Colorear por números

Förster, Yvonne

Published in:
Arbor

DOI:
10.3989/arbor.2021.800004

Publication date:
2021

Document Version
Verlags-PDF (auch: Version of Record)

ARBOR Ciencia, Pensamiento y Cultura
Vol. 197-800, abril-junio 2021, a602 | ISSN-L: 0210-1963
https://doi.org/10.3989/arbor.2021.800004

PAINTING BY NUMBERS: DIGITAL TECHNOLOGY AND THE ART OF LIVING

COLOREAR POR NÚMEROS: LA TECNOLOGÍA DIGITAL Y EL ARTE DE VIVIR

Yvonne Förster
Shanxi University Taiyuan (China)
Leuphana University Lüneburg (Germany)
ORCID: 0000-0002-5174-3256
yvonne.foerster@gmail.com

Cómo citar este artículo/Citation: Förster, Yvonne (2021). Painting by numbers: digital technology and the art of living. Arbor, 197(800): a602. https://doi.org/10.3989/arbor.2021.800004

Recibido: 21 febrero 2021. Aceptado: 11 mayo 2021.
Publicado:

ABSTRACT: The digital relies on computation. Programming uses algorithms. Algorithms are sets of rules that solve problems in a finite number of steps. In this sense, the digital world is governed by quantities, numbers, fixed rules. The degree of freedom seems to be very limited. Artistic agency and creativity, on the other hand, rely on openness, freedom, and qualitative experiences. Such experiences are not only vital to artistic expression but also to everyday life. Technological life-worlds as they are represented through current technologies (e.g. smart homes or automated driving) and science fiction do not seem to accommodate such open structures. The philosophy of technology is divided: Many hold that to a large extent technology determines human cognition (such as Mark B.N. Hansen, Bernard Stiegler) and thus subordinate human cognition to mechanical organizations. Others take a different approach and reflect on the creative potential of new technologies (e.g. Erin Manning, Jaime del Val).

This article discusses theories that address the human-machine relationship as complex structures that go beyond the dystopian idea of humans being transcended or incorporated by technology. Such approaches are central to the discussion on the future of human beings and cultural-political shaping of life-worlds. To understand how human-machine relationships can be framed as open and creative processes, I present epistemological accounts of embodied cognition, artistic examples of performance strategies with algorithmic set-ups, and finally embed these aspects within a broader picture of conceptualizing technology and human life as a continuum rather than standing in opposition or being determined by the other.

KEYWORDS: Technology, Artificial Intelligence, experience, phenomenology, art.

RESUMEN: Lo digital descansa en la computación. La programación utiliza algoritmos. Los algoritmos son el conjunto de reglas que resuelven problemas en un número finito de pasos. En este sentido, el mundo digital está regido por cantidades, números, reglas fijas. El grado de libertad parece muy limitado. Por el contrario, la actividad artística y la creatividad descansan en la apertura, la libertad y en experiencias cualitativas. Estas experiencias no solo son vitales para la expresión artística, sino para la vida cotidiana. Los mundos-vitales tecnológicos tal como se representan en tecnologías actuales (por ejemplo, en las casas inteligentes o en la conducción automática) o en la ciencia ficción no parecen dar cabida a estas estructuras abiertas. La filosofía de la tecnología está dividida: muchos sostienen que la tecnología determina en gran medida la cognición humana (como Mark B. N. Hansen, Bernard Stiegle) y, consiguientemente, subordina la cognición humana a las organizaciones maquinales. Otros adoptan una aproximación diferente y reflexionan sobre el potencial creativo de las nuevas tecnologías (Erin Mannig, Jaime del Val).

Este artículo discute teorías que abordan la relación humano-máquina en tanto que estructuras complejas que van más allá de la visión distópica del ser humano siendo trascendido o incorporado por la tecnología. Estas aproximaciones son centrales para discutir el futuro del ser humano y la conformación político-cultural de los mundos vitales. Para entender cómo las relaciones humano-máquina pueden considerarse como procesos abiertos y creativos, presento narrativas de cognición corporalizada, ejemplos artísticos de estrategias de *performance* con sistemas algorítmicos, y finalmente engarzo estos aspectos en un panorama más amplio sobre la conceptualización de la tecnología y la vida humana como un continuo, en vez de una sostenida oposición o un estar determinado por el otro.

PALABRAS CLAVE: Tecnología, inteligencia artificial, experiencia, fenomenología, arte.

1. INTRODUCTION

The digital relies on computation. Programming is done through algorithms and algorithms are sets of rules that solve problems in a finite number of steps. In that light, the digital world is governed by quantities, numbers, fixed rules. That reminds of the image I used in the title –painting by numbers. Painting by numbers is a thing we know from children's books as a way to keep them busy, maybe teach them something about how to draw with colors. It does however also exist for adults as a means to engage with art, to imitate artworks. Such practices of guided creativity or life hacks are very popular in times where there is an app for literally anything. There is a tendency in contemporary life to trust the senses and embodied cognition less than digital measurements: Cars park themselves, calendars send out alarms for each activity, electric cookers cook meals by themselves and fridges order food. One could go on and find innumerable examples where human skill has been replaced through technology. The overall presence of quantitative thinking is problematic for human creativity in a larger sense, namely the active engagement with technologies and a productive form of critique. My aim is a phenomenological reflection of technological affordances in applications today and the possibilities of creating more holistic technologies through engaging with artistic practices. The idea is to envision applications that are designed as environments which solicit much more holistic forms of agency than our contemporary screen culture does. My concept of art as a means of reflection on technology draws on Maurice Merleau-Ponty's phenomenological account of art as making invisible foundations of experience visible or perceptable. Even if his theory mainly considers painting, I argue that especially new media art and performance art have the potential to reflect on human-machine relations in productive ways.

