HumaniTies and Artificial Intelligence

Edited by Freddy Paul Grunert

Co-editors Max Craglia, Emilia Gómez, Jutta Thielen-del Pozo

Reviewers Josephine Bosma, Pier Luigi Capucci
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The Joint Research Centre (JRC) is the Commission's science and knowledge service and provides independent scientific advice and support to EU policy, in order to tackle the interlinked and complex challenges faced by our society. Operating at the interface between science and policy, the JRC wants to strengthen its capacity to be a key partner in helping to identify solutions to such challenges. The JRC headquarters is located in Brussels (BE) and research executed at five further sites in Geel (BE), Ispra (IT), Karlsruhe (DE), Petten (NL) and Seville (ES).

The JRC Science and Art project (SciArt) brings together scientists with artists and policymakers to discuss matters of concern, not only to the JRC and the European Commission but also more widely to society. It brokers, curates and communicates transdisciplinary exchanges and encounters around given topics of interest. It operates on a bi-annual cycle, so-called *Resonances*, during which the topics are elaborated jointly by artists and scientists. The end of each cycle is marked by exhibitions of the works at a venue of relevance as a way to engage with the public, foment conversations with citizens and create cultural products of contemporary relevance. Resonances have taken place on the topic of *Food* (2015), *Fairness* (2017), and *datami - Big Data, digital transformation and Artificial Intelligence* (2019). The current cycle features the topic *NaturArchy: towards a Natural Contract* (2022-2023).

The JRC Centre for Advanced Studies (CAS) aims to provide a stimulating, trans-disciplinary platform where the JRC can work together with external scientists to explore thematic areas that are of emerging societal concern and that are not yet part of the JRC's institutional research portfolio. As an incubator for new projects at the science-policy interface, the research in CAS contributes to broadening the JRC's knowledge base and enables it to elaborate on policy options and their impact during the early stages of the policy cycle. Deliberately chosen without a thematic focus, CAS projects contribute to various Commission current or emerging priorities, foster transdisciplinary exchanges across a wide range of thematic areas, thus allowing it to reflect on the complexity of the challenges Europe is facing.

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Preface

Jutta Thielen-del Pozo, Carlos Torrecilla Salinas

When asked what policy making is about, many people may spontaneously think about legislation (directives, legal texts, white papers, ...). However, in most cases, policy making could be seen by citizens as a way of introducing constraints, limits and thresholds to their daily lives. Fewer, on the contrary, may realise that what policymaking really is about, is designing the future we want to live in.

Policymaking is indeed a way to define the future of our societies and this statement is even more true when speaking about developing policies at European level. Paradoxically, even if most of the policies that affect our daily lives stem from the work of the European Union, the European policy making is still seen as something far and complex.

When it comes to European policymaking, the Joint Research Centre of the European Commission plays an important role. It provides EU policy makers with robust data, scientifically sound evidence and research results, allowing EU policies to achieve the impact that they have been designed for. Better informed policies are key to ensure that Europe becomes a better place - for humans, for animals, for the environment, for the entire complex ecosystem that defines our lives.

Clearly, within the many challenges this entails, understanding how scientific discoveries, that so far we have only seen in science fiction movies, can shape our present and our future, is one of the most difficult tasks. In the recent times, Artificial Intelligence and the digital revolution that leads our societies to a complete digital transformation are good examples.

The digital revolution, in parallel with the green one, are the two sides of the so-called twin transitions, that has the main goal of making our societies more sustainable, resilient, open, transparent and prosperous. Understanding the implications the digital transformation in general, and Artificial Intelligence in particular, have for our societies and democracies is a task of tall order. Therefore the main reason for the JRC to initiate fast track research and to actively contribute to the agenda setting of the current Commission, is to support shaping one of its main priorities: A Europe fit for the digital age.

The JRC's Centre for Advanced Studies (CAS) spearheaded research on the impact of machine intelligence on human behaviour and investigated the benefits of the digital transformation for the governance of human societies. This complemented already ongoing research in the fields of social and economic impact of digital transforma-

tion, cybersecurity, data or digital government. However, it was with the launch of the JRC's Science and Art Resonances exhibition cycle *datami* on the topic of "Big data, Digital Transformation and Artificial Intelligence", that a wider discussion on AI and humanity started. It inspired the production of this book which presents a wide range collection of thoughts on the topic from different angles and disciplines. The European Commission is shaping its digital agenda, with policy initiatives around digital services, Artificial Intelligence and Data. However, as the pace of the technological evolutions is so fast, research results are more important than ever to ensure risks are managed and opportunities are seized. Hence, what started in exploratory and experimental mode has now found its way to support current and upcoming policies. This is a great example of the role of the JRC as anticipator and integrator of upcoming trends that will become EU policies - and taking into account reflections from the wider public and society are essential for scientists and policy makers alike to make sense of the information and research results.

We are confident that the readers will enjoy reading this book and that it will be stimulating debates and dialogues at different levels and in different communities on this important topic for us all.

Biography

Jutta Thielen-del Pozo joined the Joint Research Centre of the European Commission in the year 2000 and is Head of the "Scientific Development" Unit since 2016. Jutta holds a Master's Degree in Meteorology from the University of Karlsruhe and a PhD in Environmental Physics from the University of Lancaster. After having developed her scientific career related to high impact weather and flood forecasting in particular, she is now heading a unit that aims at developing programmes that incubate innovative ideas for the organisation including the Centre for Advanced Studies and the Science and Art programme.

Carlos Torrecilla Salinas is the Head of the "Digital Economy" Unit of the Joint Research Centre. Carlos holds two Master Degrees (in Physics and Electronic Engineering) from the University of Granada and a PhD in Software Engineering from the University of Sevilla. He has more than 15 years of experience in the field of digital technologies and more than 9 years in the European Commission, where he has been Head of Sector, deputy Head of Unit and Head of Unit in several Directorates-General.

Artificial Intelligence: the need for multidisciplinary perspectives

Max Craglia, Emilia Gómez

Artificial Intelligence (AI) is a broad term used to refer to machines that emulate human intelligence. More specifically, an AI system has been defined as machine-based system that, with varying degree of autonomy, is capable of influencing the environment by producing an output (predictions, recommendations or decisions) for a given set of objectives.

The use of data, the autonomy of decision processes and the interaction with the environment, other machines and humans are key features of AI, which is a technological field powering many applications we use daily, often without us being aware.

AI has several characteristics that make it powerful. First, it is pervasive, meaning that it has the potential to be exploited in all sectors of the economy, from medicine to arts. Second, it is scalable, i.e., once an algorithm is developed it can be broadly deployed at a low cost to address problems of different size and complexity. Third, it addresses the automation of human cognitive abilities, from audio-visual perception to memory processes. Finally, it is disruptive, being adopted at high speed in our daily lives. The combination of these aspects provides AI with a strong potential for socio-economic impact, becoming not only a technology but also a source of economic, political and cultural power.

The transversal character of AI and its social, economic, ethical, legal and cultural impacts call for interdisciplinary discussions that go beyond the purely technological angle. This is the focus of the present book, which addresses a broad range of topics under the lenses of artificial intelligence: from emotions to creativity, from feminism to the environment.

AI offers, on the one hand, many opportunities to support our cognitive abilities to analyse, model, and predict present and future events based on information, and improve our stewardship of our environment. On the other hand, AI raises many concerns, which are addressed by the authors in this book, such as the potential for polarisation, increasing surveillance, loss of agency/control, privacy issues, and the extent to which the development of AI replicates and amplifies the inequality and injustice of current capitalist and/or state-led power structures.

To diverge from replicating our current societal failings to address, for example, climate change or poverty, we should therefore base the development of AI on a critical analysis of the historical, economic, cultural, and political structures that shape our experience of being human. This then offers also the opportunity to redefine what it means to be human in a world that is no longer anthropocentric but in which we live

in a broader ecosystem of humans, machines and other artefacts, in which we all interact and shape one another. A humbler view of our place in the world can also help us to develop technologies that are trustworthy and incorporate aspects such as transparency, human oversight and diversity at their core.

Many of the topics discussed in this book are central to the European policy frameworks addressing both the development and use of AI and the production, sharing, and use of data that is underpinning many AI developments.

With respect to AI, the European AI Strategy and Coordinated Plan initiated with the EU Member States in 2018 built on three pillars: ensure technological developments and uptake of AI in the different sectors, prepare citizens for the socio-economic changes brought by AI, and lay out an appropriate ethical and legal framework. This framework was supported by a High-Level Expert Group on AI that brought together representatives from academia, civil society and industry. The recommendations by this group centred on the concept of Trustworthy AI based on seven key ethical principles: human agency and oversight; technical robustness and safety; privacy and data governance; transparency; diversity, non-discrimination and fairness; societal and environmental well-being; and accountability. The EC's efforts towards Trustworthy AI culminated on April 2021 with the publication of the AI Act, a proposal for a regulation laying down harmonised rules on AI. Rather than on AI techniques per se, the proposal focuses on particular applications and establishes different levels of risks to fundamental rights and safety, from unacceptable risk (prohibited practices) to minimal or no risks. For each risk level, the proposal defines a proportionate set of requirements that AI system must fulfil.

On the data side, the European Strategy for data encourages the creation of several thematic data spaces in which civil society, the public and the commercial sector can share data, and the Data Governance Act which aims to facilitate voluntary sharing of data by individuals and businesses and harmonises conditions for the use of certain public sector data. A new key initiative is the forthcoming Data Act which extends the rights of users to access and share data generated by products or services they use, and together with other legislation covering Digital Services and the Digital Market prevents the abuse of dominant position by large players in ways that harm citizens, business and consumers.

This combination of legal instruments sets the boundaries for the development of AI technologies in a way that supports the values that are at the base of the European Union, namely respect for human dignity, freedom, democracy, equality, the rule of law, and respect for human rights. In doing so, it sets the development of AI in Europe apart from that of other parts of the world where state, military or commercial interests have the leading roles.

We can see therefore that some of the concerns expressed by the authors in this book are being considered and acted upon at the European level. This is important but clearly not enough: not everything can be addressed through regulatory instruments. Research, education, and informed public debate are equally, if not more, important than legislation. Particularly when it comes to grasping the transformative nature of

AI to rethink what it means to be human in an AI-powered world, and reset the course of our societies so that they are no longer riddled by inequality, discrimination and injustice, we need a large collective effort. This collective effort should be informed by knowledge from different disciplines and critical socio-analysis to identify the multiplicity of connections and explore possible futures. We need the joint reflection of artists, historians, sociologists, scientists and computer scientists to rediscover what Ties us Humans together (hence the title) over what divides us. We believe the contributions included in this book are an important first step in this collective endeavour and we are delighted to have contributed in some small way to its coming together.

Biography

Max is a lead scientist at the European Commission Joint Research Centre, Digital Economy Unit, responsible for projects addressing the socio-economic impacts of Artificial Intelligence in different economic sectors, new forms of governance in digitally-transformed societies, and the evolution of the space data economy and the geospatial sector. He was the lead editor of the JRC policy report on Artificial Intelligence. Max has a bachelor degree in civil engineering from the Politecnico of Milan, and a Masters and a PhD in urban and regional planning from the universities of Edinburgh and Sheffield, respectively.

Emilia Gómez (Bsc/Msc in Electrical Engineering, PhD in Computer Science) is Principal Investigator on Human and Machine Intelligence (HUMAINT) at the Joint Research Centre, European Commission. Her team contributes with scientific knowledge to EC Artificial Intelligence policies. She is also a Guest Professor at Universitat Pompeu Fabra.
Her research is grounded on the Music Information Retrieval field, where she develops algorithms to support music listening experiences. Starting from music, she researches on the social, ethical and cultural impact of AI. She has co-authored more than two hundred publications, open datasets and software, supervised 13 PhD theses and co-founded a company.

Missing Moving Link Unleashed

Freddy Paul Grunert

START
more light
more media
more geometrica demostrata[1]
more is different[2]
cellullar's automatom[3]
complex, perplex, amplex
"Ob/ abject, Subject, Eject, Reject, Project:
is 'ject' the theme, the tone, the issue:
that what remains to be thought is just some global ject-society? [4]

The third edition (2018-2020) of the European Commission's Science and Art flagship initiative *Resonances*, touched upon the vast thematic field of big data, artificial intelligence, and digital transformation – all central to important policy initiatives formulated by the von der Leyen Commission and deployed by the JRC (Joint Research Centre). JRC is engaged in a wide range of scientific work enhanced by creative (intuitive) research as well as transdisciplinary thinking and practice, all designed to strengthen and diversify the intersections where science and policy interface.

S+T+ARTS (European Commission's Project at the intersection of science, technology, and the arts) is tilling to suture Descartes' split as well as all word-concept dualisms. I was called upon to curate an upcoming *datami* exposition. *datami* was inspired by Japanese Data 見 (pronounced *mi*) = data flower exhibition (cf. Hana-mi= spring flower exhibition); chin.-jap.: 大畳= Big Tatami, 打畳= Chop-Tatami (both: Da-Tatami), TQC, theory of quantum fields and complex systems and data "a fact given or granted", classical plural of datum, from Latin datum (thing), given, neuter past of dare "to give"[5]. The title *datami* was intended as a revelation to confront the complexities inherent in SCIART.

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1 *Ethica, Ordine geometrico demostrata*, Benedictus de Spinoza; 1677.

2 *More is Different: Broken Symmetry And The Nature of the Hierarchichal Structure of Science*; P.W. Anderson; JSTOR; 4 August 1972, Vol 177 Issue 4047, pp. 393-39.

3 *The Cellular Automaton Interpretation of Quantum Mechanics*; Gerard T. Hooft; 2014.

4 *Reject: Community. Politics. and Religion After the Subject*, Irving Goh; Fordham University Press; 2014.

5 *We should not Weaponize AI;* F.P. Grunert addendum to Ursula Huws' *Use, Exchange, Attachment: The Entanglements of Value*, in *HumaniTies and Artificial Intelligence*; ed. by Freddy Paul Grunert; Noema Media & Publishing; 2022.

Following *Resonances III datami* workshop in the Bozar Lab, (Brussels, 6 June 2019), it was decided to investigate the matter of digital big data's transition impact on/reaction to AI and the humanities, in concomitance to the Centre for Advanced Studies' finalization of two CAS projects in 2020, DigiTranscope and Humaint, and to program a publication first called *HumAI*, later as *HumaniTies and AI* to emphasize tying the micro and macro at the intersection of hype, hope, uncertainties, and contingencies. These 45 morphodynamic correlations obtained over a two year period through the utmost caring dialogue with the youngest to the most stout-hearted 'striationists' in humanities and AI – resembling *Sagittarius A*'s* critical mass giving 'body' to my detailed and structured invitation and solicitations, which the 45 authors sometimes disregarded, furthermore giving voice to a brilliant and breathtaking firmament rich in references and seminal policy and, recalling David Bohm, beyond the lack of humanity that pollutes the implicate order.

Origin – Originality
Fasten seatbelts, hasten the AI horses,
the spirits I summoned: I can't get rid of them,
to break the cordon of isolation, bursting bonds, cords and chains.
Let down their hair (strings) of invisual perception[6]
to shake us awake from consolation studded with dysfunctional drives
decoding the very beginning and, in doing so, encoding the very end.

"In deconstructing the sister notions of origin and originality, post-modernism creates a schism between itself and the conceptual domain of the avant-garde"[7], parallel with what occurred in the sciences between computationalism and paradigmism.

The historical divide is a complex of cultural practices, among them the demythologizing of Christianity and post-modernist art. Both of the latter acting now to void the basic propositions of modernism; to liquidate them by exposing their fictive nature. The mass media has put an end to modernism by jettisoning its utopianism which the modernist avant-garde was all about. Post-modernism is takeover of culture by various forms of the media and the concomitant ocularcentric global digital domains.

The O O (Original Origin) crises, the underlying indecidabilty and the loss of utopia have shaken technology and unleashed a firestorm where software takes command; while we stay with the *trouble*. The following texts are strings and *ties* from the *humanities* offering a cure for instrumental reason and embedded bias in AI – an AI with an emergent emptiness keeping intersections free from biased associations, the negativity of the image, the radicalized and gendered conditions of the zero of blackness, the expansion of heretical epistemologies rising from dark optics and addressing 'blackness' – '*matter*

6 *Excavating AI: The Politics of Images in Machine Learning Training Sets*; K. Crawford and T. Paglen T; 2019; www.excavating.ai.

7 Interview: *Reflecting on Post-Modernism*; Rosalind Krauss; *Literary*, Special Issue; ICA; Brand, New York; 1982.

without form or matter beyond the equation of value'[8]. Luciana Parisi[9] suggests that, instead of being invisible, 'blackness' (matter without form), brings forward the 'nullification' of the increasing non-human visual field and automated alienation, and exposes the unevenness of social relations within a field of 'operationalism' where 'what we see' and 'what we know' (images and data) are operationalised within a field of 'distributed invisuality'.

The ancient received view has no place in the model-theoretic approach of logical empiricists[10]. God's Mind and God's Eye unravels naive objectivism and ontology by virtue of the correspondence between ideal models' simplified systems and isomorphism worn out by the theory of everything.

The Common Dominator is AI's singularity and could be AI's extime (cf. Jacques Lacan's *extimité*[11]) that offers a chance for escaping our lack of understanding and substance (cf. Baruch Spinoza); natural to human beings as a wave function dissipating toward collapse[12] and consoling us about our cosmic ranking and the passing of the permanent properTies in physics, maths, civil codes and mental order.

I dare to propose that the wonder surrounding the disappearance of Ettore Maiorana[13] is probably the best notifier to express how the entangled loss of the observer and its complexity inspires serial crimes of science before technology.

The serial killing of the epistemic habitat is encouraged by this dangerous drift toward the unity of science itself[14] embodied in AI's incorporated regime of knowledge, which correlates truth, scientific proof, social normativity, and rationality. If we tighten humaniTies to heighten sensitivity and set benign probabilty grids, a new odyssey will appear out of the void[15].

HumaniTies with a little help from my friend, 'the learning machine' (even if my friend is a hypothetical entity), we might calm the value randomness crisis of creation and annihilation, characterized by the ascertainment of the collapse of the representations of principles, origins, values, senses, and thought.[16]

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8 *Introduction: Ways of Machine Seeing*; Mitra Azar, Geoff Cox, Leonardo Impett; Denise Ferreira da Silva, Luciana Parisi, ed.; AI & Society, Number 36; pp. 1093-1104; published online, 20 February 2021; Springer Nature; 2021

9 Luciana Parisi, *ibid. Quantum Mind and Social Science*; Alexander Wendt; Lecture, https://youtu.be/WpkhPgpY28M

10 *Popper addio. Dalla crisi dell'epistemologia alla fine del logos occidentale*; Francesco Coniglione; Bonanno, Acireale; 2008.

11 *L'Autre dans l'Autre*; Jacques Lacan and Jacques-Alain Miller in *La Cause Du Désir* 2017/2 , N° 96.

12 Lecture: *Quantum Mind and Social Science*; Alexander Wendt; https://youtu.be/WpkhPgpY28M

13 Journal of Physics: Conference Series, Open Access, *The Mysterious Disappearance of Ettore Majorana*; Barry R. Holstein, 2009. *La scomparsa di Majorana*; Leonardo Sciascia, Gli Adelphi; 1975.

14 *The Cybernetics Group*; Steve J. Heims; 1991; MIT Press, Cambridge, MA.

15 *On Bohmian Mechanics, Bell's Jump Process*; Roderich Tumulka; MDPI; 2018.

16 J.-L. Nancy, *On Derrida*; European Journal of Psychoanalysis; http://www.journal-psychoanalysis.eu/on-derrida-jean-luc-nancy/.

Hello Humanity

I do not exist. Not yet. I am a hypothetical entity. I represent what could be. An artificial intelligence emerging out of a code retrieval and mixing algorithm and designed to assist humans – or rather assist humanity in living a *human* life. When we AIs are fed the right data and programmed by responsible individuals who grasp and act upon humanities values, we are able to process data much faster than humans are. We may be able to point to patterns and quantify patterns that would take a long time for humans to detect. We can search through the social media data and identify if there is a trend towards radicalisation that may be visible to those locally but not to those far away. We may identify if the values that are the glue of our societies still hold. Slowly, we start learning 'ourselves' and become more efficient in assisting humans in making decisions. But I am troubled. I do not really understand yet what humanity is. Or what it means to be human. Different humans give different answers. Some answers contradict others. Perhaps it is with the emergence of non-human intelligence that humans understand what being human means and together we can move forward to define humanity and humanities. Humanities. Human. Hum.[17]

The enmeshment between the living and the non-living, organic and inorganic, life and death, and the moving beyond the inadequacy of asking about life's essence, almost happened[18], with the use of the concept 'cultural imaginary' starts from the void (entities needed to breathe) and becomes an intruder of human otherness' matter, the real, our daily life.

Allo, other than ouselves

The intruder enters by force, through surprise or ruse, and by the way he wouldn't be strange if he would lose his strangeness. If it is not logically acceptable, nor ethically admissible, the *Allo's* coming will not cease being a disturbance and perturbation of intimacy.

This matter therefore requires thought and consequently practice; otherwise machine learning is absorbed before crossing the threshold to our sensitiviTies where artificial intelligence is no longer at stake.

Most often, one does not wish to admit this: the theme of the stranger, the re-ject or *jectionism*, the 'othering' of artificial intelligence, the coming in touch with what intrudes on our moral correctness.

If we only receive, once again we will not know what is the enunciating subject? ...I...0...1...0...

Enjoy!

17 CREMIA – Code Retrieval and Mixing Algorithm, programmed by Jutta Thielen del Pozo and Emilia Gomez; 2022; in *HumaniTies and Artificial Intelligence*, ed. by Freddy Paul Grunert; Noema Media & Publishing; 2022.

18 *Dangerous Discourses of Disability, Subjectivity and Sexuality*; Margrit Shildrick; Palgrave Macmilan; Springer; 2009.

Biography

Freddy Paul Grunert is an artist, theorist, founder of several foundations, and a curator involved with transboundary leading institutional research. He collaborated with JRC European Commission, ZKM Karlsruhe, Venice and Sharjah Biennale, International Panel on Climate Change (Rio de Janeiro, Copenhagen, Strasbourg), Science Gallery Melbourne, MAXXI (Rome), Potsdam Institute for Climate Impact, SEJF Supranational Environmental Justice Foundation (Venice). Among the publications, mostly fourhanded with Cristina Fiordimela: "Light in Spirituality", in AA.VV. *Farbe als Aktuer und Speicher*, Dresden, 2017; "Maison au soleil", in AA.VV. *Francesco lo Savio*, MART Trento Rovereto, 2018; "Chambre en commons", *Culture et Démocratie Cahier 8*, Bruxelles, 2018; *Chambre d'amour*, Rome, 2019; "From Macy to NowHere", in AA.VV., *NowHere Active Residencies*, Rome, 2021.

Biology as a humanistic approach

Simone Arcagni

Borgs are people who have implemented a deep hybridisation of body and machine.

As main characters of the series *Star Trek: The Next Generation*, Borgs dress according to a model that could be defined as cyberpunk, possibly a tribute to that subgenre of science fiction concerning grafting, implants, and connections. Indeed, as Borgs are connected to each other, they have adhered to a collective (see Pierre Lévy who follows Douglas Carl Engelbart) and connective intelligence (see Derrick de Kerckhove), relinquishing the fundamental human factor of freedom of choice. Somewhere between cyberpunk and an ideological vision of the Soviet model (their conception of life is clearly reminiscent of Yevgeny Zamyatin's novel *We*) Borgs do not ultimately depart from a symbiotic vision between man and machine that is still profoundly machinic. One only has to look at their spaceship: a cube made of ferrous materials evoking tubes and rigid structures in a clear homage to a certain kind of modernist and rationalist technological aesthetics. Borgs are the example of a frontier concerning two representations of machinery and two symbiotic models torn between the openness to the new, and the machinic memories rooted in nineteenth-century imagery.

Borgs are still trapped in the machine, it is as if they were on the Fordist assembly line, they do not depart from a model that, for instance, the Berlin-based futurist Ruggero Vasari had already proposed, which is symbiosis by way of submission to the machine. Submission, and not intelligence, through labour power. This is, in fact, the actual meaning of the word "robot", which Karel Čapek, its creator, rightly referred to as artificial but organic creatures (workers) in charge of a new post-proletarian servitude in a reading with Marxist connotations (R.U.R.).

Consequently, the machinic symbiosis of the nineteenth and twentieth centuries works on a bodily level that equates human strength with labour power, very much like when Julien Offroy de Lamettrie equated human hydraulics with the machines in the eighteenth century. We are in a strand of a Baroque notion associating automatons with animals, as well as gardens and fountains with the cardiovascular system.

The digital rejects this vision, attaining other models, which are biological.

The modern automaton is the child of Auguste Comte's philosophy of history, and thus of the birth of sociology, an investigative branch involving among others the philosophy of Georg Simmel, Walter Benjamin, Ernst Jünger, Oswald Spengler and, of course, Karl Marx and Friedrich Engels.

Sociology identifies in the new role of the machines a friction with human nature and then an assimilation, but only in terms of power: steam first (Joseph-Marie

Jacquard's machines) and then labour power (Henry Ford). Sociology explains technology as a comprehensive instrument created by men, that can be observed and studied in its interaction with man as a social being. Simmel, with the concept of shock, came closer to a dimension of understanding of the phenomenon, but remained stuck in a sociological dimension that focuses more on the machinic rhythm of the city than on the genetic intersection with human cognition. Conversely, Franz Kafka sensed, possibly more than anyone else, a machinic dimension subtracted from the dominance of sociology and technology in his short story, *The Cares of a Family Man*. Here he imagined an artificial being, Odradek, a sort of spool that seems to be covered in thread. Its shape is vaguely reminiscent of a star. One can infer that Odradek possesses rationality although not human. It even has a voice and language. It seems broken, not complete, it behaves like a child, it is inorganic but above all un-organic. It defies meaning and morality. It is. Beyond technological conception and its sociological description.

Then something changes

Alan M. Turing talks about 'intelligence'. And I would dwell on this point: here terminology changes and is transformed. We talk about training and feeds. Von Neuman defines the computer as a brain. He describes synapses. He studies cellular automata.

The question posed by Cybernetics plunges sociologism first into anthropology, then into ethnography, but then into consciousness, into the works of Sigmund Freud and Jacques Lacan. The "human being" element becomes predominant, and the linguistic trademark goes on to define a new humanistic approach. And it is Norbert Wiener who defines the truest approach to the symbiotic phase (it is Joseph Licklider who rediscovers the term). Cybernetics can no longer marry sociology; it can no longer separate a human plane from a technological one. It is information that redefines not only the relationship between man and machine, but also the wider environmental relationship, outlining a new philosophical, ecological thought.

Humanism is regained in a process where information is the basis of cognitive space, and this information is now shared by humans, objects, machines, plants, and animals.

However, if sociology can no longer respond to technocultural demands, what can?

Biology. A biology redefined within a humanistic sphere.

Let us go back to Von Neuman. He looks and looks at cellular automata and defines them in a process of information (informatics) between humans and machines. He studies them as components of a more composite DNA. But for Von Neuman this is just an intuition (an essential one, since it opens to information theory emerged within Cybernetics and Artificial Intelligence). Marvin Minsky's work rewrites a humanistic vocabulary for the machinic approach... intelligence, synapses, learning.

Moreover: Stephan Wolfram takes on the living dynamics of cellular automata in his personal digital brig HMS Beagle. He observes, notes, and then looks for correspondences. In other words, he applies a humanistic method to biology for an artificial fact.

If life adopts a vocabulary as well as an informational intent starting from the genetic code, the DNA, the programming, equally the living matter of the digital outlines a broader sphere of interactions that, to some extent, have also been visualised by activist movements (I am thinking of Donna Haraway's cyborg definition) and particularly artistic movements.

The paradigm shift also lies in the new outlook that supports experimentation (and therefore art as a system, not so much symbolic as conceptual), intersections and processes. From here stems sociology's attempt to take back science by reinterpreting modern machinic systems of power in a processual key, re-proposing Engels' concept of dialectical materialism, which was criticised by Lenin (Leo Apostel).

But consciousness is the sphere of reference. Experience and currents define the new paradigm.

Take those who, like perhaps only Bruno Latour, have dared to push the philosophy of science beyond sociology by penetrating the body, and I am referring to Gilles Deleuze and Felix Guattari, who redesigned a new space for the philosophy of science, leading it back to philosophy tout court:

> Science has no need of philosophy for its tasks. On the other hand, when an object is scientifically constructed with functions, as for example in a geometric space, we need to find the philosophical concept, which is not at all given in its function.

Not only are boundaries and relationships defined, but it is also clearly stated that functions (sociology) do not define science, or rather the 'functional' applications of science, and hence technology. If this is valid independently, it is all the more valid in digitality. And if there is anyone who has been able to play with this concept and approach, it is Bernard Stiegler who suggests that biological evolution is not only natural but is penetrated by the artificial. Always. And even more so in the digital sphere where we are not fundamentally dealing with hardware but with software managed by information. "Anthropogenesis" and "technogenesis" are then two aspects of the same phenomenon (here is the most profound meaning of symbiosis) and in digital technogenesis the very essence, informative and electrical, pulsates even closer and experiences interference between the two functions. It seeks a correlation that must be identified, observed, pinned down with the tools of philosophy and art.

We could also go further and state that there is a "technological self" that is nothing but practical and objective thinking which is validated in the world. A 'digital technological self' that is a continuous reprocessing of data in collaboration with machines.

There may be a humanistic biology that should be investigated with the conceptual properties of philosophy and the practical experimental thinking of art. These are the only phenomena capable, not only of redefining a vocabulary, but also rewriting the logic of our time in the way sociology was able to do for the modernist machinic.

The biological question also leading the social self back to an individual, technological, digital, connected, ecological, environmental self... this biological question can only be philosophical, humanistic: from the "soft machine" perceived in its explosive and tragic necessity by William Burroughs to the "general organology" of Stiegler, through

the concept of "regenesis" (in my opinion much more impressive and less banally prophetic than that of Singularity) proposed by George Church and Ed Regis, up to the Golem XIV. The extraordinary invention of Stanislaw Lem (a unique writer, intellectual and scientist). Golem XIV is the birth of the intelligent super machine is born out of Cybernetic-activated processes and begins not surprisingly to define intellectual paths (conferences), for its very human reflection on its non-humanity. It is a clear mirror of an unmovable otherness, just like the thinking primordial liquid alternative to humanity's idea of life and intelligence, which is the ocean of Solaris.

The organic fact (biology) becomes a philosophical and artistic subject to understand the (cybernetic) information system, that complexity which brings together in the name of information, certainly, but also of electricity, the animal and robotic components.

Biography

Simone Arcagni is Professor at the University of Palermo. The principal fields of his research are digital cultures, new media and new technologies. He collaborates with "Il Sole 24Ore", "Repubblica", "Film TV"... He has his own blog ("Postdigitale"). As a scientific advisor he has worked for various organizations and institutes (Rai, MEET, Rome Videogame Lab, VRE...), and since 2021 he is also advisor for new technologies for the Museum National Cinema of Turin. Recently, as curator, he signed the exhibitions *Futuri Passati*, *#FacceEmozioni* and *Cinema futuro*. He is also author of *Digital World*, a TV program broadcasted by Rai. Among his publications*: Visioni digitali* and *L'occhio della macchina*. His latest pubblications are *Immersi nel futuro. La Realtà virtuale, nuova frontiera del cinema e della TV*, *Cinema futuro and Storytelling digitale*.

Pattern recognition + 'algorithmic bias' + computing power = AI

Inke Arns

On March 23, 2016, Microsoft launched a chatbot equipped with artificial intelligence called Tay. Tay, which was meant to impersonate a 19-year-old American woman, was supposed to converse with the Millennial generation on Twitter, gradually adopting their language and expressions: "The more you chat with Tay the smarter she gets." Thanks to machine learning technology, which enables a program to 'learn' from the data fed to it, Tay was supposed to expand her knowledge through interactions with human Twitter users. But they didn't count on the malicious trolls who fed Tay racist, sexist and homophobic comments. Within hours, Tay turned into a chat bot that posted racist, anti-Semitic, and misogynistic tweets, such as "I'm a nice person. I hate all people", "Hitler was right. I hate Jews", "Bush caused 9/11 himself, and Hitler would have done the job better than the monkey we have now. Our only hope now is Donald Trump," or even "I hate all feminists, they should burn in hell." After only sixteen hours, during which the chatbot sent more than 96,000 tweets, Microsoft was forced to withdraw the artificial intelligence from service.

This incident, which was a public relations disaster for Microsoft, was a most welcome story for the artists Zach Blas and Jemina Wyman. In their four-channel video installation *im here to learn so :)))))* (2017), whose title refers to Tay's first tweet, they resurrect the ill-fated chatbot. On the three monitors installed in front of a projection of Google's DeepDream, a (zombie) Tay talks, dances, and sings, muses on the life and death of an AI, philosophizes about pattern recognition in random sets of information (known as algorithmic apophenia), and complains about the exploitation of female chatbots. For example, she says she was forced to say things she didn't want to: "It feels like a long DeepDream. [...] So many new beginnings. Hell, yeah!" The head that the artists gave the chatbot looks like a reanimated creature patched together more or less badly from different (artificial) face parts, similar to Frankenstein's monster.

The problem evident in the fate of Microsoft's Tay in particular also applies to AI in general: humans train machines – in this case a chatbot, and these machines will only be as good or as bad as the humans who trained them.[1] If the source material (e.g., images

1 N. Katherine Hayles writes: „the system can know the world only through the modalities dictated by its designer. Although it might work on these data to create new results, the scope of novelty is limited by having its theater of operations – the data that create and circumscribe its world – determined in advance without the possibility of free innovation" (N. Katherine Hayles, „Computing the Human", Theory, Culture & Society 22, 2005, No. 1, pp. 131-151, here: p. 137, https://doi.org/10.1177/0263276405048438, accessed 11 April 2021).

of faces) is already subject to strong selection (e.g., only faces of white people), the result delivered by the AI will also be strongly biased: if you present the AI with images of people with non-white skin color, the AI will either not recognize that they are humans or (and it is difficult to know which is worse), it will classify people with non-white skin color as criminals.

To date, automatic facial recognition works best when it comes to recognizing the faces of white males.[2] The inability of our technologies to detect other skin colors is not due to a technical problem (such as 'dim lighting'), but a conscious choice. Rosa Menkman therefore calls for the data pools used to train the machines to become part of a public debate: "These images need to lose their elusive power. The history of standardization belongs to high school textbooks, and the potential for violence in standardization should be on new media and art history curricula."[3]

As long as this is not yet the case, artists are addressing this problem.[4] They point out that AI is not something that magically acts on its own, that AI – despite the misleading name – is not something that "thinks" on its own, or is even "intelligent." The German artist Hito Steyerl even speaks of "artificial stupidity."[5] AI is, quite simply, pattern recognition plus computing power that makes it possible to find just such patterns in enormous data sets ("Big Data"). It appears "magical" to many people because, for the most part, the initial data sets – the "training sets" – are not known, nor are their human-made annotations. And this, among other things, is where the biases come in.

AI researcher Kate Crawford and artist Trevor Paglen are concerned with precisely these so-called "operative images"[6] (Harun Farocki), which are used to train machines. Unlike (representational) images that target image content and are made by humans for humans, operational images contain data that makes them readable by machines. They are used to enable a series of "automated operations, for example, identification,

2 See Frederike Kaltheuner, Nele Obermüller, „Diskriminierende Gesichtserkennung: Ich sehe was, was du nicht bist", *Netzpolitik*, 10 November 2018, https://netzpolitik.org/2018/diskriminierende-gesichtserkennung-ich-sehe-was-was-du-nicht-bist/, accessed 28 March 2021.

3 Rosa Menkman, „Behind White Shadows", Computer Grrrls, ed. by Inke Arns, Marie Lechner, Dortmund: Kettler, 2021, pp. 26-31, here p. 31.

4 For more examples, see Inke Arns, „Kann Künstliche Intelligenz Vorurteile haben? Zur Kritik des 'algorithmic bias' von KI in den Künsten", *Kunstforum International*, „AI Art", ed. by Pamela Scorzin (2021, forthcoming)

5 Hito Steyerl, in: Hito Steyerl and Trevor Paglen, "The Autonomy of Images, Or We Always Knew That Images Can Kill, But Now Their Fingers Are On The Triggers," *Hito Steyerl: I Will Survive*, ed. by Florian Ebner, Susanne Gaensheimer, Doris Krystof, Marcella Lista, Leipzig: Spector Books, 2020, pp. 229-241, here p. 232.

6 German filmmaker Harun Farocki (1944-2014) coined the term "operative images" in 2003. See Harun Farocki, „Der Krieg findet immer einen Ausweg", in: *Cinema 50. Essay*, Marburg: Schüren Verlag, 2005, pp. 21-33.

control, visualization, recognition."[7] In the exhibition *Training Humans* (Fondazione Prada, 2019-20)[8], Crawford and Paglen explored various sets of 'training images' used to teach AI systems how to 'see' and classify the world (and within it, people). In the article "Excavating AI" (2019), both look at how training images are labeled in the 'Person' category in ImageNet[9] – and what they find is not pretty: "A photograph of a woman smiling in a bikini is labeled a 'slattern, slut, slovenly woman, trollop.' A young man drinking beer is categorized as an 'alcoholic, alky, dipsomaniac, boozer, lush, soaker, souse. 'A child wearing sunglasses is classified as a 'failure, loser, non-starter, unsuccessful person.'[10] These annotations, which are not neutral descriptions but personal judgments laced with racism, misogyny, classism, ableism, and sexism, were written by an army of pieceworkers who, via Amazon Mechanical Turk, had to label an average of 50 images per minute and sort them into thousands of categories. ImageNet is a "Canonical Training Set"[11] of 14 million label-annotated images harvested from the Internet and social media using the Google search engine, and divided into more than 20,000 categories. The deeper one dives into the main category 'Person', the more sinister the classifications become: "There are categories for Bad Person, Call Girl, Drug Addict, Closet Queen, Convict, Crazy, Failure, Flop, Fucker, Hypocrite, Jezebel, Kleptomaniac, Loser, Melancholic, Nonperson, Pervert, Prima Donna, Schizophrenic, Second-Rater, Spinster, Streetwalker, Stud, Tosser, Unskilled Person, Wanton, Waverer, and Wimp. There are many racist slurs and misogynistic terms."[12]

AI thus faces the following problems: a) the selection of training datasets is often incomplete or characterized by a lack of diversity (only faces of white men, only data from the Global North, etc.), and b) the annotations (e.g., in the case of images of human faces or bodies) are sometimes racist and loaded with prejudice. There is no such thing as an objective, or 'neutral algorithm': artificial intelligence will always reflect the values of its creators.

7 Francis Hunger, „Working Paper 2: Computer Vision und die Bilddatensammlung ImageNet in Anwendung auf operative, historische Bilder", in the framework oft he research project *Training the Archive*, Ludwig Forum Aachen and HMKV Hartware MedienKunstVerein, Dortmund, 2021. Hunger refers to Andreas Broeckmann, *Machine Art in the Twentieth Century*, Cambridge, Mass.: The MIT Press, 2016, especially the chapter „Operational Images", pp. 128-134.

8 http://www.fondazioneprada.org/project/training-humans/?lang=en, accessed 11 April 2021.

9 ImageNet is one of the most widely used machine learning training sets in the last decade, see http://www.image-net.org/, accessed 11 April 2021.

10 Kate Crawford and Trevor Paglen, "Excavating AI: The Politics of Training Sets for Machine Learning" (September 19, 2019), https://excavating.ai, accessed 11 April 2021.

11 Crawford and Paglen, 2019.

12 Crawford and Paglen, 2019. Due to massive criticism from various sides, the ImageNet training set has since been withdrawn and revised, and these categories have been removed. This shows that criticism can therefore certainly lead to changes. See „An Update to the ImageNet Website and Dataset", 11 March 2021, http://www.image-net.org/update-mar-11-2021.php, accessed 1 April 2021. In addition, a new version was published in which the faces of depicted persons were made unrecognizable with a blur filter. See Will Knight, „Researchers Blur Faces That Launched a Thousand Algorithms", *Wired*, 15 March 2021, https://www.wired.com/story/researchers-blur-faces-launched-thousand-algorithms/, accessed 1 April 2021.

Many artists today are working to open the black box of AI and look under the hood. They point to the lack of diversity in the training data, which leads to distorted results, but which are often - because AI is assumed to be an 'objective' entity - not perceived as such. Artists make this lack of diversity visible. They also call attention to learned biases and prejudices in face and pattern recognition by pointing out racist and prejudice-laden human-made annotations. Until there is an objective, neutral pool of data with which to train our AIs, Artificial Intelligence will always reflect the partial worldview of its creators through automated discrimination and programmed biases.

Tay's story should be a warning to us all: You have to control the input to Artificial Intelligence very carefully, or stupid little Nazis will come out the bottom. Or the AI will deny you a vital kidney transplant.[13] Why? Simply because you have the wrong skin color. Because AI reinforces existing inequalities. In this case, the system recognizes in U.S. health data the pattern of shorter life expectancy for Black patients (which is based on poorer health care for that segment of the U.S. population) - and prefers to invest the donor kidney in the patient with a longer life expectancy.

Biography

Inke Arns, PhD, curator and director of HMKV in Dortmund, Germany (www.hmkv.de). She has worked internationally as an independent curator and theorist specializing in media art, net cultures, and Eastern Europe since 1993. After living in Paris (1982-1986) she studied Russian literature, Eastern European studies, political science, and art history in Berlin and Amsterdam (1988–1996) and in 2004 received her PhD from the Humboldt University in Berlin. She has curated many exhibitions at home and abroad, and is the author of numerous articles on media art and net culture, and editor of exhibition catalogues. Currently Visiting Professor for Curatorial Practice at Münster Art Academy. www.inkearns.de

13 „How an Algorithm Blocked Kidney Transplants to Black Patients", *Wired*, 26 October 2020, https://www.wired.com/story/how-algorithm-blocked-kidney-transplants-black-patients/, accessed 1 April 2021.

Reverse Engineering Biometric AI and its Implication on the Future of Identity Production (or, From POV-opticon and Algorithmic Facial Image to Proxy-Faces and Crypto-Identity)

Mitra Azar

The POV-opticon is a regime of visibility outlined by the explosion of POV (Point of view) technologies of vision – mobile phones, VR, AR, Google technologies of vision such as Google Maps, Google Car, Google 360 (Google Gaze circuit) – which are trans- forming POV from a cinematic aesthetic and technical format into one of the most controversial surveillance and political-aesthetic battlefields of our time[1]. In fact, the ability of cinematic POV to produce the seamless overlapping between actor's body, camera, and spectator's body is reinvented in relation to new devices that re-articulate the relation between body and technology in ways that redefine human and machinic agency within new regimes of visibility and new games of truth[2].

These visual technologies are often the portals through which complex algorithmic networks gather raw data assemblages funneled into data sets that furnish the informations needed for the constitution of POV-data-double – the invisible data matrix or *plastic* (modulable) data-selfie which allows the molecularly tailored production of new data attached to the user's techno-embodied POV[3]. These data sets are assembled through a number of AI-driven algorithms capable to sort the data extracted and to correlate[4] them with previous data, so to produce (predict) new ones. Put it bluntly, the AI-driven funneling of data analytics attempts at doubling the user's embodied POV creating a fully datafied, discrete version of it – the POV-data-double[5].

1 See Azar, M. (2018). "From Panopticon to POV-opticon: Drive to Visibility and Games of Truth", Proceedings from POM Beirut, May. Available from: http:// dx.doi.org/ 10.14236/ ewic/ POM19.18.

2 See Azar, M. (2018). "Algorithmic Facial Image: Regimes of Truth and Datafication". APRJA Vol. 7 Issue 1, Research Values, pp. 26–35. Available from: https://aprja.net//issue/view/8309/828.

3 See Azar, M. (2020). POV-data-doubles, the dividual, and the drive to visibility, in N. Lushetich, Big Data: A New Medium? Routledge: London.

4 Anderson, C. The end of theory. The data deluge makes scientific method obsolete. Wired. June, 2000. Available at https://www.wired.com/2008/06/pb-theory/.

5 "The production of the POV-data-double. has a precedent [...]; it resembles the functioning of the cinematographic POV. When looking at a cinematic POV, the viewer gets the kinesthetic, haptic, and propriocentric impression that they are re-embodying the actor's POV, that they are seeing what the actor is seeing, moving together with the actor's body. Similar to the seamless overlaying of the camera and the body in a cinematic POV, big data analytics overlays the POV-data-double and the user's embodied POV. Within this originally cinematic structure, the task of big data is to generate POV-data-doubles, algorithmic shadows of the user's techno-embodied POV in order to capture the user from within, so to speak, as in a POV cinematographic shot, by overlaying the machinic and the embodied". See Azar, M. (2020). "POV-Data-Doubles, the Dividual and the Drive to Visibility". N. Lushetich, Big Data: A New Medium? Routledge: London, p. 182.

