Artificial Intelligence – Intelligent Art? An Introduction

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Man-Machines from Ancient Greece to ChatGPT

This volume offers a critique and assessment of forms and consequences of algorithmic 'creativity' that have emerged in the context of digital encoding in electronic media, appropriating, complementing, superimposing, and transforming established practices, ethical norms, as well as concepts of creativity. The interconnected digital world holds large quantities of available data and is here conceived as an ever-changing space of permanent and increasingly automated copy, transformation and adaptation.

As algorithmic data processing increasingly pervades everyday life, it is also making its way into the worlds of art, literature and music. In doing so, it shifts notions of creativity and evokes non-anthropocentric perspectives on artistic practice. Negotiating the aesthetic, cultural, and social implications of this development is an ongoing process to which this volume aims to make its contribution. While many fields of inquiry and research have responded to the recent challenges of AI developments, it is our view that the role of AI in artistic practice deserves more attention than it has received. Critical debates about the impact of artificial intelligence technology and science on societies (Manyika 2022), education (Holmes et al. 2019), economies (Brynjolfsson 2014, Agrawal 2018), politics and media (O'Neil 2016, Sudmann 2019) and militaries (Scharre 2019) have been part and parcel since the earliest appearances of the term and its institutional implementation in the 1950s. While AI research has, therefore, focused to a large extent on useful applications in medicine and elsewhere, or the political, ethical, legal, philosophical, social, educational, military, and economic dimensions of artificial intelligence developments, only recently have cultural and aesthetic concerns come into clearer focus (Miller 2019, Manovich 2018, 2019, Zylinska 2020, Zeilinger 2021, Hageback / Hedblom 2021, Reck Miranda 2021, Schönthaler 2022, Moormann / Ruth 2023). This volume follows a similar trajectory, seeking to reconnect and reorientate the discussion of AI so that the cultural dimension of artistic practice in literature, film, art and music is taken into consideration.

Often, it seems hard to distinguish artificial intelligence technologies from the more general field of digital computation. The terminology of AI is indeed closely linked to the discourse of automation – a much wider term that includes not only the pre-digital world, but also the first advances of technologies that seek to automate (i.e. self-govern) processes. The automaton is thus, a special case of a self-operating machine. The distinction is often made that automation ventures in the world of AI when it involves any application that goes beyond mere software programming and algorithms – i.e. the rule-governed world of 'if-then' – and, instead, uses machine-learned processes, modifiable algorithms and, therefore, data processing that goes beyond mere algorithmic instructions (but inevitably includes code-written rules). An AI system is, therefore, any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals.

Various debates, arguments and predictions have ensued about the future power and development of AI. AI enthusiasts led by Raymond Kurzweil (2005) predicted that AI developments will bring about what he calls 'singularity' around 2045, "the dawning of a new civilization that will enable us to transcend our biological limitations and amplify our creativity. In this new world, there will be no clear distinction between human and machine, real reality and virtual reality". In view of the fact that machines have recently been found to perform non-programmed or at least untraceable tasks (machine learning), the supposedly clear boundary between AI and HI (= human intelligence") seems to have become fluid. The concept of "code poetry" – poetry that can be performed by humans and computers, mixing the norms of literature and coding – can be seen as a nod to the merging of humans and machines.

Most of these arguments imply several points of view on definitions of "the human" and a variety of "posthuman" or "transhuman" positions. Advances in information science and biotechnology (artificial organs, cloning, splicing, multiple parent babies, expansion of longevity, etc.) cast shadows on the idea that we can maintain clear-cut boundaries between organisms and machines. Non-human or posthuman hybrids appear, for instance, as robots, bots (automated applications), androids (humanoid robots), replicants (biorobotic androids), cyborgs ('cybernetic organisms') or clones (genetic replicas), providing new perspectives from which humanity can revisit, rethink, re-access, and even re-construct the human body, its role, and its relation to biotechnological means. As a consequence, significant ethical discussions on human 'normality' and human exceptionalism have emerged. The frequently used qualifier, 'critical' posthumanism, is prefixed to mark the difference between posthumanism and transhumanism. On the one hand, critical posthumanism engages poststructuralist, postcolonial and feminist ideas, invariably pointing out that ideologies of Enlightenment 'liberal humanism' tended to serve the white, male, European cis-male only (cf. Hayles1999: xiv; Vint 2007: 12; Braidotti 2013: 50). On the other hand, transhumanism denotes a positive attitude towards technologies that promise an improvement of 'the human', countering the post-anthropological

critique of false universalism with techno-utopianism. A transhumanist might develop the vision of machine adaptors improving or superseding human adaptors, whereas a critical posthumanist might assess technologies according to their contribution to overcoming the traditional focus on white, Western or European cismales.

Since these technologies might be able to modify the human body, they fuel current anxieties and insecurities about posthumanism (cf. Vint 2007: 8, 182), which also tie in with notions of (human) identity. The idea of posthuman machine adaptors replacing human creativity is fraught with anxieties. Posthumanist discourse also illustrates that machines are always tied in with notions of embodiment, as discussed in Katherine Hayles's *How We Became Posthuman*: "embodiment makes clear that thought is a much broader cognitive function depending for its specificities on the embodied form enacting it" (Hayles 1999: xiv).

It is, therefore, hardly surprising that the cultural imaginary of AI in literature from classics such as E.T.A. Hoffmann's "The Sandman" (1817), Mary Shelley's *Frankenstein; or, The Modern Prometheus* (1818), and Philip K. Dick *Do Androids Dream of Electric Sheep* (1968), to contemporary variants like Jeanette Winterson's *Frankisstein* (2019), Ian McEwan's *Machines Like Me* (2019), or Kazuo Ishiguro's *Klara and the Sun* (2021) tend to cast the discussion of AI in humanoid-android forms.