Three essential forms of human engagement in technological life-worlds seem to fall short of affordances, of interesting solicitations for agency and engagement here:

1. Qualitative first-person experiences: Even though first-person experience is a necessary aspect of human consciousness and cannot be canceled out by machine culture. Today most technologies are designed to make life easier and function in a preemptive way. That leads to a reduced trust in one's own intuition or gut feeling, if you will. Also, perception of bodily and emotional states is often delegated to sensing devices such as smart watches or other wearables. Thus, qualitative first-person experience can be viewed as being functionally replaced machine agency when it comes to decision making and many other kinds of skill based human agency. This also holds for example in the case of artificial intelligence used in recruiting or decision making processes in credit institutes.
2. The sense of agency: This is the experience to exert causal force or to change something, which is vital for humans to establish a personality. With the ubiquity of standardization and normization as well as automation and the growing field of machine agency, the experience of being an agent in human risks to being reduced to less meaningful fields. This is follows from the reduced trust in one's won perception and hence first person experience.
3. Creativity: Creativity becomes problematic in the context of digital technology because of the tendency to replace the active use skills by more or less passive reactions. I am not making any claims here for the nature of artistic production. My interest lies in the everyday use of creative digital tools like Instagram, Photoshop or social media platforms. I do not view them as endangering creativity, rather my aim is to look at them from a performative view point (Coeckelbergh, 2020). From such a perspective, everyday creative engagements tend to become more and more limited to choosing between option (like filters for images) instead of production or active creation of things. We can draw an analogy to this view by looking at passive and active command of languages. Passive knowledge of a language allows understanding, but no expression of thoughts. The expressive side of creativity in the light of today's application is not very restricted. Those three aspects as vital sources of human self-understanding require openness of structures and processes instead of precise prediction and optimization. This tension is characteristic of contemporary life-worlds. I will elaborate on this in section three.

The degree of freedom in standard human-technology relations is limited. But artistic creativity relies on openness, freedom and qualitative experiences. Such experiences are not only vital to artistic expression

ARBOR Vol. 197-800, abril-junio 2021, a602 | ISSN-L: 0210-1963 https://doi.org/10.3989/arbor.2021.800004

but also to everyday life. Technological life-worlds as they are represented through current technologies (e.g. smart homes or automated driving) and science fiction do not seem to accommodate such open structures (e.g. Förster, 2020a). The theoretical accounts in philosophy of technology are divided: Many hold that technology determines human cognition (e.g. Stiegler, 1998; Hansen, 2012). Others take a different approach and reflect on the creative potential of new technologies (e.g. Manning, 2016; Jaime del Val in his projects, see www.reverso.org) or concentrate on the material artifacts from a postphenomenological perspective (Ihde, 2001; Verbeek, 2005).

My aim is to reflect on human-machine relations as complex structures beyond the dystopian idea of humans being transcended or determined by technology. Such an approach is central to the discussion of human futures and cultural-political shaping of life-worlds. In my attempt to understand how human-machine relations can be framed as open and creative processes I will analyze epistemological accounts of embodied cognition, artistic examples of performance strategies and finally embed these aspects within a broader picture of conceptualizing technology and human life as a continuity rather than standing in opposition or being determined by the other. Human-machine relations have to be viewed as complex forms of becoming with each other, whereas the lines between human and machinic agency or creativity become blurred. This is where the analysis gets interesting. When I put the concept of experience forward, I am not arguing in favor of an anthropocentric view. Quite the opposite: Experience in technological life-worlds shapes both sides and creates new forms of hybrid creativity[1].

2. THEORETICAL FRONTLINES: CONCEPTUALIZING THE HUMAN BEYOND THE ANTHROPOLOGICAL TRAP

When thinking about technology today one is trapped between two rather undesirable narratives: One involves the infamous singularity (Kurzweil, 2006): a looming technological superintelligence that either transcends human life or destroys it. The other narrative is a late product of the tale of progress that fueled modern age: The idea that technology enhances human living conditions and as a contemporary twist, ultimately frees us from our mortal bodies. This narrative involves strong ideas of control, a normative account of what it means to live a good live and thus might be exclusive toward differences and multiplicity of (unenhanced) life forms. The negative tendencies in the narratives of technological progress can already be seen in biased algorithms, for example in the credit systems of banks or in facial recognition software and other applications that implicitly reproduce gender and racial biases (e.g. Coeckelbergh, 2019).

The tale of the singularity on the one hand could be coined as a proponent of technological posthumanism according to Janina Loh (2018: 92-129). This view of technological development does not regard the human as central concept but emphasizes a technological evolution beyond the human life-form. Humans are conceived of as enablers of a development that sooner or later emerges from the technological habitat itself and thus does not need human agency anymore. The autonomy of technology culminates theoretically in a determinism because technology then dominates human life and not vice versa. The tale of transhumanism on the other hand sees the human as active user of technology and creator of enhanced human life forms. This narrative draws on traditional humanist views of human life. Here it is the human that determines its own techno-evolutionary fate, although this can also be seen as a technological determinism since the driving factor in this narrative is technology. Both narratives evoke utopian and dystopian images of the future, which can be viewed as symptoms of the current uneasiness with technological futures. This becomes visible in many Sci-Fi narratives[2].

