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Beware of Art: ARTificial Intelligence Challenging Organizations and Society

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Content

Claudia Schnugg, Andrea Schueller

Editorial
Beware of Art: ARTificial Intelligence Challenging Organizations and Society

Digitalization and Artificial Intelligence (A.I.) are changing the world we live in in a fast pace. This evidence raises new challenges and questions.

Recognizing digital transformation processes based on Artificial Intelligence reveals fundamental essentials about the structure of our world and the way we design our living as well as digital artifacts. The world we build based on new technologies and digitalization creates new opportunities and serves many purposes. At the same time a new techno-logic infiltrates work and life with unclear goals, hidden agendas, uncontrollable outcomes and unwanted side effects. – Technology is the answer but what was the question?

Art is not only the first three letters in the word ARTificial but a deeply rooted human practice. Art is a way to express meaning, integrate opposites, make visible, experience the unnoticed, etc. Creating and experiencing art is seemingly a human-driven counterpart to technology and digitalization from a different inner source, personal as well as transpersonal. Yet both practices are manmade and stem from human brains and bodies interacting with the environment, bringing forth artifacts.

Why not fuse, integrate, and bridge digital and human-driven approaches to realize their collective creation and transformation capabilities? What opportunities, questions and possible solutions can we envisage, bringing together art, technology and digitalization to confront the challenges which humans, organizations and society face?

At the ARTificial Intelligence conference, we explored how art raises awareness and inspires us to connect with others and technology in various ways while keeping learning filters open. Also, we engaged in dialogs along crossroads of disciplines to nurture crossovers.

With this issue we continue the journey in order to intensify reflective practice to become well versed in co-creating digital realities, considering structural and system(ic) particularities and human essentials.

Based on these ideas that the COS community started to dive into and discuss during the Challenging Organizations and Society Conference in November 2019, we opened a call for papers that discuss the interplay of art, technology and organizations, in understanding opportunities for integration, interventions and collaboration in these fields that challenge ways of organizing, creating, working and living. Our focus was on the following three areas:

Future-proof cooperation

- Integration, bridging or combination of different competences and intelligences for a positive future of work and life
- Art, technology, and digitalization in organizations
- Which competencies could lead us, which backbones could support us in transient settings?
- Who shapes whom? Self-organizing emergence generating future forms of work and life

Artificial Intelligence – State of the Art

- Where are we? And where do we want to go?
- Differentiated view of artificial intelligence – how can we distinguish myth and reality?
- Utopia / Dystopia
- How to collaborate and how to engage in social contexts?

Artistic Interventions in Organization and Society

- Carrying forward insights into work processes / new work
- Hand in Hand?! ART and artificial for a better world?
- Political, social and healing power of art in the 21st century

The selection of papers in this issue brings together manifold perspectives on this interdisciplinary topic from specialists, academics and practitioners from the disciplines tackled by the issue presented above: consultants, organizational scholars with focuses on management, on creativity and new technologies in work practices, on interdisciplinary collaboration processes in art, technology and innovation, and on technological developments and their implementation in applications, as well as artists and curators operating at the intersection of art, cutting-edge technology and society.

The contribution **"Artificial Intelligence and Creative Work: Practice and Judgement, Organizing and Structuring"** by Elena Raviola opens the kaleidoscope by introducing the interplay of algorithms, A.I., creativity and work practices. The author investigates the development of learning algorithms and automation of work and juxtaposes this development with reflections on the relationship of creativity and A.I. Taking stock of the current academic discussions in this field, Raviola explores major questions in this interdisciplinary field, as well as practical implications of A.I., technological changes of work practices and creativity at work by pointing out challenges in the examples of publishing and journalism.

The paper **"The Opportunities of Artificial Intelligence and Art for Creativity and Society"** by Elisabetta Jochim follows the first contribution by giving specific insights from a curator's point of view into the work of contemporary artists exploring artificial intelligence in their artistic work in a diverse range of strategies. A major focus of the investigation is understanding the value of intertwining art and A.I. for artistic expression, human creativity, and society. Based on experience and a broad range of interviews with artists in the

field, Jochim discusses a possible role for creative technologies in society and "A.I. Art" as an opportunity for creative industries.