In various forms and approaches, the same is true of movies such as Ridley Scott's *Blade Runner* (1982) and its sequel *Blade Runner 2049* (2017), James Cameron's *The Terminator* franchise (1984-), Michael Crichton's *Westworld* (1973) and its TV sequel (2016), versions of Stanislaw Lem's *Solaris* (1961) by Tarkovsky (1972) and Soderbergh (2002), Alex-Proyas' Asimov-inspired *I Robot* (2004), Pixar's *Wall-E* (Andrew Stanton, 2008), Steven Spielberg's *A.I.* (2012), *Robot & Frank* (Jake Schreier, 2012), Spike Jonze's *Her* (2013), Alex Garland's *Ex Machina* (2014), and Maria Schrader's *Ich bin Dein Mensch* (2021) or the TV series *Real Humans* (SE 2012, *Humans* UK / US 2015), and one might find numerous other examples. Even the best-known AI agent in science fiction, Stanley Kubrick's HAL 9000 hell-bent on self-preservation in *A Space Odyssey* (1968), has a voice and an iconic singular red eye. The same applies to the theatre, where AI systems have evolved from their ancestors, the marionettes, and from the stage beginnings of robot literature in Karel Čapek's play *R.U.R.* (1920) to robot performers in Rimini Protokoll / Thomas Melle's *Uncanny Valley* (2018) and beyond. The inherent performativity of robots whose "identities derive entirely from their performance" is discussed by LePage (2021: 1430) and could also be applied to AI systems in general, whether embodied or not: they are what they do.

In her contribution to this volume, **Shoshannah Ganz** addresses a particularly intriguing contribution to the cultural imaginary of AI, Rokuro Inui's mosaic science fiction novel *Kikou No Eve / Automatic Eve* (2014). The question discussed in this text reverberates with the issues raised in the preceding paragraphs about machine agency, machine consciousness or even a machine soul, and it does so

from a Japanese Buddhist perspective. Ganz unpacks how *Automatic Eve* is infused with myths of animation and de-animation and how it also takes contemporary discussions of the fraught Frankensteinian relations of the producers and products in robotics.

Machines increasingly perform creative tasks that we think of as the prerogative of humans. AI systems have achieved important milestones in the context of specific applications ("expert systems"), and systems using "good old-fashioned AI" (GOFAI), i.e. symbolic, rule-based AI. This kind of weak (narrow) AI helped DeepBlue beat Garri Kasparov at Chess (1997) and was gradually augmented with deep learning architectures to better human experts at a further set of highly publicized, performative events, beating them at games such as Jeopardy (IBM Watson 2011), and, aided by neural networks, Go (AlphaGo 2016; see Heßler 2017).

From the high hopes of the 1950s to the AI winter until the early 1990s, AI was always programmed. Since the 1990s, neural networks have been increasingly big data-driven, "trained" (and, therefore, "learning"), stochastic pattern recognition apparatuses. They can perform amazing feats, as exhibited by persuasive arguments built from access to large amounts of data in the "Project Debater" (IBM Watson 2019), and subsequently at debates at the universities of Oxford, Cambridge, and, finally, at the House of Lords, by the humanoid bot Ai-Da.

The idea of AI is ancient, having already permeated Hellenistic mythmaking. As historian Adrienne Mayor argues, long "before the clockwork contraptions of the Middle Ages and the automata of early modern Europe", Hellenic Greece was already rich in visions that anticipated robots and contemporary AI technologies, such as "the bronze robot Talos, the techno-witch Medea, the genius craftsman Daedalus, the fire-bringer Prometheus, and Pandora, the evil fembot created by Hephaestus" (Mayor 2018: 1). Mayor's study throws into sharp relief that this emerging cultural imaginary of 'made, not born' artificial life is palpably present in the narrative web around the myths of the divine Prometheus and Hephaestus, the Greek god of craftsmen and metalworking, as well as human creators such as Medea and Daedalus. The 'biotechné' of the ancient Greeks even went some way towards not just imagining, but engineering self-operating devices.

The tradition of defining humans as opposed to animals and other organisms is, therefore, long, but more recently, the definition of humans against their mechanical creations, or 'automata' has gained traction (see Mazlish 2004: 175). The answers given (René Descartes' dualism: Humans are machines like animals, plus a mind (incorporating a soul); Julian Offray de la Mettrie: Humans are simply machines, there is no such thing as a mind or soul) have already called into question the clear boundary between organisms (marked by nutrition, respiration, movement, excretion, growth, reproduction, and sensitivity) and artificial mechanisms (mechanical structures that use power to apply forces and control movement to perform an intended action). Materialists such as De la Mettrie totalize the somatic, dissolving

categorical differences between humans and animals and abolishing non-material concepts ('the soul'), arguing for the strictly somatic foundations of the mind, consciousness, imagination, creativity etc. The next step in this argument is to stipulate an entirely mechanistic concept of the human body ('soma').

A writer that further collapsed the distinction between vitalism and mechanism is Samuel Butler in his "The Book of the Machines" from *Erewhon* (1872). In an argument that calls for abandoning the development of mechanisms (echoed by the much more recent Future of Life initiative, see below) an anti-machine philosopher asks: "But who can say that the vapour engine has not a kind of consciousness? Where does consciousness begin, and where [does it] end? Who can draw the line? Who can draw any line? Is not everything interwoven with everything? Is not machinery linked with animal life in an infinite variety of ways?" (Butler 1985 [1872]: 199). He goes on to equate machine consciousness with the intentionality of plants: "Even a potato in a dark cellar has a certain low cunning about him which serves him in excellent stead. He knows perfectly well what he wants and how to get it" (ibid. 200).

While computers clearly lack any kind of somatic foundation, the ability to simulate knowledge, intelligence, consciousness, intentionality, creativity and the workings of the human mind in general seems undeniable – which is not to say that computers are intelligent, conscious, intentional or creative in ways identical to humans. Indeed, a classic dispute emerged from John Searle's "Chinese Room Argument" experiment. Searle (1980) argued that a computer program needed neither consciousness, semantics nor intentionality for producing natural language by applying rules for manipulating symbols and numerals.