In the current pandemic situation we see an even more accelerated development of communication and surveillance technologies as well as artificial intelligence in general. The question that is being asked in this volume is about the critical potential of technology. Can the standard use and design of technological artifacts and environments be critiqued by its very own means? Can technology be used to unveil its own workings, biases and restrictions and thus open new perspectives on how to create human-machine coexistence? That reminds of Martin Heidegger's famous dictum of the saving power lying in the danger, namely technology

1 The question of the status of art created by artificial intelligences is not my focus here.

2 For an account of cinematic narratives of posthuman futures and their dystopic logic see Förster, 2016.

itself: «Thus the coming to presence of technology harbors in itself what we least suspect, the possible arising of the saving power» (Heidegger, 1977: 32). He held the view that the essence of technology is neither an instrument nor a human activity, but beyond all that a way of *seeing the world*. Modern technology according to Heidegger has become the only way in which we conceive of the environment and ourselves: as a *standing reserve* (Heidegger, 1977: 24). One can criticize his view as romantic with regard to premodern technology and too pessimistic concerning modern technology. But Heidegger certainly has a point that is more relevant today than ever: Contemporary technologies use humans as a standing reserve, more accurately as a reservoir for data mining that enables prediction of behavior and control. The fact that most applications today rely on prediction of behavior in order to control or solicit human agency has found its echo in theoretical reflections on technological determinism (e.g. Hayles, 2012).

Determinism receives a distinctive twist when looking at artificial intelligence: predictions through algorithmic processing are being made on the basis of tracking and sensing technologies. The output of such technologies is created on timescales that lie beyond the human capacity of perception. When a search engine generates a feed, it combines data of the user with a prediction of the search behavior and the actual content of what is being typed. This happens in fractions of seconds and can in the case of complex and self-learning algorithms not be made explicit by the programmer[3]. The information environment generated by search engines is a result of a computation that can digest masses of data in order to determine a profile of the user and use this targeted advertisement, nudging and so on. Large parts of our technological environment, from wearables to the internet of things and smart cities is based in predictive technologies that operate on temporal levels beyond human perception. This means that it is not actually us using and controlling technology but vice versa: they solicit human behavior through predictive strategies (Hansen, 2012).

One way of interpreting this scenario is to understand technology as generating new affordances (Gibson, 1979/1986: 127-146). Affordances are possibilities for human agency. This human activity in turn alters the environment, which then might again include new affordances generated through these interactions. If theories of technological determinism are interpreted against the backdrop of theories of embodied cognition one can give the deterministic scenario another twist: If human cognition coevolves with the environment or the respective life-world then this environment is neither pregiven nor simply deterministic. Maurice Merleau-Ponty stresses the coevolution and co-emergence of subject and object, humans and their environment (Merleau-Ponty, 1963 and 1966/2014). It is the relation and developmental processes that specifies both. This process is conceived of as open ended. As long as a subject or an organism is engaged within an environment, both are emerging together – a thought which is developed in detail in enactive theories (e.g. Varela, Thompson and Rosch, 1993). This view can be adopted for a description of human-technology relations. In combining theories of embodied cognition and their idea of co-emergence with current analyses of digital technologies in philosophy and media theory one can develop descriptive tools that capture both the characteristics of technologies, the development of new affordances within a life-world permeated by intelligent and sensing technologies as well as the qualitative changes that arise for humans as perceiving and experiencing subjects. This goes beyond the postphenomenological approach, because the focus is not on the materiality of technology but the emergence of human-machine-relations and the potential for a less deterministic view of technology.

Analyzing technology as a vital part of contemporary environments helps to emphasize both its role in the emergence of novel forms of experiences and qualitative states as well as describing technologies as processes that unfold in process of usage. Within the larger scope of a critique of anthropocentrism and the dualistic views inherited by humanist theories which I share, this might seem a step backwards from the current state of the art. Philosophical posthumanism as presented by Janina Loh, Rosi Braidotti and many others arguments in favor of transcending the human by critically engaging in the attempt to redefine human life beyond the traditional dichotomies of human/non-human, subject/object, and nature/culture. As a consequence, the emergence of qualitative states of experience in technological environments has not received a lot of attention. Most of the theories prioritize relations instead of relata (e.g. Barad,

3 This raises questions concerning ethical implications and the call for an explainable AI, whose outputs can be traced entirely (Sudmann, 2020).

ARBOR Vol. 197-800, abril-junio 2021, a602 | ISSN-L: 0210-1963 https://doi.org/10.3989/arbor.2021.800004

2007). I will argue here that we cannot abstract from experience if we want to recalibrate our view on technology (see Förster, 2020b). In the following section my aim is to take a closer look at specific contemporary technologies and the way they structure life-worlds. I will contrast the two perspectives of technology as a logic of quantification and experience as qualitative state in order to uncover entanglements beyond this rather superficial dichotomy.

3. THE LIFEWORLD: QUANTIFICATION VS. EMBODIED QUALITATIVE EXPERIENCE

The attempt to understand the grammar of new technologies, to speak with Marshall McLuhan (1964/1994), is a complex task because it involves an understanding of dynamic and emergent processes. Edmund Husserl's concept of the life-world will be taken here as a starting point to set the stage for some examples[4]. Husserl develops this notion in his book on *The Crisis of European Sciences and Transcendental Phenomenology: An Introduction to Phenomenological Philosophy* (1936). It has a twofold meaning: Firstly, it describes the ground of all shared human experience, it is the broad horizon in which things and humans exist and interact. Secondly, it describes the life-world in an epistemological perspective as being the ground from which all knowledge (including scientific knowledge) gains perspective and meaning. It is the life-world that makes abstract knowledge meaningful. The forgetfulness of the life-world in modern science is the crisis Husserl describes. When knowledge production in science has no relation to lived experience it will become meaningless in the long run.

