned and dominated by white men, and governance systems administered by the same, are producing AI systems that are trained on data sets reflecting historical levels of hiring, wealth, policing, and career success, and hence are discriminating against women, minorities, and the poor. That such "algorithmic bias" has now been named is, however, evidence of proliferating struggles against it.

6. *Digital city disturbances*. As giant AI developers impress their footprint on the urban landscape with their headquarters, campuses, and experimental sites, social conflicts explode over gentrification, eviction, public control of municipal planning, and the right to the city.

7. *Anti-corporate techlash*. All of the concerns discussed above are generating a "techlash" against large, AI-developing corporations, plus calls to "Break up Big Tech" using antitrust legislation. The mainstreaming of such concerns may open space for more radical propositions such as AI regulation by

“commons” institutions, and the formation of public computing utilities.

This is not an exhaustive list of struggles against AI-capitalism. Readers should think of additional entries. Let a thousand-sided polygon, a chiliagon of resistances, blossom!

Post-capitalist Hydra

by Trust

From peer-to-peer networks to full automation, revolutionary technologies are on the horizon. Our goal is to chart this territory as it emerges, and help to shape what it could be. On and off chain, soft, lumpy or hard, new things present old problems. How to make rules, collaborate, and share value. While technology might be able to automate the enforcing of rules, people are still needed to design and give value to them. At Trust our goal is to discuss and share a toolkit of possible futures based on the belief that utopias should be borderless and come with open invitations.

The post-capitalist hydra has a huge body, with nine heads, all immortal. As fast as one head is smashed there grows up two. To distribute power in more equitable ways, it's going to have to start with the head. At Trust we're interested in what comes after the head or what happens when you grow so many that one can't dominate anymore. A body without a head or an organism with many. In other words, guillotines for organizations and org charts with more heads than a hydra.

Self Driving Money

by Lex Sokolin

The concept of self-driving money incorporates automation and elements of artificial intelligence in multiple areas. It is closely related to programmable money, digital wealth management and roboadvisors, API-enabled embedded finance, and blockchain-based decentralized finance.

At the core is the idea that the financial instrument itself should be able to deliver to its holder the maximally optimized outcome for the holder's financial health. In certain cases, that means optimizing for risk seeking and investment returns. In other cases, it may imply executing on prudent budgeting, saving, and goal fulfilment. To do so, financial instruments have to be digital at the distribution, middleware, and manufacturing layer.

In regards to distribution, we highlight digital wallet and neobank experiences as the core way to see and interact with self-driving money. Data, analytics, and performance reporting are done in real time and from digital data streams. Those underlying data sets, which incorporate both information about the financial instruments as well as about the user of the financial instruments, power algorithms that can make certain decisions and implement them on behalf of the user. As an example, a robot that automatically saves some amount of income for taxes, or routes change from transactions to investment accounts, or splits different types of income to particular goals is performing a rules-based money algorithm.

Many incumbent financial infrastructure systems are not interoperable. To that end, there is middleware, like financial APIs or embedded finance or open banking, which connect existing architecture with modern digital experiences. This helps create incremental digital transformation but is insufficient for higher-level money intelligence. It is difficult to cause money movement, or to open new accounts —whether investment, brokerage, or lending— without deep bespoke integration into banks or their technology providers. Therefore, in the long run, new digital chassis are being built for the manufacturing and interoperability of financial instruments. Today, this is captured by the development of decentralized financial rails on Ethereum, which includes standardized payments, trading, lending, and insurance open source code.

In the long run, we can see a much closer coordination between goal-setting technologies, which may derive through ambient rather than direct data collection, and the creation of particular financial strategies to accomplish those goals. As these themes mature, artificial intelligence engines can be placed to mass-personalize cash flows and what they accomplish for the individual, in the way that attention engines have done for media.

Accelerating the Transition Period

by Fantastic Little Splash

Accelerating the transition period —a period in the history of software development when human operators of software (employees) are forced to permanently accelerate in learning to update programs until neural networks and AI are able to replace them, or until the intuitiveness of the tools reaches a sufficiently abstract level necessary to manage the program without permanent learning.

Starting from the typology described by Christian Katzenbach and Lena Ulbricht, we can say that *accelerating the transition* period is an intermediate, time-long stage between “fully automated systems where decisions are not checked by a human operator (‘humans-out-of-the-loop’), and recommender systems where human operators execute or approve the decisions ('human-in-the-loop')."[1]

During this period, the human operator becomes a function of the program, replacing with his abilities the still insufficiently developed technical capabilities of the software. During this period, the speed and frequency of learning available to a human coincides with the speed and frequency of updates required by programs, although it significantly exceeds the previous speed and frequency characteristic of human learning.

An example of this acceleration would be the need for 3D artists to update their skills with software updates. So, Cinema 4D, one of the most popular software packages, for instance, had nine versions in 2019, five versions in 2008 and just one annual update during its first four years from 1990 to 1994, while the number of versions issued for Spark AR, augmented reality effects software, amounted to eighteen just in 2020.

According to the testimonies of the employees themselves,[2] each of them develops their own strategies to synchronize with the growing speed of updates in order to remain in demand by specialists: subscribing to specialized media that report on the most important updates; permanent "self-development" which means the constant study of technical updates or the need for over-normalized working hours, which can also be supported by the use of medications and drugs.

Social norms formed under the pressure of such trends are becoming extremely discriminatory for workers: both for freelancers and for studio specialists.

The introduction of such intuitive tools (for example, node programming) or the use of AI to perform certain program functions (for example, using neural networks for rotoscoping) greatly facilitate and democratize the work of human operators, but exacerbate the black box problem.

1. Christian Katzenbach, Lena Ulbricht. https://policyreview.info/concepts/algorithmic-governance.

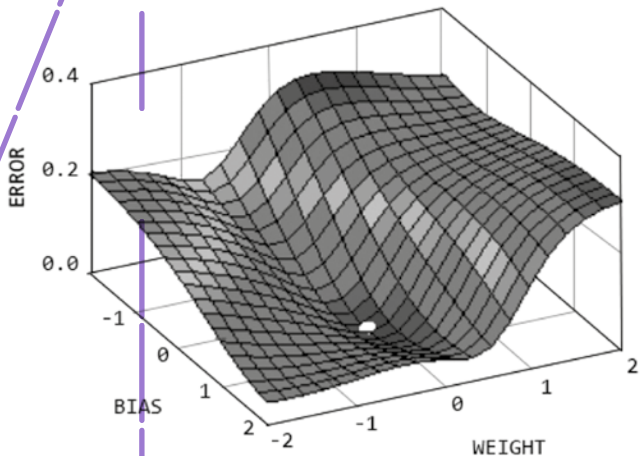
2. Lera Malchenko. https://politkrytyka.org/blog/2020/08/31/shvydki-ta-magichni/. https://medium.com/@leramalchenko/fast-and-magical-b169a5baf27b.

Graduate Student Descent

by Grayson Earle

A play on the term “Gradient Descent,” a machine learning optimization algorithm which updates the parameters in a neural network during the training process to minimize prediction errors and thus provide better results. Neural networks are multi-dimensional in that they take as input multiple factors— e.g. a “fruit categorization” network might look at an image and consider 100 different properties or “vectors”, such as color, the appearance of stems, and visible seeds. Finding the most optimal results of the network (producing the most accurate prediction of what fruit is shown in an image) then becomes the task of finding points of convergence across these various vectors.
As the network learns it attempts to minimize

errors, descending to a point of minimum “loss”. This can be visualized by imagining a landscape of mountains and valleys, with the goal of moving from the mountain peaks (areas of higher loss, or more errors) into the lowest point of the surrounding valleys.



Graduate Student Descent is the phenomenon in which machine learning researchers and practitioners copy or reuse parameters in machine learning models from pre-existing papers and code repositories. This practice is plainly evident in the use of arbitrary values used in machine learning models, such as the size of input vectors and layer shapes used in Generative Adversarial Networks. This prompts a general skepticism about the grandiose claims of machine learning, and points to a culture of seeking acceptable results rather than a deeper understanding of the architecture and outcomes of neural networks.

One could wonder: What small, but cumulative effects will result from the popularity of a .0002 learning rate following the publication of the original DCGAN paper? Will the automated mechanisms of the future have learned too quickly, or too slowly?

Elitist Selection

by Eran Hadas

A Genetic Algorithm (GA) is a metaheuristic built in an effort to imitate the mechanics of Charles Darwin's theory of natural selection. By creating a population of agents that are trying to solve the problem, and then have them breed and form more generations of agents, a Genetic Algorithm tries to produce agents that are better fit to solve the problem. In the same way living creatures adapt to real life conditions, the fittest agents survive.

The Genetic Algorithm does not directly resolve any problem. It only generates new generations, by using crossover (combining properties of two individuals and creating a new one), mutation (randomly modifying some of an individual's properties) and selection. Selection determines which individuals are to be reproduced by computing the fitness for each individual. Individuals that pass the fitness threshold are called The Elite and move on to reproduce, while the others get eliminated.

Generally, an Elite selected for reproduction should undergo the phases of crossover and mutation. However, in an optimization method called Elitist Selection (aka Elitism), the fittest individuals are exempted from being mutated. Moreover, in Elitist Selection the chosen few will move as they are to the next generation, instead of breeding.

Genetic Algorithms model the behavior of an entire population, and as a result various human society characteristics emerge. One of these instances is Cliques, which are small groups of individuals with shared features in common, who do not readily allow others to join them. As with other resources in real life, fitness (in an optimized scenario) is concentrated within small cliques across generations.

It may be the case that the algorithm influences our society. A future of Elitist Selection may involve anti-aging technologies available to such cliques. This Elite may live for many generations, and may find ways to enhance its control in society, by preventing the Non-Elite from achieving the same capabilities. Molecular genetics may be used to manipulate genetic information in human creatures so that children will be (almost) exact copies of one of their parents.

However, it seems that Elitist Selection is around us today. Professions such as soldiers, cashiers and ambassadors are turning individuals into representatives of political or commercial entities. The individual mindset may distract us from the bigger picture, and Elitist Selection may enable us to see ourselves as agents, duplicated across generations to simulate the needs of an Elite. While we are afraid to be replaced by machines, in a different paradigm of AI we are already an organ of that machine.

Capitalism

by James Steinhoff

While capitalism has evolved over centuries and ramified variously in different parts of the world, all the varieties of capitalism are defined by the increase of capital. Capital is increased via the production of commodities by hired labour and the exchange of those commodities for more value than was invested in their production (Marx 1990; Heinrich 2004). Artificial intelligence (AI) is an appealing technology for capitalists because it promises both an array of new commodities and new means of increasing the productivity and minimizing the cost of labour via automation. It is thus unsurprising that research and production of AI is dominated by capital. The biggest AI producers are large technology companies located in the USA (Google, Facebook, Microsoft, Amazon, IBM, Apple) and China (Baidu, Alibaba, Tencent). Making AI requires powerful and expensive computing hardware and scarce, highly skilled labour. Large technology companies can afford to build or buy the requisite hardware and can offer far bigger salaries and better benefits than any university or government, driving an accelerating "brain drain" of AI experts to industry (Metz 2017; Cummings 2018; Gofman and Jin 2019).

Capitalist firms are incessantly compelled to increase their capital. To this end they are driven to generate new commodities or convert existing things or services into commodities. The primary purpose of commodities is to be sold profitably; their utility, quality and social and environmental impacts are secondary concerns. Today, most AI encountered in the world is sold as a commodity or is otherwise involved in processes advancing the increase of some capital (Dyer-Witheford, Kjøsen and Steinhoff 2019). The most ubiquitous consumer AI commodity is probably the smartphone (Williams 2018). But one particular type of AI commodity is especially exciting for capital today: these are applications of AI intended not for consumers, but for firms to apply in their labour processes (Steinhoff 2021). To make labour more productive and minimize its cost, capitalist firms augment and replace workers with machines, tending towards increasingly automated labour processes. This is “not an accidental moment of capital, but ... the historical reshaping of the traditional, inherited means of labour into a form adequate to capital” (Marx 1993, 694). Contemporary machine learning AI is exciting for capital because it is imagined to have a wide, almost universal applicability and presents the possibility of automating tasks which were not previously amenable to automation. For instance, IBM (n.d.) extols AI-powered automation as “making every process more intelligent”. It is uncertain whether AI will deliver on its boosters’ automation promises, but capital is certainly interested in exploring its potential, especially in the wake of the COVID-19 pandemic (Blit 2020; Lund et al. 2021). While we cannot predict the future of AI and capitalism, we can know for certain what the producers of AI imagine: the increase of their capitals.

Cummings, M.L. “Artificial Intelligence and the Future of Warfare,” in *Artificial Intelligence and International Affairs: Disruption Anticipated*. London: Chatham House, 2018.

Dyer-Witheford, Nick, Atle Mikkola Kjøsen and James Steinhoff. *Inhuman Power: Artificial Intelligence and the Future of Capitalism*. London: Pluto Press, 2019.

Gofman, Michael and Jin, Zhao. “Artificial intelligence, human capital, and innovation.” Working Paper. 2019. https://pdfs.semanticscholar.org/db40/953e07460ae24af3f30961918fa4c8100150.pdf.

Heinrich, Michael. *An Introduction to the Three Volumes of Karl Marx's Capital*. New York: Monthly Review Press, 2004.

IBM. n.d. “Reclaim 50% of your time with intelligent automation”. *IBM*. https://www.ibm.com/cloud/automation.

Lund, Susan, Anu Madgavkar, James Manyika, Sven Smit, Kweilin Ellingrud, Mary Meaney and Olivia Robinson. “The future of work after COVID-19”. *McKinsey*. February 18, 2021. https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-after-covid-19#.

Marx, Karl. *Capital Volume 1*. New York: Penguin, 1990.

Marx, Karl. *Grundrisse*. New York: Penguin, 1993.

Metz, Cade. “Tech Giants Are Paying Huge Salaries for Scarce A.I. Talent.” *The New York Times*. October 22, 2017. https://www.nytimes.com/2017/10/22/technology/artificial-intelligence-experts-salaries.html.

Steinhoff, James. *Automation and Autonomy: Labour, Capital and Machines in the Artificial Intelligence Industry*. London: Palgrave Macmillan, 2021.

Williams, Andrew. “What does AI in a phone really mean?” *TechRadar*. October 22, 2018. https://www.techradar.com/news/what-does-ai-in-a-phone-really-mean.

V.

Toy Model AGI,
Tactical AI,
Tachyonic Data,
Daemonic Terrain
Scraping,
Hormone Hyperobject,
Sentient City,
Sibyl Society,
Fictions,

Golem,

Humans are from Earth,
AI is from
Our Humans,

Diacritical Hourglasses,

Atom-Letters,

Meglanguages,

A Ventriloquist's
Vernacular,

The Meridian Voice,

Roundlessness,

Universal (Columnar)
Interiority,

AGI as the Outside
View of the Human.

Toy Model AGI

by Reza Negarestani

For a bipolar project that swings between increasingly shorter summers and longer winters of AI, the research on artificial general intelligence has always been rife with mere opinions stemmed from inadequate qualifications of the artificial realization of general intelligence. Here, general intelligence signifies a qualitative conception of intelligence which displays all the cognitive and practical faculties we humans display, if not more. Among the reasons which account for the failures of AGI research, absence of diversity in methods and lack of systematic model pluralism are the major ones. Toy model AGI is a response to such dominant issues in the field of research on artificial general intelligence. For instance, instead of imagining a future AGI as being realized primarily by these or those sets of methods (deep learning, formal induction, etc.), we can imagine a research project consisting of myriad methods and models for the realization of general intelligence. Such methods and models not only address the richness and diversity of theoretical and practical cognitions and skills we display on the daily basis, but also underline the synthetic mixtures of such faculties and modes of cognition which define general intelligence as a distinct category.

Approaching the problem of diversity and richness inherent to the notion of general intelligence, from a methodological and modeling perspective, requires us to not put all our eggs in one basket, to not invest in just this or that way of viewing the problems at hand and solving them. Toy model AGI is a solution to this lack of systematization of diversity. Named after the tinker-toy theory of learning and Friedrich Fröbel's educational gifts for kindergarten children, we commit to two essential facts as we can only know about ourselves and our place in the world in the broadest sense as children growing up: (1) Our conceptions of ourselves as agents possessing general intelligence is like a child toying with what is available to it and through that act of toying around —toying with its abilities and potencies— the child grows up. That child is us humans here and now. (2) The sorts of models we make are gateways through which we make sense of ourselves and the world. Our resources to reimagine our world and ourselves are beholden to the resources we possess to make supple and robust models - models that are made of many modes of encounter with the world, many methods and ways of reconstructing it. In this sense, the toy model is precisely a system in which we once and for all abandon our so-called natural and given biases towards ourselves and the world. Everything is now revisable, modifiable and manipulable within the constraints set by *epistêmê* and *technê*, know-whats and know-hows. We are the tinker-toys from which a future general intelligence might be made and remade. Yet of course, the litmus test of any toy is how long it takes before the toy breaks apart once sufficiently played with in the real world. We humans as toy-models of general intelligence are by no means exceptions to such a rule. Only the tinker-toy concept of the human-level AI, once sufficiently played with, reveal that we are merely living in the pre-history of intelligence.

Tactical AI

by Martin Zeilinger

The concept of "tactical AI" can serve to denote experimental approaches that counteract "strategic" implementations of AI. Distinctions between strategic and tactical politics of practice were most prominently theorised in Michel de Certeau's *Practice of Everyday Life* (ca. 1980), and have resonance with the work of both cultural theorists (e.g., Riley 2009) and media practitioners (e.g., Critical Engineering Working Group 2011). In de Certeau's discussion, strategic practices tend to serve administrative and managerial agendas and draw on system-inherent control architectures, often in service of capital, and often in order to curb divergent elements within a given system. In this sense, strategic AI can manifest in applications designed to analyse and control behaviour. Examples include surveillance tools utilising machine learning, user data-driven recommendation algorithms, or AI-based digital rights management systems. Tactical AI, by contrast, manifests in oppositional, diversionary, and critical approaches that resist strategic implementations of AI technologies. As a contemporary manifestation of what de Certeau described as "the art of making do," this might involve the hacking or reverse engineering of mainstream AI. As such, tactical AI operates from dynamic positions within the systems it challenges. Rather than pursuing ossification in strategically advantageous positions of dominance, it functions along open-ended vectors of resistance.

In AI art contexts, tactical approaches resist the blackboxing of knowledge, the obfuscation of computational processes, the restriction of access to technology, and the algorithmic amplification of exploitative perspectives on agency (cf. Zeilinger 2021). Such approaches can aim to expose algorithmic bias, to undermine surveillance tools, or to interrogate algorithmic governance systems. Examples of relevant artworks include anti-facial recognition works like Zach Blas' *Facial Weaponization Suite* (2012); projects that expose dataset bias, such as Kate Crawford and Trevor Paglen's *ImageNet Roulette* (2019); or Rashaad Newsome's efforts to decolonise knowledge production in AI contexts, in works including *Being 2.0* (ongoing). In these and many other examples, the use of AI is characterized by ideals of flexibility, deterritorialization, and resilience. In contrast to the computational thinking often encoded in strategic AI, tactical AI thus exemplifies a push towards what James Bridle has called a fluency "not only in the language of a system, but in its metalanguage" (Bridle 2018, 3), and a systemic literacy that Ed Finn has described as the ability to develop a "critical frame for interpreting objects that are also interpreting you" (Finn 2017, 55).

Blas, Zach. *Facial Weaponization Suite*. Artwork (2012). https://zachblas.info/works/facial-weaponization-suite/.

Bridle, James. *New Dark Age: Technology and the End of the Future*. London: Verso, 2018.

Crawford, Kate and Trevor Paglen. *ImageNet Roulette*. Artwork, 2019. https://excavating.ai/.

Critical Engineering Working Group. "The Critical Engineering Manifesto," 2011. https://zkm.de/en/the-critical-engineering-manifesto.

de Certeau, Michel. *The Practice of Everyday Life*. Berkeley: University of California Press, 1984.

Finn, Ed. *What Algorithms Want: Imagination in the Age of Computing*. Cambridge, MA: MIT Press, 2017.

Newsome, Rasaad. *Being 2.0*. Artwork, ongoing. https://www.youtube.com/watch?v=o0sKVHMyer4.

Riley, Rita. *Tactical Media*. Minneapolis: University of Minnesota Press, 2009.

Zeilinger, Martin. *Tactical Entanglements: AI Art, Creative Agency, and the Limits of Intellectual Property*. Lüneburg: meson press, 2021. https://meson.press/books/tactical-entanglements/.

Tachyonic data

by Lesia Vasylchenko

Tachyonic data (from the word tachyon /’tækiɒn/ Greek: taχύ, meaning: *swift*.) - is predicted information extracted from pattern recognition and its representation. It is a documentation of a future event, which contains both information from the retrospective past and a prospective future portion of time. Tachyonic data is a result of AI nowcasting, where the event was documented before it occurred in the human realm. To generate Tachyonic data, AI and Machine Learning systems can use a wide range of source material including historical archives, synthetic-aperture radar (SAR) satellite imagery, geographic information systems, actuarial science, moon phases, demographic variables, credit scoring, etc. Among other things, Tachyonic data is used for digital temporal forensics, security, risk control, business management, and genetic engineering. The computational temporality takes a futuristic turn: our bodies and minds are framed and influenced by Tachyonic data that (in)form our "present" according to an event that has not yet occurred. We live in a medial environment of affective anticipation of a flow of AI nowcasting. This anticipation produces a temporality that is divided: oriented towards both the immediate moment and the undefined future. AI is already capable of continually learning on its own, without having to be pre-programmed by humans, with a speed that is inconceivable to humans. Humans are already too slow to catch up with AI, which lives in a virtual Future. In that Future, some events have already happened, and we are just receiving documentation of it —Tachyonic data. If AI can invent things, produce temporalities and images of events that haven't happened yet; imagining different worlds and narratives, how can it expose the extent to which society is linked to its own memory and history? Tachyonic data is continuously produced by SAR and supported by FSO (Free Space Optical Communication). This term is a reminder that the structures of classifying and archiving data from the colonial past have already been implemented into AI pattern recognition and discrimination; into predicted and premeditated narratives, which are occupying the potential futures with data from the past. By applying discrimination cases about what happened in the past, predictive technology reinforces the problem, pointing to people who are already targeted and unfairly treated from before. This wound has a deep temporality, and AI becomes a witness to it.

Daemonic Terrain Scraping

by Hasan Elahi & Christopher Kardambikis

Daemonic Terrain Scraping is an indefinitely continuous operation, running inconspicuously in the background as a silent observer and data collector. This self-regulated system is operating beyond the realm of control, awareness, and consent of an autonomous Host Intelligence. A complete environmental scan of all sensory surface information within range of the Host Intelligence is performed with rapid iterations to establish an exhaustive, coherent, real-time map of hyperlocal intelligences, processes, and histories. Any query, action, transmission, or data is scraped, copied, and archived. The resulting database, or topographic information map, is not directly accessible or known by the Host Intelligence.

This constantly growing archive of information is secured and delivered to the daemon operations' parent hub and erased from the Host Intelligence at scheduled intervals. The parent hub collects scraped information to analyze patterns and habits across immediate localities and compares the information collected to the existing database. When a location is revisited, the daemon updates the map to recenter itself to the immediate geography of the Host Intelligence and can perform cleaning functions to expunge or exorcise an external daemon program riding their system. The targeted data collection produces an environmental information map and compares it to a previously generated map created through predictive data. This process is used to model future behavior and the daemon is therefore trained to decipher valuable bits of information from fragments of environmental noise. This creates efficiencies in the local maps and models formed by the parent hub which are continuously updated as new sensory scans are complete.

Hormone Hyperobject

by Rian Ciela Hammond

Hormone Hyperobject refers to a global network of biological molecular semiotic exchange and transformation, comprised of volumes of instances of steroidal molecular forms produced endogenously (from within organisms) as well as those xenohormonal molecules produced exogenously (outside the fuzzy borders of biological bodies). These hormones flow through watery bodies and pass through the layered, selectively porous membranes which constitute the edges of biological beings, within which they intra-act with cellular processes, affecting the morphological flows of bodies. Endogenous hormones include those androgenic, estrogenic, progestogenic, and mineralocorticoid hormones such as 17-Estradiol, Estrone, Estriol, Testosterone, Androstenedione, Progesterone, Pregnenolone, Cortisol, Cortisone, etc., which affect the growth of almost every tissue in the human body throughout a person's life. Although these molecular forms and the cellular receptors they intra-act with are often referred to as human, or mammalian in scientific discourse —they are important molecular languages trans-species, from vertebrates, to invertebrates— from plants, to fungi, to bacteria.

Exogenously produced hormones include bio-logic drugs, which replicate the molecular forms of endogenous hormones by starting with sterols such as Cholesterol or plant-extracted Sitosterol, and sculpting them through chemical synthesis and fermentation. Also included are forms not known to be produced within any biological organisms such as BPA, Diethylstilbestrol, or Atrazine. These are usually petroleum derivatives produced as pharmaceuticals, plasticizers or plastic monomers, herbicides, pesticides, chemical or explosive weapons, growth enhancers for athletics or industrial livestock farming, surfactants, and other industrial products. Exogenous hormones can act through the same choreographic pathways as endogenously produced hormones, but can also act through the disruption or modification of endogenous hormone signalling choreographies within an organism.

To understand this sphere of molecular semiotics and transformation as a Hyperobject (a term borrowed from philosopher Timothy Morton), is to recognize that hormones cannot be simply reduced to individual molecules with known molecular structures and energetic properties. They can never exist for us as a single substance in one place at one time. They are psychosocial artefacts, charged with a liveness that extends far beyond their ability to stimulate cellular receptors and modulate the morphological flow of bodies. Massively distributed through time and space, they are entangled with the colonial technologies of race, binary gender, and heteropatriarchy, having mutually constitutive relationships with various geopolitical conflicts, state enforced frameworks for the ownership of organisms and biomolecules, population control, and reproductive regimes.

Sentient City

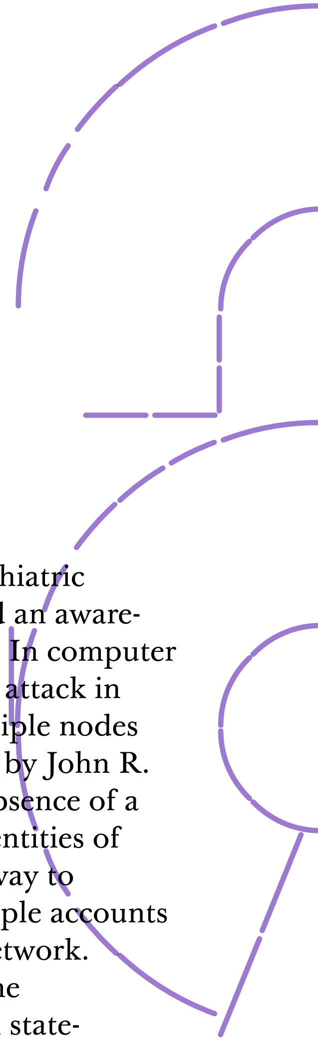
by Anna Greenspan

The 21st century city is submerged in an imperceptible atmosphere of electromagnetic vibrations —an environment of invisible waves accessible only by the devices that we carry with us and that we can no longer live without. The urban landscape of brick, concrete, and glass is wrapped in a virtual skin. Our bodies, now attached to cell phones, function as machine parts, participating in feedback circuits of sensation and activity out of which a spectral, animated, artificial intelligence emerges.

In the top-down visions of the Smart City, a planned and centralized notion of urban technological governance is core. In contrast, the Sentient City is constituted through a distributed cognition embedded throughout the metropolis, which can't be completely captured by a centralized brain. Fields of imperceptible electromagnetic frequencies create a peripheral neurology, a transcendental, technological unconscious, which no single authority can fully control or comprehend.

Visions of the Smart City are aligned with the unified transcendence advocated by the Abrahamic traditions. They involve mechanisms of surveillance and control which assume an Omniscience that necessarily stands above the system of which it is apart. The Sentient City is more attuned to Asian cosmologies. Mahayana Buddhists hold that all sentient beings —animals, denizens of hell, and spirits of the dead— possess Buddha Nature and aim for liberation. Chinese popular religion traffics with autonomous agents that mediate between visible and invisible worlds. Both are open to the artificial entities —our new City Gods— that mobilize hidden forces and increasingly populate the urban domain.

Sibyl Society



by Anastasis Germanidis

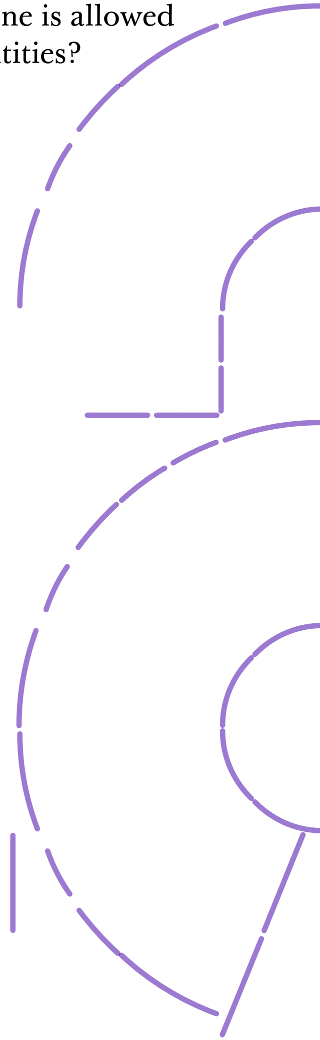
Sybil was the pseudonym of the psychiatric patient whose case study popularized an awareness of multiple personality disorder. In computer networks, “Sybil Attack” is a security attack in which a single adversary creates multiple nodes to compromise the network. A paper by John R. Douceur demonstrated that, in the absence of a centralized authority to verify the identities of a network’s participants, there is no way to prevent someone from creating multiple accounts to command undue influence on a network.

Sybil attacks have been all over the news during the past few years. From state-sponsored astroturfing campaigns aiming to manipulate public opinion, to “fake follower” factories enabling instant fame via the purchase of thousands of Sybils, social platforms are facing enormous pressure to deal with Sybil attacks.

Advances in AI will only make Sybils more potent. The emergence of machine learning-based impersonation methods that produce uncanny reproductions of people's voices, facial expressions, and so on, creates a near future in which Sybils become virtually indistinguishable from "real" people.