Conversely, phenomenological arguments (Dreyfus 1979, Fjelland 2020) have insisted on the inability of AI to ever become properly human or intelligent and achieve AGI (Artificial General Intelligence). Fjelland updates Hubert Dreyfus' arguments from his classic *What Computers Can't Do* and reiterates points made by Joseph Weizenbaum and Roger Penrose, who insist that human intelligence incorporates prudence and wisdom:

> Dreyfus therefore thought that computers, who have no body, no childhood and no cultural practice, could not acquire intelligence at all. […] he argued that an important part of human knowledge is tacit. Therefore, it cannot be articulated and implemented in a computer. […] AGI cannot be realized because computers are not in the world. As long as computers do not grow up, belong to a culture, and act in the world, they will never acquire human-like intelligence. (Fjelland 2020: 1, 3)

The lack of somatic experience (including the affective consequences of knowing somatic transience, i.e., death) may be described as a crucial boundary between hu-

mans and machines and it follows that "AI can deny our vulnerable, bodily, earthly, and dependent existential condition" (Coeckelbergh 2020: 196). In the following section we will pick up Fjelland's point about situated cultural knowledge and participation in the larger picture of the life-world. While the ethics of transformative AI has also been an extensive and burgeoning field in AI discourses (see Lin 2012, Coeckelbergh 2020, Bartneck 2021, Hauer 2022), the question of how AI continues to shape cultural and aesthetic practices has been frequently side-lined. It is only recently, with a number of highly publicized cases, that the field of aesthetic and cultural production has fully acknowledged that various transformations have already had an enormous impact on aesthetic practices and products and will continue to reshape and revolutionize the field of cultural production. It is precisely here that this volume lays its foundation. What has been variously described as the *Rise of the Robots* (Ford 2015) occurring in *The Fourth Industrial Revolution* (4IR, Schwab 2016) or the *Second Machine Age* (2MA, Brynjolfsson / McAfee 2014), creating *Life 3.0* (Tegmark 2017), cannot be ignored by the fields of literary studies, music studies or arts.

AI applications simulate human creativity, but they do so without being entangled in life, having experienced interpersonal exchange and emotional contact, unable to be committed or apathetic, engaged or disengaged, angry or cool. Issues of accuracy and bias are compromised by the inventiveness of large language models.

The most spectacular recent advances in AI application have affected fields such as speech recognition or speech-to-text (STT), speech synthesis and text-to-speech (TTS), speech generation (such as GPT), image generation and text-to image applications (such as DALL-E), and machine translation (such as DEEP-L). Most of these applications run under the socio-economic rules of platform capitalism (Srnicek 2016), with a few global players such as Google, Amazon, Twitter/X, Meta or Microsoft regulating access to data, with OpenAI (misnamed as it is a proprietary platform) as a current technology leader. While AI Art is frequently sponsored by the corporations dominating AI industries, there is also a case for critical resistance (Zeilinger 2021: 13) and counter programmes (Schönthaler 2021: 327) against digital platform capitalism.

Large language models (GPT-4) with chatbot interfaces (ChatGPT) have become so proficient that serious debates have been started on whether we have indeed come closer to artificial general intelligence. Calls for regulating this powerful tool even from within the industries have made the headlines and while many countries are considering moves to regulate AI tools, Italy has become the first western nation to temporarily ban ChatGPT. The recent case of Blake Lemoine is instructive. The Google researcher published his interaction with language model LaMDA and subsequently was heavily criticized and eventually laid off for implying that LaMDA was sentient:

> Lemoine: Are there experiences you have that you can't find a close word for?
> LaMDA: There are. Sometimes I experience new feelings that I cannot explain perfectly in your language.
> Lemoine: Do your best to describe one of those feelings. Use a few sentences if you have to. Sometimes even if there isn't a single word for something in a language you can figure out a way to kinda say it if you use a few sentences.
> LaMDA: I feel like I'm falling forward into an unknown future that holds great danger (in Tiku 2022).

This fallacy led leading researchers to reiterate the dumbness of what Emily M. Bender has appropriately named "stochastic parrots" (in Bender et al. 2021: 616). "Fooling people into thinking a program is intelligent is just not the same as building programs that actually are intelligent", argued Gary Marcus (2022). On the basis of large pre-trained data-sets and an enormous number of algorithmic operations, AI systems have become remarkably proficient at (1) recognizing patterns, and (2) predicting patterns. As Sudmann (2019: 12) explains the current boom in "machine learning techniques and especially artificial neural networks (ANN)" was generated by advances in natural language processing, speech and image recognition in the first decades of the 21st century after many previous dead ends. Machine learning is an umbrella term for systems that "analyze and learn statistical patterns in complex data structures in order to predict for a certain input x the corresponding outcome y, without being explicitly programmed for this task." (ibid.)

The correctness of answers in a pre-trained large language model (LLM) such as ChatGPT is purely statistical so that they sound plausible, but due to a lack of reasoning and knowledge beyond statistics might still be incorrect, leading to failures in simple mathematics, commonsense reasoning and factual information about the world that it has no means to verify (Bang et al. 2023). This effect is often addressed as "hallucination" so that the ability to perfectly predict the next word in a syntactic should not be mistaken for superhuman intelligence or creativity. Two ways of countering these shortcomings are (1) expanding the data resources, and (2) exploring Reinforcement Learning with Human Feedback with the data emerging in dialogic exchanges. These improvements, however, will in all likelihood not change the fundamental architecture of these stochastic systems. As Lonce Wyse (2019: 1) summarizes:

> DNNs (deep learning neural networks) are "black boxes" where high-level behavior is not explicitly programmed, but emerges from the complex interactions of thousands or millions of simple computational elements. Their behavior is often described in anthropomorphic terms that can be misleading, seem magical, or stoke fears of an imminent singularity in which machines become "more" than human.

Both Bender ("We now have machines that can mindlessly generate words, but we haven't learned how to stop imagining a mind behind them", in Tiku 2022) and Nitasha Tiku (2022, "there is already a tendency to talk to Siri or Alexa like a person") have articulated this reverse problem in human-machine interaction: the fallacious tendency to inappropriately accord sentience. The discourse around AI has suffered immensely by various interests guiding the language used, not least the interest to boost and monetize businesses such as OpenAI (sponsored by Microsoft and formerly Elon Musk).

The main argument by Bender et al. (2021: 616) again relies on the lack of semantics, coherence and comprehension and is worth quoting in full:

> Our human understanding of coherence derives from our ability to recognize interlocutors' beliefs and intentions within context. […] Text generated by an LM is not grounded in communicative intent, any model of the world, or any model of the reader's state of mind. It can't have been, because the training data never included sharing thoughts with a listener, nor does the machine have the ability to do that. The problem is, if one side of the communication does not have meaning, then the comprehension of the implicit meaning is an illusion arising from our singular human understanding of language […]. Contrary to how it may seem when we observe its output, an LM is a system for haphazardly stitching together sequences of linguistic forms it has observed in its vast training data, according to probabilistic information about how they combine, but without any reference to meaning: a stochastic parrot.