In the contribution **"Collaboration of Art, Science and Technology: Creating Future Realities with Art and A.I."** Claudia Schnugg sheds light on opportunities for integrating collaborations between art and science with a focus on technology/A.I. into scientific and technology development processes. This broadens the understanding of possible courses of action and shifts the focus from the artistic process incorporating A.I. to exploratory, scientific and development settings. Through the story of three different approaches to art-science investigations, the contribution illuminates possible formats for exploring future realities by including art into research and development processes.

In the interview **"A Reflection on Art, Artificial Intelligence and Robots in Society"** artist Sougwen Chung talks about her artistic practice and goals by engaging with cutting-edge science and technology in the field of robotics, human-machine-interaction, and A.I. Chung elaborates on her work employing A.I. as collaboration, as creative catalyst and as medium for collective authorship by illustrating how her artistic research in socially relevant topics becomes experiential in her artwork. In so doing, she introduces her collaborative practice as artist-in-residence at internationally renowned laboratories, and two of her ongoing artistic projects, *Drawing Operations* and *Mutations of Presence*.

In **"Fragments of the Future. Identity, Art and the Artificial"** Andrea Schueller explores the influence on and implications for individual and collective identity that arise by inviting new technologies and digitalization into our daily life. Through the strategies which inspired and data gathered by the artistic intervention "Fragments of the future" at the COS conference in 2019, she elaborates the generative as well as the healing impact of the artistic process and artistic interventions from an embodied perspective of becoming. She does so by visibilizing herself as holistic data source and sparking the

idea of Meaning Maker Spaces for containing ARTificially intelligent crossovers between humans, machines and art.

In their dialog **"Fragments as Media of Time"**, artist Paola Michaela Mineo and Andrea Schueller expand the history of meaning of fragments as media of time. They wander from ancient Greek temple fragments to the plaster face fragments of their Linz Performance 2019 to the fragmented mask faces of 2020 which the COVID-19 pandemic writes into our (collective) faces. From a cultural-historical perspective, they offer a view that understands fragments as the real thing, not as garbage, and bring the paradox of fragility and strong life into focus. They touch the role of artists within the pandemic and zoom out the pandemic as a catalyst for digitalization, another paradox, making us real-time, co-creating and co-sensing observers of the wanted and unwanted effects and side effects of technology.

The contribution **"Algorithmic Overdependence: Fostering Awareness Through Digital Facilitation and (Re-)Construction"** by Christian Stary and Claudia Schnugg elaborates on possible implications of continuous digitization of society, organizations, and individual habits. Implications of digitalization processes like an "Internet of Behavior" and "Algorithmic Overdependence" are introduced to the reader, concerns and possible future strategies are discussed. In the second part of this article the authors introduce a concept for an artistic installation to promote awareness of the issues of algorithmic overdependence and to enable a broad audience to deal with digitalization of their personal environment in a self-determined and informed way.

Scientist Johannes Braumann and conference host Liselotte Zvacek close the circle of contributions with a good question. In the interview **"Why didn't you stay until Sunday's brunch?",** they explore how the generative dialog between technicians, scientists, artists, or people from management professions can succeed. Based on the observation that "the technicians" were absent on conference Sunday, they generate hypotheses about different motivations,

(conference) socializations and comfort zones of different expert fields. They envision the preferred entrance gates of the professions and how these can be kept open.

We are happy and proud to have embraced a diverse crowd of authors and contributions making meaning of ARTificial in different fashions, travelling from different avenues and pointing in future directions. For us editors, this issue breathes its title: it is particularly diverse in genres, rich in images, graphics and links to virtual realities. With this issue, the Journal itself takes on its virtual form, and we are realizing a long-cherished project. Dear readers, we wish you much pleasure and inspiration in reading, receiving and carrying forward what is fresh and lively in your daily life and work.

Elena Raviola

Artificial Intelligence and Creative Work: Practice and Judgement, Organizing and Structuring

New York, October 23-25, 2018. The artwork "Portrait of Edmond Bellamy" was auctioned at Christie's and sold for $432,500. The artist was "min max…", algorithm[1] created by Obvious, a collective of artists and Artificial Intelligence (AI) researchers based in Paris. They used a method called Generative Adversarial Networks (Goodfellow et al., 2014) to create images and explore the question of creativity for machines.

Paris, Spring 2020. The company Deepnews.ai was launched, after four years of research by the former journalist and news expert Frederic Filloux and a number of computer scientists in the US and in France. Deepnews.ai's core technology is a proprietary scoring system that is able to discern quality news and put them together in specialized newsletters.