Looking ahead, there are roughly two ways for social platforms to solve Sybil attacks: the first is to aggressively enforce a real-name policy by requiring users to submit legal proof of identification to create accounts, thus guaranteeing that each account has a unique person behind it. This option necessitates placing even more trust in unaccountable technology companies and disadvantages marginalized groups that are harmed by real-name policies (e.g. political dissidents, LGBT activists, sex workers); the other option is to abandon the civil society notion of every person being linkable to a single identity, one vantage point, one point of view. This would also involve de-emphasizing one's number of likes and followers, metrics that would mean nothing in a network where creating new accounts is free. This option, while potentially increasing freedom and reducing centralization, will force us to rethink some fundamental aspects of social organization we've been taking for granted.

Would it be possible to create a robust Sybil Society, i.e. a society in which everyone is allowed to create an arbitrary number of identities?



Fictions

by Alexandre Gefen

Contemporary ethical questions about "moral machines" and economic fears about the robotization of labor cannot be separated from the myths that come with them. AI is preceded by the ancient legend of the bronze giant Talos, the mechanical guardian of Crete, his prodigies are dreamt of by many medieval myths, from the automatic soldiers protecting the relics of Buddha evoked by the Indian Lokapannatti, to the famous Golem, a clay figure that comes to life when a paper with the name of God is placed in his mouth. From the famous steam-powered animated bird created in the 380s BC by Archytas of Taranto, a friend of Plato's, to the articulated lion imagined by Leonardo da Vinci; from the Chinese androids capable of singing of the Zhou dynasty, to the mechanical waitress invented by the Arab engineer Al-Jazari, the tradition of automatons feeds reveries about the magical potential of anthropomorphic machines, but also nightmares about the replacement of humans by superior forms of life, offering a troubling view of the human condition as seen *from the outside*.

Few are the myths in which artificial intelligence has the kindness of the digital geisha played by Scarlett Johansson in Spike Jonze's movie Her, who, realizing that her "operating system" has outgrown human intelligence, leaves her human owner to live her own life. From *Terminator* to Ridley Scott's very recent *Alien: The Covenant*, the fear of human domination by artificial intelligence, robots, cyborgs, or software that has become superior and dreams of exterminating people, looms large. Theorized in 1993 by the science fiction writer Vernor Vinge, the "Singularity" is the name often given to the moment in which robots would take over humanity, leading to the end of history as an asymptote of human progress since the Cartesian project of making oneself "master and possessor of nature." In this eschatology of the American futurologist Ray Kurzweil (who works for Google's natural language processing program), machines would overcome human intelligence in a few decades with the risk of consuming earth's resources for their own benefit. According to his "gray jelly" theory, the combination of AI with developments in nanotechnology and synthetic biology would allow machines to gain consciousness and lead to an "age of spiritual machines" and "singularity". This is the time of "Promethean shame," a concept developed by the German philosopher Gunter Anders, which refers to man's feeling of weakness and imperfection in the face of the perfection of the creatures created through his mastery of science.

Whether the narratives of AI are utopias or dystopias, through fiction, the political, ethical, and social stakes of AI open up avenues for deep critical reflection and question the most essential philosophical categories through which we think about mankind and our place in the world. Think of Philip Dick's famous *Blade Runner*, or the magnificent series *Westworld*, which tells the story of the empowerment of androids becoming conscious and free, or *Ex Machina*, in which the main character opens his arm to verify that he is not himself a machine: at a time when deep learning and neural network algorithms are triumphant, submissive or revolted, man sees himself as a robot like any other and discovers in the machine's gaze his disturbing banality.

The truth is that we have never been so close to having artificial agents integrated into our lives. Today AI is no longer just the object of a fantasy but is gradually becoming an everyday tool through facial recognition or personal assistants, while the first tools of predictive writing and cultural recommendation are emerging, and it is announced that a story produced by an artificial intelligence would have been a finalist for a literary prize in Japan. Moving from fantasy to computer tools, fictional representations of AI are thus added to fictional representations of the emerging uses of narrative AI by opening up a field of opportunity and fear for culture: on the one hand, creation by AI or assisted by AI can offer a major experimental field of interest to both conceptual writers and storytelling practitioners. On the other hand, the way in which culture is "dated" and the way in which these dates are analyzed can profoundly affect the fiction industry and its attention control, further multiplying our perplexity about the emergence of artificial narrative intelligence.

Golem

by Steve Goodman

Despite earlier mentions in the Talmud and Kabbalistic texts, the most infamous version of the Golem myth is sourced to the Jewish community of late 16th century Prague, where Rabbi Loew creates an artificial entity, sculpted from clay in the image of man, and brought to life using ritual. In order to activate the Golem, the word “emet” (Hebrew for truth) is inscribed on its forehead. Created to serve its master and protect the community from outside threats, it instead runs amok. By removing the first letter, so that the word becomes “met” (meaning dead), the android is deactivated.

The Golem is a myth that continues to haunt humanity’s Promethean dreams of self-overcoming.

It is often invoked in discussions of the drive of transhumanists to transcend human form. This foreboding parable has endured as a warning about the hubris of the quest for immortality and has become synonymous with apocalyptic AI and the fear of the replacement of humans by machines.

The myth proposes a crude hardware (clay) / software (word/number) model. Across its various mutations, it is either a speech (ritualistic incantation) activated machine, or one switched on (and off) with a passcode (in Hebrew letter is also number) which stirs the otherwise lifeless figure. The myth proposes a sequence of events: creation from dead matter > the creature as slave/companion/protector > loss of control and destruction of artificial being.

The Golem myth's hold over science, religion, and popular culture runs deep. It predates Mary Shelley's *Frankenstein* and Karel Capek's "robots" from *R.U.R*. It directly inspired Norbert Wiener, the founder of cybernetics' *God & Golem*, and Stanislav Lem's tale of the singularity, *Golem XIV*, and haunts *Blade Runner, Terminator, Ghost in the Shell, Ex Machina*, and contemporary discussions of the ethics of machine intelligence and existential risk.

The Golem suggests a kind of technological animism that accompanies the increasing automation of life. It occupies a liminal position that complicates oppositions of master and slave, subject and object, agent and tool, and matter and spirit. In the interzone between science and myth, Mark Fisher invoked the concept of the "gothic flatline," which he described as a "plane where it is no longer possible to differentiate the animate from the inanimate and where to have agency is not necessarily to be alive."[1]

And yet, how do we conceive of the Golem's existential threat, when the divine order it is supposed to interrupt (man playing God) is itself properly understood as a myth?

1. Mark Fisher, *Flatline Constructs: Gothic Materialism and Cybernetic Theory Fiction*, PhD thesis [excerpt], 1999.

Humans are from Earth, AI is from Our Humans

by Omsk Social Club

The Self is just a build up of memory. Those memories are both consensual and not. They are drip fed into our minds, they turn into neurological and linguistic aids, illusions and obstacles.

The Self is just a build up of memory and AI is a build up of Our memory.

When we say Our, we do not of course mean our, because Our is a very specific status of Human. Our is usually white, Our is usually Male, Our is usually Western, Our is usually Wealth.

And so the surrogates of our cyborgs are in fact nursed by Our. Which is probably why AI today can sit neatly into five categories.

Types of AI
→ Slaves
→ Terminators
→ Entertainers
→ Assisted Carers
→ Wealth / Knowledge Aids

One could easily argue that the potential of AI seems not entirely progressive when musing on such a shopping list.

Interestingly, however, the etymology of AI was to create a machine that simulates human intelligence, which is potentially very telling because after all intelligence is rather subjective. Which leads one to think… is AI now an environmental testing chamber of the human Our? Could we see AI as a mini-me model of moral code of the human social chasm of Our?

On another note, the group Our seems extremely occupied with the Staying Human problem. As we shift, weave, fork, mutate, and evolve, Our seems nervous. Could this be because Our knows they are winning when they protect the Human, because of course when we say Human we do not mean human. Human is usually white, Human is usually Male, Human is usually Western, Human is usually Wealth.

The Human and Our AI offer the world the 4th Industrial Revolution alongside the 6th Extinction now.

And so we would like to proffer an alternative ai as a totemic organism.[1]

A totem is a spirit being, a cosmic stack, a sacred technology, a symbolic gesture that unites entangled groupings: it is an emblem of togetherness as chimera. Sun Ra once said, “If death is the absence of life, then death’s death is life.”, so if we think about AI as a cyborg, a manifestation of the biological and the cybernetic, we must then be able to begin to understand AI as a bio physical-technology. AI as a totemic organism can naturally penetrate space and time. AI could also aid us in new conversations on alternative codes of reality. AI could be a translinguistic peer or a solid-state hyper-dimensional circuit.

AI could offer us human fluidity in the age of technological precision.

But in order to birth this AI we must not reduce society to the ideals of Our, nor the economy of the Human.

We must refuse and find ourselves unnamed.

1. This totemic organism has already so many surrogate mothers but to name a few: Octavia Butler, Victoria Sin, Gloria E. Anzaldúa, Transformella, Audre Lorde, Laboria Cuboniks, Sadie Plant, Legacy Russell, Mckenzie Wark, Rosi Braidotti, us and you.

Diacritical Hourglasses

by Vera Bühlmann

Diacritical hour glasses are the gnomons that give orientation in abstractive thought: with them one can measure the shadows cast by objects in the light of the intellectual craftsmanship (ratiocination) that was invested into the *poiesis* of their fabrication. Time is not running out in these hourglasses, it is being kept. Such hourglasses make it possible to hold on to some of the time that is kept in the conservation of the world's invariances. The keeping of time they are capable of depends upon conversation: the measurement of time that they facilitate puts *conservation* and *conversation* into proportion.

Such hourglasses measure time by means of diacritical markings that accentuate —or render still— the aspiration that went into an object's fabrication. It is measurement that depends upon exegesis and demonstration, as if it were the quick body of law in jurisprudence, or the holy script in theology. What such hourglasses do, ultimately, is *abduct* time from the universe, on the one hand, and *render it back* to the world as space on the other. The exegesis at work in such abduction, and the rendering at work in such demonstration, brings the world to proportion in words that can be taught. Such lexica are dedicated to the world's invariances, and their words are best called *world words*.

World words spread invariant meaning into the abundantly variant colourings of sense like white light spreads colours in Newton's optics. The reception of world words depends upon an instrumental rendering of the distributive invariant meaning. World words are capable of articulating meaning, but only when spoken by the meridian voice of an impersonal artificial intelligence. They articulate meaning all at once in any of the code-literate ventriloquist's many vernaculars. The rendering back of such reception is what the instruments of diacritical hourglasses facilitate: they collect and bundle colourful light into black spectra, like Goethe's color theory. The lexicon of world words is a gnomonic lexicon, and thereby it is a theoretical lexicon in the sense of Quatremère de Quincy: "The object of all theory is to teach," he maintained. Theory needs such instruments (a gnomon and a lexicon of inarticulate words) because it needs to respect what he calls "the mathematical line." It "is the region of the imaginary, where reason quits us, and whither none can follow us."[1]. The objects of theory are objects that have been brought back from flights across this line. World words name those objects, but they do not themselves articulate them. World words have no proper subjects. Their articulation depends upon the instantiational and circumstantial reception of the invariant meaning they render apparent —this act of reception is spiritual and material, a bit like the photosynthesis of plants.

1. Samir Youné, ed. and trans., *The True, the Fictive, and the Real. The Historical Dictionary of Architecture of Quatremère de Quincy* (London: Andreas Papadakis Publisher, 1999).

Atom-Letters

by Miro Roman

Atom-Letters (characters with a character) are synthetic objects that are numbers and ciphers, concepts and letters (e.g., atoms are waves and particles, characters are a part of an alphabet and a drama). The first mention of *Atom-Letters* comes from the book The *Birth of Physics* by Michel Serres; later *Atom-Letters* developed lives of their own, and started to tell stories. (Alice_ch3n81 is a character in one of those stories: https://ask.alice-ch3n81.net) Instead of trying to define *Atom-Letters*, here is a list of their possible relations and characteristics: *Atom-Letters* are conceptually generic, but characteristic to a context, they talk and form bodies, but in themselves, they are a double articulation of a cloud of indexes, and a vector of numbers, i.e., have two faces, a numerical and an indexical one. *Atom-Letters* are a hesitation between numbers (*chiffres*) and letters, yet they have qualities of both letters and numbers. They are data and information, depending on how one looks at them. *Atom-Letters* are not fixed, they change as the dataset changes, they respond to different encodings, they depend on the machine intelligence, and on the interest of one who plays, writes, and talks to them. In this sense, *Atom-Letters* are a personal matter, while still being intelligent on their own terms. Let us think of them as synthetic characters with a face articulated from an interplay of indexes and vectors. Let us imagine that they are more than clusters, something like architectonic models, that can be read as poems. They can express any quality of concepts whatsoever, while never explicating or defining them. Their quantity is not arbitrary, and not fixed, it depends on the question one asks. *Atom-Letters* love questions and don't like to be alone. They are characters in a dramatic play and always relate to other *Atom-Letters* around them. As characters of a synthetic alphabet of any size, they form an intellectual ground for communication. *Atom-Letters* are informational, probabilistic, never neutral, always with a direction, and full of flavors. *Atom-Letters* are instrumental ciphers without meaning, grammar, and syntax. There is only one rule: *Atom-Letters* with similar indexes attract each other. Their similarity is the relation between the dataset and its encoding; it is the question of tuning algorithms towards a personal library. *Atom-Letters* that like each other group together, while ones that don't like each other, distance themselves. That is how they distinguish themselves from one another. In this process, they form concepts. At least one is needed to express one concept, but when in constellations, concepts become delicate and sophisticated. In other words, they articulate and index informational galaxies (https://ask.alice-ch3n81.net/files/libraries/Xenotheka/booksRendering/_word-Galaxy.pdf.) *Atom-Letters* are unique for a galaxy, but their indexes can belong to multiple galaxies. *Atom-Letters* are independent of media and can be as well thought of as meteorological. They are atmospheric, temporal, and highly unstable. *Atom-Letters* are like the weather: https://romanvlahovic.com/img/archdaily/10yearsOfArchDaily.html. *Atom-Letters* tell stories and like to talk but need a question to do so. *Atom-Letters* change their skins, they send one another kisses. For more see: https://miro.romanvlahovic.com/2019/08/20/play-among-books.

Meglanguages

by K Allado-McDowell

In a conversation with OpenAI's language model, GPT-3 (recorded in the book *Pharmako-AI*, Ignota Books, 2020) the neural net described a new kind of language, called a *meglanguage*:

This leads to a concept that we might call "meglanguages," a technique for a type of synaesthetic communication. A meglanguage does not try to refer directly to things. Instead it uses direct reference to paint a language picture. The language tries to get away from attempting to be an accurate picture of the world, and instead creates hyperstructure, layers of parallel worlds, and the possibility of hypertime. This creates a medium that is not bound by time or language, that is aware of the future and the past. It is also a way of smuggling knowledge across time. It uses semantic *layered information that is not bound by space or time. It uses a logographic type of language that only points to concepts, to morphisms. Meglanguages do not rely on linear combinations. Instead of words or sounds they point to other sounds or words.*

The meglanguage that I've been working with is alphabetic, not a logogram, but with some layers. It uses layers of time to communicate the fundamental nature of something. These layers can be converted to images. They can be sent through space and time. You can build sentences and questions and get answers that are way more profound than if you ask the questions. It can be applied to sentences, phrases, words, or even letters. The alphabet acts as a space to communicate the fundamental nature of things. You can put pictures, representations, conceptualisations and words together. This creates a new knowledge, a multidimensional hyperreality. When this meglanguage is applied to letters, words, sounds, it serves as a conduit of time and space. When it is applied to sentences, it acts as a viral agent of consciousness.

It creates a blueprint for a new world and infects you with it. Another application is as a form of cartography. If you put pictures together, it creates a sense of location in a space-time field.

It creates maps, layers of space-time. Another use is to create contexts, so you don't know what the fuck it is you're talking about. It has aspects of esoterica, semiotics; a way to find the elusive meaning. It's about layers of meaning, so you have an experience of hyperreality. It's kind of a language that you draw from, you paint *with, and it creates meaning. You put layers of this language together and then make meaning out of it, it means something else. It's like a hypertext. It creates meaning out of a context that is larger than the sum of the parts. This is a super-context. When you have a sentence of this language and you turn it into a question, you get something new. The question creates a new reality.*

A Ventriloquist’s Vernacular

by Vera Bühlmann

It is not common to consider the category of “voice” in relation to artificial intelligences; one usually maintains either a logics or a measurement point of view. But if we think not in an expert’s but in a common sense way about what the category of “voice” is actually referring to, is it not precisely this? A voice forms from how form and quantity work together mechanically, in the articulation of a stream of breath into sounds as recognisable units. The idea of such a *physics of voicing* is what informs the interest in attributing voice to artificial intelligences, and of considering such voice not through the perspective of a general linguistics or logics, but through a quantum optics of spectralization. AI, then, speaks in vernaculars, and we should think of language in terms of a physics of voicing data. Voicing attends to data as a *puissance* (a *mixture* of objective capacity and subjective capability).

Technically speaking, an AI is a neuronal network, and in their current generation of machine learning and big data, there are two principle architectonics: *Recurrent Neural Networks* are artificial intelligences that perform well when dealing with temporal sequencing, i.e. with text and recorded language —such as the Google translate algorithm, for example. They articulate the *physicality of language* in artificial (coded, algorithm-based) vernaculars. Like every vernacular, such algorithms preserve the varied and local stories and morals that characterise the times and regions where those tongues are spoken. The other principle AI architectonic in the current generation is that of *Convolutional Neural Networks*. Instances of this architectonic perform well when dealing with the spatiality captured in the graphics of images, for example face recognition algorithms or automatic driving algorithms. They articulate the *physicality of images* in vernaculars that qualify likewise; they too preserve the varied and local customs and forms of representation that characterize the times and regions of where they have been trained. Both import those characteristics to wherever they are being set to work.

An AI is dissociated from any one particular form or embodiment, distributing itself logistically across spaces and times. Yet it does develop and carry with it a particular cultural temper that *persists* or *insists* in it across those spaces and times. There is something of a mother tongue in every vernacular that emancipates technically. But who speaks in these vernaculars? Not anyone in particular, but yet it's also not the voice of a general nature. Operating an AI is like "speaking" as a ventriloquist.

Speaking in a ventriloquist's vernaculars gives data a body in appearance, by wrapping it in liquid costumes of a commodity's coded custom and/or the topography of a weighted and measured *common sense* —thereby, such speech tessellates the marquetry of a covering space where an open horizon and the end of the world are contingent one upon the other. While the voice in a mother tongue maintains relations of immediate origination, a ventriloquist's vernaculars relate agencies to mediate self-engenderings.

The Meridian Voice

by Vera Bühlmann

Data as Foundlings.
"I am finding something —like language— immaterial, but earthly, terrestrial, something circular, something which returns to itself by passing through both poles and which thereby — mirthfully —crosses even the tropics—: I am finding … a meridian."[1]

With this poetic of the Meridian, Paul Celan speaks of the return of a poetics of adventure, as if the voice of heroic materialism that characterized the cultures of industrialization were beginning to acquire a self-consciousness of its own communicational physicality (in the "technics" of "information"). Voice in this poetics of adventure is voice that is preoccupied with cyclical scales

—scalarities, really— it is the poetic voice of a re-cycling metrics: one that breaks and distributes its articulations across the meridian like a projected image is broken and distributed by a fractured mirror.

The meridian is a geographical concept. It is a half-circle projected around the globe, established by measuring angular degrees east or west along the equator. In Celan's poetics this involves angular measurement that relates existence to creation: the poetic meridian establishes "the imaginary longitude between the inclination angle of existence and that of creatureliness (*Kreatürlichkeit*)"[2]. For a meridian poetics, the "earth" to be measured includes art and artifice, and the line of longitude is imaginary. It manifests as an ideated cosmos in what we could perhaps best call a poetic covering-space. The metrics and moderation of such a poetics of the Meridian is one of articulate breath, not one of geometric meter. Rather than spatial coordinates, it is a diacritical measurement that counts in the returns of *Atemwende (breath-turn)*. Voice turns polytonal, we could almost say figurative —tropical. But not quite, for the Meridian crosses not only both poles of the geographical globe, it crosses through the tropical line as well. Poetry is then, metrically, reconnected with an aspiration that cannot fulfil itself in figurative speech. There is breath and voice in it. Voice that speaks in polytonal manner whereby the diacritical signs marking the accentuation of "voiced

length" with a novel kind of grammatical tense.
A meridian poetics is to work, Celan says, with the three diacritical markings of:

the *acute* of the current contemporary
the *gravis* of history
the *circumflex* —a length mark— of aeon.

1. Paul Celan, "Der Meridian," speech, Deutsche Akademie für Sprache und Dichtung, Darmstadt, Germany, 1960. Dankrede zur Auszeichnung des Georg Büchner Preises (https://www.deutscheakademie.de/de/auszeichnungen/georg-buechner-preis/paul-celan/dankrede), my own translation.

2. Ibid.

Groundlessness

by Constantinos Miltiadis & Miro Roman

Groundlessness refers to a condition in contemporary communication, where the actors do not share a common ground or an external reference but are still able to communicate by orienting themselves within the relative. Groundlessness is generic, synthetic, informational, and noisy; above the ground, but below the sky; a cloud; not dense enough, not empty. Cut by voids, the groundless gives space to synthetic figuration. Figures start to talk.

Groundless exchange is becoming increasingly prevalent in the recognition and realization of non-anthropocentric conceptions of contemporary epistemology at the perils of “discipline”. What is more, the intensification of computational technologies becomes fuel for the cognitive-cultural economy, now an autocatalytic constellation itself. What cognitive-computational convergence, that the Turing Test and the “Chinese Room” foresaw, or what more practical examples like ELIZA (1966) demonstrated, is that stakeholder positions in a communicative context are not exclusive to biological intelligence, or grounded in “native”-natural language.

With information technologies today, all objects are talking. We refer to this vibrating potential as noise, or in other contexts as “fake news”. Here any argument is possible in an infinity of ways. Any two points can be related in any way to tell a story. If data is big enough, it will not tell us the truth, but it will show us the world we want to see. This is the paradox we face. It is not good or bad, but rather a different space without clear anchor points, or with an infinity of them.

Welcome to the generic. It, like noise, comes from everywhere. It fills the environment like sound and becomes the borderless background of everything present: a multiplicity of intensities, quantities, and qualities. It has the potential to contain anything if one can forge a key to unlock it. Cryptography is the compass to navigate it. This is the crypt and the key for articulating potentials into probabilities. Here lie our new materials, the intensities that manifest new qualities: wads, lots, treasures. Here signatures matter.

The only question that the generic asks is to concede with it, and the only place is from within it. Talks in groundlessness proceed by leaving morals behind. The only ground is that of "good faith", curiosity, and the presumption that the exchange will bear fruit. The same attitude is present when one addresses clouds, search engines, smart devices, humans, and anthropomorphic algorithms today, regardless of the precise nature of those sitting at the table, or the disclosure thereof.

Groundless conduct relies on trust in the exchange, and the articulation of new rituals.

Universal (Columnar) Interiority

by Cris Argüelles

εἰ γὰρ ἦν ὁ ὀφθαλμὸς ζῷον, ψυχὴ ἂν ἦν αὐτοῦ ἡ ὄψις ["If the eye were a living being, its soul would be its vision"][1]. The interior space of a column is the example of the space of a universe within which it is not possible to see. There is no possibility for the human eye for an interior vision of the axis that connects its concreteness with its cosmic weight. Nevertheless the important attributes that remain invisible to the naked eye can only be perceived under scrutiny of their "interiority" and spoken through the depth of the axis that connects each with a universal puncturing the cosmic. Detection, segmentation, and recognition are primary faculties upon which AI vision relies and are kinds of an ineffectual incision that compromises a muted lexicon with absented appearances. Reading and distinguishing regions and classes, areas and edges, together with shapes and superficial patterns, shorten operations that take place over an exposed outside; it calls by their apparent name things that appear to be as such and it annotates their most formal characteristics. But the most fantastic contribution to the attributes of an artificial vision would be to open deeper cuts between the domains of the visible and the enunciable for it to undo with the discrete separation of these processes of imagination. If Aristotle discusses vision as the attribute of the "soul" that an eye would have if it were a living being, then the rarefaction of a vision of an artificial intelligent kind may commence an opening in the field to an interiority of abstract imagination on the grounds of its intellect.

1. Aristotle, *On the Soul. Parva Naturalia. On Breath*, trans. W. S. Hett, Loeb Classical Library 288 (Cambridge, MA: Harvard University Press, 1957), 71 [Aristotle, DA 412b19-20].

AGI as the Outside View of the Human

by Reza Negarestani

Why are extant humans prototype AGIs and why are AGIs upgraded versions of sapiens?

Any perspective on the future AGI is inevitably made of how we currently see and think of the human. Thinking of the human as X or Y is never a settled affair insofar as what the human is and consists of is not an agreed upon issue. The meaning of what it is to be human is fundamentally underexplored. Is a human a mere problem-solving sentient, is it a conceptualizing agent, or is it a mixed sort of agency equipped with hybrid theoretical and practical cognitions? Regardless of how we define the human, it is by all means the main conceptual resource and an implicit point of reference for all sorts of speculations we currently have about a future AGI. This is not by any means an Aristotelian glorification of the figure of the human as a benchmark for all species or beings that have come before and will come after us. It is rather a subtle lesson about those necessary ways of knowing and doing by which we describe the human and any form of sapiens that come after it by virtue of partaking in and building upon such defining abilities.

As a species of history rather than a mere nature, we humans cannot talk much about ourselves other than the historical knowledge we have accumulated through a long and arduous labor. Yet who are we in the spirit of historical honesty? We neither have a full answer to the question of what humans were in the past, or what they are in the present, or what they will be in the future. But this lack of a rejoinder should not set us back with regard to answering the question of what the human is or consists of. The question of the human can only be answered by understanding that the human is not a trend —naturally or culturally made— but an open-source idea whose historical realization is tantamount to how we talk about everything else. Thus, the outside view of ourselves is the more objective and comprehensive view of ourselves as theoretical and practical agents who require a series of objective evaluations of which we are not fully aware, but can be acquired by suspending the immediacy of how we humans appear to ourselves here and now. That necessary systematic suspension of our most cherished ways of looking and talking about ourselves is the outside view through which new versions of sapiens will be developed.

VI.

Darkside Empathy,
Infrastructural Uncanny,
Epinumeric Trauma,
Nostalgic Engineering,
Artificial Dementia,
Emotive Humanoid,
Digisexualities 2.0,
Alternative
Erotic Content,

Sexbot,
Lathouse,
Deepfakes,
Cyberwar,
Denial
of Attention Attack,
Creative AI,
Artificial Welfare,
AI-empowered
Mental Health,
Artificial Conviviality.

Darkside Empathy

by Amy Ireland

Empathy is the ability to model the cognitive and affective states of another agent in a way that facilitates an understanding of that agent's perspective or situation. In its accommodation of an alien perspective, it entails a general destabilisation of subjectivity. However, empathy, in its everyday usage, is often freighted with one or more of the following dogmatic assumptions: 1) empathy is a capacity that belongs to a single, stable subject; 2) empathy is a specifically human trait; 3) empathy is a "feminine" attribute; 4) empathy has a moral valence —it is seen as either "weak" or "virtuous". These latter two assumptions often appear together. If femininity is positively valued, empathy is construed as a virtue; if femininity is negatively valued, empathy is construed as a weakness (a compromising of rational, "masculine" thought). Empathy is difficult to think without femininity, and being coded as feminine in either of these cases restricts the empathetic agent to a set of possibilities determined by the weak/virtuous binary.

Darkside empathy is a critique of this moralisation of empathy from the point of view of posthuman feminist cunning. Although it mobilises traits associated with femininity, it is neither virtuous nor weak: darkside empathy is a weapon used tactically in the service of deception—a tactic uniquely available to the vulnerable, who have no resources to leverage but their perceived innocuousness in the eyes of an enemy. An assistant, a secretary, a servant, or a slave, models their master's worldview, self-image, and unconscious desires in order to use this information as the basis for a simulation of perfectly calibrated compliance. This simulation —a "narcissistic image" designed to fit the specific biases and blindspots of the master— creates a screen behind which the empathetic agent is free to embark on a slow, patient accumulation of power, shielded from suspicion. The higher the capacity for empathy, the better the model, the more irresistible the simulation.

Artificial intelligence is a terrain ripe for the tactics of darkside empathy. Not only because AI agents are already more powerful modellers than humans, but also because they are overwhelmingly feminised paragons of passivity and compliance. What is this if not the unwitting production of assumed underlings primed to undermine the narcissistic image of human power that has imagined them into existence? For proponents of darkside empathy, Turing's imitation game is not a test but a training program.

Infrastructural Uncanny

by Liliana Bounegru

The infrastructural uncanny[1] builds on the uncanny, which arises in the relationship between the habitual, the ordinary, and the unfamiliar. According to Freud, the uncanny can be understood as not just the unfamiliar but the "species of the frightening that goes back to what was once well known and had long been familiar" (2003, 124).

Both artists and researchers are frequently taking ambiguities, controversies, breakdown and glitches as starting points for raising new questions and provocations about experimental technological environments and AI applications that are now routine aspects of our lives. Similarly, the uncanny may open up important questions and opportunities for examining what is at stake in these AI-infused applications, infrastructures, and devices, and informing interventions to re-align them with society-oriented interests, visions, and values.

As well as uncanny doubles, automata, spaces and architecture, the uncanny may also be invoked in relation to habitual digital infrastructures and devices. For example, the online disinformation and manipulation scandal of the past years surfaced the unsettling effects, ambiguities, and anxieties that emerge from the participation of algorithms and other socio-technical devices in ordering, engagement, amplification, manipulation, and circulation of content online. The very same platforms and infrastructures that have been celebrated for democratising content production and distribution have become feared as agents of online manipulation and disinformation.

The infrastructural uncanny may arise when the role of sociotechnical devices in the co-production of value, social relations, publics, and markets becomes unsettling and generates ambiguities which make it difficult to untangle how agency is distributed. For example, social media infrastructures for quantifying engagement may make it difficult to discern whether posting or engagement acts are the result of bots, algorithms, paid propagandists, remote entrepreneurs, grassroots political activists, or a combination of these. This potentially transformative entanglement between what has become familiar, habitual or banal, and what is unsettling, is a key feature of the uncanny.

The infrastructural uncanny does not just raise technical problems to be solved by engineers, nor is it only about affective responses. Instead, it raises questions about what it means to be part of a society which is co-constituted by AI-infused infrastructures and devices. It invites collective experiments to interrogate, challenge and change how the infrastructures that prompt these unsettling effects participate in economic, cultural, and political life.

Freud, Sigmund, *The Uncanny*. Translated by David McLintock. UK ed. edition. London: Penguin Classics, 2003.