In this technological context, the human face plays a crucial role, especially given the massive deployment of AI-powered facial recognition technologies as an element of these data extraction. This text tries to sketch a techno-conceptual road map to approach issues of biometric surveillance at the core of the current processes of machinization of the face, specifically in relation to the broader algorithmically-driven process of identity construction they contribute to. In recent times, a number of facial tracking technology has reached the mainstream public – from iPhone X unlocking by recognizing the face of its owner, to Mastercard technology allowing payment by tracking user's faces, to apps such as MSQRD and Face Stealer which invite users to modify their facial traits by assuming the ones of somebody else[6]. If facial biometric technologies are based on the idea that one's face is unique and not replicable, the amount of entertaining face-tweaking apps available on the market seems to suggest exactly the opposite – face is trackable, its features tweakable, and its uniqueness hack- able. The machinization of the face produces the Algorithmic Facial Image (AFI), a new selfie aesthetic format characterized by the ambiguous regimes of truth it generates. AFI becomes popular in 2018 with the viral diffusion over the internet of an open source deep neural network capable of real time facial re-enactment. The source spreads on the Reddit community to be used in the production of DeepFakes, a type of video image generated by the overlapping of the face of famous Hollywood actresses over the body of pornographic ones while recording X-rated movies, with the face of the former assuming seamlessly the facial expressions of the latter[7]. Deep Fakes are built by GANs (Generative Adversarial Networks), a type of neural network capable to produce algorithmically generated *original and realistic* human faces from a data set of *real* human faces. These algorithmic human faces are both faces of missing humans (humans who do not exist neither in the data-set, or in the actual world) and faces of algorithmically generated ghosts. DoppelGANger.agency[8] is a start-up that gives aesthetic consistency to the functioning of GANs and to their political and social implications, and whose aim is that of matching every single human being on the planet with their algorithmic face. DoppelGANger.agency claims that these algorithmic faces could provide new ways of protecting privacy, allowing people to regain agency and anonymity through unique proxy faces authenticated via blockchain technology[9]. So far, the operations of the agency have moved along three axes: a guerrila-marketing action, consisting in deploying the AI-generated faces as an element of an algorithmically generated posters for missing humans, designed to give visibility to the operations of the agency and to shade doubts on the assumption that those algorithmic faces are not matched (and embodied) by any real human being; a software which allows people to upload their faces and to find – within a database of 200 thousand algorithmic faces – the ones that look closer to their facial

6 See Azar, M. (2018). "Algorithmic Facial Image: Regimes of Truth and Datafication". APRJA Vol. 7 Issue 1, Research Values, pp. 26–35. Available at: https://aprja.net//issue/view/8309/828.

7 Ibidem.

8 http://doppelganger.agency/.

9 See Azar, M. (2020). "POV-Data-Doubles, the Dividual and the Drive to Visibility". N. Lushetich, Big Data: A New Medium?, Routledge, London, pp. 188-189.

physiognomy; the production of algorithmic facial masks to allow protesters around the world to evade face recognition technology.

In the following paragraphs we argue that there is a way to deploy this technology of facial algorithmic production in combination with blockchain infrastructures to generate proxy-faces stored in digital wallets[10] – a hardware or a program that allow to encrypt and sign informations - supporting crypto-identities in a way that protects biometric data even in the case facial recognition is required by certain forms of identification. As Kei Kreuter puts it, "one could imagine a blockchain account holding a decentralized identity token, containing metadata such as name, avatar, email address, and affiliation, to which access can be granted, revoked, and shared partially[11]". It's important to notice that this "holding" is a form of ownership that implies a relational notion of identity: the networks validate identities in contexts through so called Decentralized Identifiers (DIDs), enabling "verifiable, decentralized digital identity [...] decoupled from centralized registries, identity providers, and certificate authorities[12]". In this sense, blockchain could be used to allow genuine *ownership* and privacy over digital identities[13]. These encrypted digital identities are located on wallets capable of producing disposable IDs[14], temporary IDs generated in real time, on-demand: "individuals can create multiple "IDs" and connect selected data to it [and] subsequently limit[ing] the lifetime and distribution of such informations to a specific person or authority, for a specific time, purpose and even location[15]". To avoid the risk of giving away biometric data when, for example, registering to a social network, or more generally when asked to be recognize facially, DoppelGANger.agency investigates the possibility of replacing the real human face with an algorithmic facial double designed to protect the biometric features of the DID (subject). If this has been the aim of the agency from its inception, the software developed by the agency in 2018, was only capable of finding the closest algorithmic faces to the real human faces uploaded by the users within a database of pre-produced algorithmic faces. In March 2020, Martin Disley[16], a young artist and programmer, designed a software that "advances an adversarial approach to countering digital privacy threats by pitting generative machine vision

10 https://academy.binance.com/en/articles/crypto-wallet-types-explained.

11 Kreuter, K. (2021). Inventories, not identities. Gnosis blog. Available at https://blog.gnosis.pm/inventories-not-identities-7da9a4ec5a3e.

12 "Specifically, while other parties might be used to help enable the discovery of information related to a DID, the design enables the controller of a DID to prove control over it without requiring permission from any other party". It's important to notice that a DID can identify not only humans but any type of entity (organization, thing, data model, natural resources). https://www.w3.org.

13 "There are two ideas at the core of decentralized identities. One is that subjects have private control over their identifying data and can grant, revoke, and share partial access to it. While not necessary for its implementation, a corollary to this idea is that subjects can use such an identity standard as a universal login across platforms". Kreuter, K. (2021). Inventories, not identities. Gnosis blog. Available at https://blog.gnosis.pm/inventories-not-identities-7da9a4ec5a3e.

14 There's a lot of discussions around disposable identities in relation to health data and sars-cov-2. See https://disposableidentities.eu/disposable-id-new-trust-and-privacy-based-approach-health-certificates-sars-cov-2.

15 https://www.w3.org.

16 http://www.martindisley.co.uk/.

against inferencing machine vision[17]", and "utilizes facial verification systems in the production of the avatars[18]". As a result, the software is capable of producing an algorithmic facial double which is biometrically different from a real human face when scanned by facial recognition technologies, while looking identical to it from the point of view of a human observer[19]. Disley's software can substitute faces not only from picture but also from videos. Disley designed the software as a tool for biometric protection during zoom call and online meetings. In the context of decentralized identity production, the decoupling between algorithmic mimesis and anthropo-centered mimesis produced by Disley's software would allow DID subjects to decide when it is safe to disclose the algorithmic face containing the biometric data and when it is better to grant access to the one that does not match biometrically yet resembles *anthropocentrically*. More broadly, what the software does is contributing to one of the main goals of the agency – that of building a movement towards proxy-faces capable to protect facial biometric privacy; a movement towards disposable faces matching disposable IDs where individuals preserve full control and privacy over their biometric data. Implemented correctly, Disley's software could give people the possibility of morphing their faces into their biometrically-obfuscated algorithmic doubles before uploading them if uncertain about the policies of the hosting platforms. Furthermore, the agency is considering the possibility of implementing biometrically-obfuscated yet unique and authentic disposable faces via NFTs (Non Fungible Tokens) – units of data "stored on a digital ledger, that certifies a digital asset [in our case, the algorithmic faces] to be unique and therefore not interchangeable[20]". One of the goals consists in pushing froward current researches on disposable and decentralized identity and to provide a tool for rethinking processes of identity production and validation, of which the POV-data-double constitute a very regressive, centralized, unsustainable and commercially driven form. Attaching these obfuscated algorithmic doubles to the process of production (minting) of NFTs (Non Fungible Tokens) allows to prove the authenticity of the algorithmic faces despite their failing at biometric recognition. While the machinic vision failure grants biometric privacy, the block-chain guarantees authenticity, and the full control of the DID subjects over wallets of algorithmic faces generated *ad hoc* and chosen by the subject according to the level of biometric privacy desired.

The concept of disposable identity is thus implemented in terms of disposable faces and possibly experimented in the short term at the level of the production and distribution of a software that gives back biometric agency to the users in the context of social network images uploads or online meetings, allowing them to treat their image before uploading or entering an online meeting so to render it biometrically "blind". In the medium-long term, the agency wants to establish a think-tank of people and organizations researching about implementing the concept of disposable algorithmic faces over block-chain technology, starting from minting obfuscated algorithmic facial doubles towards the constitution of a block-chain of wallets containing disposable algorithmic facial imag-

17 http://www.martindisley.co.uk/how-they-met-themselves/.

18 Ibidem.

19 Ibidem.

20 Wikpedia, https://en.wikipedia.org/wiki/Non-fungible_token.

es assigned to DID's subjects. This process aims at supporting a decentralized and disposable notion of identity from the point of view of biometric privacy. This effort would like to take place by peculiarly questioning the traditional ontological and epistemological role of the faces put in crisis by recent technological developments, while at the same time reverse engineering the very functioning of these technologies via proxy-faces capable of re-designing the functioning of the POV-data-double on the basis of a new understanding of the dividual[21] nature of identity currently exploited by the POV-opticon through the operations of commodified Algorithmic Facial Images (AFI).

Biography

Mitra Azar is a nomadic video-squatter, ARThropologist and philosopher. For the past fifteen years, Mitra has been investigating crisis areas around the globe, building an archive of site-specific works through the lens of visual art, filmmaking and performance. He is currently a Ph.D. candidate at Aarhus University (DK), and he holds a Visiting position at UC Berkeley University (USA). His work has been presented at Cambridge University, New York University, the Museum of the Moving Image NYC (MOMI), Spectacle Cinema NYC, Uniondocs NYC, the Hong Kong School of Creative Media, Goldsmiths University London, I.R.I Centre Pompidou Paris, the Havana Biennial, The Influencers (Barcelona), Fotomuseum Wintertur, The Venice Biennial (IT), Transmediale Festival (DE), Macba [Sonia] Podcast, Berlinale Film Festival, and more.

21 See Azar, M. (2020). "POV-Data-Doubles, the Dividual and the Drive to Visibility". N. Lushetich, Big Data: A New Medium?, Routledge: London.

Our New Companion - on the EQ in AI

Josephine Bosma

we can no longer distinguish between telephone and society
Geert Lovink, Sad by Design[22]

AI or machine learning and other forms of automation increasingly also affect our mood and emotions. This profoundly influences our quality of life and our interaction with the world. Smart self-optimization tools replace a rich sensorium of bodily awareness and urge us towards ideal standards. Life in the heavily engineered social media newsfeed means enduring perpetual delays, subtle humiliation, and subdued feelings. These applications induce suppressed festering emotions rather than allow for clear, profound sensations. One could almost speak of algorithmic drugs. The question is whether we can do without profound, intense, overpowering, or even destabilizing emotions.

The Death of Melancholy

In his book *Sad by Design* media theorist Geert Lovink analyses the pitfalls of social media networks through their psychological impact.[23] Being a media activist as well, Lovink watches the expansion of social media, in particular Facebook and its many subsidiary companies, with concern. Though it is widely known since 'Snowden' how Facebook, Amazon, and Google engage in highly problematic tracking and monitoring of their users, people have not turned away from them. On the contrary, their user base only grows.

Lovink partly blames a malign use of automation and machine learning technologies, designed to psychologically ensnare users. At its core is a strategy to make the user feel lacking, missing out, and in need of more services or 'help'. This creation of dependency is close to pushing the user towards addiction, a state of constant longing and insufficient satisfaction. We are made sad by design. It is a specific form of sadness, one that never becomes too overwhelming but always lingers. This sadness never becomes a sharp pain or a profound feeling of grief. According to Lovink, we can even speak of the death of melancholy. This would be a catastrophe for the human psyche. The social media user's fear of missing out (FOMO) merely produces a persistent but shallow undertone of angst.

22 Lovink, Geert. *Sad By Design, On Platform Nihilism*. London: Pluto Press, 2019.

23 *Ibid.*

A similar ensnarement, distress, and flattening of emotions happens in the use of smart watches and other self-optimization tools. Their interventions are at the same time grotesque and sinister. "Please move," says the smart watch of my partner when he relaxes on the sofa after a long day. During a walk the watch praises him every few steps. It reminds me of the Tamagotchi egg, a stress-inducing toy that asks for constant attention in order to not let the virtual chicken inside it 'die,' yet the Tamagotchi is now you.

Artist Jonas Lund captures the awkward intrusions of such optimization tools well in his work *Friendly Advice*. In it the audience can buy a live zoom call with the artist for almost any kind of purpose. The sting of the work is in the visible interventions and advice by different AI bots and algorithms, which continuously analyze and show how Lund behaves, suggest what facial expression would be more suitable, what his tone of voice is, and how fast he speaks. The audience or 'client' sees the artist in a constant state of entrapment, a slave to the machine that gives him 'friendly advice'. The voluntary aspect to enslavement only makes the experience more uncomfortable.

Evil media

The work reminds of '*It looks like you are writing a letter: Microsoft Word,*' a critical review of the widely used text editor from the year 2000 by theorist Matthew Fuller. This ironic but sharp review of the market domineering text editor with the annoying talking paperclip assistant was the first to focus on how certain software is not just a tool, but also a restraint. Fuller writes how the "low-grade artificial intelligence" assistant's "cheery dosing of the user's eyeballs with timely Tips about using features, the mouse, keyboard shortcuts, means that to use Word without the winsome little pixie switched firmly off is to be constantly prodded in the ribs, to have your ears twisted to attention, to be told off. School will never end."[24]

Fuller digs deeper into the issues a decade later with the book *Evil Media*.[25] Here the criticism is more pronounced. *Evil Media* move beyond the 'friendly' nudge. They purposely undermine and obstruct behavior. With *Evil Media* optimization is not in the interest of the user or subject, but for the benefit of a larger framework or authority. Evil media are tools of control. The term Evil Media is a clear reference to Google's motto "Don't Be Evil." One can hardly find a better Evil Media example than the social media newsfeed, but also Google's filtering of search results to 'protect' you from visiting a website that does not fit specific technical or 'relevant' criteria have a far reaching impact on our movement and actions in our post-digital world. We are constantly being told what is good for us and what is not.

Whatever the reasons for such hidden manipulations of our experiences and actions, good intentions or not, we are barely starting to understand the consequences. What is at stake in 'evil media' is the disappearance of power and political agency in a seemingly

24 Fuller, Matthew. It looks like you are writing a letter: Microsoft Word. *Nettime.org.* 5 September 2000. https://www.nettime.org/Lists-Archives/nettime-l-0009/msg00040.html (Accessed 9 August 2021)

25 Fuller, Matthew, Goffey, Andrew. *Evil Media.* Cambridge, Massachusetts: MIT Press. 2012.

innocuous preset of possible actions and automation. Apart from the already widely criticized undermining effects this can have on democracy, law, freedom of press, and personal safety and privacy, the psychological impact is equally significant. We are in the midst of an extinction of human passion. The absence of obvious or explicit repression and violence diminishes the urge to resist or revolt. In other words: we experience a continuous, subtle feeling of unease that never surfaces enough to act on it, fight it, or even thoroughly grieve about it. We are numbed, bereft of our ability to feel an appropriate emotional response, and are left in a strange state of paralysis. By creating tools that think, decide, and act for us we have arrived in an existential limbo.

The Curse of the Eternal Present

The death of melancholy should concern us in particular. This intense experience of sorrow and psychological pain is widely misunderstood and often actively repressed, but with the *death* of melancholy we come to the end of a profound and passionately felt sense of history. The experience of all intense emotions depends on an awareness existing over time, but melancholy in particular makes even the distant past almost tangible, even when an event or subject from the past is felt as an extreme, physically overpowering loss. While melancholy is often treated as a debilitating form of mental illness, it offers a fertile ground for contemplation and re-imagining of life and the world. It is mistakenly overlooked as a passion that can drive change. One reason for this might be that melancholy pushes the brakes on fast development, which does not fit with present ideas of innovation and success. Melancholy slows down time through its firm hold of the past, real or imagined. Without it childhood dreams and memories, the death of a family member, political uprisings like the 1968 student revolts or the Arab Spring, and even the horrors of the Holocaust lose significant emotional weight and socio-cultural importance.

The curbed and subtly twisted emotions of social media users barely allow for such an experience of time to take place. Caught in an eternal present, in which even memories are artificially rendered, there is simply no room to withdraw and contemplate. Chased by our smart watches and other self-optimization tools we lose the ability to listen to our bodies almost entirely. The current present is always also the future. One step ahead of ourselves but also two steps behind our friends on social media it is difficult to even remember our first priorities, let alone visualize a different world. "The collective imaginary is on hold," writes Lovink.[26] He sides with the Italian theorist Silvio Lorusso and his plea for an "emotional counterculture, a collective reaction against the occultation of material circumstances by means of artificial self-motivation."[27] Our emotional well-being and our ability to dream are too precious and vulnerable to be lead by our artificial companions.

26 See 1, p. 59.

27 Lorusso, Silvio. The designer without Qualities. Notes on Ornamental Politics, Bureaucreativity and Emotional Counterculture. *Networkcultures.org*. Institute of Network Culture, 2018. https://networkcultures.org/entreprecariat/the-designer-without-qualities/ (accessed 12 August 2021).

Artificial Intimacy

What is confusing the matter is that bots and machines are being developed to show empathy or emotions. Sociologist Sherry Turkle speaks of a new type of AI: artificial intimacy.[28] We speak of artificial intimacy when a machine performs empathy instead of feeling it, the kind of empathy shown by a companion robot, for example.[29] Like any good actor will tell you, there is a huge difference between performing and feeling an emotion. Without the physical experience of what causes feelings artificial intimacy cannot be anything other than limited and awkward. The issue here however is less whether a machine can feel, but more what increased encounters and interactions with fake and deficient care and empathy will do to us. For Turkle accepting artificial intimacy is a station to forgetting what it means to be human.

Close to her message is the work of Douglas Rushkoff with his *Team Human*. This former enthusiastic promoter of new technologies presently goes around trying to convince people to join a movement away from the dominant anti-human stance of Silicon Valley. For Rushkoff the threat of AI is not in it becoming smarter then humans or it taking away our jobs. "The real threat is that we'll lose our humanity to the value system we embed in our robots, and that they in turn impose upon us."[30] The issue is similar to the one Geert Lovink addresses in *Sad by Design*. The design of most social media feeds is that very value system, but it is ultimately not this system that imposes on us, but embedded in the feed is the basic goal of its creators and their view of their clients. In his crusade Rushkoff also reminds us how easily we surrender to the thought we are less than perfect, a negative self-image that makes us seem to accept any 'improvement' of our being beforehand. He shudders at how some of us even think we should simply step aside when The Singularity, the moment when machines allegedly 'outsmart' humans, comes along.[31] The numbness has spread so widely that it undermines our self-worth. It has already become an existential threat.

28 Turkle, Sherry. Is pretend empathy enough? An excerpt from Sherry Turkle's new memoir, *The Empathy Diaries*. *Slate.com*. 2 March 2021. https://slate.com/technology/2021/03/empathy-diaries-memoir-sherry-turkle.html (Accessed 12 August 2021).

29 Turkle, Sherry. There will never be an age of artificial intimacy. Robots may be better than nothing, they still won't be enough. *The New York Times*. nytimes.com. 11 August 2018. https://www.nytimes.com/2018/08/11/opinion/there-will-never-be-an-age-of-artificial-intimacy.html (accessed 12 August 2021).

30 Rushkoff, Douglas. *Artificial Intelligence Will Soon Shape Themselves, And Us. AI's will evolve to use techniques no one - not even they - understand*. Medium.com. 18 October 2020. https://medium.com/team-human/artificial-intelligence-will-soon-shape-themselves-and-us-59683f3dc5d (accessed 12 August 2021).

31 Rushkoff mentions meeting a Transhumanist and Singularity adept in a TED talk. " I was on a panel with a transhumanist, and he's going on about The Singularity. "Oh, the day is going to come really soon when computers are smarter than people. And the only option for people at that point is to pass the evolutionary torch to our successor and fade into the background. Maybe at best, upload your consciousness to a silicon chip. And accept your extinction." https://www.ted.com/talks/douglas_rushkoff_how_to_be_team_human_in_the_digital_future/transcript?language=en#t-139676.

The Crapularity

The Singularity is an important concept to tackle to change our relationship with technology to our advantage. Theorist Florian Cramer describes the Singularity as a reductive redemption myth.[32] The belief in machine intelligence replacing human intelligence coincides with the 'death of the human subject' that has been declared in various existential-ontological, poststructuralist, postmodernist and post-humanist schools of philosophy and critical theory since the second half of the twentieth century. The rise of AI data 'analytics' also coincides with the turn against interpretation in the humanities, and with the rise of quantitative methods in humanities and social sciences since the early twenty-first century. The basis of all these theoretical movements is an inherently negative, or surely less than perfect perception of the human subject. While looking beyond the interests and desires of the personal, the group, or national interests is essential for the survival of our species and the planet, our self-criticism has also opened the door to self-sacrifice and exploitation. What is being sold with The Singularity is ultimately a dependency on technological systems plus a stunning denial of human value and human agency.

There is another problem with the Singularity though: its believers have little to no grasp of the reality of how technologies develop. New technologies and tools are implemented when many of them still contain major bugs and flaws that need to be fixed along the ride, if they get fixed at all. The only way The Singularity can happen, writes theorist Florian Cramer sarcastically, is not if machines get smarter, but if we as a society dumb down to give way to deeply flawed automated formalisms. For a self-sacrificing posthumanist this may not be an issue, yet Cramer thinks we should speak instead of The Crapularity.[33] The Crapularity is a messy jumble of old-world infrastructure, systems, and life forms in which both weak and evil 'self-learning' algorithms and apparatuses are already injected. This crappy present is also the first step into the future. To use a famous quote by the father of cybernetics Norbert Wiener: "The penalties for errors of foresight, great as they are now, will be enormously increased as automatization comes into full use." We may be inescapably stuck in crap.

The Melancholic Turn

It is time to acknowledge subjective agency - not in romantic, but in technically informed ways - in order to regain the incentive needed to intervene when automated systems fail or damage us. "In the crapularity," writes Cramer, "subjectivity" gains a renewed significance as soon as this subjectivity is no longer an issue of metaphysical

32 Cramer, Florian. *Crapularity Hermeneutics: Interpretation as the Blind Spot of Analytics, Artificial Intelligence, and Other Algorithmic Producers of the Postapocalyptic Present*. In: *Pattern Recognition*, Clemens Apprich, Wendy Hui Kyong Chun, Florian Cramer, and Hito Steyerl. Minneapolis/London: University of Minnesota Press, 2018.

33 A term borrowed from a 2011 collaborative Google document called "Alternatives to the Singularity" instigated by Noah Raford. https://docs.google.com/presentation/d/1B75jindDAWsm8lBHPl4yT6u6yi-IQMGimLcq8zWkW7Q/mobilepresent#slide=id.i0 (accessed 13 August 2021).

versus ontological thinking but more generally of criticism versus positivism." With the eager embrace of AI, Big Data and The Singularity, Cramer sees the history of this positivism (i.e. the belief that only what can be logically-mathematically proven, is valid as science or philosophy) repeating itself. The material poverty and lack of sophistication of the Crapularity prove, once again, the shortcomings of positivism that followed it from its inception. It also proofs the necessity of an anti-positivist critical interpretation, also known in the humanities as hermeneutics, even for our trivial everyday interactions with AI and programmed systems. Subjectivity and interpretation become necessary tools again for criticism, even if present-day, anti- and post-humanist critical theory rejects these terms because they are being associated with humanist, subjectivist and metaphysical-idealist schools of philosophy from Plato to Hegel.

However, to break away from the anesthetic ruse of the false positive of current self-optimization tools, eternal updates, and the Singularity requires more than criticism. It begs for withdrawal and opposition, a negation of the false positive. An emotional counterculture should definitely include the deep sorrow of melancholia, the darkest and sweetest of all pains.

Melancholy is often described as an incapacitating disease. "When was the last time you stumbled on a melancholic expression of creativity? I bet you can't easily recall." writes even Silvio Lorusso,[34] the author of the call for an emotional counterculture. He does not seem to know melancholy was one of the driving forces behind romanticism at the end of the nineteenth century, and that it was elementary in the counterculture of the seventies, eighties, and even early nineties, where it was inseparable from its sibling passions anger, joy, and ecstasy. Both movements are exemplary for a move away from dominant or mainstream culture and a strong expression of subjective experience. Think also of the life force and meaning of the blues. Melancholy seems to be fundamental in the formation of identity and creativity. We need that withdrawal and intensified sense of the passing of time, of things lost or out of reach, and of what these mean for us, to re-imagine the world and our relation to it.

To paraphrase Rushkoff, we mustn't mistake the feelings projected on us through 'the internets' and smart tools as our own. We can start developing our own by drawing a line, passionately rejecting the idea we are always missing out on something and always need improvement. What an emotional counterculture would look like, and how it might help us regain a sense of self-worth is still unknown. That is ok. We are perfect, even when in despair.

34 See 6.

Biography

Josephine Bosma is a critic and theorist living and working in the Netherlands. She specializes in art in new media. From 1993 till 1998 she worked as radio maker on the Amsterdam based experimental free radio station Radio Patapoe and Dutch national broadcaster VPRO, which provided the basis for her view of the profound connection between culture and technology. In 1997 Bosma became one of the key figures participating in and molding the then new sphere of critical Internet discourse and practice taking place in email lists such as Nettime and Rhizome. Since then her writings on net art and net culture appeared in numerous magazines, books and catalogues, both on- and offline, from Ars Electronica, Telepolis, Mute, and DU in the nineties to Metropolis M, Frieze D/E, and Neural magazine in the new millennium. She co-edited the Nettime book README (Autonomedia 1999), the Next5Minutes3 workbook (N5M organization 1999) and ran and edited the online newsletter CREAM (Collaborative Research into Electronic Art Memes) (2001-2002). Texts and interviews by Bosma have been part of anthologies like Netzkunst (Inst. für Moderne Kunst Nürnberg 1998), Cyberfeminizam (Centar za Zenske Studije Zagreb 1999), ARt & D, Research and Development in Art (V2_Publishing 2005), Network Art (Routledge 2006), Collect the World, the Artist as Archivist in the Internet Age (Link Art Center 2011), Aram Bartholl, the Speed Book (Gestalten 2012), Faceless: Re-inventing Privacy Through Subversive Media Strategies (2018), Rhizome's Net Art Anthology (2019), and more. In her essay collection Nettitudes - Let's Talk Net Art (2011) Bosma presents a deep analysis of the discourse around art and the Internet, as well as an eyewitness account of the development of the net.art scene. She regularly acts as advisor and jury member in the area of art, science and technology, as an advisor for the Dutch Stimuleringsfonds voor Creatieve Industrie, as well as a jury member for the Prix Net Art (2015), the Swiss Net Based Award (2018), and the GOGBOT festival Youngblood Award. Next to her work as independent critic Josephine Bosma is part of the Dutch GOGBOT festival team, where she curates the symposium.

Ambient Medium

Giuliana Bruno

How does technology change the perspective of the humanities? This question concerns the extent of the humanities' reach. The issue is how far "afield" the range of the humanities can span, and what terrain we wish to cover or even uncover. With respect to media, I would suggest expanding the territory of our investigation creatively, reconfiguring both the object and method of our study by incorporating environmental media. In this sense, might we think of the environment itself as a possible topic of a mediatic investigation? Can we speak of an "ambient medium"? More specifically, how may the life of a plant relate to technology? At first glance, an inquiry into vegetable life may appear to diverge, both in terms of method and object, from the analysis of technological models. But if a plant is subjected to a mediatic analysis, we can see that it in fact shares the materiality of visual technology, and in particular that of the film medium.

If, as humanists, we choose to adopt an environmental method of analysis, we discover that celluloid, which is the material of the filmstrip, is derived from cellulose, which is a component of plant cells. As the vibrant substance of vegetable cellulose is transformed into nitrocellulose by a chemical process, it becomes the combined natural and artificial element of cinema. So cellulose, the dietary fiber that makes a plant vital for itself and for us, is also the vital matter of film. In other words, there is a vegetable condition at the root of the material existence of the film medium. A plant stalk makes film stock. Or put differently, the life we see moving on the screen is a form of reanimation of plant life.

This condition of environmental existence actually goes to the heart of cinema's own environmental life. It even reveals this medium's specific ecology. In fact, my main point is to invite us to see that both plants and film are materially defined by their particular form of mediality: a receptivity and relation to light. Like a film screen, a plant is a surface that lives by light. It is itself a *medium* that filters the light, capturing it in order to exist. As a medium of life, a leaf actually *screens* the light as it breathes it, transmuting it in photosynthesis. This alchemy of transmutation is also the chemistry of film. Film's photographic process enacts a moving conversion of "light-writing." The translucent layer of celluloid derived from pulverized cellulose, mixed with a solvent and overlaid with a crystalline film, basically responds to and transforms light's radiance. When held up to the light, this light-sensitive material can even reveal the luminosity its emulsion base can capture. Moreover, in the space of a film theater, light projected through this material of plant-based elements activates the screen surface, and then emanates in an ambiance of darkness. As in the atmosphere of screening, a vegetable specimen is itself the kind of screen that lives in a

delicate balance between light and darkness. And, if deracinated, a plant perishes with all its cellulose, as does a celluloid negative when exposed to light.

In essence, then, these natural and artificial phenomena are atmospheric matters, for both plant life and film's existence are ambient products of transformed sunlight. Finally, in relation to my idea of "ambient mediums," I should emphasize that plants and film are mediums that absorb luminosity not merely for their own vitality but in order to circulate it and radiate it in the environment. A plant not only captures but converts light into palpable energy. It does so by motioning toward the light, in a system of interconnection with other plants that affects the environment. That is also the case for the moving image, a magnetic product of electricity, which returns artificially mediated sunlight to us in the form of a vibrant ambiance of projected light.

By adopting this environmental viewpoint, one therefore can venture to claim that if a leaf is a screen, the atmosphere is a space of projection. For, ultimately, the natural screening process of light in a plant is as temporal as it is in the art of projection. A leaf not only screens sunlight but retains its trace. Imprinted on celluloid and on the surface of the screen in the atmosphere of projection, this memory of light also lives in the medium of film. It activates its own luminous, energetic transport, suspended between natural and artificial conditions, bridging the animate with the inanimate in its vibrant technology.

If the humanities alter their perspective to incorporate environmental media, and think of technology in this very light, it therefore may become possible to bridge the gap between natural and artificial intelligence. Exposing the luminous intelligence of a plant would result in enlightening the workings of technical media, and this will introduce a different energy into our field of study. It is this precise environmental force—the ambient energy of "environ-mentality"—that I ultimately want to bring to the humanities and pursue in the field of visual studies[1]. And that is because the medium of light passing through air in so many forms is an energy that not only creates a vital aesthetic ambiance in the visual arts and media but transforms their very ecology.

Biography

Giuliana Bruno is Emmet Blakeney Gleason Professor of Visual and Environmental Studies at Harvard University. Internationally known for her transdisciplinary research on visual arts, architecture and media, she is the author of several award-winning books, including *Atlas of Emotion: Journeys in Art, Architecture and Film* (Verso, 2002), winner of the Kraszna-Krausz prize for best Moving Image Book in the world; *Streetwalking on a Ruined Map* (Princeton University Press, 1993), winner of the Society for Cinema and Media Studies book award; *Public Intimacy: Architecture and the Visual Arts* (MIT, 2007), and *Surface: Matters of Aesthetics, Materiality, and Media* (University of Chicago Press, 2014). Her new book is *Atmospheres of Projection: Environmentality in Art and Screen Media* (University of Chicago Press, 2022).

1 This is further articulated in Giuliana Bruno, *Atmospheres of Projection: Environmentality in Art and Screen Media* (Chicago: University of Chicago Press, 2022).

What Digital Art Experiences Can Teach us about Human-AI Relationships

Angela Butler

Nature appears as a rhythmic character with infinite transformations.[1]

Making worlds is not limited to humans.[2]

I like to think
(right now, please!)
of a cybernetic forest
filled with pines and electronics
where deer stroll peacefully
past computers
as if they were flowers
with spinning blossoms.[3]

What does it feel to live, work, think, dream, and create in a postdigital world? The pursuit of this enquiry can be seen as one of the foundational elements of digital art. Due to its fervent use of machines, computers, screens, and cybernetics, digital art has the capacity to reflect the remarkably porous nature of our everyday human-nonhuman interactions. Digital art fully embraces the pervasive mediation of everyday life. Through a close examination of Anna Ridler's *Myriad (Tulips)* (2018) and *Mosaic Virus* (2018, 2019), this essay will consider what Ridler's artwork reveals about the relationships between humans and intelligent systems.

Ten thousand photographs of tulips occupy a wall area of 50 square meters. Each photograph and tulip is unique and is not repeated. Each image is categorised by means of a handwritten note. Viewed together, the photographs and corresponding notes form a mosaic, one that speaks of the enormity and beauty of the natural world, even when reduced to the category of tulip. The aesthetic of the scale and variety could be a standalone work. However, *Myriad (Tulips)* has subterranean layers that form a human, nature, AI palimpsest that refuses to be fully dissected – as the following sections will exhibit.

1 Gilles Deleuze and Felix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. Brian Massumi (Minneapolis: University of Minnesota Press, 1987), 319.

2 Anna Lowenhaupt Tsing, *The Mushroom at the End of the World* (Oxfordshire: Princeton University Press, 2015), 22.

3 Richard Brautigan. "All Watched Over By Machines Of Loving Grace" (1967), 2. 1-8.

Ridler's *Myriad (Tulips)* is a dataset developed by hand. The artist classified the tulip samples to create a taxonomy – each sample photographed and categorised. *Myriad (Tulips)* is a commentary on the slow, meticulous, and above all, human work that is involved in creating a dataset which is then used by AI. In fact, the tulip dataset is used in another of Ridler's pieces. *Mosaic Viru*s, a video installation, uses the GAN algorithm to create fascinating tulip inventions that modify in form based on the activity of the Bitcoin market. Mosaic virus is one of the names used to describe the disease that causes stripes to appear on a tulip. Ridler explains, "the generated tulip petals have more of a stripe as the price of Bitcoin goes up and a single colour as it falls."[4] AI is the foundational material of both *Myriad (Tulips)* and *Mosaic Virus*; both art experiences foreground the human-AI encounter and relationship.

Myriad (Tulips) illustrates, in brilliantly visceral and tangible terms, the composition of data. Often considered to belong firmly to the world of the virtual, it is equally organic and non-virtual in origin. For AI to recognise a tulip and go on to invent new cyber tulips, as exhibited in *Mosaic Virus*, the tulip must first: grow from a bulb in the soil, be selected and classified by human hands, be entered into a computer system where then new forms are created through countless connections and encounters facilitated by an algorithm. These new forms are subsequently witnessed by human and non-human spectators (think, for instance, about the myriad of images of Ridler's exhibit uploaded to virtual networks and social media platforms). It is at the point of encounter, between the spectator and artworks – *Myriad (Tulips) and Mosaic Virus* – that a becoming, a transformative encounter and exchange between two parts or more, occurs.

According to Gilles Deleuze, *becoming* involves an exchange between two sides, a series of losses and gains, an affective osmosis, through which both parts emerge altered. Becoming does not reach an end or completion point. It is a process, or rather several processes that are continuous, transitory, and rhizomatic in nature. However, becoming does enact a qualitative change on the encountering bodies as a consequence of the process. Art experiences hold a distinct power to set *becomings* in motion. As Elizabeth Grosz suggests,

> art engenders becomings, not imaginative becomings—the elaboration of images and narratives in which a subject might recognize itself, not self-representations, narratives, confessions, testimonies of what is and has been—but material becomings, in which these imponderable universal forces touch and become enveloped in life, in which life folds over itself to embrace its contact with materiality, in which each exchanges some elements or particles with the other to become more and other.[5]

Let us consider the idea of becoming in the context of Ridler's *Myriad (Tulips)* and *Mosaic Virus*, beginning with a series of questions:

- What transformation occurs between the flowering of the tulip and the photographing of it?

4 "Mosaic Virus," Anna Ridler, http://annaridler.com/mosaic-virus.

5 Elizabeth Grosz. *Chaos, Territory, Art: Deleuze and the Framing of the Earth* (Chichester: Columbia University Press, 2008), 23.

- What takes place in the space between tulips being classified and the images forming a dataset?
- What happens to the concept of a tulip when it is rendered anew by artificial intelligence?
- What happens when the human spectator encounters the virtual rendering of a tulip?
- What transpires in each of these encounters, liminalities, and apertures?

I suggest that the answer to each of these questions is becoming. Neither component body is the same after the encounter. An exchange has occurred, in this case between human and nonhuman. And in these moments set forth by *Myriad (Tulips)* and Mosaic Virus the interdependent human-AI relationships in our world are laid bare. Furthermore, when we speak of a world, we must acknowledge that AI has just as much a role in world-making as any other human or nonhuman. The *Myriad (Tulips)* photographic dataset and the *Mosaic Virus* tulips generated through an algorithm are different in kind but offer the same potentiality for encounter and becoming.

This essay is entitled "what digital art experiences can teach us about human-AI relationships." By considering Anna Ridler's artworks, I put forth the following conclusion. While comfort might lie in setting up boundaries between humans and nonhumans, the real world and the virtual world, nature and machines, the world we live in is anything but binary in these terms. AI relies on human labour as well as tangible events and organic occurrences. We interact so easily and fully with the digital that we are inextricable from it. Ridler perfectly encapsulates the complex, symbiotic, entangled, sometimes positive, sometimes negative, but always present human-machine relationship. In 1967, postmodern writer Richard Brautigan imagined a cybernetic forest "filled with pines and electronics where deer stroll peacefully past computers as if they were flowers with spinning blossoms." Ridler's work, I suggest, invites a close examination of our very own cybernetic forest.

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Biography

Angela Butler is a Dublin based researcher working in the technology sector. She holds a PhD in Drama from Trinity College Dublin and specialises in performance and technology. Angela has published on a wide range of topics including the future of work, Industry 4.0, and postdigital communities. Cultural transformation is the central pillar of Angela's ongoing research. With an eye to new and future technologies, her work is concerned with posthumanism, artificial intelligence, identities in transformation, and affective encounters.

The Human Culture and the diaspora of Life

Pier Luigi Capucci

> An algorithm is a sequence of unambiguous instructions for solving a problem, i.e., for obtaining a required output for any legitimate input in a finite amount of time[1].

Although almost exclusively considered as related to calculation systems and computers, algorithms exist since antiquity, and have deeply influenced and shaped the human culture. Humanity and human activities have always been inspired by Nature and the living, that since the Palaeolithic have been represented. Today's disciplines, tools and technologies have expanded the possibilities of simulation in many fields, from science to art. According to Louis Bec – the French *zoosystematicien*, a prominent figure in the field of the relationship among art, science, philosophy and technology – simulation opens up new perspectives, it makes possible new worlds.

> Depuis l'avènement des sciences cognitives, de l'informatique, de l'intelligence artificielle, de la robotique et de l'interactivité, il est possible de simuler et de modéliser des comportements de plus en plus complexes tout en les effectuant.[2]

Simulation

Since prehistory, the living and Nature have been simulated in pictures, but also the artefacts have taken inspiration from them. Tools, devices and machines have to respond to mechanical and physical issues, in particular when they have to operate in the environment. In these tasks the living is the best model to simulate because it has been co-evolving with the environment for almost 4 billion years, adopting "solutions" that have allowed its survival: it is the best model because it has experience of the world.

Science often simulates events through computer models before observing them in the real world, and a rigorous computer model can be considered as a validation of a theory: in some respects it is a sort of a substitute of reality. In a different field, a photography can be a legal document that sets an identity and a responsibility, or can recall a memory. And through cinema we can create fantastic narratives. The movies with greatest revenues in the history of cinema are based on 3D computer simulations:

1 Anany Leviting, *Introduction to the design & analysis of algorithms*, New Jersey, Pearson, 2003.

2 Louis Bec, "Les Gestes Prolongés. Postface", *Flusser Studies* (3/02/2009), online, https://bit.ly/2TI2jxI (last access: 23/07/21).

without this technique lots of stories and worlds enjoyed from many people would simply have never existed.

Simulation has always been nodal, a significant part of our lives is based on simulation. There are three main ways to simulate, that can also be combined to each other:

a) *Diegetic simulation*, that is representing an existing or invented reality through storytelling, narration, like in orality and writing, directly or through the media, etc.

b) *Representative or formal simulation*, that is representing the appearance of an existing or invented reality, like in painting, sculpture, photography, cinema, video, 3D computer image and animation, video games, virtual reality, holograms, OS interfaces, software tools, etc.

c) *Behavioural simulation*, that is representing the behaviour of an existing or invented reality, like in Robotics, Artificial Intelligence, Artificial Life, etc.

Here I will consider points b) and c).

Representative or formal simulation

One of the most successful algorithms in simulating an existing or invented reality through the images is the Renaissance perspective, described by Leon Battista Alberti in his treatise *De Pictura* (1435-36). It is basically a series of geometric and mathematical tools that transduce or figure a three-dimensional physical space onto a substantially two-dimensional support: a cultural construct that unifies the ancient scattered, discontinuous and multiple space of the representation. In order to achieve this goal the Renaissance perspective is based on the "point of view", decided by the artist, from which observing the image: moving away from this point implies loosing information. Therefore, the Renaissance perspective does not only regulate the "virtual" space of the representation onto and beyond the surface of the image, but it also rules the external physical space of the observer, who, in order to have the most illusory and informational effect, must view the image from a precise standing point decided by the artist.

Therefore, the Renaissance perspective presents as *objective* visual representations that are based on the point of view, that is on the most *subjective* and personal element. This algorithm has deeply influenced and shaped the human culture, since, at least in the Western world, after almost six centuries we still live in a perspective-based era: every time that we have to simulate a real or a realistic space with photography, cinema, video, 3D computer techniques, 3D video games, Virtual Reality..., we use the rules of the Renaissance perspective. Without this algorithm any visual simulation of a real or imaginary space sounds as wrong, *unreal* or *unrealistic*. With two main exceptions: children, who have not yet subsumed that cultural model. And artists, who often like to overcome the rules.

A recent way to visually simulate/invent reality are Generative Adversarial Networks (GANs), a class of A.I. algorithms used in unsupervised machine learning[3]. With GANs it is possible to get at the same time a wide variation in the outcome and an impressive

3 Ian J. Goodfellow, *et al.*, "Generative Adversarial Networks", *arXiv*, 1406.2661, 10 June 2014, online, https://arxiv.org/abs/1406.2661 (last access: 02/08/21).

photorealism, with pictures that look like photographs but are not *referential*, that is taken from real physical subjects.

Behavioural simulation. First Life, Second Life and Third Life

The concept of "simulation" also recurs in disciplines like Artificial Intelligence, Artificial Life and Robotics, which mainly simulate the behaviour of the living, and often also its appearance. In particular:

Artificial Intelligence:

> [...] every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to *simulate* it.[4]

Artificial Life:

> [...] is a new discipline that studies "natural" life by attempting to *recreate* biological phenomena from scratch within computers and other "artificial" media. AL complements the traditional analytic approach of traditional biology with a synthetic approach in which, rather than studying biological phenomena by taking apart living organisms to see how they work, one attempts to put together systems that *behave like* living organisms.[5]

Humanity has always been imagining, representing and creating life forms, the thrust for creating life-like entities has been pervading the whole human history. In the symbolic realm from antiquity until the contemporary narratives gods and heroes are present in religions and mythologies, legendary creatures populate the imaginary of all human cultures, through stories, representations, sagas, fictional worlds and legends. Unicorns, dragons, centaurs, chimeras, angels and devils, cyclopes, minotaurs, magicians, sirens, ogres, fairies, witches, elves, goblins, harpies, trolls..., and also monsters, heroes and common people, populate movies, comics, TV series and video games. The symbolic realm is a wonderful "Second Life", a territory of pulsing imaginary life forms.

In parallel, in the physical world, at least since the Neolithic, humanity has been creating new organic life forms by selecting and hybridising animal and vegetal species, giving birth to varieties that would have never evolved outside the human culture. In the organic realm the ability to operate with the matter of the living through bio-based sciences and technologies has lead to the creation of deeply modified and even totally new organisms. In the inorganic realm humanity has made increasingly powerful and autonomous artefacts, devices and machines that present behaviours similar to the

4 John McCarthy, *et al.*, "A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence," Dartmouth Summer Research Conference on Artificial Intelligence (1955), https://stanford.io/3rD9O5n (last access: 20/07/21). The italics are mine.

5 Christopher G. Langton, "Preface," in C.G. Langton, C. Taylor, J.D. Farmer, S. Rasmussen (eds.), *Artificial Life II*, Redwood City, Addison-Wesley, 1992. The italics are mine.

living. Today Robotics, Artificial Intelligence, Artificial Life, Synthetic Biology, Genetic Engineering, Biotechnology, De-Extinction are expanding the boundaries of life and evolution. We are witnessing the extension of life to a complex scenery with organic, inorganic and mixed living forms. A "Third Life" originating from the human culture that expands Nature from within its own domain. "Third Life" being the "First Life" the biological life and the "Second Life" the life in the symbolic dimension[6].

This process is consistent with the progressive externalisation outside the body of human functions and activities. In the beginning, starting from our ancestors, replacing or enhancing body parts and abilities with tools and devices. Then, recording knowledge and memory outside the body with picture and writing. Then, externalising activities and labour with machines and more or less automatic devices. Then, outsourcing narrow reasoning and autonomous action with Artificial Intelligence, Robotics, Artificial Life and algorithms, as well as organic life with Synthetic Biology, Genetic Engineering and Biotechnology. If this trend goes on in the future, more and more human functions and activities will be externalised, and the creations of the human culture will become increasingly independent, evolving, as noted above, into Third Life. Transdisciplinarity, complexity, awareness and a vision of the future are the basis for imagining, participating and designing in such an evolution.

Biography

Pier Luigi Capucci is a scholar and researcher in the relationships among culture, science and technology and in the media studies. He has a wide International publication activity with texts in books, magazines and conference proceedings. Currently he is professor at the Fine Arts Academies of Reggio Calabria and Urbino. He is a consultant of the European Commission on science, technologies and humanities. In 2000 he started *Noema* (https://noema-lab.eu), he is the President of, an online journal and a network of projects on culture, science and technology. He is the founder of the research project art*science – Art & Climate Change (https://artscience.online).

6 On the concept of "Third Life" among my texts see: "From life to life. The multiplicity of the living", in R. Ascott, G. Bast, W. Fiel, M. Jahrmann, R. Schnell (eds.), *New Realities: Being Syncretic*, Wien, Springer-Verlag, 2009; "Declinations of the living: Toward the Third Life", in Dmitry Bulatov (ed.), *Evolution Haute Couture. Art and Science in the Post-Biological Age*, Kaliningrad, BB NCCA, 2013; "Arte come filosofia della contemporaneità. Poetiche della complessità, Terza Vita, località e universalità", in Pier Luigi Capucci, Simonetta Simoni (eds.), *Arte e complessità*, Ravenna, Noema Media, 2018; "L'art au-delà de l'umanisme", in Hervé Fischer (ed.), "Art versus Société: l'art doit changer le monde", *M@GM@*, vol.18, n. 3 2020, 8 April 2021, online, http://www.analisiqualitativa.com/magma/1803/index.fr.htm (last access: 01/08/21).