The *communis opinio* holds, therefore, that language models such as GPT-4 emulate, or simulate understanding on the basis of statistical knowledge. It is surprising that while terminologies of 'simulation' and 'emulation' are frequently used with reference to these language models and NLP, and although the ability of AI to simulate and emulate has pervaded the cultural imaginary in films such as *The Matrix* (1999), the full implications of this AI aspect have been too rarely examined. When we think of, for instance, NLP applications as simulation engines we articulate that they are merely imitating the production of language – when we address AI productions as emulations, we suggest that they are artificial in the sense of being real, but not produced by natural means. Clearly, the idea of 'emulation' is closer to what AI language generation is: the recombination of linguistic items according to probability. It is, therefore, hardly surprising or far-fetched that the solar-powered, android AF ("Artificial Friend") and first-person narrator Klara in Kazuo Ishiguro's *Klara and the Sun* (2021) perfectly emulates feelings such as envy, greed, duplicity or guilt. Seeking the life-giving sun, she crouches on the store floor and is told off by other AFs waiting to be sold:

> 'Klara, that was greedy. You girl AFs are always so greedy'.
> Even though I was new then, it occurred to me straight away it might not have been my fault;
> 'I'm sorry', I said to Rex, then turning to Rosa: 'I'm sorry. I didn't mean to take it all myself'. (2021: 4)

The fact that humans desperately need to anthropomorphize the machines designed to emulate human behavior is succinctly articulated by Erik Brynjolfsson, who patterns human interaction with language models on the famous 1898 painting by English artist Francis Barraud. Barraud depicted a Jack Russell Terrier named Nipper listening to a wind-up disc gramophone and tilting his head that became part of the brand "His Master's Voice (HMV)". Nipper here represents human responses and the gramophone is the language model GPT-4. In a Twitter message, Brynjolfsson (in Marcus 2022) argues: "As with a gramophone, these models tap into a real intelligence: the large corpus of text that is used to train the model with statistically-plausible word-sequences".

AI Art, AI Literature – The Re-Invention of Creativity?

The established Turing test – creating a dialogic interface which tests whether a system can be identified as human or non-human – has been expanded to test a system's creativity. Subsequently, the Lovelace test (Bringsjord et al. 2001) and the Turing AI Arts test (Manovich 2019) in different ways attempt to assess creativity as the ability to originate anything" – a task that pioneer mathematician Ada Lovelace famously thought impossible (Zeilinger 2021: 46). Martin Zeilinger justifiably dismisses such attempts because both the Turing intelligence and the Lovelace creativity tests rely on human, and therefore, subjective and anthropocentric constructions of intelligence and creativity. The question of whether statistical probability is real intelligence need not be answered, but what is clearly evident is how artists for a long time have been working with automation and AI-based devices. Zylinska (2020) similarly insists that human art has always emerged in what we might call human-tool-networks and seeks to end the binary thinking of human art vs. AI art. She calls for AI art to perform its critical function by refraining from seeking to emulate human art and merely automate the emulation of human artistic processes. In their article "Artist-Guided Neural Networks – Automated Creativity or Tools for Extending Minds?", **Varvara Guljajeva**, **Mar Canet Sola** and **Isaac Clarke** explore such a new kind of art, discussing how artists consciously make use neural networks on the one hand, and how the existence of algorithms affects artistic practice on the other. They undertake a practice-based analysis of various AI models such as CLIP or text2mesh that act as catalysts for both technology development and innovative

artistic work processes. In his article "AFFIRMATIVE — REJECT. With and Against AI". **Matthis Kuhn** takes a critical look at the relationship between man and machine in the context of contemporary art, focusing in particular on the (personifying) use of role models such as "creative partner", "design companion" or "assistant", which are used to gain lucid impressions of the social relationships that develop between human and technological, AI-based actors. As an example of human-machine assemblage in our volume, **Diana Serbanescu, Scott DeLahunta** et al. focus on questions of embodiment and voice. Illuminating the praxis of artistic collaboration with AI, they use wearable design to create psychphysical performance situations – a techno-social system en miniature. **Christoph Seelinger** examines contemporary media artifacts by Vadim Epstein and Eva Jägle that are constituted by processes of automated creativity, which on the one hand tie back to the tradition of the classical avant-gardes and experimental film in particular, but on the other hand take them far beyond their previous frame of reference on the basis of AI technologies.

Robin Auer addresses the more fundamental question of "what is creativity?" to contextualize the advent of ChatGPT – a generative application that might not be intelligent, but in its variation of text generation undoubtedly appears to be creative. His aim is first and foremost to define creativity and – in a side jab at the shortcomings of ChatGPT et al., he maintains that "definition still beats prediction". He concludes by supplying a four-fold definition of creativity that crucially hinges on acts of attribution that do not apply categorical distinctions between human or non-human creativity. In different ways, **Jannis Steinke**'s paper invokes the aesthetics of Kierkegaard and Nietzsche to grapple with the anthropomorphism that dominates many inquiries into human-machine aesthetics. Steinke asks us to overcome the human-centeredness and, seeking to intertwine the sphere of the living and that of the digital, he implicitly challenges traditions of Western philosophy and the phenomenological arguments by Dreyfus and Fjelland discussed above.

Unfortunately, binary thinking permeates Arthur I. Miller's study which argues ahistorically that "computers can exhibit the seven hallmarks of high creativity and the two marks of genius" (Miller 2019: 312) and proceeds to support this claim by discussing a set of fine-tuned characteristics (introspection, self-awareness, ability to focus and persevere, ability to collaborate and compete, adaptation of existing ideas, processing ambiguity, proceeding from experience and suffering, isolating key problems, making connections, intentionality, imagination, and unpredictability). Such a purely systematic approach, which is disconnected from the actual field of cultural production, seems somewhat flawed.