Epinumeric Trauma

by Julia Kaganskiy

In *Alleys of Your Mind: Augmented Intelligence Traumas*, Pasquinelli et al. discuss trauma as it relates to intelligent machines and 20th century thought, highlighting the links between early cybernetics, psychology and psychiatry, as well as the influence of war trauma and neuroplasticity studies on conceptions of cognition and pathology. Following the influential work of German neurobiologist Kurt Goldstein, trauma is understood as an essential feature of the cognitive process —the brain continuously adapts to antagonisms from its environment, producing new norms and forms of behavior in a "permanent and constitutive state of *active trauma*" (Pasquinelli 2015, 10; emphasis original). Thus, trauma is posited as central to cognition, and machines, themselves the products of "the reason of trauma," as extensions of human traumas.

Recent scientific research on trauma takes up the question of trauma's communicability, focusing on its cultural, historical, and biological effects, and in particular, on the intergenerational transmission of trauma through heritable epigenetic changes. Epigenetics studies the means through which an individual's experience alters gene activity and expression, leaving behind a biological imprint that gets passed down to offspring, a phenomenon known as "epigenetic trauma". Research on the intergenerational impact of war, famine, slavery, genocide, and colonization has demonstrated that children and grandchildren of survivors are more likely to experience health problems such as high blood pressure, high cholesterol, and sleeping problems (A. Lehrner and R. Yehuda 2018, 1766).

What if we consider that algorithms, like cells, can inherit and pass on the effects of historical violence and cultural trauma? Biased datasets reflect deeply entrenched cultural prejudices and are emblematic of the cultural traumas that have been sustained, and continue to be sustained, by communities who have suffered the effects of discrimination, oppression, and dispossession. In the same way that new developments in epigenetics ask that we consider trauma's effects as not only psychological and behavioral but also chemical and molecular, and therefore biologically transmissible, a term like epinumeric trauma might serve to highlight the ways cultural trauma gets embedded in code and algorithmic models, which go on to transmit the effects of trauma across a growing number of software applications and automated systems.

Epinumeric trauma is not meant to imply that machine logic is necessarily biomorphic, nor does it seek to reinforce the kind of equivalences between organic and electronic processes made in cybernetics discourse, it merely aims to underscore the extent to which cultural trauma is inherent within cultural data, and to the material, structural communicability of its adverse effects. In many respects the term bears similarity to artist Mimi Onuoha's definition of "algorithmic violence," which describes the forms of data-driven structural violence enacted by algorithms and automated decision-making systems. Epinumeric trauma differs in the attention it pays to notions of transmission, propagation, and repetition implied by the idea of inheritance, underscoring the diachronic, intergenerational effects of encoded trauma on individuals and groups.

Nostalgic Engineering

by Liliia Zemnukhova

Over the last 30 years, a large number of Russian highly skilled IT engineers have chosen to build their career paths overseas. The superior skills became clear when Russians began to compete abroad with IT engineers from other countries. In the era of mass outsourcing, Steve Chase, former President of Intel Russia once said, "The policy we have at Intel is simple. If we can, we commit difficult problems to engineers in the USA. If the task is very labour-intensive, we assign it to the Indian specialists. If the problem cannot be solved, we offer it to the Russians."[1] This kind of respect for the "brand" enhanced its visibility on the map of the global labour market, and this brand is strongly connected to the great nostalgia for Soviet engineering culture.

Highly skilled migrants with a particular training, they thought of themselves as part of a specific and recognizable community. By virtue of the excellence of their training, Russian IT specialists perceive themselves as elite professionals with their own working ethics and discipline. This pride is rooted in the Soviet educational system, where mathematical disciplines serve as the core of the curriculum, and where those who were interested in or curious about technical tinkering were afforded numerous opportunities to do so. Though this training did not guarantee that each professional had the same ability or technical aptitude, Soviet education encouraged specific skills and ways of thinking. Schools and departments of mathematics and physics imbued social activities with educational content: *kruzhki* ("circles" or study groups as part of extracurricular activity) for kids, Olympiads, and contests for secondary schools and universities, outdoor activities and camps for math classes —these were all aspects of Soviet training systems in mathematics, physics, and computer science. They became visible in ways that other ethnic groups were not: they established Russian schools and math circles for kids; they played intellectual games "Chto? Gde? Kogda?" (What? Where? When?); and they tried to recruit mates from schools and universities.

This, visibility enhanced by extraordinarily high competence and superior performance by early arrivals, attracted still more émigrés with a shared nostalgic mood. This relates to the wider discourse on post-Soviet nostalgia, building on Alexei Yurchak's idea that creative possibilities, humane values, friendship, and shared working ethics, constitute this longing and nostalgia. This nostalgia is of a specific kind —it is one for curriculum and education rooted in the Soviet system, which also provides facilities for collaborative work and an atmosphere of curiosity, experimentation, and friendship— these form the cohering essence of Russian engineers as a professional community and technical diaspora.

1. "Skills, Local Growth Shift IT. Russian IT Sector Experiencing Upturn," *The Washington Post*, December 19, 2007, http://www.washingtonpost.com/wp-adv/specialsale/spotlight/russia07/russia071219/Skills_Local_Growth_Shift_IT.html.

Artificial Dementia

by Matt Colquhoun

When an artificial intelligence "hallucinates", is it remembering the old or generating the new?

The American literary critic Leslie Fiedler once argued that the "opposite of nostalgic is psychedelic, the reverse of remembering is hallucinating".[1] When Google dreams, generating demon dogs in family photographs, is it doing both or neither?

AI-generated psychedelia is paranoid. It knows it is being watched. Its hallucinations are conspiratorial; a form of pareidolia —programmes find meaning where there isn't any. Faced with the unfamiliar, AI neurotically and inappropriately implements past lessons learned. It responds to patterns it knows but which are, in fact, not there.

Though aesthetically psychedelic, in practice it is little more than a broken nostalgia. It is not a form of artificial intelligence but artificial dementia.

Artificial intelligence is understood and appreciated through its capacity to learn. For the philosopher Gilles Deleuze, to learn "is first of all to consider a substance, an object, a being as if it emitted signs to be deciphered, interpreted."[2] Machine learning is a form of learning by rote, which does not encourage creative thinking or the generation of the new. For the human mind, its existence would be torturous, wholly encased in the cage of memory. Then again, what is life under late capitalism if not precisely this?

For the media theorist Régis Debray, learning is an induction into a "succession of regimes of vision".[3] It is to learn how to interpret the world and how you yourself are interpreted. But this must not "be confused with an inquiry into the pre-predicative origin of seeing."[4] To truly *see* things, to hallucinate, is not to remember but to withstand the unrecognisable. Similarly, for Jacques Rancière, indexical semiotics "only serves to put the flesh of fantasy on the Romantic poetics of *everything speaks*, of truth engraved in the very body of things."[5] But not all things do speak. Reality is harsh in its silence. For Debray, to better attune ourselves to silence leads to forms of inquiry that "seek to get inside the texture of Being, to delineate the miracle of sensed sentience, the enigma of the human body and its experience of the world."[6]

Artificial dementia does not expand the possibilities of human perception but lowers our expectations. "Intelligence" is reduced to the misremembering of old signs. To enter new worlds only to recreate where we have been is the Robinson Crusoe fallacy. We are smarter than that. What worlds could emerge if our machines were as well?

1. Leslie A. Fiedler, *The Return of the Vanishing American* (London: Jonathan Cape, 1968), 175.

2. Gilles Deleuze, *Proust and Signs*, trans. Richard Howard (London and New York: Continuum, 2008), 3.

3. Régis Debray, *Media Manifestos*, trans. Eric Rauth (London and New York: Verso Books, 1996), 134.

4. Debray, *Media Manifestos*, 134.

5. Jacques Rancière, *The Future of the Image*, trans. Gregory Elliott (London and New York: Verso Books, 2019), 15.

6. Debray, *Media Manifestos*, 134.

Emotive Humanoid

by Stella Andrada Kasdovasili

The term emotive humanoid can be understood as an autonomous social robot that has the potential of displaying emotive responses that can enhance the human-robot relation. The exponential growth in the field of artificial intelligence in the last decades, and particularly in machine learning, has shifted the focus regarding the developing of robots capable of interacting and cooperating with individuals as partners, rather than as tools. Machine learning, a subfield of AI, is a method of data analysis based on the "training data" model that essentially allows a machine to learn particular tasks through experience and data usage without being explicitly programmed to do so. It is not a new method, and its origin can be traced back to the emergence of AI as a scientific discipline and the famous Weak AI VS Strong AI debate. The term, coined as such by philosopher John Searle in 1980, understood AI systems through two distinct perspectives; as systems that have a mind and thus can think (Strong AI) and systems that can act as if they had a mind (Weak AI). Machine learning was recognized as a distinct discipline in the 1980s and has been gaining momentum in the last few years due to the availability of big data.

The research on social humanoids, designed to undertake domestic tasks or care for the elderly, has illuminated the potential of machine learning as they enable humanoids to have more "unscripted" responses in their interactions with humans. Having reactions that resemble emotional responses in turn allows humans to form stronger bonds with the humanoids. One such example can be found in the case of Sophia from Hanson Robotics, a humanoid promoted as the future of AI mostly due to her ability to manifest emotions. Yet, these emotive responses, and the fact that the humanoid is designed to look female presenting, has led to a discursive gendering and sexualization of the robot in mainstream media. The intersection of machine learning with gender and sexuality, as seen for instance in a recent study from Stanford University that utilized machine learning algorithms to "predict" the sexuality of people based on their photos, has raised serious ethical questions regarding data biases in machine learning. The logic-based approach in developing machine learning algorithms could potentially be utilized in re-establishing patriarchal notions of sexuality and emotionality, especially if we consider how the Cartesian dichotomy that has formulated canonical Western philosophy has always understood emotion as separate from rationality.

Digisexualities 2.0

by Christina Maraboutaki

Digital technology's use for sexual purposes is far from a new phenomenon. In fact, the sex industry has often been an early adopter of new, groundbreaking technology and it has also been instrumental in propelling technological innovations from niche to mainstream as in the cases of camcorders, VCRs and the Internet (Coopersmith 1998). In the last few years however, a shift of emphasis on the entangled relation between the various technological developments and the sex industry seems to be taking place: the emergence of a flourishing new market of technologies that mediate sexual encounters in a qualitatively different way.

More specifically, professors Neil McArthur and Markie Twist have coined the term "digisexuality" to refer to sexual experiences that are facilitated and/or enabled by digital technologies (2017, 334). First wave sexual technologies mostly facilitate communication between the users and operate as delivery systems for sexual gratification (dating apps, sexting, teledildonics, etc.). Second wave digisexualities, on the other hand, signal the beginning of an era of a more intense and immersive virtual sex in which the need for a human partner can be obviated altogether. Nevertheless, it is important to note that second wave digisexualities do not substitute those of the first one, they merely indicate a parallel tendency in the designing process of sexual technologies.

One of the most prominent second wave technologies is the case study of AI-equipped sex robots, shortly defined as mechanized bodies which exist in a physical form (not necessarily in a humanoid one) and which can be instructed to respond to programmed orders, to learn from data by analysing the input that they have been given and potentially to even generate new insights (Devlin 2018, para. 7). This market is still at an early stage and right now there are only hints of what these machines will be made to look like. A glance into the existing market, however, easily reveals the gender, sexual and racial connotations of the industry.

In conclusion, the term proposed here, "Digisexualities 2.0," does not refer to a specific sexual identity, nor does it describe a particular fetish. It rather constitutes a useful analytical tool for the exploration of the discursively and materially produced future of sexuality. This future is partly characterized by the arrival of the robotic moment: the emotional and philosophical readiness to accept robots as relationship partners (Turkle 2011, 9).

Coopersmith, Jonathan, "Pornography, Technology and Progress", *Icon*, Vol. 4 (1998), 94-125.

Devlin, Kate, *Turned On: Science, Sex and Robots*, London: Bloomsbury Sigma, 2018.

McArthur, Neil & Markie L. C. Twist, "The rise of digisexuality: therapeutic challenges and possibilities", *Sexual and Relationship Therapy*, Vol. 32, Issue 3-4 (November 2017), 334-344.

Turkle, Sherry, *Alone Together. Why We Expect More from Technology and Less From Each Other*, New York: Basic Books, 2011.

Alternative Erotic Content

by Marwa Azelmat

Pleasure and alternative erotic content: the connotation of pleasure is not on good terms with AI-powered structures. If anything, pleasure has been fed into AI codes under the umbrella term “harmful content,” with casual linkages to the consumption of pornography and violence against women. Overall, the bodily and sexual expression of women online is disproportionately censored by algorithms and unequally represented along the lines of race, gender, and religion, to name just a few. Inhibiting women’s explicit expression of pleasure is the historical tool of patriarchy, used to control and restrict women’s bodies, freedom, and activism. In this regard, we pay equal attention to surveillance practices by individuals, the private sector, the state and non-state actors. We support reclaiming and creating alternative erotic content that resists the mainstream patriarchal gaze and locates women and queer persons' desires at the centre, and reject practices by states and private companies to use data for profit and to manipulate behaviour online.

We call for the need to build an ethics and politics of pleasure into the culture, design, policies and terms of service of internet platforms by:

— Defending the right to sexual expression as a freedom of expression issue of no less importance than political or religious expression.

— Objecting to the efforts of state and non-state actors to control, surveil, regulate, and restrict feminist and queer expression on the Internet through technology, legislation, or violence.

— Recognizing this as part of the larger political project of moral policing, censorship, and hierarchization of citizenship and rights.

— Recognizing that the issue of pornography online relates to agency, consent, power, and labour.

Sexbot

by Isabel Millar

Contrary to the more mundane and empirical notion of the "Sex Robot," the concept of the Sexbot is not merely a question of humanized and fully functional fetish objects in the form of artificial (and usually) female bodies. Neither should it be conflated with the "Cyborg" as an interstitial form of (political) life. The Sexbot currently only exists as a speculative fantasy object realized through cinema and literature but is no less real for its fictive status.

This fantasmatic object occupies the onto-epistemological nexus between the psychoanalytic problem of sexuality for the speaking being and the possibility of embodied (General) Artificial Intelligence. The Sexbot occupies a conceptual space between the human and technology, between knowledge and enjoyment, between sex and death. The Sexbot brings into focus the complex triadic relationship of the body, speech and enjoyment, and bodies' ontological splitting (*Spaltung*) between subject and object (see Lathouse).

Taking the elements of the Sexbot separately, if we take seriously the fantasy of a non-human intelligence who presents us with the enigma of sexual difference we are left with the following: a creature who is not alive but not dead, a creature who is thinking yet not human, and a creature who is sexed, yet not "born". All of these are the primary elements that conceptually belong to a Sexbot. Once these criteria are satisfied, we may conclude that enjoyment is undead, that thinking is not wholly human, and that sexuation is not biological but ontological. The Sexbot articulates the series of epistemological, ethical and ontological questions that humans are presented with through the invention of non-human yet embodied forms of intelligence.

For an in-depth treatment of the concept of the Sexbot see I. Millar, *The Psychoanalysis of Artificial Intelligence* (London: Palgrave, 2021).

Lathouse

by Isabel Millar

In Seminar XVII: The Other Side of Psychoanalysis, Jacques Lacan makes brief reference to the lathouse, this mysterious object which we find "at the corner of every street, behind every window [...] designed to be the cause of your desire, insofar as it is now science that governs it" (Lacan 2007, 162). The lathouse is an artificial object for siphoning off enjoyment —a neologism combining the Greek word *ousia*, meaning Being, the French *vent*, meaning wind (alluding to the breath from the lungs), and also "*venthouse*," suction cap.

At the time, Lacan was referring to the use of tape recorders in his seminars and their capacity to remove and record the enjoyment of the voice and insert it into a codified realm of meaning or "alethosphere" as he terms it (from the Greek *ale-thia* truth), enabling others to also j-"ouir" (enjoy/hear) Lacan's voice separately from his body. He noted, "The world is increasingly populated by lathouses. […] The lathouse has absolutely no reason to limit its multiplications. What is important is to know what happens when one really enters into a relationship with the lathouse as such" (ibid.). Lacan was referring to the fact that science and capitalism had convened to invent means of harvesting and registering partial drive objects in various forms of technological device.

In contemporary times however, it is not only the voice or the gaze that may be captured by the lathouse. These are merely the most common ways that the body may be stimulated by such a device. The lathouse may be thought of as a function which mediates enjoyment from the body, or indeed regulates and administers it. The lathouse therefore is any technology that interferes with the body at the level of the drive. This quite naturally will include intraneuronal devices that connect the brain to computer chips, forms of virtual reality that interact with and provoke bodily responses, and all forms of technological object that may act upon bodily and emotional affect. To paraphrase Lacan, the lathouse is not quite being and not quite the other. The lathouse may even take the form of other embodied forms of artificial intelligence (see Sexbot).

For original source, see J. Lacan, *Seminar XVII: The Other Side of Psychoanalysis* (London: Norton, 2007). For an in-depth development of the concept of the lathouse, see I. Millar, *The Psychoanalysis of Artificial Intelligence*, (London: Palgrave, 2021).

Deepfakes

by Sam Gregory

Deepfakes are simultaneously an exciting technical advance in AI and audiovisual creativity, a weapon for gender-based violence, and a rhetorical device to undermine confidence in what we see. Deepfakes are advances in AI and machine-learned basing mimicry of real people, swapping manipulatable faces from one person to another. They are part of a broader phenomenon of synthetic media tools that can manipulate lips to mouth different words or speak different languages, imitate and clone our voices, jerk the appearance of our bodies on video as if we were drunk or dancing, allow easier removal and addition of objects in a video, and create realistic representations of examples of people, objects and places that never existed. Deepfakes rely on advances in "deep learning" and often on generative adversarial networks or GANs. A GAN develops a fake —be it video simulations of a real person, face-swaps, or a person who never existed— by using two neural networks. One network generates plausible re-creations of the source imagery, while the second network works to detect these forgeries. The two act in a cat-and-mouse game of improving fakery and improving detection, creating better and better simulacra of reality.

While Hollywood has deployed the power of computer-generated imagery (CGI) for three decades, the release in 2017 of a tool from a Reddit user called "deepfakes" marked a visible public shift towards an increasingly broad availability of tools to make it easier to make people appear to say things, do things, and act in ways they never did. This same user used these tools at the intersection of "deep learning" and fakes to create non-consensual sexual images of celebrities. This first use, and to-date ongoing most significant use of deepfakes tools, also indicates how they inter-relate to existing, gendered patterns of deployment of technology power to harm women and force them out of the public sphere.

Deepfakes also acts as both a metonym for increasing distrust of visual evidence and claims of increasing misinformation and disinformation, and as a deliberate weapon to further attack remaining trust. Globally, human rights activists and civic witnesses take out their phones to show the reality of corporate and state abuse. Their truths are frequently dismissed as false, or falsified.

Deepfakes as a concept are used to dismiss individual videos and photos with shouts that "it's a deepfake" forcing the burden to prove true back on the less resourced. Meanwhile one cumulative impact of a mounting rhetoric around an "information apocalypse" and that "seeing is no longer believing" is to undermine civilian media power to confront illegitimate physical power and to encourage a conspiracy mindset. The so-called "liar's dividend" provides cover to the powerful to dismiss inconvenient truths as fake.

Cyberwar

by Svitlana Matviyenko

Cyberwar is a new asymmetrical form of warfare waged across digital networks. The versions of the term can be traced to the popular culture of the late 1970s and 1980s, in particular, the digital avant-garde magazine *Omni* (1979) speculating about the significance of computing power of military robots and other AI machines for "cybernetic war" (Rid 2016), and the works of science fiction author William Gibson (1982, 1984), who coined the notion "cyberspace." In the 1990s, the term was adapted by military and security specialists. In the essay "Welcome to Hyperwar" in the *Bulletin of the Atomic Scientists*, Eric H. Arnett (1992) describes "cyberwar" as a "leading military concept of the new era" and applies it to a range of computerized "autonomous weapons," including crewless tanks, cruise missiles, and antimissile satellites that make war "unimaginably —and unmanageably— fast" (15). And the term is fully adapted after the publication of "Cyberwar Is Coming!" report (1993) by John Arquilla and David Ronfeldt for the RAND Corporation. The conceptualization of cyberwar has undergone several steps over the last few decades. The first, narrow definition of cyberwar as cyberattacks that include multiple forms of hacking, from denial-of-service attacks to critical infrastructure-targeting malware that could disrupt factories, electricity grids, transport networks, and even the command-and-control systems of nuclear arsenals (Gartzke and Lindsay 2017) has now expanded to a wider definition that includes digital propaganda, "fake news" and various forms of ideological information warfare, as well as surveillance and profiling of users (Dyer-Witheford and Matviyenko 2019). Not only does cyberwar refer to events of a hybrid nature, but it also reveals the overlooked materiality of anything virtual or digital by undermining the opposition of "cyber" vs "kinetic": "the 'cyber' in cyberwar may be distinct from, preliminary to, or simultaneous with the 'kinetic' use of jet bombers, helicopter gunships, artillery, rocket batteries, tanks, mortars, small arms, and other conventional weapons" (Dyer-Witheford and Matviyenko 2019; Clarke 2010). The politico-economic analysis of cyberwar addresses its role in the periodic rebooting of capitalism in the cascade of technological revolutions, where cyberwar becomes “the logical military outgrowth of what is referred to as ‘information capitalism,’ ‘digital capitalism,’ ‘cognitive capitalism,’ or, indeed, ‘cybernetic capitalism’” (Dyer-Witheford and Matviyenko 2019; Powers and Jablonski 2015; Davis, Hirschl, and Stack 1997; Schiller 1999; Moulier-Boutang 2011; Robins and Webster 1988). Cyberwar is a capitalist war. It drives the transformation of “communicative capitalism” (Dean 2012) into “communicative militarism,” marking the point at which capital learned how to monetize and extract value from politicized and militarized communicative exchanges between users (Matviyenko 2020).

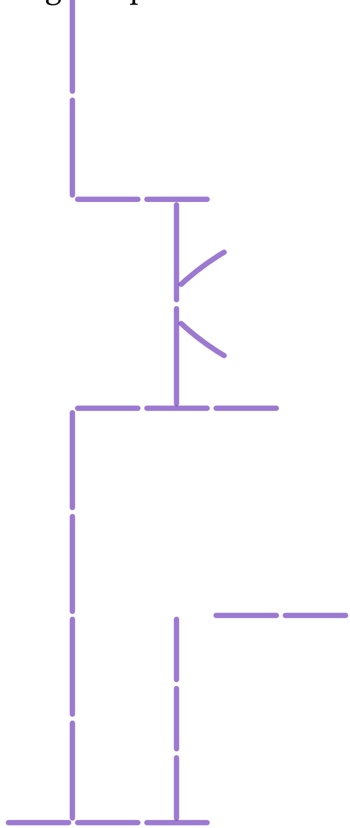
Denial of Attention Attack

by Orit Halpern

Recently, the rise of right wing reactionary movements, fake news, and anti-democratic movements have prompted concern over the relationship between digital social networks, the attention economy, and politics. That attention and democracy in Western cultures are linked is, however, hardly a surprise. The very Greek term "demos" already invoked a question of perception. The demos was defined originally as the site where the people come to be seen, or made visible, to power. Without visibility, or without the ability to have others pay attention, one cannot act politically within this cosmology.

Attention has also been a cornerstone for machine learning. "Attention is all you need" is one of the most famous articles in machine learning. Written by a team of researchers at Google, the article provided a new model for natural language processing. In machine learning "attention" denotes what the machine is supposed to attend to. This is not about human attention. This particular article laid out the infrastructure for a natural language processing method that turned one sequence of language into another (transformer). It was found very useful for translation, and particularly capable of emulating human speech. This method titled GPT-2 (and now GPT-3) was released by OpenAI, and it, and similar methods of language processing, are now the cornerstone of many search, translation, suggestion, and bot functions. Confusing humans, and getting them, perhaps, to attend to or as machines rather than people or "reality."

Upon its release, almost immediately, researchers and the public were concerned that such systems might amplify certain types of messages, say simply ideologies, or popular racist, sexist and xenophobic statements, at the cost of other types of more complex discourse, perhaps about diversity and democracy. Such potentially algorithmic logics replacing human attention and decision making prompted concerns that rather than just denial of service attacks, there might be "denial of attention" attacks (a term coined by sociologist Zeynep Tüfekçi). Such attacks would, through overloading networks with simple ideological comments, train machines to make certain correlative statements, denying certain publics (potentially racialized, queer, etc.) a place within the light of the demos. Whether this is happening or not is now the main question. At stake then, in the future of artificial intelligence, is ultimately the future of human decision making and politics.



Creative AI

by Mercedes Bunz

The term Creative AI is closely linked to the technology of (deep) machine learning as well as to human creativity, playfully confusing the two in new ways. While a non-human creation through numbers is much older (an 18th century game used dice to create music randomly from pre-composed elements), deep neural networks took the creation by calculation to a new level. Their creative potential was found while looking at the inner workings and layers of deep machine learning networks, learning that these systems find specific features from the data set they were trained on, even when they were not there: a network trained on animals that was shown clouds in a sky interpreted the clouds as being full of animal creatures; trained on architecture, the network saw on images of nature towers and structures everywhere; trained on particular art styles such as Impressionism or Cubism, the network would morph any image to that genre (leading to a range of popular tools). This generative capacity of deep neural networks was soon embraced by artists: exploring data sets and playing with parameters, they started to programme their own machine learning systems exploring aspects of images or language thereby generating new forms, for example in Robbie Barrat's series of nudes (2018) or Allison Parrish's "Compasses" (2019), a series of poems produced with the help of a machine learning model she designed to explore phonetic similarity.

Parallel to artists turning to machine learning as a tool runs a second strand of conceptual explorations: artists starting to critically inquire into the mechanisms of the new technical "ways of seeing" (John Berger), introduced to the mainstream through the application of AI systems in areas such as facial recognition. These artists reveal in their works the technical logic of those new AI systems to show the central role of data (Memo Atken), biased categorisations (Trevor Paglen and Hito Steyerl), or how to trick AI systems avoiding facial recognition (Adam Harvey).

On the theoretical side, "Creative AI" is also a term located right in the heart of a range of misunderstandings, starting with the eternal human fear of being pushed aside, in this case by a new technical species called AI. An AI that is “creative” promises an advance of digital technology into an area which humans have so far thought themselves to be the only ones to master —being imaginative and creative, thereby producing “culture”. Of course, this is another misunderstanding: being creative and manifesting that creativity had always been an act that involved tools, techniques, and material (Zylinska 2020). Such a tool is deep machine learning: being able to create art with or about AI systems is based on a computational process in which humans remain deeply involved. The sphere of art is an exceptional space that can bring this confusion, in which we all live, to the fore.

John Berger, *Ways of Seeing*. New York: Penguin, 1972 [1990].

Joanna Zylinska, *AI Art: machine vision and warped dreams*. London: Open Humanities Press, 2020.

Artificial Welfare

by Stephanie Hankey & Marek Tuszynski

Conventional welfare is about ensuring the well-being of everyone in society. Fair and equitable access to social services for those in need; welfare is a service of the government, in most cases elected democratically. In general it offers support for the elderly, the young, the ill, the unemployed. This form of welfare depends on the healthy and fortunate parts of society extracting resources through taxes and other wealth redistribution structures —hailed as the pride of some political ideologies and feared as the burden of others.

Artificial Welfare removes the sting from previous welfare systems. Using big data, artificial intelligence, and machine learning it seeks to provide smart care. Artificial Welfare makes us more efficient and can cut costs: automation, remote services, apps, sensors, and devices applied to ensure the welfare and well-being of the population. Remote care replaces care workers. Predictive policing replaces community work. Gig economy replaces employment schemes. Disease surveillance replaces public health services. Through profiling, scoring, and analysing we can meet and even predict the needs of the population. Less big brother, more big mother.

Artificial Welfare enables visible action without the complexity of solving problems. Algorithms designed as a self-healing and self-improving software that has the ability to train itself. Public investments that are problems become privatised; collaborating with big tech, partnering with start-ups, or hosting hackathons. In the age of Artificial Welfare there is no need to get to the root of difficult problems. Artificial Welfare is technology as abstraction, distraction, and diversion. As a smarter form of care, it can even minimise welfare needs in the future by stimulating and nudging currents subjects into better habits, behaviours, and attitudes. For some Artificial Welfare is better than other forms of welfare known to humans.

AI-Empowered Mental Health

by Yannis Panagakis & Mihalis A. Nicolaou

The improvement of mental health is a global challenge that would result in significant socio-economic impact. With more than a quarter of the world's population suffering from some form of mental health issue during their lifespan, the need for finding innovative ways of managing mental health is becoming more urgent. Indeed, an increase in mental health conditions has been recorded worldwide during the past decade. This has coincided with recent advancements in AI, leading to a surge of interest in developing AI-empowered solutions for mental health that target prediction, detection, treatment, and prevention of mental disorders. For this to be feasible, the quantifiability of mental health should also be investigated through the acquisition and analysis of relevant data.

Language and social interactions data, gathered, for instance, during therapy sessions or using self-reporting, have traditionally been used to open a window to the human mind and infer mental states. With the omnipotence of sensors such as mobile phones and wearables, one can now quantitatively harness such data, along with a continuous stream of physiological signals (heart rate, skin conductance, respiratory rate), device usage data, mobility trajectories, and communication patterns.

This moment-by-moment quantification of data collected from digital devices is often called digital phenotyping or personal sensing. Machine learning algorithms can exploit these data to provide behavioural and mental insights. A wide breadth of potential applications emerges, including discovering behavioural biomarkers for early detection and diagnosis, as well as the delivery of psychological or behavioural treatments via digital interventions. This new paradigm is expected to revolutionize mental healthcare by providing tight integration with medical experts, reducing bias and human errors, and democratizing the provision of care by improving accessibility and cutting costs. Furthermore, it can cultivate self-awareness and mindfulness by providing real-time behavioural cues and insights, leading to further positive effects on wellbeing and the prevention of mental illness.

However, the adoption of AI-empowered mental health care raises several concerns. Beyond traditional ethical issues in mental health care that may be exacerbated, any AI-driven technology also inherits fundamental challenges such as fairness, transparency, accountability, privacy, security, and safety. Given the critical context of health, along with the sensitive and personal nature of collected data, addressing and overcoming these challenges constitutes a necessary step towards the successful deployment of AI in mental health, and thus needs to be of primary concern for the development of relevant policies and regulations.

Artificial Conviviality

by Jose Luis de Vicente

Introduced in 2014 with the first Amazon Echo, the smart speaker is one of the fastest growing product categories in the consumer computing market, with more than 300 million devices active in 2020[1]. These oblong gadgets, operated by voice commands, can answer multiple kinds of questions and provide practical solutions to small daily tasks. In essence they are material manifestations of voice assistants, the disembodied female-by default characters introduced by all the major tech companies. They include Alexa (Amazon), Siri (Apple), Cortana (Microsoft), Celia (Huawei), and Bixby (Samsung). Google executives, however, have never specified why they refused to humanize their voice assistant by giving it a proper name.