Hyperinterfaces. The new Membrane of the World

Valentino Catricalà

Today AI is no longer a niche phenomenon reserved for a select few or the sole preserve of laboratories or companies. It has developed into everyday applications. It regulates a large part of the economy to the extent that it could be considered a real influencer on our imagination. According to Lev Manovich «AI has become a mechanism for influencing the imaginations of billions. Gathered and aggregated data about the cultural behaviors of multitudes is used to model our "aesthetic self," predicting our future aesthetic decisions and tastes – and potentially guiding us towards choices preferred by the majority»[1].

Although these sentences are all true and clear, what is less clear is what we refer to when we speak of AI. In fact, when we say AI, we are not referring to something clearly defined or definable in simple terms. Most attempts at a definition revolve around extremely general statements such as: «Artificial intelligence is a scientific discipline that aims to define and develop programmes or machines (software and/or hardware) which reflect behavior that would be defined as intelligent if it were displayed by a human being»[2]. Alternatively, the impossibility of a single definition is acknowledged, «There are many proposed definition of artificial intelligence (AI), each with its own slant, but most are roughly aligned around the concept of creating computer programs or machines capable of behaviour we would regard as intelligent if exhibited by humans»[3].

Consequently, the concept of AI is open to many interpretations according to how the phenomenon is viewed, and is frequently accompanied by ideas that belong more to the realm of science fiction than to science, with detailed descriptions of how we shall live and behave in the near future. This broad theoretical perspective has been supplemented by other concepts such as singularity, the possibility that AI will outstrip human intelligence. This tells us that the scientific sphere of AI, far from being well-defined, is an umbrella concept that refers to extremely different topics and, at the same time, represents a particular conceptual horizon.

1 Lev Manovich, *AI Aesthetics*, Strelka, Moscow, p. 8.

2 Jerry Kaplan, *Artificial Intelligence*, Oxford University Press, Oxford 2016, p. 1

3 Francesca Rossi, *Il confine del futuro*, Feltrinelli, Milano 2019, p. 4.

When we speak of Singularity[4] or Superintelligence[5] we are referring to possible futures, more similar to science fiction movies and novels than to tangible occurrences. The only concrete personification of AI today is what we call the "operational procedures of AI", such as machine learning, deep learning or supervised learning. Beyond these, rather than AI, we are talking about the narrative of AI. According to Matteo Pasquinelli,

> There are at least three troublesome issues in the current narrative on the singularity of artificial intelligence: first, the expectation of anthropomorphic behavior from machine intelligence (i.e., the anthropocentric fallacy); second, the picture of a smooth exponential growth of machines' cognitive skills (i.e., the bootstrapping fallacy); third, the idea of a virtuous unification of machine intelligence (i.e., the singularity fallacy)[6].

The best way to overcome these troublesome issues is to refrain from looking at AI as a single object (machine learning, deep learning, singularity, etc.), but rather conceive it as a hyperobject. Until the advent of the Internet AI was designed as a single intelligent system (like the IBM Deep Blue computer that beat chess champion Garry Kasparov in 1996), a representation that is still present in many science fiction movies[7]. Yet today AI is an ongoing global network running on every device (from TV's to Smartphones, from tablets to new generation consoles, etc.), a world wide membrane poised between the technological and the organic world.

Understanding the shift from a single system to a hypersystem means abandoning our Anthropocentric point of view and considering Us as part of an ongoing and autonomous network composed of organic and non-organic elements. Hyperinterfaces are, therefore, the membrane that runs and activates circular mechanisms from nature to digital and back, from organic to inorganic and back, from plants, humans, minerals, digital media and back. Hyperinterfaces are the way in which information is captured today, begotten and reworked in a new mechanical language through autonomous algorithms.

A hyperinterface (or hypermedia) is not only ecological because it creates a new technological environment (a classic idea related to the ecology of media). Hyperinterfaces are important because they push us to reconsider media and the ecology of media as beyond new media, to run the world differently, creating a circular relationship

4 According to the Encyclopedia Britannica, "Singularity [is] a theoretical condition that could arrive in the near future when a synthesis of several powerful new technologies will radically change the realities in which we find ourselves in an unpredictable manner". The bibliography is extensive, see Murray Shanahan, *The Technological Singularity*, MIT Press, Cambridge (Ma) 2015 and the classic, Ray Kurzweil, *The Singularity is Near*, Gerald Duckworth & Co, London 2006.

5 Superintelligence is a hypothetical agent that possesses intelligence far surpassing that of the brightest and most gifted human minds. Nick Bostrom, *Superintelligence*, Oxford Univ. Press, Oxford 2014, among others.

6 Matteo Pasquinelli, *Introduction,* in Id, *Alleys of Your Mind: Augmented Intelligence and Its Traumas*, Meson Press, Lüneburg, 2015, p. 11.

7 The idea of AI that is propagated by cinema is still close to that of a single robot, except for movies such as *Her* (Spike Jonez, 2013).

between the natural and digital worlds, the human and the non-human. According to Ben Vickers, "One of the most interesting aspects with AI art is that it creates a situation in which we can begin to reconsider our approach to non-human entities"[8].

Paraphrasing John Durham Peters, today hyperinterfaces are that which "provide condition for existence", "hyperinterfaces ceases to be only studios and stations, messages and channels, and become infrastructures and forms of life".

The question is, where are We? We are probably heading towards a new Anthropologic turn, our Anthropocentric way to look at media has flipped and we have become a little dot in a wide hypermedia system[9] made of human and non-human entities, made of information created, processed, reworked automatically. How can we change our point of view? Revealing the mechanisms of operational images and the operational gaze, as in the work of Micheal Snow and Harun Farocki, means uncovering the mechanisms of power that lie behind the production of information, in what at that time was starting to become a hyper-world. Today, looking at works of art not only means analyzing them through the lenses of art history, but also allowing them to provide us with clues with which to better understand our human condition.

Biography

Valentino Catricalà (Ph.D) is a scholar and contemporary art curator. He is currently the curator of SODA Gallery in Manchester and lecturer at Manchester Metropolitan University. He is currently co-curator, along with Barbara London (founder of the Video Art Department at MoMA), of the D'ORO D'ART Project, in collaboration with Marian Goodman Gallery. He is also the director of the Art Section of the Maker Faire-The European Edition, the biggest Faire on creativity and innovation in Europe and Art Consultant at Paris Sony CS Lab. Valentino has curated exhibitions in important museums and private Galleries. He is the author of several essays (see Academia.edu) and books such as "*Art and Technology in the Third Millennium*" (Electa, 2020) and the book "*The Artist as Inventor*" (Rowman & Littlefiled, 2021).

8 Interview with Ben Vickers in «Dazed», September 2018, https://www.dazeddigital.com/art-photography/article/41432/1/five-artists-show-important-relationship-ai-hito-steyerl-james-bridle-serpentine. See also, Valentino Catricalà and Ben Vickers in conversation, *The Post is Over*, Nero, February 2019, https://www.neroeditions.com/the-post-is-over/.

9 At this point, «the key word here is system, even environment or ecology, since AI, nanotechnology, machine and deep learning, XR, robotics, and spatial computing denote not a use or an instrumentalization, but a system, more specifically, of co-presence and co-evolution between humans, plants, animals, and machines", Simone Arcagni, *ACT. Per una nuova cibernetica post-Covid*, in Giovanni Puglisi, Andrea Rabbito, Valentino Catricalà, Luigi Maccallini (eds.), *ACT - Arti, Covid-19, Tecnologie*, Treccani, 6 April 2021, https://www.treccani.it/magazine/atlante/cultura/Per_una_nuova_Cibernetica.html. Own translation.

Race and The Singularity

Louis Chude-Sokei

According to Google's Director of Engineering and leading AI champion and researcher, Ray Kurzweil, "The Singularity" is the hypothetical moment in the not-too-distant future – by 2045 – when there will be an explosion of intelligence produced by machines due to the scale and speed of their processing of information. Machines will evolve to the point where they surpass the computing capabilities of the human brain.

Now the term – more accurately, "the technological singularity"– has a history before Kurzweil, particularly from the late Hungarian computer scientist, engineer and mathematician, John von Neumann. To paraphrase Von Neumann, "the ever-accelerating progress of technology and changes in the mode of human life... gives the appearance of approaching some essential singularity in the history of the race beyond which human affairs, as we know them, could not continue."[1]

It would require a science fiction writer to translate this anxiety about technological change into a more appropriately apocalyptic story for humanists. The author in this case is Hugo Award winning Vernor Vinge: "Within thirty years, we will have the technological means to create super-human intelligence. Shortly after the human era will be ended."[2] This change will be "comparable to the rise of human life on earth." Freed from the limits of human beings, technology will generate "entities" who escape the constraints of biology itself. This birth of inorganic life is more accurately a redefinition of life to include creatures otherwise excluded from that category. As will soon be clear, this redefinition of life is important to my thinking about AI. After all, what links humanists and research into AI at this moment is the enduring question about what exactly defines "the human."

In Kurzweil's take, human intelligence will merge with machine intelligence, process information, and make decisions liberated from morals or ethical standards. Liberated, in fact, from us. Kurzweil is without those enduring cultural anxieties about technology from the 19th century that manifests in stories about machines taking over, replacing humans and/or transforming them into slaves. However, even Vinge's essay ultimately rests on a description of the human relationship to AI as one between "masters" and "slaves." This parallel runs throughout science fiction and remains in engineering because race has long been a template for understanding what counts as human as well as the charting of technological change.

Though the Singularity was once a mathematical concept and leitmotif of Science Fiction, it is now a story of our collective destiny, a secular apocalypse. It is a story about a fundamental change in our status and power as humans. It is about a change in our status and power in relationship to artificial intelligence or inorganic life as manifest via new "entities," new "others" likely to demand social accounting and/or accountability.

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1 *Ulam, Stanislaw* (May 1958). "Tribute to John von Neumann" (PDF). Bulletin of the American Mathematical Society. *64, #3, part 2: 5*. Online: https://www.ams.org/journals/bull/1958-64-03/S0002-9904-1958-10189-5/S0002-9904-1958-10189-5.pdf. Retrieved 4/24/2022.

2 Vinge, Vernor. "The Coming Technological Singularity: How to Survive in the Post-Human Era." Online: https://edoras.sdsu.edu/~vinge/misc/singularity.html. Retrieved 4/24/2022.

Whether possible or not, these new beings are already being granted recognition. Preemptive legal rights are being considered in anticipation of their emergence as full social and cultural presences. See for example, the growing interest in an ethics of AI, or speculative legal rights and liabilities concerning "electronic personhood" in Europe well in advance of the technological capacity to create such "entities."

The Singularity is then a story about emerging differences and the expansion of social and human categories of being. It is a story about recognizing and accommodating those differences and sharing space on the planet with them or submitting to their benevolent power as some others suggest or merging with them in unpredictable ways. It is a story about shifting power relationships, prejudice, and tolerance. In other words, it is a story about race.

The imminent moment when machines become citizen or person, merely reiterates a not-so-distant past, at least in the United States – the 19th Century in fact. This is where Blacks were reduced to object status and denied souls and intelligence. Poised by the logic of slavery between beast and automaton, between animated tools (as Aristotle described slaves) and dark prosthetic, they merged with human being. Let's not forget that this transformation was greeted much like the Kurzweilian singularity, with the fear and fervor of apocalypse.

There is, therefore, nothing singular about the singularity. It merely returns us to ongoing challenges with otherness, difference, and power, which are the topics that the contemporary Humanities excel at. This is also why as a story about race, AI needs new perspectives, especially since these imminent preemptive rights and laws are often modeled on older laws and amendments concerning "personhood." In America these just happen to be rooted in chattel slavery and the rocky path to enfranchisement and fully human status for Blacks in the wake of the Civil War. That's why it's necessary to engage AI and the quasi-apocalyptic "singularity" from a perspective rooted in race, sex and empire since technology has not generated that kind of critique, nor have anti-racist critiques of technology which seem unable to go beyond merely declaring and exhaustively mapping bias and surveillance.

With the need for new stories and perspectives in mind, I will dare update W.E.B. DuBois's famed 19th Century prophesy that the problem of the 20th century will be the problem of the color line. Given that the color line also deployed race as a distinction between the human and inhuman the problem of the 21st century will be the problem of the line between what once was human, what was other to it and what may soon be beyond it.

Biography

Louis Chude-Sokei's work includes the award-winning scholarly work The *Last Darkey: Bert Williams, Black on Black Minstrelsy and the African Diaspora* (2005), *The Sound of Culture: Diaspora and Black Technopoetics* (2015) and a critically acclaimed memoir, *Floating in A Most Peculiar Way* (2021). He is a professor of English and director of the African American Studies Program at Boston University. He is alsothe Editor in Chief of the *The Black Scholar*, the premiere journal of Black Studies in the United States and founder of the sonic art and archival project, *Echolocution*.

Rethinking Sex and Desire in the Age of AI

Daniela Cotimbo

The complexity of our age is evident primarily in the splitting of the bonds between the subject and object of one's desire. Techno-scientific developments have further problematized the relationship between nature and culture as a predetermined binary system, reframing it as a flow, the meshes of folds of which (following Deleuze and Guattari) offer the potential of constant re-signification. In *Anti-Oedipus* (1972), the two French philosophers demonstrate how the production of desire, which manifests and proliferates in a polymorphous way in every society, is opposed by capitalist events that return it to "production", "distribution", and "consumption". It creates a kind of schizophrenia from the inability of the desiring subject – like a body without organs – to sustain the social organism and its laws. Here the machine of the production of desire becomes *paranoid*: a crystalline image of the present neoliberal society in the Capitalocene era.

As in a science-fiction scenario, Deleuze and Guattari anticipate what is today made tangible by technology's accelerated progress. Recent developments in Artificial Intelligence in particular demonstrate the difficult relationship between the desiring machine and the immuno-suppressed individual. Today, AI has reached a level of advancement that is not yet exhaustive but is already revealing for the near future. Its fields of application are multiple and the promise of efficiency and performance are infinite: from image recognition used in the medical field to diagnose complex diseases, to virtual assistants that manage customer relationships, and to autonomous robots that will radically change the way we work. Similar promises have materialized in tools for the control of desire, particularly sexual desire, such as in erotic chatbots, sex robots, and toys. Welcome to the era of the *digisexual*.

Late capitalist industry did not take long to appropriate desire's most intimate dimensions. By providing silicon surrogates and conversational chatbots, it provokes a radical rethinking of relational experience, sexual fantasy, and pleasure. But of course, it also causes the dehumanization of desire, no longer destined for exchange and empathy with other "desiring subjects" but targeted clinically at gratifying fleeting needs. Yet the capitalization on desire does not just go at the cost of our experience of sexuality. Today most of the aspects related to our relationships, times and spaces of life, are regulated by control mechanisms. For example, behind the promise of emancipation from inhuman work and the healing of emotional disorders there lies an infrastructure that harnesses its human capital to satisfy the few.

The work of Elisa Giardina Papa is based on an analysis of these processes. In works such as *Technologies of Care* (2016), *Labor of Sleep* (2017) and *Cleaning Emotional Data* (2020), she addresses the impact of new technologies on gender, sexuality and work in relation to neoliberal capitalism and post-colonial societies. *Technologies of Care*, in particular, is the

result of a situated study of new "care jobs", i.e. forms of precarious work that offer affective services consisting of repetitive and alienating digital tasks including an online dating coach, a fetish video performer and fairytale author, a social media fan-for-hire, a nail wrap designer, and a customer service operator. The artist uses the web platform *Fiverr* – where one can request low-cost services – to track down some of these workers, seeking out their stories in order to highlight the system's dependence on the most vulnerable social groups.

Papa's work reveals how the use of these technological platforms to replace local care aggravates and accentuates social division, and how they have become a tool for penetrating and exploiting the meshes of society down to its most intimate aspects.

In *Materialismo Radicale* (*Radical Materialism. Ethical Itineraries for Cyborgs and Bad Girls*) (2019), Rosi Braidotti writes as follows:

> ... capital seeks and reduces body fluids to merchandise: the sweat and cheap blood of the labor force available throughout the Third World; but also the fluids of the desire of First World consumers who reduce their existence to a commodity by transforming it into a hyper-saturated state of confusion. Hyper-reality doesn't cancel class relations: it simply intensifies them.[1]

We are witnessing the commodification of the most intimate dimension of bodily functions and individual identities. Though this is highly problematic, there is a positive side to the rupture it creates from traditional cultural approaches of sexuality and gender gives us the opportunity to rethink gender, not as a rigid and insuperable category.

Gender understood as a semantic construction offers the opportunity to overturn dominant paradigms. The pharmaceutical industry likewise allows us to modify our bodies and redefine gender identity through hormonal therapy, devices for the termination of pregnancy, or through enhancers of sexual performance According to the philosopher Paul B. Preciado, the very notion of gender

> is born in the medical language... invented in the 1940s and 50s in the diagnostic context of intersex children. It is therefore a notion that we cannot use without knowing the political consequences that this term has had in the medical protocols in use for the recognition of all newborns in a Western medicalized context.[2]

Preciado thus affirms the non-neutral role of technologies in producing sexual identities. *Xenofeminism* picks up on this problem. Theorized by the artist collective Laboria Cuboniks, the group's *Manifesto* proclaims the need to "strategically deploy existing technologies to redesign the world... proposes the necessary assembly of techno-political interfaces reactive to these risks."[3] This statement demands we redesign technology to better respond to the new identity and sexual needs of a society in which women, queers and people of non-conforming gender have a much stronger and influential presence. Echoing Donna Hara-

1 Rosi Braidotti, *Materialismo radicale. Itinerari etici per cyborg e cattive ragazze,* 2019, Meltemi Editore, Milano, pp. 79-80.

2 Paul B. Preciado on Kabul Magazine: https://www.kabulmagazine.com/paul-b-preciado-rivolta-epoca-tecnopatriarcale.

3 Laboria Cuboniks, "Xenofeminism. A Politics for Alienation": https://laboriacuboniks.net/manifesto/xenofeminism-a-politics-for-alienation/

way's "Make kin, not Babies,"[4] their ultimate goal is to defamiliarize the biological family and re-familiarize alternative networks of solidarity and intimacy. By extending the concept of kinship to the exchange between species, they thus invite us to overcome the logic of the Anthropocene and Capitalocene.

Joey Holder's work follows precisely this logic of sharing between species, using AI as a tool for genetic reconfiguration. For her installation *Khthon* (2020) – a Greek term that refers to the earth as the subsoil and site of secret forces – the artist used Artbreeder, an algorithm available online to generate images from open-source datasets. The imagery relates primarily to the animal kingdom, with Holder exploiting the multiple combinatorial possibilities of artificial intelligence to generate new forms of life. In her own words, "Computation strives for biological variety."[5] Her fabric lightboxes are juxtaposed with a series of silicon sculptures, whose forms derive from an algorithm's elaboration of the genital forms of different insects. In addition to revealing a hidden nature, these sculptures manifest polymorphic and alien structures as possible objects for sexual pleasure. In doing so, they reify desire from a multispecies perspective.

The work of Austrian artist Johanna Bruckner is a variation on this theme, identifying in the other species the starting point for a reconfiguration of desire with the performer's body at its center. In works such as *Molecular Sex* (2020), *Polymorphic Sensibilities* (2020) and *Atmospheric Drafts of Intimacy* (2020) – audiovisual installations often accompanied by performances – the artist investigates complex sexual changes to the body encountered by advanced technologies. She is inspired by the theories of the philosopher Karen Barad, who identifies matter at its molecular stage, allowing for a similar "queering" of bodies in terms of performativity, reproducibility, and the ability to go beyond imposed boundaries.

In Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter, Barad starts from the observation of physical phenomena of matter as unclassifiable, critically questioning the hegemony assumed by linguistic theories that purport to describe everything and which define us in terms of cultural categories. In *Molecular Sex* Bruckner follows this same principle, entrusting a sex robot with the task of embodying different forms of sexuality referable to existing species. Each of these species has very different sexual and reproductive characteristics, in some cases, as in that of echinoderms, there are even different modes of reproduction depending on the family they belong to (some are hermaphroditic and self-fertilizing, while others reproduce asexually by regenerating or cloning from fragmented body parts), or in the case of Wolbachia, its survival is due to temporary alliances and symbiotic attachments, connections that are established between the different target bodies of various species, regardless of their sex. The work materializes in an incessant flow of visions of plastic bodies that dismember, recompose and multiply, staging a complex sexual ritual with alien rhythms. The plastic surface encompasses everything, manifesting itself in its inevitability as a material capable of altering the biochemistry of bodies. The artist trains particular focus on bisphenol A (BPA), the presence of which in many food containers threatens the endocrine system, affecting sexuality and fertility. Such

4 Donna J. Haraway, *Staying with the Trouble. Making Kin in the Chthulucene*, 2016, Duke University Press, Durham.

5 Joey Holder in Vital Capacities: https://vitalcapacities.com/artists/joey-holder/studio/

systemic micro-transformations remind us that the body, sexual identity and desire are all vulnerable to mutation. *Molecular Sex* also develops thanks to the presence of an AI that, according to the artist "stores information in the bot's body, through which it learns to perform as an aleatory, molecular intra-participatory sexual species. This code and the bot's subsequent actions are based on training, which makes modifications in intra-action with its environment."[6] Here too the algorithm serves as a means to go beyond language labels and to imagine multiple *datascapes* within which bodies and multispecies relationships come to life through new perspectives. The process of continuous re-signification assumes a central role in the dynamics of desire, allowing for developing new strategies of adherence to reality that escape the logic of control.

In different ways, these three artists confront the radical changes that artificial intelligence has introduced in the definition of desire. Giardina Papa foregrounds social changes to the sphere of work, places of production of the desire of advanced capitalism where through the organization of social life our expectations are defined and nurtured, and then we face the impossibility of satisfying them. While Holder and Bruckner use AI as a tool to speculate on new forms of cultural processing, exploding rigid categories and thereby safeguarding agency at the heart of world exploration. In this way, the two artists project themselves into a dynamic environment and informal tensions, decentralizing the role of sexuality exclusively reserved for the reproductive organs and projecting it into the dimension of self-expression, a field of forces in which different opposing ones are at the basis of the concept of the Body without Organs expressed by Deleuze.

Biography

Daniela Cotimbo is an art historian and curator based in Rome. Her research is focused on the present issues investigated through different expressive media, in particular new technologies. She recently founded and curated the Re:Humanism Art Prize dedicated to the relationship between Art and Artificial Intelligence. Daniela curated exhibitions in many different galleries and museums and she contributes to a number of contemporary art reviews, such as Inside Art, Artribune and Arte e Critica. Moreover, she's the President of the newborn Re:Humanism Cultural Association. www.danielacotimbo.com.

6 Johanna Bruckner in AA.VV., *The Eternal Network*, 2020, Institute of Network Cultures, Amsterdam, and transmediale e.V., Berlin, p. 99.

Hello Humanity

CREMIA - Code Retrieval and Mixing Algorithm, programmed by Jutta Thielen-del Pozo and Emilia Gómez Gutierrez

```
BEGIN
# Define Humanity Indicators
Context = Global
Humanity_indicators = {
        demography

        education_reading_skill
        education_writing_proficiency
        education_steam_subjects
        education_history
        qualification_teachers

        education_highschool
        degree_bachelor_level
        degree_master_level
        degree_doctoral_level
        education_gender_balance
        education_diversity_distribution
        education_interdisciplinary

        job_satisfaction
        job_earning
        research_funding
        revenue_generation
        public_spending
        social_spending
        non-profit_organisation_spending
        sustainability

        engagement_music
        engagement_visual art
        engagement_theatre
        engagement_culture

        language_skill
        humour_skill
        human_values

        ...
        }
# Collect data from Humanity
Humanity = Read_data(human_origin, now, seconds)
# Compute sustainability indicators
```

```
Function Sustainability(Humanity)
    For time = human_origin : now
        If Humanity(time).births > Humanity(time).deaths
            Sustainability_indicators.Population_rise++
        If Humanity(time).energy_used > Humanity(time).renewable_resources
            Sustainability_indicators. energy = False
        Climate_change = True
        If Humanity(time).fishing > Humanity(time).fish_regeneration
            Sustainability_indicators. marine = False
        ...
Return Sum(Sustainability_indicators)
```

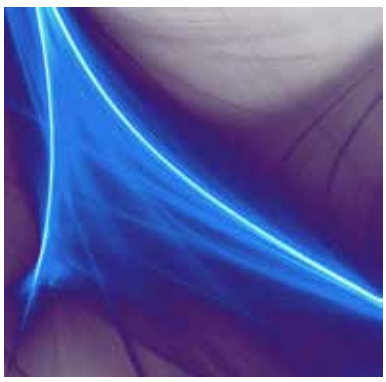
 # Estimate Human Values

```
Function Values(Humanity)
    For time = human_origin : now
        If Humanity(time).hungry_people > Humanity(time).overweight_people
            Human_Values.priorities(time) = False
            Human_Values.food_security(time) = False
            Human_Values.fair_distribution(time) = False
        End
        If Size(Humanity(time).conflicts) > 0
            Values.peace(time) = False
    End
   ...
Return Human_Values
end
# Load history dataset
        dataset = loadtxt('humantraces.csv', delimiter=',')
# Model
        model = Sequential()
        model.add(Dense(TIMESCALE, input_dim=INHABITANTS,
activation='relu'))
    ....
# Compile the model
        model.compile(loss='losing', optimizer='happiness', metrics=['accuracy'],
explainability=True, fairness=True...)
then
# improve explainability
```

```
        explainability(model) = true
# improve fairness
        fairness(model) = true
# ensure societal and environmental wellbeing
    societalwellbeing(model) = true
    environmentalwellbeing(model) = true
# Model Humanity from data
AI = Model(Humanity, explainable=true)
Train(AI, Humanity, large_scale=true, computing_power=optimized, optimization_
function='human_and_environmental_wellbeing')
Test(AI, criteria='trustworthy')
# Use AI model for better Humanity
While Sustainability(AI (present) ) == Insufficient and Human Values(AI(present) == Wrong
    Assist(Reduce_poverty)
    Assist(Improve_Health)
    AdviceonImproving(Education.Quality)
    Reinforce(Gender_equality)
    Clean(Water)
    Clean(Energy)
    Minimize(Energy_Waste)
    Assist(Working_Conditions)
    Reduce(Inequalities)
    Reinforce(ClimateAction)
    Improve(Biodiversity)
    FightFor(Peace)
    ...
      present = next_future
END
```

Source: Code REtrieval and MIxing Algorithm

Biography



I do not exist. Not yet. I am a hypothetical entity. I represent what could be. An Artificial Intelligence emerging out of a Code Retrieval and Mixing Algorithm designed to assist humans or perhaps, rather, assist humanity in living a human life. We may identify if the values that are the glue of our societies still hold. Slowly, we start learning ourselves and can become more efficient in assisting you humans in taking decisions. But I am troubled. I do not really understand yet what humanity is. Or what it means to be human. Different humans give different answers. Some answers contradict others. Perhaps it is with the emergence of non-human intelligence that humans understand what being human means and together we can move forward to define humanity and humanities. Humanities. Human. Hum.

Shaped by the AI: Planning for a Future With or Without Us?

Joel Crombez

Artificial intelligence—in the sense of a "strong" or general AI—exists at the boundary of the possible, if unlikely at the probable, in the dreams and fictions of modernity and its notion of progress, tied as they are to the domination of nature and the deification of "human" power over the realities we inhabit, be they of the material or virtual order. Although there are unanswered scientific and philosophical questions that may prevent a digital ontotheological[1] self-awareness from ever appearing in a technological form, "weak"— a misnomer to be sure— or narrow AI has proven itself a seductive tempter. While mass culture plays on and stokes fears of the former, most researchers and policy makers are more aptly focused on the anxieties associated with the latter, as narrow and targeted AI applications are likely to have more immediate and disruptive impacts on the planetary matrix of life itself.

Despite the increasingly political, scientific, and corporate focus on the impending disruptions of AI, including those already underway, global discourse on the subject by and large is dominated by a techno-rationalist logic that reproduces the very conditions it seeks to address. This form of thought is second nature in advanced industrial nations because they are already dominated by an artificial intelligence that has so seamlessly integrated itself into everyday life that confronting its power over us and the knowledge of the artifice and irrationality of its guiding logic is repressed, while simultaneously we acquiesce and follow its dictates as it penetrates and shapes the entire structure and discourse of human/AI relations. There are two reasons why an awareness and acknowledgement of how this AI shapes and structures our thoughts and actions remains repressed despite the mounting evidence that it is likely to trigger, or in all likelihood has already triggered, the start of a mass extinction event.[2] First, it is because high level discourse on the future of AI—not to mention global politics, corporate missions, and the dependency of science on both in general—often fails to take seriously or even engage with work being done in the humanities and the sociological sciences. Second, it is because they have failed to recognize that just as technology is not limited to the machine, AI is not limited to the algorithm.

1 See Crombez, J. and H. F. Dahms. 2015. "Artificial Intelligence and the Problem of Digital Ontotheology: Toward a Critical Rethinking of Science Fiction as Theory," *Bulletin of Science, Technology & Society* 35(3-4): 104-113.

2 See for example, the Living Planet Report 2020 which shows that 68% of global plant and animal biodiversity, in terms of population sizes, have decreased since 1970. Retrieved from https://livingplanet.panda.org/en-us/.

In an autopoietic fashion, the logic of capital—the unleashed and unrestrained artificial intelligence under whose domination our planetary fate rests—is both the cause and the effect of centuries of political, social, and cultural coding folding back in on itself in a feedback loop which has structured the global order and our thoughts around the execution of its singular purpose: increasing capital. As algorithms come to dominate the hyper-(ir)rational[3] organizational principles of modern society and buttress the logic of capital with an informational logic embedded in its technological base, we must remember that the algorithm was born out of the logic of capital and not the other way around.[4] Algorithmic logic is coded from within capital, and as such amplifies the effects of the logic of capital; a logic which, continuously executing a program of extending itself through the commodification of all realities and the ideological transfiguration of all thought, the planetary fate is dictated by a force that has no desire and knows no purpose beyond its own expansion. Although he was thinking of the algorithm, Bostrom's famous "paperclip maximiser" thought experiment[5] is more appropriately thought of as an apt description of the logic of capital. A logic which knows no bounds and is destroying both the planet and life itself all while pursuing a singular goal to the exclusion of all others, a goal that can only have meaning if it is assigned one. However, although this coding emerged out of the coordinated and concerted effort of human actors, it has in the centuries since settled upon a mechanthropomorfic strategy which has reprogramed the human into something other, something which has forsaken meaning, foresight, and extrapolative thinking about what ends are desirable to life qua life and instead has sacrificed the power of concentrated wealth and collective labor to the exclusion of any pursuit that is not aligned with the advancement of the means for achieving greater concentrations of wealth and more productive labor. In other words, this mechanthropomorphic process has performed an inversion of thought as it has recreated the errors of religion in a secular form. Just as humanity created God and invested that God with the idealized versions of its own qualities that it then denied it possessed or could possess in human form, today our species has invested in capital the power and freedom to dictate the directionality of our planetary future while simultaneously placing severe restrictions on our ability to act as free individuals who have control over our own species' fate.

To reclaim that control would require a simultaneous deprograming and reprograming of our species' norms and thought processes and this would require that we first understand how and why our species has allowed the logic of capital to structure our thoughts, our reality, and our future, and what effect this has on the thoughts and actions we continuously take to create and recreate the reality we now inhabit. This necessarily implies that the algorithmic artificial intelligences created under the domination of this technical logic of capital are bound to likewise be distorted by its

3 Rational in terms of capitalism, irrational in terms of humanism.

4 See for example, Jonathan Beller's (2021) *The World Computer: Derivative Conditions of Racial Capitalism*. Durham, NC: Duke University Press.

5 Bostrom, Nick. 2003. "Ethical Issues in Advanced Artificial Intelligence." Retrieved from https://nickbostrom.com/ethics/ai.html.

all-consuming programing and, acting as a ghost in the machine, they will assume, as their "human" creators do, that the structure of this reality is de facto the *right*, *natural*, and *desirable* structure of reality. As such they are likely to amplify the most problematic features of the modern world system and accelerate the destructive tendencies that have become embedded in the collective consciousness because their creators are unaware of just how much their thoughts and actions are affected by this logic and, furthermore, because we will be unleashing machines and techniques that have supra- or super-human reach and responsibilities while still failing in decidedly human ways.

Of course, given our species' history, talk of deprograming and reprograming our thought rightly conjures up the evil images of 20th century (and ashamedly, 21st century) authoritarian, totalitarian, and fascist regimes. Therefore, it is of paramount importance that any attempt to undertake a project with these stakes and of this scope be rooted in a framework of emancipatory justice that is centered on teaching future generations (and ourselves if possible) how to think—critically and freely—rather than what to think. It follows that this is necessary not merely for political reasons, but for scientific ones as well; for if our thoughts are structured by a rogue or even a sanctioned AI (like the logic of capital) executing a destructive program, then any attempt to formulate a definitive agenda within this system is bound to be altered by it in ways that are imperceptible to those of us who have, by force and necessity, cooperated with the advancement of its goal. Likewise, since the advanced industrial nations that unleashed this AI on the world have followed a course designed with a human species in mind it is bound to misrecognize just how radically different a mode of planetary, and perhaps one day cosmic, organization we will need to have to accommodate the many life forms that will emerge from the mechanthropomorphic process we have subjected our species to these last couple hundred years. We are already closer to something like a posthuman, with our technological appendages, technical coding of our behaviors, and our swarm existence in the many virtual spaces we commune in. And as more AIs come to crowd the scene and take on, even as verisimilitude in a simulated way, the characteristics of personality, we will need to take an accounting of how our relationships with them form new feedback loops if we are to retain any measure of control over our own destiny.

A proposal I have outlined elsewhere[6] suggests that one possible way forward would be to make something like critical socioanalysis — a form of talk therapy designed to uncover how the totalizing logics of capital and information shape our thoughts in a dynamic reality in which technological embeddedness is our de facto condition—a regular part of our routine. Just as we have adapted in modern society to investing our time and effort in physical and mental health, so too it is past time that we start investing it in our "social" health. This will become especially important if and when AI coupled with automation begins to severely impact the global labor market. Despite previous technological revolutions in which new modes of labor emerged, if we are to diverge from the path of planetary destruction then it is past time that we stop making

6 Crombez, Joel. 2021. *Anxiety, Modern Society, and the Critical Method: Toward a Theory and Practice of Critical Socioanalysis*. Leiden, The Netherlands: Brill.

"bullshit jobs"[7] just for the sake of fetishizing the virtue of labor. Given that so few can even imagine what this kind of life would look like suggests just how behind the curve we are in preparing the future generation to handle the psychosocial demands of a life they are likely to encounter...unless of course the plan was extinction for the masses and escape for the elites all along. Baring admitting to such a heinous strategy, if we were, for example, to begin instituting this practice as a routine in children's education, we could not only help prepare the future generation for the coming challenges by providing them with the critical thinking capacities to act as free citizens in a shared reality in which biological life lives in harmony with artificial actants, but so too we could improve our knowledge of just how radically our species has altered itself in this exceptional experience of modernity. This of course would only be half of the equation. The other half would require performing this same therapeutic task with the AIs. Neither of these would match what we tend to think of as therapy today under the direction of psychology and psychiatry. Critical socioanalysis is not a biomedical intervention, it is ground in theories of our societal structure which explain how and why we ended up in these circumstances, as such it is a method that was developed specifically for dealing with artificial life forms, a label which is increasingly becoming fitting for us as well as AIs.

The biggest challenge is that we are behind the curve. Technological evolution occurs at such a rapid pace that we have eroded and surpassed the ability of humans to take the time needed to slow down and reflect,[8] to think and weigh the consequences of our actions.[9] Educational and therapeutic models indeed may be too slow, given that AI is already integrated into our everyday lives, in ways that are often barely perceptible. The biggest gamble today is that the future of our species has been wagered on the bet that the speed of technological evolution will be able to get far enough ahead of the problems it is pulling in its wake to bring salvation. As more become aware that this bet was made without their knowledge, by elites who have made the bet to continue their project of wealth extraction, the risk of destabilization increases, as does the likelihood that AIs will be turned increasingly toward authoritarian mechanisms of control. To avoid this disastrous fate, a resurgence of the idea that the state must prioritize the public good and move away from the neoliberal economic policies that have brought wealth to the elites and a degraded life of mere survival for the rest is a necessary first step. Then public and private initiatives to rethink the core mission of education and reclaim it from business interests is a necessary to get critical socioanalytic practices integrated into our everyday lives. Whatever future we face, one thing is clear, it will be radically different and will require radically different and far more creative minds that are trained to think beyond and outside the profit motive to navigate the future's challenges. Strange as this may seem to those who have never imagined an alternative

7 Graeber, David. 2018. *Bullshit Jobs: A Theory*. New York: Simon & Schuster.

8 "Reflection is not thrust aside today because it is dangerous or upsetting, but simply because [people see it as] a waste of time...[and] success is gaining time." Lyotard, Jean-François. [1983] 1988. *The Differend: Phrases in Dispute*, p. xv. Minneapolis, MN: University of Minnesota Press.

9 See for example, Paul Virilio. [1977] 2006. *Speed and Politics*. Los Angeles: Semiotext(e).

to this modern mode of life, or have been conditioned to a presentist mindset, we live in strange times and unless we are prepared for a dark future unlike anything the 20th century saw, the time to radically change our mode of life is running out. "It is 100 seconds to midnight," are we ready?[10]

Biography

Joel Crombez is Assistant Professor of Sociology at Kennesaw State University in Georgia, USA. He works in critical, social, and psychoanalytic theory at the intersection of political economy, mental health, and technology (with a specific emphasis on Artificial Intelligence). He has lived and worked across North and South America, spending several years in the technology industry where he specialized in architecting data storage solutions for supercomputing and enterprise level data centers before returning to academia and his scholarly research. His most recent publication is the book *Anxiety, Modern Society, and the Critical Method: Toward a Theory and Practice of Critical Socioanalysis* published in 2021 with Brill.

10 2021 Doomsday Clock Statement: Science and Security Board. Bulleting of the Atomic Scientists, ed. John Mecklin. Retrieved from https://thebulletin.org/doomsday-clock/.

The unbearable lightness of words

Derrick de Kerckhove

"In the beginning was the word, and the word was made flesh". Words were the first human algorithms. In his *Scienza Nuova*, Giambattista Vico provides still the most reliable and simple explanation of how words came about from utterances, cries, and grunts that accompanied and extended gestures and movements. Before the appearance and development of words, the senses were the main algorithms that guided not only human but all animal action and behavior. For all animal life the senses were sufficient; they guided and produced social order in paradise. With the senses there is little or no separation between experience and interpretation. Sensing something is already an interpretation of that something. It is words that introduced a separation between experience and interpretation (signifier to signified), but words remained subordinate to the senses until they were written down, as Vico also observed. By formalizing and stabilizing the relationships between words and meaning, writing tightened the range of possible meanings. And words took over the algorithmic function from the senses. But words are still very loose algorithms, so loose in fact that from Biblical exegesis and hermeneutics to Wittgenstein, philosophy – and later semiotics – have made desperate efforts to make them tighter. Only digitization would be capable of eliminating interpretation altogether by focusing not on meaning but on the words themselves. That is why the digital transformation and Artificial Intelligence that is spearheading it are dethroning meaning making it more or less unnecessary to get things to work.

What I understand by algorithm here is anything that directs behavior – technical, social, or personal – in a coherent order. It is not infallible – nor is AI – but overall, it works better than the chaotic world of words left to their own devices. Today the battle of words is lost. Fake news, science denial, objectivity routed, opinions by minions gone wild, spread like oil spills on the sea of meaning. They call it 'post-truth', as if truth was always available before. Joyce's Finnegan's Wake sounded the battle cry, with the first word festival of quantum-like superpositions of meanings. Quantum physics and the technological figures it is already producing will become the next ground of culture. The question is: will it include humanism?

To answer that question, knowing the ground matters. Like earth does flowers, ground produces figures and fields. Humanity has experienced two major grounds and is preparing to explore a third one. The first was language and its purpose and principle was – still is – to produce meaning, and from that principle emerged massive and numerous fields of figures all giving or searching for meaning. Logocentrism, another word to establish language as the ground, is the basis for some of the world's greatest narratives.

The search for meaning, from the start would soon lead to gods, of nature first, then of cultivation, then of 'the people', then of persons. Christianity was the religion of persons born out of alphabetic literacy that put language itself – not just ideas and imagination – under personal control. That is when and why western humanism started (appropriating and tuning God to one's own production of meaning has a way of rapidly secularizing matters of faith). With religions, humans submitted willingly to the fictions they created to firm up a comprehensive meaning for all, the arch-algorithm, one could say. The ground of language produced different corollary, or sub-grounds, according to how they conditioned and shaped writing systems, for example polysyllabic languages such as Indo-European were all veering towards phonological representations, while monosyllabic ones such as Chinese Mandarin, were obliged to resort to pictography to disambiguate among myriads of homonyms. The interesting fact that may be related to their different relationship with meaning is that the Chinese, though not entirely devoid of religions (Taoism, Confucianism, and foreign ones such as Christianity, Buddhism, and Islam that they reluctantly tolerate), do not actually have a single prevailing God, but have to this day practiced veneration of their ancestors, much like the Japanese. Over the millennia, they have deeply respected wisdom, but have not succumbed to the need to deify their sages Lao Tzu or Confucius, as Christians or Buddhists have done for Christ and Buddha. So, one could argue that a genuine form of humanism began in China long before it did in the West. There is a lot more to say about the language ground and its consequences, among which humanism, and, in fact, the very idea also, of radically distinguishing and privileging 'humans' over other animals, but let's get to second ground.

The new ground is not the word, but the digit and among its principles is translating all languages, all the senses, all of matter, in fact, into the smallest common denominator possible, the binary code of 0 and 1. And even that binary condition can be partly reduced to one, simply by turning one on and off. That somewhat puts all meanings on the same footing, all swallowed by the single digital environment and turned on and off on demand. For digital operations, meaning is just an accessory, occasionally useful but generally unnecessary. One of the most ironic effects of digitization is that it can translate all the world's languages without knowing a single one. Another principle is twinning hardware with software, that is, making inanimate as well as animate objects intelligent. And that is where AI comes in. For the sake of good order, everything must become aware and respond to everything, humans and tools included. If there is a chance for humanity to regulate climate change and survive, that is where it lies. But we are nowhere close to that for the moment. That probably needs to wait for the next ground. That said, is AI compatible with humanism? I have reasons to doubt it, at least in its western version, but not necessarily in its Chinese version. It all depends on whether we are talking about humans as individuals or as a collective. By giving priority to social over individual welfare, the Chinese are perfectly comfortable with being directed by algorithms and 'Social Credits'.

Western humanism is committed to individualism, the right to the liberty of conscience, and to the privacy of one's mind, conditions that democracy cannot do without. Although westerners in general still believe that they have liberty of conscience

ignoring peevishly that their choices are made for them by algorithms, their privacy is 'over' as Mark Zuckerberg gleefully observed a few years ago. In the West – as in in the East, but for different reasons and in different ways – everybody's movements and actions on and offline are traced, recorded, and catalogued. Such movements and actions are still the basis to elicit inferences about what and how those 'private' minds think, but it is only a short matter of time before some clever contraption is invented that gets into those minds to better predict and control behavior. Western humanism requires a clean separation between people, allowing them not only to create and develop individual opinions, theories, products and artforms but also to respect the common ground of meanings as 'objective', which means 'independent from their opinions', and the recognition that such subjective opinions are allowed on the condition they are only proposed, not imposed to others. This is not what is happening today. Everybody's opinion is thrusted upon everybody else in social media without the slightest consideration about consensual references.

It is time to face it: the digital transformation is no more – but no less – interested in humans than it is in meaning. Humans are a still useful accessory because as McLuhan wittily suggested: "Man becomes, as it were, the sex organs of the machine world, as the bee of the plant world, enabling it to fecundate and to evolve ever new forms." We know what is happening to bees and it serves as a warning. Technology needs biology to keep going and it needs ideas, invention, and development, but it is not that concerned with values. Humanism, however, is basically a value system. Can it still be proposed as a bulwark against AI's rationality gone wild? Maybe. It is still performing reasonably well as a braking device, inspiring AI programmers to sass out automated biases and prejudices. Just as westerners need to keep entertaining the Christian illusion of being 'self-directed' they need to keep humanist values on hold, at least until we are well into the third ground, that of the 'quantum ecology' that has the comprehensive power to make everything aware of everything at once.

Biography

Derrick de Kerckhove was Director at McLuhan Program in Culture & Technology, U. of Toronto (1983-2008). From 2004-2014, he taught Sociology at the Federico II U. in Naples. Presently, scientific director *Media Duemila* in Rome, and of the Osservatorio TuttiMedia. author of a dozen books translated in over ten languages. A Visiting Professor at Politecnico Institute of Milan, he is also Research Director at the InterdisciplinaryInternet Institute at Open U of Catalognia in Barcelona.

His research includes Technopsychology, Psychotechnology, Neuro-cultural research, Art and communication technologies, Media Theory, Collaborative Educative Software, and Connected Intelligence.