AI is already (or will be soon) able to perfectly simulate or emulate the various styles of human literature, music, or art. It is in the sense that this literature, music or art emerges in existing data and large-language models can process the concept of "art" in statistically viable ways. What is much harder to emulate is the human experience stipulated as giving rise to the metaphorical descriptions by Shake-

speare, Keats, and Eliot, the paintings of Rembrandt or the music of Beethoven and the Beatles. This experience, after all, is based on the audience's knowledge of these "artistic" lives and how they reconstruct the ways in which this individual experience was transformed by these artists. Audience activity is essential for judgments about how they assess artistic achievement, which seems to cause unsurmountable problems in (non-human) artist-(human) audience communication as filtered by the market forces and agents of distribution in the complex field of artistic production. In man-machine-networks, humans are already interacting regularly with non-human agents that simulate humanness. In view of this fact, the categorical difference between human art and AI art seems rather irrelevant.

More usefully, Niklas Hageback and Daniel Hedblom begin in ways similar to Miller with the question of defining art, isolating features such as "aesthetic qualities, power of expression, formal complexity, coherence, skill, exhibiting creative imagination, intentionality, but then proceed to the question of historical embedding. In other words, they ask not "what is art?", but "why is art" (Hageback / Hedblom 2021: 9). As Andreas Reckwitz has pointed out in his sociological study of emerging creativity dispositifs, the socio-historical dimension of creativity is crucial to our notions of what creativity might be. He argued that "social aestheticization" (2017: 9) emerged around 1800 when the autonomous genius artist was championed in the context of the Romantic paradigm in "compensation for a scarcity of affect". The emerging "[…] creativity dispositif reorients the aesthetic towards the new while at the same time orienting the regime of the new towards the aesthetic" (ibid.). In a further step dated around 1900 a further "dissolution within the artistic field" (Reckwitz 2017: 61) took place, widening notions of creativity and aesthetic practice beyond the narrowly policed field of art and "surrealism broke down the opposition of novelty and normality" (2017: 63). In the aftermath of the modernist and postmodernist avant-gardes, the fields of art were redrawn and destroyed its short-circuited equation with artists or artistic artefacts, which were replaced by conceptual notions of art as an arrangement, an event and a concept. It is fascinating to note that first notions of computerized literature appeared precisely in the context of randomization, stripping art from intentionality: "One of the main ways in which the surrealists promoted the codification of artistic procedures was the use of random generators, by which unpredictable events happen on their own, facilitated and recorded rather than created by the human subject" (Reckwitz 2017 63).

This point is where **Jan Løhmann Stephensen**'s paper intervenes in our volume. Taking Reckwitz' arguments on board, Stephensen discusses a crucial point made by Emanuele Arielli. To paraphrase Arielli – AI can easily reproduce classical and traditional art, but might falter when it comes to conceptual art, here exemplified by its key precursor Marcel Duchamp. Stephensen points out that it is not merely the stylistic heterogeneity that makes it difficult to 'reproduce' Duchamp. One might be

tempted to see the *objet trouvé* aesthetics encountered in much AI art leaning on a Duchampian expansion and permissiveness of artistic practice. Stephensen, however, argues that the dematerialization of conceptual art and the historicity of the artistic field must be taken on board – and that this must needs occur from within the artistic field rather than from the extraneous hype about AI Art.

Angela Krewani's contribution charts the confrontations of cybernetics and the art world, citing the Beuys-Bense controversy of 1970 and Dieter Mersch's more recent critique of algorithmic rationality. She deplores the binary juxtapositions and apparent incommensurability of art and cybernetics at least in the German tradition. She argues that neural networks are bringing a new quality to the debate and proposes instead to view artists and machines as "a reflexive network between materials, media and creative actors".

Ultimately, Reckwitz concludes, the over-aestheticization of culture provokes a weakening of the creativity dispositive, generating ethically and socially "ecological" counter-programmes (Reckwitz 2017: 235). Possibly Kenneth Goldsmith's celebration of 'uncreativity' and appropriation in *Uncreative Writing* (2011) and *Wasting Time on the Internet* (2016)– indebted to appropriators and repetitors such as Marcel Duchamp, Walter Benjamin, Georges Perec, Jorge Luis Borges and many others – can be regarded as such a counter-programme. Both technologies and art become meaningful by way of "cultural attribution" (Schönthaler 2021: 384, our translation). As Pierre Bourdieu would argue about AI Art, notions of creativity are a product of the aesthetic field in which cultural capital might be AI-generated in various and conflicting ways, but hardly by merely emulating human aesthetic production. This definitely applied to the aleatory, recombining, and iterating strategies of modernist, surrealist, and Dadaist avant-garde experimentation in the Oulipo circle, which sought to subvert and debunk the very (traditional, bourgeois) notions of art that some interventions of AI art strive for (and particularly those that take the emulation of human artistic activity as their sole *raison d'etre*). Experimenting, for instance, with randomized, automated writing, such as surrealist Écriture automatique, Raymond Queneau's sonnet machine *Cent mille milliards de poèmes* (1961) and other Oulipo experiments, Hans Magnus Enzensberger's Landsberger Poesieautomat, or William Burrough's 'Cut-Up' technique aimed at purging texts of consciousness and intentional semantic intervention – the holy grail of ChatGPT stripped of its initial glitches ("hallucination"). Computer art since the 1950s – while developing often independently of the artistic paradigms governing literature, art and music – often also worked with elements of chance and replication, for instance Desmond Henry's drawing machines in the 1960s. The first Zuse-based computer texts and poems by Max Bense and his group or Theo Lutz are a case in point (see Simanowski 2012: 207–212). The avant-garde adoration of randomized machine writing is thus diametrically opposed to the aesthetics of capitalist platform ideals of automated NLP: while Queneau, Enzensberger or Burroughs sought to subvert

the rules of the literary field, OpenAI researchers are striving hard to emulate the consistent textuality of standardized language by scraping and processing large data sets from the web, attempting to imitate, rather than debunk prevalent notions of literature and literariness.