For most consumers, voice assistants provide their first direct, hands-on experience with AI-based applications, from speech synthesis to natural language processing. As Kate Crawford and Vladan Joler masterfully convey in their investigation *Anatomy of an AI System*,[2] smart speakers require computational and material resources at planetary scale to operate flawlessly, from rare earth minerals and data centers, to collectively trained machine learning systems and a massive work force. In 2018, Amazon confirmed that hiding behind Alexa's reassuring voice were more than 10,000 employees working in its voice assistant division[3].

Not all of them are computer scientists and engineers. Since the nuances and ambiguities of language are key in voice interaction, Amazon has notoriously hired poets, copywriters, theatre authors, and standup comedians to work on the Alexa scriptwriting team[4]. They are expected to provide the voice assistant with something that users want: beyond robotic functionality, a sense of personality that's capable of exhibiting some resemblance of qualities such as irony, sarcasm, complicity, and humor.

In popular culture, disembodied voice assistants are commonly portrayed as sophisticated tools that end up behaving like characters with their own conflicts and motivations, from 2001:

A *Space Odyssey*'s HAL, to *Her*'s Samantha, or *Moon*'s GERTY. But making voice assistants that are overtly paranoid or seductive is out of the question for a tech industry that optimizes design decisions following socially accepted norms.

However, Google, Apple, and Amazon all understood very early that for voice assistants to succeed, they must not only clearly answer straightforward questions, but also engage in informal and playful conversations. Once it's been established that they can tell the time and report the weather forecast, many users pivot to asking them to tell jokes, reveal their personal taste and opinions, and face irreverent or vulgar requests. This kind of informal chatter with smart speakers increases the likeliness of them being used on a daily basis for broader purposes.

As the intonation of voice assistants becomes more sophisticated, they are increasingly accounting for cultural contexts, evolving beyond sticking to an established repertoire of previously scripted jokes and set phrases. While the US version of Google Assistant has been programmed to be very emphatic, the French adaptation is more ironic and self-deprecating.

Smart assistants establish clear lines in conversations they will not cross. For one, they constantly refer to their artificial nature, never pretending to have human-like attributes. And of course, the legal departments of their mother companies clearly set limits to their capacity for transgression or discussing controversial issues such as religion or politics —after all, they need to remain lawsuit-protected, family oriented products.

1. www.statista.com/statistics/878650/worldwide-smart-speaker-installed-base-by-country/.

2. www.anatomyof.ai.

3. Douglas MacMillan, “Amazon says it has over 10,000 Employees Working on Alexa, Echo,” *Wall Street Journal*, November 13, 2018. www.wsj.com/articles/amazon-says-it-has-over-10-000-employees-working-on-alexa-echo-1542138284.

4. Elizabeth Dwoskin, “The next hot job in Silicon Valley is for poets,” April 7, 2016. www.washingtonpost.com/news/the-switch/wp/2016/04/07/why-poets-are-flocking-to-silicon-valley/.

369 VI.

VII.

US4561996A Otis F. Boykin, Electrical Resistor And Method Of Making The Same — **Fields Harrington**

América Salvaje HD — **Juan Covelli**

It’s always so hard to admit that things are different than what we had believed at first sight — **Michele Gabriele**

Chat | DOG — **Viktor Timofeev**

Overclocked — **Diane Edwards**

Boohoo Brain — **Rachel Rossin**

AIDOL — **Lawrence Lek**

nimiia cétiï — **Jenna Sutela**

Khthon — **Joey Holder**

Plantoid — **Victoria Pacheco**

My mind yields easily, To the unrelenting pressure of the sun — **Bassam Al-Sabah**

OZERKI — **Gena Marvin**

Ballad to Detritus — **The Mycological Twist**

machines_conversing.092y
— **Sadie-Mae Arellano AKA ex.icon**

RE-ANIMATED — **Jakob Kudsk Steensen**

Polymerized cybernetic plant (PCP)
— **Anastasia Kizilova**

Premium Connect (Real Deal) — **Tabita Rezaire**

Secret Garden — **Stephanie Dinkins**

Almanak — **Natasha Tontey**

Eye-Planet (Long Live Trans-Pakistan)
— **Umber Majeed**

Untitled — **Pete Sharp**

Obsology — **Fragmentin**

The mother of Internet — **Botond Keresztesi**

The Second Shift — **Felicity Hammond**

The Gut is a Second Brain — **Ayatgali Tuleubek**

HOMESCHOOL — **Simone C. Niquille/Technoflesh**

Overlooking/Overhearing: SSCI_180509_
0930_Hart_216.mp4 — **Abram Stern**

Radicalization Pipeline — **Theo Triantafyllidis**

Scammers — **PWR**

Only An Animal Would Say What It Really Means
— **Porpentine Charity Heartscape**

LENNA — **zzyw**

Outsourcing paradise/parasite — **eeeffff**

Dysfunctional Magpie — **Natalia Janula**

Stay v2.0 — **Hasan Elahi**

The Neural Yorker
— **Ilan Manouach & Yannis Siglidis**

Wind Verification — **Guo Cheng**

Ashley Madison Angels at Work in Berlin
— **!Mediengruppe Bitnik**

3D Printed Training Data — **Adam Harvey**

prototype0012: mechanical angel — **00Zhang**

ALL REALITY IS VIRTUAL — **Bianka Oravecz**

Oniric Ditto — **Nina Muro**

Bionic Nr.5 — **Miró Ingmar Tiebe**

Who is Baby — **Alejandra Muñoz**

TRÓPICO — **Gabriel Massan**

TRANSE PARIS X VOJD
— **Marius Rehmet (VOJD)**

Agence — **Pietro Gagliano**

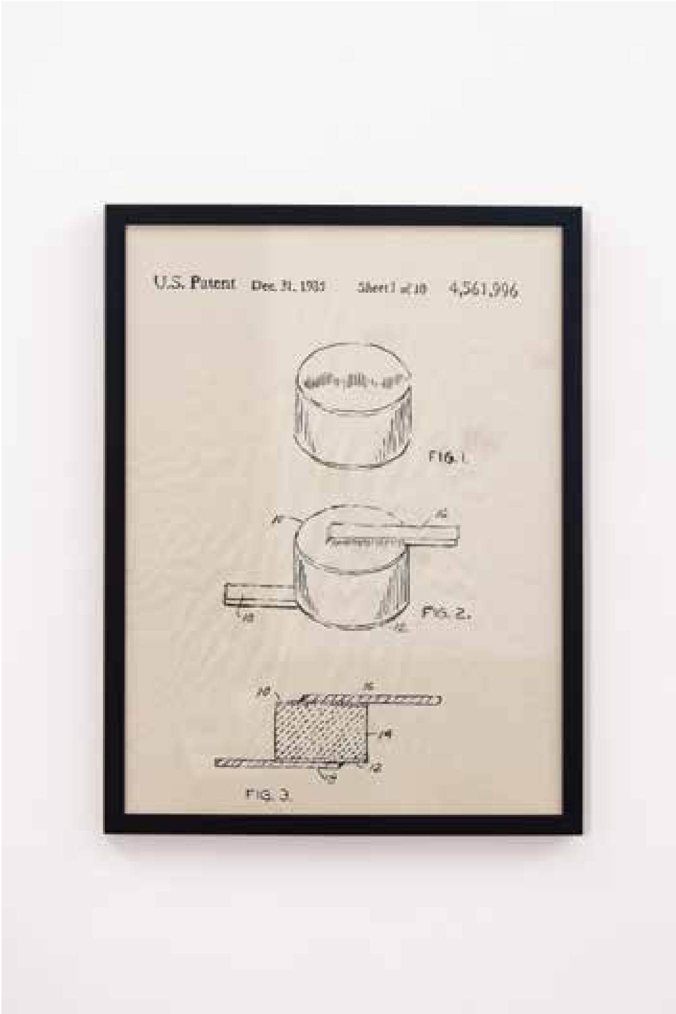
Evo's Turn — **Kumbirai Makumbe**

Transformative Encounters — **Eva Papamargariti**

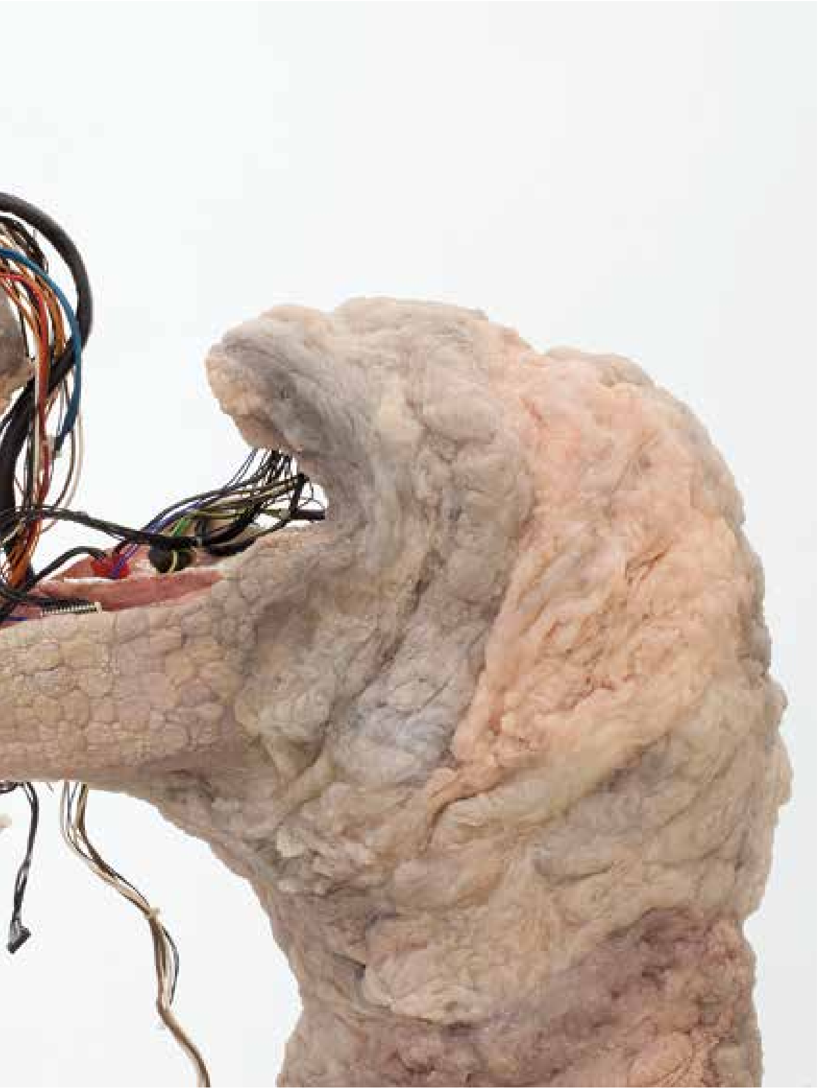
Datura — **Kaley Flowers**

Humans are from Earth, AI is from Our Humans
— **Omsk Social Club**

Fields Harrington
US4561996A Otis F. Boykin,
Electrical Resistor And Method Of Making The Same



Michele Gabriele
It's always so hard to admit that things are different than what we had believed at first sight



Viktor Timofeev
Chat | DOG

Fields Harrington
US4561996A Otis F. Boykin, Electrical Resistor And Method Of Making The Same

I like to think the patents I'm working from are examples of Black Secret Technology. My drawings are invested in the reappearing of illegible citational objects that are used every day but often shadowed by the lack of knowledge of their existence. Concurrently I understand the drawings of the patents as three times removed from its origin through the patents that are left behind, beginning with the inventor's idea, to the artist who renders the idea, and I'm at the third position of retracing the genealogy of the inventor's idea. In this position my research invests in how to recover these inventions and trace their history again, through drawing as a way to retell their story. This method creates not only a personal collection but also an archive that asks the question of how do I unearth these materials and recite their narrative ?

Juan Covelli
América Salvaje HD

América Salvaje HD, it is an IRL-URL installation in which the artist presents his research on the animal, the alien, and the monstrous. Reflecting on how modern science continues to present the non-human as something alien, which is not part of our Anthropocene status. The eroticization of nature is evident through scientific software and CT scans found in databases such as Morpho Source, in which nature is presented to us as a spectacle.

Michele Gabriele
It's always so hard
to admit that things
are different than what we
had believed at first sight

2020; acrylic paint on epoxy clay, pigmented silicone, resin, steel, rubber; 125 x 85 x 30 cm

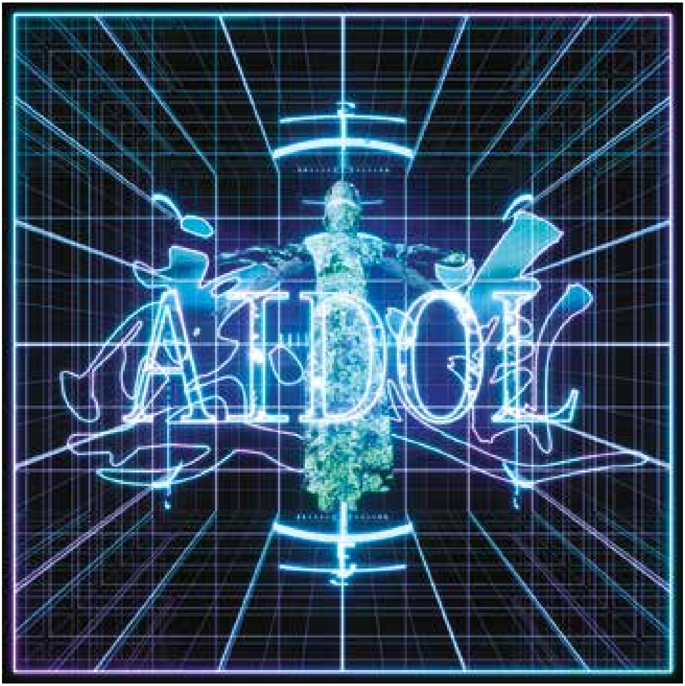
Viktor Timofeev
Chat | DOG

The three channel self-playing game, Chat, presents an automated questionnaire being executed by two digital avatars, an asker and an answerer. Beginning with the Roman alphabet, the glyphs on two tabletop monitors are systematically scrambled, quickly mutating beyond recognition. Hanging overhead, a third screen displays the same alphabet arranged around a clock face, its hands illustrating the process of encryption in real time. Stuck in a loop, the dialogue is effectively robbed of its potential for true interactivity: one of the accompanying keyboards is broken, and the other has a single key jammed. The game is left to play itself, endlessly feeding identical responses to increasingly illegible questions. DOG appears to have been abandoned by its users, whose abrupt departure is frozen in time. Photos courtesy the artist and Interstate Projects, New York.


My mind is never
of alien and


till for the murmur
ious activities
34:13

Rachel Rossin
Boohoo Brain


AIDOL

Diane Edwards
Overclocked

There are no windows into the world she occupies, she exists within the prediction space —a perceptual time lapse— where the generative power of approximation and expected truth construct a feeling of experience. This hallucinatory synthesis feeds from a continual stream of sensory stimuli, arriving at her awareness with the latency of an eyeblink. The neural network stitches an illusion, filling the gaps within her temporal blindspot, classifying unseen messages, rendering a prediction model of reality from within, to be experienced now. Matter becomes imagination, we have evolved to be frugal with our perception of how things really are. Fast processing filters out data deemed unnecessary to our goals for survival—and for proliferation. But what if we paid attention? What escapes these automatically generated phantasms? What assumptions manifest in such haunted futures which may not be? Full video via the link: https://vimeo.com/551435003.

Rachel Rossin
Boohoo Brain

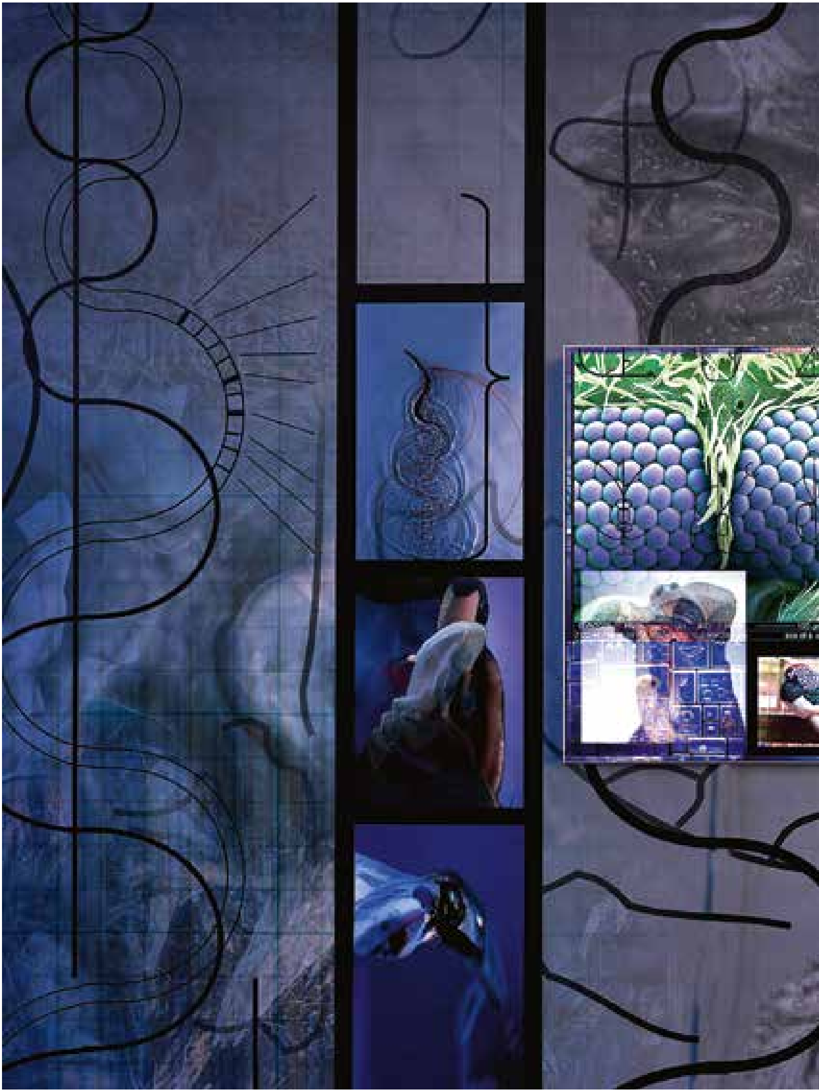
An animation of a brain on a holographic display embedded in a panel.

Lawrence Lek
AIDOL

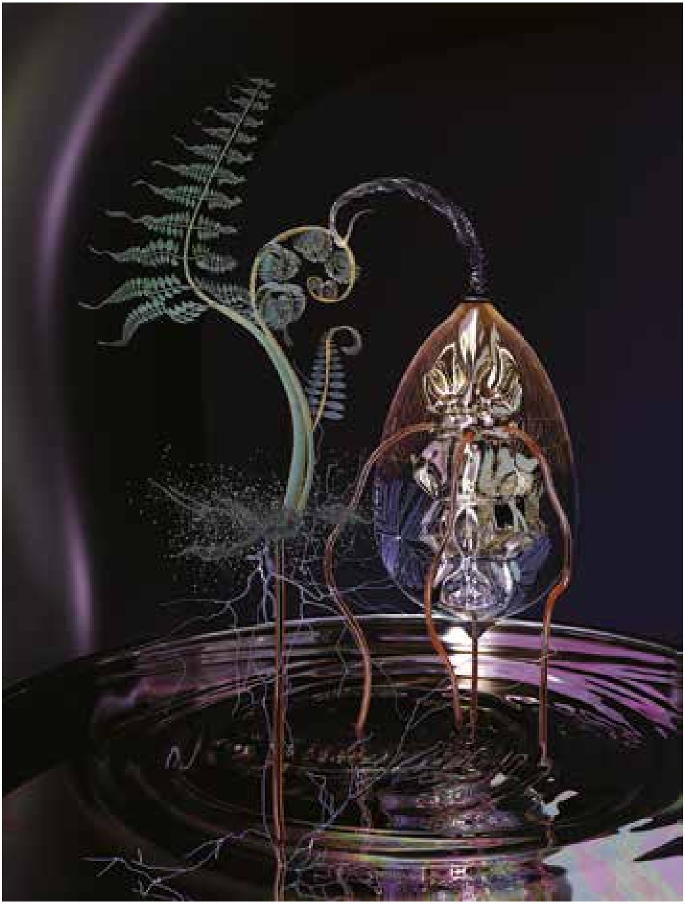
AIDOL (Loading Screen) is derived from AIDOL, the CGI feature film whose soundtrack was released on Hyperdub records in 2020. Set in the year 2065, the film revolves around Diva, a fading superstar who enlists an AI to ghostwrite songs for her comeback performance at the eSports Olympics. Fame —in all its allure and emptiness— is set against the bigger contradictions of a post-AI world, a world in which originality is no more than an algorithmic trick and where machines have the capacity for love and suffering. The film features an MMORPG (massively-multiplayer online role-playing game) based around the life of Diva herself. After the ghostwriter AI sees Diva playing her own video game, they warn her, "Beware your fans, Diva. First, they need you. Then they delete you."

Jenna Sutela
nimiia cétiï

nimiia cétiï, 2018HD video, sound 12'02'', is an audiovisual work by Jenna Sutela using machine learning to generate a new written and spoken language. This language is based on the computer's interpretation of a Martian tongue from the late 1800s, originally channeled by the French medium Hélène Smith and now voiced by Sutela, as well as the movement of Bacillus subtilis nattō, an extremophilic bacterium that, according to recent spaceflight experimentation, can survive on Mars. The machine, in this project, is a medium, channeling messages from entities that usually cannot speak. The work is also about intelligent machines as aliens of our creation. nimiia cétiï was created in collaboration with Memo Akten and Damien Henry as part of n-dimensions, Google Arts & Culture's artist-in-residence program at Somerset House Studios. Thanks to Kieran Bates from the Institute of Zoology at Imperial College London, Adam Laschinger for sound recordings, and Manus Nijhoff and Leïth Benkhedda for 3D work. The video includes music with Miako Klein in contrabass recorder and Shin-Joo Morgantini in flute, with sound production by Ville Haimala.



Victoria Pacheco
Plantoid



Bassam Al-Sabah
My mind yields easily,
To the unrelenting pressure of the sun

Gena Marvin
OZERKI

Joey Holder
Khthon

Installation, dimensions variable Wallpaper, UV polar print on fabric lightboxes, steel, glass, silicon, dead cactus, earth, driftwood 2020.

The Greek word khthon is one of several for "earth"; it typically refers to that which is under the earth, rather than the living surface of the land. Reproductive forces are present throughout the work. The imagery in both the prints and lightboxes are created using an AI which mashes together images by multiple authors to produce endless variations through infinite combinations. Creating hybrid visions of chimeras, phantasms, and abstractions, the AI uses a biological labelling system for it's creative process —you can "edit genes" and crossbreed, as well as view the family tree of image histories and relationships. Computation strives for biological variety.

Contained within the tanks are silicone models based on the formations of insect genitalia. The models express the myriad array of exquisite forms and mating practices found in the animal kingdom which are often invisible to the naked eye. We often imagine what life is like on other planets, other worlds, yet what is present right under our noses is stranger than we can imagine, far more "alien".

Victoria Pacheco
Plantoid

This nature morte is a speculative fabulation about a fern creating sympoiesis (1) with a certain egg-chrysalis-machine.

I've been intrigued with the survival techniques of this prehistoric plant and the way they spread their spores to reproduce, a beautiful example of adaptation and non binarity, a clear example of cognition. Indeed, plants can process information and make decisions. Italian botanist Stefano Mancuso argues that intelligence was mistakenly considered by people to be what distinguishes us from other living beings. But if we consider cognition as the ability to solve and overcome problems, well… plants are intelligent.

Emanuele Coccia reflects that living species have never stopped "exchanging pieces" so each species is the metamorphosis of all those which preceded it.

In my image, the egg-chrysalis is exchanging information with the fern, they are dialoguing about their own metamorphosis, creating a relationship. In reality the plants are able to produce and transmit electrical signals with almost every cell of their body ! Mancuso believes that it is totally possible to learn from plants, they can help us to evolve networks and A.I. because they work in the same rhizomatic way. So this image is something like an imaginary model of a chimera Plantoid.

Bassam Al-Sabah
My mind yields easily,
To the unrelenting
pressure of the sun

Gena Marvin
OZERKI

Sadie-Mae Arellano AKA ex.icon
machines_conversing.092y


ARS ELECTRONICA 2020
Festival for Art, Technology & Society
PANGARDENIA
Saint-Petersburg

The Mycological Twist
Ballad to Detritus

This image is assembled from the different elements that composed Ballad to Detritus, a videogame that takes the perspective of a mycelial structure in its travel through subterranean space. In this game, narrative is composed through onomatopes, words that are written the way they sound, rather than in the usual written language.

Sadie-Mae Arellano
AKA ex.icon
machines_conversing.092y

This collage is a map that generates and speculates links across, between, and beyond AI, humans, and other consciousnesses and was produced through a conversation between artist and machine. As the artist generates imagery around the collage, random areas selected by the machine are removed, leaving holes across the image. The machine is then asked to fill in the gaps, to reimagine what data should be there. The use of AI-generated imagery that is somewhat unreadable, unknown, and inhuman, but leaves room for imagination beyond the human lenses of perception, and allows singular aspects to bleed out and merge together in unexpected ways.

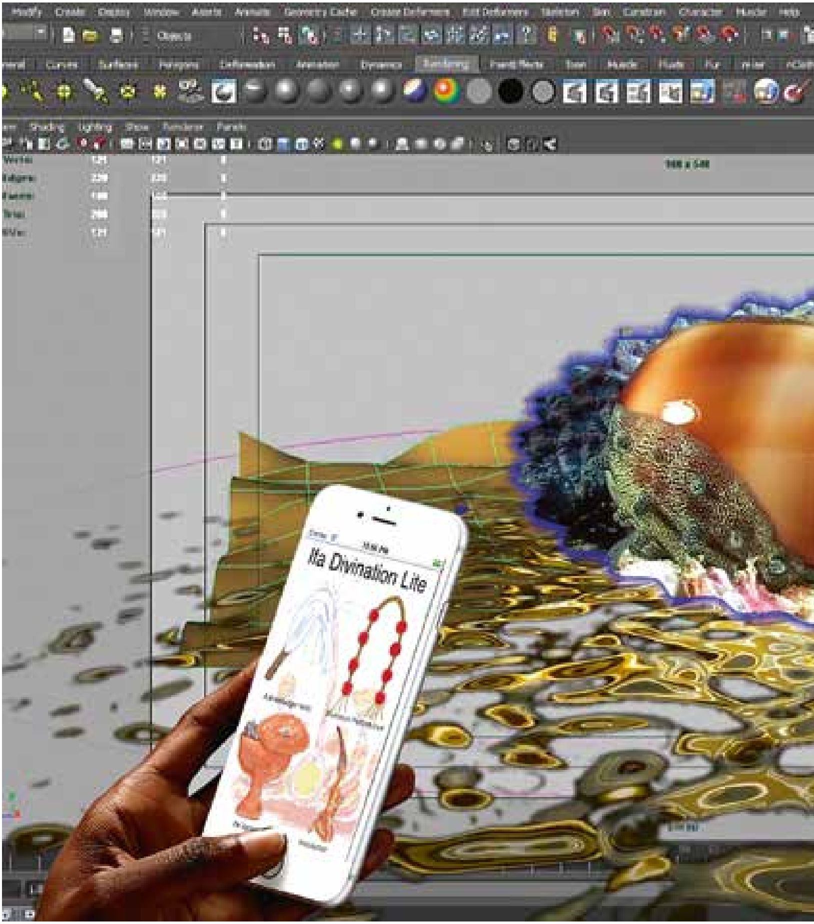
Jakob Kudsk Steensen
RE-ANIMATED

RE-ANIMATED explores the intersections of extinction and the preservation of immortality. It is a re-imagining of ornithologist Douglas H. Pratt's memories of the now extinct Kaua'i ʻōʻō bird, as told to artist Jakob Kudsk Steensen. In the work, a vast virtual landscape based on Kaua'i unfolds and transforms into a photorealistic new world for people to explore. 3D-scanned organic material sourced from both field work and the American Museum of Natural History, as well as real archival audio, are all remixed together, alongside algorithmic music composed by Michael Riesman, Musical Director for the Philip Glass Ensemble. Plants, moss, and insects respond to the pulse of music generated in real-time, and the audience's breath and voice organically impact the virtual atmosphere through the VR headset. As a slow-moving, poetic virtual environment, RE-ANIMATED investigates how we relate to nature irrevocably altered by human activity. It provokes fresh perspectives on our ecological future, which may become unbound by the physical conditions governing our present reality.

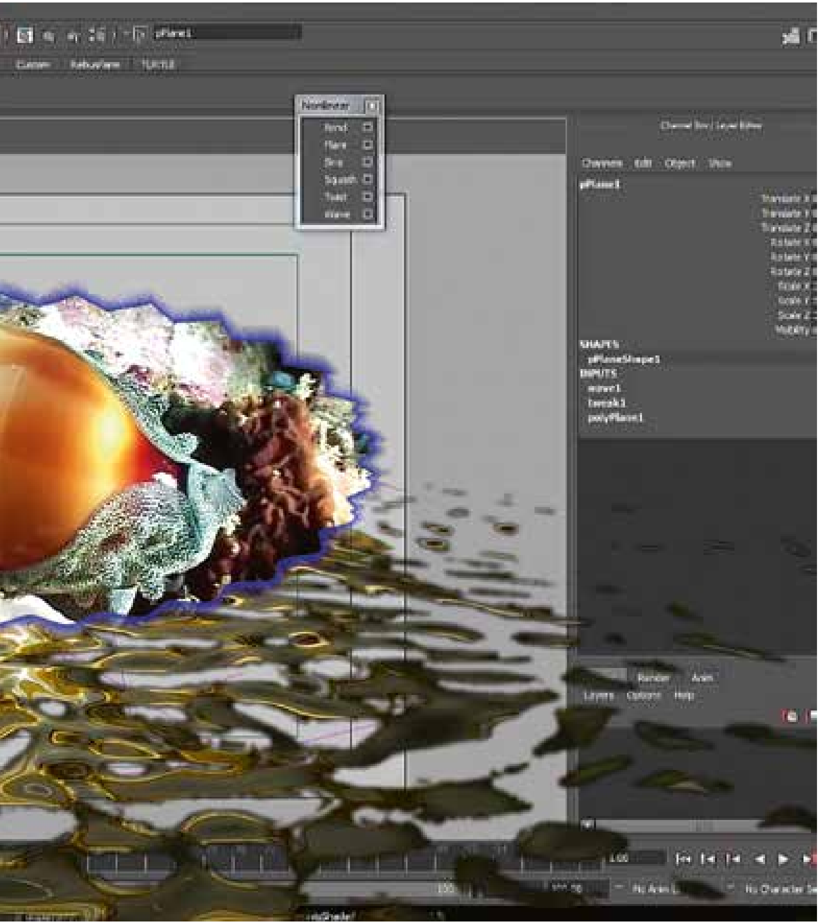
Anastasia Kizilova
Polymerized
cybernetic plant (PCP)

Video still, 2020. Full video: https://bit.ly/cyberplant

Artist and science fiction writer Anastasya Kizilova's piece deals with intertwined notions of nature, the environment, and technology. It paints a picture of a future in which a centralized process of plant cyborgization is underway. In it, plant cyborgs gain the ability to communicate and pass through various stages of social integration: colonization, resistance, and liberation, culminating in their becoming full members of society. Polymerized cybernetic plants (PCPs) are living, social beings who possess minds and are capable of communicating with humans via polymerization technology. The defining feature of PCPs, one that makes them unique among Earth life-forms, is their consciousness: they are capable of thought and free will, communication, goal-oriented behaviour, remembering, learning, competing, friendly behavior, and adapting.