Shenzen, August 2019. The annual conference on Artificial General Intelligence takes place in a luxurious hotel in the so-called Chinese Silycon Valley. In his keynote speech, the CEO of the Finnish company Curious AI presents their AGI model and speaks about AI's ability to imagine the future as the key to reaching general intelligence in machines.

1 Algorithms are instructions inscribed in a machine that tell it what to do. The Cambridge English Dictionary defines an algorithm as "a set of mathematical instructions that must be followed in a fixed order, and that, especially if given to a computer, will help to calculate an answer to a mathematical problem". Thus, as mathematical instructions, algorithms are formal and unambiguous rules that determine the machine's actions to solve a problem defined in mathematical terms. The particular type of algorithms that classify as artificial intelligence give instructions on how a machine should learn a given task, so that it can improve itself in performing it. These learning algorithms can build on logical and/or statistical models of learning and thus function in different ways, but they all remain "unambiguous specification" of how to solve the problem of learning.

Although not new (Boden, 1977), lately the debate has intensified around artificial intelligence and so-called creative work[2]: machines are reported to be able to learn to write stories and poetry, produce "paintings" (if that is the right name for it), compose music, choreograph dance, design buildings, make news and other things. AI explorations and experiments in creative fields is interesting for the AI community, as creativity is often thought of as one of the distinct human features and thus these explorations might lead to shift and controversies on the boundaries between humans and machines. In fact, shortly after the sale of the first AI-generated portrait at Christie's in October 2018, The Guardian art critic Jonathan Jones wrote that, although almost plausible, "no algorithm can capture our complex human consciousness" (Jones, 2018). Other artists working with the same algorithm, namely the Generative Adversarial Network (GAN), criticized the artwork as unoriginal, as the GAN had been used and shared in art since 2015 (Cohn, 2018). The results achieved by learning algorithms have triggered intense discussions

2 It all started with the mapping and measurement exercise promoted and carried out by Tony Blair's New Labour government in the UK in 1998. Although the term 'creative industries' has come to be highly contested, it is undeniable that there has been success in creating a new category for policy, industry and research. A consensus seems to have been reached to consider sectors like advertising, architecture, art and antiques, crafts, design, designer fashion, film and video, music, performing arts, visual arts, publishing, TV and radio as creative industries. Sometimes even computer games and software are considered as creative industries. Lately, the UK government has considered the adoption of a new classification of 'creative' industries, building on 'creative intensity', that is, the ratio by which 'creative' occupations are employed (Bakhshi, Freeman, Higgs, 2012). At the European level, since the Millennium, the European Commission has launched many initiatives to promote the creative and cultural industries, identified both as one of the fastest growing sectors of the economy and as potentially capable of fostering innovation in the economy at large (see the Cre8tv.eu research project report, 2016). In this essay, creative work, organizations and fields are used as field/empircal categories that represent belonging to the so-called creative industries. For the purpose of this essay, which is to explore the transformation of creative work practices, organizational processes and field structure, the label 'creative' is used to identify an area of empirical investigation. In short, in line with an ethnographic approach, I call 'creative' what is called as such in the field and I am thereafter interested in understanding the meanings that this label gets in practice and what it becomes associated with.

both in the media and in research about creativity and AI: Can machines be creative? Can creativity be automated? What is creativity, then? Is their work really original? This discussion is at the center of a whole field of computer science research called computational creativity.

Such debates, like others related to AI developments, are often accompanied by either utopic visions or dystopic scenarios about the future of humanity. On the one hand, some – entrepreneurs in the AI field, often technology developers, some creators, investors and part of the press – portray the possibilities offered by AI applications as the solution to all human problems and the tools able to empower and free people's inner creativity. On the other hand, others shout at the potential loss of jobs in all industries and at the impossibility of machines doing "real" creative work.