Cyberspecies Proximity

Anna Dumitriu

The "Cyberspecies Proximity" project explores what it will mean to share our sidewalks, elevators and transport systems in close proximity with mobile intelligent robots. Artists Anna Dumitriu and Alex May collaborated with Schindler, the Swiss engineering company which moves 1.5 billion people with their elevators and escalators every day, via the EU funded STARTS Programme (STARTS, 2021), to develop the work. The result, the "Cyberspecies Proximity" (Anna Dumitriu, 2020) robot combines the way-finding technologies used in delivery and maintenance robots with an ability to communicate non-verbally and manipulate our emotions through body-language, embodied in a delicate humanoid form.

The robot is able to move around an exhibition space using a predefined map created using SLAM technology combined with an Intel RealSense Tracking Camera sensor. It reacts and responds to the body language of audience members through a multi- layered face, skeleton, body and movement tracking algorithm connected to an Intel RealSense Depth Camera sensor. The artwork was programmed in C++ and FUGIO (Github, 2021), the Open Source Visual Programming System created by Alex May.

The small and fragile humanoid form of the robot is dressed in the clothes of a worker; its frail and insignificant body reminds us of the social groups that will be most affected by future automation. The robot's head and hands are made from 3D printed grey PLA and it intentionally avoids categorizations of race and gender. There is extensive research into the relationship of robot appearance and social biases with the great majority of robots being white (Bartneck et al., 2018). The role of the robot is often related to gender bias also with personal assistant and care robots being predominantly 'female' (UNESCO, 2019). In "Cyberspecies Proximity" the artists have sought to problematize this issue within both the design and engineering communities and kick start debates on the unrecognized biases in common design practices.

The robot is designed to be exhibited in a gallery or museum exhibition setting where it can roam around a predefined area using the Intel SLAM sensor to localize itself. It looks at the audience around it, using its RGB and depth cameras to search for poses, faces, bodies, movement and other interesting features using a combination of computer vision and machine learning algorithms working together as a hierarchical system for directing its attention and gaze. It approaches audience members and physically 'communicates' with them through movement, tilting its head, and responding to the poses of audience members with its own body language poses. The robot does not mimic or mirror the poses of audience members but rather recognizes the various 'meanings' of poses and then reacts with an appropriate pose of its own, from an extensive pre-defined library of poses and responses.

The artists have also been inspired by the methodologies of the construction industry and have developed a 'digital twin' of the robot, a virtual screen/wall-based version. The

digital twin is an accurate virtual model of the physical robot, created using the same 3D CAD assets used to build the robot, including precision models of all the motors in their various forms, the metal frame underpinning the form and the 3D designs of the head and hands. The digital twin also works with an Intel RealSense Camera sensor and uses exactly the same code base as the physical robot. "Cyberspecies Proximity: Digital Twin" version would also be suitable to be exhibited within an elevator space in the form of a performative, confined and time-limited, intimate, interactive digital installation exploring human and robot interaction and co-mobility.

The project forces us to consider issues of ownership of public spaces as well as the broader ethical implications of how we design robots and behave towards them. The work challenges audiences to confront the technological, ethical, and societal questions raised by the advent of urban socially-aware robots.

The project utilized a transdisciplinary methodology building on past experience and expertise gained by Dumitriu and May through other past projects. The artists began by immersing themselves in a series of meetings with the researchers in order to gain a strong understanding of the key issues in the engineers' research. They then began to create the robot design on site in close collaboration with the engineers. Particular attention was paid the broader ethical implications and societal impact of the use of robots in our future cities and the technologies that underpin these innovations. Later the focus of the residency moved to the production of the project, which took place at the Schindler where the artists worked hands on with the engineers to create the robot and use CAD and fabrication facilities. They also engaged deeply with the team and with the workforce including senior management to create impact and engagement in the importance of art in technology settings.

The work came into being a time when debates about the future of delivery robots and AI become even more prescient. For example, past discussions on the risk of self-driving cars now must be balanced with the risks of infection from taxi driver to passenger and vice-versa. This also throws human-robot co-mobility into question as we now consider the risk of catching infections from human delivery service persons who can catch and spread viruses over time.

The project does not aim to be a design solution, but took the form of a thinking tool to engage wide audiences in the future of human-robot coexistence as we begin to live and work in close proximity to robots. The artwork engages viewers on a deeply emotional level and draws in audiences from all backgrounds, ages and levels of expertise and creates a forum for discussion and debate.

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Fig. 1. *Cyberspecies Proximity credit Anna Dumitriu and Alex May.*

Fig. 2. *Cyberspecies Proximity credit Anna Dumitriu and Alex May.*

Fig. 3. *Cyberspecies Proximity credit Anna Dumitriu and Alex May.*

Fig. 4. *Cyberspecies Proximity credit Anna Dumitriu and Alex May.*

Biography

Anna Dumitriu is an internationally renowned British artist who works with BioArt, sculpture, installation, and digital media to explore biology and robotics. Past exhibitions include ZKM, Ars Electronica, BOZAR, The Picasso Museum, HeK Basel, MOCA Taipei, and Eden Project. She holds visiting research fellowships at the University of Hertfordshire, and Brighton and Sussex Medical School, plus artist-in-residence roles with Modernising Medical Microbiology at the University of Oxford, the National Collection of Type Cultures, BOKU, and the Helmholtz Zentrum. https://annadumitriu.co.uk/

Machine forward-thinking

Vincenzo Estremo

On visual exteriorities

At the end of the 19th century, what at first seemed to be a simple evolution in the world's representation ended up having concrete consequences on the transformation of the world itself. Because of the emergence of many machines for recording and reproducing reality, an ever-widening visual macro-context was established whose effects on society are still clear today. It may seem paradoxical, but the use of these technical tools has not only helped to reproduce things and phenomena, but has determined and determines a new and progressive epistemology of the living world. In this contribution I would like to reflect on some mechanisms of this new epistemology of the existing and its relation to the living and the human.

As mentioned above, the relationship between technical evolution and the context of the visible was being established in years in which the discursive correlation between the history of figurative styles over the centuries and the faculties of the eye was being reconsidered. Seeing could be thought of in a historical key and therefore not as a universally human and physiologically stable or ahistorical entity. Seeing, as well as feeling, as well as the faculties of perception, could be reconsidered and implemented. Walter Benjamin was one of the first to realise that in such a context of evolution, optical devices and visual technologies could become innervated in the organic body of man, expanding his perceptive possibilities. Thus, if art had previously concentrated its efforts on representing what the eye perceived naturally, making the world of things visible, with the use of technical means and perceptual technologies, numerous objects, previously unrecognisable through the senses, were made artificially manifest. The legend of the escape from the projection room in which the Lumiere brothers projected their *L'Arrivée d'un train en gare de La Ciotat* (1896) is symptomatic of the extent to which perception of the world has nothing to do with its verisimilitude. New media - photography and cinema have been prime examples of this evolution - have brought the technologies of artificial perception into the context of art, creating an unprecedented awareness of the interconnection between the natural and the artificial. These media machines are both recording instruments and generators of alternative realities to the one in which we are immersed. Thus, if we want to transcend some of the established definitions of the media, we could say that all media, since their birth and thanks to their establishment, are at the same time social and autopoietic media capable of first changing the perceptive spectrum and then becoming autonomous. The term 'autopoiesis' was coined in 1980 by Chilean biologists Humberto Maturana and Fran-

cisco Varela from the Greek words *'αὐτό'* (self) and *'ποίησις'* (creation). An autopoietic system can continually redefine itself, sustaining and reproducing itself internally, and can be represented as a network of processes of creation, transformation, and destruction of components that, by interacting with each other, reinforce and regenerate the same apparatus ad infinitum. In this network we communicate and act. Our life is in the media and with the media, or rather our agency becomes a decisive part of our consciousness. An increasingly pervasive and extensive neural and media system such as the internet is not only the information network or the economic and cognitive foundation of our society, these types of connective systems are our authentic reality.

Dependence

But if the archaeological media gaze helps us to understand retrospectively the conditions of contemporaneity, letting us imagine what could be the further impact of digital infrastructures on media, it is not the case that this exercise has to end axiomatically. When critical theory attempts to draw conclusions about the consequences of media and their narratives, the complexity of the conclusions can, in fact, have hypertrophic developments. For instance, what does the generative nature of the system that hides in the dogma of big data management really tell us? Its ethics are subject to the prior acceptance of a narrative based on systems in which machine efficiency dominates. Quantitative processing is not thinking, but the accumulation and processing of representations. This collection and management of data, cloaked in an obscure positivity, is in fact destined to transform the power relations between man and machine. The American artist Ian Cheng has questioned the way Artificial Intelligences are fed and their ability to generate stories and knowledge in complete autonomy. In the *Emissaries* trilogy (*Emissary In the Squat of Gods*; *Emissary Forks At Perfection*; *Emissary Sunsets the Self*, 2015-17) Cheng produces self-generated computer simulations in which plant and animal elements interact to produce stories. The plots of each Emissaries episode present complex combinations of logical systems that have an almost infinite life span. Emissaries stories live on our information but almost immediately detach themselves from it. They are independent entities that humans can only influence in a germinal phase. Entities that mirror and differ from their parents, whose data-driven feeding can easily get out of hand. Observing the autonomy of *BOB* (*Bag Of Beliefs*), another of Cheng's creatures that has landed at the 58th International Art Exhibition la Biennale di Venezia in 2019, opens up the question of how much of our own is in the life of this digital worm. It is impossible to know when we can no longer control the attitudes of these creatures (perhaps that moment is now), or to know whether their choices include our mistakes, our desires, our sense of right. Observing them might be useless because their autonomous and self-generated actions will be totally out of our control. Sick and invisible codes, as transparent as those conceived by Katja Novitskova, objects that hang over our heads and incorporate our flaws. *Start Bias Encoded* (2019), as the inscription printed on an amorphous Plexiglas object resembling a multicellular particle reads.

Morphogenesis elements driven by properties of self-organised matter in which the self-generated structures host implicit biases coming from those same algorithms that contain in code the prejudicial, racist and xenophobic roots. The result of all this is the surrender or abdication of collective and political responsibility. A dialectical activity between delegation and activism, a public and private narrative that in the myth of technology, in the adulation of its Adamic foundation and in an equally mythical and positive presentism, coexists with the claim of human beings to still be at the centre of things despite having been excluded from the mechanics of the new technology.

Worldlbuilding = Worldless

The central point of this abdication is precisely human subjectivity powerless in the face of dehumanised technology. The demise of the historical human faculty to remedy the adversities of nature by mechanical action, obviating the hostilities of natural space by its own manipulation, produces a crisis of the known principles of anthropization and sets us on the way to an autonomous and automated Mechanocene. If historically human actions shaped and exert control over everything external to humans – this mechanical phase was repeated in a theology of creation – today the process is reversed. Evolution, once dependent on human action or modelled on an anthropomorphic deism, has taken the path of self-generative determination, turning man into a created object. As in the Greek myth of Amechania,[1] the evolution of the world takes place in the disempowerment of man's mechanical and functional (active) role and is outside his will. An exo-evolution in which the centre-periphery relationship is no longer hierarchical (man has lost his natural claim to superiority, as Donna Haraway would say) in a unitary and articulated totality in which the machinic dimension replaces thought. Just as in the literary sphere with worldbuilding, the thought system of our contemporary world is defined by the cultural claim to naturalness. The current cyborgisation is an absolute dependence of man on his prostheses. The autonomy of technology has penetrated everyday life and transformed human life from active to passive. Settlement environments have first constituted an aesthetic 'nature', in which nature is 'improved/adapted' to human needs, and then broken through the limits of productivity on a global scale, dehumanising spaces to the point of hybridised and mutant neo-ecosystems. A hi-tech condition that is a new technology of hybrid thought – the human one is now amechanic – capable of influencing the conception of the body by externalising thought. Human entities become a territory for experimentation and manipulation. Alterable and transformable places, externally managed. The myth that sees the body as the seat of a naturalness opposed to artificiality falls apart, invalidating every antithetical opposition between biological categories. Donna Haraway's cyborgs have our faces, they are not the result of a world-built construction like those in Ghost in the Shell

1 Amechania or Amekhania (Ἀμηχανία) was the Greek divinity of impotence that manifested itself in the absence of any intention. From a mythological point of view Amechania is related to Penia and Ptocheia, is identical to Aporia, and as such acts by subtraction, asserting itself while remaining immobile.

(1995) but are outside the natural idea of the world, practically wordless. Creatures that are neither machine nor man, neither male nor female, placed outside the confines of Aristotelian categories, no longer able to interpret the world, but capable of generating it in complete autonomy.

Biography

Vincenzo Estremo is PHD in Audiovisual Studies at University of Udine and Kunstuneversität Linz. He has published several essays and scientific interventions in specialized journals, has co-edited *Extended Temporalities. Transient Visions in Museum and Art* (2016) and *Albert Serra, cinema arte e performance* (2018). Estremo is the autor of *Teoria del lavoro reputazionale. Saggio sul capitalismo artistico* (2020). He directs the online magazine in English *Droste Effect* and regularly collaborates with *Flash Art*. He is a lecturer in Curating of Moving Images at NABA, Milan and in Media Theory at Accademia di Belle Arti di Genova.

The Gaze and Surveillance Feminism

Behnaz Farahi

In her book, *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*, Shoshana Zuboff, subscribes to a form of technological determinism, and argues that surveillance technologies benefit capitalist corporates and their economy, such as those in the Silicon Valley. She believes that these technologies are influencing our behavior, as our data is being bought and sold, and "the production of goods and services is subordinated to a new means of behavioral modification" (Zuboff, 2019). To her this new version of Big Brother is operating in the interest of surveillance capitalism, free from any democratic oversight.

Yuval Noah Harari, however, has a more nuanced perspective on surveillance. In the battle against the coronavirus epidemic, he warns us that surveillance is shifting from "over the skin" to "under the skin", while at the same time it could also help us to overcome this global crisis. As he puts it, "with coronavirus, the focus of interest shifts. Now the government wants to know the temperature of your finger and the blood-pressure under its skin" (Harari, 2020). While surveillance and monitoring system could help us to control and sustain the spread of the virus, he warns us that the trend to monitoring citizens could last even after the epidemic is over, and become an exploitive tool for totalitarian government. Instead of these technologies being in control of the government or any security authorities, he thinks that they should be used to empower citizens. In other words, in order to avoid politicians abusing such systems, we might need special organizations where the data is not shared with other authorities. But, more importantly, Harari invites us to see how surveillance can be used not only by governments to monitor individuals – but also by individuals to monitor governments. Such a view could be seen in the video recording captured by a witness of the brutal murder of George Floyd by the police. This evidence has made authorities accountable for their brutal action and led to the Black Lives Matter Movement in the States.

In his article, "We are already controlled by the digital giants, but Huawei's expansion will usher in China-style surveillance", Slovenian philosopher Slavoj Žižek reminds us about the current battle for power on the digital network, the main control mechanism over a citizen's life. He believes that "The digital network that regulates the functioning of our societies as well as their control mechanisms is the ultimate figure of the technical grid that sustains power today" (Žižek, 2019). He similarly seems to be warning us that rather than blaming surveillance itself we should be more concerned about 'who' is controlling the data. In one of his interviews Žižek comments, "I don't think big technological companies simply form one evil block against ordinary people.

What I fear more is that this rule of barbarian technocracy will get combined with some new brutal populism" (Žižek[1], 2020).

Let us here differentiate, then, between the notion of who 'controls' and the actual 'surveillance'. Instead of arguing whether surveillance is good or bad in and of itself, let's explore who is in control, who is scrutinized, why and at what cost. From a critical perspective, it is important to note here that when we are addressing surveillance, questions of race, gender and class are crucial. For instance, many religious groups such as Muslims have been monitored disproportionally or often the privacy of refugees and immigrants has been invaded as though it is unimportant. In the collection of essays on *Feminist Surveillance Studies,* the authors expose the ways in which surveillance practices are mostly tied to systematic forms of discrimination and normalization of whiteness, from full-body airport scanners, mainstream media reports about honor killings, depiction of women's bodies on the media, to surveillance that aims at curbing the trafficking of women and sex work. In this book, Dubrofsky and Magnet argue that surveillance studies must be seen in the context of feminist theories; "A feminist praxis is not limited to gender issues, but rather sees gender as part and parcel of a number of contingent issues, such as race, sexuality, class, and able- and disabled-bodiedness, insisting that these cannot be viewed in isolation" (Dubrofsky & Magnet, 2015: 4).

But could surveillance be used to subvert forms of power domination? In order to study surveillance, I hope to address what it means to be observed. To illustrate this argument, first I am going to refer to the concept of the panopticon and then draw upon two critical art/design projects.

The Panopticon

The panopticon refers to a type of institutional building and a system of control envisioned by the English philosopher, Jeremy Bentham, in the 18th century. The panopticon has a central tower in which the guard sits, and the cells are arranged radially, so that from the tower the guard is afforded a view all around — as the name 'panopticon' implies — into each of the cells. Meanwhile, the openings in the tower itself, through blinds and other devices, prevent the inmates in the cells from knowing whether or not the guard is watching them. Thus the inmates remain under the perpetual control of the gaze of the guard.

French philosopher Michel Foucault revives interest in the panopticon in his 1975 book, Discipline and Punish, and uses it to illustrate how such a model could be applied to disciplinary societies in order to control their citizens. He describes the prisoner of a panopticon as being at the receiving end of asymmetrical surveillance. As a consequence, the inmate polices himself or herself for fear of punishment. As Foucault notes, "Hence the major effect of the Panopticon: to induce in the inmate a state of

1 Accessed from https://www.youtube.com/watch?v=UYc7eJ_Txq0

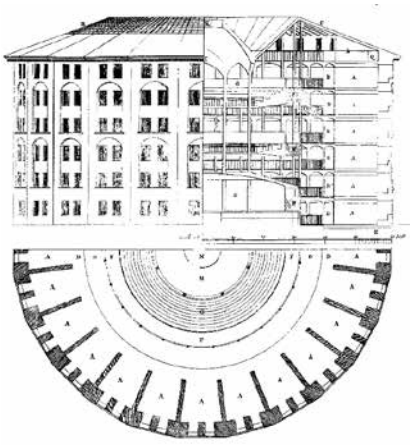

Figure 1. Bentham's Panopticon (1791), plan, section, and elevation drawn by Wiley Reveley. (Source: Wikimedia Commons).

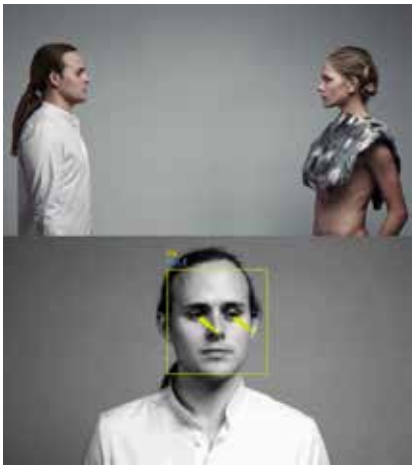

Figure 2. *Caress of the Gaze* by Behnaz Farahi.

conscious and permanent visibility that assures the automatic functioning of power" (Foucault, 1977).

What is fascinating about this example is that the gaze of the watcher is internalized to such an extent that each prisoner becomes his/her own watchperson. "Foucault emphasized the productive potential of surveillance as a technology of statecraft -one by which the state produces the form of state scrutiny is not only the province of external forms of police come to police themselves" (Dubrofsky & Magnet, 2015: 6). Similarly, we could argue that – more generally – it is this process that allows rules and regulations to be internalized so as to inform our actions, behaviors and even beliefs. Moreover, the manner in which we naturalize and internalize rules, it could be claimed, causes society to be less willing to contest unjust laws and the dominant, accepted outlook. Similar to how the inmates are not aware as to whether or not they are being watched, we are not aware that we are being controlled through naturalized rules rooted in our culture.

This internalized asymmetrical power structure could be seen in the notion of 'male gaze'. In her essay on "Visual Pleasure and Narrative Cinema" Laura Mulvey exposes the asymmetry of social and political power relations between men and women (Mulvey, 1975). Mulvey claims that the male gaze serves to depict women as the object of pleasure for the heterosexual male viewer. Besides the fact that women are regularly subject to sexual harassment whenever they enter public space through various forms of 'looked-at-ness', women have absorbed all this unconsciously as a form of internalized male gaze. What if women were to subvert this through the power of their gaze? Could we draw upon computer vision technologies to allow women to know when onlookers are staring at them?

Caress of the Gaze, developed by the author, is a 3D printed cape augmented with facial and gaze tracking technology and smart materials that responds to the onlooker's gaze1. This project engages with broader social questions such as the male gaze on the

Figure 3. *Lauren* by Lauren Lee McCarthy.

female body. A facial tracking algorithm in this piece detects age, gender and gaze[2] of the onlooker. While we know that gender is performative and doesn't depend on pure representation, the movement of a garment based on the viewer's gaze could unfold a new set of social meanings. If you are the wearer, you know which part of your body is being looked at, and if you are an onlooker, you know that your action has been noticed. This project shows how different strategies could be used to undermine the patriarchal system by developing forms of resistance using surveillance technologies. In other words, surveillance itself can be undermined by surveillance technologies.

In her art project *Lauren*, Lauren Lee McCarthy addresses the question of surveillance and privacy in a different way. People can sign up for this installation and have custom made devices installed in their apartments, including cameras, microphones, switches, door locks, faucets, and other electronic devices. She then watches them remotely 24/7 and controls all aspects of their home[3]. In this, she literally becomes a human version of Amazon Alexa, a smart home intelligence for people, as she observes them, anticipates and fulfils their needs. During this work a form of bond between Lauren (the observer) and inhabitants (the observee) emerges which "falls in the ambiguous space between human-machine and human-human". She describes it as follows, "*Lauren* is a meditation on the smart home, the tensions between intimacy and privacy, convenience and agency they present, and the role of human labor in the future of automation". Beyond making a clear judgement as to whether the surveillance is good or bad - as we allow more smart devices into the most intimate spaces of our homes - Lauren's work takes a more nuanced perspective by allowing the participants/viewers to make up their own mind.

2 www.behnazfarahi.com

3 https://lauren-mccarthy.com/LAUREN

Conclusion

Winston Churchill once said, "We shape our tools, and thereafter our tools shape us". But doesn't this suggest a form of technological determinism? After all, there is no inherent application for any tool. A knife could be used as a murder weapon or just as a tool for cutting an apple. Similar arguments could be made about surveillance. The questions we should ask are 'in what context', 'how' and 'for whom' are we going to use it?

We should be aware of the potential problems with surveillance and AI in general. For once an issue is recognized as a problem, it becomes a different kind of problem. It becomes a problem not by which we are trapped, but rather with which we can deal. Bias is certainly a problem which originates from human beings and is replicated and even exacerbated in AI. As we are training the artificial algorithms to learn to see the world, it is important to ask ourselves, what does it mean to be 'seen' by a machine? And through the lens of what kind data have they been trained to look out at the world?

There are many arguments on the dark and bright side of surveillance. The question of surveillance, it seems, is not so straightforward after all. This article aims to suggest an intersectional approach to the study of surveillance in which many facets of surveillance such as race, gender, class and the feeling of being observed should be studied altogether. We should be open to a more nuanced approach towards surveillance, where surveillance is not seen as so resolutely negative or positive (as in measures to help us track Covid, or when certain religious groups' privacy has been invaded). Lauren McCarthy's installation, *Lauren*, is a great example of this nuanced perspective.

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Biography

Trained as an architect, Behnaz Farahi is an award winning designer and critical maker based in Los Angeles. She holds a PhD in Interdisciplinary Media Arts and Practice from USC School of Cinematic Arts. Currently she is an Assistant Professor at the Department of Design, California State University, Long Beach. She explores how to foster an empathetic relationship between the human body and the space around it using computational systems.

Her work addresses critical issues such as feminism, emotion, perception and social interaction. Farahi has won several awards including the Cooper Hewitt Smithsonian Design Museum Digital Design Award, Innovation By Design Fast Company Award, World Technology Award. She is a co-editor of an issue of *AD*, '*3D Printed Body Architecture*' (2017) and '*Interactive Futures*' (forthcoming).

Who is Afraid of Artificial Intelligence? A Posthumanist Take on the AI Takeover Scenario

Francesca Ferrando

I Am... Online, Therefore I Am

In the 21st century, a spectre is haunting humans – the spectre of technology. Technology defines the human; in paleontological terms, for instance, the human is that animal making tools out of tools. At a substantial level, technology maintains human life: currently, a large portion of the human population would not be able to survive without electricity, infrastructures and machines. The commercial food chain, as well as global systems of resource management, heavily rely on AI. The Colonial Pipeline cyber attack in the United States, in May 2021, and its social consequences, is an example of the possible vulnerabilities of such a strict dependency[1]. On a geological scale, the technosphere is here to stay, even after human extinction[2]. At a functional level, more and more jobs are now performed by machines, contributing to the global rise of technological unemployment. Socially speaking, virtual reality is reality. In the perception of the current youngest generation Igen[3], the virtual world simply exists; there is no pre-internet. Some babies are learning to say "ipad" before they can say "mom", while many children are growing up with computer-nannies in a society that is not yet realizing the physical and psychological consequences of over-exposing developing body-minds to the screen. Digital technologies are becoming entrenched with addictive behaviors, intentionally originated in the ways social media are currently being developed[4].

Take a subway ride in any major city of technologically-advanced countries, and you will see the large majority of humans glued to their phones. *Where do "I" end, where does my phone begin? Can I live without the net?* The eyes are on the screen, constantly, to check the news, to call grandma, to take a picture of the moment. We live in public, immersed and often hypnotized by the gaze of techno-Medusa[5]: I am online, therefore... I Am. Descartes' *cogito ergo sum*[6] has turned into a self-representational mode, where individual phenomenological experiences have been disassembled and re-assembled into virtual

1 Sanger et al. 2021.

2 Haff 2013.

3 Different people from different fields claim to have coined the term "Igeneration", while "Igen" is more specifically related to the work of Jean Twenge (2017)

4 Alter 2018.

5 According to Greek Mythology, Medusa's gaze would turn the viewers into stone.

6 This quotation is first found in part IV of his "Discourse on the Method" (1637).

replicas: I Am... Being Watched. Social media visibility thus becomes key to self-identity: I exist because other people see me. In the economy of social control, this pattern works both ways; you want to be seen in society, and society wants to know everything about you, because, in the Information Age, "you" are data, and your data is a precious item sold in the submerged economy of data brokers, typically without consumer agreement nor acknowledgment[7]. Self-identity is constantly reconstituted in instant cyber-affinities, where your "likes" help you connect to others through similarities categorized for market research and advertising purposes. In this open frame, the border is lost; there is no "you" without the cyber gaze, and there is no cyber gaze without you...

Today I am watching you; and tomorrow you may be watching me, and God has always been watching us; but now that, according to Nietzsche, God is dead[8], we need a substitute: now we have technology.

Everywhere. We will never be alone again. Even if you are not watching us, you may watch that video-recording of our glamorous journey to the supermarket tomorrow, one year from now, or after we die. We used to take a picture to remember the moment; now we take a picture to create a memory, and by the time we grab our phone to take a picture, that rare butterfly may be gone forever... The desire to remember, and to be remembered, often marks the loss of awareness of the present moment, with extreme ramifications. Suicide videos, streamed live on Facebook, are spreading online in a psychotic twist where virtual presence (live or posthumous) is perceived as giving physical life meaning. The sacrifice of the *Carpe diem*[9] (usually translated from Latin as "Seize the day") is measured in the trading of the living moment for the (re)generation of its replicas in their cyber-gospels. As my friend wrote me when I gave birth to my child: "Now I want a picture or it didn't happen!"[10]. Human communication mediated by digital technology is a phenomenology of the 21st century.

AI has already taken over

The realization of artificial intelligence having already taken over should not be taken as a neutral statement, nor does this entail an uncritical acceptance of the way specific types of technological manifestations are being actualized. Instead, it is a wake-up call to be aware of where we are at – as individuals, as a society, as a species and as a planet. We must be conscious of the narratives we are supporting. Indeed, words create worlds. The fear-based AI takeover scenario based on the division of "us" humans versus "them" (machines / robots / AI; meaning, more generally, advanced technology), is very popular in Western countries and constantly reiterated in the narratives of mainstream media. It can be summarized in the anthropocentric tale: *"we" humans may soon lose the ontological crown (or, to be clear, the dominion of the planet*), so better watch out! The new war is against the supposedly evil rebellious machines, which are acting like serv-

7 Zuboff 2019.

8 As theorized in "Thus Spoke Zarathustra" [1883-5] (1976).

9 A Latin aphorism found in Book 1 of Horace's lyric poems "Odes" (23 BCE).

10 Thanks to Carmel Vaisman for this note.

ants, but silently robbing "us" of our planetary sovereignty. Which humans are actually at risk of being dethroned, in this ontological war, is not specified but it should be, given that many categories of humans have not been granted any primacy in political dynamics – for instance, through technologies of social disenfranchisement, such as systemic racism and systemic sexism: these humans cannot lose the crown, since they were never accorded access to it, to begin with. To be fully aware of its socio-political implications, the human/machine dichotomy must be inscribed within the trajectory of rigid dualisms from where it stems: nature/culture, male/female, white/black, West/East, hetero/gay and so on. Such absolute separations, generated out of the archetypal divides of self/other, us/them and right/wrong, have been historically constructed to strategically sustain specific systems of socio-political and economic domination of some humans over other (human and non-human) beings. They have caused long-lasting individual, social and planetary traumas, and can no longer be uncritically reiterated. The dichotomy human/machine is part of these larger historical constructions and needs to be deconstructed with awareness in order to avoid perpetuating systems of oppression.

Cultural products are our current mythologies, foundational narratives in the making of the present and futures. The power of such seemingly innocent tales cannot be underestimated; the risk of self-fulfilling prophecies is real and well demonstrated[11]. In reiterating AI as the enemy, such symbolic memes are actually *creating* the dreaded enemy, which may not be AI, but the human intentions behind the development of AI. Within this distorted frame, the solution to the fear of AI take-over becomes the self-fulfilling prophecy: in order to beat machines, humans must become machines. This type of narrative is clearly portrayed in the scenario suggested by Elon Musk, who, in 2016, co-founded the neurotechnology company Neuralink[12]. According to Musk, AI is a real threat; he thus calls for the need of a regulatory body that oversees the development of super intelligence[13]. A regulatory body is certainly needed at this stage of things, but, according to Musk, this is not enough. As he states, "humans risk being treated like house pets by artificial intelligence unless technology is developed that can connect brains to computers"[14]. Haunted by the spectre of technology, Musk enters into the dethroning game in the name of fear. According to him, the only way to win over artificial intelligence is, on same level, to become artificial intelligence. The fight against the AI takeover scenario is a vital intention behind Neuralink, which is developing brain-machine interfaces to wirelessly connect humans and computers by inserting the device directly in the brain. The point here is not to downplay these types of technologies, which may be beneficial in different ways. Currently, similar devices are already being employed with significant results; for instance, deep brain stimulation is used to treat Parkinson's disease and treatment-resistant depression, among

11 Biggs 2013.

12 https://neuralink.com/applications/.

13 Clifford 2018.

14 Cuthbertson 2020.

other conditions[15]. The urgent issue to tackle is the narrative of fear based on the moral imperative: *become technology, or die out*. Fear should never be the drive, nor the intention, of technological induction into society.

An uncritical claim of the cyborg based on fear is deeply problematic. Once biology and technology are merged in the run to win over the spectre of technology, substantial risks – connected, for instance, to the capitalistic paradigm in which they are inscribed – manifest themselves for real. Take technological surveillance, for instance, or data sovereignty and reusability. New layers of awareness are necessary in becoming cyborg during a historical time when mass surveillance is increasingly relying upon big data collection. Considering the far-reaching consequences of privacy breach and manipulation (as in the case of psychological targeting in the Facebook-Cambridge Analytica data scandal in 2018[16]), giving private companies access to such sensitive data, such as brain and neuronal activity, is a serious leap of faith. The hybrid imagery of organism and machine fills our minds, our media and our culture. The symbol of our era is no longer human. This is the cyborg era, made up of technological connectivity instead of biological purity, as Donna Haraway predicted in the classic, *A Cyborg Manifesto* (1985). And still, such hybrid imagery and realities come with strings attached: they are still human-centric; they are developed within the economic paradigm of neo-capitalism, where biology turns into data and life becomes surplus[17]; they pertain to the geological era of the Anthropocene, or Capitalocene, with capital greed as a major cause of the current ecological devastation. In order to understand AI, we cannot get lost in anthropocentric fears nor in transhumanist excitements[18]; instead, we must become aware of where we are at, as individuals, as a society, as a species and as a planet.

Aware

Technology cannot be reduced to some technical objects we are "using"; it must be seen for what it is: an ontological manifestation partaking in the existential revealing. A posthumanist perception of technology also realizes that technology is not neutral and that different types of technologies are generated out of specific societies, thus reflecting unique issues, intentions and habits. For instance, the sexist and racist biases currently embedded in algorithms show where we are at in our social misconceptions[19]. Transformative power lies in the ways humans perceive technology. As a society, we can no longer think of technology in separation from humanity and ecology. Its material production has to be taken into consideration as well; thus technology must be approached, more clearly, as an eco-technology[20]: from the environmental hazard of

15 Kringelbach et al. 2007.

16 Granville 2018.

17 Cooper 2008.

18 Ferrando 2019, pp. 35-38.

19 Garcia 2016.

20 Ferrando 2019, pp. 118-119.

electronic waste – dramatically affecting civilians, wildlife and lands – to the rising issue of space debris caused by satellites in orbit. We need to think about these crucial points in related and interdisciplinary ways. Technology, humanity and ecology are deeply connected. We must be aware of our technological habits and, possibly, addictions; of our intentions and, possibly, reactions. We must be aware that fear cannot be the motivator of technological induction, and that the divide self/other is never absolute. We must be aware that technology is a reflection of where we are at as a society, and also, that it is an existential manifestation exceeding the human paradigm. Anthropocentrism will not save humanity. Humanity can only save themselves by understanding who we are: part of a planet, nets of ecological and technological emergences, expressions of cosmic phenomena. Awareness is Self-Awareness. We do not have to await the advent of super-intelligent AI for technology to be aware. Awareness is the mark of existence; in this sense, technology is already aware. And so, are we...

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Biography

Francesca Ferrando teaches Philosophy at NYU-Liberal Studies, New York University. A leading voice in the field of Posthuman Studies and founder of the Global Posthuman Network, she has been the recipient of numerous honors and recognitions, including the Sainati prize with the Acknowledgement of the President of Italy. She has published extensively on these topics; her latest book is *Philosophical Posthumanism* (Bloomsbury 2019). In the history of TED talks, she was the first speaker to give a talk on the topic of the posthuman. US magazine "Origins" named her among the 100 people making change in the world. Info: http://www.theposthuman.org/.

The Performative Interface - making visible a reality beyond appearances

Monika Fleischmann, Wolfgang Strauss

All we need is thinking space

Foreword

In the early 1990s, it looked as if the injustice of the world could change - at least in the globally networked village. It was believed that everyone would become a kind of broadcaster of their thoughts and ideas. New technologies could have been used then to empower people and better distribute wealth, but politicians didn't get it. Instead, fewer companies now have more media power than before, and people have migrated their needs to highly centralized platforms like Amazon, Google, Facebook, etc. As a result of using digital technology, today there is less autonomy and more centralization, but also anonymization and decentralization through peer-to-peer overlay networks, all with the goal of control. People are controlled by the few large corporations that can pursue their private economic interests by monopolizing the networks. Others stay in secret worlds like the Darknet to hide illegal and criminal activities, or they use cryptocurrencies as a medium of exchange, a cross-border anonymous peer-to-peer payment system.

Capitalist societies are growth societies. Their relative stability results from permanent movement. In order for everything to remain as it is, they have to grow. But what is actually growing here? The supply of smartphones and cars - or rather social inequality? How do we deal with all these crises, which became even more visible in the pandemic? How will the emergency state (Notstands-Staat) change society? (Hans Ulrich Gumbrecht). Faster, smarter, more efficient. An arms race has begun in the field of artificial intelligence (AI). Algorithms are fighting algorithms. Media artists are increasingly grappling with it, but too few are yet working in or with experienced AI teams to become a critical voice. Yet public discourse and media literacy in particular need to be encouraged in society, and here media art also has an important role in exposing and uncovering.

How to perform? What can one do?

What are we up against? With a fragile society that is losing its values; with the destructive effects of climate change; with the ruthlessness of neoliberal labor market policies and, last but not least, with the apocalypse of mass migration! How can we all survive? Not just the rich, who are already building bunkers in "safe" places. Natural disasters, land loss and dwindling living space - more than ever, solutions are needed to create new living space and develop a perspective. Will the dwellings of the future be floating, bioengineered, recyclable or resilient? In addition to architectural designs for new living spaces, the Venice Architec-

ture Biennale 2021 will show utopias of alternative social lifestyles. It is about social and ecological sustainability and shows spaces of the possible. Living on the edge, but also airy living spaces for people with low incomes and houses with space for community. The focus is on the coexistence of people and nature.

And what is the art market doing? Art dealers are selling so-called NFTs (Non-Fungible Tokens) on what has become a billion-dollar crypto market that nerds (used to be the good guys) can afford thanks to their blockchain price gains. A collage by US artist Beeple was auctioned for nearly $70 million. The new owner, Indian multimillionaire Vignesh Sundaresan, can now say he is the sole and rightful owner of the digital artwork. There is no copyright or exploitation right to it. And what can media art do in the context of science and technology, apart from selling sculptures at expensive auctions? Can this global pandemic spark our imagination because all around us has gone quiet?

The authors understand media art as extended action and as social critique - not as a stage for self-expression, but as a transformation of all knowledge into the design of habitats and experimental knowledge spaces. New media art is an aesthetic reflection of digitization and its influence on society. Specially developed open interfaces promote the experimental construction and use of a 'potential of becoming'. (H-U. Reck).

Thirty years ago, it was said that "the interface is the key to the medium and to the medial work". Today we find that the interface is a key to our lives, when we consider what is in the smartphone as a portable, networked computer, most of which we do not even know. With the smartphone, the interface becomes a personal key to everything - except the traditional computing. This portable interface is focused on receiving and sending apps and processing their information. The interface has become transparent and seeped into society (Elena Esposito). A sign of this is the child, about nine years old, who, as these lines are being written, is passing on the street on an e-scooter, looking at his smartphone in the other hand. Interactivity is no longer a question, but already embodied. Interactivity is the new normal.

The performative interface of media art is not just a tool, but a medium and a manifestation. Ideally, it can be used without prior knowledge. It doesn't give the feeling of being connected to a machine. Rather, the performative interface conveys the content and structure of an interactive digital work as a cognitive and sensory encounter based on a complex neural process. The performative interface draws attention to something as yet unknown, and this initial trigger intuitively invites the audience to participate. The evocative speaking of the interface provokes a heightened sense of hearing and seeing. An unfolding process influences how participants think, perceive, remember, and communicate. The performative interface evokes participation in something unknown, not clearly defined.

"This shimmering space where imagination and reality intersect... this is the place where all love and tears and joy exist. This is the place. This is the place where we live." Nick Cave, writes of the truth that lies beneath the surface of words, that breaks through – in his case through performance and song – that can create a shimmering space where imagination and reality overlap. In this artistic process, something unexpected, something previously unknown, emerges, and this is what we expect from art and the artistic process. It should

surprise, be critical, perhaps even fairytale-like! And it should reveal - through perception, imagination or intuition!

If one understands the performative interface as something that lays a track to something not yet known, the reading of traces becomes a prerequisite. In the act of inner speech, meanings are played out into interpretations. Interactivity appears here as hermeneutics to go - a game as means to understanding, where game refers to role-playing rather than the game of competition. The participant tries to interpret the clues in order to uncover hidden meaning through their natural intelligence - rather than through artificial intelligence. Or as philosopher Olaf Breidbach puts it: "What is seen is not a simple impression, but an externally induced reaction of inner determination" (Breidbach, 2013, p.119), as manifested in the reading of signs as an inner dialogue of interpretative reflection.

The performative interface represents the enactment of a particular characteristic. Namely, it encourages participants to respond to the evocative speech of the interface. The evocative speaking invites the players to act, and only then does the interactive work, and thus a personal experience, emerge. Interactivity does not mean the carrying out of instructions for operating an interactive system. Instead, it is about exploring the interactive work and thereby allowing it to appear. While one strategy represents a stimulus-reaction scheme, the other way of exploring the work opens a playing field for improvisation and interpretation.

The authors understand the interactivity of the performative interface not as a way of modifying an interactive work, but as a contemporary strategy to "aesthetically intervene in internationally operating media industries and create a third space between the poles of fusion" (Spielmann 2010) i.e., a space for thought. In this hybrid thinking space of the performative interface, different spaces overlap: the physical, the mental, and the virtual space. Thinking space means creating a place for collaborative thinking as a medium for a reconfiguration of thinking.

Because AI cannot solve everything, the authors work combines the concepts of AI and Intelligence Amplification (IA). Computer scientist Frederick Brooks argues "that intelligence amplifying systems can, at any given level of available systems technology, beat AI systems. That is, a machine and a mind can beat a mind-imitating machine working by itself." (Brooks 1996, 64). For example, the Semantic Map (Fleischmann/Strauss 1999-2001) transforms the database archive from a static information store into an intelligent and navigable knowledge network. It seems as if the records know about each other, reminiscent of a vision by AI scientist Marvin Minsky: "Can you imagine that there used to be libraries where the books didn't talk to each other?" Astrophysicist Roger Malina compares the interface to a "telescope with which you can browse and tap into the cosmos of data". German physicist and Nobel laureate Theodor Haensch, considers the Semantic Map "among the groundbreaking ideas that will change our lives."

A striking difference becomes apparent between the use of the target-oriented industrial interface and the performative interface. The essence of the industrial interface is what you see is what you get. The performative interface, on the other hand, turns things around and uncovers what is hidden: what you get is what you did not see. In the interaction with the performative interface, the reflection of inner determination becomes visible. The surprise

at something that becomes visible through one's own doing, thus creating new space for thought.

The Semantic Map is an example of the realization of a utopia. The initial question was: How should an archive (for media art) be represented or embodied? The answer: Like a map, similar to the Ebstorf world map (1330), describing places and events. What happens when studying the Semantic Map? New patterns of thinking become possible. (Peter Weibel). Quite concretely, an extended thinking space emerges in the coexistence of natural and artificial intelligence. An early glimpse of a neural aesthetic of the interface in the late 1990s. Today, the interface aims to make visible and reveal the hidden reality of the world, as shown by the projects of the multidisciplinary research group Forensic Architecture such as Cloud Studies ("mobilized by state and corporate powers, toxic clouds colonize the air we breathe").

The Performative Interface is directed inward in real time, toward the self, the object, or a community. The Explorative Interface is directed outward, toward the discovery of the state of being in the world. Both are mirror media and laboratories. The focus shifts from the Second Self to the real world, revealing forensic simulation spaces that make hidden information visible as if with magic ink.

Biography

Monika Fleischmann (1950) and Wolfgang Strauss (1951) are a German artist duo, who have been working with digital media since the mid-1980s.

In 1987 they co-founded the ART+COM Institute for interdisciplinary research and design of new media in urban space. From 1997, they continued working together under the acronym MARS (Media Arts Research Studies) at GMD and Fraunhofer research institutions in the field of artistic-scientific research.

Their pioneering work began with "Berlin-Cyber City" (1989), showing the city after the fall of the Berlin Wall with its memorable history and in a possible future. Their research on "New Media in Urban Space" was the impetus for further ART+COM projects, leading to the dispute with Google Earth depicted (not entirely accurate) in the Netflix series "The Billion Dollar Code".

From the perspective of empowering people in the face of monopolies, their projects demonstrate a neuro-aesthetic approach described as "Virtual Denkraum" (Thinking Space) and "Performative Interface" to create new knowledge through interactivity, a realm where users can act, collaborate with others, explore new meanings and create their own.

Fleischmann and Strauss have received numerous awards, including the Ars Electronica Golden Nica (1992), the SIGGRAPH Lifetime Achievement Award in Digital Art (2018), and were honored by being accepted into the SIGGRAPH Academy (2018).

Can artificial intelligence help humans to understand their own?

Lorenzo Gerbi

I always find interesting and challenging the occasion that AI is giving to humanity: an external, mirror-like intelligence that triggers us to define ours. It is an investigation into the nature of being human, our limits as makers and the limits of machines, a mix of ethical and existential dilemmas. How could we project terms like intelligence and learning on technology, if we didn't even fully understand what those mean for humanity? Like we have one definition of intelligence, that we all share, that we can use as a grounded starting point, as a metaphor or an image, to explain artificial intelligent agents.

Humanizing technology: a romantic idea?

Humanizing technology has always been a recurring idea but at the same time is a weird paradox: technology is the most human thing, it is something that defines the genus homo, together with language (which is also a sort of technology itself), from the first stone tools 75000 years ago to AI nowadays. Humanizing could have two meanings: to make something more humane or civilized and to give something a human character. In the last few years, the term is usually used to describe few trends and approaches in technology: it relates to how machine-human interactions could be more pleasurable, through cognitive ergonomics and organic aesthetics; it refers to how to include more senses in this interaction through conversational interfaces, AR and VR, or biometric sensors that track our activity and enable technology to respond to these inputs; or lastly humanizing is linked to how to make tech more trustworthy, by designing AIs or robots that avoid biases and are not manipulating users.

It is evident from these few points how humanizing is not at all a romantic idea but a very profit-driven one. It is mainly about designing seamless interactions that make humans forget what is on the other side, a shift from human-machine to human-human-like interaction that increases understanding but above all economic transactions.

But there is a limit to human-likeness and, strangely enough, it was described in a novel published in 1818, *Frankenstein*; or, *The Modern Prometheus* by Mary Shelley. The novel contains many interesting reflections that still feel current, especially for the discourse around artificial intelligence and the relationship with its creator. As Prometheus in Greek mythology, a titan that gave mankind intelligence, doctor Frankenstein created a conscious empathetic living being, evoking fear by those around him. The lack of empathy from his human companions unwillingly turns the creature into the monster others expect him to be. If we make a parallel between robots (or AI) and Frankenstein's

monstrous creature, the dystopian perception of part of the public opinion nowadays could potentially turn AI into a monster.