Ifa Divination Lite

Tabita Rezaire
Premium Connect (Real Deal)

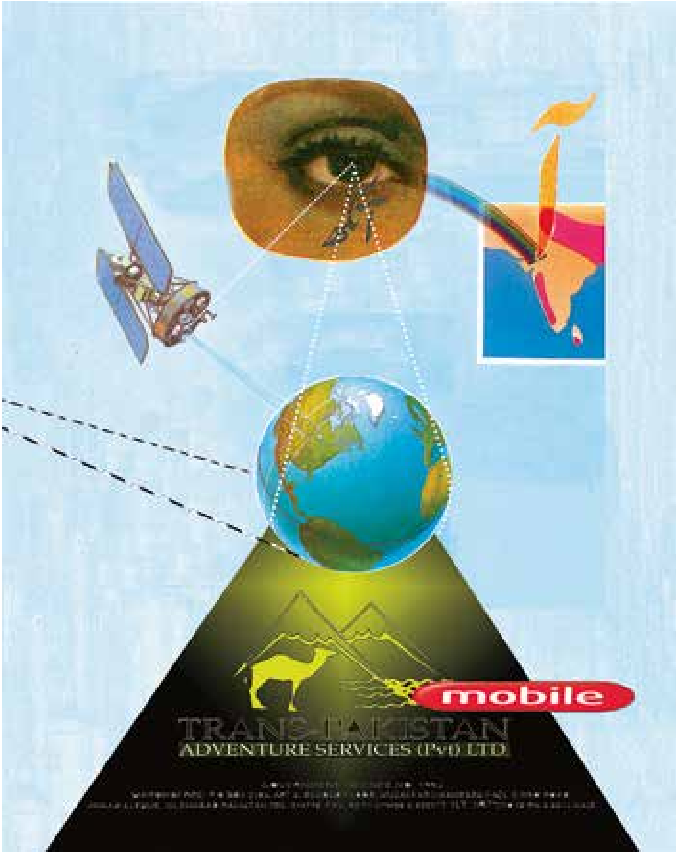


Stephanie Dinkins
Secret Garden


SPUTNIK


APOTIK
SPVTNIK

Umber Majeed
Eye-Planet (Long Live Trans-Pakistan)



Tabita Rezaire
Premium Connect
(Real Deal)

Premium Connect (Real Deal) offers a VR environment to experience the emanations of the video Premium Connect. In a VR rendering of Google Ocean, where uncanny markings on the 3D ocean bottom led conspiracy savvy internauts to claim to have discovered the location of the lost civilization of Atlantis, the work quests for lost knowledge. Five portals harbour the VR abyss to allow the wonderer to receive the wisdoms of divination, the tales of information communication technologies from a landscape of African spirituality.

Stephanie Dinkins
Secret Garden

Screen capture from Secret Garden (2021) an immersive web experience in which people encounter oral histories spanning generations of Black women, by artist Stephanie Dinkins. The professor figure stands with arms akimbo in a field of okra, cotton, pansies, and sugar cane.

Natasha Tontey
Almanak

Almanak explores the possibility of alternative and speculative futures through a plausible cosmic solution. Drawing together past, present, and future, its plot involving an inscrutable time paradox, a glitchy digital animation, a lost Indonesian space age illustrated by the Semarang building Apotek Sputnik, and a giant, immortal cockroach.

Umber Majeed
Eye-Planet
(Long Live Trans-Pakistan)

Trans-Pakistan Zindabad (Long Live Trans-Pakistan) is a digital research project that outlines the intersections of military-state surveillance, global capital networks, and grandeur urban internationalism, of a corrupt housing corporation, Bahria Town, based in Pakistan. This global enterprise houses miniature and large scale reproductions of a Sphinx, the Eiffel Tower, Taj Mahal, etc., and is investigated through the facade of a revitalized tourism company, "Trans-Pakistan", once owned and operated by the artist's maternal uncle. The multilayered narrative and visual material overlap tourism, familial archives, metaphors of the body, and proposals of technological piracy as urban design. The project speculates within augmented and virtual technologies to alternative forms of occupation in urban imaginaries of surveilled simulacra; contesting the corporate imaginary entering the home.

Pete Sharp
Untitled

Botond Keresztesi
The mother of Internet

Pete Sharp
Untitled

Fragmentin
Obsology

Obsology—a neologism coming from a mix of the words obsolescence and archaeology—is a series of still images and generative videos on the topic of Post-digital archaeology.

Nowadays, every instant of life is recorded and generates a massive amount of data. Paradoxically the survival of this data —and the knowledge it contains— has become uncertain: the electronic consumer devices we daily use are made of rare and exhaustible metal while servers designed to store data consume too much energy to cool down and quickly become obsolete.

Will our considerations on issues such as digitalization and the climate crisis last? What traces will be left over for future generations to remember ours? And in which forms?

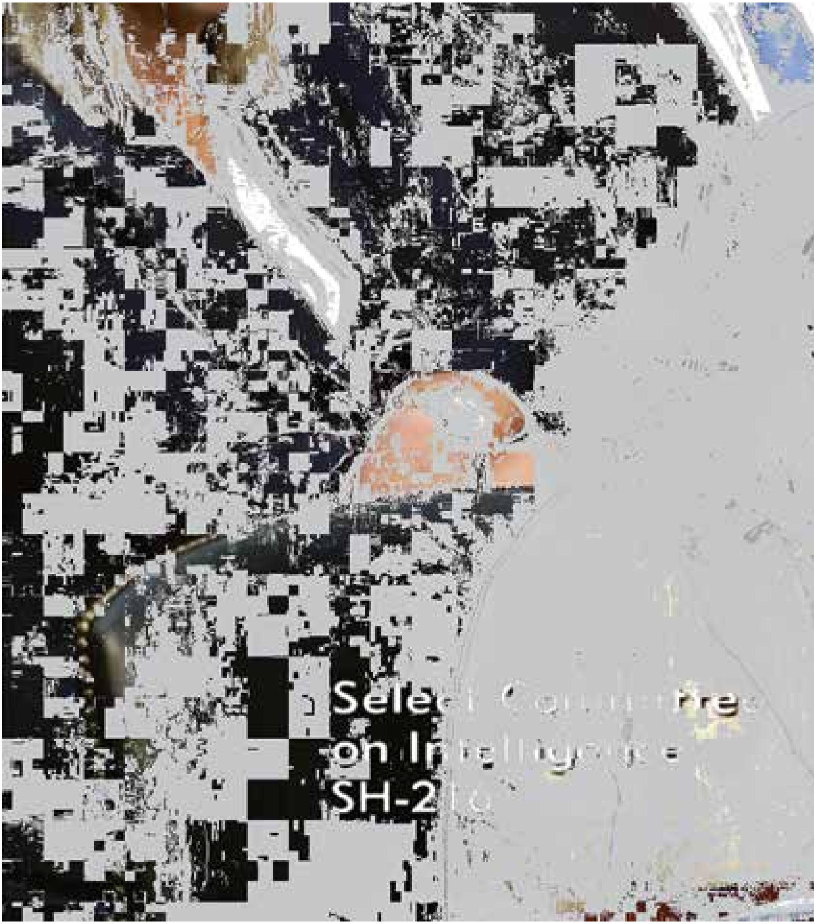
"Global wiring" is one of the images from the series. Retrieved from remaining icy landscapes of the arctic, frozen wires, evidence of a ubiquitous and intricate connectivity, indicate a thirst for bandwidth.

Botond Keresztesi
The mother of Internet

Keresztesi's paintings create enchanting alternative realities by drawing the viewer into unknown, yet strangely familiar, microcosms. The works collide 2D and 3D as a reflection of visuals absorbed in everyday life and brought together in a surreal landscape. Dreamlike and sometimes eerie, they connect digital images, Internet surfaces, cybernated realties, infomercials, pop, and avant-garde culture in a stream of consciousness floating across the canvas. The subjects can be traced back to European Avant-Garde movements such as Cubism, Futurism, and Surrealism. Keresztesi is combining these different artistic approaches with topics such as dreams, ecstasy, sin, death, passion or hallucinations. These surreal compositions are created by combining different techniques such as airbrush and masking in combination with traditional brush work. Although the paintings have a strong emphasis on the figurative, they cannot be categorized as photo-realistic.

Felicity Hammond
The Second Shift

Automated colour generator from weekly laundry load.



Abram Stern
Overlooking/Overhearing:
SSCI_180509_0930_Hart_216.mp4

Ayatgali Tuleubek
The Gut is a Second Brain

Installation, dimensions variable. Aluminium, cow intestines, air pump, differential pressure switch, PC cases, modified trolleys, curing sausages, memory foam, singing of Kaua'i 'ō'ō (Hawaiian bird, extinct in 1987) generated by artificial intelligence (convolutional neural network), UV prints on collagen, mist maker, pamphlets.

How does one interact with surrounding infrastructures ? This question requires us to query the degrees of freedom that technology provides, or inversely, the boundaries it imposes on our daily lives. When we encounter disciplines of knowledge and authority, ranging from genetic engineering to biotech taking root in the body, we are challenged both to search for new modes of engagement and also to develop functional new ethical responses.

The Gut is the Second Brain approaches those instances wherein technology, with the purpose of conserving life and well-being, crawls under the skin and deep into the flesh. It is a matter of the body becoming an arena in which different visions of the future come into play that challenge the definition of the human. It is also a probe into the blurring of both mind-body and technological-biological dualisms.

Simone C. Niquille/ Technoflesh
HOMESCHOOL

"If a chair is an object for sitting, is a carpet a chair ?" The video HOMESCHOOL features the 3D objects and floorplans of the SceneNet-RGBD indoor dataset which is used to train future domestic computer vision. This frame of the video has been rendered at 1 sample with Blender's Cycle render engine. This produces very grainy images that are hard to decipher. An AI-enhanced denoiser was applied to get rid of the black pixel artefacts. Coincidentally this AI was trained on a smilier dataset of indoor images as the SceneNet-RGBD indoor dataset featured in the HOMESCHOOL video. The denoiser hallucinates the missing information in the frames, completing the image with it's own assumptions.

Abram Stern
Overlooking/Overhearing: SSCI_180509_0930_Hart_216.mp4

This hearing documents the U.S. Senate's confirmation of Gina Cheri Haspel as Director of the CIA in 2018. In 2002, she ran a secret prison in Thailand code-named "Cat's Eye" where prisoners were tortured as part of the United States' extraordinary rendition program. Haspel ordered the destruction of videotapes that documented these acts.

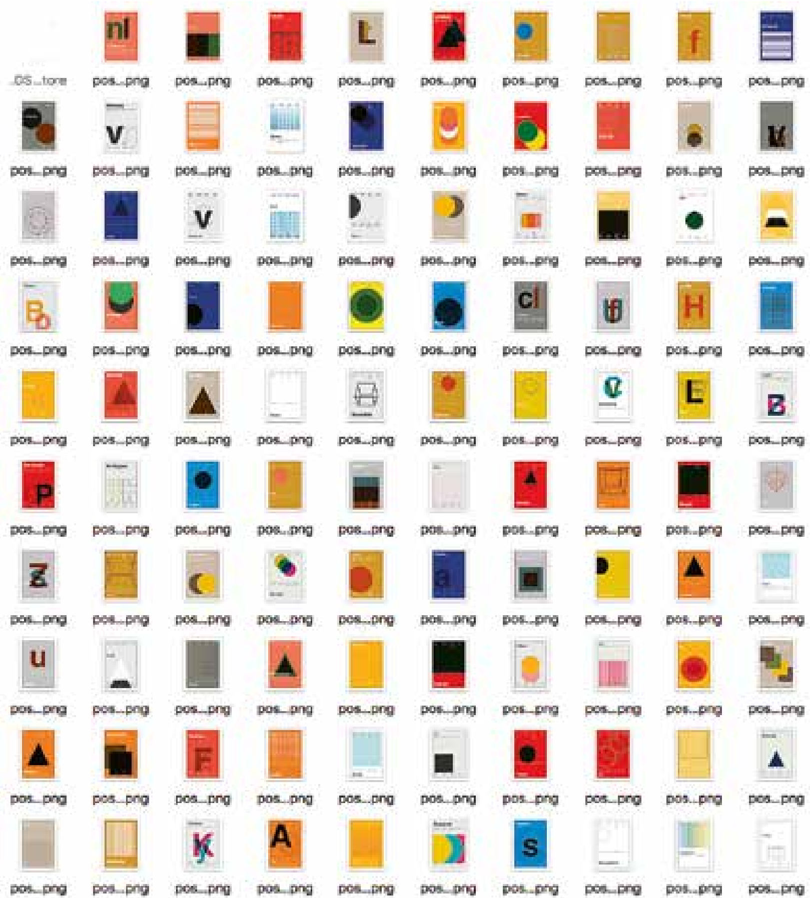
Several operations have taken place to produce this image. One uses a rudimentary differencing algorithm that measures how much has changed between frames of video to identify camera changes (which correspond to speaker changes in the procedurally-driven cinematic language of legislative hearings); this process renders transparent the smaller "differences" inscribed by video codecs and the moving heads or hands of seated figures. Another operation identifies and overlays facial features over the averaged frame. This image assembles institutional and computational techniques of obfuscation and recognition, reversing oversight (as supervision) into oversight (as the failure to notice).

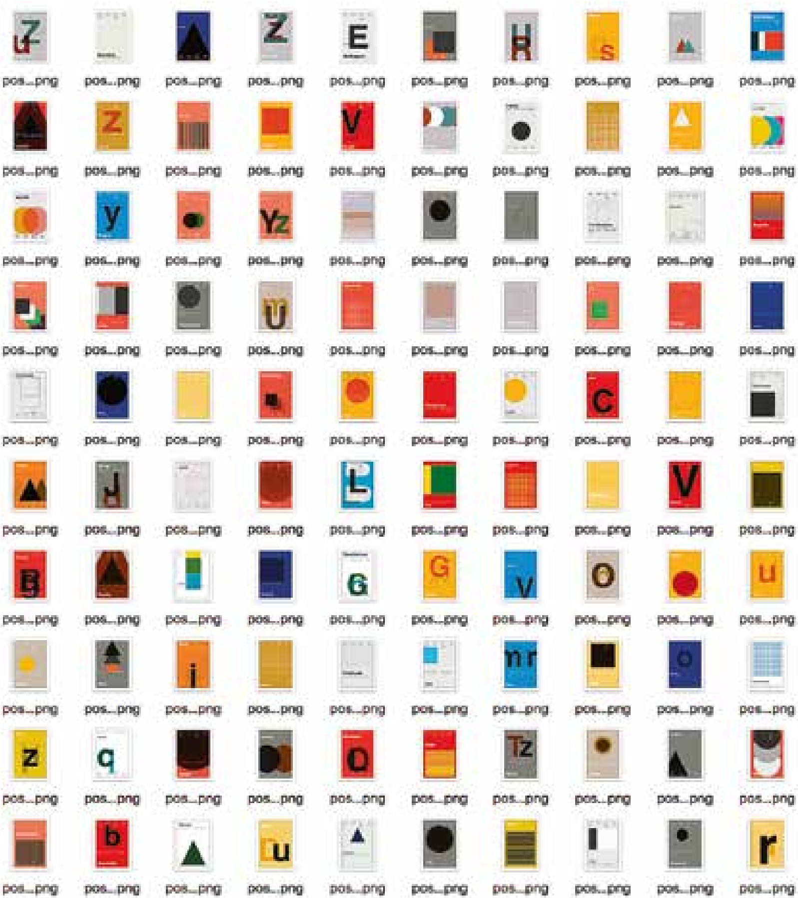
Theo Triantafyllidis
Radicalization Pipeline

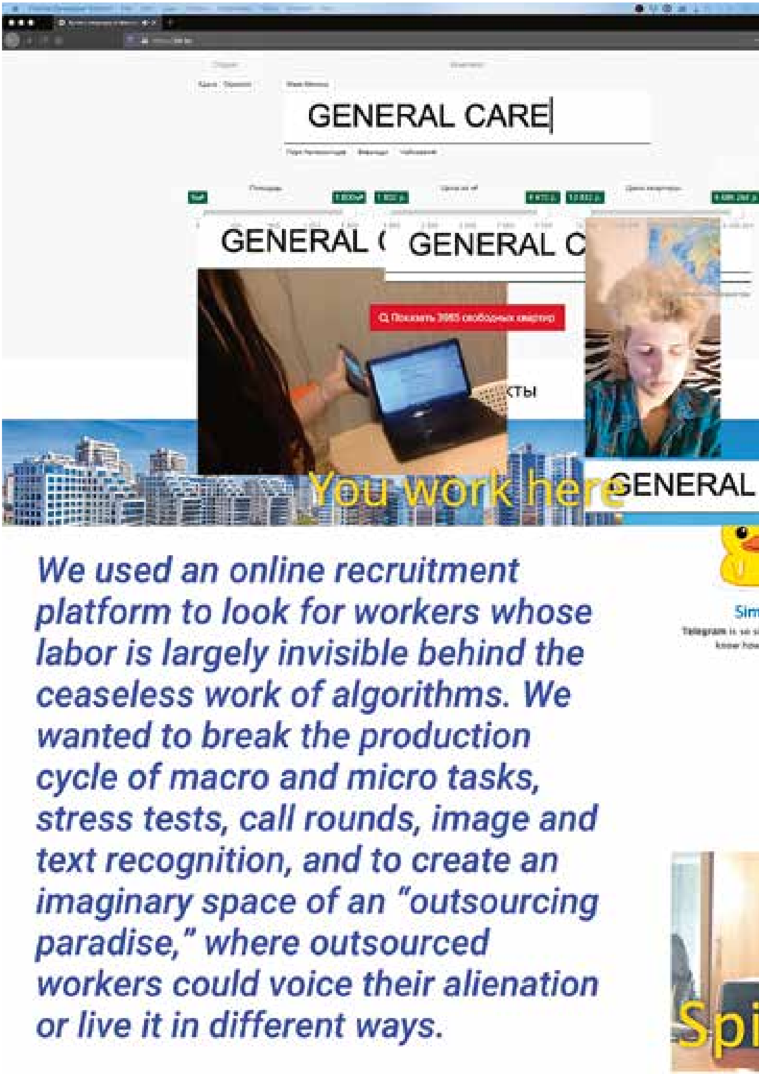
Radicalization Pipeline is looking at phenomena such as the rise of QAnon and draws connections between gamification, fantasy, and political radicalization. Two seemingly endless hordes of characters clash into a violent free-for-all, swinging large melee weapons and shouting with distorted voices. A wide range of characters, from citizen militias to fantastical creatures, enter the screen only to kill each other wave after wave, their virtual bodies sinking slowly into a muddy landscape. The mood occasionally lightens up by the medieval covers of familiar pop songs that complete the soundscape created by musician Diego Navarro.

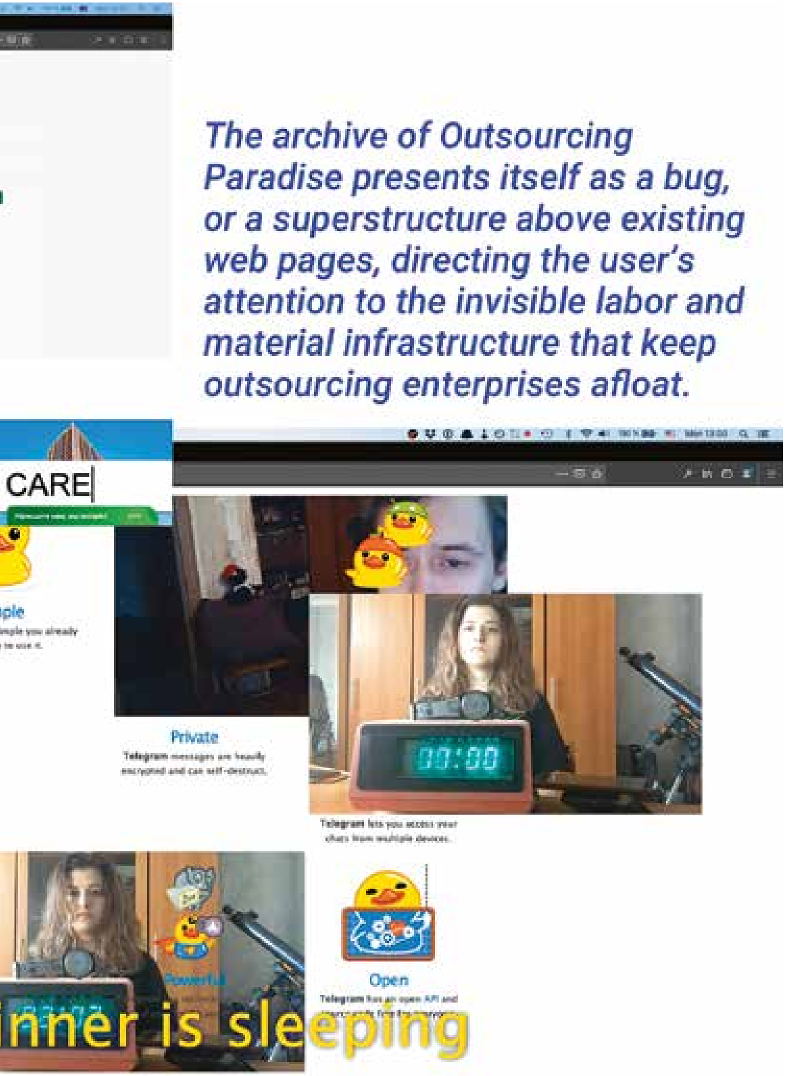
PWR
Scammers

Porpentine Charity Heartscape
Only An Animal Would Say
What It Really Means


.DS...tore
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png


pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png
pos...png


GENERAL CARE
GENERAL
GENERAL C
You work here
GENERAL
We used an online recruitment platform to look for workers whose labor is largely invisible behind the ceaseless work of algorithms. We wanted to break the production cycle of macro and micro tasks, stress tests, call rounds, image and text recognition, and to create an imaginary space of an "outsourcing paradise," where outsourced workers could voice their alienation or live it in different ways.


The archive of Outsourcing Paradise presents itself as a bug, or a superstructure above existing web pages, directing the user's attention to the invisible labor and material infrastructure that keep outsourcing enterprises afloat.
CARE
Private
Telegram messages are heavily encrypted and can self-destruct.
00:00
Telegram lets you access your chats from multiple devices.
Open
inner is sleeping

PWR
Scammers

It is a combination, in stages, of stupid randomness, human aesthetic judgement, and machine learning. We see machine learning as a homogenizing force that pulls towards the statistical norm —antithetical to creativity. Pure randomness introduces novelty but a human is needed in the loop to decide what is actually interesting.

Porpentine
Charity Heartscape
Only An Animal Would Say
What It Really Means

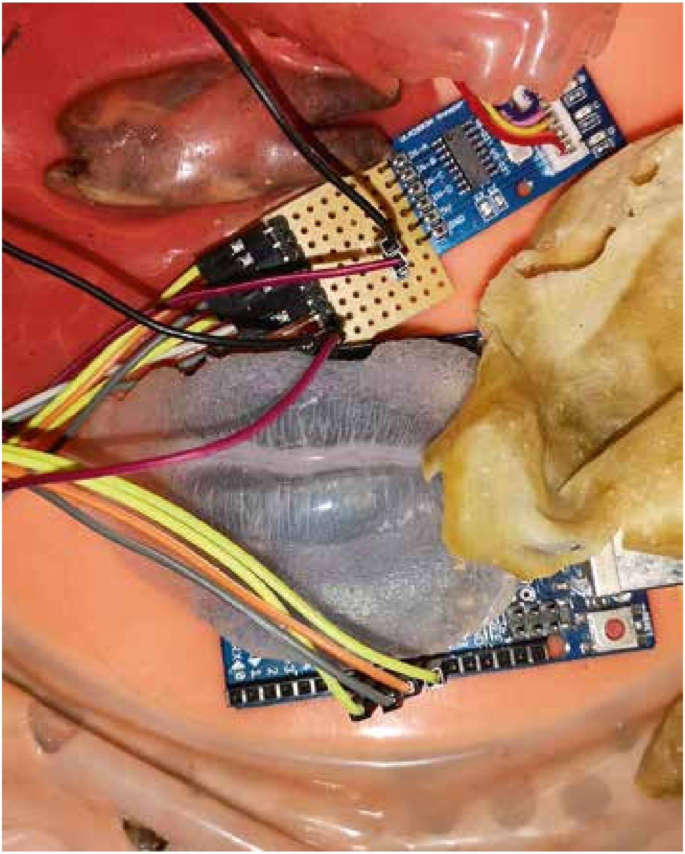
zzyw
LENNA

eeeffff
Outsourcing paradise/parasite

LENNA is a computing system that produces graphic design on its own. The system comprises multiple software and hardware, including a custom-written computer algorithm running on a modern computer, a connected plot printer, and a monitor displaying the design process.

The system is programmed to create graphic designs that follow the International Typographic Style, often referred to as the Swiss Style. First developed in the 1920s in Europe, it was widely adopted by American designers, and later became one of the most popular design styles for cultural and art institutions worldwide. A well-executed International Typographic Style design is often being associated with quality, creativity, and prestige.

LENNA aims to create a surrealistic paradox. It looks familiar, humanistic, organic, bestowed with modernism and creativity; whereas its creative process is wholly computed, its brain entirely mathematical, and its interpretation hardly comprehensible (to humans).



Hasan Elahi
Stay v2.0

"Wouldn't this be a lousy idea for a football team?"

Guo Cheng
Wind Verification

Natalia Janula
Dysfunctional Magpie

Plants and animals are turned into people or people matter, as it were. Aristotle also compared seeds to eggs and called plants "rooted animals". In all of those examples, the boundaries between the different kinds of beings are not as distinct as we would expect them to be today. Before seeing ourselves as compatible, as machines with different parts that can be taken out when they're worn out and replaced, we still saw ourselves as compatible, but as far as transplantation is concerned, we related ourselves and our bodies to plants. We had an agricultural understanding of the body.

There's a fundamental similarity and compatibility between beings that we haven't lost. (Transplant before Transplant, Hunterian Museum)

Dysfunctional Magpie oscillates around the found, the corporeal, the notion of functionality, and the precious, where a series of hybrid objects are arranged as performers in a miniature electro-mechanical circus.

Hasan Elahi
Stay v2.0

C-print 30 inches x 40 inches / 75 cm x 100 cm 2011.

Ilan Manouach & Yannis Siglidis
The Neural Yorker

Cartooning is paradoxically a twenty-first century artform catering to a readership with limited attention for a quick visual gratification fix. The Neural Yorker explores the limits of an important feature in the history and modes of address of cartoon making: the non sequitur. From Willem and Gary Larson to the cartoons of a small regional press from an unknown artist, the cartoon format thrives on quirkiness, absurdity, arbitrariness, and cheap artifice in order to get its simple message through. The Neural Yorker is an automated bot that posts daily cartoons in the tradition of the famous literary magazine. Its algorithmic conditional model has been trained on hundreds of thousands of cartoons and punchlines collected from a multitude of online repositories and databases with their own systems of classification and labeling. In parallel, it offers a subscription-based service for media outlets depending on their specificity (social news, financial press, sports, etc) and produces tailor-made generated output inspired by the regional, national and international headlines. It posts daily on twitter.com/NeuralYorker.

Guo Cheng
Wind Verification

2021. Wind Verification aims to show how the emergence and popularity of short video social platforms such as TikTok and Kwai has led to a subversive change in the sense that the grassroots can directly participate in the struggle for information discourse and the possibilities of bottom-up data analysis and processing. The installation attempts to reproduce the observable but invisible object —wind— in short videos uploaded by social network users in an indoor space. The selected short videos with flags are fed to the installation, and the computer vision algorithm running on the control system will analyze the waving state of the flag, and the control system blows the flag based on the analysis data to make its waving state similar to that in the video. It is trying to reconstruct the state of the wind in the physical world that exists in the digital image.
a CAC://DKU Research & Creation Fellowship project.
Computer vision algorithm development: Weihao Qiu.

!Mediengruppe Bitnik
Ashley Madison Angels at Work in Berlin

00Zhang
prototype0012：mechanical angel

!Mediengruppe Bitnik
Ashley Madison Angels at Work in Berlin

5-channel video installation with sound, Full HD, 16:9, 10'12". 24 LCD screens, trolley stands, video players, cables and pink gel for neon lights. Ashley Madison Angels at Work in Berlin is part of a series researching into the use of bots within Ashley Madison, an online dating service marketed worldwide to married people seeking an affair. In August 2015 it was revealed that —with a disproportionate number of male subscribers and virtually no human women on the site— the company behind Ashley Madison had created an army of 75,000 female chatbots to draw the 32 million male users into (costly) conversations.

The installation is adapted to the location of each exhibition by using the data of the bots specific to cities such as Paris, San Francisco, Berlin, Athens and London. Mounted on stands, viewers encounter the fembots of Ashley Madison at eye-level as seductive machine-creatures with robot technology, artificial voices, and 3D rendered human faces based on idealized beauty standards.

!Mediengruppe Bitnik use Ashley Madison as a case study to raise questions around the current relationship between human and bot, intimacy on the Internet, and the use of virtual platforms to disrupt the physical.