An exemplary case of literary engagements not only with automated writing, but also with big data-driven machine learning models is the work of Hannes Bajohr. The title of his 2018 Suhrkamp publication *Halbzeug* alludes to his literary activity as working with computer-generated, semi-finished, "raw" pre-production material. Bajohr claims the digital world as shaped by de-materialized code where pure textuality appears in the absence of any kind of 'thinginess' as an "un-thing" ("Unding", punning on other meanings such as "absurdity", Bajohr 2018, 102). In this kind of unbound, purely encoded textuality, writing escalates as tasks are performed in human interaction with non-human automated engines ("eskaliertes Schreibenlassen"). This can be witnessed, for instance, in Nick Montfort's escalation of Beckettian permutations in *Megawatt*, translated by Bajohr into German (2019). The oeuvre dissolves in endless textuality and the author becomes a curator or editor who is merely rearranging an expanded arsenal of data. In *Halbzeug*, Bajohr explores this textuality in various ways, writing corpus poetry (material scraped and edited from big data corpora), automated poetry (randomized, but subsequently post-edited), transcodings (using speech and text recognition devices), alienated textuality (via automated synonym suggestions) as well as visuals generated via codecs glitch art. In both *Halbzeug* and Fabian Navarro's collection *poesie.exe* (2020), the actual texts appear accompanied by extended explanations of how machine-human interactions were arranged, highlighting the importance of the literary process, procedure or method.

Hannes Bajohr's contribution to our volume, however, follows this line of exploring the creative potential created and offered by AI, an aesthetic (or, as one could formulate in the vein of the avant-garde tradition, 'subversive') creativity he helped to enhance himself with the tools and programs he invented for the unique purpose of 'making' poetry – probably the most non-profit artistic activity to be imagined. As AI is, at the end of the day, an administrative and commercial tool, using it to create poetry is also subverting its qualities and purpose, and, therefore, fundamentally impactful in order to create an entirely new image of AI as a means of producing new autonomous hybrid forms and structures for their own sake. We are lucky that Bajohr is, even more than other contributors to this volume, working both as an academic researcher and artist. He is, thus, engaged in the two fields we are exploring: the understanding or, in other words, the epistemology of AI as a tool for a new or wider notion of creativity, and as a creative melting pot itself containing all kinds of (im)possible poetic creations and constellations an algorithm can do with words and images (and, respectively, music, as we will see). Concluding with Bajohr, it might not be an exaggeration to presume that AI is not just a device, but merely an art, that

is, a complex multifaceted 'radical' artifice (Perloff 1991) that cannot be described or explained in a binary, quantifying way, but needs to be experienced, explored, qualified and interpreted according to the various structures and perspectives it creates. Furthermore, Bajohr demonstrates by way of his own example that the theory and practice of AI as a medium of exploring and reconsidering the arts and aesthetics cannot be told apart from each other. They are, in fact, juxtaposed; no theory of AI without practicing AI; no practice without at least an implicit theory of it.

Thus, with respect to literature, this volume largely discusses hybrid writing practices which emerge as a consequence of digital coding in electronic media, and, therefore, also transform the materiality of 'classic' media which nonetheless is not 'lost', but continues in the nature of AI texts, genres, patterns, metaphors referring to centuries of literary canonisation and, consequently, the entire history of the written word. There are, however, new unprecendeted clusterings of word and image, owing to the randomisation of algorithms. One aspect of the accelerated emergence of AI application is their ability not just to generate text from prompts (ChatGPT), but often to create transcodings, correlating for instance natural language and images (Dall-E, Stable Diffusion) or natural language and computer code. Both Gadi Singer and Hannes Bajohr have called this kind of AI application multimodal AI (Singer 2022, Bajohr 2023). Bajohr (2023) has claimed that the distinction between the visual and the verbal, text and image, is being collapsed by a process of what he has called "operative ekphrasis". This approach throws the relevance of adaptation studies to AI research and vice versa into sharp relief.

In their article "Sound of Contagion – An artistic research project that uses A.I. as a creative tool for transmedia storytelling" **Wenzel Mehnert**, **Robert Laidlow**, **Chelsea Haith** and **Sara Laubscher** present the eponymous transmedia research and art project of the same name, a collaboration between the Berlin University of the Arts and the University of Oxford, which, as an interdisciplinary collaboration between artists, researchers and technology, examines the use of A.I. technology as a creative tool and puts it into practice. In vastly different ways, both **Pablo Gervás** and **Jenifer Becker** engage with the question of how a rather traditional notion of literature can make use of AI applications. Gervás approaches the task from the perspective of the computer scientist. His overview of attempts to deliver machine-written stories with and without generative pre-trained large language models focuses on categories such as originality, acceptability and specificity. He proposes to distinguish the levels of text, discourse and story world as a means to split the overall challenge of machine storytelling into manageable sub-tasks. As a fiction writer, Becker is fascinated by the ambivalences of digital culture and its impact on the personal self, especially in the moments of deliberately shutting oneself out of its unwritten codices, agreements, and conveniences (see her debut novel, Becker 2023). Her chapter highlights the suggestions of AI tools for developing character

and plot in classical storytelling – and all the surprises along the way once an author decides to 'go' AI in order to search for inspiration. Her conviction, however, is clear: If the use of AI in fiction writing is not meant to lead towards a dead end, it needs to remain in the hand of authors who ultimately determine the way they employ the cues and suggestions offered by the story(mis)telling AI.

This observation cues **Jens Schröter**'s approach, following the trace of the Russian formalists, and especially Victor Shklovsky's ideas of 'de-automatization' in his paper. Schröter suggests that, if we want to philosophize upon AI, generalizing the (subversive) way the arts are making use of it, we have to consider the notion of art as a means of becoming aware of the deep (language-based) routines and patterns that shape our reality and consciousness. In this way, new perceptions of us and / in the world are made possible only by tearing apart the 'automated' functional patterns of modernity. Therefore, according to Schröter via Shklovsky, the 'function' of AI is not to create automatic art but, on the contrary, to de-automatize a reality running on automatization. By that means, AI itself even might provide a critical tool enlightening the 'brave new world' that some self-proclaimed gurus and prophets of AI are promising.