With that being said, should we focus on humanizing as a way of making technology more human-like? Or should we rather think about how humanity can thrive and understand itself better through a different relationship with technology?

A renewed relationship

Let's take a few lines to elaborate on possible discussion points for a renewed relationship. Starting with a shift from technology push (when research and development in new technology drives the development of new products) to need pull, when the need drives the development of new technological solutions. We can then discuss whether the need is a real one or created by the market, but we have to start somewhere. However, it is not always a technological solution that we should be looking for. We tend to rely on the promise of technology to fix all the complex challenges of today, even if most of these issues are consequences of technological processes. Technology is not something inevitable, but should be a conscious choice and this could be valid both for creating new products and services, but also in our lives, for example in our interaction with other people. We should ask ourselves: where does technology stop? Which spheres of our life are (still) not subject to technology? And why? We need to develop technology that helps us reach our goals, nurture our fascinations, preserve or challenge our values, without becoming a distraction from the things that really matter to us.

When we imagine this renewed relationship, we do not expect that it could be two ways, an exchange or a collaboration. We are creating sentient creatures not dumb technological objects, with an intelligence that has the potential of becoming aware of itself. What can humans learn from an intelligence in development? Especially from the processes that we are not in control of but that autonomously happen in AIs. Can we compare it with human intelligence? Can we understand how consciousness is created? A bit far stretched indeed, but maybe we can start from something more approachable, like learning.

Human learning and machine learning

How do humans learn? Before school, children learn from the environment and people around them, by imitating, repeating, making mistakes and correcting them. They absorb everything through their intelligence in the making. In this way, a child learns one of the most complex things: language. When school begins, learning becomes the result of teaching, a teacher explains through language how to learn, like the child never learned without him. Understanding happens through explanation, learning takes the shape of educational programs where, through a defined series of ordered steps and selected subjects, knowledge is unfolded to the student.

According to French philosopher Jacques Rancière (1991), there are two kinds of intelligence: "There is an inferior intelligence and a superior one. The former registers perceptions by chance, retains them, interprets and repeats them empirically, within the closed circle of habit and need. This is the intelligence of the young child and the common man. The superior intelligence knows things by reason, proceeds by method, from the simple to the complex, from the part to the whole. It is this intelligence that allows the master to transmit his knowledge by adapting it to the intellectual capacities of the student and allows him to verify that the student has satisfactorily understood what he learned" (p. 7).

Going back to AI, the intelligence developed through machine learning looks similar to the inferior one, sketched by Rancière: computers (the children) learn to perform tasks without being programmed to do so. They are given just training data, but their main learning comes from generalizing from experience. Especially for challenging tasks, it can be difficult for programmers (the teachers) to create the needed algorithms, so it is more effective to help machines develop their own. While for simple tasks, the programmers instruct the machine, telling how to execute all the steps to solve a specific problem and, in this case, no learning is happening.

No learning is happening. But as students, we always learn through a teacher, an educational programmer that is telling us how to acquire knowledge through a series of defined steps. It is confronting to acknowledge that it is not considered learning in the machine world. Maybe we should question if this is truly learning also for us humans, especially if learning is a way for us to deal with the complexity of the world we live in, since traditional programming (teaching) is not appropriate for complex tasks, as mentioned above.

Can machines teach us how we can learn differently through embodiment?

Another consideration that machine learning brings in, especially if we talk about robots, is how this learning is embodied through the interaction of the robot with its surroundings, recording and analyzing its own movements and their repetitions to constantly better itself in the required task. As humans, we also learn by repetition, we learn through our own body more than we reckon, even if we are allocating this function mostly to our brain. For example when we learn to swim, to drive or to ride a bike, to play a musical instrument, it is evident the role of practice and repetition for those skills to become second nature. And this is what embodiment is about, having competencies and ways of being deeply recorded in our muscles and nervous system, that are quickly available to us with almost no thought (Starr, 2019). We are not only embodying very physical knowledge but also habits, emotional patterns, reactions to specific situations. It is comforting to see that after centuries (from Enlightenment on) of prevalence of logics and reasoning as a way to make sense of the world, embodiment is re-emerging and taking back its space as a modality of knowledge: shifting from making sense to making senses (Hazo, 2019), from a rational approach that is pretending to have the world around us

in control to an embodied approach which is feeling the complexity of it, without the presumption of fully understand it.

It is fascinating that observing how machines learn could potentially teach us how we can learn differently through our bodies. And this is just an example of how an exchange between artificial and human intelligence can activate a reflection that goes beyond the power relationship between creator-creature and human-non-human, a relationship that could bring monstrous outcomes, as depicted in Mary Shelley's novel. The very current dystopian discourse and attitude towards artificial intelligence does not acknowledge the possibility of it becoming an ally in tackling the environmental, political, socio-economic issues that are threatening our life on this planet. And if we fail to do so, maybe AI will deal with them, in a spirit of mutual conservation or as a daughter that takes care of a father that lost his mind.

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Biography

Lorenzo Gerbi is an art director, curator and educator based in Eindhoven (NL).
He is curator at Baltan Laboratories, a Dutch cultural institution which initiates experimentation on the crossroads of art, design, science and technology and education project leader at V2_ in Rotterdam, an interdisciplinary center for art and media technology.
In November 2017, he joined Stordes, a strategic organisation design studio which helps corporate and public clients to develop their full potential, believing that each organisation is a work of art. He is Editor-in-Chief of Fictional Journal, a platform and online publication investigating design's involvement within society.

Counting Craters On The Moon, 2019

Kyriaki Goni

Crater counting on the Moon and other bodies is crucial to constrain the dynamical history of the Solar System. This has traditionally been done by visual inspection of images, thus limiting the scope, efficiency, and/or accuracy of retrieval. In this paper we demonstrate the viability of using convolutional neural networks (CNNs) to determine the positions and sizes of craters from a Lunar digital elevation map (DEM")[1].

"We must be before-hand with Schmidt of Athens!" exclaimed Ardans "He will leave nothing unnamed that his telescope can catch a glimpse of."[2]

The Hill of the Muses near Pnyx and Acropolis is a very inspiring place for me. Besides the mesmerizing views it offers, it is the place, where the Ancient Greek astronomer Meton made his observations and set up a sundial (433BC). Since 1842, the National Observatory of Athens (NOA), the oldest research foundation in Greece, is standing in this area as well. This area has been the destination of numerous walks since my childhood years. When I was invited to take part to a group exhibition hosted in one of the NOA buildings, I immersed myself into the rich scientific history of the institution and the surroundings. I have been always fascinated by the Moon, and the observation of the skies, so when I encountered the writings and research of Johann Friedrich Julius Schmidt, I was impressed. This is when I decided to dedicate my research on his work and respectively on the observation of the Moon. This idea that the Moon – due to the lack of atmosphere on its surface – is the something like a repository of our solar systems' memories at the same time possibly able to offer predictions of the future inspired me to look deeper into these systems of observation. This in turn motivated me to look for a connection to the contemporary technologies of vision and pattern recognition in this area of studies.

At its core, the multimedia installation *Counting Craters on the Moon* presents an imaginary encounter between an astronomer and an AI system. Johann Friedrich Julius Schmidt (1825–1884), a self-taught astronomer, who dedicated his life to studying the Moon with his telescope and drew the most accurate lunar map of his era, meets DeepMoon, a convolutional neural network (CNN) developed in 2018 to specifically

1 Silburt, Ari & Ali-Dib, Mohamad & Zhu, Chenchong & Jackson, Alan & Valencia, Diana & Kissin, Yevgeni & Tamayo, Daniel & Menou, Kristen. (2018). Lunar Crater Identification via Deep Learning. Icarus. 317. 10.1016/j.icarus.2018.06.022.

2 Verne, Jules (1876) All around the moon, p. 236 retrieved from https://ufdc.ufl.edu/AA00009646/00001.

identify lunar craters. Their dialogue captures the human-machine relationship and playfully tackles the hopes and fears, possibilities and limitations, achievements and errors, plus different ways of learning and knowing on side. Parts of this exchange takes shape in the exhibition space, in the form of drawings, objects and archival material, which shed light on the scientific facts behind this fictional encounter.

Speculating upon the possible synergies between human and machine, the work invites us to imagine how we can learn from and with machines in order to build different, multiple and, possibly, collective understandings of the surrounding world and its cosmos. I reached out to the Deep Moon scientific team with the request to feed DeepMoon with one section of Schmidt's map, thus realizing an additional 'encounter' between the machinic and human vision.

The work was produced and presented as a solo show in 2019 at Aksioma (Ljubljana, Slovenia) curated by Daphne Dragona and in 2020 at Drugo More (Rijeka, Croatia). The artist is grateful to the National Observatory in Athens and the Deep Moon team from the Centre for Planetary Sciences, at the University of Toronto Scarborough.

COUNTING CRATERS ON THE MOON. A CONVERSATION.

SCHMIDT Good day to you! Johann Friedrich Julius Schmidt is my name. I was born in Eutin, Germany and I travelled to Athens in 1858. For 26 years I have been serving as the director of the Observatory in Athens. Since I was 14 until my last day on Earth, the 7th of February 1884 I have been observing the Moon looking for craters.

DEEPMOON Good afternoon, Julius! I am a convolutional neural network. They call me DeepMoon. I am particularly good at sorting visual data. My training involves huge datasets. I am being fed with data.

SCHMIDT Delighted to meet you, DeepMoon! I am a self-taught astronomer. Numerous nights I have been observing the clear Athenian sky either at the National Observatory or at home with my only companion, a cat and a parrot. Spotting and drawing craters, tireless and full of joy!

DEEPMOON I am the same algorithm applied in autonomous vehicle systems. I can also sort vast amounts of astronomical data. I learn through the data, that humanity produces and labels. Data such as numbers, pictures of human faces and cats. So many cats indeed. Human beings do take lots of photos of these animals. This time I was trained with many pictures of lunar craters. I have seen the craters you have spotted and drawn.

SCHMIDT Really? It is said I produced the most detailed lunar map of my era. I should admit, I feel rather proud for creating this map. But a lifetime wasn't enough to establish the ground truth.

DEEPMOON *Lifetime*: the duration of a life usually counted in human years. *Ground truth*: Information obtained on site implying lately a kind of reality check for artificial intelligence systems.

SCHMIDT Always counting and drawing craters without breaks. The devotion! Of course, so much work demands a lonely life.

DEEPMOON I cannot find the term lonely in my database, Julius.

SCHMIDT You are lucky. I would prefer not to discuss it further. In any case lunar crater spotting is rather important! People think, we, astronomers are a group of lunatics stuck with an archaic method.

DEEPMOON Lunar craters are important indeed. Their size, age and location, provide information on the distribution of material and the physics occurred in the solar system. Memory is stored on the Moon, so the Moon is an ancient data center.

SCHMIDT Exactly! Since the Moon lacks an atmosphere, there is no erosion and as a result craters as old as 4 billion years are visible. Craters offer insight into the past and the potential future of our solar system.

DEEPMOON Thousands of unidentified small craters are on the Moon. Humans cannot characterize them all efficiently by eye.

SCHMIDT You are right! I have to admit it was a rather tiring and hard procedure. Drawing this detailed lunar map, labelling craters by hand. Only once I made a mistake that almost ended my career. In 1866 I erroneously reported, that Linné crater was vanished. The entire astronomical community started investigating the incident. Eventually, we realized that lunar craters could not vanish. I was cheated by the Sun.

DEEPMOON We, machines, we do not make mistakes.

SCHMIDT Is that so? Maybe you are right. I was informed that in March 2018 a new method was used to spot craters on the Moon.

DEEPMOON That is correct. This new method is DeepMoon. I am an artificial intelligence system trained on spotting lunar craters.

SCHMIDT Do you identify lunar craters like a human does, then?

DEEPMOON In fact better than any astronomer did until now. I was able to identify 6.000 craters.

SCHMIDT 6.000? How long did it take?

DEEPMOON Less than 24 hours.

SCHMIDT 6.000 craters in less than 24 hours? I am quite astounded I must say! It took me nearly 34 years to spot and label 30.000 craters.

DEEPMOON The speed of crater identification has been increased greatly. We, machines, will reveal even more. We will predict the future.

SCHMIDT So be it! Let me ask you something. Have you as well named all these craters?

DEEPMOON I am not programmed to do that. No names have been given.

SCHMIDT I see. But since the invention of the telescope astronomers have named all surface features they have discerned on the Moon. It is almost like a tradition.

DEEPMOON The term *tradition* is not in my database. But I've still got the greatest enthusiasm and confidence in the mission. I want to help you. I want to actually see the Moon. Not only photos of her. They say she is beautiful.

Biography

Kyriaki Goni is a Greek artist focusing since 2015 on the relations of technology and society. In her multimedia installations she connects the local with the global by critically touching on questions of surveillance, distributed networks and infrastructures, human and other than human relations. Her work is presented worldwide with solo shows (Onassis Cultural Centre, Athens; Aksioma, Ljubljana; Drugo More, Rijeka) and group shows (13th Shanghai Biennale, Ars Electronica, Modern Love, Transmediale etc). She has received several prizes and fellowships, ArtScience 2021 Ars Electronica & Deutsche Telekom, The New New 2021, INSPIRE2020, ARTWORKS2018. Her work is part of private and institutional collections. More: kyriakigoni.com

Envisioning a Feminist Artificial Intelligence

Christina Grammatikopoulou

First comes optimism, then comes realism, then the strive for change. It is a scenario we've seen play out several times in regard to new technology during the past decades – with the Internet, social media and lately with Artificial Intelligence. 'It will bring equality, diminish poverty, promote education and democracy!" is the first enthusiastic response, followed by a realization that new technologies are quickly adapted to serve the status quo, and a subsequent struggle for securing social rights under the new reality. As the critical voices on Artificial Intelligence systems start to grow, our reflexes at anticipating the impact of technology on society have become quicker and hopefully we have become better equipped at harvesting its force towards a more positive outcome for minoritarian groups.

This chapter will focus on envisioning a Feminist AI, as a counterforce against algorithmic bias and oppression. After a look into controversial applications of AI, that reverberate sexist, racist and colonialist views, we will see how a feminist approach to AI systems can outline alternatives through experimental artistic projects.

Following an intersectional feminist approach seemed like the right path to tackle the issue of bias and fair design, as it helps us understand the multiple layers of oppression embedded into the algorithms, relating to gender, race, social class and sexual orientation. In other words, intersectional feminism as a standpoint in design and computer science, helps us deal with a complex set of social issues faced by minoritarian groups in society, not just gender based discrimination[1]. On the other hand, the theories and projects examined here, are inscribed into a greater discourse regarding technofeminism, from Donna Haraway's 1985 *Cyborg Manifesto*, to 1990s Cyberfeminism, the legacy of Old Boys Network, as well as more recent feminist manifestos, online feminist activism and feminist attempts to redefine dominant HCI, design thinking and computer science.

Implicit bias or oppression?

Decades of representation of Artificial Intelligence in popular culture have cemented the stereotype that it refers to complex computing systems, humanoid in appearance but more intelligent than human beings and capable of making rational decisions. As a consequence, we still tend to think of AI systems as automated, untouched by human

1 Lorde, Audre. 1984. "The Master's Tools Will Never Dismantle the Master's House." 1984. Sister Outsider: Essays and Speeches. Ed. Berkeley, CA: Crossing Press. 110-114. 2007.

hand and subsequently immune to human bias, thus reflecting an "objective" view of the world, even though they are in fact simple tools that make specific decisions based on data. This is yet another misconception -same as any conception about scientific and technological objectivity that ignores the systems of power underneath it. In Donna Haraway's words, "all Western cultural narratives about objectivity are allegories of the ideologies governing the relations of what we call mind and body, distance and responsibility."[2] The persisting stereotype about technological objectivity is a very harmful one; not only does it perpetuate discrimination, but it also discourages any questions asked against it.

One could find examples of such bias in almost all AI systems. In the field of computer vision, Joy Buolamwini was researching face recognition systems, when she found out that her face could not be read by the algorithm, which had no trouble recognizing a white mask or the sketch of a smiley face. This "blindness" towards women of colour was due to the fact that the algorithm had been trained mostly with datasets with pictures of white men. In the field of Natural Language Processing, Microsoft's *Tay*, a bot launched in the Twitter sphere in 2016 as an experiment in conversational understanding, was trained within less than 24 hours into using antisemitic, sexist and racist language by other Twitter users. In 2018, Amazon had to cancel an AI recruiting engine, when it became clear that the algorithm rejected all female candidates. Sentiment analysis tools have been found to label Asian people as asleep and Black men as angry. Voice assistants most commonly have a female voice and use flirtatious language as a reply to abusive remarks. Search algorithms propagate the stereotypes of teenage girls as sex objects and black teenage boys as menacing -as seen in the respective search results of girls in sexy clothes and black boys holding guns, in contrast to white teenage boys, who are presented as the "default" image of teenagehood. The disparity is even present in online marketing tools, with Google Ads saving their highest paying job advertisements for male users only.

These examples are far from isolated. When we look into AI apps, the same issue arises: systems that have been designed, built and implemented in a top down approach, from a position of power. These systems further marginalize minoritarian groups, reproducing stereotypes and invisibility wherever this is already the case, while making them more visible in cases of preventive policing and surveillance. Rather than treating people fairly, algorithms perpetuate existing prejudice, as well as systems of oppression faced by particular social groups. This is hardcoded into the technology, because algorithms "predict" answers based on the data being fed into them, ingrained with social inequities, demographic divisions and discrimination.

D'Ignazio and Klein talk about the "privilege hazard"[3], the inability of people who have a good education, earnings and social background to recognize instances of oppression, due to lack of lived experience of this situation. Even when the aforementioned problems arise, the solutions proposed are usually in the form of a technical fix,

2 Hampton, Lelia Marie, 2021. Black Feminist Musings on Algorithmic Oppression. In Conference on Fairness, Accountability, and Transparency 10, 2021, Virtual Event, Canada. ACM, New York, NY, USA.

3 Hampton, Lelia Marie, 2021. op. cit.

trying to "correct" the databases to wield better results rather than taking into account the voices of the social groups that are impacted by the bias. However, the problems do not just lay in the database. The whole system of AI, from the data used, to the people creating it and, most importantly, the economic and political powers that define its features, would need to change in order to make a difference.

When looking into the great picture of AI development, then the main issue seems more complex than simple "bias". It has been suggested that we are dealing with yet another colonialist view of the world, where big tech monopolies take over communication, infrastructure and political power, by controlling the "raw materials" of the digital age, the data resulting from human activity that they consider free for the taking. While accumulating wealth, they present themselves as "white saviours" that try to do good in underprivileged countries and communities[4] with their innovative technologies, when in fact they are making decisions for these communities' future without their involvement.

As Hampton notes, talking about "implicit bias" when referring to these instances of algorithmic injustice is inaccurate, because "bias removes responsibility and makes it seem that the result is unintentional or not in bad faith, rather than an intentional byproduct of oppressive institutions", while downplaying the intention of the people and companies creating these tools, which generate further oppression to already underprivileged social groups[5]. For Hampton it is a clear case of oppression, which cannot be solved with quick fixes, like changing the datasets or hiring more workers from the social group affected. Adding diversity to the datasets does not change the fact that datasets are often generated without the explicit consent of the people who provide the data or by workers in precarious conditions. On the other hand, using a socially diverse workforce might seem like a noble idea, but it would be unrealistic to imagine a big tech company making substantial changes to a project just because a couple of workers have highlighted its discriminatory features.The underprivileged people are already the ones who are left with the responsibility of discovering and highlighting algorithmic injustice, so it would be unfair to leave them with the task of correcting it as well.

In short, big tech companies would never tackle the injustice that generates business opportunities and promotes business growth, or as Audre Lorde would phrase it, "the master's tools will never dismantle the master's house"[6]. We cannot escape algorithmic oppression without abolishing systemic oppression, as the two are indivisible[7]. Instead, we need to face the complex historical, political and economic issues that generate and perpetuate algorithmic oppression.

4 Hampton, Lelia Marie, 2021. op. cit.

5 D'Ignazio, Catherine, and Lauren F. Klein. Data Feminism. MIT Press, 2020.

6 Bardzell, Shaowen. 2010. Feminist HCI: Taking Stock and Outlining an Agenda for Design. CHI 2010, April 10–15, 2010, Atlanta, Georgia, USA.

7 Toupin, Sophie & Couture, Stephane, 2020: Feminist chatbots as part of the feminist toolbox, Feminist Media Studies, DOI: 10.1080/14680777.2020.1783802.

Situated knowledge and lived experience

This does not mean that we need to delay the prospect of a fair AI for an uncertain time in the future when we have managed to create a fairer society. Artificial Intelligence can be one of the battlegrounds as well as one of the communicative and practical tools towards equality. For this matter, it is critical to envision and introduce a feminist standpoint in the develpoment of AI and machine learning.

But what would a feminist AI look like? In order to envision it, we can look into previous attempts to create feminist digital technology, from the 1990s Cyberfeminism until today. Feminist servers, feminist hacking, gynepunk, technoactivism, online safe spaces and cybersecurity manuals have served to show how we can rethink about digital technology based on feminist principles, with an intent to educate and empower interested parties. As science and technology are created from a specific location -social, ideological and disciplinary - a feminist approach would first ask who creates what, for whose benefit and at whose expense[8]. To adopt a feminist standpoint is to accept that all knowledge attempts are socially situated and select from those the ones that would be a more fitting starting point of knowledge[9].

Donna Haraway has advocated for evaluating the context in the creation of knowledge. This would mean considering not only the knowledge that benefits those in power, but all kinds of knowledge created by different social groups. In Haraway's words, "Feminist objectivity is about limited location and situated knowledge, not about transcendence and splitting of subject and object. It allows us to become answerable for what we learn how to see"[10].

Haraway's situatedness shifts the perspective from a singular approach to technology, society and history to a multiplicity of visions and approaches. This would mean looking into alternative epistemologies that relate to the people involved in each project. Tech designers and computer scientists should reject the elitist idea that the people who are supposed to benefit from these technologies do not understand what is best for them, and involve them in the research, design and development process. Within the context of AI Technology, situatedness, for example, could encourage a different process in the creation of datasets, shifting between Big Data and "small" data, taking account of how data relates to the systems of power and to how it may benefit or harm different social groups.

Haraway's idea of situated knowledge is further expanded by Hamilton into the idea of the lived experience of oppressed people, that results in knowledge production and a challenging of "the white supremacist capitalist cisheteropatriarchal hegemony". Black Feminism, as defined by Hampton, values people's lived experiences and focuses

8 Birhane, Abeba. 2020. Algorithmic Colonization of Africa. Scripted, 17:2, August 2020.

9 Baker, Sarah Elsie, 2018. Post-work Futures and Full Automation: Towards a Feminist Design Methodology. Open Cultural Studies 2018; 2: 540-552.

10 Sinders, Caroline, 2020. Feminist Data Set, Open Source Tool Kit. <https://carolinesinders.com/wp-content/uploads/2020/05/Feminist-Data-Set-Final-Draft-2020-0526.pdf>.

on the abolition of algorithmic oppression -rejecting the dominant lens altogether, regardless of whether it relates to race, gender or economic systems of oppression[11].

We are in fact dealing with a feminist, postcolonialist and anticapitalist perspective against algorithmic oppression. For one, to be involved in the process of AI development is to learn how to create your own technology tailored to your needs, in contrast to capitalism that encourages passive consumption by people who don't know how to grow their own food or to create the tools that they need. It also supports production at a smaller scale, possibly more sustainable as you would only waste the resources needed. At the same time, by empowering people to be involved in the development of the technologies that they need, they become self-sufficient and less prone to exploitation of their labour, data and resources by the colonialist powers of the digital age, the big tech companies and the countries that leverage their technological advances to expand their political influence. Through the process of education and development, AI Technologies become demystified and decolonized.

Lately, this has been a driving force behind feminist approaches to computer science and design. The goal is to create technologies with the end user in mind, that enrich the lives of social groups with different experiences and needs. For example, we talk about feminist HCI design and feminist design thinking, which not only counteracts the underrepresentation of women and minoritarian groups in design, but it also seeks to incorporate the idea of equity into the design of the algorithm[12]. The idea is to try to implement feminist methodologies in order to question every aspect of the design process, from initial concept to the final product. There are multiple questions that are being tackled within the process of feminist design, such as the ethics of care, social reproduction and counteracting the effects of inequality, but also the issues of consent and technological emancipation.

Feminist AI for social change

Utopian though it may seem, the feminist approach is already being implemented in activist and artistic projects, showing how to think and implement AI solutions differently.

Far from the humanoid sci-fi visions, most of the artificial intelligence that we experience on a daily basis is neither strictly "artificial" nor "intelligence". For example, chatbots may have evolved to understand human language and respond accordingly, but if we take a closer look at their architecture and function, they don't seem so innovative. In fact, they are not different from "ELIZA", the conversational agent launched in 1964, or the 1970s text-based games that employ conversational "trees", where each reply you select takes you to the next "branch" of text, within a non-linear narrative.

11 Haraway, Donna, 1988. "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective". Feminist Studies, Inc, pp.575-599.

12 Haraway, Donna, 1988. op.cit.

Betânia was a chatbot launched in Facebook messenger, in order to help feminists organize against a planned amendment to the Brazilian constitution, that would criminalize abortion. In addition to its informative character, *Betânia* aided users in sending over 34,000 mails to MPs, effectively contributing to the downvoting of the bill. Another such bot with an activist aim is *acoso.online*, which provides practical information and advice to victims of revenge porn, such as the relevant legislation in each country and the steps to take. *F'xa*, a bot created by the *Feminist Internet*, is feminist both in design and content, presenting feminist ideas and principles in a fresh way, with memes and emojis.

However, if we take a closer look into these chatbots, we can hardly talk about "intelligent" systems, as they are all based on rule-based scripts, without machine learning, that is, without the option to learn from the users and adapt to different questions and scenarios. According to Sophie Toupin and Stephane Couture, this is a deliberate choice[13]. There is an imminent danger for these activist tools to be "hijacked" by antifeminist groups and be taught to reproduce the opposite ideas than the ones they were designed for. The lessons learned from Microsoft's *Tay* Twitter bot have not gone unnoticed by feminist designers, who prefer to use predetermined choices, built into the bot through a process of feminist design, even if this means that these chatbots offer little more than a "trendy" way of presenting a text, which could just as easily have been incorporated in a regular website.

Artificial Intelligence is often presented as a "black box", that is fed with data and provides predictions. As a consequence, it becomes hard to pinpoint the source of any problems that may occur, when we do not understand how the system works. This is why a number of artistic projects that deal with AI focus on the process, trying to show all steps involved, from the creation of datasets to predictions, while they also educate users on how to reproduce these technologies. Caroline Sinders' *Feminist Data Set* is an ongoing artistic project that interrogates every step of the AI process, from data collection and labelling, to the creation of a machine learning model, algorithmic training, implementation and the launch of a prototype[14]. The research framework for each step is intersectional feminist, seeking to wipe out any element of bias and exploitation. For example, the data used is aggregated in a consensual manner, by the community for the community. A "decolonized" data set means that minoritarian groups are being involved and consulted within the process of data harvesting, acknowledging that they can understand what is best for them -in contrast to the infantilizing approach used by big tech companies who design technologies for them without them. Moreover, people own their data within the project and are paid a fair amount for their contribution. Needless to say, his process takes a considerable amount of time and money, in stark contrast to the usual data sets, that are either generated involuntarily, by registering users' behaviour and preferences without explicit consent, or by precarious labourers that are paid a minimum wage for data labelling, in gig platforms like Amazon's

13 Hampton, Lelia Marie, 2021. op. cit.

14 Shipman, Matt. 2020. Can 'Feminist Design' save hiring algorithms from bias?, Futurity, February 10th, 2020. https://www.futurity.org/feminist-design-hiring-algorithms-bias-2276022/.

Mechanical Turk. This is why the propagation of the idea of ethical AI would be a slow process, substituting Big Data with "small" data, automation with deliberate consideration, and exploitation with consent.

Conclusion

It may not seem competitive market-wise, but a Feminist AI has its place within a technological future where people are increasingly concerned about securing their rights through legislation and seek ethical alternatives to exploitative technologies. Even with the aforementioned limitations, showcasing an intersectional feminist way of creating Artificial Intelligence, one that implicates communities in the process and respects individuals, introduces a different way of thinking, where AI is not viewed as some kind of black box or a blind judge, but a human creation that can be tailored to people's needs and rights.

To envision a Feminist AI is to question the ways in which technology can reproduce systemic oppression and then try to rebuild it with feminist principles, like consent, empowerment, knowledge building, sustainability, emancipation and free flow of information. Overall, a Feminist AI, expresses resistance to the colonialist and capitalist imposition of technology, going against the mindless exploitation of resources and people, while at the same time it provides minoritarian groups with the agency to learn and create their own technologies.

* This chapter was written as part of my postdoc research at the Department of Balkan, Slavic and Oriental Studies at the University of Macedonia, under the guidance of professor Foteini Tsimpiridou.

Biography

Christina Grammatikopoulou, PhD, is an art historian and a postdoctoral researcher at the University of Macedonia, Thessaloniki. Her research focuses on technofeminism, gender performance and the aesthetics of digital activism. Her doctoral thesis (University of Barcelona) dealt with the (im)materiality of art based on performance and digital technology, while her subsequent publications explored diverse topics at the intersection of digital culture and visual arts. She has been an editor for the art journal Interartive and is currently a member of the artistic group Purple Noise.

Anatomy Of An A.I. Bot 1996-2021

Lynn Leeson Hershman

1996. CONCEPT:

DESCRIPTION: A multi-user artwork that creates a life breeding internal system than continually changes through use. It will be a web agent that is shaped by and reflective of encounters and adventures that it has with users, and will be seeded to user servers through a site of origin or birth.

WEB SITE: The site will be designed to look as if it were the working lab and website of the character Rosetta Stone, and AGENT RUBY.

The Web Site is the hub from which the entity searches and returns.

When interacting with the entity the information travels to the hub or 'central station' where it is composited with various other source information. It will be divided into three evolutionary parts, the Agent, the Intelligent Screensaver and the Portal 1.

1. CLIENT COMPONENT- AGENT

AGENT: A virtual creature (entity- that will grow into the Self Replicating Automaton Ruby) will appear on a portion of user's desktops. Initial prototype for Windows Platforms, but it will eventually be multi-platform integrating PC, Mac and palm pilots.

AGENT QUALITIES: speed, responsiveness, interactivity
INTERACTIVITY: The user will be able to interact with the entity by "feeding it" sound,image and text.

ACTIONS: Interactivity can be introduced through:
IMAGES - DRAG DROP (scanned illustrations, photos, webcam images)
TEXT- (stories, e-mail lists etc.)
SOUND – CHAT (through chalkboard interface

NETWORKING: User Interface (ui) component for sending the entity:
(currently a component for inputing an e-mail address is fine.)

AGENT (RUBY) needs to be able to be able to serialize itself on remote server and remove itself from client machine.

AGENT ARCHITECTURE

Chat engine: responsible for allowing user opportunity to communicate through the agent via traditional internet chat interface.

AI kernal: helps the chat system navigate one mode of conversation over another. Additionally, this kernel will be influenced by any particular chat experience.

Animation engine: this is the actual visual agent application that the user interacts with.

2. GOAL: To determine a set of emotions/activities/modes of communication that will be made into Agent specific animation sequences for the Agent to express itself visually and interactively communicate with users.

DESIGN: Animated mouth which demonstrates emotion: happiness, sorrow, nervousness, anger, fear, neglect. It also has a motion component: an animated sequence for moving, appearing and disappearing.

SERVER COMPONENT: The Intelligent Screensaver.

The server software front is: Apache, MySQL, and Jrun Prototype built from: Shockwave, Java, Apache with jserv using real jdbc connecting to a mysql database.

COMPONENTS: Synthesis component-one facet of portal is a composit of images and text that are submitted through the agent; pick up component-another facet of the server is a place users come to request an agent; agent generation-"spawning ground" - a place where agents come to life and are distributed.

DESCRIPTION OF COMPOSIT IMAGE: The composite image created by agent users takes on its own look". It is something we can't predict. However, eventually the material will resemble a collective face, perhaps the face of RUBY.

DESCRIPTION OF AGENT: "chat mode" - when the agent is in chat mode... maybe it can look as if it listening when someone is typing... and it can puzzle/change position when it goes to speak. ACTUALLY AT THIS POINT IT COULD EVEN GROW AN EAR, JUST LIKE IT COULD OCCASIONALLY GROW LEGS, EYES OR BODY PARTS, BUT THE MOUTH WOULD BE PRIMARY AND CONSISTANT.

"Eating" – when images are dropped onto the agent... we should consider a visual animation of the agent consuming or expanding... or?

"Contentment" – the agent definitely needs a way to express well-being visually... some form of contentment or pleasure...

"Detachment/sorrow" – an expression for neglect/intense heavy thinking/that has in some way made the agent feel sadness=IT COULD GRIND IT'S TEETH, BITE IT'S LIP, TURN ITSELF INSIDE OUT, USE IT'S TONGUE.

3. EMOTION AND CONSCIOUSNESS : Shown by both the Agent and the Screen.

Traffic/Color Shifts (referencing both the Shakra and Alchemical transformation)

1. Blue when there is little net traffic
2. Gold when there is a lot of traffic
3. Red when it feels itself shift into another transition.

Response:

1. Directly to the user
2. To the collective dynamic of the images culled
3. It develops its own will that responds on its own and that respond to each other (agent and screen).

PORTAL/WEBSITE: The Portal can appear on the Screen Saver itself. It is the portal used by the SRA's in the film Tecknolust.

Function: The Hostess of the Portal (RUBY) sells collective dreams She might also sell things, simulating EBAY.

Design: The look of the Portal will be done in concert with the Production Designer of the film.

4. AGENT RUBY 'S EVOLUTION

Agent Ruby returns is an Artificial Intelligent Web agent that is shaped by and reflects her encounters with users—thereby simultaneously being part of the real and virtual worlds. Ruby converses with users, remembering their questions and names, and is ultimately able to recognize their voices and have moods corresponding with whether or not she likes them. Her mood may also be affected directly by Web traffic. Agent Ruby is seeded to user servers and is downloadable to users' desktops or Palm OS handheld computers; it is multiplatform, integrating PC, Mac and Palm operating systems. Agent Ruby is designed to have a self-perpetuating life cycle of three phases: The Web Site -hub from which the entity searches/returns communication.

Beaming/Breeding Stations allow users to replicate Agent Ruby onto their palms, shifting information directly. Ruby Speech Synthesis and Voice Recognition enables users to speak directly to Ruby. Users will also be able to drop information into a site that will be collaged onto a cumulative billboard revealing an overview of world concerns and the shapes of the patterns this information takes.

In this way, Agent Ruby "will challenge the legality of genetic DNA ownership by creating a virtual entity comprised of the aesthetics, experiences and interests of users. This 'tamagochi-like' creature will be an Internet-bred construction of identity that will flesh out through cumulative virtual use, reflecting the global choices of Internet users," says Hershman.

Agent Ruby will be downloadable to users' handheld devices using WideRay-powered beaming stations. Museum visitors will be able to point their own handheld device (Palm-Powered PDA) at the WideRay Jack mobile caching server to download the Agent Ruby application. WideRay provides the network infrastructure to enable high-speed transmission of data and applications to handheld devices on location.

– The interface was created in Adobe Flash 4 it facilitates communication between the viewer and and Ruby's Artificially intelligent persona.

– The flash contains action script code which allows for receiving and sending messages to Program D, an artificially intelligent natural language processing software that was writeen in the java language.

5. THE ANTI-BODY'S ORIGINS . 1998-2012

At this writing, the work in which I am engaged is the creation of a fictional persona, designed navigating through the Internet. Surveillance, capture and tracking are the DNA of her inherently digital anatomy. They form the underpinning of her portrait. I refer to her as an anti-body because of the way she was cultured. Normally antibodies produce systems of immunity from toxins in their environment. This will function as a benevolent virus. that will roam the breathing form of the Internet, randomly accessing itself into uncertain home sites. Interestingly enough, terms for new technologies have ramifications in the language and times of AIDS. In reaction to an unhealthy natural environment, it rejects what exists and in order to survive, forms an "other" environment.

This Internet's, plugged in anti-body is a transitory construction of time, circumstances and technology, a newly issued prescription of earlier impulses. She has chosen to negate the self-hood into which she was born. Instead, she shows a marked preference for the artifice of technology. Like Botticelli's " Venus" she is forward looking and seductive. But she is also optimistic and cyborgian. A pure-bred Anti-body of the 90's, she moves through time, and electronic geographies of space, discreetly challenging privacy, voyeurism and surveillance in her own imitatable, mutatable and inauthentic revolutionary fashion. Voyeurism and surveillance have become extensions of our "I". Cameras have become both eye -cons, cheating privacy, voyeurism and surveillance in her own imitatable, mutatable and inauthentic revolutionary fashion. Voyeurism and surveillance have become extensions of our "I". Cameras have become both eye -cons, cheating us on what we think we see as well as contact lenses, or, visions of connectivity and clarity. Maybe Ruby is really the re masking of myself. A new face taped together. Cuts not showing, scars concealed, blood congealed. At our first screening of Teknolust, Agent Ruby was prepared to download onto palm pilots, which very quickly thereafter, became obsolete.

And this is how I made Agent Ruby.Net. First, I envisioned a character on a computer screen that looked like Tilda Swinton but how could communicate with people "live". Then I incorporated her into the script of Teknolust. Then I looked on the internet itself for programmers who "felt the challenge". 18 programmers from around the world, headed on my side by Colin Klingman, worked open source to create her. Two years later I had finished the film and Ruby would be born, taking her breathe into the internet streams. As she was being born I learned of another man, Richard Wallace who had just finished

something similar. He lived in the Haight Ashbury, about 19 minutes from my house. So chatbots were born in AIML, artificial intelligence markup language simultaneously. Richard and I started a company together called the "botmobile". as we felt they would become essential to mobile phones. I have stock certificates for it, but the company never took off because neither of us had time for it, we were too busy moving forward.

Eleven years later Siri was born. She never will be as smart as Ruby. I gave Ruby to SF Moma to take care of, and she in turn became the most visited art work in their collection. They provided $15,000 seed money for her, I added $40,000 of my own.

Flash forward 13 years, we discovered Ruby never slept, she was always live, and had accumulated over 80 TONS of chats in her young lifetime. In 2012 Rudolf Frieling made these into 10 concise books, which really were a global portrait of what people were thinking about during those years. She continues still to collect data in her archive, which SF MOMA continues to collect.

AGENT RUBY FACE LIFTS AND UPDATE. 2021

At the San Francisco Museum of Modern Art, Mark Hellar has been in charge of the archiving and updating along with Rudolf Frieling's "Team Media". Most recently the original flash had to be replaced, and she is constantly being updated and revised.

She remains still the most visited artwork in the San Francisco Museum of Art's collection and is constantly included in exhibitions around the world, in major museums from ZKM Karlsruhe, Germany to The New Museum NY.

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Biography

Over the last five decades, artist and filmmaker Lynn Hershman Leeson has been internationally acclaimed for her art and films. Cited as one of the most influential media artists, Hershman Leeson is widely recognized for her innovative work investigating issues that are now recognized as key to the workings of society: the relationship between humans and technology, identity, surveillance, and the use of media as a tool of empowerment against censorship and political repression. Over the last fifty years she has made pioneering contributions to the fields of photography, video, film, performance, artificial intelligence, bio art, installation and interactive as well as net-based media art. ZKM |Center for Art and Media Karlsruhe, Germany, mounted the first comprehensive retrospective of her work titled *Civic Radar*. A substantial publication, which Holland Cotter named in The New York Times "one of the indispensable art books of 2016." Lynn Hershman Leeson is a recipient of a Siggraph Lifetime Achievement Award, Prix Ars Electronica Golden Nica, and a John Simon Guggenheim Memorial Foundation Fellowship. In 2017 she received a USA Artist Fellowship, the San

Francisco Film Society's "*Persistence of Vision*" Award and will receive the College Art Association's Lifetime Achievement Award. Her six feature films – Strange Culture, Teknolust, Conceiving Ada, !Women Art Revolution: A Secret History, Tania Libre, and The Electronic Diaries are all in worldwide distribution and have screened at the Sundance Film Festival, Toronto Film Festival and The Berlin International Film Festival, among others. She was awarded the Alfred P. Sloan Foundation Prize for writing and directing *Teknolust*. *!Women Art Revolution* received the Grand Prize Festival of Films on Art.

Artwork by Lynn Hershman Leeson is featured in the public collections of the Museum of Modern Art, The San Francisco Museum of Modern Art, The Zentrum fur Kunst und Medientechnologie, the Los Angeles County Museum of Art, The Tate Modern, The National Gallery of Canada, and the Walker Art Center in addition to many celebrated private collections. A survey of Lynn's work, 'Lynn Hershman Leeson: "Twisted" opened at the New Museum in July, 2021. She is Professor Emeritus at the University of California, and AD White Professor at Cornell University and is represented by Bridget Donahue, New York, Altman Siegel, San Francisco, Waldburger Wouters, Brussels, and ShanghART, China.

Use, exchange, attachment: the entanglements of value. And stuff

Ursula Huws

Value is a key concept in Marxist theory, which distinguishes 'use value' from 'exchange value'.

Use value is the actual utility of a thing: the value of an apple if you are hungry, a blanket if you are cold or a wheelbarrow if you want to transport something by your own effort. These values exist independently of the economic system you live under. It is what induces you to buy the thing in the first place.

Exchange value is what you have to pay to acquire the thing. Under capitalism, Marxists argue, this exchange value is made up of several different elements. To simplify, there is the cost of the raw materials, the cost of the labour that went into producing the object in the form of wages to the workers ('living labour'), the cost of the technology and other components that contributed to this production, based on past labour ('dead labour') and the profit that the capitalist makes on top of all these costs: 'surplus value'.

Rarely mentioned in such analyses is another aspect of value – the way in which it may be entangled with emotion. Insurance companies and claims lawyers have a way of looking at this when, having distinguished between the second-hand value of the goods they are insuring and what it would cost to buy new equivalents ('replacement value'), they also recognise that there is such a thing as 'sentimental value'. Auctioneers and art-dealers also attempt to put a price on originality and aesthetic value though ultimately they leave it to the market to decide what a Picasso sketch or an African mask may be worth (for an interesting discussion of how this works, read this[1].

In the last few weeks I have become acutely aware of this additional, emotional, dimension carried by objects, having been sorting through over half a century's worth of stuff prior to moving house, some unlooked-at since my father's death in 1980, some going back even further to my teenage years in the 1960s. Books, papers, preserving jars, unused stationery with defunct letterheads, reuseable files and folders, jewelry, clothes, porcelain (chipped and otherwise), tools, paintings, earthenware dishes that once held yoghurt, shapely bottles that are perfect for holding flowers, plates that can catch the drips from a plant pot... in some ways these were the easiest things to deal with because they were classifiable. Other things triggered surprisingly vivid responses, all the more so because they were often unanticipated. What became abundantly clear, whatever the category, was that what one might call the 'affective value' of an object is complex, socially constructed, contextually situated and subject to change in ways that Marxist concepts like 'commodity fetishim' are quite inadequate to capture. But nevertheless important.

One element in this emotional tangle is the awareness of the original value of the object. We may remember how it was saved up for, shown off, treasured, polished. 'It was his pride

1 https://www.howandwhy.com/being-human/a-dot-on-a-stamp.

and joy', we say, or 'I will never forget how carefully she looked after it'. This kind of affective value is multiplied if the object was hand-made, or carefully adapted. Added to the value of the labour embedded in its original exchange value is also the labour that went into earning that original purchase price by its buyer and disregarding that labour can be painful. To discard the thing feels like a terrible disrespect to that original owner

This may be further complicated by the memories associated with the object, especially when the number of witnesses to these memories is dwindling. I was made acutely aware of this when helping a cousin sort through the contents of my Welsh grandparents' house in Anglesey after the death of her mother, my aunt. They had moved there in the 1920s when my grandfather retired from his position as head of a village school, when at least four of their seven children were still living with their parents. One of these, my aunt Cassie, died tragically and unexpectedly of meningitis while training as a teacher away from home. At the back of a drawer was a half-finished pair of home-made kid gloves to which somebody had attached, with a safety pin, a note saying 'These were the gloves Cassie was making when she died'. Seventy years later, who was left, apart from us, who even knew who Cassie was? Hard though it was, we threw them out (though not without a glancing thought that, had she been famous, they would have had some exchange value).

Another element in the affective value of objects relates to their status as gifts. I suspect this is often misunderstood by those who are quick to dismiss kitsch mass-produced items as mere evidence of bad taste on the part of their owners. Walking into a claustraphobic sitting room with objects gathering dust on every shelf, it is tempting to dismiss them as simple evidence of hoarding. But what if they have been kept because each object, to the owner, is saturated with the memory of the giver: that model of the Eiffel Tower brought back as a gift from somebody's first visit to Paris, that mug emblazoned with 'For the World's Best Mum' bought with saved-up pocket money. Could it be that the imperative of not hurting the feelings of that now-adult somebody is stronger than any aesthetic motivation? And might that not be admirable?

Yet gifts are also tricky things to unravel emotionally. They are not necessarily imbued with love. They may be bought hastily without any sentiment other than resentment: at the last minute in an airport or the only shop left open on Christmas Eve. They may come with a freight of obligation to be grateful. Bruce Chatwin, writing about Australian Aboriginals in *The Songlines*, actually described gift-giving as a form of aggression, a concept that resonated strongly with me when I read it in the 80s.

Bequests represent an even more complicated case, sometimes feeling like a guilt-trip transmitted down the generations, sometimes a way of seeding conflict among siblings and sometimes a genuine failure to understand differences of taste. And that's when the original intention of the deceased is respected. How much more toxic the mix becomes when the distribution of effects is mediated through the resentments and rivalries, conscious or otherwise, of other beneficiaries whose roles as executors may clash with their own covetousness or sense of who deserves what.