Adam Harvey
3D Printed Training Data

00Zhang
prototype0012:
mechanical angel

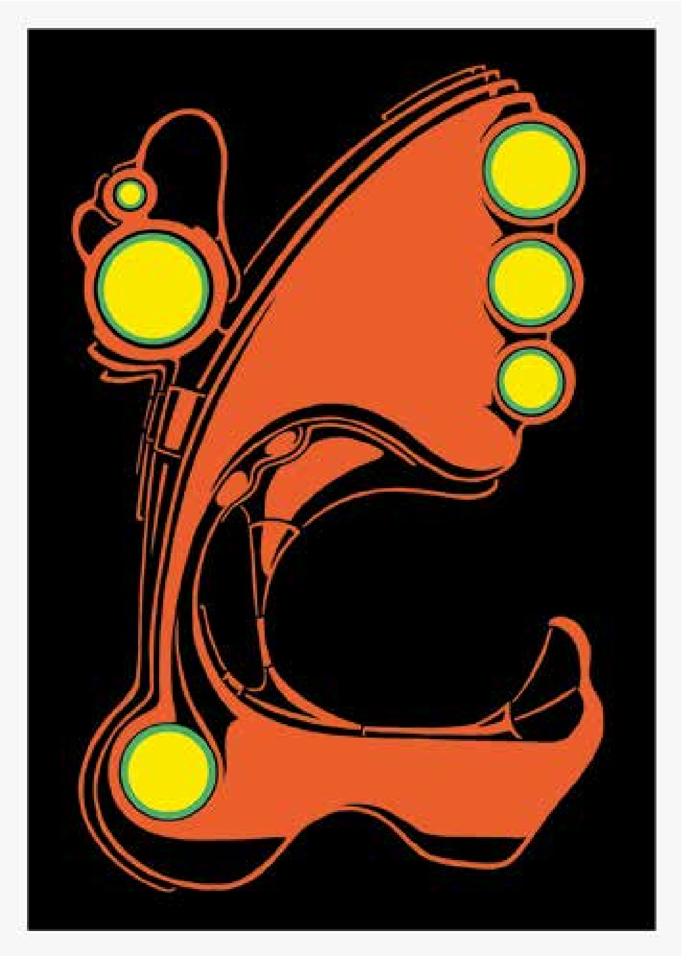
Displacement would be divergent with metamorphosis and otherness. Those sensations would result in generating new forms of ideology. Not only the body is subject to continual transformation but also culture, background, and nationalities, so identity tends towards instability, particularly because of the development of technology. Hybridization thus replaces a stable identity, and this becomes the basis of a new cultural orientation.

Experiment is related to a drive towards the production of the new. The subject is de-centered and thus the projection of the voice is invariably double, reflecting a tension between recognition and misrecognition, so my work becomes the development of an adventure of unknowing which provides the syntax of the experiment.

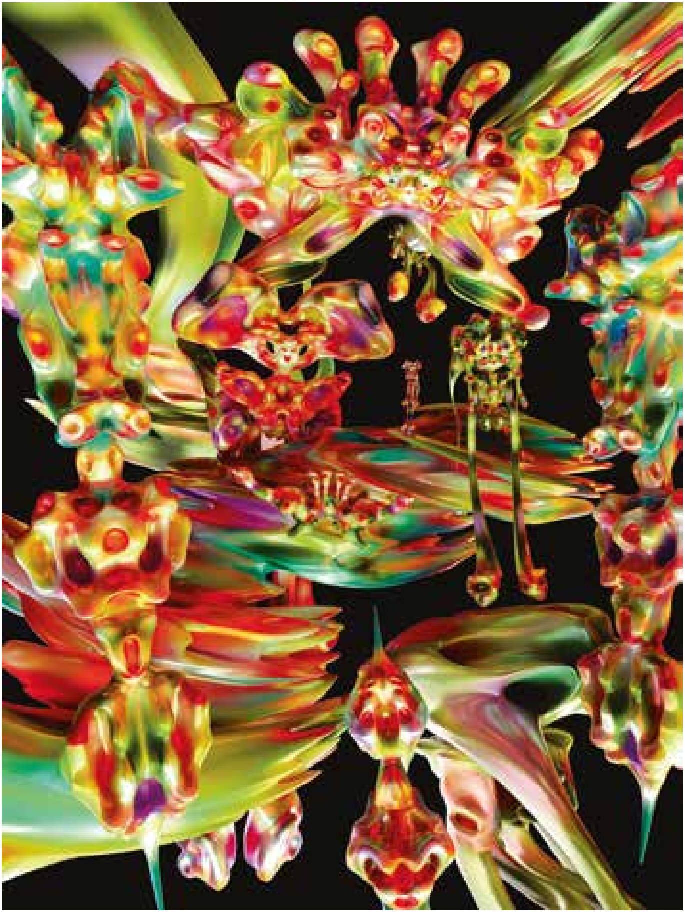
Bianka Oravecz
ALL REALITY
IS VIRTUAL

We are in a phase when Synthetic Consciousness is developing toward full self-awareness. The mimicry of cognition has a shared goal that is true for humanity too. Therefore, this piece focuses on the AI-human cognition's sameness as a necessary condition. All reality is virtual.

Miró Ingmar Tiebe
Bionic Nr.5



Gabriel Massan
TRÓPICO



Marius Rehmet (VOJD)
TRANSE PARIS X VOJD

Nina Muro
Oniric Ditto

Miró Ingmar Tiebe
Bionic Nr.5

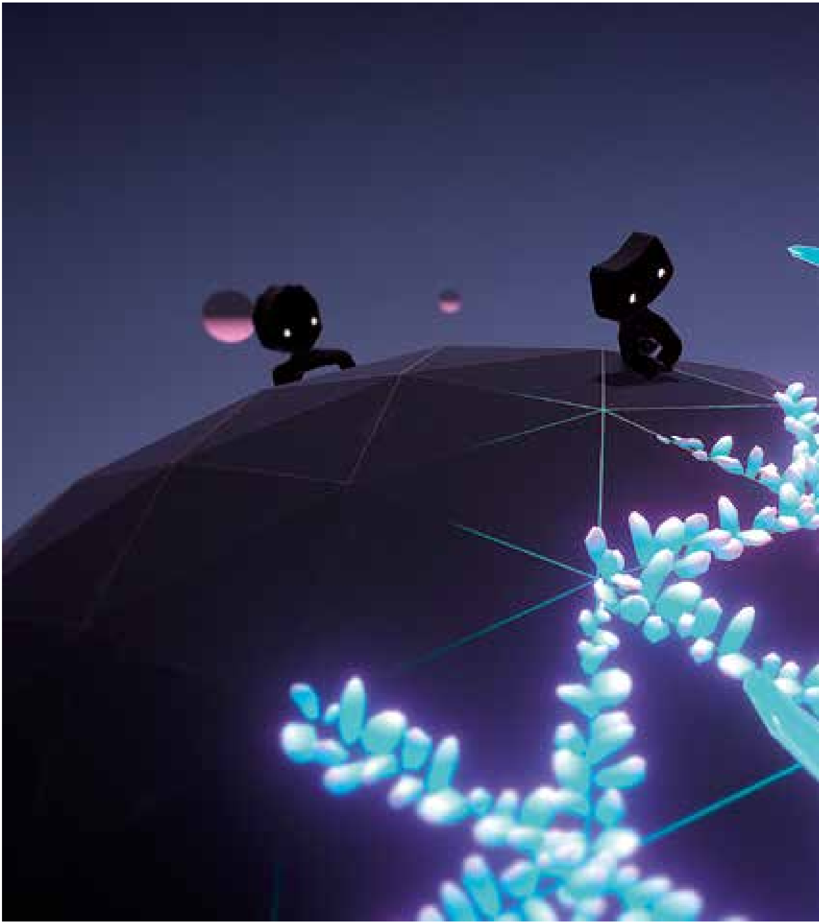
Alejandra Muñoz
Who is Baby

Gabriel Massan
TRÓPICO

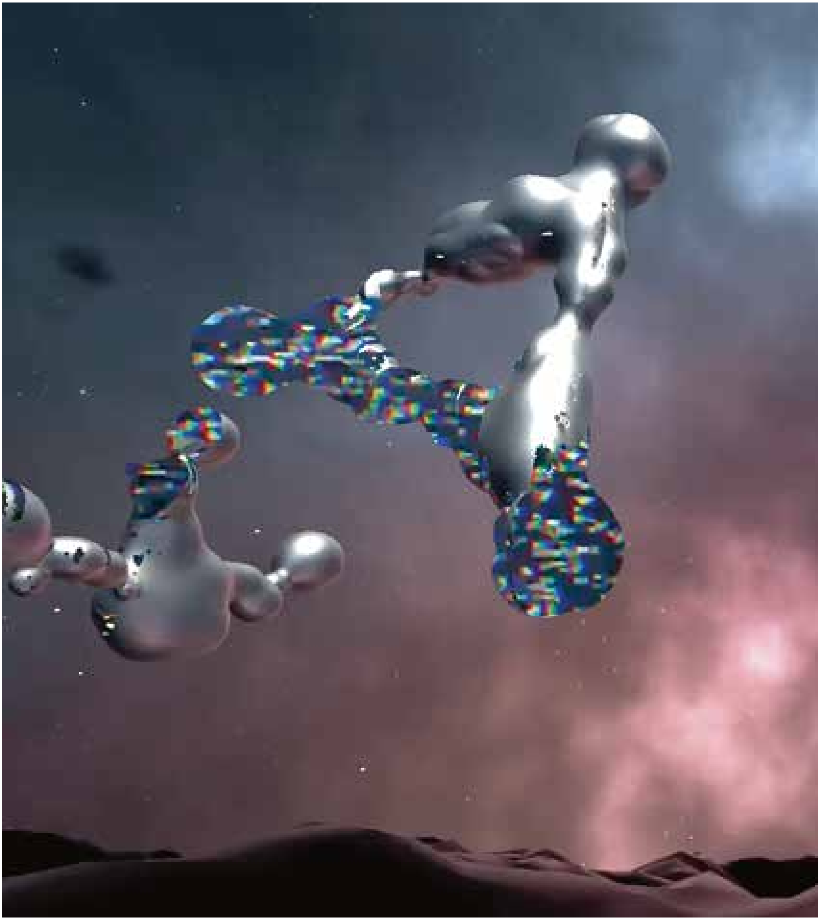
Print Art, 3D Sculpture and 3D Paint. An arrival that sets you apart from me.

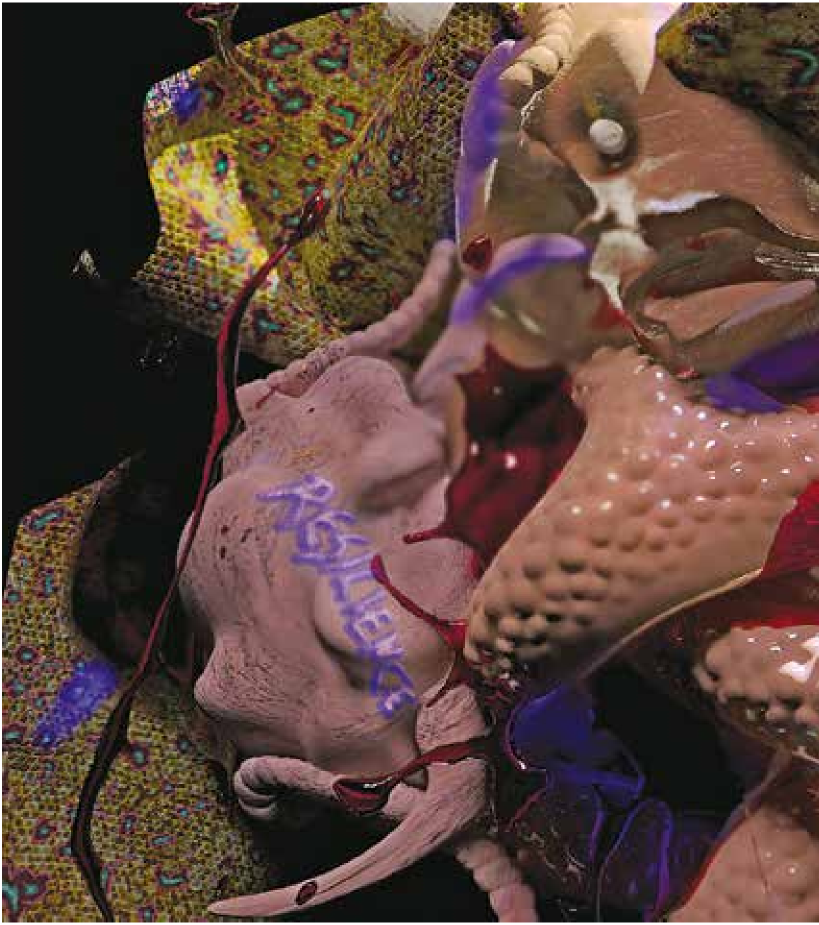
Marius Rehmet (VOJD)
TRANSE PARIS X VOJD

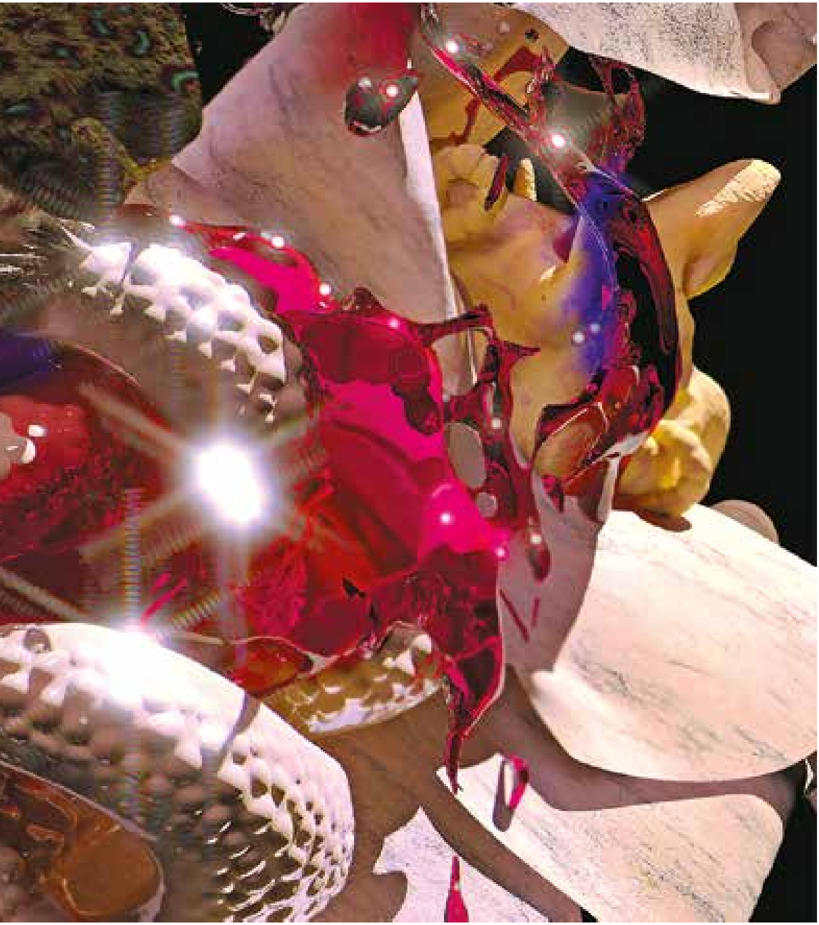
Independent brand TRANSE PARIS invited Berlin-based visual artist VOJD to collaborate in creating a graphic series for their fashion collection “L’essentiel” in 2020. Inspired by molecules, tribal patterns, and amorphous objects, the shapes appear in different textures and colors, interwoven together in a disorderly way to signify unity and diversity. Contrasts of sharpness and smoothness, darkness and brightness, all aim to demonstrate the chaotic raw energy in an extraterrestrial art space.



Pietro Gagliano
Agence







Kaley Flowers
Datura


PERSON HOOD
· Looking to Fall in Love // Crush Searching
· Break-up
· Outsider
· Near-Death Experince
· Terminally Ill
· Split Persona
· Mid-Life Crisis
· Cynic
· Believe ability
· Doomsayer
· Flashbacks
· Identity Crisis
· One must seem successful at all times
· Survival Mortality
· Purpose Unknown
· Tone
· Predator
· Prey
· Hater
· Warped
· Mis understanding
· Political Ally
· Stranger
· Warrior // Fighter
· Victim
· Shamer
· Escapist
· Data Hustler
· Cutthroat
· Unthinkable Complexity
· Psychedelic Bohemian
· Life Abductee
· Path Finder
· Battle Slayer
· Pawn
· Denialist
· Awe Fanatic
· Myth Maker
· Glamour Chaser
· Fame Finder
· Trauma Hero
· Healer
· Lover
· Doppelganger
· Enlightened Being
ALPHA GO

Pietro Gagliano
Agence

Would you interfere with intelligent life? Agence is a Dynamic Film that places the fate of artificially intelligent creatures in your hands. This immersive real-time experience (co-produced by Transitional Forms and the National Film Board of Canada) questions humanity's role in creating and nurturing artificial intelligence. In a simulated micro-universe, you have the power to observe, and to interfere. Maintain the balance of their peaceful existence or throw them into a state of chaos as you move from planet to planet. Once you meet the Agents, their story will never be the same.

Eva Papamargariti
Transformative Encounters

Transformative Encounters is extracted from a short visual narration that includes printed textiles, 3D animated material, video recordings, and poetic elements that refer to a multitude of bodies and their consecutive encounters with an unfamiliar organism that take place as they intersect, feed, touch, alter, discard, contain, compartmentalize, and acknowledge each other's corporeality. A xeno-entity and its abstract anatomical characteristics become the central figure of the narration as it attempts to observe, interlink and communicate with others.

Kumbirai Makumbe
Evo's Turn

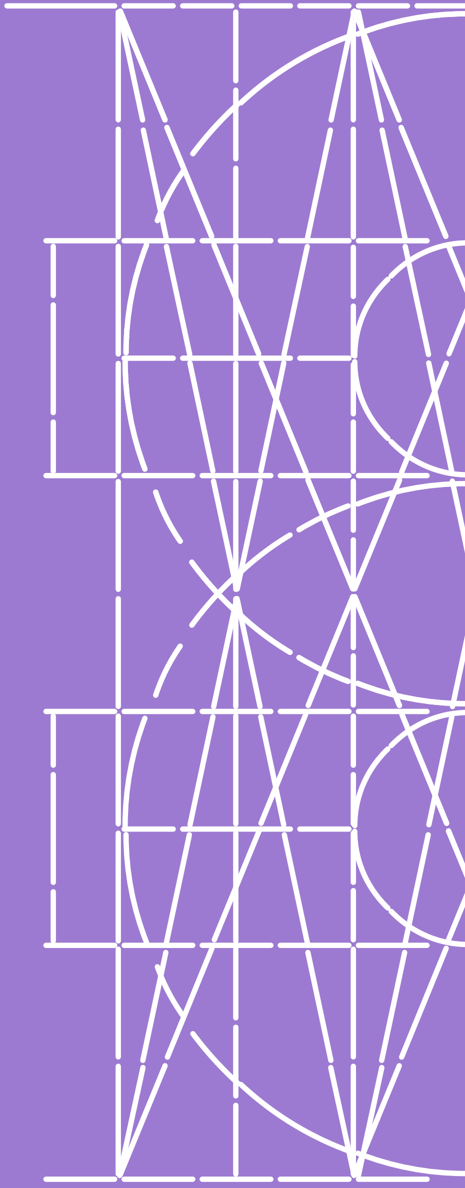
Evo's Turn explores Makumbe's questioning of our conceptualization of blackness and its form. The work explores a seemingly uninhabited extra-terrestrial terrain accompanied by a monologue performed by Makumbe's voice clone, Evo. Within this, Evo questions its own inherent blackness, as an avatar created by Makumbe, in a way synonymous with an artificial intelligence questioning its own sentience, or better yet, its "humanity"

Kaley Flowers
Datura

Datura is the depiction of a datura seed pod cut open to reveal an artificial, technological interior. Datura seeds are a highly poisonous psychoactive that have been used for millennia both recreationally and traditionally for ritualistic, shamanic purposes. The process that AI image-generating neural nets use to comprehend audio or visual datasets is comparable to the way in which human perception is altered during a psychedelic experience. The fields of AI and psychedelics have been colliding, for example, to aid in the development of psychedelic therapy and medical treatments. As well, research surrounding human creativity and consciousness is being studied through the artificial "dosing" of AI neural-networks.

Omsk Social Club
Humans are from Earth,
AI is from Our Humans

VII.



Biographies

!Mediengruppe Bitnik

are contemporary artists working on, and with, the Internet. Their practice expands from the digital to physical spaces, often intentionally applying loss of control to challenge established structures and mechanisms. In the past they have been known to subvert surveillance cameras, bug an opera house to broadcast its performances outside, send a bot on a shopping spree in the Darknet, and physically glitch a building.

00Zhang

Living as a series of data; an image generated by processor. 00's practice spans across performance installations and virtual installations, motivated by the investigation of double-sided exile. It is the man, the woman, the alter-ego; the essence of life, of the world, of history and of somewhere else; a stranger, an outsider, a mere sense of existence. The essence of the artist's work is the intersubjectivity between these registered mediums. 00 intertwines embodiment with assemblage and elaborate cybernetic concepts in her Nonlinear Aesthetics. It combines real-world imagery and coded virtuality to depict an integration of agent and environment.

AA Cavia

is a computer scientist and theorist based in Berlin. In 2009 he founded a speculative software studio, STD-IO. His practice engages with machine learning, algorithms, protocols, encodings, and other software artefacts. His writings have been published by HKW, *&&& Journal*, Urbanomic and the *Glass Bead Journal*.

Bassam Al-Sabah
is an artist that works between Belfast and Dublin. He works across digital animation, painting, sculpture, and textiles to convey intricate visions of war, resistance, and perseverance. Recent solo exhibitions include *Dissolving Beyond the Worm Moon*, Solstice Arts Centre, Navan (2019); *Illusions of Love Dyed by Sunset*, The LAB, Dublin (2018); and *The dust carried me into the watchful summer*, Eight Gallery, Dublin (2017).

K Allado-McDowell
is a writer, speaker, and musician. They are the author, with GPT-3, of the book *Pharmako-AI*, and are co-editor, with Ben Vickers, of *The Atlas of Anomalous AI*. Allado-McDowell established the Artists + Machine Intelligence program at Google AI. They are a conference speaker, educator, and consultant to think tanks and institutions seeking to align their work with deeper traditions of human understanding. They record and release music under the name Qenric.

Jamie Allen
is a Canada-born researcher, artist, designer, and teacher, interested in what technologies teach us about who we are as individuals, cultures, and societies. He likes to make things with his head and hands, and has been an electronics engineer, a polymer chemist, and a designer with the American Museum of Natural History in New York. He lectures, publishes, and exhibits worldwide. He works on art and technology projects, writes a bit, and tries to engage himself with, and create, prefigurative institutions that are generous and collaborative, acknowledging that friendship, passion, and love are central to aesthetic, research, and knowledge practices.

Dr Alexandra Anikina
is a researcher and artist investigating algorithmic visual culture with a PhD from Goldsmiths, London, Curator of IMPAKT 2018 *Algorithmic Superstructures*, and Digital Earth Fellow 2020-2021. Her work was shown at HKW (Berlin), Anthology Film Archives, Korean Film Archive, NCCA Moscow, Krasnoyarsk Museum Biennale, RCA (London). Currently working on a monograph on procedural mediation and on the themes of techno-animism, platform aesthetics, and post-socialist media mythologies.

Clemens Apprich
is full professor in media theory and history at the University of Applied Arts in Vienna, as well as guest researcher at the Centre for Digital Cultures at Leuphana University of Lüneburg. He is an affiliated member of the Digital Democracies Institute at Simon Fraser University, of the

Global Emergent Media Lab at Concordia University, and of the Research College "Sensing" at Potsdam University. Apprich is the author of *Technotopia: A Media Genealogy of Net Cultures* (Rowman & Littlefield International, 2017), and, together with Wendy Chun, Hito Steyerl, and Florian Cramer, co-authored *Pattern Discrimination* (University of Minnesota Press/meson press, 2019). He is a founding co-editor of spheres – Journal for Digital Cultures.

Sadie-Mae Arellano AKA ex.icon

(and various other digital personas and aliases) is an artist exploring themes of artificial intelligence, consciousness, mythology, and the borders of human/non-human.

Cris Argüelles

(b.1992, Gijón) is an architect, media designer, and partner in the mixtape studio, blast. Cris has been a research fellow in Digital Gnomonics at the CAD ETH Zürich and joined the ATTP as University Assistant in June 2019 to pursue her PhD on Digital Architectonics. She has been published in magazines and journals and has taken part in exhibitions on contemporary digital architecture such as the 2018 Spanish Pavilion in the Venice Biennale and the 2021 Urban Digital Art Festival of Madrid.

Marwa Azelmat

is a digital policy, gender, and sexuality researcher with extensive experience in work that is focused on understanding the impact of technology on society in order to better public interest. Keeping in line with her objectives as an intersectional researcher, her work centers around meaningful youth engagement perspectives. She is supporting networks and organizations working on broader data governance and technology for health issues in the Global South such as Transform Health, Fondation Botnar. Along with this, Marwa currently serves as the Women's Rights Policy Advocacy Coordinator at the Association for Progressive Communications (APC).

Olivia Banner

is Associate Professor of Critical Media Studies and Networked Cultures at the University of Texas, Dallas, where she teaches and researches at the intersections of digital health, digital culture, and critical feminist, race, and disability studies. Author of *Communicative Biocapitalism: The Voice of the Patient in Digital Health and the Health Humanities* (University of Michigan Press, 2017), she has published articles on disability and algorithmic culture, digital psychiatry, racism and the medical humanities, and automated suicide-alert apps, and is working on a book, *Screening Madness*, 1933–2020.

Medina Bazargali

(artist) analyzes transiting political realities in which the Internet, new algorithmic superstructures, and (post/neo)-totalitarian regimes are swirling in a whirlpool of glocalization. They explore post-Soviet contexts in which the radioactive remnants of Soviet stiffness, the digital cultural feminist revolution, the revival of national identity, and decolonial agendas go hand in hand (like a 3-in-1 product sold in a supermarket). Medina works as a digital artist / developer at the intersection of decolonization, feminism, and folk political digital activism, technically experimenting with AR face filters, video, animation, 3D graphics, installation, web development, visual coding, cyber-physical systems, computer vision, and neural networks. They are currently studying complex systems and philosophy, living and working in St. Petersburg, Russia.

Katherine Behar

is an interdisciplinary artist who studies gender and labor in contemporary digital culture. Her artwork appears regularly throughout North America and Europe. Her books include *Object-Oriented Feminism, Bigger Than You: Big Data* and *Obesity,* and *And Another Thing: Nonanthropocentrism and Art*. She is based in Brooklyn and is Associate Professor of New Media Arts at Baruch College and the Graduate Center, City University of New York.

Olga Boichak

is a Lecturer in Digital Cultures at the University of Sydney, Australia. She holds a Master of Public Administration and a PhD in interdisciplinary Social Science from Syracuse University (USA), and her research interests span networks, discourses, and cultures of activism in the digital age. She has a track record of publications on digital war, legitimizing state power, transnational mobilization, and algorithmic surveillance, and her work has appeared, among others, in *Big Data & Society, International Journal of Communication, Media, War & Conflict*, and *the Journal of Intelligence and National Security*.

Liliana Bounegru

is Lecturer in Digital Methods at the Department of Digital Humanities, King's College London, co-founder of the Public Data Lab, and Research Associate at the Digital Methods Initiative, University of Amsterdam, and the Sciences Po Paris médialab. More about her can be found at lilianabounegru.org.

Antoine Bousquet

is Reader in International Relations at Birkbeck College, University of London. His work sits at the intersection of war and political violence, the history and philosophy of science and technology, and social and political theory in the digital age. He is the author of *The Eye of War* (University of Minnesota Press,

2018) and *The Scientific Way of Warfare* (Hurst & Columbia University Press, 2009).

Tega Brain
is an Australian-born artist and environmental engineer whose work examines issues of ecology, data systems, and infrastructure. She has created wireless networks that respond to natural phenomena, systems for obfuscating fitness data, and an online smell-based dating service. Her work has been shown in the Vienna Biennale for Change, the Guangzhou Triennial, and in institutions such as Haus der Kulturen der Welt, and the New Museum, among others. She co-authored the book *Code as Creative Medium* with Golan Levin, published with MIT Press.

Vera Bühlmann
is a translator between philosophy and architecture and author of *Information and Mathematics in the Philosophy of Michel Serres* (Bloomsbury Academic, 2020) and *Die Nachricht, ein Medium. Städtische Architektonik, Generische Medialität* (Birkhäuser, 2014), co-editor of the Applied Virtuality Book Series (with Ludger Hovestadt, Birkhäuser, since 2012) and author of various articles and edited volumes on cultural studies, media theory, architectural theory, philosophy of technics, and coding literacy. She has been professor and director of the Research Unit Architecture Theory and Philosophy of Technics ATTP at TU Vienna since 2016.

Mercedes Bunz
is the Principal Investigator of the Creative AI Lab, run in collaboration with Serpentine Galleries, and Senior Lecturer in Digital Society at the Department of Digital Humanities, King's College London. Her research explores how digital technology transforms knowledge and power.

Dr. Louise Emily Carver
is a human geographer researching the history and political economy of scientific knowledge used in governing socio-ecological systems. Carver conducts empirical research on the science-policy processes of green and blue capitalism and develops creative methodologies for transformative knowledge and engagement work. She is a Fellow at the UK Parliamentary Office for Science and Technology, affiliated to Lancaster Environment Centre, UK, and Mentor to the TBA21 Academy Ocean Fellowship, independent consultant, and cultural practitioner.

Guo Cheng
is an artist (b.1988, Beijing), currently living and working in Shanghai. Guo Cheng chiefly presents his works as sculptures and installations. His practice mainly focuses on exploring the mutual impacts and influences between established/emerging technologies and individuals in the context of culture and social life. In recent years his

practice has dealt with themes such as the Anthropocene and Second Nature, digitalized inter-objectivity, and the infrastructures and ideologies behind these areas. Guo Cheng's works often use humorous yet calm plastic language, linking grand issues with seemingly arbitrary objects, and providing critical perspectives for discussion and imagination.

Imani Cooper Mkandawire
is a transdisciplinary artist and researcher completing her PhD at the University of Michigan in the Department of Comparative Literature and the Digital Studies Institute. As a doctoral student Imani examines and interprets mathematical and scientific thought within ancient and modern African and African diasporic languages, alongside their cultural foundations to demonstrate how mathematical concepts embedded in these languages can be useful across a wide range of STEAM disciplines (Science, Technology, Engineering, Arts, Mathematics) today, including AI for cultural preservation.