Contemporary life-worlds are environments filled with artifacts that have been produced by the scientific worldview and which are connected, responsive and possess agency. Computer technology subscribes to classic scientific values such as objectivity, quantification, prediction and optimization. These are the characteristics that Heidegger detected at the birth hour of modern technology, namely in the rise of modern physics. According to Heidegger modern physics has not been the enabler of the development of technology, but is itself already a product of the essence or spirit of modern technology, the logic of the *enframing* that entails measurement, prediction and domination of nature (Heidegger, 1977: 24). If Heidegger is onto something here, then today's problem is not so much the technology itself but the perspective it casts on humans and the life-world alike. That is not to say that technology in itself is or can be neutral. I would argue along the lines of McLuhan (1964/1994) that every device orchestrates new relations and constellations in the social, practical and communicative sphere and thus cannot be neutral. It affords always novel ways of agency and perception.

The point I want to make here is that neither technology nor humans can be identified as the driving force in the development of this relation. Humans are not simply determined by technology nor is technology a simply a means to an end. In the following I will consider a few examples from recent technological developments and analyze them as a modulation of life-world entanglements with regard to their processuality and potential for creative and engaged agency[5]. I will do so with regard to experience, agency and creativity as central features of human rapports within the life-world.

1. Qualitative First-Person Experiences

Qualitative first-person experience is what characterizes conscious life. It is still an open question how self-consciousness and first-person-experience is generated in the brain. Qualitative states come in degrees, they are not only a property of human life, but of life in general, from minimal forms of consciousness to full-fledged human self-consciousness. This is the watershed that divides artificial intelligences from humans: They do not have qualitative mental states, at least not in the foreseeable future –a general AI is beyond contemporary technological possibilities. The quality of experience, what it feels like to have a certain experience, a body or an aching body for that matter, this is notoriously hard to grasp through scientific methods (comp. Förster, 2020b). Neuroscience predominantly searches for neural correlates of certain cognitive or emotional states. This unfortunately does not say anything about the subjective quality of experience.

Many contemporary technologies are just about that: Creating a user experience or predicting qualitative experiences as solicitors of agency (e.g. in targe-

4 I will not give a Husserlian interpretation or hermeneutic reconstruction of this concept but rather use it as backdrop for considerations that include phenomenological descriptions and theories of embodied cognition.

5 Tim Ingold (2014) holds that creativity depends on relations and processes in which humans and things are entangled and enmeshed in processes of becoming.

ted marketing). How do they do that? They use scientific insight. The fact that we do not know much about qualitative states seems to keep no one from making educated guesses of how to induce them. This is similar to the effects of antidepressants. It is not clear how they causally act on neural dynamics but they mostly do so successfully. Social media and communication technologies such as Facebook, Instagram or TikTok are means to engineer qualitative experiences in users within the virtual world. Let us take a look at Facebook. This platform has come under strong critique after the US elections in 2016, when the data mining company Cambridge Analytica developed Facebook profiles of some 220 million US citizen and influenced their voting behavior through targeted information spreading. This is what is known as information bubbles. The virtual environment is not an arbitrary mix of information in form of a feed. Rather it is an algorithmically congregated theater played out in front of the user's eyes. It reflects the image of the user seen from the perspective of an algorithm that gathers data according to a logic of sets of preferences deduced from earlier behavior. Such a platform can be seen as a form of environment in which the user finds affordances as possibilities for action and in turn through engagement in this environment leaves traces that change or specify this environment in relation to her agency. Experience here is largely impoverished: Firstly, the user is engaged in this environment as disembodied or minimally embodied. All forms of experience find their expressions in limited ways of short commentaries, emoticons, GIFs and or measurements of gaze duration. Secondly, other than a natural environment or the material life-world, this virtual world is determined through intentions that are hidden from the user. A natural environment is not created as a means to an end, but represents a factual existence that can afford action possibilities only in relation to an organism. The virtual environment always has a hidden agenda that creates monetary profitability. Facebook is in fact a marketplace that mines data of potential buyers and turns them into advertisement profits. That means human experience in such a virtual reality is implicitly guided and instrumentalized. Agency within these kinds of social media is strongly mediated through algorithmic structuring of information and less so through active engagement and qualitative experiences.

On the positive side there is a layer in which human experience can also profit from quantification through computer technology: Lev Manovich argues in his article *Computer vision, human senses, and language of art* (2020) that natural languages fail to account for the details and fine-grained differentiations in human experience. Using digital analysis for the representation of analogue artefacts is according to Manovich closer to the actual experience than natural language could ever come:

> «Numerical measurements of cultural artifacts, interactions and behaviors give us a new language to talk about cultural artifacts and experiences. This language is closer to how the senses represent analog information (sounds, music, colors, spatial forms, movement, etc.) The senses translate their inputs into quantitative scales, and this is what allows us to differentiate between many more sounds, colors, movements, shapes, textures than natural languages. So, when we represent analog characteristics of artifacts, interactions and behaviors as data using numbers, we get the same advantages. This is why a language of numbers is a better fit than human languages for describing analog aspects of culture» (Manovich, 2020).

Manovich holds that digital technologies, namely the mathematical description of physical artefacts is a new language to describe experiences. His argument is that there is an analogy between a computer models the mathematical properties of artefacts and the way the neural processes translate sensory input into qualitative experiences. This is an interesting way to shed light on the material culture. But it runs into similar problems as neuroscience does, when it comes to accounting for first person experience. As Manovich points out, the «senses translate their inputs into quantitative scales». That holds true for the description of the neural process with its distributed information processing and diverse levels of synchronicity and integration on different time scales. But then again it proves difficult to translate such findings back into the quest to explain qualitative features of experience.