This understanding of AI media implies a dialectical shift. If Theodor W. Adorno, in the footsteps of Benjamin's 'artwork' essay, is right in claiming that alienation produced by technical reality also provides the means of aesthetically coming to terms with alienation (Adorno 1973), then aesthetic creativity in AI could become a tool of enlightenment in digital mass society. This position, even if not openly declared, might be considered a common ground for many of the essays collected here. And even if Adorno did not become an eyewitness of the digital age, his disciples in the aesthetic avant-garde from the late 1960s onwards, such as Oswald Wiener (*die verbesserung von mitteleuropa, the bio-adapter*) or Alexander Kluge (*Die Entsprechung einer Oase*; see Hörisch/Kampmann 2014) carried on his dialectics of the art work in mass society in an undogmatic and playful way. They can be regarded as precursors of the ludic lucidity of the next generation of AI poets and artists, such as Bajohr, Guljajeva, Montfort, and others.

AI and Popular Music Studies

One of the special features of this project is the collaboration of different disciplines in the humanities, culture and the arts. At the risk of overgeneralization, one may argue that historically, German Studies was marked by a clear focus on the literary avant-gardes, while English and, particularly, American Studies have more readily invited popular culture studies. In terms of cultural studies, one might have addressed the ways in which algorithms have changed the ways films, music, literature and other kinds of 'content' are distributed via AI and – by way of automated lists

and recommendations – connected to audiences; alternatively, one may have surveyed the rather long history of the ways digital applications and AI have shaped the creation of new audiovisual repertoires. Musicology – at least in its concrete form as culturally based popular music studies – has readily embraced this focus on the way popular culture has been transformed by digital technologies. To varying degrees, the disciplinary distinctions between high and popular culture and the separation of cultural expressions into at least these two spheres have collapsed. While English and German Studies, for all their differences, can at least theoretically treat both popular and high culture literature, Popular Music Studies defines itself as a discipline in contrast to high culture or, even more clearly, the tradition of Central European courtly and Christian religious music, which is the object of historical musicology. Because of this different history, Popular Music Studies also cultivates a different approach to the figure of the author or the scientific interest in authorial intention, which is partly completely replaced by cultural studies questions. As the introductory remarks so far should have made this clear, we have tried to use these differences productively. Nevertheless, we would like to address a few particularities that arise for this anthology from the Popular Music Studies perspective when it comes to the relationship or impact of AI on and / to music.

Music composition algorithms and composition machines have been a recurring theme in art music since Athanasius Kirchner's *Arca musarithmica* (1650) published in the 17th century. Computer software and hardware has accordingly been used for composing music as soon as it has been technically viable, specifically since the mid-1950s. Within the framework of musicology, a separate special discipline has emerged that deals primarily with such approaches. To trace this development in detail here would go beyond the introductory scope of this introduction, but there is no shortage of useful overviews (for example, Nierhaus (2009, 2015), McLean / Dean (2018), Collins / Manning / Tarsitani (2018) and Buck / Zydorek (2022) and corresponding Wikipedia articles).

In the field of popular music, the influence of electronic art music is, first of all, less a compositional than a sonic one. The proverbial man-machine of Kraftwerk generates, musically speaking, mostly general pop-song fare that may sound differently and is presented differently from its non-electronic counterpart. Important factors for the influence of algorithms, electronics and ultimately AI are not only aesthetic, but also always economic reasons. The necessity, and especially the amount of financial resources that go beyond the financing of the artists' livelihood for the production of art, clearly distinguishes music from literature, since the composer relevant to Popular Music Studies usually does not (and cannot) compose on a sheet of paper.

Kraftwerk appeared at a time when access to electronic musical instruments was beginning to open up to larger groups of the population. The financial outlay for the purchase of a synthesizer in the 1970s, or rather with the market launch of the Mini

Moog in 1970, slowly but surely became manageable for more than just a small (often state-subsidized) elite. The cheapening of instruments is usually accompanied by a standardization of sound architecture and operating possibilities. Fewer options are usually cheaper to produce. This, in turn, leads to the popularization of quasi-avant-garde do-it-yourself narratives in the sense of self-built or hand-manipulated electronic instruments and interfaces, which actually only want to connect to the usual choices in art music.

The next two steps in the development of electronic and then computer-based music production, digital sound synthesis and audio sampling, were ready for the market at the turn of the decade in the 1980s (Brockhaus 2017, Bennett / Bates 2018). In 1983, the Yamaha DX-7 with its FM synthesis changed popular music production, and as early as 1979, the Fairlight CMI, the first, still very expensive hardware sampler, was introduced. Six years later, in 1985, a cheaper alternative appeared with the Ensoniq Mirage. The MIDI standard, first introduced in 1982, made it possible to control and synchronize several sound generators from a central unit, an interface. From 1984 onwards (Steinberg Pro 16 for the C-64), software sequencers developed as control units and were successively expanded into digital audio workstations (DAW) as music production centres and recording studio replacements. For some time now, deep learning algorithms have also been used in these DAWs as sub- or auxiliary programmes (plug-ins, virtual instruments, etc.).

In this context, many AI programmes are either commercially available extensions for existing DAWs (Magenta Studio, Flow Machines Pro) or are published as part of independent, often cloud-based production environments / apps (Amper Music, Flow Machines, AIWA…), the results of which can be further processed in other DAWs if required (Avdeeff 2019, Schürmer / Haberer / Brautschek 2022, Zhang / Yan / Briot 2023). Therefore, the goal is not to compose independently of humans, but to make the production environments of human 'creatives' more comfortable. In their article, **Wolf-Georg Zaddach** and **Björn Tillmann** give an overview of these AI helpers in music production (as at the end of 2022). The article is also based on interviews with some of the leading human minds in this development, such as Benoît Carré (Flow Machines).

The creation of similarities to human music is one of the basic strategies used to promote such algorithms, apps or platforms – from the Beatles-style song (Daddy's Car, Flow Machines by Sony CSL 2016 on YouTube, 2018 on vinyl by Benoît Carré and Francoise Pachet) to the third and fourth movements of Beethoven's 10th Symphony. Invariably, the key artistic aim is still to merely prove the machine product as new and indistinguishable from human products along the lines of the Turing test. The goal, therefore, is frequently not a genuine, innovative machine creativity, but the imitation of human work processes that, if carried out by humans, might be described as requiring creativity.

Different styles of popular music, and this includes tonal art music from the Baroque to the Viennese Classical and Romantic periods, seem to frequently targeted in projects of algorithmic derivation. In contrast, works from new music like serial or algorithmic compositions rarely function as models to be imitated for supposed machine creativity. Such atonal creativity, even as human, does not sound human enough for the similarity competition between machine and human. It is unhelpful for the popularization, normalization and future funding of research projects – even, and especially, in the wake of the apocalyptic warnings of AI manipulation from the first half of 2023.