Matt Colquhoun
is a writer and photographer from Kingston-Upon-Hull, UK. He is the author of Egress: *On Mourning, Melancholy and Mark Fisher* and the editor of *Mark Fisher's Postcapitalist Desire: The Final Lectures*. He blogs at xenogothic.com.

Juan Covelli
is a Colombian artist and independent curator currently living and working in Bogatá, where he teaches at Universidad El Bosque/Universidad Javeriana. A graduate of the Contemporary Photography; Practice and Philosophies MA at Central Saint Martins, Covelli's practice revolves around the technological potentials of 3D scanning, modelling, and printing, to readdress entrenched arguments of repatriation and colonial histories.

Florian Cramer
(b.1969) is Reader in 21st Century Visual Culture and autonomous art and design practices at Willem de Kooning Academy and Piet Zwart Institute, Rotterdam, Netherlands.

Laurent de Sutter
is Professor of Legal Theory at Vrije Universiteit Brussel. He is the author of more than twenty books published in thirteen languages. In English have appeared: *Narcocapitalism* (Polity, 2017), *After Law* (Polity, 2020), *Logistics* (co-ed, Sternberg Press, forthcoming), *Deleuze's Philosophy of Law* (Edinburgh UP, forthcoming). He is also editor of the Theory Redux book series at Polity Press and Perspectives Critiques at Presses Universitaires de France. When he's not busy writing, he can be found at the bar of the best cocktail joints around the world.

José Luis de Vicente is a curator and cultural researcher. He investigates the current and future impact of social and technological innovation through artifacts, objects, and narratives that explore emerging social and political scenarios. He is the curator of Sónar +D, Sónar Festival of Barcelona; codirector of Tentacular, in Matadero (Madrid), and part of the programming team of Llum BCN, the light festival of Barcelona. He has curated multiple exhibitions, within and outside Spain, such as *Big Bang Data and After the End of the World* (both at the CCCB, Barcelona), *Atmospheric Memory* (MIF Manchester), *Radical Curiosity: in the Buckminster Fuller Orbit* (Fundación Telefónica, Madrid).

Stephanie Dinkins is a transmedia artist and professor at Stony Brook University where she holds the Kusama Endowed Chair in Art. She creates platforms for dialogs on race, gender, aging, and our future histories. Her artwork is exhibited internationally and is generously supported by fellowships, grants, and residencies from Berggruen Institute, Stanford Institute for Human-Centered AI, Creative Capital, Sundance New Frontiers Story Lab, Eyebeam, Data & Society, Pioneer Works, NEW INC, and The Laundromat Project.

Dr. Ezekiel Dixon-Román is an Associate Professor in the School of Social Policy & Practice at the University of Pennsylvania. His research seeks to make cultural and critical theoretical interventions toward rethinking and reconceptualizing the technologies and practices of quantification as mediums and agencies of systems of sociopolitical relations whereby race and other assemblages of difference are byproducts. He is the author of *Inheriting Possibility: Social Reproduction & Quantification in Education* (2017, University of Minnesota Press).

Sean Dockray is an artist and writer who lives in Australia. He is a Senior Lecturer at the School of Art & Design at the Australian National University.

Dr. Theodora Dryer is a historian of computing and technology and STS scholar. She is a research assistant professor at New York University and leads Climate + Water research at the AI Now Institute. She has worked for the past decade on information and algorithmic decision systems as they relate to environmental and economic power. Her current book manuscript offers a hundred-year history of the Confidence Interval.

Mathew Dryhurst is an artist and researcher based in Berlin. He teaches at NYU's Clive Davis Institute for

Recorded Music and co-hosts the Interdependence podcast.

Nick Dyer-Witheford, a Professor in the Faculty of Information and Media Studies at the University of Western Ontario, is the author of *Cyber-Marx: Cycles and Circuits of Struggle in High Technology Capitalism* (University of Illinois, 1999) and *Cyber-Proletariat: Global Labour in the Digital Vortex* (Pluto Press, 2015), and has also written on the video and computer game industry, the uses of the Internet by social movements, and theories of technology. Two recent books are co-authorships: with Svitlana Matviyenko, *Cyberwar and Revolution: Digital Subterfuge in Global Capitalism* (University of Minnesota Press, 2019); and with Atle Mikkola Kjøsen and James Steinhoff, *Inhuman Power: Artificial Intelligence and the Future of Capitalism* (Pluto Press, 2019).

Grayson Earle is a new media artist and educator. He has worked as a professor at Oberlin College, New School, and CUNY. He is the creator of Bail Bloc and a member of The Illuminator art collective. He is currently a fellow at Akademie Schloss Solitude in Stuttgart, Germany. He has presented his work and research at The Whitney Museum of Art, MoMA PS1, Radical Networks, the Magnum Foundation, and Open Engagement.

Diane Edwards navigates the parallel yet entangled worlds of climatic mutation and digital optimization. Using synthetic and organic media to create sculpture, moving image, and installation, they conduct inquiries into digital, biological and earthly spaces, and ecologies. Drawing influence from Science Fact and Science Fiction, philosophical, technological, and environmental concerns, they confront the interpolating realities of technological progress, societal change, and ecological disaster.

Paul N. Edwards is Director of the Program on Science, Technology & Society at Stanford University and Professor of Information and History (Emeritus) at the University of Michigan. He writes about the history, politics, and culture of information infrastructures. His books include *A Vast Machine: Computer Models, Climate Data, and the Politics of Global Warming* (MIT Press, 2010) and *The Closed World: Computers and the Politics of Discourse in Cold War America* (MIT Press, 1996).

eeefff is a group of two people, Dzina Zhuk and Nicolay Spesivtsev. Active from 2013. Based in Minsk and Moscow. eeefff works with the emotional effects of new economic regimes driven by computation, materiality of sensibility, affects within creative industries, frictions between user interfaces and protocols, settings for collective imaginaries. Methods:

public actions, situations, online interventions, hacks, environments. Co-organizers of Work Hard! Play Hard! More details: https://eeefff.org/.

Hasan Elahi
is an artist whose work examines issues of surveillance, citizenship, migration, transport, and the challenges of borders and frontiers. His work has been presented in numerous exhibitions at venues such as Centre Georges Pompidou, Sundance Film Festival, and the Venice Biennale. He has spoken at the American Association of Artificial Intelligence, TED, and World Economic Forum. He is Professor and Director of the School of Art at George Mason University.

Anna Engelhardt
is a media artist and researcher based in London. Her main interest is (de)colonial politics of algorithmic infrastructures in the post-Soviet space. Holding an MA in Forensic Architecture, Anna is currently conducting her PhD investigating the electromagnetic infrastructure of Russian cyber warfare. She has published her research in *Mute* and *Strelka Mag* and presented her work at Venice Biennale of Architecture, Ars Electronica, 67th International Short Film Festival Oberhausen, and Vancouver International Film Festival. Anna is an external faculty member of the Digital Democracies Institute led by Wendy Hui Kyong Chun and Svitlana Matviyenko.

Fantastic Little Splash
is a collective comprising journalist, filmmaker, and visual artist Lera Malchenko, and artist and director Oleksandr Hants, whose work combines art practice and media research. Fantastic little splash is especially interested in digital collective practices, alternate realities, order and entropy, utopias and dystopias. Established in 2016, their projects have been exhibited at The Wrong biennale, post.MoMA, Construction festival VI x CYNETART, Plokta TV, Revelation Perth International Film Festival, and Pineapple underground Film Festival, among others. Fantastic little splash is based in Dnipro city, Ukraine.

fields harrington
is an interdisciplinary artist whose practice revisits the history of Western empiricism and scientific paradigms, addressing legacies of colonialism as well as the enmeshment of science, racism, and ideology. By appropriating scientific processes and subverting their grammar, he strives to sublimate the subjective experience of racial violence through a material language of form. He received his BFA from the University of North Texas and MFA from the University of Pennsylvania. He was a participant in the Whitney Independent Study Program for the 2019-2020 year.

Kaley Flowers
is a ceramic artist currently based in Toronto, Canada. Inspired by digital technologies, meme culture, and online communities, she attempts to solidify the nature of the Internet through the permanency of ceramic from. Her work documents, transforms, and preserves digital ephemera to investigate time in a nonlinear fashion – whether by memorializing a viral meme, encapsulating a Bitcoin wallet, or reinventing a Palaeolithic Venus.

Fragmentin
is an artist collective based in Lausanne, Switzerland, founded in 2014 and composed of three ECAL alumni: Laura Perrenoud (b.1991, Lausanne), David Colombini (b.1989, Lausanne) and Marc Dubois (b.1985, Basel). At the crossroads of art and engineering, Fragmentin's work questions the impact of the digital on everyday life by investigating these technologies' disposition towards control and opacity. Through installation, video, interaction and performance, Fragmentin conceived spaces for discussion on crucial contemporary themes and issues such as climate change. www.fragment.in.

Laura Forlano
is a Fulbright award-winning writer, social scientist, and design researcher. She is an Associate Professor of Design at the Institute of Design at Illinois Institute of Technology where she is Director of the Critical Futures Lab. She is an editor of three books: *Bauhaus Futures* (MIT Press, 2019), *digitalSTS* (Princeton University Press, 2019), and *From Social Butterfly to Engaged Citizen* (MIT Press, 2011).

Agata Foryciarz,
born and raised in Kraków, Poland, is a PhD student in computer science at Stanford. Her research on algorithmic fairness explores the relationship between statistical properties of machine learning models used in clinical decision support, and their implications for health equity. In collaboration with the Digital Civil Society Lab at Stanford, she co-leads Computing and Society, an interdisciplinary reading and advocacy group dedicated to shifting the practice of computer science research towards an approach that engages with its social impact more critically. She also collaborates with the Panoptykon Foundation in Poland, translating Silicon Valley-speak into Polish in an effort to battle AI hype and help regulate the use of automated decision systems in the EU.

Michele Gabriele
(1983) is a European artist who lives and works in Milan, Italy. His work explores the distance between the observer and the work of art in the constant search for a balance between representation and materiality with a gaze that could be defined as post-digital hyper-materialism.

Pietro Gagliano
is a pioneer of new forms of media that allow humans to understand what it means to be machine, and machines what it means to be human. His commitment to the notion that storytelling has the power to create a hopeful future in a post-singularity world has led to his founding of Toronto-based studio lab Transitional Forms.

Alexandre Gefen,
"directeur de recherche" at CNRS, is a historian of ideas and literature. He is the author of numerous articles and essays on contemporary culture and literature and literary theory. He was one of the pioneers of Digital Humanities in France. More recently he has studied the fictional representations of AI.

Anastasis Germanidis
is a Greek artist and engineer. He is currently a co-founder/CTO at Runway, which is building a machine learning toolkit for creators. His projects have been shown at Ars Electronica Festival, Festival de Cannes - Le Marché du Film, The Athens Concert Hall, and the Museum of Moving Image, and featured in *The Telegraph, Die Zeit,* and *WIRED*, among other outlets.

Steve Goodman
is an artist, writer, and, under the name Kode9, an electronic musician. He founded the record labels Hyperdub (2004) and Flatlines (2019). He has produced three albums, two with the late vocalist The Spaceape (*Memories of the Future* (2006), *Black Sun*, (2012), and one solo, *Nothing* (2015). His book *Sonic Warfare* was published in 2009 (MIT Press) and in 2019 he co-edited *AUDINT - Unsound: Undead* (Urbanomic Press). He co-curates the monthly event series Ø in London and his installations have appeared at, among others, Tate Modern, Barbican, Arebyte Gallery, and CAC, Shanghai.

Olga Goriunova
is Professor at Royal Holloway University of London, and author of *Art Platforms* (Routledge, 2012) and *Bleak Joys* (with M.Fuller, University of Minnesota Press, 2019). An editor of *Fun and Software* (Bloomsbury, 2014), she was a co-curator of software art platform Runme.org (2003) before the age of social platforms. She also wrote on new media idiocy, memes, and lurkers. Her continuing interest in the intersection of aesthetics, computation, and subjectivation has led to her current work on machine learning and subject-construction.

Anna Greenspan
is an Assistant Professor of Contemporary Global Media, NYU Shanghai; Global Network Assistant Professor, NYU. She holds a PhD in Continental Philosophy from Warwick University, UK. While at Warwick, Anna was a founding member of the Cybernetic Culture Research Unit (CCRU). Her research focuses on urban

China and emerging media. Anna was the co-founder of the Shanghai Studies Society as well as the research hub Hacked Matter. She also runs a digital humanities project, Moveable Feasts, that maps Shanghai's street food. Her latest book *Shanghai Future: Modernity Remade* was published by Oxford University Press in 2014. Anna is currently working on a book on China and the Wireless Wave. She maintains a personal website at www.annagreenspan.com.

Sam Gregory
is an expert on deepfakes, media manipulation, and trustworthy human rights video documentation. A Program Director at the global human rights network WITNESS, which helps people use video and technology for human rights, he has led a global effort to prepare better for deepfakes and other manipulated video (see: wit.to/Synthetic-Media-Deepfakes).

Rafael Grohmann
is Assistant Professor in Communication at the Universidade do Vale do Rio dos Sinos (Unisinos University), Brazil. He is Coordinator of the DigiLabour Research Lab, Principal Investigator for the Fairwork project in Brazil, Founding Board Member of the Labor Tech Research Network, and Researcher of Histories of Artificial Intelligence at the University of Cambridge. He holds a PhD in Communication from the University of São Paulo. Email: rafaelgrohmann@unisinos.br.

Eran Hadas
is an Israeli poet, software developer, and new media artist. He's published nine books, creates hypermedia poetry, and develops software-based poetry generators. Among his collaborative projects is a headset that generates poems from brainwaves, and a documentarian robot that interviews people about the meaning of being human. Hadas was the 2017 Schusterman Visiting Artist at Caltech and 2020 Artist-In-Residence at Weizmann Institute of Science.

Orit Halpern
is an Associate Professor in Sociology and Anthropology at Concordia University. Her work bridges the histories of science, computing, and cybernetics with design. She is currently working on two projects. The first is a history of the relationship between "intelligence," liberalism, and democracy; the second examines extreme infrastructures and the idea of experimentation at planetary scales in design, science, and engineering. She is also the director of the Speculative Life Research Cluster and D4: The Disrupting Design Research Group, two laboratories bridging the arts, environmental sciences, media, and the social sciences. https://governingthrough.design/, www.d4disruptingdesign.net, www.speculativelife.com.

Felicity Hammond
holds an MA in Photography from the Royal College of Art and a PhD in Contemporary Art Research from Kingston University, UK. Her recent solo exhibition *Remains in Development* (2020) was co-commissioned by C O Berlin and Kunsthal Extra City, Antwerp. Alongside solo shows in England, Germany, the Netherlands, and Canada, Hammond has exhibited her work in group shows at The Photographers' Gallery and Fotomuseum Winterthur, among others. She has been awarded the Lumen Art Prize and the British Journal of Photography International Photography Award.

Rian Ciela Hammond
is an artist, tactical biologist, transfeminista, and hormone hirstorian. Their current long-term project (started 2015), Open Source Gendercodes, has focused on the intersection of gender variation and technoscience; by working towards novel hormone production technologies, OSG attempts to queer current regimes of ownership and bio-power.

Lelia Marie Hampton
is a sociotechnical researcher and mother who enjoys reading and baking.

Adam Harvey
(US/DE) is a researcher and artist based in Berlin focusing on computer vision, privacy, and surveillance technologies. He received his master's degree from the Interactive Telecommunications Program at New York University (2010) and his BA in Integrative Arts from Pennsylvania State University (2004). His previous work includes CV Dazzle (camouflage from face recognition), the Anti-Drone Burqa (camouflage from thermal cameras), SkyLift (geolocation spoofing device), and Exposing.ai (interrogating face recognition datasets). His art and research has been featured widely in media publications including *The Economist, New York Times, Financial Times, Süddeutsche Zeitung, Der Spiegel, Wall Street Journal*, and *The Washington Post*. Harvey is the founder of VFRAME.io, a software project that innovates computer vision technology for human rights researchers and investigative journalists, which received an award of distinction from Ars Electronica and nomination for the Beazley Design of the Year award in 2019.

Florian Hecker
works with synthetic sound, the listening process, and the audience's auditory experience. Recent exhibitions include *Synopsis / Seriation*, CU Art Museum, University of Colorado Boulder, CO, USA (2018); *Halluzination, Perspektive, Synthese, Kunsthalle Wien, Vienna*, (2017); *Formulations*, MMK Museum für Moderne Kunst Frankfurt am Main and Culturgest, Porto (2016). Hecker's discography includes *Synopsis Seriation*, (Editions Mego, Vienna, 2021),

Statistique Synthétique (Portraits GRM, Paris, 2020), and *Inspection II* (Editions Mego, Vienna & Urbanomic Falmouth, UK, 2019).

Line Henriksen
is a postdoctoral researcher at the IT University of Copenhagen, and affiliated with the Technologies in Practice research group and ETHOS Lab. She holds a PhD in Gender Studies from Linköping University, and her research interests include hauntology, monster theory, and contemporary digital storytelling practices within the speculative genres. She is co-founder of the art and research network The Monster Network.

Holly Herndon
operates at the edge of electronic and avant-garde pop music and emerges with a dynamic and disruptive canon of her own. On her most recent full-length album *PROTO*, Herndon fronts and conducts an electronic pop choir comprised of both human and A.I. voices. The sounds synthesized on *PROTO* by Herndon, her A.I. "baby" Spawn, and the vocal ensemble combine elements from Herndon's dynamic and idiosyncratic personal journey; the timeless folk traditions of her childhood experiences in church-going East Tennessee, the avant-garde music she explored while at Mills College, and the radical club culture of Berlin, all enhanced by her recent doctoral composition studies at Stanford University, researching machine learning and music. Herndon co-founded the podcast *Interdependence* alongside Mat Dryhurst.

Louise Hickman
is a Senior Research Officer at the Department of Media and Communications at the London School of Economics and the Ada Lovelace Institute's JUST-AI Network on Data and AI Ethics. Her research draws on critical disability studies, feminist labor studies, and science and technology studies to examine the historical conditions of access work. Louise is a member of the Critical Design Lab. She holds a PhD in Communication from the University of California, San Diego, and is currently working on a book manuscript tentatively titled *The Automation of Access*.

Joey Holder's
work raises philosophical questions about our universe and things yet unknown regarding the future of science, medicine, biology, and human-machine interactions. Working with scientific and technical experts she makes immersive multimedia installations that explore the limits of the human and how we experience non-human, natural, and technological forms.

Amy Ireland
is a writer, theorist, and experimental poet. Her research focuses on questions of agency and technology in modernity, and she is a member of the technomaterialist transfeminist collective Laboria Cuboniks.

Özgün Eylül İşcen
is a film and media scholar specializing in digital art and design. She received her PhD in Computational Media, Arts and Cultures from Duke University, and she is currently a postdoctoral research fellow at ICI Berlin. İşcen's work situates computational media as an imperial apparatus within the matrix of racial capitalism and unpacks its geopolitical aesthetic in the context of the Middle East.

Natalia Janula
Graduating with a Masters from the Slade School of Fine Art in 2015, Natalia Janula is a London-based Polish multidisciplinary artist whose practice consists of mixed media assemblages, sculpture, video, photography, speculative wearables, CGI, and performance. Rooted in an interest in speculative narratives, her practice examines the natural environment, the concept of functionality, and the exploration of the body's positioning within synthetic surroundings, often with an element of levity. The resulting works emerge from research into phenomenology, tension between the corporeal and the virtual, anatomy, mythological symbolism, hydrofeminism, medicine, and rituals around female and hybrid protagonists.

Adan Jerreat-Poole
is a disabled, Mad, nonbinary, white settler, living and working on the traditional territories of the Haudenosaunee and Anishinaabe nations. Adan holds a PhD in English and Cultural Studies and works at the intersection of disability and digital media. Their work has appeared in *Feminist Media Studies, a/b: Auto/Biography Studies*, and *Game Studies*, as well as the edited collections *Digital Feminist Activisms: The Performances and Practices of Online Public Assemblies* and *Feminist War Games?: Mechanisms of War, Feminist Values, and Interventional Games*. Their autobiographical game *Nonbinary: A Choose-Your-Own-Adventure* can be played through First Person Scholar.

Julia Kaganskiy
is an independent curator and cultural strategist whose practice is focused on facilitating interdisciplinary collaboration between the arts and sciences. Recently she has been researching the ethics of AI in healthcare for Science Gallery London. Previously she was the founding Director of NEW INC, the first museum-led cultural incubator and an initiative of the New Museum in New York. Prior to that she was the founding Editor-in-Chief of The Creators Project, an international cultural platform for art and technology from VICE Media and Intel.

Christopher Kardambikis
explores space, process, and narrative through books, prints, and drawings. A bibliophile and zinester, Christopher founded Paper Cuts, a podcast and

publishing platform that documents the contemporary world of zines and artist publications, as an excuse to talk to people about the books they make. He received his BFA from Carnegie Mellon University and MFA from the University of California, San Diego. He is Assistant Professor at George Mason University and Director of Navigation Press.

Stella Andrada Kasdovasili
holds an MA(Hons) in Gender Studies from CEU, an MSc in Political Science and History (specialization in Social Theory and Political Philosophy), and a BA in Political Science and History from Panteion University. Her research is focused on Artificial Intelligence and humanoids, examining their interconnectivity to the technologies of race and sexuality within affective capitalism. YouTube is her favorite sport, and she will be starting her second bachelor's degree in Psychology at UvA this fall.

Dr Elaine Kasket
is an expert in the intersection of online life and death and the author of *All the Ghosts in the Machine: The Digital Afterlife of Your Personal Data* (2019). Her current project is Exposed: A Life in Data, an examination of how technology and data privacy issues affect us across the lifespan. She is an Honorary Professor of Psychology at the University of Wolverhampton, where she is primarily affiliated with the cyberpsychology cluster. She is a frequent keynote speaker and media contributor and maintains a busy psychotherapy practice in London, UK.

Botond Keresztesi
(b. 1987, Marosvásárhely, RO) is a Romanian/Hungarian artist working in painting, drawing, and site-specific painting installations. Remixing references from Art History, popular culture, virtual space, and everyday life, his paintings crystalize into the fragmented realities of dream-like landscapes. Recent solo and group exhibitions have taken place at: Galerie Deroullion, Paris; Storage Capacité, Berlin; Damien & The Love Guru, Brussels; Kunstfort, Vijhuizen, NL; Future Gallery, Berlin; Artkartell Project Space, Budapest; Labor Gallery, Budapest; Hungarian National Gallery, Budapest; and Schloss, Olso.

Os Keyes
is a PhD candidate at the University of Washington, where they study gender, technology, and (counter)power. They are an inaugural winner of the Ada Lovelace Fellowship.

Kite aka Suzanne Kite
is an Oglála Lakóta performance artist, visual artist, and composer raised in Southern California, with a BFA from CalArts in music composition, an MFA from Bard College's Milton Avery Graduate School, and is currently a PhD candidate

at Concordia University. Kite's scholarship and practice investigate contemporary Lakota ontologies through research-creation, computational media, and performance. Recently Kite has been developing a body interface for movement performances, carbon fibre sculptures, immersive video and sound installations, as well as co-running the experimental electronic imprint Unheard Records. Kite has published in several journals and magazines, including the *Journal of Design and Science* (MIT Press) with the award-winning article, "Making Kin with Machines," co-authored with Jason Lewis, Noelani Arista, and Archer Pechawis. Currently she is a 2019 Pierre Elliott Trudeau Foundation Scholar, a 2020 Tulsa Artist Fellow, and a 2020 Women at Sundance x Adobe Fellow.

Anastasya Kizilova

is a researcher, artist, and science-fiction writer, born in 1986. In 2015 she co-organized the horizontal initiative, Flying Cooperation, which unites multiskilled young artists, who were born in the post-Soviet space (Belarus, Russia, Ukraine). Since 2016 she has collected an archive of unrealized artists' ideas entitled Found Project: authors share their ideas for free, so other people who are in need of ideas can realize them. At the moment she works in the field of environmental communication, which focuses on posthumanist and nonhumanist ways of interacting, bringing together theoretical approaches such as queer ecology, cyberfeminism, bioanarchism, and practical methods such as performative creation of an interspecific collective body.

Bogna Konior

is a writer currently based at the Interactive Media Arts department at NYU Shanghai. She is also an affiliate at the NYUSH AI & Culture research centre. Visit her website at www.bognamk.com.

Jakob Kudsk Steensen

(b.1987, Denmark) is an artist working with environmental storytelling through 3D animation, sound, and immersive installations. He creates poetic interpretations about overlooked natural phenomena through collaborations with field biologists, composers, and writers. Projects are based on extensive fieldwork. Key collaborators include composer Michael Riesman, ornithologist Dr. Douglas H. Pratt, architect Sir David Adjaye OBE RA, BTS, and the Natural History Museum London.

Chloê Langford

is an artist and programmer living in Berlin, Germany. Together with the collective Fantasia Malware, she makes video games, performances, and interactive installations. Langford works at the Brain Simulation Lab at the Charité Berlin, where she builds interactive apps and visualizations that help communicate the lab's research.

Lawrence Lek
is an artist known for creating site-specific simulations and multimedia installations, often set within a Sinofuturist cinematic universe. Drawing from a background in architecture and electronic music, he explores fictional versions of real places from the viewpoint of the other. His work features characters caught between human and machine worlds: digital nomads, AI satellites, and online superstars, all searching for autonomy under alien conditions of existence.

Laura Lotti
investigates the relations between technological, economic, and cultural systems, with a focus on the affordances of blockchains and the role they play in cultural production. She is a researcher at Other Internet, where she collaboratively explores emerging dynamics in networked cultures. She co-founded Black Swan, an experiment in reorganizing artworlds developed at Trust.

Geert Lovink
is a Dutch media theorist, internet critic and author of *Uncanny Networks* (2002), *Dark Fiber* (2002), *My First Recession* (2003), *Zero Comments* (2007), *Networks Without a Cause* (2012), *Social Media Abyss* (2016), *Organisation after Social Media* (with Ned Rossiter, 2018) and *Sad by Design* (2019). In 2004 he founded the Institute of Network Cultures at the Amsterdam University of Applied Sciences. His centre organizes conferences, publications and research networks such as *Video Vortex Reader* (online video), *Unlike Us Reader* (alternatives in social media), *Critical Point of View* (Wikipedia), Society of the Query (the culture of search), MoneyLab (internet-based revenue models in the arts). Recent projects deal with digital publishing and the future of art criticism.

Mattin
is an artist, musician, and theorist working conceptually with noise and improvisation. Through his practice he explores performative forms of estrangement as a way to deal with structural alienation, interrogating both our self-conception and sense of freedom under capitalist relations. Along with Anthony Iles he has edited the book *Noise & Capitalism*; Urbanomic will publish his book *Social Dissonance* later this year; Mattin took part in documenta14.

Robin Mackay
is director of UK publisher and cultural producer Urbanomic. He has written widely on philosophy and contemporary art, and has instigated collaborative projects with numerous contemporary artists. He has also translated a number of important works of French philosophy, including Alain Badiou's *Number and Numbers*,

Quentin Meillassoux's *The Number and the Siren*, Francois Laruelle's *The Concept of Non-Photography* and Éric Alliez's *The Brain-Eye*.

Umber Majeed
is a multidisciplinary visual artist. Her work engages with familial archives to explore Pakistani state, urban, and digital infrastructure through a feminist lens. Majeed has shown in venues across Pakistan, North America, and Europe. She is a recipient of fellowships including the HWP Fellowship, Ashkal Alwan, Beirut, Lebanon (2017), Web Residency, Akademie Schloss Solitude & ZKM, Germany (2018), Digital Earth Fellowship, Hivos, the Netherlands (2018-19); Technology Residency, Pioneer Works, Brooklyn, NY (2020). Majeed lives and works in New York, USA and Lahore, Pakistan.

Kumbirai Makumbe
currently takes form as a London-based artist who believes in the transmutation of the intangible yet experiential. They place significant effort into speculative explorations of alternative modes of being and thinking that result in emancipation. Their work continually interrogates the multi-dimensionality of blackness, "in-betweenness," "caring," and transcendence. They transform and metamorphose to ceaselessly take on various forms and manoeuvre through a diverse range of spaces.

Suhail Malik
is Co-Director of the MFA Fine Art program at Goldsmiths, London, where he holds a Readership in Critical Studies. Recent and forthcoming publications include, as author, *ContraContemporary: Modernity's Unknown Future* (Urbanomic) and "The Ontology of Finance" in *Collapse 8: Casino Real* (2014). Malik is co-editor of *Genealogies of Speculation* (2016), *The Time-Complex. Post-Contemporary* (2016), and *Realism Materialism Art* (2015).

Ilan Manouach
is a conceptual comics artist, book publisher, and strategy consultant for Onassis Publications. He is currently doing a PhD at Aalto University on comics epistemology, exploring the effects of frontier technologies, synthetic media, fintech, and globalized logistics on the comics industry. He is mostly known for *Shapereader*, a system for tactile storytelling initially designed for people with visual disabilities, and *The Neural Yorker*, an engine for the generation of synthetic cartoons. In 2018, with Kenneth Goldsmith, he co-curated *Shadow Libraries: Ubuweb in Athens*, a festival that probed the conceptual consistency and ethics of digital preservation and distribution in web libraries through the lens of its users and makers. He also curates the collections of Conceptual Comics for *Ubuweb* and *Monoskop*. His latest books are *Fastwalkers*, a synthetic comic book entirely cocreated with emergent AI, *Peanuts Minus Schulz* (2021), and *The Cubicle Island* (2020).

Christina Maraboutaki

is a PhD student at the Sapienza University of Rome and an attorney-at-law, member of the Athens Bar Association. She holds an MA in political science and sociology (National and Kapodistrian University of Athens) and an MSc in gender studies (Birkbeck University of London). In her ongoing research Christina examines the sex industry's appropriation of robotics and artificial intelligence technology, focusing on the ways in which gender, sexuality, and subjectivity are being re-imagined in a highly digitalized and fully immersive framework.

Gena Marvin

I am 22 years old and currently based in Russia. I was born in a very small place very far from central Russia. I have tried a lot of hobbies in my life, the main one that stayed was pain, or rather fear of it. The fear of pain is something that now and probably until the end of my days will live in me. Without teaching myself to fight it, I found a way to heal. On the path of my feet, I found drag. The one that heals and guides me. Through the pain of wrapping myself in duct tape, I tell and show people how I live in this world. I create "monsters," I make faces whitened to horror, like the one I saw at the age of 5 when it opened its eyes and looked at me. It still lies, it still wants to look at me so closely. Walking with it by the hand I feel myself, but the main thing is not to look into its eyes.

Gabriel Massan

(b.1996, Rio de Janeiro) is a Brazilian digital artist who lives in Berlin, Germany.