The debate would, however, benefit from looking at how work – by humans and machines – is actually performed and organized every day and what AI means for the way creative fields are (re)structured. The conversation in the field of AI and creativity has especially been focused on defining whether machines can "really" be creative and making utopic or dystopic imaginaries for the future, but I would like here to call for viewing learning algorithms as technical artifacts that are culturally and socially made and that in turn shape cultural and social relations. This means calling for understanding AI not only technically, but also through a practice-based, symmetrical and history-aware[3] investigation of the development and use of learning algorithms, with

3 The three adjectives "practice-based", "symmetrical" and "history-aware" have their roots inat the intersection between Actor-Network Theory (Latour 1982, 2005; Mol & Law, 1994; Callon, 1986) and Economies of Worth (Boltanski & Thevenot, 1991/2006), two social science perspectives that have been called symmetrical twins (Guggenheim & Potthast, 2012). In particular, both approaches call for investigations of the social world that focuses on actions, treats humans and non-humans symmetrically and traces associations in time and space without fixed a priori notions of causes and effects. This implies that neither AI (and associated terms, like algorithms and automation) nor creative processes, aesthetic judgment, organizations, or fields are fixed entities, and that we need to pay attention to how human and non-human agents actively compose or decompose such "things".

a distinct attention to work practices, organizing processes and field structures. Along these lines, this essay aims to identify some of the overlooked issues in the AI transformation of creative work and to frame urgent questions to investigate the conditions and consequences of this transformation.

The rest of this essay is thus structured as follows. First, I introduce a brief note on the beginnings of AI and the debate of automation of work. Then, I move on to discuss how AI and creativity have been related and develop a critique in order to move forward and ask new questions. Thirdly, I spend some space framing the two crucial questions of this essay: practice and judgement, organizing and structuring. Finally, I develop some concluding remarks.

Learning algorithms and automation of work

The history of automation of work goes back, in a way, to the beginning of humankind, as archeology and literature have shown us through artefacts and mythology. From what we know about humans, it seems that we have been using tools to enhance our ability to perform tasks (We need clarification here: other what? DKS) for thousands of years. The Industrial Revolution brought the possibility to produce energy and thus to give the ability to machines to move by themselves (being autonomous) and to do this on a big scale. At the beginning, automation of work focused on bodily functions; over the last 60 years the development of artificial intelligence has shown in theory and in practice that it is possible to automatize an increasing number of intellectual activities.

The automation of routine tasks in intellectual activities, like sending a letter or formatting and printing a text, is unquestionably part of so-called white-collar work and, perhaps it could even be argued that the two have been rising together. Machines considered intelligent are now, however, learning to perform non-routine intellectual tasks and are conquering new domains, performing at the human level or above at tasks such as playing chess, steering

airplanes, driving cars, navigating ships and recognizing faces. Today the research on the possibilities of automatizing tasks of the human mind, like decision-making, is intense and has found concrete and well-spread applications in a variety of commercial, financial and legal areas (Davenport & Harris 2005, Kraus 2001). Academic projects, such as the Human Brain Project in Europe and the Human Connectome Project in the US, and industry investments spearheaded by Google, IBM, and Microsoft, lead this development. Applications of these intelligent machines in creative work is considered particularly interesting because creativity is usually treated as a unique human capability.

Scholars usually agree that the term Artificial Intelligence was coined in 1955 by John McCarthy, Assistant Professor in Mathematics at Dartmouth College in the US. Together with three colleagues, he proposed a summer research project on artificial intelligence, which should take place at Dartmouth College during the summer of 1956. In the proposal, he wrote:

> *We propose that a 2 month, 10 man study of artificial intelligence be carried out during the summer of 1956 at Dartmouth College in Hanover, New Hampshire. The study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves.*
> *(http://www-formal.stanford.edu/jmc/history/dartmouth/dartmouth.html)*

This incipit of McCarthy's and colleagues' proposal summarizes the ideas, assumptions and purposes of what they called Artificial Intelligence. They gathered under the belief that a precise description of all intelligence or learning could be developed, so that it could be formalized in unambiguous rules

for a machine. One of the themes of this first project was called "randomness and creativity" and aimed at the study of an appropriate way to describe creativity and formulate precise rules for it: McCarthy and colleagues departed from the hypothesis that randomness guided by intuition could represent creativity for machines. It is indeed interesting that computer scientists believed in the possibility to inscribe into a machine a sort of creativity formula and this was driven by logic rather than by a practical understanding of creative work. The logic of logic dominating the first developments of AI – and in part also contemporary developments – seems also to be particularly suited to the current neurologizing trend, according to which, all we do can be controlled by the mind and neural mechanisms.