2. Agency

Human agency is a central concept to determine the possibility to bear responsibility for one's own actions, but also in developing a personal identity. Humans need to make the experience of their own action as being effective in order to develop a sense of the self as independent personality. If one has the experience of actions running into the void, of not changing anything, then the person is in danger of developing self-doubt, depression or pathological mental states. The counterpart to human agency today

ARBOR Vol. 197-800, abril-junio 2021, a602 | ISSN-L: 0210-1963 https://doi.org/10.3989/arbor.2021.800004

is automation. A simple example is the skill of parking a car: Not long ago anyone who learned how to drive a car would also need to be able to park it. In order to do so successfully one needs to require a feeling of the care as an extension of one's own body. The shape and size of the body are a form of implicit or tacit knowledge that is not propositional but is actualized in sensory motor action. The car as means of transport becomes like any other tool partly integrated into the body schema of the user[6]. Once this learning process is completed the driver can estimate whether or not a given space is large enough for the car to fit in and can also perform the movements of the car in a body-like manner. Even if this is not an impressive example, the act of parking is usually accompanied by a sense of self-effectiveness. Even more so when it comes to craftsmanship, decision making or work in general. Today many of these areas can be automated and performed by machines.

There is a tendency to decrease human agency as a form of agency prone to error and failure and an increase in automated machine agency. More and more forms of technological agency are developed that do not operate in closed environments such as in assembly lines, but more and more technologies operate in open, real live situations. Social robots for example combine movement in open spaces with social communication skills in also potentially open communicative situations. By *open* I mean that the space and content of the agency is not completely determined through an algorithm or the interactive environment. Beyond all criticism there is also potential in such open human-machine-relations, such as the design of innovative care robots for example.

Johanna Seibt works as a philosopher in the field of social robotics and questions the traditional view that social robots need to mimic human behavior. Traditionally social robots are designed in an anthropomorphic manner with the attempt to duplicate behavior and expression of humans. The underlying idea was to render them acceptable to human users. Seibt proposes an alternative view that binds successful robotic agency not to anthropomorphous properties but to sociomorphic ones. That means social robots do not mimic human traits and expressionss but the logic of social interaction on different scales. She states:

> «[…] social interactions with robots are not always the result of anthropomorphizing, i.e., the projection of imaginary or fictional human social capacities, but of sociomorphing, i.e., the perception of actual non-human social capacities. Sociomorphing can take many forms which phenomenally manifest themselves in various types of experienced sociality» (Seibt, 2020: 51).

Here again the experiential aspect of human-machine interactions embedded within a socio-cultural context seems to be of the essence. Seibt's take on social robotics argues that not all interaction with social robots must involve anthropomorphizing, which means users only imagine the robots having certain quasi-human forms of behavior or mental states. She argues that in the design of social robots as well as with regard to their use and perception it makes sense to draw on a perception-grounded view of robot-behavior. She compares the problem of how we perceive and interact with social robots to interactions with small children or animals, which do have a similar range of behavior like social robots. In these cases, we perceive «manifestations of capacities» (Seibt, 2020: 51) rather than imagining them. In children for example the capacity for shared attention (such as directing their gaze onto an object that's being pointed at by someone else) only develops at a certain age. When it is developed, we see that the child intently looks at the object of shared attention. Such capacities are relevant on very different levels and their being manifested is something that can be perceived within «experienced sociality». This line of thought makes the case for experience being a fundamental category also in the design of technological agency. If robot behavior is not merely taken as a simulation of intelligence or social agency, but becomes part of an experienced sociality, then it participates in the human life-world as qualitative factor and becomes part of the large the socio-material tissue, that includes all kinds of agencies, processes and affordances. Framed like this, technology can be seen as an important factor in experienced sociality and the life-world with its affordances for agency in general.

3. Creativity

The vivid scene of new media, computer and performance art using respective technologies shows that creativity is in no crisis because of technological developments. Quite the contrary: A broad field of reflection on the nature of creativity, originality and authorship has developed alongside the development

6 For the term body schema see Merleau-Ponty, 2012: 100 [127].

of new media. Creativity has also become a huge market outside of the art scene in form of *creative* imaging applications: photo and video apps. Some of them are not only editing tools but social media platforms, like Instagram, Snapchat or TikTok. The editing and filter options provided by smart phones apps provide the world of artsy image at fingertip's reach. This is just an example for a vast array of applications that solicit creativity with easy strategies to succeed. But on a basic level this is a reduced creativity like painting by numbers. The qualities of a photo get manipulated by intensities and quantities: The user can manipulate lights, shadows, contrast and colors by sliders, graphs or just tapping on filters. On the level of production there are finite options to manipulate properties by quantifiable enhancements. The result is still a product of individual taste, experience and creativity. But the creativity is made simple and limited to quantifiable adjustments at the same time. Obviously, I am not talking of the full potential of programs like Photoshop, which by no means are simple or unartistic. But the average user will not go into the artistic depths of such a program. The development of camera apps for example moves away from individual settings to more and more predefined modes of photography. This camera apps implicitly function as filters and make it very easy for users to always have the perfect setting right at hand. Creativity here consists in choice, not so much in production[7].

If we want creative use of technology to become a means of emancipation and critique, we need to look beyond the smooth surfaces of social media. Are there ways of making visible the functional logic of algorithms and create ways of engagement that enable users to understand these technologies to a fuller extend and participate in the development?

4. TOWARD A NEW ARTISTIC TECHNO-CULTURE

To understand how technology can open up new horizons for a more open and inclusive way of living, we need to dive deeper into the fabric of human-machine relations and work creatively with underlying technological conditions. What makes the whole human-machine world so tricky to understand at least from a philosophical perspective or the humanities in general is the deep entanglement of both. If we take a closer look, there is no such thing as *the human* or *that technology*. The distinction between both is as obvious and as unclear as it gets. From an outside perspective, we can be very sure if we are talking to Alexa, the AI embedded in our living space, or our very human neighbor. When we are asking how meaningful relations come about within technological life-worlds, we need to take a closer look at processes of constitution.