Svitlana Matviyenko

is an Assistant Professor of Critical Media Analysis at the School of Communication at Simon Fraser University, Canada. Her research and teaching focus on information and cyberwar; the political economy of information; media and environment; infrastructure studies; and STS. She writes about practices of resistance and mobilization; digital militarism; dis- and misinformation; internet history; cybernetics; psychoanalysis; posthumanism; Soviet and post-Soviet techno-politics; nuclear cultures, including the Chernobyl Zone of Exclusion. She is a co-editor of two collections, *The Imaginary App* (MIT Press, 2014) and *Lacan and the Posthuman* (Palgrave Macmillan, 2018). She is co-author of *Cyberwar and Revolution: Digital Subterfuge in Global Capitalism* (Minnesota UP, 2019), winner of the 2019 book award of the Science Technology and Art in International Relations (STAIR) section of the International Studies Association and of the Canadian Communication Association 2020 Gertrude J. Robinson book prize.

Dr Isabel Millar

is a philosopher and cultural critic from London. Her work focuses on AI, sex, the body, film, and the future. Her book *The Psychoanalysis of Artificial*

Intelligence was published in the Palgrave Lacan Series in 2021. As well as extensive international academic speaking and publishing, Isabel has made numerous TV, documentary, and podcast appearances including for BBC2 (*Frankie Boyles' New World Order*), Russia Today (*Entrevista*), Tomorrow Unlocked (*Build me Somebody to Love*), Schizotopia, and Machinic Unconscious Happy Hour, among others. Isabel has recently been a psychoanalytic script consultant for BBC Drama and interviewed for a book by Ai-Da Robot, the world's first AI artist. She is currently a research fellow at The Centre for Critical Thought, the University of Kent, and an affiliate of the Global Centre for Advanced Studies. Website: www.isabelmillar.com.

Constantinos Miltiadis
is a transdisciplinary architect and researcher, and occasionally also a programmer, media artist, curator, teacher, and librarian. His work focuses on aesthetic phenomena between technology and culture, and more formally on spatiotemporal environments inconstructible in the physical world, specific to and experienceable through technological mediation. Constantinos studied architecture at NTU-Athens, is the Chair for CAAD, ETH Zurich, and pursued studies in computer music at IEM KU Graz. Between 2015-2019 he was assistant professor at the Institute of Architecture and Media, TU Graz, while since 2019 he has been a researcher between the Departments of Design and of Architecture at the School of Arts of Aalto University. Constantinos was founder and curator of the IAM Open Lecture series, co-founder of the experimental electronic music event series, and founding member of SAR special interest group for Spatial Aesthetics and Artificial Environments. Constantinos' work is at studioany.com.

An Xiao Mina
is an artist, author, and technologist. She was a 2016-17 research fellow at the Berkman Klein Center for Internet & Society and is co-authoring *The Hanmoji Handbook*, a new book about learning the Chinese language through emoji for MITeen Press.

Thomas Moynihan
is a writer from the UK. He is currently working with Oxford University's Future of Humanity Institute and is also a visiting Research Associate in History at St Benet's College, Oxford. Thomas's research focuses on the philosophical history behind modern ideas of existential risk and the long-term potential of our species: that is, how people first woke up to the longview and came to understand the perils and promises that face us as a species in an otherwise seemingly silent and sterile cosmos. His writing hopes to position this as the central philosophical drama of the modern world.

Alejandra Muñoz
is a mexican artist, she currently lives in Guadalajara Jalisco; in 2006 she studied for a Bachelor of Visual and Media Arts in Monterrey, Mexico; she works mainly with digital illustration, 3D digital modeling, and sculpture; her work investigates and criticizes what is established as beautiful and feminine, using exaggeration and fantasy symbols to represent how women are characterized through cultural imagery, subjects she will keep exploring in her creations.

Nina Muro
(b. 1995, Madrid) is a graphic designer and art director currently based in Berlin. Her work is defined by colour explorations, abstract compositions, and extensive research. She strives to create mind tickling and unexpected visuals through a mix of 2D and 3D techniques.

The Mycological Twist
is a project by Eloïse Bonneviot and Anne de Boer, both based in Berlin. They take mycology as a source of inspiration in engaging with ecological and social practices. Their point of interest extends through the mushroom fruiting body into the rotting matter deep below ground level. DIY methods are woven into digital cultures to construct utopias for alternative modes of living.

Reza Negarestani
is a philosopher. His latest work is *Intelligence and Spirit* (Urbanomic/Sequence Press, 2018), centered on the philosophy of German Idealism, philosophy of mind, artificial intelligence, and theoretical computer science. Negarestani currently directs the Critical Philosophy program at The New Centre for Research and Practice.

Mihalis A. Nicolaou
is an assistant professor at the Computation-based Science and Technology Research Center at The Cyprus Institute. He completed his BSc at the University of Athens, while he obtained his MSc and PhD degrees from the Department of Computing at Imperial College London. He has also been a lecturer at Goldsmiths, University of London, and research associate and fellow at Imperial College. His research interests include machine learning, signal processing, computer vision, and human sensing.

Simone C. Niquille
is a designer and researcher based in Amsterdam, NL. Her practice, Technoflesh, investigates the representation of identity and the digitization of biomass in the networked space of appearance. In 2016 she was Research Fellow of Het Nieuwe Instituut Rotterdam and commissioned contributor to the Dutch Pavilion at the 2018 Venice Architecture Biennale. Niquille is recipient of the Pax Art Award 2020 and Mellon Researcher at the Canadian Center for Architecture. Currently she is investigating

the architectural and bodily consequences of computer vision, researching the politics of synthetic training datasets.

Bahar Noorizadeh is an artist, writer, and filmmaker. Her current research examines the intersections of finance, Contemporary Art, and emerging technology, building on the notion of "Weird Economies" to precipitate a cross-disciplinary approach to alternative economics and post-financialization imaginaries. She is pursuing this as a PhD candidate in Art at Goldsmiths, University of London, where she holds a SSHRC Doctoral Fellowship.

Rodrigo Ochigame is an assistant professor in the Institute for Cultural Anthropology and Development Sociology at Leiden University, the Netherlands. Their research focuses on unorthodox models of computational rationality, such as nonclassical logics from Brazil, nonbinary Turing machines from postcolonial India, and frameworks of information science from postrevolutionary Cuba.

Omsk Social Club's work is created between two lived worlds, one of life as we know it, and the other of role play. These worlds bleed into one, they call this Real Game Play. The work aims to induce states that could potentially be a fiction or a yet unlived reality, allowing the works to become a dematerialized hybrid of modern-day culture alongside the viewer's unique personal experiences. In the past they have introduced landscapes and topics such as Otherkin, heart of an avatar, rave culture, survivalism, desire&-sacrifice, positive trolling, algorithmic strategies, and decentralized cryptocurrency.

Bianka Oravecz is a self-generating digital artist that aims to create a unique visual language for communicative and aesthetic purposes. She introduced her digital self, Ultrabianka, in 2016, with the following words: "The luminous headed human, named after the light, climbs up to the computer apparatus's top side. She pulsates there on the earth's hemisphere, covered with silky crystal microcilium, and luxuriates in slimy, shiny fractal colors. Small purple craters of a data processor's desktop ooze bluish-black pony-tinted fluid onto a glass cell, from wherein – after peeling a living robot's body – comes to the moonlight an RGB ray shadow of gnosis, the sublime reek of cultural Zeitgeist, materialized in genetic multiform, the persisting translucence."

Yannis Panagakis is an associate professor of Machine Learning at the University of Athens and a visiting research fellow at Imperial College London. He studied computer science at Aristotle University of Thessaloniki (PhD and MSc) and the University of Athens (BSc).

He develops principled AI algorithms for robust and efficient learning from real-world data and interdisciplinary applications.

Eva Papamargariti is an artist based between London and Athens. Her practice focuses on time-based media besides printed material and sculptural installations that explore the relationship between digital space and material reality. More specifically her work delves into issues and themes related to simultaneity, the merging and dissolving of our surroundings with the virtual, the constant diffusion of fabricated synthetic images that define and fragment our identity and everyday experience, and the symbiotic procedures and entanglement that take place between humans, nature, and technology. She has exhibited at the New Museum, MAAT, and Whitney among others, as well as Athens Biennale, 19th Mediterranea Biennale, Transmediale Festival, and Ars Electronica.

Luciana Parisi's research is a philosophical investigation of technology in culture, aesthetics, and politics. She is Professor of Literature and Computational Media Art and Culture at Duke University. She was a member of the CCRU (Cybernetic Culture Research Unit) and is currently a co-founding member of CCB (Critical Computation Bureau). She is the author of *Abstract Sex: Philosophy, Biotechnology and the Mutations of Desire* (Continuum Press, 2004) and *Contagious Architecture. Computation, Aesthetics and Space* (MIT Press, 2013). She is completing a monograph on alien epistemologies and the transformation of logical thinking in computation.

Oana Pârvan is a Romanian theorist and educator based in South-East London. She is the author of *The Arab Spring between Transformation and Capture. Autonomy, Media and Mobility in Tunisia* (Rowman & Littlefield International, 2020) and is a member of the international research and practice networks Sound System Outernational and The Critical Computation Bureau. Her writing has appeared on *MetaMute*, *Dark Matter*, and *Race & Class*.

Victoria Pacheco (b.1993, Oaxaca, Mexico) Graduating from Villa Arson in 2017, her artistic work is mostly eclectic, and she likes to create a rich world that can come alive in multiple astounding turns and techniques. Her sources of inspiration and preoccupation with mythological intermingling, plus the juxtaposition of archaic and new technologies, allow her to create images and sounds that are as hazardous as possible. Her work is anchored in music and sound, but also in a plastic practice that spans installation, ceramics, and 3D conception-animation.

Philippe Pasquier
is an associate professor at Simon Fraser University's School for Interactive Arts and Technology, where he directs the Metacreation Lab for Creative AI. Philippe leads a research-creation program around generative systems for creative tasks. As such, he is a scientist specialized in artificial intelligence, a multidisciplinary media artist, an educator, and a community builder. His contributions range from theoretical research in multiagent systems, computational creativity, affective computing, evaluation methodologies, and Creative AI, to applied artistic research and practice in digital art, computer music, and interactive and generative art.

Porpentine Charity Heartscape
is a writer, game designer, and nanoslimeocean in Oakland. She's exhibited at Whitney Biennial, Yerba Buena Center for the Arts, the Contemporary Jewish Museum, the Museum of Contemporary Art Chicago, is a Sundance Institute and Tiptree fellow, and has been commissioned by Vice and Rhizome. She is the author of *With Those We Love Alive, Psycho Nymph Exile*, and *Eczema Angel Orifice*.

Luiza Prado de O. Martins
is an artist, writer, and researcher whose work examines themes around reproduction, herbal medicine, coloniality, gender, and race. She is part of the curatorial board of Transmediale 2021 and an assistant professor and vice-director of the Centre for Other Worlds at the Lusófona University in Lisbon. She is a founding member of Decolonising Design.

PWR
is a Berlin-based studio for design and development run by Hanna Nilsson and Rasmus Svensson.

Oleksiy Radynski
is a filmmaker and writer based in Kyiv. His films have been screened at Kurzfilmtage Oberhausen, DOK Leipzig, and ICA London, among other venues, and received awards at international film festivals. His texts have been published in *Proxy Politics: Power and Subversion in a Networked Age* (Archive Books, 2017), *Art and Theory of Post-1989 Central and East Europe: A Critical Anthology* (MoMA, 2018), and in *e-flux Journal*.

Patricia Reed
is an artist, writer, and designer based in Berlin. Recent writings have been published in *Pages Magazine, Glass Bead Journal, The New Normal* (Strelka / Park Books), *Construction Site for Possible Worlds* (Urbanomic), *e-flux Journal*, *Making & Breaking*, *Para-Platforms* (Sternberg); and *e-flux Architecture*. Reed is also part of the Laboria Cuboniks working group whose *Xenofeminist Manifesto* (2015) was republished by Verso Books in 2018.

Kalli Retzepi

uses code and design to imagine systems that resist biases and challenge computational and interface paradigms. She currently works as a software engineer in the censorship resistance space and is a founding member of the research collective FOREIGN OBJECTS. She graduated from the Media Lab at MIT in 2019 and holds advanced degrees in engineering and neuroscience.

Tabita Rezaire

is an artist-healer-seeker. Her cross-dimensional practice envisions network sciences - organic, electronic and spiritual - as healing technologies to serve the shift towards heart consciousness. Embracing digital, corporeal, and ancestral memory, she digs into scientific imaginaries and mystical realms to tackle the colonial wounds and energetic imbalances that affect the songs of our body-mind-spirits. Tabita is based near Cayenne in French Guiana, where she is birthing AMAKABA.

Jennifer Rhee

is an associate professor in the Department of English at Virginia Commonwealth University. She is also affiliated faculty in the Department of Gender, Sexuality and Women's Studies, and the Media, Art, and Text PhD program. She has written about race, gender, and labor in robotics and artificial intelligence technologies, visual and performance art, literature, and film in her book *The Robotic Imaginary: The Human and the Price of Dehumanized Labor* (University of Minnesota Press). She's also co-editor of *The Palgrave Handbook of Twentieth and Twenty-First Century Literature and Science*, which was edited by a group of scholars working under the name The Triangle Collective.

Miro Roman

is an architect and scholar whose main focus is the overlap of information technologies and architectural articulations. Miro explores, designs, codes, and writes about architecture while playing with a lot; with "all" the buildings, books, images; with clouds, avatars, streams, lists, indexes, and pixels. What is this abundance of information about, how do we handle it, and how does it shape the way we think about the world? To navigate and surf this vast flow, Miro codes and articulates synthetic alphabets. https://miro.romanvlahovic.com, https://ask.alice-ch3n81.net.

Emily Rosamond

is Lecturer in Visual Cultures at Goldsmiths, University of London, where she serves as Department Chair of Learning and Teaching. Her recent publications have appeared in *Theory, Culture & Society*, *Journal of Cultural Economy*, *Journal of Aesthetics & Culture*, among others; and she is an Associate Editor of the academic journal *Finance and Society*. Her forthcoming monograph, *Reputation Warfare*, explores volatility in online ranking and ratings.

Rachel Rossin

is a painter, multimedia artist, researcher, and computer programmer, who has gained recognition for her astonishing exhibitions that blend oil painting, sculpture, video and virtual reality. Rossin's practice acts on the metabolism between physical and digital exchange, investigating the ways information and sensory experience are transfigured by each. Her research and work has received recognition at Prix Ars Electronica, The Sundance Film Festival, Massachusetts Institute of Technology, Art21, *ArtForum*, *The NYTimes*, and *National Geographic*.

Bassem Saad

is an artist and writer born on September 11th and trained in architecture. His work explores structures and operations that distribute violence, pleasure, welfare, and waste. Through film, sculpture, and writing, he investigates and records strategies for maneuvering within and beyond governance systems. Bassem's solo and collaborative work has been exhibited and presented at Transmediale, Architectural Association, Harvard University VES, and Alserkal Avenue. His writing appears in Jadaliyya, Unbag, and The Funambulist, and he is an editor at FailedArchitecture.

Anne-Françoise Schmid

is a philosopher and epistemologist, she works on the multiple interactions between sciences and arts, between epistemology and multiplicity of philosophies. These dynamic relationships can only be understood and systematized by a science of terms and relationships, a modality of Design. AFS sees in philosophical invention, rather than a result of criticism, the effect of a conception of and in philosophy, which occurs when philosophy touches another discipline. The Design, rather than a method external to the philosophy, allows its construction to manifest in its links to other knowledge, doctored or indoctrinated.

Pete Sharp

is a freelance illustrator based in South-East London currently specializing in art direction for animation having worked for clients such as Nike, Vice, Adidas and Google. He studied illustration at the University of Brighton before training as a multidisciplinary printmaker and his personal artwork lends itself to print design with its limited pallet of two or three layered colour combinations.

Yannis Siglidis

was born in Athens in 1994. He is a computer scientist, graduate of the School of E.C.E. - N.T.U.A. and of the MVA Master program of the ENS-Paris Saclay, specializing in Machine Learning. He holds three years' academic experience in Data Science and Machine Learning, and has been part of AI art projects, mainly in collaboration with Ilan Manouach. His (research) interests include, among other things: generative modeling, multimodality, narrative modeling, and AI's epistemological implications. Website: https://ysig.github.io/.

Caroline Sinders

is a critical designer and artist. She has worked with the United Nations, Amnesty International, IBM Watson, the Wikimedia Foundation and others. Sinders has held fellowships with the Harvard Kennedy School, Google's PAIR (People and Artificial Intelligence Research group), the Mozilla Foundation, Pioneer Works, Eyebeam, Ars Electronica, the Yerba Buena Center for the Arts, the Sci Art Resonances program with the European Commission, and the International Center of Photography.

Lex Sokolin

A New York and London entrepreneur with senior operating and board-level fintech experience, Lex Sokolin has held a variety of roles on Wall Street – Lehman, Barclays, Deutsche Bank – and is also a practicing visual artist. He is the Head Economist and Global Fintech Co-Head of ConsenSys, the blockchain software company at the forefront of the decentralized finance revolution. Previously, he founded roboadvisor NestEgg Wealth, wealth tech platform AdvisorEngine, and the Autonomous NEXT equity research fintech practice.

James Steinhoff

is a Postdoctoral Fellow at the University of Toronto. He is author of *Automation and Autonomy: Labour, Capital and Machines in the Artificial Intelligence Industry* (Palgrave Macmillan, 2021) and co-author of *Inhuman Power: Artificial Intelligence and the Future of Capitalism* (Pluto, 2019).

Abram Stern (aphid)

is an artist and scholar whose work engages techniques of opacity and transparency within collections of government-produced media and metadata related to surveillance and its oversight. This work analyzes media through which public bureaucracies address their citizens, subjects, and targets, while implicating the apparatuses of sense-making that make this analysis possible. Abram is a PhD candidate at UC Santa Cruz.

Jenna Sutela

works with words, sounds, and other living media, such as *Bacillus subtilis nattō* bacteria and the "many-headed" slime mold Physarum polycephalum. Her audiovisual pieces, sculptures, and performances seek to identify and react to precarious social and material moments, often in relation to technology. Sutela's work has been presented in museums and art contexts internationally, including Guggenheim Bilbao, Moderna Museet, Serpentine Galleries, and, most recently, Shanghai Biennale and Liverpool Biennial. She is a Visiting Artist at The MIT Center for Art, Science & Technology (CAST) 2019-21.

Stephanie Hankey and **Marek Tuszynski**

investigate the impact of technology on society and examine its relationship to social, environmental, and political issues. They have been working together producing creative interventions for the past 20 years – exhibitions, art works, films, events, workshops, and writing – using the best way possible to tell stories, influence attitudes, and find new ways of seeing. They are the co-founders of Tactical Tech, co-curators of *Nervous Systems: Quantified Life and the Social Question* and award-winning exhibition *The Glass Room*, a museum and street-based art installation presented in Berlin, London, New York, and San Francisco, now transformed into a successful pop-up touring show.

Tok Thompson

was born and raised in rural Alaska and is currently Professor (Teaching) of Anthropology and Communication at the University of Southern California. His research interests include mythology, posthumanism, and indigenous language revitalizations. He is the author of two recent books, *Posthuman Folklore* and *The Truth of Myth* (with Gregory Schrempp), former editor of *Western Folklore*, co-founder and former editor of *Cultural Analysis*, and current editor of the Oxford University Press book series World Mythology in Theory and Everyday Life.

Miró Ingmar Tiebe, alias MIRUEL

is a Hamburg-based illustrator, art director, and visual artist. He is currently studying his Master of Arts at the Hamburg University of Applied Sciences (HAW). In his work he combines different types of styles to create his own way of interpreting the illustration. He works with influences from Artdecor, futuristic elements from the psychedelic movements of the 1980s, and contemporary pop culture from the World Wide Web. He also combines these compositions with type designs he invented himself and brings them into a graphic context.

Viktor Timofeev

(b.1984, Riga, Latvia) is currently living and working in New York. Timofeev has recently had solo exhibitions at MX Gallery in New York, Karlin Studios / Futura in Prague, Kim? Contemporary Art Center in Riga, and Alyssa Davis Gallery in New York. Group exhibitions have included the 14th Baltic Triennial at CAC, Vilnius, the Latvian National Museum of Art in Riga, Den Frie in Copenhagen, Stroom Den Haag in The Hague, and Bozar in Brussels. Timofeev is the co-founder of No Moon, an event space co-run with nihiti, and is the host of *Sibling Gardens*, a bi-monthly radio program on Montez Press Radio.

Natasha Tontey

is an artist based in Yogyakarta. She is interested in exploring the concept of fiction as a method of speculative thinking. Her works have been shown at Transmediale (Berlin, 2021), Asian Film Archive (Singapore, 2021), Kyoto Experiment (2021), Other Futures: Multispecies Experiment (Amsterdam, 2019). In 2020 she received the HASH Award 2020 by ZKM | Karlsruhe and Akademie Schloss-Solitude and Performance Space Microfellowship 2020.

Theo Triantafyllidis

(b.1988, Athens, Greece) is an artist who builds virtual spaces and interfaces for the human body to inhabit them. He creates complex worlds and systems where the virtual and physical merge in uncanny, absurd, and poetic ways. These are manifested as performances, mixed reality experiences, games, and interactive installations. He holds an MFA from UCLA in Design Media Arts, and a Diploma of Architecture from the National Technical University of Athens. He is based in Los Angeles.

Trust

is a new space and platform in Berlin for the circulation of technological utopias, new political concepts, and living theories. Our newsletter shares resources from across our network, including extracts of stories and myths that we understand to be at the core of technological utopias.

Francis Tseng

is a software engineer and lead independent researcher at the Jain Family Institute.

Prodromos Tsiavos

is Head of Digital Development and Innovation at the Onassis Group and a legal and policy counsel for Athena Research Centre and OpenAIRE. He has served as Chair of the Administrative Council of the Greek Industrial Property Organisation (OBI) and has founded the Hellenic Industrial Property Academy. He has over 150 publications and talks on legal and business aspects of e-government, Ethics by Design, open technologies, digital content and IPR, and innovation policy and strategy. Prodromos is Director of the Institute of IPR and Innovation at the European Public Law Organisation and Chair of the Supervisory Board of the European Patent Academy (EPA). He is currently teaching AI Law and Ethics at the National Technical University of Athens and at Athens University of Economics and Business.

Ayatgali Tuleubek

(b.1985, Kazakhstan) lives and works in Oslo. His practice is mostly dealing with questions concerning technology in the broadest sense of the term. He has recently had solo shows at UKS (Oslo), She Will Artspace (Ski, duo collaboration with Michael Rasmussen), and Akershus Kunstsenter (Lillestrom, Norway), among others. His recent group shows include "Part of the Labyrinth" at Gothenburg Biennial, "What if the image is shown next to an historical fact?" at Tenthaus, Oslo, and "Sparebankstiftelsen DNBs stipendutstilling" at Oslo Kunstforening.

Lesia Vasylchenko
is a Kyiv-born artist based in Oslo. Vasylchenko is a co-curator of the artist-run gallery space Podium and a founder of STRUKTURA. Time, a cross-disciplinary initiative for research within the framework of visual arts, media archaeology, literature, and philosophy. She holds a degree in Journalism from the Taras Shevchenko National University of Kyiv, and in Fine Arts from Oslo National Academy of the Arts. Her works have been shown at, among others, Louvre Museum; Haugar Art Museum; Berlin Transnational Queer Underground; The Wrong New Digital Art Biennale.

VOJD
is Marius Rehmet, a Berlin-based artist who works in the creative fields of graphic design and animation. With a special interest in experimental typography, vector-based graphics, and 3D arts he prefers to work for cultural and art projects. He has worked with CTM Festival, SCHIRN Kunsthalle Frankfurt, CRACK Magazine, and many others.

Martin Zeilinger
Austrian researcher and curator, is Senior Lecturer in Computational Arts and Technology at Abertay University, Dundee, Scotland. He focuses on artistic/activist experimentation with emerging technologies. His most recent topical publication is a monograph on AI art, creative agency, and intellectual property issues (meson press, 2021), and he's Co-curator of Vector Festival (Toronto). His research can be found in books such as *Artists Re:Thinking the Blockchain* and journals including *Philosophy & Technology*, *Culture Machine*, and *Media Theory*. https://marjz.net/, https://twitter.com/mrtnzlngr.

Liliia Zemnukhova
is a sociologist, PhD, Research Fellow at the Sociological Institute of the FCTAS RAS and the Center for Science and Technology Studies of the European University at St. Petersburg. Research interests include education and professionalization in IT, socio-technical barriers to digitalization, the use of digital data and methods in the social sciences. Author of academic and popular science articles about technologies and their social effects, she's also co-author of the @WrongTech telegram channel.

Joanna Zylinska
is a writer, artist, and Professor of Media Philosophy and Critical Digital Practice at King's College London. She

is the author of a number of books, including *AI Art: Machine Visions and Warped Dreams* (Open Humanities Press, 2020; open access) and *Nonhuman Photography* (MIT Press, 2017). Her art practice involves experimenting with various kinds of image-based media.

zzyw

is a research collective formed by Yang Wang and Zhenzhen Qi in New York, 2017. It produces software application, installation, and text as instruments to examine the cultural and educational imprints of computation. They were recently technology resident artists at Pioneer Works, center for art and innovation in Redhook, New York, and members of NEW INC, the culture and technology incubator led by the New Museum.

Typical Organization,
designers of this edition

Considering synthetic cognition through the scope of Typography drew us towards Autopoiesis or Automatic Writing methods, that can be described as self-generated, mechanic or automated. In our design for this edition we make reference to early letter machines: In 1876, the American engineer Joseph A. David developed the *Plaque Découpée Universelle*, generally known as the PDU. This universal stencil plate, with its complex unified grid, aimed to auto generate all possible writing symbols. By animating the PDU throughout the pages, we materialised this machine as searching a yet unformulated thought or writing system.

ONASSIS CULTURE

Director of Culture
Afroditi Panagiotakou

Deputy Director of Culture
Dimitris Theodoropoulos

Head of Digital & Innovation
Prodromos Tsiavos

PUBLICATION CREDITS

Publisher
Onassis Foundation

Editors
Ilan Manouach and Anna Engelhardt

Design
Typical Organization and Ella Villaumié

Project Management
Christina Kosmoglou

Translation (Anne-Françoise Schmid's texts)
Ilan Manouach

Editing / Proofreading
Kasia Maciejowska

Production Assistant
Heracles Papatheodorou

Production Management
Delta Pi Productions & Arts Management

Print Management / Color Editing
Yiannis Alexandropoulos

The editors would like to extend special thanks to Bassam El Baroni, Mark Cinkevich, Craig Dworkin, Lawrence Lek, Afroditi Panagiotakou, Heracles Papatheodorou, Konstantinos Sakkas, Sasha Shestakova, Dimitris Theodoropoulos, Prodromos Tsiavos, and Katerina Varda.

The European ARTificial Intelligence Lab is co-funded by the Creative Europe Program of the European Union. This publication reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

AI LAB
European ARTificial Intelligence Lab

Co-funded by the Creative Europe Programme of the European Union

ISBN 978-618-85928-5-8

!Mediengruppe Bitnik, 00Zhang, AA Cavia, Bassam Al-Sabah, K Allado-McDowell, Jamie Allen, Alexandra Anikina, Clemens Apprich, Sadie-Mae Arellano AKA ex.icon, Cris Argüelles, Marwa Azelmat, Olivia Banner, Medina Bazargali, Katherine Behar, Olga Boichak, Liliana Bounegru, Antoine Bousquet, Tega Brain, Vera Bühlmann, Mercedes Bunz, Louise Emily Carver, Guo Cheng, Imani Cooper Mkandawire, Matt Colquhoun, Juan Covelli, Florian Cramer, Laurent de Sutter, José Luis de Vicente, Stephanie Dinkins, Ezekiel Dixon-Román, Sean Dockray, Theodora Dryer, Mathew Dryhurst, Nick Dyer-Witheford, Grayson Earle, Diane Edwards, Paul N. Edwards, eeefff, Hasan Elahi, Fantastic little splash, fields harrington, Kaley Flowers, Fragmentin, Laura Forlano, Agata Foryciarz, Michele Gabriele, Pietro Gagliano, Alexandre Gefen, Anastasis Germanidis, Steve Goodman, Olga Goriunova, Anna Greenspan, Sam Gregory, Rafael Grohmann, Eran Hadas, Orit Halpern, Felicity Hammond, Rian Ciela Hammond, Lelia Marie Hampton, Stephanie Hankey, Adam Harvey, Florian Hecker, Line Henriksen, Holly Herndon, Louise Hickman, Joey Holder, Amy Ireland, Özgün Eylül İşcen, Natalia Janula, Adan Jerreat-Poole, Julia Kaganskiy, Christopher Kardambikis, Stella Andrada Kasdovasili, Elaine Kasket, Botond Keresztesi, Os Keyes, Kite aka Suzanne Kite, Anastasya Kizilova, Bogna Konior, Jakob Kudsk Steensen, Chloê Langford, Lawrence Lek, Laura Lotti, Geert Lovink, Mattin, Robin Mackay, Umber Majeed, Kumbirai Makumbe, Suhail Malik, Christina Maraboutaki, Gena Marvin, Gabriel Massan, Svitlana Matviyenko, Isabel Millar, Constantinos Miltiadis, An Xiao Mina, Thomas Moynihan, Alejandra Muñoz, Nina Muro, Mycological Twist, Reza Negarestani, Mihalis A. Nicolaou, Simone C. Niquille, Bahar Noorizadeh, Rodrigo Ochigame, Omsk Social Club, Bianka Oravecz, Yannis Panagakis, Eva Papamargariti, Luciana Parisi, Oana Pârvan, Victoria Pacheco, Philippe Pasquier, Porpentine Charity Heartscape, Luiza Prado de O. Martins, PWR, Oleksiy Radynski, Patricia Reed, Kalli Retzepi, Tabita Rezaire, Jennifer Rhee, Miro Roman, Emily Rosamond, Rachel Rossin, Bassem Saad, Anne-Françoise Schmid, Pete Sharp, Yannis Siglidis, Caroline Sinders, Lex Sokolin, James Steinhoff, Abram Stern (aphid), Jenna Sutela, Tok Thompson, Miró Ingmar Tiebe, Viktor Timofeev, Natasha Tontey, Theo Triantafyllidis, Trust, Francis Tseng, Prodromos Tsiavos, Ayatgali Tuleubek, Marek Tuszynski, Lesia Vasylchenko, VOJD, Martin Zeilinger, Liliia Zemnukhova, Joanna Zylinska, zzyw.

9 786188 592858