From the beginnings, artificial intelligence as a field has expanded significantly and it has gone through different cycles of optimism and pessimism. In the sixty years after McCarthy's summer research project, this term successively came to include technologies for an increasing number of tasks, like natural language processing, speech recognition, game-playing, robotics, intelligence knowledge-based systems (Susskind & Susskind, 2016). The history of AI could be divided in two seasons: 30 years of what can be called an AI Spring, culminating in the '80s with their hopes for the role of machines in the future of humanities, and about 30 years of what can be called an AI Winter, "a period during which AI seemed to stall (Susskind & Susskind, 2016:183). Over the last few years, however, AI seems to have come to a renewed Spring (see Czarniawska & Joerges, 2020, for an insightful and comprehensive review) and many technologists and non-technologists contribute to the hype. As such, some ride on it, others wait until it's over, and a few have the privilege of asking questions tracing automation from the design of AI to its consequences. The reflective hybrids that this special issue calls upon belong to those privileged ones and have the duty to raise naïve questions that open up boundaries of technologies and make development more democratic, questions such as: What automation? What for? Why? In what way? For whom?

AI and Creativity: Taking stock and moving on

Margaret Boden is usually recognized as the mother of this community, as she had already focused on creativity in her 1977 textbook *Artificial Intelligence and Natural Man*. Boden (1998) argued even the most technologically-oriented AI cannot ignore creativity as a key feature of human intelligence, and in turn creative AI might be useful to psychologists to understand human creativity.

This area of research, where artists and psychologists are active alongside computer scientists, has greatly contributed to experiments with new computational models in creative processes (e.g. Dahlstedt & Nordahl, 2001) and has extensively debated what creativity is and how it can be modeled (see e.g. Boden's model of combinatory, exploratory and transformational creativity, 1998). As Boden (1998) herself recognized, one of the key issue in this research is the evaluation of creativity: "how can a computational system know when its outputs are worthy of the term *creative*?" (Cardoso et al., 2009: 19). Evaluation mechanisms are indeed programmed into creative AI in different more or less autonomous ways, but what do these technological inscriptions of values carry and what are their consequences? If we shift the focus from optimizing the functionality of algorithms to understanding them as a culturally- and socially-made artifact, we see that creative processes and aesthetic judgement unfold in the midst of collective practices of valuation, where things are collectively made valuable and worth is established, assessed, maintained and contested (Kornerberg et al., 2015). Rather than defining whether machines can "really" make art or "really" be creative, this essay aims at framing urgent questions and calling for further research and debate on how AI reshapes practices, organization and fields of creative work.

Research on the creative fields has highlighted, from different perspectives, the struggles between aesthetic and professional autonomy on the one hand, and managerial practices of control and marketization on the other hand (Hesmondhalgh and Baker, 2011). To put it in Banks' words (2007:6), the "artistic desires for creative autonomy and independence exist in uneasy tension

with capitalist imperatives of profit-generation and controlled accumulation" (2007: 6). These struggles have been portrayed under different terms: art and commerce (Caves, 2000; Banks, 2007), culture and commerce (Slater and Tonkiss, 2001), creativity and commerce (Negus and Pickering, 2004), art and capital (Ryan, 1992). In organization studies, organizations in which different, often competing, logics, like culture and commerce, coexist have been called pluralistic organizations. The concepts deployed to depict plurality in pluralistic organizations have flourished over the last few years: to mention a few, institutional pluralism (Kraatz and Block, 2008), institutional logics (e.g. Thornton et al. 2012), competing rationalities (Cloutier and Langley, 2007), and pluralistic contexts (Denis et al., 2007). The relation between different logics, rationalities and contexts is often portrayed as a tension – see for example the literature on new public management and the abundant studies on health care and other professional organizations (e.g. Reed & Anthony 1992; Power 1999; Schedler & Proeller 2002; Hughes 2003; Hammerschmid & R.E. Meyer 2005;).

Studying applications of learning algorithms in creative work is particularly interesting and relevant as the encounter between a mathematically instructed agent and an artistic (human) agent might give rise to a number of challenges. What happens there? How and where might the encounter develop? How is that encounter organized? In particular, three key aspects of creative fields, highlighted by organizational and sociological research, raise crucial questions in relation to AI developments and applications and potentially offer important insights for other fields of work.

(1) First, creative work is often subject to complex and ambiguous processes of evaluation: To establish what is good and what is bad, what has aesthetic and symbolic value vs economic value is barely possible – if not undesirable – with standardized and universal measures (Becker, 1982; Bourdieu, 1996). Given the unambiguous set of mathematical rules that need to be inscribed in algorithms, it is, thus, interesting to explore how

these rules relate to the ambiguity that characterizes practices of creative production.