At this point of the inquiry a look into the constitution of human cognition is necessary. As mentioned at the beginning of this article on of the most prominent approaches to human-machine relations today is a form of techno-determinism. In short this means that the evolution of human consciousness beyond its natural origins is driven by technological inventions. Today technology has come to be the main engineer of human perception and cognition because most parts of human reality rely on technologies of prediction and control that function on timescales beyond human sensory capacities. Mark B.N. Hansen for example sees this influence as being directed at the subpersonal level of human consciousness:

> «We must reconceptualise the coupling of human and technics beyond the figure of the 'technical object.' In the wake of computational technologies that distribute sensibility beyond consciousness, the correlation between human-implicating individuation and technics has moved beyond what we might think of as its objective stage [...] and has entered a properly processual stage in which technics directly intensifies sub-perceptual dimensions of human experience. [...] The technical object had to make way for technical processes that operate through far more complex imbrications with human activity» (Hansen, 2012: 51, 55).

The fact that human cognition and technological processes are deeply entangled does not necessarily lead into a one-sided determinism. Theories of embodied cognition, if one can apply such a general label, would hold that organisms and their environments co-emerge through processes of enaction and skillful coping. Eleanor Rosch, Evan Thompson and Francisco Varela called this co-constitutive relation «laying

7 It is also worth researching why most of the creative apps are focused on images or video. Compared to these the presence of apps for other forms of creative production is very little. This might be linked to the historical/philosophical prioritization of vision against the other senses, that was already present in Greek antiquity. Vision is culturally understood as the noblest of the senses since it does not require touch and is analytically closest to conceptual thinking (e.g. the use of central perspective in painting). Also, it is linked to control and modern ideas of transparency in society. This is beyond the scope of this article but definitely worth of a follow up research.

ARBOR Vol. 197-800, abril-junio 2021, a602 | ISSN-L: 0210-1963 https://doi.org/10.3989/arbor.2021.800004

down a path in walking» (1993: 237). This image stands for the enactive theory of cognition that describes cognition as a product of a structural coupling of organism and environment. Both sides of the relation are constituted through active sensory-motor activity couplings that are open ended and procedural. Within the framework of embodied cognition cognitive abilities (today this also holds for artificial intelligences) develop through active engagement within an environment, which itself only gets specified through this very action: The path is not only a cognitive path but also a trace organism leave in their environment[8]. The main point here is: Adopting a view of cognition as embodied process, the organism and the environment become part of a co-constitutional process. Technological determinism on the other hand stress a more one-sided influence, namely technology acting on human perception, not so much the other way around. The procedurality of human-technology relations is the fundament for forms of creative and artistic engagements that arise precisely from the relation and not from only one relatum (human or machine). Such open structures as conditions for creativity are stressed for examples in Tim Ingold's research (2014). In the remaining pages, I want to argue for a view of human-technology relations as being a fundament for critical creative approach to technology by means of using technology. Many contemporary artists create such open spaces of experience with and through digital technology. Let me once more reflect on Heidegger's appeal to art as a safeguard against the ubiquitous logic of technology: «Could it be that the fine arts are called to poetic revealing? Could it be that revealing lays claim to the arts most primally, so that they for their part may expressly foster the growth of the saving power, may awaken and found anew our look into that which grants and our trust in it?» (Heidegger, 1977: 35).

He held that technology is a way of revealing. It does so but in a limited perspective which turns the world into a standing reserve: Technology not only brings forth or reveals, it also puts a veil on every other possible way of seeing the world. This might seem somewhat nostalgic and Heidegger is not very explicit about what those other ways of seeing might reveal or how we could even change our perspective. It is by no means a given that technology prevents us completely from seeing the world differently. It might as well reveal fresh sights and new potentials.

The summoning of the arts in Heidegger comes with a catch: Only if art is open to the aim of finding truth, the saving power will be actualized. How can art show the truth one might ask? Art is about perception, about ways to see things in a new light. Seeing differently is not yet seeing the truth. He goes one step further and speaks of a method: reflection. Art, so Heidegger in the last passages of his essay should not be perceived in a mere aesthetic way, but solicit reflection:

> «But certainly, only if reflection on art, for its part, does not shut its eyes to the constellation of truth after which we are questioning. Thus questioning, we bear witness to the crisis that in our sheer preoccupation with technology we do not yet experience the coming to presence of technology, that in our sheer aesthetic mindedness we no longer guard and preserve the coming to presence of art. Yet the more questioningly we ponder the essence of technology, the more mysterious the essence of art becomes. The closer we come to the danger, the more brightly do the ways into the saving power begin to shine and the more questioning we become. For questioning is the piety of thought» (Heidegger, 1977: 35).

What Heidegger hopes to be revealed through art is the way how the logic of technology, the technological worldview comes into existence. He turns to art in order to understand how the technological world view is constituted. The danger he sees concerning art itself, is that it gets subjected to this world view as well. The «sheer aesthetic mindedness» can be interpreted as a critique of art as being a mere means for distraction and aesthetic pleasure. In that regard art becomes instrumental and subjected to the logic of technology. If on the other hand art was taken seriously and could provoke reflection rather than distraction, Heidegger sees a way to reveal the essence of technology through artistic practice and thus a way to prevent the danger of technology. Now and then

8 Environment as defined by Jakob von Uexküll (1909) is not only the surrounding of an organism, but is the world surrounding the organism in a meaningful way. This is how in one place we can find several forms of being entangled with the surroundings and thus there are several environments in the same time and place possible: While my cat inhabits the same apartment space like I do, it is not the same in term of affordances. The cat not only perceives different things, e.g. smells different scents, sees different aspects of the interior. There are also different types of agency solicited through the same physical space in different organisms. That also means we inhabit the same space but not necessarily the same environment, because the environment is the way, surroundings become meaningful or useful for certain kinds of perception and agencies.

the talk of technology as the greatest danger remains somewhat obscure.