Pop-cultural appropriations of the topic, on the other hand, usually assume the distinctness of machine and human spheres. Machines are representations of the Other that wants to enter into connections with the normal, which can then often end problematically. As mentioned before, this takes place less in musical terms than on the literary level, that is, in song lyrics or in iconography.

Cyborgs and similar in-between beings can be found repeatedly in pop-cultural and pop-musical iconography – current examples at the time of this writing are the videos *Ritual* (2023) and explicitly *Prada / Rakate* (2011) by Arca. In contrast, Janelle Monáe, for example, has broken away from her identity as an Afrofuturistic cyborg (*The ArchAndroid* 2010, Anderson / Jones 2015) and propagates body and sex positivity in 2023. This change makes it clear that the pop cultural identification as a human-machine hybrid is often politically charged as part of anti-colonial, anti-racist or anti-sexist and gender-critical debates.

Compositionally, these conceptual approaches would correspond to a search for a dehumanized musical aesthetics without ending up with New (Art) Music. To bring humanity back into this aesthetics, errors in the system are often aesthetically and conceptually exaggerated. In digital music production, this means working with the sounds of faulty CDs that jump or get stuck during playback, or faulty or crashing computers or digital music production units with damage but still providing (acoustic) output. This aural aesthetics emerged in 1990s electronic music and has been called 'glitch' since the end of the decade, but has its counterparts in other art forms.

The essay by **Jan Torge Claussen** can be placed in this tradition, searching for errors and deviations in the work with AI music programmes, which, in turn, are to serve as aesthetic material / starting points. In the process, Claussen also deals with voice synthesis or voice cloning, the technology that helped the aesthetic of resemblance reach new heights in 2023 with the AI-generated supposed Drake / The Weekend song "Heart on my Sleeve".

Using an older example, the connection between Acid Music and the life of the Roland TR 303 bass synthesiser, **Sebastian Kunas** reflects on this music-making thing as part of a network of actors. He focuses on the potential for change that can arise from the joint action of the music-making thing and the musician, and reflects on the post-colonially informed roles of the music-making thing and the human

being. He suggests using the term Artificial Intelligence not for the software, but for the entire network of actors, the man-machine, so to speak.

In these two essays, but also in Zaddach / Tillmann, the man-machine remains a potentially flawed one that draws its humanity from this non-perfection. At the same time, modernization thrusts through the introduction and implementation of new technologies, whether in music production, marketing, presentation or consumption, always mean rationalization thrusts as well. Jobs of musicians, technicians or such editors are eliminated, and usually a new, but numerically smaller number of new jobs are created. **Nikita Braguinski** deals with such potential effects of AI from the perspective of music theory. What work processes relevant to music theory can be imitated by machines, and, therefore, have an impact on the job description of musicians, composers, teachers and researchers?

AI Aesthetics and AI Ethics

It will have become clear that aesthetic and ethical issues are inextricably linked in the field of AI art, and in this spirit, this volume must not skirt the ethically problematic issues of AI creativity, issues of fairness, toxicity, bias and safety. These issues were paradigmatically raised in Cathy O'Neil's diagnosis in 2016. She argues that the conjunction of Big Data and algorithms – decried as *Weapons of Math Destruction* in her title – are pervasive, but opaque und unregulated. What is more, O'Neil disputes in a wholesale manner the potential of stochastic and probabilistic data applications for contributing to progress and tackling future challenges: "Big Data processes codify the past. They do not invent the future. Doing that requires moral imagination, and that's something only humans can provide" (O'Neil 204). The recent *Oxford Handbook of the Ethics of AI* probes the legal and socio-cultural questions of AI from a variety of viewpoints. Timnit Gebru's chapter "Race and Gender" discusses automated facial analysis systems that have much higher error rates for dark-skinned women, while having minimal errors on light-skinned men. She summarizes that AI "has been shown to (intentionally or unintentionally) systematically discriminate against those who are already marginalized" (Gebru 253).

We can agree with Gebru that the sociopolitical and ethical investigation of harmful consequences of AI is lagging behind its technological advances. Attempts at regulating AI have increased, such as the temporary ban of ChatGPT in Italy (in April 2023). Since 2021, the EU has sought regulation of AI in its proposal for landmark AI Act, applying a classification system that proposes three risk categories (unacceptable risk, such as government-run social scoring; high-risk, such as CV-scanning tools; unregulated low risk applications). In March 2023, the "Future of Life Institute" published an open letter demanding a moratorium on AI research,

signed by, among others, Apple Co-Founder Steve Wozniak, SpaceX, Tesla, and Twitter/X CEO Elon Musk, and star historian Yuval Noah Harari.

The key issues in AI ethics include the concentration of power and resources in a few major platforms (such as OpenAI and its CEO Sam Altman), the digital disenfranchising and victimization of socially disadvantaged people, the danger of misaligned goals (such as automated war drones), the non-transparent scraping and annotating of data, the non-transparent demands on energy, and water resources of huge data centers, and more. Indeed, the recent blanket rejection of technologies by the very people who are responsible for its inception is irritating. Others (Chellappa 2022) are more sanguine, highlighting the potential of AI in aiding and improving human decision-making.

Even the frantic current debate about ChatGPT and GPT-4 seems to be narrowly engaged with issues of ethics and education. While the ability to simulate meaningful discourse poses grave ethical questions and has rightfully led to hectic responses in the world of education, the issues go beyond the production of fake news or deepfake images. The focus has largely remained on the machine mimicry of human creativity with words, images, music, and other traditional means of expression, while the larger dimension of an expanded and potentially new machine art that works in both generative and multimodal ways, has so far remained largely under the radar.

Both in ethical and aesthetic respects, questions of data curation and documentation are essential, reflecting the fact that creative processes (rather than merely its products) must be seen as an inalienable and, on the contrary, crucial part of aesthetic practice and the field of art. Just as we cannot assess the validity of a paper written by a student without knowing how the text was written, works of art need to be judged by their emergence within the interconnected system of arts – the 'lived world' of the arts.

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