(2) Second, what will be successful both in artistic and commercial terms is very difficult to predict, despite many attempts. In very simple terms, trying to predict and at the same time influence what the audience and the critics will like to read, watch and perhaps buy has been the full-time job of editors, directors, producers, and other mediators. For a number of years, increasingly sophisticated learning algorithms have been used to make predictions by means of logical or statistical extrapolation, built in their learning model. These are used both in recommendation systems, like the Amazon's or Tripadvisor's "You might be also interested in…", and in the actual making of creative products, like in many Netflix produced series.

(3) Third, creative organizations and fields are usually organized as hybrids, where multiple competing logics, values and interests coexist (e.g. Denis et al. 2007; Jarzabkowski et al. 2009; Thornton et al., 2012). The literature reports on struggles between art and commerce (Caves, 2000; Hesmondaghl, 2007; Florida, 2002) and ways of organizing to balance or integrate the two logics (Davis & Scase, 2000; Howkins, 2002; de Monthoux, 2004; Eikhof and Haunschild, 2007). Scholars have investigated how digital technology contributes to disassembling and reassembling the established ways of organizing in the creative industries (Mangematin, Sapsed and Schüßler, 2014) and to bring about novel forms of organizing, new collaborations, new expertise (Raviola and Norbäck, 2013) as well as new actors in the field, like global technology companies (Google, Facebook and the likes) and a new wave of so-called creative entrepreneurs. I believe, however, that the investigation of the development and use of learning algorithms in creative work needs a specific effort to develop new theoretical sensitivity and new methodological tools that are suitable to study and understand the making of society in what has been called the fourth industrial revolution.

In line with viewing AI as a culturally- and socially-made technical object, I would like here to frame two questions for investigations of AI in creative work at large, that would lead us to understand its wider conditions and consequences:

1. How is creative work practiced and judged in the midst of AI applications?
2. How is creative work reorganized and how are creative fields restructured in the midst of AI applications?

Practice and judgment

Artists and other creative workers are concerned with building artifacts that convey complex meanings, playing with ambiguities and exploring the liminal region between opaque mystery and interpretability. (…) In contrast, the focus in AI is on task competence, that is, on demonstrably accomplishing a well-defined task. To "demonstrably accomplish" means to show, either experimentally or by means of mathematical proof, that the AI system can accomplish a task. A "well-defined task" means a simple, concisely defined objective that is to be accomplished using a given set of resources, where the objective often has "practical" (i.e. economic) utility. (Meatas, 2001)

Many AI systems currently in use in creative work rely on human interventions to guide the programs in evaluating different aesthetic paths and the results of their work. So, designers, artists, journalists and musicians are often involved as observers giving feedback to the machine in its working process. There are, however, attempts at developing learning algorithms performing creative work by learning from existing creative products, like advertisement videos, painting images or texts, but producing results without human interventions. In all these cases, the encounter between artists' ambiguous meanings and mathematical (logical or statistical) rules raises a number of empirical questions: How are the ambiguity of creative work, rarely problematic in

arts, and the precision of mathematical rules negotiated and compromised? How are these algorithms written in the compromising process and how do they further write themselves as they are working? How do these algorithms interact with creative workers? How do they function as organizing devices both during their development and during their working?

Let's take performing arts as an example. They are interesting here, among other reasons, because they have been considered the emblematic example of what the economist Baumol called the "cost disease". Baumol argued that in labor-intensive sectors of the economy, like performing arts, advancements in technology do not produce a decrease in their production costs: To perform Beethoven's Symphony No. 9 you need the same number of musician today as in the XIX century. So, what is the role of AI in performing arts? Music has indeed developed in strict connection to technology and available techniques and materials have been shaping music practice and taste over time and space. Music creation has experienced the deployment of AI in different forms and processes since the 1950s. Different models, like GAN and genetic algorithms, are used in music composition and improvisation.

Recently there have been several experiments, led by researchers, dancers and big and small technology companies (like IBM), to try to write learning algorithms that are also able to produce dance movements and choreography. Learning algorithms are used in different ways in choreography, for example (1) to generate choreography, in interaction with artists (e.g. the machine learning tool for choreographers generated by Google Art & Culture), (2) to read movements and produce corresponding music (e.g. the Yamaha's AI system to transform a dancer's movements into piano music), (3) to dance with a human dancing partner (e.g. the project "The most human" by Swedish choreographer Robin Jonsson and his robot Alex). The use of AI in choreography raises issues of understanding the body and its movement, aesthetic judgment in practice and ultimately the boundaries of the human.