It is yet to be elaborated on what art might bring to the table concerning a critique of technology. Heidegger's appeal to ultimate dangers and truth is more than questionable and unhelpful for coming to grips with digital technologies. Rather we will need lived experience to actually relate to technological life-worlds and appropriate them in open creative ways. Art or more precisely, art engaged with new technologies should open perspectives beyond the standing utopian and dystopian narratives about technological development that are present in theory, popular science and culture. A lived experience of technological spaces as fostering agency, qualitative experience beyond user-friendliness and frictionless experience is what is needed to establish a more emancipated use of technology. This surely needs to be turned into a broader educational movement of education that enables people to understand, undermine and subversively appropriate technologies of prediction and control.

Today's life-world is already permeated by sensor and control technologies. That means we move and act within an increasingly tight knit fabric of technologies that sense, predict and interact with humans. Most of these technologies are invisible or integrated within larger devices such as cars, robots or smart household appliances. Technology thus is driven by various form of computer vision and artificial sensing in general. There is a whole dimension of non-human or better non-organic sensing present that orchestrates processes in everyday life. How can creative engagement tackle this dimension? How can these very technologies be used to uncover such processes? And can such a non-aligned use of sensing technologies lead to a new and emancipatory appropriation of technology?

Artistic approaches in New Media or Performance Art as today aim at making the fabric of technological life-worlds visible or they try to rethink/invent new forms of interactions or interfaces. This ubiquitous sensitivity of the world of perception can be described by the concept of the «flesh», that Merleau-Ponty introduced in his late writings (1969). In his theory of perception, he argues that perception is grounded in the possibility of the perceiver to be perceived as an object too. Perception hence is dependent on the subject and the object being alike, because both are part of the perceptible world. Sensing is not merely a subjective capacity but a modulation of the fabric or «flesh» of the world.

Caroline Yan Zheng is a designer who investigates modulation of the emotional space through affective computing. Her aim is precisely to make these modulations palpable and develop interactive designs to make people feel such an «open-ended emergence and becoming» (Zheng, 2017: 111) of human-machine relations. To do so, one needs to focus on the experiencing subject and its entanglement with technology. Coeckelbergh (2020) points out that most theories lay emphasis on technological performativity and its influence on human behavior without actually paying closer attention to those changes from the perspective of the subject. The movement of the body, the temporal horizon and social interaction make up the experience within the technologically permeated fabric of the life-world. Coeckelbergh argues for the use of metaphors from performance arts in order to capture the experiential aspects of human involvements with technology. And indeed, technological agency and human agency are deeply intertwined. Still when we talk about this field of entangled agencies we usually think of technology choreographing human behavior. Such orchestrated processes draw strongly on habit and the absence of friction. In order to understand how life is choreographed by technology we need to be able to see and perceive both technology and embodied perception as well as socio-technological interaction. In short, we need to get a grasp of the dynamics of ubiquitous sensing, of the flesh of the socio-technological life-world, to use Merleau-Ponty's metaphor. Zheng exemplifies such an attempt with her project «Tangible Emotions» (Zheng, 2017: 119), in which artefacts equipped with sensors solicit social interaction, amplify the participant's emotions and feed these data back into the loop of human-human-artefact interaction:

> «Feedback in my installations is not unidirectional; the kinetic movement of the textiles in turn influences the emotions of the participants. And unlike most wearable artefacts which utilise individual human-machine interaction, here when more than one person participates, it suddenly becomes a human-human interaction, mediated by technological artifacts» (Zheng, 2017: 120).

Such artworks create the possibility to make feedback loops between embodied perception and technological sensing explicit and put the user in the position to actively engage in these loops. The goal of artistic interventions with regard to technology should be to make the inner workings and logic of

ARBOR Vol. 197-800, abril-junio 2021, a602 | ISSN-L: 0210-1963 https://doi.org/10.3989/arbor.2021.800004

technological environments tangible and thus open the view for possibilities of interaction, subversion and emancipatory forms of usage. That in turn also requires knowledge about the human influence on technological processes and ideas of how mutual shaping is indeed mutual and not a one sided determinism.

5. VISIONS INSTEAD OF CONCLUSIONS

Active engagement is key to an open, emancipated and democratic use of technology. Designers and artists like Zheng can translate these artworks into actual applications that do not simply follow the ideal of frictionless user experience and linear market logics. If creators of technology include the user as active experiential subject that conceives of technological application as an environment in which one finds new affordances, challenges and new possibilities, then we have come a long way from cybernetic control fantasies to people engaging with technology in an emancipated way. Such a project needs work, educational work. What needs to be taught is technological knowledge combined with the ability to reflect on social developments from an engaged and embodied perspective. The benefits of looking at technology as part of a complex environment that includes qualitative experiences, quantitative sensing methods and a tightly knit fabric of diverse agencies is the following: We can understand how human and non-human agencies interact, amplify and influence each other and create possibilities to reflect these interactions, which is the condition of possibility for any critical and emancipatory engagement. This way it is possible to develop a new art of living that does not center on human aims but on an open and integrative lifestyle that is aware of the deep entanglements within a shared life-world and regards technology as environment rather than a hidden danger. That can only be done if we take the liberty to experiment with technology beyond the means/ends logic and see it fresh eyes to include technology into our contemporary art of living.