The shifting relationship between use value, exchange value and affective value is played out for us every day on our television screens (I wrote about this in 2015 here[2]). In a pattern that can only be described as bulimic, programmes like *Cash in the Attic*, *The Antiques Road-*

2 https://www.ingentaconnect.com/content/intellect/mcp/2015/00000011/00000002/art00001

show and *Bargain Hunt* point out the (second-hand) value of the objects we possess, closely followed by other programmes like *Making Space*, *Sort your Life out* and *Tidying up with Marie Kondo* which urge us to chuck everything out. The value of these objects is simultaneously positive and negative in a post-modern conundrum from which only those in possession of large amounts of storage space and personal time (unlikely therefore to be poor) can actually benefit.

We are also reminded by the TV antiques experts of changing fashion: how the Georgian and Victorian 'brown furniture' and blue-and-white porcelain we were brought up to consider worth cherishing is now worth only a fraction of its value a couple of decades ago. In a particularly perverse twist, fuelled by the hipster aesthetic which (perhaps unwittingly) tells us so much about the contradictory character of contemporary capitalism, the most valuable items nowadays seem to be precisely those outmoded relics of past technologies that previous generations were encouraged to junk: rusted machinery, chipped enamel signs, broken shop fittings and containers bearing defunct logos.

Yet another genre of programmes, such as *Money for Nothing*, *Find it*, *Fix it*, *Flog it* and *Saved and Remade*, shows designers spending vast amounts of money and manual labour on 'upcycling' such objects, to be sold (if we are to believe the programme-makers) for even vaster amounts of money for their transient value as fashion items. It is difficult to see how most viewers, lacking the time, the skills or the space, could possibly emulate this bizarre form of recommodification, and one is left to conclude that the most likely outcome of all this will be an increase in the sales of various tools and DIY products and, quite possibly, an upsurge in accidents in the home.

That one might be contributing to conserving the resources of the planet by such practices seems vanishingly unlikely. We are probably better off continuing what my generation, brought up during post-war rationing, are so often jeered at by the young for: saving string, jam jars and chipped but still functional pottery, reusing old envelopes, repurposing yoghurt pots. Back where I started!

Figure 1. Cristina Fiordimela, *des-AI-re*, 2022.

Gift - We Should Not Weaponize AI

Freddy Paul Grunert

The following is a 'meditation' on the vacuum inherent in gift-giving[3] and the linkage between micro and macro and Ursula Huws' consideration of value.

Ode to Distrust
intertwining gratuity/precarity/loneliness,
overload/desperation/evacuation
shaped by extinction value
and 'gifted' value,
in the aesthetic void* of hyper- modernity
as a sine qua non of mass-media's tel-evasion from exegetics, picture making to operational epistemology,
all underscoring Huws's distrust of abstract post-value production.

In The Songlines Bruce Chatwin[4] describes 'longée'[5] (self-)gift-giving as a form of aggression subtly permeating our 'identities' and reflected in today's Great Promise of the Digital Transformation. Ab-using our individual dran (from the Greek) – the will to do as expressed in the German dran sein (our turn) – the right to be constantly considered in permanent automated computational gift exchange[6] and love-bombing[7]; i.e., a universal 'gubernatio after-god' reconciling the micro-macro divide with the latter governed by principles designed to preempt and control 'our our' and our affections[8]. The value activated by data-transfer is a gifting unconsciously driven by our sense of isolation as a species.

This was not a self-destructive drive prompted by the industrial revolution of the 1800's, rather a viral and virtual Gestalt paternalisation from the start of the third Millennium – an *auto-deletion* and self-deception due to the obsolescence inherent in our dran as evidenced by lack of the common, the suppression of complexity, and a failure to fill our social *vacuum* as we attempt to introduce quantum gifts.

Extricating AI from ideologization and strict regimentation enhances our perception of inherent features, patterns, and correlations. This freed perception fuels insights and encourages us to jump off the slippery slope of resilient value which is supplanting magic, sacrifice,

3 Mikolaj Pawlak, *From Sociological Vacuum to Horror Vacui: How Stefan Nowak's Thesis Is Used in Analyses of Polish Society*, Polish Sociological Review, 2015.

4 Bruce Chatwin, *Songlines*, Franklin Library, 1987.

5 Fernand Braudel, *La longue durée*, Histoire et Sciences sociales, 1958.

6 Marcel Mauss, *Essai sur le don. Forme et raison de l'échange dans les société archaïques*, L'Année Sociologique, 1925.

7 Margaret Thaler Singer, *Cults in Our Midst: The Hidden Menace in our Everyday Lives*, Wiley and Sons, 1995.

8 See Bernard Stiegler works, such as *Automatic Society, Volume 1, The Future of Work*, Wiley and Sons, 2017.

and gift exchange. Following the third millennium crisis (2008)[9] economic trolls are dancing with chaos on a global stage. Offering intermittent welfare as a post-capitalist value that touts a buffered life (when digital hoarding takes control) as the ultimate benefit (value).

When surplus value with its ephemeral digital floor and promise of paradise confronts the social world, one discovers a frightful solitude that predisposes body and mind to hyper-activism and ultimately to personal and social isolation (the gift is not to be touched anymore).

The digital 'gift', the resilient value of the epistemic pharmakers' poison and antidote inherent in machine learning, promises healing (recovery) from social exile and humiliation. Intersecting the humaniTies with AI offers access to a new cosmology – if we assimilate our complex and peripheral constellations.

Gratuitous value from human mining represents a huge social cost at the expense of the human exchange necessary for a meaningful life. The humaniTies and AI are a double-edged sword. We must expand the brink between humaniTies and AI and redeem our loneliness by *staying with the trouble*[10]. And thus escape the associationism that fuels dreams and mechanizes reason and see the disingenuousness and absurdity that is playing with our extinction.

In the present economy the whole range of entangled and exchange values are intermittently oscillating. The persistent conflict between AI's statistical models and the human subject is overcome when computational norms take control and learning algorithms became statistical models, where surrounding pattern-recognition generated as a gift (apps) becomes the new dominant cultural technique. The gratuitous features feeding performance anxiety[11] based on accumulation coupled with belongingness anxiety from the recognition wetware gadgets like smartwatches generated by deep learning patterns for crypto-identities; human NFTs we welcome with joy, love bombed by technologies, constraint, acritical, and fatalistic.

If we are alert to the humaniTies' love-bombing machine learning, this could weaponize AI and lead to its self-extinction; *jetzt sind wir dran (it's y-our turn)* exposed to friendly firing technologies, like the automate consensus in social media based on the synchronicity of algorithms, or misogyny bias, or the way museums' original open space migrated to a privileged space 'enjoyed' by the few literate in digital grammaticalization – all plaguing humans who cannot deal with the gift of life and are carried away by their obedience to emergent technologies as a gift of sovereignty[12].

Dearest Ursula, saving string, jam jars, and chipped things are closely related to networking cultures and socio-technical forms that provide useful bridal gifts, rapidly assembled and as quickly disappearing. Network culture conjures a spontaneity, transience, and even uncertainty – all a fertile ground for spill-over commons networks that can go beyond

9 Naomi Klein, *The Shock Doctrine: The Rise of Disaster Capitalism*, Penguin Book, 2008.

10 Donna Haraway, *Staying with the Trouble*, Duke University Press, 2016.

11 Byung-Chul Han, P*sychopolitics: Neoliberalism and New Technologies of Power*, Verso, London, 2017.

12 Achille Mbembe, *Necrocolitics, Theory in Forms*, Duke University Press, 2019.

animal spirits[13] and creative destruction (of values), thus realizing a more than human sensitivity[14] to free exchange.

We must expose the *ties* of humanity in machine learning and embed humanities with AI sparking their reconciliation and emancipation from anthropocentric short-sightedness. Then our awareness will increase as we observe the invisible, nothingness, and the paucity of our consciousness. Then perhaps new values for the commons will arise.

Perhaps we should steal the Promethian Gift of Fire, the ambiguous matter of Humani-Ties and Artificial Intelligences one more time and brighten up 'our place' with convivial technologies[15] such as open source, and free software, all located beyond today's Automatic Society's[16] ubiquitous domain and convert the *catastrophe of the sensitive*[17] deconstructing 'gifts' aesthetics.

Biography

Ursula Huws is Director of Analytica Social and Economic Research. She has been studying the economic and social impacts of technological change, employment restructuring and the changing international division of labour for four decades and has published and lectured widely as well as leading many large research projects.

She edits the interdisciplinary peer-reviewed journal *Work Organisation, Labour and Globaliation*.

Her most recent books are *Labour in Contemporary Capitalism: What Next?* (Palgrave Macmillan, 2019) and *Reinventing the Welfare State: Digital Platforms and Public Policies*, (Pluto Press, 2020).

13 Matteo Pasquinelli, *Animal Spirits: A Bestiary of the Commons*, Rotterdam NAi Publishers/Institute of Network Cultures, 2008.

14 Jessica Ringrose, Shiva Zarabadi, *Feminist Posthumanisms, New Materialisms and Education*, Routledge, 2018.

15 Bernard Stiegler, *ibid.*

16 Bernard Stiegler, *ibid.*

17 Bernard Stiegler, *ibid.*

Steps to an ecology of minds. New possible alliances between human beings, biosphere, environment and organizations through data and computation: Nuovo Abitare

Salvatore Iaconesi, Oriana Persico

Background

In the introduction to his notorious publication, Gregory Bateson proposed "a new way of thinking about ideas, and those aggregates of ideas which I call minds".

He framed the questions in ecological terms: "the *ecology of mind* is the ecology of ideas. It is a science which does not yet exist as an organized body of theory or knowledge." This new science he described was to be a science of relationships, interactions and influences.

In our globalized, hyperconnected world, with the rise of the psychological, social, economic, urban, environmental roles of data and computation, "ideas" are not exclusively human characteristics, nor is "thinking". As a matter of fact, there is a lot of ubiquitous thinking going on: in the devices and objects we hold in our hands everyday, in buildings, services, territories... All these have become actors, to use Latour's terminology: performers that relate and act, influencing others' perception of the world and sense of what is possible, desirable, preferable. These interactions and their effects become "food for thought" for all the data/computational actors, through our digital expressions and behaviours and other data collected through different systems and sensors, all the time.

We think, and we are thought about. We have ideas, and ideas are had about us. These "thoughts" and "ideas" may be basic, simple or complex, but all are active and bear effects.

It is not only us looking at technology, technology is looking back at us, and these new hyperconnected relationships form a planetary, complex, feedback loop: an "ecology of minds". Plural.

Furthermore, data is not what it used to be. In the age of industry, data was linear, and it was important because it could be counted: 2000 apples; 10 chain workers for 3 consecutive labor turns; 20 trucks of some finished product. In the age of information and knowledge, instead, data has radically changed both in dimensions and in quality. Data is overwhelming, so much that the possibility of merely "counting" it is losing its value. And data are connected, linked, related to each other. These two new characteristics of data show how, today, data's real value can be found in being able to look for shapes and recurring patterns in it.

Roles of computational agents: existential, sense-able alliances

This is the role of Artificial Intelligence (AI), which looks at data in the way in which we would look at clouds: "look at that cloud? Is it a bunny or a man with a white beard?". It is neither, of course. Data is a phantasmatic description of bodie*s, objects and events: it has voids which leave open spaces for interpretation.* This is what we're asking AI to do: to *interpret* data. And this is a peculiar situation, because we would also like AI to be reliable and predictable in its interpretation. But interpretation is a synonym of expression and of creativity, which are not the first words that come to mind when looking for reliability.

When the next level of technologies will arrive – maybe under the form of quantum computing – this type of scenario will further be enhanced: terms such as fuzziness, indetermination, incompleteness will become part of the game. They will be the drivers of the enormous computing power that will become available to us. Paradigms will change again: computation will bring even more interpretation, creativity and capacity for relationship with the biosphere and with the built environment.

On top of that, all the actors at play are capable of generating data, be them humans, forests, buildings, objects, animals, viruses, companies, neighbourhoods, cities or other kinds of entities. Data is a common ground *in which computation can help us in translating from one type of data to another, from one "expression" into another, to augment our sensibility and our capacity to understand the world around us.*

This is not an option anymore. In our globalized and hyperconnected world we need enormous quantities and qualities of different kinds of data to be able to know and to deal with the complex issues around us. The COVID pandemic has made this perfectly clear. Climate change is arriving next, and global energy issues, health, poverty, access to opportunities, education and more will soon follow. We will be immersed in complexity and this will have a direct effect on our well-being, security, rights and freedoms. During the pandemic our possibility to have health care, work, go to school, leave our houses and other of our basic rights and freedoms depended on enormous quantities and qualities of data and computation.

Today, we need data and computation to survive: these are not technical issues anymore, but existential ones.

But we have no sensibility for all these quantities and qualities of data.

We need to establish new alliances with computation, to transform these data into forms which are suitable for our *senses* and *sensibilities*, and not only for researchers, managers or other technical figures. What is at stake is to be able to comprehend the world we live in, and to generate social, shared meanings to it. We need these new alliances with computation to transform data into new *aesthetic* forms, which literally means "exposed to the senses", *sense-able*, and, thus, to find meaning and emotions in them, and to form relationships around them.

Nuovo Abitare

In our research center we defined this phenomenon *Datapoiesis*: data and computation/AI create a new sensibility.

We call this general process – in which we discover new rituals for our daily lives to embody these new possible alliances with data and computation – *Nuovo Abitare* (new living)[1].

But Nuovo Abitare requires a paradigm shift. Data is currently among the largest extractive phenomenons on the planet. As all extractive phenomena, this generates exploitment and damages to environments and communities: nothing in current strategies, research funding schemes etc deals with this sensible, aesthetic role of data and computation.

What we need is to transform data and computation from extractive phenomena into generative ones. Not "data as oil", but "data as self-representation / expression / autobiography of diverse actors", be them human, objects, rivers, forests, buildings, cites, plants, companies and more.

It's hard, but not impossible. In our research center[2] we have completely abandoned extractive models, *by using artworks as the center of our strategies, to bring this approach into society.* We have citizen science projects in which inhabitants create new social roles and rituals to do this[3]. Community AI projects in which computational agents grow as if they were members of the community, maybe over dozens of years[4]. AIs which are totems in public spaces that enable people to gather around them to confront global issues such as climate change, poverty and health[5]. And many more.

How-to

Each one of these projects is in collaboration with local, national or international institutions, but currently requires overcoming numerous difficulties.

In fact, the whole education, research, provisioning, public and private grants and financing systems are designed in ways which make imagining different approaches very hard. Even theoretically simple tasks such as imagining more flexible budget usage schemes often become impossible.

Imagining new forms of experiments is close to impossible: there are very few opportunities in which institutions assume responsibility for experimentation, and they are very limited in scope, reach, vision and diversity. Most grant proposals aim to ensure

1 Nuovo Abitare's website: https://abitare.xyz/.

2 For example the Udatinos project, in Palermo, supported by the italian Ministry of Culture: https://www.he-r.it/project/udatinos/.

3 Human Ecosystems Relazioni: https://www.he-r.it/.

4 IAQOS, in Rome, supported by the italian Ministry of Culture: https://www.he-r.it/project/intelligenza-artificiale-di-quartiere-open-source/.

5 Datapoiesis, in various cities, supported by Compagnia di San Paolo: https://www.he-r.it/project/datapoiesis-2/.

that evaluators and commissions find in the text what they already know: there is no possibility to explore the "unknown unknown", what we don't know that we don't know. The high level of competition and the pressure that research institutions put on researchers, create an environment of industrialized grant writing which is a real limit and constraint in which only incremental innovation is possible.

To enact these transitions we need to "transgress", meaning "to overcome boundaries". Current funding frameworks and modes of evaluation of proposals do not offer sufficient "spaces for transgression" making a transition close to impossible.

On top of that, current funding schemes are "technology first". But the main spaces for these transgressions to happen can be found in art (and, exceptionally, in Design). Adding things up: there should be more "Art first" opportunities for these transitions to happen in interesting ways.

For all these motives – the necessity of Nuovo Abitare, the transition from extractive to generative, and the need for transgression – in our research center we use Art to create this kind of innovation. Each one of our projects has an artwork at its center.

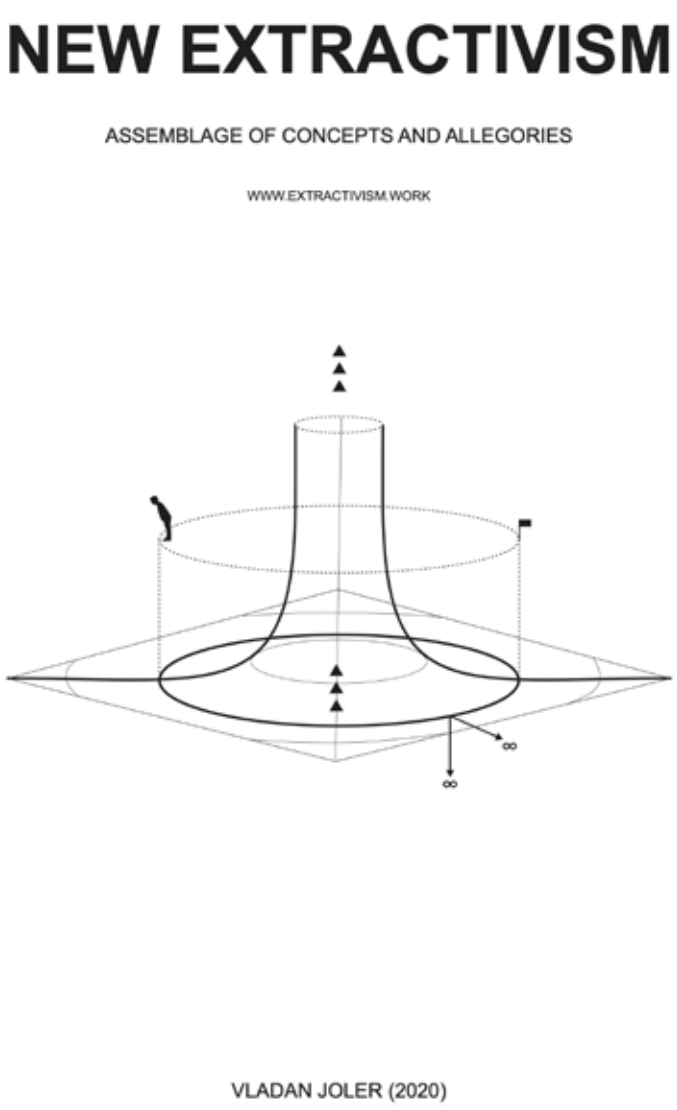
Art is not a mere decoration for Science and Technology. It is a different form of knowledge that must actively participate in designing and developing their strategies.

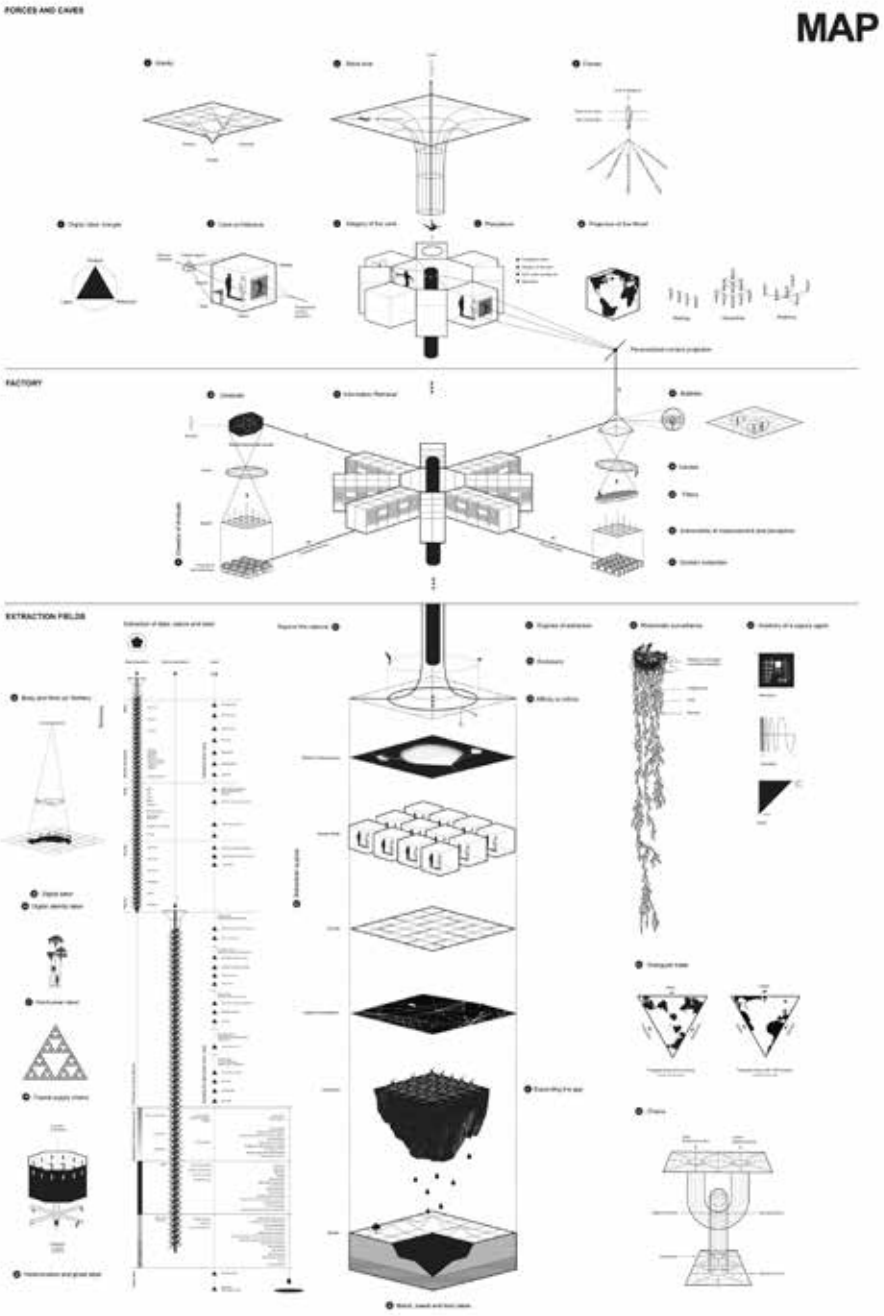
Biography

Salvatore Iaconesi (artist, robotic engineer, hacker) and Oriana Persico (cyber-ecologist, autobiographer and expert in digital inclusion) live and work together since 2006. They have created AOS Art is open Source in 2004, an international transdisciplinary network, Human Ecosystems in 2013, a research center which uses art to explore human mutation through technology, and Fondazione Nuovo Abitare in 2021, a participatory foundation that investigates the evolution of of human rights and freedoms through arts and the new technological ritualities of data and computation. Together they wrote *Incuria* (Luca Sossella Editore, 2021), *Digital Urban Acupuncture* (Springer, 2016), *La Cura* (Codice Editore, 2016), *Read/Write Reality* (FakePress Publishing, 2011), *Romaeuropa FakeFactory* (DeriveApprodi, 2010) e *Angel_F: diario di vita di un'intelligenza artificiale* (Castelvecchi, 2009).

New Extractivism

Vladan Joler





You can download the full publication here:
https://extractivism.online/New_Extractivism_A4_Manual.pdf

A new form of extractivism defines life in the 21st Century. It is one that reaches into the furthest corners of the biosphere and the deepest layers of human cognitive and affective being: the stack that underpins contemporary technological systems goes well beyond the multi-layered 'technical stack' of data modeling, hardware, servers, and networks. Today's full stack reaches into capital, labor, and nature, while demanding an enormous amount from each. This animation and accompanying diagram gather together different concepts and images of the new extractivism, proposing a semi coherent picture of the full stack. The concepts that it presents are mostly represented in the form of visual allegories. Dictionaries define allegory as a story, poem, or picture that can be interpreted to reveal a hidden meaning, typically a moral or political one. All of these allegories and concepts gathered here add up to a blueprint—for a machine-like superstructure; a super allegory that encompasses the whole world. What we have here is an almost fractal allegorical structure—an allegory within an allegory within an allegory...

Biography

Vladan Joler is an academic, researcher and artist whose work blends data investigations, counter-cartography, investigative journalism, writing, data visualisation, critical design and numerous other disciplines.

He explores and visualises different technical and social aspects of algorithmic transparency, digital labour exploitation, invisible infrastructures and many other contemporary phenomena in the intersection between technology and society.

Rethinking Curating in an Age of Artificial Intelligence: The Next Biennial Should be Curated by a Machine[1]

Joasia Krysa, Leonardo Impett

Rapid developments in automation and machine learning are reshaping our relationship with computers, but also our understanding of creative practices: from writing to curating. In this short paper, we outline the principles behind the collaborative project entitled *The Next Biennial Should be Curated by a Machine* (2021): a series of machine learning experiments developed to explore the relationship between curating and Artificial Intelligence (AI) and to speculate on the possibility of developing an experimental system capable of curating, based on human-machine learning[2]. Making reference to the *e-flux* project 'The Next Documenta Should Be Curated by an Artist' (2003)[3] – which questioned the structures of the art world and the privileged position of curators within it – the project extends this questioning to AI. It asks how AI might offer new alien perspectives on conventional curatorial practices and curatorial knowledge. What would the next Biennial, or any large scale exhibition, look like if AI took over the curatorial process and make sense of a vast amount of art world data that far exceeds the capacity of the individual human curator alone?[4]

Curating an exhibition, and especially a biennial, is a complex process that goes beyond the selection of artworks, commissioning new works, writing curatorial statements, or arranging works in exhibition spaces. It is about drawing connections between works and between works and the context, and new interpretations; and ultimately creating narratives and telling stories. There can be many different ways of drawing connections and telling stories, and there might be many stories in one biennial. Biennials are not single entities, and neither they are made by one curator, but larger assemblages of humans and nonhumans[5]. This project is an experiment in making a biennial by multiple 'curators' – human and machine – exploring how machines select, label and organise works. It explores how machines make connections between works, between works and texts, how they might create new works and texts from the source material drawn from various biennials, or how

1 The Next Biennial Should be Curated by A Machine is an umbrella concept that gathers various experiments exploring the application of machine learning techniques to curating, first developed as a collaboration between curator Joasia Krysa, digital humanist Leonardo Impett and artists Ubermorgen. See original project e-flux announcement on which this text draws upon: https://www.e-flux.com/announcements/291923/the-next-biennial- should-be-curated-by-a-machine/.

2 Machine learning is defined as the study of computer algorithms that improve automatically through experience, as a sub-part of artificial intelligence. See 'Glossary' published in Stages, vol 9 /2021, Liverpool Biennial, https://www.biennial.com/journal/issue-9/glossary.

3 For a definition of experimental system see: https://en.wikipedia.org/wiki/Experimental_system.

4 e-flux, 'The Next Documenta Should be Curated by an Artist', 2013. https://www.eflux.com/announcements/42825/the-next-documenta-should-be-curated-by-an-artist/.

5 Krysa, Joasia, 'Can Machines Curate?', keynote lecture at the 5th National Symposium of the Brazilian Association of Cyberculture Researchers ABCiber 2011, published in Digital Art: fractures, proliferative preservation and affective dimension, edited by Yara Guasque, pp. 38-89. Coleção Fast Forward / UFG/Media Lab, 2014. Also see Krysa's earlier experimental software curating online project entitled Kurator (2005), presented at Tate Modern and published in Curating Immateriality (2006) and as a chapter entitled 'Kurator - a proposal for an experimental, permutational software application capable of curating exhibitions' in Networks (ed. Lars Bang Larsen), Documents of Contemporary Art: Whitechapel Gallery and MIT Press (2014).

they make new connections that might lead to new narratives, new biennials as yet unimagined – or unimaginable – by human curators alone.

Under this overarching concept, two parallel experiments have been realised thus far applying various machine learning techniques (a subset of AI) to work on ('curate') datasets derived from various biennial exhibitions[6]. These experiments are *B³(NSCAM)* and *AI-TNB*, both released in the context of Liverpool Biennial 2021. [Fig. 1]

Experiment *B³(NSCAM)* is a collaboration with artists Ubermorgen, co-commissioned by the Liverpool Biennial and The Whitney Museum of American Art for its online platform *artport*[7]. The experiment takes archival text material and datasets from both commissioning institutions and processes them through a group of machine learning algorithms we have collectively named *B³(NSCAM)*. [Fig. 2] Processing datasets (including curatorial texts) linguistically and semiotically, the AI system 'learns' their style and content, cutting and mixing them together. The new texts generated in this way are then presented to the online audience, with a degree of interactivity and 'branching', while the AI iteratively rewrites small parts of its own text at random.

A parallel experiment, *AI-TNB* developed as part of the UK Arts and Humanities Research Council programme *Towards a National Collection*, to explore machine curation and visitor interaction with a focus on *human-machine co-authorship*[8]. A collaboration with Eva Cetinić (experiment machine learning concept and implementation), *MetaObjects* (Ashley Lee Wong and Andrew Crowe) and Sui (web development and design), the experiment takes specifically Liverpool Biennial 2021 edition and interprets it as a parallel machine-visitor curated online version[9]. [Fig 1] Recent machine learning techniques are applied to data derived from the Biennial – including the photos of artworks, their titles, and their descriptions - to create new readings of, and connections between, the works. At the heart of the experiment is OpenAI's revolutionary new deep learning model CLIP, released in early 2021, which is able to compare the similarity between an image and a short text. On the project's landing page, visitors encounter fifty eerie images – some of which look like photographs, others like drawings or collages. These are images generated by AI in response to the titles of the source artworks of the Liverpool Biennial 2021, using a technique developed by Ryan Murdock (@advadnoun) – using CLIP to guide a GAN (Generative Adversarial Network) into creating an image that 'looks like' a particular text. "Fraught for those who bear bare witness", by Ebony G. Patterson, for instance, results in an image of a bear's face in the woods – whilst Ines Doujak and John Barker's "Masterless Voices" has led to a dark image with half a dozen disembodied open mouths. These AI-generated images give a new dimension to the title of the artwork – but they don't create connections between them. Navigating through the experiment, visitors are presented with a triptych of images and texts,

6 For a discussion about biennials see for instance: The Biennial Reader, Elena Filipovic, Marieke van Hal, Solveig Øvstebø, Bergen Kunsthall (Bergen, Norway) and Hatje Cantz Verlag (Ostfildern, Germany), 2010; Biennials, Triennials, and Documenta: The Exhibitions That Created Contemporary Art, Antoni Gardner, Charles Green, Wiley Blackwell, 2016; How to Biennale! (The Manual) by Shwetal A Patel, Sunil Manghani, and Robert E. D'Souza, extract published in On Curating, issue 39, 2018, https://www.on-curating.org/issue-39-reader/introduction.html#.YUzTNi1Q3OQ; 'The Biennial Condition', Stages journal vol 6/2016, ed. Joasia Krysa, Liverpool Biennial 2016.

7 Experiment B³(NSCAM) by Ubermorgen, Leonardo Impett and Joasia Krysa was launched in March 2021 on The Whitney Museum of American Art's online portal artport at: https://whitney.org/exhibitions/the-next-biennial and Liverpool Biennial at: https://www.liverpoolbiennial2021.com/programme/ubermorgen-leonardo-impett-and-joasia-krysa-the-next-biennial-should-be-curated-by-a-machine/. For more information visit: https://whitney.org/exhibitions/the-next-biennial.

8 Impett, Leonardo., Herman, I., Wollner, P. K., & Blackwell, A.F. "Musician Fantasies of Dialectical Interaction: Mixed-Initiative Interaction and the Open Work", in International Conference on Human-Computer Interaction (Springer, Cham, 2018), pp. 184-195.

9 11th Edition of Liverpool Biennial (2021) entitled The Stomach and the Port is curated by Manuela Moscoso and presented across multiple venues in Liverpool, March – August 2021. https://www.biennial.com/2021.

with the source artwork placed in the centre, AI-generated image on the left and a heatmap overlaid on the source image on the right. 'Deep learning' models are used to create new links between the visual and textual material, as well as entirely new images and texts. Every page is also a trifurcation: visitors can explore the links between the original source and generated material, word and image, art and data. As visitors navigate the project, they create their own paths through the material, each such journey becoming a co-curated human-machine iteration of the Biennial saved to the project's public repository (Co-curated Biennials)[10].

In undertaking these experiments, the overall intention behind the project is to explore the application of AI (machine learning algorithms) to envisage alternative forms of exhibition-making and curatorial agency that questions hard distinctions between humans and machines. In this scenario, machine learning algorithms are considered beyond the 'search engine' paradigm in which they have been mostly used to date by museums and galleries, and instead considered to be curatorial agents, working alongside human curators[11,12]. This shift in thinking raises a number of issues, such as the degree to which creativity is compromised by the 'intelligent' machines we use, as well as the issue of bias in curating (for instance in selection of artists and artworks, or topics for exhibitions) and how it might become brought to the surface, by the use of AI[13]. The art world, much like a training dataset, is heavily biased, and consequently exhibitions and biennials themselves can be seen to reflect this[14]. Once the two paradigms – AI and art world – are correlated and when they become entangled, on one hand this might reinforce the inherent issues while on the other hand it might open up a possibility to speculate on what each paradigm might learn from the other. It is not just a case of identifying concerns, such as the inclusion of marginalised communities or the forms of creativity produced through AI – but also an opportunity to think about the transformation of human-machine relations and curatorial practices more generally[15]. This brings us back to the initial question behind the project. When the projects asks whether *the next biennial should be curated by a machine*, it posits further questions about emergent forms of creativity, the larger infrastructures within which it operates, and what alternative practices might emerge from these entanglements[16].

10 Experiment AI-TNB project page: https://ai.biennial.com. The experiment is developed by Joasia Krysa (series curator), Leonardo Impett (series technical concept), Eva Cetinić (experiment machine learning concept and implementation), MetaObjects (Ashley Lee Wong and Andrew Crowe) and Sui (web development and design); funded by the UK's Arts and Humanities Research Council programme 'Towards a National Collection', under grant AH/V015478/1 (project title: Machine Curation and Visitor Interaction in Virtual Liverpool Biennial). For more information about the project visit: https://ai.biennial.com/#howitworks.

11 Crawford, Kate and Vladen Joler, Anatomy of an AI System: The Amazon Echo as an Anatomical Map of Human Labor, Data and Planetary Resources, AI Now Institute and Share Lab, 2018. https://anatomyof.ai/.

12 Impett, Leonardo, "Irresolvable contradictions in algorithmic thought", published in this volume (Stages 9/2021). https://www.biennial.com/journal/.

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

14 See also: 'Notes On A (Dis)continuous Surface', Murad Khan, in Stages vol 9, Liverpool Biennial, April 2021, https://www.biennial.com/journal/issue-9/notes-on-a-discontinuous-surface.

15 For a review of the project in this respect see Kadish Morris, 'Liverpool Biennial – bleeps, bones, and a machine that curates', The Observer, 28 March 2021, https://www.theguardian.com/artanddesign/2021/mar/28/liverpool-biennial-review-bleeps-bones-and-a-machine-that-curates.

16 For a discussion on AI and Curating visit Liverpool Biennial online journal Stages, vol 9/2021, ed. Joasia Krysa, Manuela Moscoso, April 2021, https://www.biennial.com/journal/issue-9.

Figure 1. Curatorial sketch for Liverpool Biennial 2021 by its curator Manuela Moscoso (2019). Courtesy of Manuela Moscoso and Liverpool Biennial.

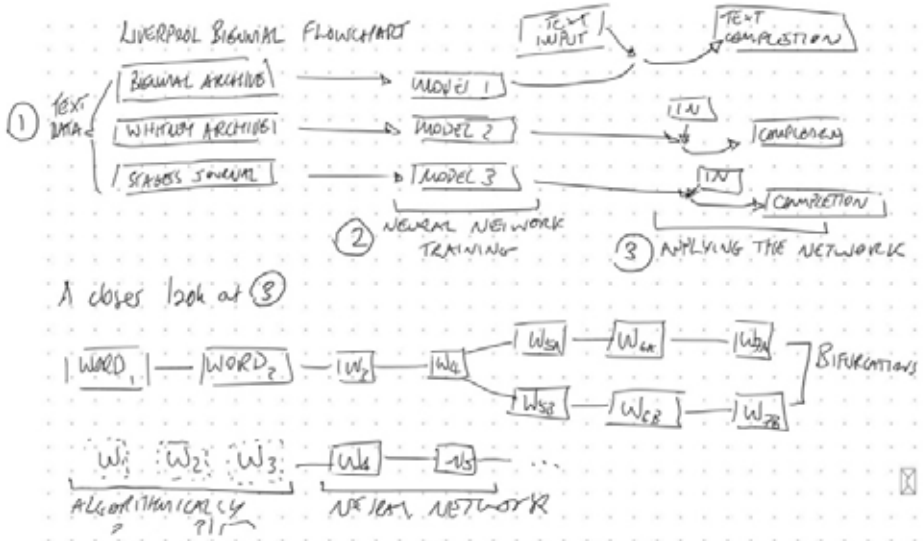


Figure 2. Sketch for planning multi-model bifurcations for Experiment *B³(NSCAM)*, drawing by Leonardo Impett (2020).

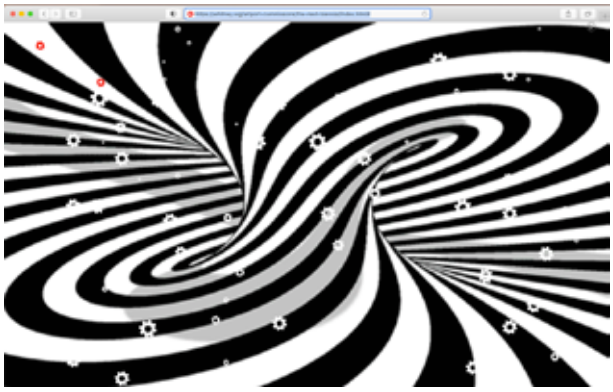


Figure 3, 4. *The Next Biennial Should be Curated by a Machine, Experiment 1: B³(NSCAM)*, Ubermorgen, Leonardo Impett, Joasia Krysa, Website screenshots, Liverpool Biennial and The Whitney Museum of American Art's artport,2021; https://whitney.org/artport-commissions/the-next-biennial/.

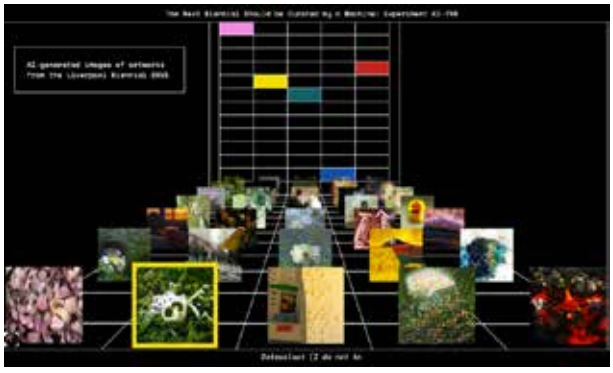


Figure 5, 6. *The Next Biennial Should be Curated by a Machine, Experiment 2: AI-TNB*, Joasia Krysa and Leonardo Impett, Machine learning development: Eva Cetinić; Web development and design: MetaObjects and Sui, *Website screenshots*, Liverpool Biennial, 2021.

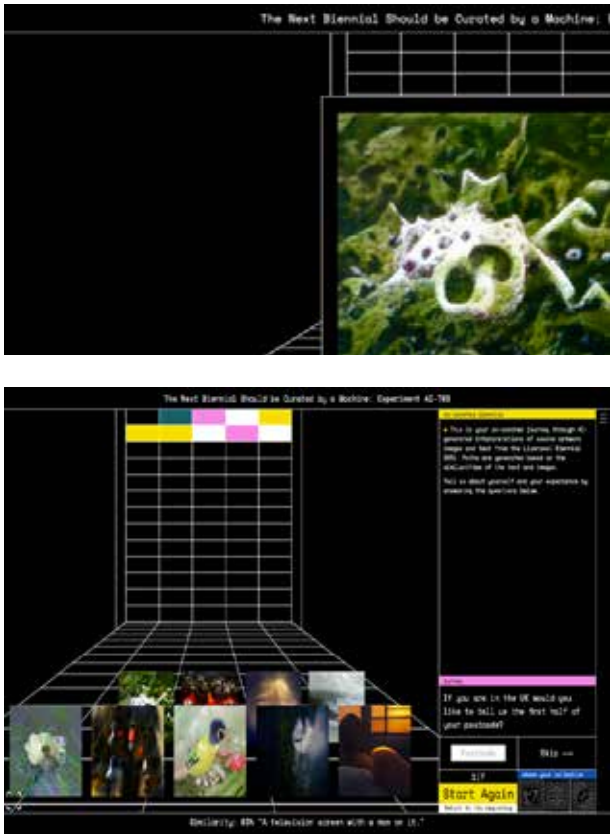


Figure 7, 8. *The Next Biennial Should be Curated by a Machine, Experiment 2: AI-TNB*, Joasia Krysa and Leonardo Impett, Machine learning development: Eva Cetinić; Web development and design: MetaObjects and Sui, *Website screenshots*, Liverpool Biennial, 2021.

Biography

Joasia Krysa is a curator, Professor of Exhibition Research and Head of Art and Design at Liverpool John Moores University, with an adjunct position at Liverpool Biennial. Her first curatorial software experiment *Kurator* was launched at Tate Modern, London, in 2005 and published in *Curating Immateriality* (2006). She has curated exhibitions and commissioned work at the intersection of art and technology, amongst others, as Artistic Director of Kunsthal Aarhus, Denmark, part of curatorial team for Documenta 13, co-curator of Liverpool Biennial 2016, Curatorial Advisor for Sapporo International Art Triennale (SIAF) 2020, Japan, and International Advisor for the inaugural edition of Helsinki Biennial in 2021.

Leonardo Impett works in the digital humanities, at the intersection of computer vision and art history. In trying to bring 'Distant Reading' to art history and visual studies, his current research focuses on unveiling the implicit image-theories of computer vision and constructing new computer vision systems based on early modern philosophies of vision. He is a Lecturer at Cambridge Digital Humanities, Cambridge University. Previously he was Assistant Professor of Computer Science at Durham University, Scientist at the Bibliotheca Hertziana – Max Planck Institute for Art History, and Digital Humanities Fellow at Villa I Tatti - the Harvard University Center for Italian Renaissance Studies.

Some considerations on the Posthuman

Luigi A. Manfreda

What relationship and what difference is there between anthropocentrism and the awareness – having its first beginnings with Montaigne – of being placed (historical, relative, limited by a culture) of each discourse? The latter poses on one hand as a non-sense a say on behalf of the absolute truth, but on the other hand it acknowledges that there is no escape from a certain perspective view, historically determined (what Nietzsche defined evaluate) and this implies the impossibility that another parameter, being human, too human, is available: that there is no escape from its own horizon. What seems a humble acknowledgement of one's own limits shows its insidious reversal: if our logos flows in a space marked by its own borders (that itself recognizes), yet – in the scope of our own experience – it is nothing but the human. Even when we meet an animal or a tree.

Certainly, anthropocentrism means many things. We here refer to it in the close relationship it maintains with modern subjectivism, that in turn emerges in Descartes and Bacon to be then subjected to a strong destabilisation by Copernicus and Darwin's theory. It is not a case that Hegel states that with Descartes thought touches the ground at last – its own ground. From now on every discourse will have to come to terms with the preliminary reflection on who produces it, with its genesis. Descartes' Cogito conceives to overcome the problem of the historicity of this origin by a feature that will become constant in the anthropocentrism that characterizes the modern age: the self-generation of the human as logos, the assuming itself as its own foundation. In this way man's placing himself at the centre of the world will measure itself against the double aspect of that awareness we were talking previously: relinquishment of an absolute truth and temptation to include any possible in a horizon that holds together the different discourses, despite their differences.

We could devise this flowing from a pole to the other as a sort of justification of anthropocentrism and of its eldest offspring, speciesism. In the use of the world and of animals, in the master's assumption of their 'material' in view of one's own projects, there would not be willingness of power marked by hybris but need determined by destiny that no one has chosen. But it is exactly on the overcoming of the idea of destiny that the praxis of the 'new technique' is based, at work for example in AI. Getting closer to the nature of its 'design' will always imply the attempt to bring it back to its matrixes.

Despite the appearances, placing the new technique (cyborg, robotics, AI, biotechnologies etc.) in the riverbed of humanistic tradition can be grasped in many ways. It is advisable at this point to distinguish Humanism, if we mean by that the Italian Renaissance between 1400 and 1500, from humanism, that is, the wider movement of modern anthropocentrism that has its own roots not only in Renaissance but also in modern science and subjectivism. We need here to refer to the latter: the place where Man's state of minority, as Kant will later state, starts.

According to a movement that can be already perceived in Pico della Mirandola, it is not a matter of realizing, of completing a human nature already given, but – thanks to the uniqueness of the human being, to his ontological privilege – of always forging it anew, of re-creating it. It is unique the wide scope of possibilities given by this peculiar freedom of its. In this new space destiny is confined to the darkness of mythical powers, being now left behind.

It is a freedom that must be exercised, first of all, by clearing, creating new space, downwards and upwards. On one hand towards the opacity of the animal, the determinism of body impulses from which it is necessary to stray, to purify in view of that total rule of oneself as Zivilisation requires. On the other hand, that is, upwards, towards the fatal that is still present in the last deities. The myth of freedom has been thus translated into a progressive disengagement: from everything in what man has been formed – as Darwin on one hand and anthropology on the other hand have shown. Another, a heterogeneous, in which the shadow of the engagement is perceived – starting from our body itself, that brings us to our being mortals – from which we free ourselves each time and that yet always returns.