In AI developments and applications in and for creative work, many questions remain to investigate around the everyday practical interactions between creative humans and machines. For example, questions around which tasks are automatized and what happens in the formalization of those tasks into machines; questions about how expertise evolves and is distributed in new collaborations between computer scientists and creatives; questions about how aesthetic judgement is performed and (perhaps) displaced during the creative process and questions around new ways of negotiating and compromising different ways of valuing and evaluating work in the everyday situations.

Reorganizing work and restructuring fields

As new collaborations and intersections with other fields are established, new technologies not only enable artists to explore new creative processes and create new forms of aesthetics (Franco, 2017; Taylor, 2014; Patterson, 2015). They also trigger the construction of new fields of artistic production, like new media art and time-based media art, and the shifting of boundaries of existing fields of practice. The development and deployment of learning algorithms in artistic work intersect the general development of AI in society. Much of the global development of AI is driven by large global technology companies, like Google, Facebook, Microsoft and IBM, which have also made efforts and investment to be present in the AI and Art sphere, like in many other spheres of economic and social life. In June 2016, for example, Google launched the Magenta project (https://magenta.tensorflow.org/), a crowd-sourced open source research project exploring and developing machine learning for creative processes. Questions thus arise on how creative work gets reorganized and how fields of artistic practices at local and global level are transformed when new technologies, new norms and new organizations enter the scene.

Let's take publishing as an example. Publishing is usually classified as one of the media industries and it refers to all possible outlets, like books, newspapers, magazines and websites. For the purpose of this proposal the focus is on news publishing, as this field has long been affected by digitization and this is one of my areas of empirical expertise. The rise and spread of digital technologies in journalism, allowing us first to simply publish news online, then to share them on social media and now to automatize the prioritizing of news, have challenged existing professional norms and practices. Robot journalism is now on the agenda of many news organizations as a new phase of digital journalism, not least for its promises of efficiency. What is perhaps most interesting about the development of automation and AI in the news field is its transformation from a mature field with major newspapers as traditional actors and a relatively stable audience to a reemerging field with a lot of new entrepreneurs (blending tech and editorial competences), traditional actors in crisis yet trying to innovate and powerful giants, like Google and Facebook, which are new to the field, but have become inevitable points of passage for anyone else both technologically (for their platforms) and financially (they fund a lot of news innovation even by traditional newspapers). At the intersection between journalism and AI, new expertise has emerged, and many entrepreneurs have worked to sell their editorial and technological solutions for other purposes than news reading. Fact-checking has, for example, come to be a new category of actors whose technology-intense services have been offered and used in politics and NGO contexts.

Therefore, AI developments and applications in creative work also raise a number of important questions about their consequences for the organization and definition of fields, questions about who is in and who is out, questions about how new categories are constructed and performed and questions about relations of power between actors in the field.

Conclusions

Almost all sectors of society are crossed by the promise of radical change through AI and a group of new AI experts is growing. This essay calls for viewing AI as a culturally- and socially-made technical object and for a practice-based, symmetrical and history-aware investigation of its development and application in creative work. My aim here has been to frame some urgent questions along two crucial intertwined lines: practice and judgment, organizing and structuring. I would like to conclude here on what this might mean in terms of methodology and thus join others' appeal for the necessity of interdisciplinary research on AI (Sloane and Moss, 2019).

I see it as necessary to combine methods from our different disciplines – humanities, social sciences and technology –to develop a new research toolkit enabling us to *zoom-in* on the very practice of creative work, including the technical making of AI, and *zoom-out* to explore and trace connections beyond the very specific practice of creative work (Nicolini, 2009). In order to *zoom-in*, close collaborations between researchers (technological, social and human scientists) with workers on the floor are needed. Efforts to *zoom-out* will need to blend competence in artistic and computer science research with fieldwork techniques that are common in ethnographically-inspired (Atkinson, 2001) organization studies (Czarniawska, 2008), political science and legal ethnography (Arvidsson, 2013).