REFERENCES:

Barad, Karen (2007). *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. Durham: Duke University Press. https://doi.org/10.2307/j.ctv12101zq

Coeckelbergh, Mark (2019). Technology Games/Gender Games. From Wittgenstein's Toolbox and Language Games to Gendered Robots and Biased Artificial Intelligence. https://doi.org/10.1007/978-3-476-04967-4_2

In: Janina Loh, Mark Coeckelbergh (eds.). *Techno:Phil – Aktuelle Herausforderungen der Technikphilosophie* (Vol 2). Stuttgart: J. B. Metzler, pp. 27-38.

Coeckelbergh, Mark (2020). Technoperformances: Using Metaphors from the Performance Arts for a Postphenomenology and Posthermeneutics of Technology Use. *AI & SOCIETY*, 35: pp. 1-12. https://doi.org/10.1007/s00146-019-00926-7

Förster, Yvonne (2020a). Aesthetics of the Past and the Future, Human Life within Changing Environments. In Zoltan Somhegyi, Max Ryynänen (eds.). *Aesthetics in Dialogue*. Bern: Peter Lang, pp. 237-250.

Förster, Yvonne (2020b). Ecological Subjectivity vs. Brainhood: Why Experience Matters. In Markus Mühling (ed.). *Perceiving Truth and Value Phenomenological Deliberations on Ethical Perception*. Göttingen: Vandenhoeck&Ruprecht, pp. 63-76. https://doi.org/10.13109/9783666573200.63

Förster, Yvonne (2016). Singularities and Superintelligence: Transcending the Human in Contemporary Cinema. *Trans-Humanities*, 9 (3): 33-50. https://doi.org/10.1353/trh.2016.0020

Gibson, James J. (1979/1986). *The Ecological Approach to Visual Perception*. Boston: Houghton Mifflin.

Hansen, Mark B. N. (2012). Engineering Preindividual Potentiality: Technics, Transindividuation, and 21st-Century Media. *SubStance*, 129 (41.3): 32-59. https://doi.org/10.1353/sub.2012.0025

Hayles, Katherine N. (2012). *How We Think: Digital Media and Contemporary Technogenesis*. Chicago: University of Chicago Press. https://doi.org/10.7208/chicago/9780226321370.001.0001

Heidegger, Martin (1977). *The Question Concerning Technology and Other Essays*. New York, London: Garland Publishing Inc.

Husserl, Edmund, (1936/1970). *The Crisis of European Sciences and Transcendental Phenomenology: An Introduction to Phenomenological Philosophy*. Evanston: Northwestern University Press.

Ihde, Don (2001). *Bodies in Technology*. Minneapolis, London: University of Minnesota Press.

Ingold, Timothy (2014). The Creativity of Undergoing. *Pragmatics and Cognition*, 22 (1): 124-139. https://doi.org/10.1075/pc.22.1.07ing

Kurzweil, Ray (2006). *The Singularity Is Near: When Humans Transcend Biology*. New York: Penguin Books.

Loh, Janina (2018). *Trans- und Posthumanismus zu Einführung*. Hamburg: Junius.

Manning, Erin (2016). *The Minor Gesture*. Durham: Duke University Press. https://doi.org/10.2307/j.ctv111jhg1

Manovich, Lev (2020). Computer Vision, Human Senses, and Language of Art. *AI & Society*: 1-8 https://doi.org/10.1007/s00146-020-01094-9.

McLuhan, Marshall (1964/1994). *Understanding Media, The Extensions of Man.* Cambridge (MA): MIT Press.

Merleau-Ponty, Maurice (1966/2014). Phenomenology of Perception. Abingdon, New York: Routledge. https://doi.org/10.4324/9780203720714

Merleau-Ponty, Maurice (1963). *The Structure of Behavior*. London: Beacon Press.

Merleau-Ponty, Maurice (1969). *The Visible and the Invisible*. Evanston: Northwestern University Studies.

Seibt, Johanna (2020). Sociomorphing, Not Anthropomorphizing: Towards a Typology of Experienced Sociality. In Marko Nørskov, Johanna Seibt, Oliver Santiago Quick (eds.). *Culturally Sustainable Social Robotics—Proceedings of Robophilosophy*. Amsterdam: IOS Press, pp. 51-67. https://doi.org/10.3233/FAIA200900

Stiegler, Bernard (1998). *Technics and Time, 1: The Fault of Epimetheus*. Stanford: Stanford University Press.

Sudmann, Andreas (2020). Künstliche neuronale Netzwerke als Black Box: Verfahren der Explainable AI. Medienwissenschaftliche Perspektiven. In: Peter Klimczak, Christer Petersen, Samuel Breidenbach (eds.). *Maschinen der Kommunikation. Interdisziplinäre Perspektiven auf Technik und Gesellschaft im digitalen Zeitalter*. Wiesbaden: Springer, pp. 189-199. https://doi.org/10.1007/978-3-658-27852-6_10

Uexküll, Jakob Johann von (1909) *Umwelt und Innenwelt der Tiere*. Berlin: Springer.

Varela, Francisco, Thompson, Evan and Rosch, Eleanor (1993). *The Embodied Mind. Cognitive Science and Human Experience.* Cambridge (MA): The MIT Press.

Verbeek, Peter-Paul (2005). *What Things Do: Philosophical Reflections on Technology, Agency, and Design*. University Park: Pennsylvania State University Press. https://doi.org/10.1515/9780271033228

Yan Zheng, Caroline (2017). Machinising Humans and Humanising Machines: Emotional Relationships Mediated by Technology and Material Experience. In Susan Broadhurst, Sarah Price (eds.). *Digital Bodies: Creativity and Technology in the Arts and Humanities*. London: Palgrave Macmillan, pp. 111-127. https://doi.org/10.1057/978-1-349-95241-0_8