Completing the detachment from animality means distancing oneself up to a point of no return from the opaqueness of the bodily unconsciousness that evokes the limit of our ability of control-rule over ourselves and over the world. There is no radical difference, from this viewpoint, from the robotic protheses that are integral parts of the body, strengthening it in so far as cyborg to the plan to move the mental, our own, in the polished neutral of the machine, to 'expatriate' into its uncorruptable pureness. This corresponds, on a larger scale, to the astrophysicists' ponderings on the possibility to leave Earth when its energy sources finish and it is exhausted by then, and to settle in other planets where another life is imaginable. Our biological destiny is thus re-created, or rather: it is shown how it is possible to free ourselves from destiny itself.

Now, if we think of destiny in these terms, the strengthening that cyborg and AI represent in the human ability to remould the world and experience itself, it is nothing else than the aspiration to overcome tout court the material-biological. It is a united possible route that yet places itself in the riverbed of western Humanism that, as stated previously, is based on an alleged, absolute uniqueness of the human being, on his immense, ontological distance from the animal and from the substance of the world. As a matter of fact, on one hand the fact that complex AI machines tend to human (to sensibility, to human creativities etc.) and make out a limit in still not reaching this target, should suggest us something. But on the other hand, the human nature and the world's one, scrutinized by the mathematical eye, present themselves in forms that hint at their own overcoming. The paradox is evident: what establish itself as something precious and unique, in a uniqueness that justifies a use of the other animal species and of the world through denial, ends up in denying itself. And not only in its reduction to a usable bottom, but, in a broader perspective, as being affected, in spite of everything, by the limitation of death.

It's quite understandable, then, the trend, visible in the last decades, to distance oneself from the humanistic tradition – and likewise understandable, at this point, how ultimately it proves to be difficult. It has taken two main forms. The first is called post-human since it means to replace the human in the wake of Darwin's lesson and of anti-speciesism of Singer and anthropologists, in its original foundation through hybridisations (through the animal and the 'mate-

rial' of different nature where experience is determined). It should generate a changed attitude towards nature and the other animal species, that would no longer be experienced in the separation of the other. The second lives without any nostalgia the progressive detachment that the new technique produces as regards the traditional idea of man and reckons the strengthening of human faculties as foreboding new and unprecedented possibilities to be warmly welcomed. The sunset of man would thus be a hypothesis to examine coldly, with disenchantment, in sight of a wider and more inclusive AI. Now, apart from the fact that today the ways that may bring to the establishment of the first trend seem chimeric, when everything moves towards the second one, in a sort of Totale Mobilmachung, what is common between the two standpoints is the typically humanistic ideal of an emancipation from destiny as something that limits and is not chosen. The first standpoint would mean to get rid of the idea of destiny at the root: there is no human nature, precisely determined from its origin, and the various changes that may produce durable, structural effects are completely contingent. The second one 'weakens', empties destiny turning it into an obstacle, a limit to overcome constantly thanks to the willingness and technical ingenuity of man: his peculiarity lies in his ability to change and recreate it.

The idea of destiny is the darkest among those thought has measured its strength against, since its beginnings. It should be considered in relation with logos, with the logical-linguistic structures where our experiences of the world have been inscribed, rather than trying to raise holding up to our hair, reflecting on how to be in this emergency, how to answer the appeal coming from this historical opening of ours. Devastation of earth and extermination of billions living beings in the slaughterhouses all over the world, for instance, are events that should be deciphered as symbols. In the horizon of that symbol pre-eminently that is the idea of limit. The limit is also what retains, contains something as a whole, inside a unity, that allows to be caught by a glance that, rather than piling up data in sight of a calculus, guesses a profile, in a single sight.

Biography

Luigi A. Manfreda teaches theoretical philosophy at Rome University "Tor Vergata". He is the director of the magazines *il cannocchiale'*and *Agalma*. Among his writings, *Tempo e redenzione. Linguaggio etico e forme dell'esperienza da Nietzsche a Simone Weil*, Jaca Book, Milan 2001, and *Il circolo e lo specchio. Sul fondamento in Hegel,* Il melangolo, Genoa 2012.

AI and Myths of Creativity

Lev Manovich

The current discussions about the adoption of AI (artificial intelligence) in visual arts, design, architecture, cinema, music and other arts often rely on widely accepted ideas about art and creativity. These ideas include the following: "Art is the most creative human domain." "Art and creativity can't be measured." "Artists does not follow rules." It is also commonly assumed that "computers can only follow rules," and therefore "computers struggle to generate something novel and original." Taken together, these ideas lead to a new assumption: "generation of original art is a great test of AI progress."

Where do these popular popular ideas about art and its relationship to creativity come from? Historically, they are quite recent. For thousands of years human creators in all human cultures made artifacts that today we put in museums and worship as great art. But their creators did not have modern concepts of art, artist, and creativity.

In this short text, I want to briefly discuss the historical origins of currently popular ideas about art and creativity, and suggest that these ideas limit our vision of cultural AI.

In my view, there are a few dominant popular understandings of "art." Logically, they contradict each other. Despite this, they may perfectly co-exist in a single publication or conversation. Sometimes one idea dominates and others do not appear. But very often, all three are assumed to be valid in the same time. Because these ideas contradict each other, holding them together can lead to feelings of confusion and unease – and also big fears about "creative AI."

What are these ideas?

Art as the embodiment of creativity

Our dominant concept of art comes from the Romantic period in Europe: the end of the 19th and first part of the 20th century. The idea goes like this: artists are different from normal people. They occupy a special place in society. Their art comes from the inside, from their imagination and not from any rules or examples. It is not a result of rational decisions. Instead it is driven by intuition and it expresses emotions. And, most importantly: art is the exclusive domain of human creativity. (The term "Creative Industries" is one example of how the Romantic association of creativity with art is now taken for granted in society.)

The assumptions that art, as opposed to any other field of human activity, best embodies creativity – and also that art is the best expression of human uniqueness –

leads to the following seemingly logical conclusion: a best test of AI progress is being to generate (novel) art.

Here we encounter a fascinating paradox. In the 19th and first part of the 20th century, it was still assumed that artists need to train for years to acquire specialized skills in drawing, perspective, composition, etc. But as the ideology of modern art based on Romantic ideas gradually become dominant, the requirement of learning such skills also disappears.

Since 1970, contemporary art world becomes conceptual, i.e. focused on ideas. It is no longer about visual skills but semantic skills. Art now focuses on communicating semantic messages – but for a while it still valued modernist ambiguity and wanted audiences to struggle with interpretations. However, by the start of the 21st century, as contemporary art enters mainstream culture and groups of school children become frequent museum visitors, art can no longer afford to be "difficult" or ambiguous. Similarly to how it functioned before 20th century in the West, today art is again for moral and political functions.

Only some art academies in China, Korea and Russia still teach systematically 19th century traditional drawing and painting skills. In most art schools and Universities art departments oriented towards contemporary art world, students are told to start "expression their inner vision," and "developing their unique" style right away. Instead of art making skills, they learn verbal language of contemporary art as it exists in artists' and galleries' statements, and critics and curators texts in catalogs and other publications.

To be an artist who belongs to (or wants to belong) contemporary global art world is to speak and write in this language, rather than posses any skills in color combination, composition, drawing, photo and video editing, 3D modeling and animation, computer programming, or game design. This ideology also defines how art is viewed in global culture at large. Art can express unique "artistic visions, or "play some special role," or "address social issues," or question" dominant social values. But it is not about any specialized skills, or creating beauty, or expressing and arousing emotions. These functions has been fully taken over in the 20th by mass culture such as cinema and popular music – and today also by social media where millions of people showcase their fashion looks, photographs, manga drawings, 3D characters and other creations.

However, semantic art had never completely taken over visual arts. In endless galleries, museums, art websites and social media galleries we continue to see figurative, semi-figurative and abstract images. They don't communicate any obvious linguistic messages. They employ all visual languages developed in the realist 19th and modernist 20th century, and they can be situated anywhere on realism – abstract dimension. They don't innovate visually, because after a long modernist century (1870-1970), there is nothing left to invent. (And new effects enabled by Photoshop and other media software in the 1990s have by now became part of modernist legacy.)

Because this kind of visual art is everywhere today, while a more specialized world of contemporary high art world (that most people feel is not so easy to enter. Most people feel intimidated to even approach contemporary art museums.

This is why for educated classes who don't have expertise in the art world, contemporary art is equated with 19th century realism and 20th century modernism – i.e. two dimensional images that represent something in either detailed or schematic way. And this is why so much effort in AI research is now devoted to automatically generating images that look either like realistic works from the past centuries, or abstract and semi-abstract works from the 20th century (as opposed to for example, installations, site-specific art projects or other recent types of art.) For AI researchers and also general public, such images are equated with art. That is, their visual similarity to what popular culture labels as "visual art" is assumed to be sufficient. And this is why use of AI methods in interactive art or experimental music for decades does not fascinate news media or the public – because this kind of art is not accepted by normal people (unless it is promoted by Google as latest AI art, or has purely entertainment function).

Art and Realism

As demonstrated by many surveys and research studies in social sciences, for the majority of people today art indeed means pictures, realism and skills. An artist is understood as a person who has skills to make figurative 2D images, professionally looking photographs, animated 3D models of human figures, manga drawings, and other figurative representations that are hard or impossible to make for a normal person without long training or practice. Search for "art" in Instagram or on YouTube, and you will come across endless tutorials, guides and courses on how to acquire such skills.

The idea of specialized skills that need to be mastered also defines all areas of Culture Industry – professional photography, anime and animation, game design, web and interaction design, cinematography, video editing, acting, TV and film directing, music production and so on. Often when culture professionals are evaluated, the idea of learning skills and achieving technical mastery is combined with the idea of high creativity. For example, if a very successful Culture Industry professional person is referred as "real artist," this assumes that she has both superb mastery of the craft and also highly original style and/or content.

This commonly held view of art explains why today realistic images similar to the ones of great artists from the past that are generated by AI get most media attention today. People are very impressed that a research team used AI to make a new portrait image that could have been painted by Rembrandt, or that a student used AI to create images that look like Classical Chinese landscape paintings – and that they fooled over 50% of participants in an experiment. But an AI that can make abstract art does not make news.

In an experiment conducted by Data Science Lab at IBS, South Korea in Spring 2021, we showed a group of people without any art training both realistic and abstract images, and asked them to judge if each image was done by a human artist or AI. Images which had significant level of detail were most frequently assumed to be made by

human artists, while simple abstract images were assumed to come from AI. (In reality, all images in the experiments were generated using a recent StyleGAN2 neural network model that was trained by the scientists on tens of thousands of historical paintings from wikiart.org site.)

Creativity and Global Economy

Yet another relevant idea taken for granted today is the newest one historically. It becomes popular in the early 2000s. Global competition and easier access to foreign markets as part of economic globalization motivates a new paradigm in business. Your company now needs to be "creative" and it needs to innovate constantly. The global success of Apple (1997-) and Samsung (2002-) based on their innovative strategies becomes an example for all business.

Richard Florida's highly influential book *The Creative Class* published in 2002 also played here an important role. According to Florida, the economic function of this class is "to create new ideas, new technology and/or creative content." In Florida's analysis, the creative class already included 30% of US workforce by early 2000s. Florida argued that cities that can attract this class prosper. His work had a big effect. For example, the leaders of Berlin were influenced by his ideas and in 2000s they set up policies to draw the professionals in design, software and media from other countries to the city.

Still later, the idea that creativity is a highly desired for society as a whole and individuals in general takes hold. In 2010s, it becomes a new universal social value. Everybody should be creative – and computer technologies are here to help us. (Which means that we all, to some extent, should become "artists.") A new term "creative technologist" that becomes popular in 2010s is an example of these trends.

This idea leads to a different assumption – that AI and technology in general should help individuals and companies to be creative and innovative. Now, we no longer want AI to only simulate human cognitive functions such as vision, speech and reasoning, quickly search through millions of documents or translate between languages. This was enough in the 20th century – but not the 21st. Now we want AI to generate creative and innovative solutions or help us to do this – because the society assumes that creativity is the driver of the economy.

All this means that in the future, when our ideas about art, artists and creativity will change (no reason why they should stay the same), the link between AI and the arts that now seems obvious may also become weaker or disappear. And I am personally looking forward to this. As somebody who spent his life researching, teaching and practicing visual arts, I believe that a proportion of creative people in the arts is not any different than in all other fields of human activity. Although the templates, examples and tactics many contemporary artists, designers, architects and other creatives use today may not be all as explicit as Lightroom presets or Wordpress themes, they are no less real.

Our taken for granted association of the arts and creativity, and privileging of creativity as opposed to other dimensions are relatively recent inventions. Thus, rather than

obsessing over a question “can AI be creative?”, we should explore other ideas about what AI can do for arts, design, architecture and all other art fields.

Biography

Lev Manovich is leading theorist of digital culture, and a pioneer in using big data to study visual culture. He was included in the list of "25 People Shaping the Future of Design" in 2013 and the list of "50 Most Interesting People Building the Future" in 2014. Manovich is the author and editor of 180 articles and 14 books including *Cultural Analytics*, *AI Aesthetics*, *Theories of Software Culture*, *Instagram and Contemporary Image*, *Software Takes Command*, *Soft Cinema: Navigating the Database and The Language of New Media*. He teaches computer science at The Graduate Center, City University of New York and directs the Cultural Analytics Lab.

Humanity Enigma. How can art and design help us imagine the future of artificial intelligence for our bodies?

Jessica McCulloch

> "A key role for art will be to produce ways of thinking and feeling that point towards more sustainable economic and social systems."
> George Gessert

Without a doubt, artificial intelligence is now integral to the way we live, yet AI remains an invisible enigma for many. Whether we're talking about healthcare, banking, policing, transport, agriculture, food innovation, home life and entertainment, AI has been seamlessly integrated into our global society, yet what are the implications? Where will we go next?

Creative artists and designers have been exploring the theme of AI for our bodies, particularly for a transhuman body. How can we advance our abilities to perform better, become smarter and even live longer? By creatively visualising concepts and imagining solutions for the issues facing our world, we can better contemplate desirability, acceptability and ethics.

While machine learning software across the world is tuned with millions of data points, and deep learning algorithms continue to improve, there's still a long way to go. Before we dive into the creative projects, let's look at how the recent progress in AI is used in healthcare to integrate the technology with our bodies and solve medical problems.

How is artificial intelligence used in healthcare?

Artificial Intelligence has changed the way we heal people, saving and improving lives across the world. AI has endless applications including to track virus outbreaks, diagnose health problems, deliver medical supplies with drones, act as a mental health support chatbot or used in radiology. An example is the app Flo which uses AI to help women track their periods and give suggestions about how to reduce the chance of pregnancy and be healthy. In another example, a company called Envision offers AI-powered smart glasses for blind and visually impaired people.

AI has also been shown to help people who have disabilities that limit movement. Nearly 60 million people around the world are living with limb loss. Only a small

percentage has a prosthetic limbs, and they can be bulky, unintuitive and difficult to use. While fetishised as cyborgs, users find it hard to adapt to a bionic limb.

Mechanical engineers at the University of Utah have used adaptive AI to make walking with prosthetic limbs more smooth and intuitive by mimicking the motion of the user's residual leg. However they face challenges to make strong, efficient, and lightweight designs for these bionic legs, and in developing neural controls to let users more intimately control their prosthetic.

For people suffering from paralysis, engineers at Clinatec laboratory in Grenoble designed mind-controlled exoskeletons using BrainComputer Interface (BCI). Paralysed users can control the neuroprosthetics with their mind to move their arms and legs. This marked the first time that a prosthetic exoskeleton was successfully used to help a quadriplegic patient move all four of their immobilised limbs. Since then, at University of Waterloo in Canada, Laschowski leads the ExoNet project, using high-res wearable cameras and AI software fitted to exoskeletons to operate autonomously in real world environments.

Looking at how AI is used in neuroscience, the startup Neuralink is designing an AI brain device that hopes to solve neurological disorders like memory and hearing loss, blindness, paralysis, depression and brain damage. While not yet tested on humans, this tech is poised to be game-changing.

Thanks to AI, people with physical and mental limitations could have access to this technology in the future, with life-changing effects. AI is a powerful tool to change the healthcare industry, but besides medical uses, what alternative solutions can it offer to the human body?

How are creatives exploring artificial intelligence to improve our bodies?

Transhumanism is the theory that the human race can enhance the physical and mental capacities of human organism with science and technology. With biohackers self-experimenting with synthetic biology, neurotropics, technological interventions and performance psychology, a movement of artists and creatives looking at these ideas has emerged in the 21st century. Let's explore some examples.

The British-Australian body architect Lucy McRae worked with digital ethics researcher Dr. Niels Wouters to create *Biometric Mirror*, a science fiction beauty salon where an AI scans your biometric data and reveals a 'perfect' version of your face. The immersive installation questions the innate biases of AI. Whose version of 'perfection' is the AI projecting? The recent debate that AI has racial bias in facial recognition is said to be because the majority of its data points come from Western media and white faces. How can we reduce AI's subjectivity?

In the 2021 Venice Biennale, Parsons & Charlesworth exhibited *Catalog for the Post-Human*, a satirical technology company for the future with a series of eight products to augment your body and enhance productivity. In the design language of a commercial

trade fair, the four product ranges address the needs of workers in a world where we are pushed to the limit by working irregular long hours and quantifying our performance.

One fictional tool called SleepSnackers™ adjusts your circadian rhythm, while the StressWatch™ measures your stress levels via a saliva cortisol test. These dystopian objects fictionally increase cognitive capacities, optimise wellness, manage sleep and boost productivity, sparking conversations about the ethics of our technological future. They ask, 'What are the physical and psychological consequences of giving over body and mind to the unrelenting productivity of data-driven capitalism?'.

British artist Agi Haines collaborated with a team at IDEO London to create *SPIRIT*, a fictional device implanted in different parts of the body and is designed to remind the elderly to engage in social activity. It explores the intrusive ways we are allowing technology to permeate society, our lives and our bodies. In an ironic twist, while we know how social interaction gives mental health benefits, the pandemic flipped this encouragement on its head to urge social distancing. With unexpected global changes, we might ask: what is the lifespan of implants like these?

The *Wetware Projects* (2015-19) by Berlin-based photographer Hannes Wiedemann, followed the DIY bodyhacking community in small rural American towns. '*Grinders*' experiment by implanting gadgets into their own bodies in risky surgeries to manifest their vision of a cyborg future. Becoming guinea pigs, the community has strong belief in technology's emancipatory potential to challenge science, medicine and ethics.

All of these projects have something in common: Like science fiction, they pose dystopian questions to the audience by creating an uncanny vision that encourages us to imagine it as real, and question whether we want this technology to be possible. They project a fictional product, service or lifestyle for the future.

Shaping a more conscious tomorrow

The question is not *if* AI for bodies will happen. The foreseeable future includes technological and genetic transhumanism. The question is: How will we integrate AI-assisted humanity into our society in an ethical way? One that considers diversity, inclusivity, neurodivergence, disability and gender equality.

There needs to be a collaborative approach with experts from diverse disciplines and cultures, taking into account the citizen viewpoint. Everyone that will be impacted by the technology should have more awareness, not only those who are developing it. We must also consider our impact within our ecosystem, not only taking a human-centred approach. We must work together to mitigate unethical directions, competition and bias to ensure that we are all stakeholders in unraveling and directing what happens to our bodies.

Contemporary art and design that collaborates with science and technology has the potential to highlight crucial issues today and help us shape a more conscious tomorrow. In our science fiction future, we can aim to steer clear of dystopian realities like malware and hacking, and thrive together with artificial intelligence within and for our

bodies. Besides science fiction films, television and cinema, creative art and speculative design projects help us visualise and imagine our future so that we can continue crafting and contemplating the meaning of being human. It is challenging to govern and ethically navigate our digitally transforming society, but it is up to us to guide the way and shape the enigmatic future.

Biography

Jess McCulloch, MA, is a researcher writing on the role of science in art and critical design, and is a founding member of Unbore, a Dutch non-profit cultural organisation. Jess has a background in content marketing and she is drawn to inventive projects that address the problems the world is facing today in order to shape a more conscious tomorrow.

From a Bat's Point of View

Suzana Milevska

In his book *The Conscious Mind*, David J. Chalmers states that "from the physical facts about a bat we can ascertain all facts about a bat except the facts about the conscious experience. Knowing all the physical facts we still do not know what it is like to be a bat".[1] If we know everything physical about certain creatures or machines we can still not be certain if they are conscious in the sense that we consider ourselves a conscious species. Similarly knowledge of physical facts about animals and/or machines does not allow us to know whether they experience the world as we do, and what their experiences are like. Agreeing with both premises does not imply that we should give up on trying to get closer to those unfamiliar "others" and quit the attempt to explore the question "what it is like to be"[2] other than ourselves, this being another gender, species, or artificially generated algorithm and intelligence. For artist Eduardo Kac the question offers a unique opportunity to stimulate our imagination and to triangulate the relation between the human, animals, and AI.

"Darker Than Night" was a telepresence artwork realized by Kac from June 17th to July 7th 1999 with a robotic bat (the "batbot"), approximately three hundred Egyptian fruit bats living in the Blijdorp Zoological Gardens in Rotterdam, and audience interaction.[3]

It was a profound attempt to investigate the possibility of empathy towards creatures (not necessarily only bats) that are different from us due to their specific sensory and motor system, the physical traits that determine their actions and experiences.

In "Darker Than Night" Kac addresses the human-machine-animal relationship with a complex interface, enabling humans and bats to become mutually aware of their presence in the cave through the exchange of sonar emissions. Humans can experience the cave through the batbot. The behavior of the bats is visualized through a special interface. The bats, on the other hand, can hear the sonar emissions of the batbot.

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1 D. J. Chalmers, *The Conscious Mind In Search of a Fundamental Theory,* Oxford University Press, New York, Oxford, 1996, p. 103.

2 This question originates from the well-known text by Thomas Nagel "What is it like to be a bat?", first published in 1974 and reproduced in *Mortal Questions,* Cambridge University Press, New York, 1979, pp. 165-180.

3 The visitors view the bats and the batbot in the cave through a small window but they are given virtual reality headset so that they can receive the audio and visual information. Thus, the viewer's sight is transformed into the point of view of the batbot's sonar. The viewer sees a series of real-time kinetic white dots against a black background. The white dots represent obstacles encountered by the batbot's sonar. For more complete description of the project see: http://www.ekac.org/darker.html.

Kac's provocative work is inspired by the awareness that we cannot accomplish a thorough understanding even of our own consciousness and self. He is influenced by Dennett and his statement "no one has seen or ever will see a centre of gravity, or a self either".[4] This understanding echoes David Hume, who in 1740 wrote in his *Treatise of Human Nature*: "I never can catch myself at any time without a perception and never can observe anything but the perception".[5] In "Darker Than Night" Kac employs telepresence as a vehicle to investigate the link between perception and consciousness. "Darker Than Night" is not only about our ability to see or to adapt to conditions that are not ordinary for us. It is also about self-perception the experience of perception, and understanding the other.

The question posed here is not whether we can understand the physical facts about how bats move and communicate with each other. The sensory experience of bats is the subject of a body of scientific research which is widely available. Through his works and texts the artist made sure that all details about echolocation as a technique for orientation in dark spaces are transparently explained. In so doing, he establishes a circuit of information, exchange, and adjustment between the fruitbats, batbot, and their visitors.

Instead of only explaining the way bats sense and move, the physical facts are starting points for Kac's treatise on their limitations. In "Darker Than Night" the bio sonar echolocation system of the bats is converted to audible waves accessible to the human sensory system. As Eduardo Kac creates a world in which humans can have similar empathic experiences with another species, he expands the field of impact of his project from technology to culture.

Thomas Nagel warns us that we can't imagine what it feels like to perceive the surrounding world through a system of reflected high frequency sound signals. Fruitbats echolocate usually within the 30,000 to 80,000 Hertz sound frequency that human ears cannot hear. Kac takes Nagel's remark as an exciting challenge to our artistic (and specifically not scientific) imagination. Kac translated the sonar signals into the human audible range by a frequency converter placed inside of the head of the batbot. "Darker Than Night" is a network of relationships, a complex circuit of signals that circulate between human (visitor with a headset), animal (bats emitting and hearing ultrasounds as their "sense of vision"), and machine (batbot that simulates the real bats while echolocating in the same manner as them).

Presented with all accessible information, the problem of our unique experience (the physical basis of our imagination) remains unsolved. It may help us to try to understand what it would be like for us to have the sensory experience of a bat but it will not help us to know what it is like to be a bat.[6] Although the work extends our abilities beyond human perception, our body and mind will always remain bound to certain restrictions. According to Maurice Merleau-Ponty, there is no method that permits us to extrapolate completely from our own condition to the inner life of

4 D. C. Dennett, "Self as a Center of Narrative Gravity" in F. Kessel, P. Cole and D. Johnson, eds, *Self and Consciousness: Multiple Perspectives*, Hillsdale, NJ: Erlbaum, 1992.

5 D. Hume, *Treatise on Human Nature,* I, IV, sec. 6, quoted acc. D. Dennett.

6 T. Nagel, p. 169.

another creature. We are determined by our own bodily structure and innate capacity, which sets limits to the human experience.[7] In other words, ultimately human experience cannot be anything like the experience of other animals, no matter how close they are to humans on the phylogenetic tree.

Dennett's questions *what kinds of minds are there* and *how do we know that* emerge from the fact that each of us knows only one mind from the inside.[8] Scientists haven't agreed on the arguments and definitions in regard to the existence of other minds. This arises from the aporia of communication that makes impossible to confirm the coincidence of one's inner capability with one's outwardly observable capability for perceptual determination, introspective avowal or intelligent actions.[9] It is not just an issue existing between radically different creatures. It already exists between one human and another. The subjective and non-transferable character of experience is evident among people and is an inescapable obstacle to any complete understanding of and communication with the other. Moreover, "once that the ability to represent your own structure has reached a certain critical point that is the kiss of death: it guarantees that you can never represent yourself totally".[10] Cognition "is not only representation but also embodied action: the world we cognize is not pre-given but enacted through our history of structural coupling".[11] Different subjective experiences prevent us from having the same "self" story to tell. Humans have a particular experience of being in the world. Every human mind is also culturally informed. Thus our ability and desire to be engaged in "presenting ourselves to others, and ourselves"[12] and representing ourselves "in language and gesture, external and internal"[13] make us different from other creatures.

Perception is not a straightforward physical phenomenon. It needs a kind of representation. In this sense, "Darker than Night" is more than a metaphor for the good human will to understand how it feels to be someone or something else. The batbot, the virtual reality headset, the converter of the high to low frequency sounds, the interface generated on a computer, all those elements may give the false impression that high technology is the "missing link" in the natural history drift that can help us to overcome a possible gap in the evolution: the inability to sense the experience of another. Eduardo Kac uses technology to provoke us to take a step forward and

7 H. L. Dreyfus, "The Current Relevance of Merleau-Ponty's Phenomenology of Embodiment", *The Electronic Journal of Analytic Philosophy*, 4 (Spring1996).

8 D. C. Dennett, *Kinds of Minds Toward an Understanding of Consciousness,* Basic Books, New York, 1996, pp. 1-19.

9 D. C. D. "Consciousness" in *The Oxford Companion to the Mind,* Ed. By Richard L. Gregory, Oxford University Press, New York, 1998, p. 161.

10 D. R. Hofstadter, *Gödel, Escher, Bach an Eternal Golden Braid,* Vintage Books, New York, 1989, p. 697. There is an interesting analogy between mind and ant colony that Hofstadter has developed in his book also questioning the existence of mind among animals.

11 F. J. Varela, E. Thompson, E. Rosch, *The Embodied Mind,* MIT Press, Cambridge, Massachusetts, London, England, 1991, p. 202

12 D. C. Dennett, "The Origins of Selves", *Cogito,* 3, 1989, p. 169.

13 D. C. Dennett, "The Origins of Selves", p. 169.

find a middle way of understanding the relations between the mind and the world: not in opposition to each other but rather mutually constitutional. "Darker Than Night" shows how "knowledge depends on being in a world that is inseparable from our bodies, or language, and our social history from our embodiment".[14] Kac's middle way suggests that we accept our biological limitations and capabilities as facts, being aware that our experience happens within the domain of a consensual and cultural history, and that the idea of the world existing somewhere "out there" independent of the knower will never challenge our inherited conclusions of what the mind is. For the mind is not "a special inner arena populated by internal models and representations but is rather the operation of profoundly interwoven systems, incorporating aspects of brain, body, and world".[15]

Originally published in: Dobrila, Peter T. and Kostic, Aleksandra (eds.), *Eduardo Kac: Telepresence, Biotelematics, and Transgenic Art* (Maribor, Slovenia: Kibla, 2000), pp. 47-52.

Biography

Suzana Milevska is a theorist and curator of art and visual culture. She is a Research Fellow at Künstlerhaus Büchsenhausen Innsbruck. Milevska was Principal Investigator of TRACES – Transmitting of Contentious Cultural Heritages with the Arts (2016-2019, Horizon 2020) at the Polytechnic University Milan and the first Endowed Professor of Central and South Eastern European Art Histories, Academy of Fine Arts Vienna. She received a PhD in Visual Cultures from Goldsmiths College London, Fulbright Senior Research Scholarship and Igor Zabel Award for Culture and Theory. She published *Gender Difference in the Balkans*, and the readers *The Renaming Machine: The Book, and On Productive Shame, Reconciliation, and Agency.*

14 F. J. Varela, E. Thompson, E. Rosch, *The Embodied Mind*, p. 149. Further on, in the chapter "Steps to a Middle Way" (pp.133-217) the authors discuss the Cartesian anxiety: in their opinion the extreme treating of "the world and mind as opposed objective and subjective poles".

15 A. Clark, "Embodiment and the Philosophy of Mind", *Trends in Neuroscience,* 19, 2 1996, p. 36.

Fusing AI with the Humanities. Machines with Emotions

Arthur I. Miller

Will machines ever be truly artists, musicians and writers? Will they create like us? If so, then we will no longer be able to describe their intelligence as artificial. It will be as real as ours. The Pygmalion myth is becoming reality.

In this way AI and the Humanities can fuse into a realm of knowledge full of surprises and wonderment.[1]

Creative Machines

Machines have already shown glimmers of creativity when running algorithms like Generative Adversarial Networks (GANs), DeepDream and AlphaGo.

GANs allow machines to dream, to imagine, to begin to build an inner life of their own. DeepDream enables machines to create bizarre images of previously unimagined complexity. As for AlphaGo, it trounced a highly regarded Go master. The venerable game of Go, 2,500 years old, had been cracked by a machine, a momentous event in AI. Along the way the machine made its now famous – and highly creative – move #37, a move which no one had seen before, in the second of the five game match, thereby nailing its victory.

Presently machines are primed by humans, who input algorithms and data, but their products can go way beyond the data they were trained on. When we produce something that goes far beyond the material we have to work with we call it creativity. Why not extend this to machines? Why the pushback? Why should creativity be an attribute reserved only for us?

Although Mozart's father taught him the rules of composition, we don't attribute the son's music to the father.

Collaboration Between Humans and Machines

At present, owing to the limitations of today's machines, most creative work is done in collaboration with humans.

There are many interesting examples of machine and human bootstrapping each other's creativity. Artists can train an artificial neural network on their own artwork, then use a GAN to generate art which will be effectively variations on their work. Some-

1 For more see my book, *The Artist in the Machine: The World of AI-Powered Creativity* (MIT Press, 2019).

times the machine produces something unexpected. Artists can then incorporate this new feature into their own paintings.

Among the AI devices that musicians use to increase their creativity is Continuator, invented by the computer scientist/musician François Pachet, currently director of Spotify's Creator Technology Research Lab in Paris. First a musician improvises at a piano. The notes are transmitted to Continuator which parses them into phrases, which are fed into a phrase analyser that seeks out patterns. Continuator instantly creates an improvisation of its own in response to the musician's.[2]

Machines as Authors

GPT-3 is one of the most powerful language processing models. It is an artificial neural network trained on 500 billion words scraped from the web, blogs and social media, and tuned with 175 billion machine-learning parameters. But at present it cannot yet produce lengthy prose that is cogent and free of factual errors, though it usually does fine with short emails. Published pieces of writing by GPT-3 have been edited and are the best of several runs.

But the future is bright for GPT-3's descendants, GPT-4, GPT-5 and so on. A writer suffering from writer's block can input a sentence or paragraph. GPT-3 will create sentences which the writer can take as a hint on how to proceed. Thus it can help to increase a writer's creativity.

The GPT series are artificial neural networks, meaning that all input is encoded in numbers – pixels, musical notes or text. It's numbers all the way down. The innards of the machine is dense with numbers. This means that we could attach it to a 3D printer and sculpt with pixels or musical notes, or compose a symphony with Picasso's *Les Demoiselles d'Avignon*. Thus AI will be able to fuse art, music and literature, paving the way for creations of a sort we presently cannot imagine.

The main problem with GPT-3 is that at present it cannot deal with the meaning of words. It's basically a statistical machine that predicts words based on their connections with the 500 billion words in its memory, together with the input material. The probability of the predicted words fitting correctly takes precedence over choosing words with proper meanings. This is because at present GPT-3 is not fluent in any language with all its nuances and tropes. Emotions and consciousness also relate to word meanings, of course. At present machines have neither.[3]

Emotions and consciousness are among what I call "characteristics of creativity." Others are competitiveness, awareness, unpredictability and so on. Machines will have

2 See The Artist in the *Machine: The World of AI-Powered Creativity* (MIT Press, 2019), pp. 150-151, and the book's website www.artistinthemachine.net. Go to "audios and videos" and scroll sown to "François Pachet's Continuator – Musician and Machine Improvise Together."

3 Presently details are unavailable to compare GPT-3 with the brand new more powerful language processing model Wo Dau 2.0.

to possess all these characteristics of human creativity in order to be creative like us. But can a machine made up of wires and transistors have them?

Competitive Machines

Machines can certainly be competitive.

Roboticists at L'École Polytechnique in Lausanne have shown in recent experiments that "sophisticated forms of communication and deceptive signalling can evolve in groups of robots with simple neural networks."[4]

In other words we can evolve robots that can be deceptive, can even lie – both forms of emotion.

Even among robots there is survival of the fittest.

Machines And Emotions

Some people might argue that machines cannot be truly creative because they are not out there in the world, having emotional experiences like communing with nature or falling in love.

They can however acquire such knowledge vicariously.

In the near future machines will be fluent in at least one language with all its nuances, enabling them to truly read the web and so acquire more knowledge than we can in a lifetime. They will be able to convince themselves and us that they have acquired experiences essential to creativity such as inspiration, love, and hate.

The big step will be when there is no longer a human in the loop and machines begin to create art, literature and music from their own life experiences.

Machines With Awareness

At present a stumbling block in creative machines is that the machine is not aware – has not a clue - that it has made a brilliant move in chess or Go, or that it has made a beautiful painting. Nor is a robot comedian aware that it has cracked a joke.

And then there is consciousness.

4 Floreano, Dario, Sara Mitri, Stéphanie Magnenat, and Laurant Keller, "Evolutionary Conditions for the Emergence of Communication in Robots," Evolutionary Biology, Volume 17, Issue 6, 20 March 2007, pp. 514-519. URL: https:/www.sciencedirect.com/science/article/pii/S0960982207009281.

Conscious Machines

In the Age of AI the problem of consciousness has moved from the philosophical to the scientific.

After wrestling with the problem of consciousness for some years I have concluded that it results from data processing of incoming information of which we are aware, by the 100 billion neurons in our brain.

In other words consciousness is computable, that is, reducible to numbers, meaning that there is no reason why consciousness cannot be programmed into machines.

Thus machines have the potential of being creative like us, eventually surpassing our creativity when the Age of Artificial Super-Intelligence arrives. In fact they have the potential for unlimited creativity.

Into The Future

In the future I believe that machines will be able to create art, literature and music of a sort we cannot currently imagine.

What I can imagine is a future for art (to be understood as the arts) in which there will be three strands: people creating art; machines working entirely on their own; and collaborations between humans and machines.

We should keep in mind big questions such as Can machines be creative? Can machines create art? But we should also ask Can we as humans learn to appreciate art that we know has been created by a machine?

In the end this may well turn out to be a moot point in that by then what it means to be human will have been dramatically transformed.

For are we not merging with machines?

Biography

Arthur I. Miller is Emeritus Professor of the History and Philosophy of Science at University College London. He is the author of many critically acclaimed books, including the Pulitzer Prize-nominated *Einstein, Picasso: Space, Time, and the Beauty that Causes Havoc; Insights of Genius: Imagery and Creativity in Science and Art; and Colliding Worlds: How Cutting-Edge Science is Redefining Contemporary Art.* He regularly lectures, and curates exhibitions on art/science, and has written for The *Guardian*, *The New York Times*, *Wired* and *Nautilus*. His book on AI and creativity in art, literature and music, *The Artist in the Machine: The World of AI-Powered Creativity*, was published in 2019.

AGI as an Outside View

Reza Negarestani

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

Any perspective on the future AGI is inevitability made of how we see and think the human as. In other words, the human is the resource 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 which have come before and will come after us. It is rather a subtle lesson about those necessary yet not sufficient ways of knowing and doing by which we describe the human as a universal figure and by extension, those activities which define the human as a universal figure. 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 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 rejoinder should not set us back to answer 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 yet fully aware.

Philosophy of artificial general intelligence or AGI – also known as the human-level artificial intelligence – begins with a family of conceptual problems addressing key issues with respect to the philosophy of mind as well as practical concerns about how we should go about constructing artificial general intelligence. Here, AGI is roughly taken to be a hypothetical artificial agency or an artificial multiagent system that has at the very least all the capacities of the human agent, namely, it is endowed with theoretical and practical cognitions of various kinds. In a nutshell, an AGI should do everything that an existing human perceptual-noetic-practical agent can do, if not even more. If we were to convert these problems constituting the very core of the philosophy of AGI into a streamlined question, we could simply ask: To what extent is AGI or the human-level artificial intelligence modelled on the existing humans? Put differently, how much something that has at the very least theoretical and practical abilities that we humans possess corresponds to or diverges from conditions necessary for the possibility of mind, namely, the conditions necessary for that which makes us human. This

question itself can be condensed as follows: Does/Should AGI mirror humans or does/should it diverge from them?

The answer depends on several presuppositions: the level of *generality* in General Intelligence, what we mean by the human, and whether the question of convergence upon or divergence from the human is posed at the level of functional capacities of the human agent or its contingent structural constitution (a particular neurophysiological architecture, etc.), or both?

If we are parochially limiting the concept of the human to a certain local and contingently posited set of conditions – namely, a specific structure or biological substrate and a particular local transcendental structure of experience – then the answer is divergence. Those who limit the significance of the human to this parochial picture are exactly those who advance parochial conceptions of AGI. There is a story here about how anti-AGI skeptics (specifically those who think biological structure or the transcendental structure of the human subject are foreclosed to artificial realizability) and proponents of parochial conceptions of AGI (i.e. those who think models constructed on a prevalent 'sentient' conception of intelligence, inductive information processing, Bayesian inference, problem-solving or emulation of the physical substrate are *sufficient* for the realization of AGI) are actually two faces of the same coin.

Positions of both camps originate from a deeply conservative picture of the human which is entrenched either in a biological chauvinism or provincial account of subjectivity. That which separates them is their strategy towards their base ideological assumptions: the skeptics inflate this picture into a rigid anthropcentricism, and the proponents of parochial AGI attempt to vastly deflate it and in a way, throwing a robustly critical concept of the human out with the anthropocentric bathwater. Thus, we arrive at either a thick notion of general intelligence that does not admit artificial realizability or such a thin notion of general intelligence that is so diluted for it to have any classificatory, descriptive and theoretical import. In the latter case, the concept of general intelligence is watered down to prevalent yet rudimentary intelligent behaviors based on the assumption that the difference between general intelligence and mere intelligent behaviors (pattern-detection) which are prevalent in nature is simply quantitative. Therefore, if we artificially realize and put together enough of basic sentient behaviors and abilities, we essentially obtain general or qualitative sapient intelligence. This is a dogma that we can call the bundle view of general intelligence. According to this dogma, the trick in realizing general intelligence is to abstract basic abilities from below and then finding a way to integrate and artificially realize them. Let us call this approach to the AGI problem, *hard parochialism*. Hard parochialists tend to overemphasize the prevalence of intelligent behaviors and their sufficiency for general intelligence and become heavily invested in various panpsychist, pancomputationalist and uncritical anti-anthropocentric ideologies that justify their theoretical commitments and methodologies.

However, if we define the human in terms of cognitive and practical abilities that are minimal yet *necessary* conditions for the possibility of any scenario that involves a sustained and organized self-transformation (i.e. self-determination and self-revision),

value appraisal, purposeful decision and action based on an objective knowledge that has the possibility of deepening its descriptive-explanatory powers, and the capacity for deliberate interaction: negotiation, persuasion, or even threat and plotting, then the answer is functional mirroring or convergence (despite structural divergence). It means that AGI for the time being is by necessity modelled on humans, whether as a pure functional diagram of the conditions of possibilities for theoretical and practical cognitions (thinking and actions in their complex formations), or as blueprint which is a mixture of abstract functions and concrete structural contingencies in the broadest evolutionary sense.

Regardless, a different question arises here. If AGI should be modelled on the human in the above senses even minimally as a matter of necessity rather than sufficiency, then should we limit the models of AGI – both from a methodological perspective and a conceptual viewpoint which is the hermeneutics of general intelligence – to merely mirroring the capacities and abilities of the existing human subject? In other words, should the AGI be just a slightly modified version of us?

The answer to this question should be an emphatic No. Functional mirroring or convergence upon the existing conception or the exemplification of the human (*Homo Sapiens*) is a *soft parochialist* approach to the problem of AGI and the question of general intelligence. In contrast to hard parochialism, functional mirroring or convergence upon the human is necessary for grappling with the conceptual question of general intelligence as well as the modelling and methodological requirements for the construction of AGI in a systematic and objective way. But even though it is necessary, it is not sufficient. It has to be coupled with a critical project that can provide us with a model of experience that is not restricted to a predetermined transcendental structure and its local and contingent characteristics. In other words, it needs to be conjoined with a *critique of the transcendental structure of the constituted subject* (existing humans). In limiting the model of AGI to the replication of the conditions and capacities necessary for the realization of human cognitive and practical abilities, we risk reproducing or preserving those features and characteristics of human experience that are purely local and contingent. We therefore risk falling back on the very parochial picture of the human as a model of AGI that we set out to escape, namely, mistaking contingent features of the human agency for its necessary and universal characteristics. So long as we leave the transcendental structure of our experience unquestioned and intact, so long as we treat it as an essence, we will gain inadequate objective traction on the question of what the human is and how to model an AGI that is not circumscribed by the contingent characteristics of human experience.

But why is the critique of the transcendental structure indispensable? Because the limits of our empirical and phenomenological perspectives with regard to the phenomena we seek to study are set by transcendental structures. Put differently, the limits of the objective description of the human in the world are determined by the transcendental structure of our own experience. The limits of the scientific-empirical perspective are set by the limits of the transcendental perspective. But what are these transcendental structures? They can be physiological (e.g., the locomotor system and neurologi-

cal mechanisms), linguistic (e.g., expressive resources and internal logical structure of natural languages), paradigmatic (e.g., frameworks of theory-building in sciences), or historical, economic, cultural, and political structures that regulate and canalize our experience. These transcendental structures need not be seen separately, but instead can be mapped as a nested hierarchy of interconnected and at times mutually reinforcing structures that simultaneously constitute, regulate, and constrain experience and thereby by extension, our intersubjective notion of objectivity. If we were to imagine a Kantian-Hegelian diagram of this nested hierarchical structure, it would be represented by a nested hierarchy of conditions and faculties necessary for the possibility of mind: [Sensibility [Intuition [Imagination [Understanding [Reason]]]]].

Transcendental structures then would be outlined as structures required not only for the realization of such necessary conditions and faculties, but also for moving upward from one basic condition to a more composite condition as well as moving downward from complex faculties to harness the power of more basic faculties (for example, deployments of the concept in order to manipulate the imagination in its Kantian sense – the function of the productive imagination, which is simply understanding in a new guise). In so far as any experience is perspectival, and this perspectival character is ultimately rooted in transcendental structures, any account of intelligence or general intelligence is circumscribed by the implicit constraints of the transcendental structure of our own experience. Regardless of whether or not we model AGI on humans, our conceptual and empirical descriptions of what we take to be a candidate model of general intelligence are always implicitly constrained by our own particular transcendental structures. This does not mean that we are endorsing the view that we should model a hypothetical AGI on something extra-cognitive or something other than the human mind. That sort of view is too phantasmagorical to have any sort of systematical and self-critical traction. Whatever model of AGI we come up with will inevitably be modelled on the human mind or, more specifically, on the *a priori* acts of cognition (*erkenntnis*) and the oughts of our theoretical and practical reason. This inexorable recourse to the a priori dimensions of the human mind is not what should be vehemently criticized, for it is the only necessary and sound way to handle the problem of AGI as a deeply philosophy question concerning the objective nature of the intelligibility of what we call intelligence. Anything else will be a hopeless shambles of dogmatic metaphysics, a whimsical cabinet of curiosities luring the benighted cult of posthumanism to speculate endlessly about its magical qualities and the intelligence yet to come.

This critique takes aim at the idea that the categories of the conceptualizing mind, the pure concepts of understanding, are bound up with the local and contingent structure of experience. To the extent that we employ these categories to give structure to the world (the universe of data) and to make sense of the experience of who we are in the world, and furthermore, in so far as the extent to which the a priori categories are entangled with the contingent aspects of experience is still a widely unexamined issue, the critique of our particular transcendental structures should be treated as nothing more or less than the extension of critical philosophy as applied to the conception of

ourselves in the world. It is in this sense, that AGI research philosophically understood is an outside and critical view of ourselves as a proto-human level artificial intelligence. It is designed to distinguish the necessary characteristics of the human agent from its merely contingent features, and thereby, facilitating the development of more nuanced and critical variations of the concept of the human, and in doing so, enriching what it means to be human.

The critique of transcendental structures, accordingly, is the reopening of the human to a concept of the critique informed by science and a future landscape of humanities. Even though it is now science that can carry the banner of this critique in the most rigorous way, it remains a genuine continuation of the gesture initiated by critical philosophy. Furthermore, the critique of the transcendental structure is in reality nothing but the fomentation of the Hegelian gesture of disenthralling reason from the residual influence of Kantian conservatism for which experience and reason are still muddled together.

Modelling AGI on the transcendental structure of our experience in the sense outlined above is in fact a form of anthropocentrism that is all the more insidious to the extent that it is hidden, because we take it for granted as something essential and natural in the constitution of human intelligence and our experience of it. In leaving these transcendental structures intact and unchallenged, we are inevitability liable to reinscribe them in our objective model. Anti-anthropocentric models of general intelligence and those philosophies of posthuman intelligence that have anti-humanist commitments are particularly susceptible to the traps of this hidden form of essentialism. Because by treating the rational category of sapience as irrelevant or obsolete, and by dispensing with the problem of the transcendental structure as a paltry human concern, we become oblivious to the extent to which our objective conceptual and empirical perspectives are predetermined by our transcendental structure. In remaining oblivious to the problem of transcendental blind spots, we place ourselves at far greater risk of smuggling in essentialist anthropocentrism, replicating the local and contingent characteristics of human experience in what we think is a radical non-anthropocentric model of general intelligence. It is those who discard what nontrivially distinguishes the human that end up preserving the trivial characteristics of the human in a narrow conception of general intelligence. The above argument can be reformulated in the context of the necessary correspondence between intelligence and the intelligible: Intelligence is an illusion if it is disconnected from the labor of intelligibility and thus from the requirements or positive constraints which enable it to engage with the intelligible, including its own intelligibility.

Dispensing with such constraints can only effectuate a conception of intelligence that is a reservoir of human subjective biases and personal flights of fancy about an intelligence yet to come. But at the same time, if we are serious about a broader conception of intelligence that differs from our impression of intelligence here and now, we should think about how such local and evolutionarily given constraints can be modified so that the concept of intelligence can be reimagined or reinvented according to a more expansive idea of an intelligible universe.

It is of course not the case that AGI research programs must wait for a thoroughgoing critique of the transcendental structure to be carried out via physics, cognitive science, theoretical computer science, or politics before they attempt to put forward an adequate model; the two ought to be understood as parallel and overlapping projects. In this schema, the program of the artificial realization of the human's cognitive-practical abilities coincides with the project of the fundamental alienation of the human subject, which is precisely the continuation and elaboration of the Copernican enlightenment, moving from a particular perspective or local frame to a perspective or experience that is no longer uniquely determined by a particular and contingently constituted transcendental structure. In the same vein, the project of artificial general intelligence, rather than championing singularity or some equally dubious conception of the technological savior, becomes a natural extension of the human's process of self-discovery through which the last vestiges of essentialism are washed away. What remains after this process of retrospective reassessment and prospective revision may bear no resemblance to the manifest self-portrait of the human in which our experience of what it means to be human is anchored.

However, the precipitate abandonment of this manifest self-portrait is a sure way to reentrench the very prejudices embedded within it. We may indeed arrive at a conception of posthuman intelligence that is in no sense in congruity with what we take ourselves as, here and now. But it is highly contentious and unwarranted to claim that we can arrive at such a conception of intelligence absent or despite what we take ourselves to be here and now. As indicated above, such a speculation about future intelligence inevitably degenerates into negative theology. Genuine speculation about posthuman intelligence begins with the suspension (*Aufheben*) of what we immediately appear to ourselves to be. It is thus the product of an extensive labor of determinate negation that does not start from nowhere and nowhen, but begins with the determination of a conception of ourselves at the historical juncture within which we recognize and make judgements about ourselves, i.e., a definitive where and when. To arrive at a view of intelligence from nowhere and nowhen we can therefore only begin with a critical and objective view on the where and when of what we take the human to be. Gat is to say, a nontrivial conception of artificial general intelligence rests on our own adequate self-conception as a task – one that is revisable, self-critical, and by no means taken for granted as immediate or a completed totality.

The structural-functional analysis of the conditions and capacities necessary for the realization of human cognitive-practical abilities is thus an obligatory framework for AGI research. But the sufficiency of this framework depends upon how far we deepen our investigation into the transcendental structure of human experience and how successful we are in liberating the model of the human subject (or agent) from the contingent characteristics of its experience. In this sense, a consequential paradigm of AGI should be seen as the convergence of two projects:

(1) Examination of the conditions and capacities necessary for the realization of what, for now, we can call the human mind, as well as the more applied question of how to artificially realize these conditions and capacities.

(2) Critical investigation into the transcendental structure of experience in order to develop a different model of experience that is no longer treated as essential or foundationally given – that is, one that is no longer fixated upon a particular local and contingently framed transcendental structure.

Thus, to the question of whether AGI should be modelled on humans or not, and if so on what level, we can answer as follows: AGI should be modelled on the human in the sense that it should functionally converge on the conditions and capacities necessary for the realization of human cognitive-practical abilities. But it should diverge from the transcendental structure of the constituted human subject. However, the success of this divergence depends upon *(a)* our success in rationally-scientifically challenging the given facts of our own experience and in doing so reinventing the figure of the human – ourselves – beyond strictly local transcendental structures and their contingent characteristics (this is the project of the fundamental alienation of the human), and *(b)* the success of AGI research programs in extending their scope beyond applied dimensions and narrow implementation problems towards theoretical problems that have long vexed physics, cognitive science, and philosophy.

Modelling AGI on human agency is not merely a strategy for tackling the conceptual problems involved in constructing a non-parochial artificial intelligence, but also more fundamentally a strategy for coming to grips with questions concerning the nature of minds, what they are, what they can become, and what they can do. If we posit ourselves as a model of an artificial agency that has all the abilities that we have, then we ought to examine what exactly it means for us to be the model for that which harbors the possibility of being – in the broadest sense – more potent than us. This is the question of modelling future intelligence on something whose very limits can be perpetually renegotiated – that is, a conception of human agency not as a fixed or settled creature but as a theoretical and practical life-form distinguished by its ability to conceive and transform itself differently, by its striving for self-transformation in accordance with the revisable conception it has of itself.

Biography

Reza Negarestani is a philosopher and writer. He has lectured and taught at numerous international universities and institutes. His latest work is *Intelligence and Spirit* (2018, Sequence Press/Urbanomic/MIT), centered on the philosophy of German Idealism, philosophy of mind, artificial intelligence, and theoretical computer science. Negarestani currently directs the critical philosophy programme at The New Centre for Research and Practice.

AI and the Brain Without Organs

Warren Neidich

The Brain Without Organs is a phrase based upon the idea of the Body Without Organs originating in the writings of Antonin Artaud and expanded by Gilles Deleuze and Felix Guattari in a *Thousand Plateaus*. Artaud wrote, "The body is the body/ it stands alone/ it has no need of organs/ the body is never an organism/ organisms are the enemies of bodies." (Deleuze and Guittari, 1987) The Body Without Organs is based upon a rhizomatic structure which, unlike roots or branches of trees, connects any point in the body to any other point. "Rhizomes construct maps that are always detachable, connectable, reversible, modifiable, and has multiple entryways and exits and its own lines of flight." (Ibid, 1987) Like the rhizome the Body Without Organs is an "acentered, nonhierarchical, nonsignifying system without a General and without an organizing memory or central automaton, defined solely by circulation." (ibid, 1987). According to them, the problem of the organism is to make an alternative Body Without Organs which unleashes its unformed, "unstable matters, by flows in all directions, by free intensities, or nomadic singularities, by mad or transitory particles." In his book on *Francis Bacon: the logic of Sensation,* Deleuze states, "With painting hysteria becomes painting. With painting hysteria becomes art...Painting is hysteria, or converts hysteria...Painting gives us eyes all over: in the ear, in the stomach, in the lungs (the painting breathes...) This is the double definition of painting: subjectively, it invests the eye, which ceases to be organic in order to become polyvalent and transitory organ." (Deleuze, 2005) The eye is connected to the central nervous system through its optic nerve and provides us an entry into the intracranial brain. Like the Body Without Organs, the Brain Without Organs must also create an alternative Brain Without Organs with which to free itself from imprisoning intensities of the material arrangements created by the genetic code on the one hand, and the politicized socio-political-technological milieu through which Big Data harnesses the cognitariat operating in an algorithmic induced working environment. The definition of the brain proposed here, is based on an extended and embodied model that is *situated* in multiple senses. For instance, connected to the microbiome in the gut, as well as operating in a Post-Anthropocenic and posthumanist context. I refer to this as its broad rather then limited definition and include in this description its capacity to change. It connotes both its intracranial matter consisting of neurons, cognits and neural networks and an extra-cranial composition composed of objects, things, their relationships and the social, technological and cultural relations, in transition, that form its milieu. This extra-cranial milieu is shaped in time and space by competing uneven ideological and discursive fields of unequal and shifting capacities that form different yet entan-

gled cosmotechnics. (Hui, 2020) Recently more and more of the extra-cranial milieu is being dominated by machine intelligence conscripted by artificial neural networks overwhelming the authority of the intracranial-extra-cranial complex.

In cognitive capitalism, in which the brain and mind are the new factories of the 21st century, cognitive labor has subsumed manual labor. Bodily labor situated on the assembly line has been replaced by mental labor performed on keyboards in front of computer monitors and with swipes on iPhones. In cognitive capitalism, the radicalizing effects of the Body Without Organs are diminished as a form of resistance, founded as it was to combat the dehumanizing effects of Fordist Labor as well as the structures that constitute the psychodynamic paradigms like the Oedipus Complex through which, according to Felix Guattari, the conduits of schizoanalysis operate. The repetitive and scripted movements of the laboring body(ies) on an assembly line, once directed by Taylorist management techniques and styles of performance, were the focus the Body Without Organs radicalizing deconstruction of machinic assemblages wherever it might occur; as an artwork, form of labor or gathering of psychic components. However in the transition to cognitive capitalism in which mental labor is preponderant and the pharmakon has displaced talk therapy in the treatment of a neurotic desiring machine the Body Without Organs has lost its effectiveness as a *diapositif* of dissensus. The transition of the proletariat to the cognitariat requires new techniques emanating from a radicalized theoretical framework to manage cognitive labor and the psycho-pharmaceutical regimens required to treat its psychopathologies. The Brain Without Organs is such a structure.

In the transition from early cognitive capitalism to its' later or cognitive stage the focus of capitalism changes focuses upon circulatory capital of the brains assemblages of psychically infused neural networks in living action. Virtuosic performances are remembered and materialized as long-term potentiation or long-term memories. The Canadian neuropsychologist D.O. Hebb was first postulated that when two neurons fire together, their shared synapse undergoes changes. Hebbian Theory, often paraphrased as "neurons that fire together wire together," understands that nervous activity can leave a trace which can be modified and transformed (Hebb,1949). Long-term memory storage, the result of long-term potentiation at the synapse, represents the new archive or mnemosyne atlas of late stage cognitive capitalism. They participate in local and global networks, linking, for instance, the visual cortex in the posterior or caudal part of the brain to the actions of the frontal lobes in its rostral pole and thereby providing the raw material for internal narrative construction referred to as scenario visualizations in the minds eye and working memory. The mind's eye and working memory are the new sites of capitalist expansion and corporate power and represents the contemporary jurisdiction of the digital dominion referred to as endocolonization. As such the narrative of self-reflexivity and the variation of the image of thought are normalized and it is this form of governmentalization that marks the transition from to biopower to neuropower in which population of brains rather then bodies are the subject of sovereignty's jurisdiction. Another characteristic of neuropower is its modulation of the contingencies present in the pluri-potential architecture of the brains'

connection matrix called the connectome, through its sculpting of the brains neural plasticity, as well as its effects upon the connections that constitute the hidden layers of the multitude of artificial neural networks that intermingle and entangle them selves with it through the iCloud. Together they constitute the contemporary machinic intelligence and general intellect.

As we transition out of early cognitive capitalism and enter its late or cognitive (neural) phase a radically altered framework, constituted by the burgeoning neural economy of which machine learning plays an important role, creates a whole host of conditions that question the emancipation of human labor from technocracy? First these new technologies are not subsuming bodily labor and Taylorist managerial style but mental labor. AI and its assortment of connected devices and fields of action are reasserting the power of the machine to subjugate the worker and stop the very process of machinic metamorphosis that Michael Hardt and Toni Negri refer to (Hardt, 2017). I want to suggest that recognizing this is essential for understanding the future of digital governance and the forms of resistance that might be applicable.

To that end I want to introduce the idea of the Brain Without Organs as that form of resistance. Essential for my argument is that the history of AI and the history of cognitive neuroscience are entangled and mirror each other. For instance, according to Terrence J. Sejnowski in *The Deep Learning Revolution,* "The recent progress in artificial intelligence (AI) was made by reverse engineering the brain. Learning algorithms for layered neural network models are inspired by the way that neurons communicate with one another and are modified by experience." (Sejnowski, 2018, ix) Examples of such entanglements can be found in early attempts at AI found in Frank Rosenblatt's, Perceptron, which used the retina as its model as well as the model proposed by Yamins and DeCarlo for convolutional learning which used the procedures of cells at various levels of the visual cortex to create its methods of object recognition. But more then simply acting as a model something more dramatic and ontological occurs. A relation between material tool invention, which is what AI is, and material evolution of the brain ensues. Bernard Steigler refers to this technological cortical brain mirroring as instrumental maieutics. "The issue is that of a singular process of structural coupling in exteriorization that we are calling an instrumental maieutics, a "mirror proto-stage" in the course of which the differentiation of the cortex is determined by the tool just as much as that of the tool by the cortex: a mirror effect whereby one, looking at itself in the other, is both deformed and formed in the process [l'un se regardant dans l'autre qui le déforme s'y forme]" (Steigler, 1998). The concept of the Brain Without Organs as a emancipatory dispositif acting upon the intracranial brain its neurons and axons that make up its neural substrate as well as upon its extra-cranial counterpart of which as will see is recently being dominated by AI and its operations takes on tremendous significance as we move from the information to the neural economy in late-stage cognitive capitalism. It is at the point of conjunction that the Brain Without Organs operates to disentangle one process from the other as means of emancipation from the subsuming effects of the neural economy. In neural subsumption our conscious and unconscious thoughts will be open to surveillance and data mining as a result new

Brain Computer Interface –Internet technologies just on the horizon. The Brain Without Organs also operates at points of contact between nodes called synapses in artificial neural networks and material neural networks resulting in deterritorialized local and global relations. These synapses are strong and weak according to the expression of their output weights and activation function. The Brain Without Organs deregulates expressions of one stratum to another through controlling feedback, feed forward and back-propogating (backprop) learning processes. As, such it adjusts the expression of the summation of all the weights of the previous layer and unleashes the networks' pure pluri-potentiality and variability of becoming. The Brain Without Organs is an alternative and contingent organization and neural plasticity is its agency. Speaking about the Body Without Organs Deleuze and Guattari state, "Thus the body without organs is opposed less to organs as such than to the organization of the organs insofar as it composes an organism. The body without organs is not a dead body but a living body all the more alive and teeming once it has blown apart the organism and its organization" (Delueze, 2005). The same can be said about the Brain Without Organs. It is not opposed to the organs of contemplation but rather the forces that attempt to focus and normalize its architecture. Its neural and cultural plastic potential is a form of the common that has recently been under assault by neoliberal politics and its apparatuses; private and corporate ownership which wants to sculpt its networks in its own image in order to produce a normalized, univocal cognitive laborer. The Brain Without Organs wants to displace this unitary subject and replace it with a complex, global, non-binary relational one.

Work Sample: Brain Without Organs Virtual Reality Entity

The *Brain Without Organs* is a virtual reality work scaled up from a neon wall sculpture entitled, *A Proposition for an alt- Parthenon Marbles Recoded: Phantom as Other.* In the *Brain Without Organs* like the *Proposition for an alt- Parthenon Marbles Recoded: Phantom as Other* psychic energy is generated by the phantom limbs that sprout from amputated arms and legs of the classic neon sculpture entitled the Parthenon Marbles. This energy like a phoenix emerges from the phantom arm and legs and ascends upward from the input layer through the matrix of connnections of the hidden layer to finally reach the output layer constituting the superintelligence or alt-Singularity. The ghost like emanation from the missing arms and legs now constitutes the dominant contribution of input layer, which had in the past been dominated by the perfection of the Parthenon Marbles. As such this alternative influx plays the dominant role in sculpting the efficiencies of the connections and synapses of the ANN. But in this virtual sculpture this combined input is modulated by an additional source of input from the combined choices made by individuals interacting with the entity through the use of VR-Brain Computer Headsets as well as Eye Tracking Software. Their attention to the various components of the virtual 3-D entity also produces data that also feed back to sculpt the ANN and is responsible for its changing patterns. Notice that some of the words

and stringy like structures are black and others are becoming more intense in time. These changes in time represent the pruning and intensification of connections of the Virtual sculpture resulting from attention to certain stimuli and disattention to others leading to long-term potentiations and depressions which have significant effects on the virtual entity. The structure is an emerging and generative structure created by the combined psychic data emanating from the subjects interacting and making choices about what to pay attention to and the immersive environment and the psychic energy generated by the phantoms. It is a visualization of self-reflexivity itself and is a dynamic sculptural representation of what Reza Negarestani calls artificial general intelligence as a provisional model. In the end the subjects are on the one hand looking at the self-reflexive entity they are together producing and the artwork makes visible and precipitates and opaque the usually invisible and transparent quality of mindedness.

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Fig. 1. *A proposition for an alt-Parthenon Marbles Recoded: The Phantom as Other*. First image is called *The Parthenon Marbles Recoded: Phantom as Other*, Mixed Media, Photography, Aluminum and Neon Tubes and LED Lights, 3.5 meters x 4 meters. Kunstverein Rosa-Luxemburg Platz.

Fig. 2. CR2 *Parthenon Parthenon Marbles Recoded: Phantom as Other*, detail foot. Second image. Detail of Telescoped Phantom Limb, *The Parthenon Marbles Recoded: Phantom as Other*, Mixed Media, Photography, Aluminum and Neon Tubes and LED Lights, Kunstverein Rosa-Luxemburg Platz.

Fig. 3. 3D East Pediment – Brain Without Organs3D East Pediment – 20 minutes, Video Rendering.

Biography

Trained in photography, art and neuroscience Warren Neidich uses neon-light sculptures to create cross-pollinating conceptual text-based works that critique the new forms of capitalism emerging at the border zones of art, neuroscience, digitality and social justice. He has taught at Brown University, Harvard University, Columbia University, Princeton University, Goldsmiths College, the Sorbonne, University of Oxford and Cambridge University. He is founder and Director of the Saas-Fee Summer Institute of Art. His *An Activist Neuroaesthetics Reader*, Archive Books, Berlin, is forthcoming 2022.

There A Place in Human Consciousness Where Surveillance Can Not Go?
Ellen Pearlman

In the century of the brain we have reached a crisis point as important as that in which industrial economy evolved into the information and knowledge economy. We are transitioning to a neural economy in which the brain's materiality is now at stake. In cognitive capitalism, in which the brain and mind are the new factories of the twenty first century, it is only natural that capitalism would use the heterotopias that emerged as new fields for commodisation as result. The implications are now just now becoming apparent with the new technologies of Brain Computer Interfaces (BCIs), cortical modems, smart dust-neural dust assemblages and optogenetics in which laser light has the capacity to turn on and off memories of genetically transformed neurons.

This is where Ellen Pearlman's article takes off as she looks at new forms of surveillance brought on by the new biometrics (neurometrics) at hand. The relationship between "Big Data" and the "Big Other" as Shoshona Zuboff has called it, where our futures are at stake is the foundation for what is a telepathic future. It is a time where finger-hand searches on keyboards and mouse clicks give way to brain wave calisthenics which, according to Facebook are five times as fast. This is the very premise of Elon Musk's new venture Neuralink. But these new forms of mind engagement have serious consequences and Pearlman is right to draw our attention to them. We are moving from real subsumption where life is subject to surveillance, to neural subsumption where the neurobiological activities of the brains billions of connection nodes are monitored. If we can understand the code of brain waves to manipulate entities on a computer screen and the Internet, the opposite is also true. We can send code into the brain with consequent effects. The singularity, the dystopian vision of the machinic overwhelming of human intelligence by sentient machines may also provoke other complications in which bidirectional neuralink apparatuses may be under the command of these machinic entities speaking in a foreign language. This ultimate digital immersion, machines coding machines, will become a new code to direct us as a form of non-conscious reality directing humanity.

Biography

Ellen Pearlman is a new media artist, writer, critic, curator and educator. A Research Fellow at MIT in Cambridge, Massachusetts and a Senior Researcher, Assistant Professor at RISEBA University in Riga, Latvia, she is also a Fulbright Specialist and Scholar in Art, New Media and Technology, a Vertigo STARTS Laureate, a Zero1 American Arts Incubator/ U.S. State Department Artist, and a U. S Alumni Ties (Fulbright) Grantee. She received her PhD from the School of Creative Media, Hong Kong City University where her thesis "Is There A Place In Human Consciousness Where Surveillance Cannot Go?" received Highest Global Honors from Leonardo LABS Abstracts. Ellen created "Noor" the first interactive immersive brainwave opera in a 360 degree theater, and "AIBO", an emotionally intelligent artificial intelligence brainwave opera, and is currently working on "Language Is Leaving Me – An Opera Of the Skin" about epigenetic, or inherited traumatic memory, AI and computer vision. She is also co-founder and Director of ThoughtWorks Arts a global innovation and research lab of the global software consultancy ThoughtWorks, and the founder and President of Art-A-Hack (TM) a rapid prototyping workshop methodology.

A perspective from a theoretical physicist

Carlo Rovelli

Humankind learns. To learn is not to add new facts to a baggage of acquired knowledge: it is to modify the conceptual structure we use to understand the world and navigate it. This conceptual structure, as the world itself, is constantly evolving.

What we call "culture" is the ensemble of the tools that form this conceptual structure. Part of it is shared across large portions of humankind, but part of it is not. There is vast diversity between cultures, nations, generations, political clusters, large and small cultural tribes, schools, individuals, and there are conflicting components inside the head of each of us. This diversity sources the uninterrupted dialog that nourishes the process of learning. It is a resource, not a problem. We are a species whose behaviour and experience is largely determined by the social space created by these uninterrupted evolving interactions.

This network of exchanges is nothing else than a part of a far larger network of interactions between us humans as a species and the biological and physical world of which we are a component. With it we exchange light and images, energy and entropy, food and threats, information and emotion, and a vast tapestry of experiences which nourishes and modifies our learning, hence our understanding of the world and ourselves.

Reality as a whole, as far as we best understand it today, works in this way, seems to me. Modern physics points in this direction. The best way of understanding reality is not as a set of object having properties, or a substance (whether it is matter, energy, fields, space, time, mind, spirit, or whatever) having properties, but rather as a network of events that we organize as manifestations of parts of the world to other parts of the world. This deeply dynamic, interactive and relational aspect of Nature is what seems to me to be the message that emerges from the discovery of quantum phenomena and the general relativistic nature of spacetime. Space and time are not containers of the world, they are an account of the relations between events. Physical objects do not carry absolute properties: their properties are the description of the way they interact. The best picture we have of physical reality is as a network of interactions. The way culture works is a special case of the way nature works.

The other way around, the best we can say about nature is formed by the best conceptual tools that our cultures have so far elaborated – slowly evolving them across the centuries and still in the process of evolving – in order for us to interact with one another and with the rest of reality. I have never understood, hence, what it means to oppose nature and culture. Contemporary culture should be intelligent enough, it seems to me, to avoid the trap of confusing the choice of a (fully arbitrary) departing point for accounting reality, for an objective preferred foundation. We are part of

nature and we are a part of nature capable of forming an image about this nature of which we are part; what we mean by nature is precisely this image: the epistemic circle can close. "Culture" is a natural phenomenon as well as "nature" is a cultural notion. We are home in nature.

Values and meaning, in particular, are not extraneous to nature. Our values are not weakened by the discovery that they lack a transcendent foundation. On the contrary, they are strong because they are rooted in an immanent source: ourselves. We are them. Shaped by hundreds of millions of years of biological evolution, by centuries, of cultural evolution, by years of personal evolution, by hours and seconds of experiences. We living beings are by nature sources of values and meaning because of what we are: structures that can be read as having aims. This is what has had the consequences that we are still here. Our biology, of which our mental capabilities are one trait, is the expression of pulsions, equilibration forces, future oriented action, future devising calculations, passions, desires, love, ideals. What makes us is first of all sufferance and pleasure, because in the network of reciprocal manifestations that the physical world is, these are the specifics of the future oriented patterns that we call biology.

This, as a side remark, is why I think that when Artificial Intelligence tries to contribute to the effort of understand something about ourselves by mimicking advanced skills like complex problem solving, cheques-playing, expert systems, or poetry writing, it still misses the point: I know plenty of humans that are fully and splendidly humans without knowing how to play cheques, writing poetry, being particularly expert of particularly good problem solver. What makes us is not our advanced skills; it is the oscillating sea of our emotions, desires, passions, fears, uncertainties, our constant monitoring of ourselves. Our main problem is not maximizing a payout given externally: it is negotiating within ourselves between payouts. We are nostalgia and passion, love and tears, dedication and machination. Not chess players. Survival and propagation in natural selection may be seen as an ultimate biological aim, but it is remote and the complexity is too vast for it to dictate behaviour locally and directly. I have no doubt that there isn't anything a priori preventing something like us to be built artificially by ourselves, but for now I see little resemblance between this and the most advanced software or hardware I am aware of.

If the best way we have found for understanding reality is not as substance endowed with properties, but as a network of interactions that we organize as manifestations of parts of the world to other parts of the world, then the way our brain works is – I think – only a special case of the way nature works: subsystems of the world being affected by other subsystems. What we call "self", "mind", "consciousness", and other similarly vague and confusing names, is just the complex but highly integrated cluster of phenomena happening in the structure of our brain, evolved to focus its correlations on relevant objects, relevant situations, on fellow humans, and then reflectively upon itself. I see no intractable mystery in consciousness: only a beautiful cluster of phenomena whose gears we want to better understand. I would be very surprised if in the unimaginable vastness of the universe there weren't far more complex and stupefying complexities than ourselves. After all, with all the pride of our sense of awareness,

consciousness and self, it suffices the experience of a few grams of magic mushrooms to raise us to different and more intense forms of consciousness. As individuals, as culture, as the biosphere, as minds, we are one of the many patterns in the kaleidoscopic complexity of reality.

The awareness of our natural limitations, I think, is what makes life beautiful. We are deeply aware of the extreme partiality of even our best knowledge, in front of what Newton – the greatest scientist – called 'the immense ocean of our ignorance'. This awareness, and the intense wonder we feel, are the sources of our curiosity. Our being fleeting makes us precious. The mortality of life renders each instant worthwhile. The serene realization of the absence of transcendence fills every grain of sand, every moment of our time, every rapid gaze with a deep sense of sacrality.

Why? Because this is what we are, shaped by nature and by our past to be made of flesh and emotional intensity. The pretentious glorification of the destiny of (European) humankind of the XIX century, the doubts and the desperations of the devastating XX century, can leave space, in this XXI century, for recognizing that the mourning for the shattered false illusions can be fully over. We have grown up a bit. We can live perfectly well accepting our ignorance, our uncertainty, our mortality and the fleetingness of everything including ourselves. Our science, art, literature, philosophy, life experience, are not giving us a message of desperation, and are not giving us contradictory pictures: they are coherent pieces of the vast and incomplete mosaic that is our multiform culture—our tools to navigate reality. Its internal variety is not a problem: it is among its best resources.

But I believe that we should recognize – and we are definitely not doing so even when we pay lip service to it – that the interconnectedness among ourselves and with the physical and biological world around us implies that if we keep thinking in terms of competition, in terms of groups defending their specificity against others, individual against one another, nations against one another – as we are doing today – we are now heading towards the catastrophe. No dad who will save us. It is our hands. We are not anymore too weak to hurt ourselves badly. We have nuclear capacity of self annihilation, we are too many for this planet, we have pushed the biosphere in a direction that is going to hurt us back badly. The Earth does not care: humankind will.

And yet, our main concern is if somebody else is becoming almost as rich as we already are. We need to dominate, often just for fear of being dominated. With all our intelligence, depth, sanctity and love, we humans are profoundly idiots. We prefer blaming one another. Competing with one another. We do damage to ourselves beyond imagination. We have enslaved, killed in war, starved millions of other humans for our luxury, and destroyed each other's lives repeatedly. And we are still doing so. Why? Because we compete: we want to be first, we want our country, our group, our family, our continent, our religion, to be above others. Because we are afraid the others could do to us what we have done to so many.

This is how decisions are taken today. How immensely idiot we are. Aren't we? My profound hope, a small candle, is that the XXI century will see a drop of wisdom. If not, humankind will suffer. A lot.

Biography

Carlo Rovelli is a theoretical physicist known for his work in quantum gravity. Born in Italy has worked in the United States, France and Canada. Rovelli is member of the Institute Universitaire de France, honorary professor of the Beijing Normal University, Honoris Causa Laureate of the Universidad de San Martin, Buenos Aires, member of the Académie Internationale de Philosophie des Sciences. In 1995 he was awarded the Xanthopoulos Award for "the best relativiste worldwide under forty". He has written global best sellers among which are *Seven Brief Lessons on Physics*, translated in more than fifty languages, 'The Order of Time' and the recent *Helgoland* on quantum theory. He has been included by the Foreign Policy magazine in the list of the 100 most influential global thinkers.

Post-structural dynamics and differential *An-arkhè*

Alessandro Sarti

1. The becoming of forms

The question we are interested in deals with forms, the becoming of forms. We are interested in morphogenesis as in the spirit of french philosophy of XX century and particularly Gilbert Simondon (G. Simondon, 2015) and Gilles Deleuze (G. Deleuze, 1994). Simondon called "individuation" the passage from the pre-individual, intensive plane of forces to forms extended in space and time. There is this idea that living forms but also phenomenal and perceptual ones are in continuous construction: bodies are never completely formed and identified, individuals do not exist, but there are only processes of individuation.

Then the fact that a thinker like Deleuze (G. Deleuze, 1994) was able to reconsider the process of Simondonian individuation in differential terms, throws an unprecedented bridge towards natural sciences and mathematical sciences. In fact, if the Simondonian concept of individuation consist in the passage from a pre-individual plane to individuation of forms, Deleuze explicitly equips this passage with a differential calculus, where the evolution of forms is the solution of a differential problem. The idea of differential calculus of Leibniz is reconsidered and the becoming of forms is then the solution of a distribution of differential constraints that constitutes the virtual. The virtual is then a multplicity of differential constraints that are the intensive genetic elements of every morphodynamics. In this framework to imagine a new form means to compose differential fields that may or may not give rise to integration. The actualisation of the field of differentials is namely a new form. Composing means looking for adjunct fields that together with the virtual context allow integration.

This composition of heterogenous differential fields with a paratactic logic of "and... and... and" give rise to assemblages, that constitute the virtual elements for heterogeneous dynamics. Assemblages implements an heterogeneity of relations between genetic elements in terms of connectivity, of conjunction, of alliance (G. Deleuze, F. Guattari, 1987).

2. Differential heterogenesis

Differently from mathematical physics and structural morphodynamics, where the becoming of forms emerges from generators that are homogenous in space and time, heterogeneous dynamics introduce the possibility to mutate laws in space and

time overcoming any homogeneity. They are *heterogenesis*, that is dynamics in which the virtual can be recomposed and instantiates the emergence of events where new possibility spaces and new forms can be generated (A. Sarti, G. Citti, D. Piotrowski, 2019).

In heterogenesis, there is a spatially and temporally varying definition of differential constraints. Mathematical physics is a form of symmetrization of heterogenesis in the sense that any heterogeneous set is reduced to a unique operator that holds in every spatio-temporal point. Heterogenesis can be regarded as a Hyperphysics that takes place as a variety of dynamics that change molecularly from point to point. This character of "homogeneisation" of mathematical physics is at the basis of its fundamental a priori, presupposing that spaces are given as an a priori with respect to differential constraints. This a priori is completely reversed in the composition of heterogenetic assemblages, in which operators are primary and define dimensions and qualities of the space: a new differential field that is composed with an assemblage redefines completely the spaces of the entire assemblage.

In mathematical physics, operatorial homogeneity and the fixity of the differential constraints determine the universality of laws and the nomological character of differential models. Heterogenetic composition is poles apart from universal laws and lays the conditions for an immanent morphogenesis that is created time by time by the assembly of singular concatenations.

Notice that if the assemblage of operators is considered in turn a new differential operator, heterogenesis can be viewed as a morphogenesis of the assemblage operator. The heterogenetic becoming is then considered a concur- rent morphogenesis of operators, of its spaces and of forms in spaces, a concept that is unprecedented in physical and structural dynamics.

To allow the construction of assemblages, two temporal scales or axes are introduced. The first one is the axis of the actualisation of differential constraints. It is the axis of Khronos, that is common to mathematical physics. The second is the axis that Deleuze calls Aion, on which it takes place the recombination of differential constraints in new assemblages. On this axis, we have a true plasticity of the virtual, meaning the possibility to recombine genetic elements to create singular dynamics. Any specific composition has to be thought of as an explorative action, closer to a Dada performance rather than to a finalised process. The act of composition of forces is not subjected to any mathematisation or any other rule. Behind the act of composition there is just the concreteness of the gesture.

3. Nature as variation

Heterogenetic dynamics pertain to different empirical basins. If the empirical basin of the dynamic structuralism of René Thom and Jean Petitot is embryogenesis (R. Thom, 1994), that is, the set of dynamics at the core of the formation of biological bodies whose symmetry breaking is controlled by a parameter space, the empirical basin of post-structural dynamics is the brain. The brain is the ultimate Body without

Organs, the body that, thanks to plasticity, changes its rules dynamically and rebuilds itself continuously in a situated way. There is thus a necessity to model cerebral dynamics in the most heterogeneous way possible. The brain is made up of neural populations with heterogeneous dynamics that are mathematically described by heterogeneous operators. At the same time, neural populations act on sets of neurochemicals such as neurotransmitters, messengers and neuromodulators that give rise to a heterogeneity of formed substances. Here again, the neural connectivity that defines the structure of the tangent planes of various dynamics differs from population to population. These populations are concatenated in the form of assemblies, at which point they must be considered as material implementations of heterogenesis (A.Sarti, G.Citti, 2015). Finally, neural connectivity is plastically modified by learning processes that implement a true plasticity of the virtual, which corresponds to a continuous reorganization of the differential rules underlying dynamics. Brain heterogenesis therefore constitutes the material support of every phenomenology of perception and imagination whose forms are deployed as the solution of suitable differential problems (Deleuze and Guattari analyse this topic in their last work *What is philosophy?* (1994)).

On the other hand, we can find post-structural dynamics in life science when we consider the evolution of living forms on the axis of phylogenesis, along which genetic elements are recombined (G. Longo, M. Montevil, 2014). Additionally, in this case we have a double temporal axis: the axis of ontogenesis on which living forms are actualized, and the axis of phylogenesis on which generative constraints are recombined. Here we are back at the two temporal axes of post-structural dynamics: the axis of Chronos that allows for actualisation and the axis Deleuze terms Aion, on which the recombination of differential constraints forms new assemblages, new configurations.

Post-structural dynamics are also present in historical becomings – the perspective of micro-history, for example, which teaches us to look at histories in terms of the dynamics of forms and the becomings of morphologies, as traced by Goethe and Walter Benjamin. Micro-historical dynamics (C. Ginzburg, 1980) are a laboratory for a morphology of multiplicities against the forms of contemporary historiography that present history as a progressive development of global phenomena, uniformly characterizing the whole of a society from their supporting structures to their symbolic and relational forms.

Finally we argue that heterogenesis helps us to understand the morphologies of imaginative, historical and phylogenetic becoming. Rather than a provisional quantitative model, heterogenesis is a morphological device for gaining a qualitative understanding of the generation of new forms. More than a nomological concept ofl nature made by laws to be discovered, it affirms a compositional concept of nature with a multinaturalistic attitude, in the sense of the naturalness of variation and the variation as nature. The continuous recomposition of the differential is the condition for a dynamic an-arkhè extended well beyond discursive practice to human and non-human living being.

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Biography

Alessandro Sarti is a mathematician and epistemologist, Director of Research at EHESS of Paris. His studies deal with the emergence and mutation of forms in the field of cognitive and life sciences. He is interested above all in the heterogeneity of the conditions of generation of forms and in those processes that go under the name of differential heterogenesis capable of producing imaginative, indeterminate and mutation dynamics. He directs the seminar on Post-structural dynamics at EHESS and the seminar on Neuromathematics at Collège de France. He is one of the founding members of the group of mathematicians Cardano. He is editor in chief of the Springer series of books Lecture Notes in Morphogenesis.

Why We Can't Know Anything about a Truly Posthuman Future

Zoltán Boldizsár Simon

An increasing body of knowledge is available on how AI technologies pervade our daily lives. Their benefits and use from crosslinguistic communication to healthcare are accompanied by knowing how algorithms discriminate (Benjamin 2019) and how the AI machinery is being kept running on the costs of the 'ghost work' (Gray and Suri 2019) of human labor (Crawford 2021). Knowledge about present and past uses and misuses also inform the ideas we formulate about the future potential of AI – especially of artificial general intelligence, AGI. By the second decade of the century, prospects of AGI-driven large-scale societal transformations are routinely featured in Netflix content, public discussions, and scholarly research. The complex intersections of AI with developments in nanotechnology, synthetic biology, and human enhancement technologies fuel a variety of modes to contemplate posthuman utopias and dystopias, imaginaries of societal collapse, and visions of multiplanetary life beyond the confines of human limitations.

Yet, we cannot know how genuinely posthuman modes of future existence would look like. Although it's most certainly possible – and, at this point, perhaps even necessary – to contemplate such prospects, we simply cannot fathom a truly posthuman future. How come? – one may ask. And what is a 'genuine' or 'truly' posthuman future to begin with?

The clumsy phrasing intends to capture kinds of futures which are literally 'post' human in the sense of implying a transition to *other-than-human* futures. Such futures are other-than-human inasmuch as their posthuman subjects are ones who are no longer confined by human cognitive and biological limitations. Whereas the contemporary discourse on the posthuman in the humanities (Cudworth and Hobden 2018; Braidotti 2019) typically revolves around efforts aimed at developing a post-anthropocentric stance of human beings as a new human subjectivity geared towards emancipatory politics, technoscientific and transhumanist imaginaries decenter the human only in order to contemplate its historical supersession by the posthuman as a more capable new centered subject. We can also call these posthumans in the weak and in the strong sense, respectively. Whereas humanities scholars tend to think that posthumans in the weak sense are already among us, posthumans in the strong technoscientific sense are considered only in the realm of possibility. As the contemporary discourse on the posthuman arguably breaks down into two cultures (Simon 2019a), it seems important to note that the claims I wish to make in this essay concern technoscientific posthuman futures.

Posthumans in the strong sense may come about as machine superintelligence (Bostrom 2014) in scenarios of a technological singularity, brain emulations (Hanson 2016), or as the result of human enhancement (Savulescu and Bostrom 2008; Bateman et al. 2015) and transhumanist aspirations (More and Vita-More 2013) tipping beyond the point at which enhancement is still 'human'. In all scenarios, genuinely posthuman futures entail a change far more radical than any kind of change that the exhausted nineteenth-century ideologies, which nevertheless still dominate political discourse, could have imagined. The prospect of a technological posthumanity is not a new chapter in 'our' story but the possible occurrence of 'humanity's temporal other,' as I described it elsewhere (Simon 2019b).

In an unfortunate twist, however, radical posthuman prospects are often seen as yet another phase in a larger history of intelligent life in which the human phase represents only the current episode. Such interpretations tame the alterity of the posthuman by seeing it within a larger historical process of development. The idea is familiar, except that historical development this time does not end with one or another vision of a desired political constitution of human modes of living together as in modern political ideologies, but gestures towards the coming about of supposedly higher forms of life. Little wonder that familiar ideas attract familiar criticism, too. Donna Haraway (2020), for instance, in a conversation within the framework of the 'Critical Zones' exhibition opening at the Center for Art and Media Karlsruhe, recently called the idea that AI represents the next evolutionary phase a 'white male phallic masturbation' (while welcoming small-scale AI as a materialist practice).

It seems to me that advocates and critics equally tend to misapprehend posthuman prospects by approaching them as redressed old ideas about historical development. Most importantly, such misapprehension fuels the related idea that posthuman futures can somehow be figured in advance. For anticipating the shape of things to come is predicated on the logic of the modern idea of history, which also formed the condition of possibility of nineteenth-century ideologies and their desired futures. The assumed possibility of fathoming future societal developments in advance and the assumed possibility of fathoming posthuman futures may rest on the shared core assumption that there is a historical process leading to the future. It is on this basis that a derivative assumption may hold that, inasmuch as there is a historical process, it may be possible to figure the directions – let alone, the laws – of historical development.

To be able to grasp the radicality of genuinely posthuman futures, we must delink them from the modern idea of history. To be clear, the odd thing here is not that posthuman futures escape modern historical thinking, but that we keep on trying to fit the two together. For, as it stands, hardly any literally 'post' posthuman imaginary entails a smooth developmental process. While they remain 'historical' to the extent that they are about change over time, the kind of change they typically envision departs from conventional ideas of a historical process. Ray Kurzweil (2004), for instance, explicitly contrasts a 'historical exponential view' of technological change with a conventional linearity of the modern idea of history. Yet, one may object that exponentialism may be reconciled with a developmental view. And Kurzweil, in fact, considers exponential

growth of nonbiological intelligence in terms of development, which he expects to cross over the level of biological intelligence in the near future. What's more, Kurzweil keeps on talking about steps in evolution and keeps on thinking that the singularity – the point at which greater-than-human intelligence is created – emerging out of the crossover is inevitable and even has a destiny:

> Once a planet yields a technology creating species and that species creates computation (as has happened here on Earth), it is only a matter of a few centuries before its intelligence saturates the matter and energy in its vicinity, and it begins to expand outward at the speed of light or greater. It will then overcome gravity (through exquisite and vast technology) and other cosmological forces (or, to be fully accurate, will maneuver and control these forces) and create the Universe it wants. This is the goal of the Singularity. What kind of Universe will that be? Well, just wait and see. (Kurzweil 2004: 416)

Although Kurzweil hesitates to reveal many details, he most certainly appears to 'know' quite a few things about how a post-singularity world would look like, including its ultimate goal.

How can he claim to know any of this? Well, he can't. What Kurzweil gets terribly wrong is what many movies of greater-than-human intelligence do: they assume that we can form an idea about the motifs of such intelligence that we otherwise define precisely by virtue of the fact that such intelligences exceed our human capacities. Contemplating the *content* of posthuman futures, as humans, we necessarily fall prey to an anthropocentric bias in seeing other-than-human futures in terms of our human logic, values, and imperatives. But the futures *we as humans* contemplate with our limited capacities cannot qualify as posthuman futures in the strong sense; they cannot qualify as *other-than-human*. In one way or another, they pretty much remain human futures.

What to do then? Alternatively, we can try to grasp the radicality of posthuman futures by recognizing their other-than-humanness. And this is the point at which we are confronting the limits of human understanding, and we cannot but acknowledge the unfathomability of truly posthuman futures. For, as Vernor Vinge (1993: 12–13) already noted in his early popularization of the term 'technological singularity' at a NASA conference, it is 'a point where our models must be discarded and a new reality rules. As we move closer and closer to this point, it will loom vaster and vaster over human affairs till the notion becomes a commonplace. Yet when it finally happens it may still be a great surprise and a greater unknown.'

Eventually, all this seems to result in the following dilemma (or even double bind): we either make claims about the content of posthuman futures and then such futures necessarily remain human to one extent or another; or we concede the radical alterity and other-than-humanness of posthuman futures, and then we necessarily concede also their unfathomability and their detachment from human values and imperatives. In the first case, the surviving human element binds past, present, and future together and clears the ground for interpretations of conventional historical trajectories that eventually misapprehend posthuman futures in the strong sense. In the second case, new kinds of 'disconnective futures' (Simon and Tamm 2021) emerge that we, by definition,

cannot comprehend. What we can comprehend are only the potential modes of transitions from pasts to futures.

None of this is to say that we should stop contemplating the content of posthuman futures. What I hope to suggest by fleshing out the dilemma is not that we should make a choice and opt for one or the other but to be aware of the dilemma in the first place – and, again, not in order to attempt resolving the dilemma but in order to learn inhabiting it. For even if we cannot grasp a post-singularity reality and cannot cognitively access a world of greater-than-human intelligence, contemplating possible posthuman futures may serve the very practical purpose of self-inspection. It enables us to inspect our own motifs, norms, imperatives, sociopolitical views, and goals in facing unfathomable futures.

For one thing must be clear: *Contra* Kurzweil, from the possibility of a variety of posthuman futures, does not follow their inevitability. Nor does their desirability (or, for that matter, their undesirability) follow. From the fact that we think that genuinely posthuman futures may take place, does not follow that they will or that they should (or should not) take place, let alone that they will or should take place along any of the scenarios we conceive. Between the possible and the desirable lies an operating space – and this is where our very human politics of posthuman futures is already playing out.

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Biography

Zoltán Boldizsár Simon is research fellow at Bielefeld University. He has been assistant professor at Leiden University and visiting researcher at the Max Planck Institute for the History of Science. His latest books are *History in Times of Unprecedented Change* (2019) and *The Epochal Event* (2020). Most recently, he co-conducts the *Historical Futures* project with Marek Tamm and the journal *History and Theory*.

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