These zooming-in and zooming-out are indeed privileged journeys for some of us working on the boundaries of different fields, and at the same time might also be uncomfortable and disorienting. Some of us moving in and out, for example, are, like myself, social scientists that have been shadowing AI across different sectors and have developed some sort of interactional expertise (REF.) with technologists. I recognize myself as a (hopefully reflective) "hybrid" at the periphery of AI developments, observing AI experiments and discourse with curiosity and strangeness and trying to find openings to get in, hoping to pose naïve questions and give voice to new perspectives.

To paraphrase the call for this special issue, if technology is the answer, I have here tried in my hybridity to deconstruct its matching with the question of creativity and to call for opening the black box of creative work. When I first heard about the portrait of Bellamy, sold at Christie's in 2018, I got very curious indeed and ready to ask a battery of naïve questions. When I read about deepnews.ai and other experiments – at about the same time as the Cambridge Analytica scandal – I started to wonder about democratic consequences, positive and negative, of making news with AI, using my knowledge of the news field to zoom-out. But when I finally got to Shenzen and hung out for almost a whole week among technologists, AI gurus and entrepreneurs, however, I realized that the liminality of the hybrid position, which might facilitate reflection at times, for the possibility to look across boundaries, might also be filled with anxiety, for not belonging, for being "othered" and for not being expert in a society of experts, thus making reflexivity difficult.

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Elisabetta Jochim

The Opportunities of Artificial Intelligence and Art for Creativity and Society

Abstract

In this article I explore the value of intertwining art and technology, which goes beyond the sum of its parts. I illustrate the different ways in which Artificial Intelligence (AI) and machine learning bring new opportunities to artistic expression. I discuss how AI and art can help us unveil biases embedded in our society, expand human creativity, develop better technology to serve society, and spark innovation in other creative fields.

Keywords: Art, Artificial Intelligence, creativity, bias, society, neural networks, creative technologies.

1. Introduction

I am co-founder and director of Cueva Gallery, an online gallery, first of its kind in Ireland, devoted to art inspired and made by Artificial Intelligence. The gallery, a *Libre AI*[1] project, has been created to work toward bridging the gap between technical and creative communities, bringing to life a new space to nurture collaborations. One of its goals is to make AI art approachable also for those who are not tech savvy, and an essential element in doing so is a blog where I interview artists who use AI in their practice. The blog has given me the opportunity to chronicle my exposure to different forms of AI art and the

1 https://libreai.com/

artists who produce them. In this article I would like to discuss some common themes that arise around AI art and give examples that illustrate my views on its impact:

- the function of AI art as a mirror of our society
- the expansion of human creativity
- the possible role of creative technologies in society via artistic practice
- the new opportunities for the creative industry

I have done about 20 interviews since June 2019. I choose the artists to feature for their vision and ideas, after having studied them in depth and gathered information from their website, previous interviews, exhibitions, and collaborations. I provide the artists with a list of questions that I find relevant for our blog, with the intention of highlighting aspects that have not been discussed yet.

My point of view, therefore, is based on examples and vignettes taken from my interviews, iterations with artists, a personal study in the artistic field of AI, called Creative AI, a research project/exhibition that took place in Milan in 2019, the discussion about creative technologies in the field of Computational Creativity, and some first attempts at cross-collaboration within the creative industry.

2. AI Art as a Mirror of Ourselves and Our Society

As a mediator between the tech and the artistic communities, I find that AI art shows a convincing ability to detect potential dangers embedded as prejudices in our culture and at the same time to offer a cathartic opportunity for the creation of a more inclusive future. In the artistic practice, indeed, Artificial Intelligence can be at the same time a subject of study and a tool. AI art could help us to know more about ourselves and open our eyes on several issues, including social ones. I present here three examples where AI art can

act as a mirror of our society. Two of them relate to interviews with artists who critically engage with AI, and the third one is about a project/experiment which unveiled biases contained in a famous database used for the training of AI algorithms.

Several artists I spoke to, for example Jeroen van der Most and Harshit Agrawal, believe that AI art can unveil some of the problems that our society is facing. These artists often combine traditional ways of making art with algorithms, AI and data, and they critically explore the interplay between art and technological progress. According to van der Most, Artificial Intelligence is changing not only our ideas of what an art object is, but also how we define ourselves. The relationship we are forging with technology is shaping a new identity for us and urges us to reflect on our inner selves, opening opportunities for growth at a personal level (Jochim, 2019a).

Agrawal, a self-described cyborg artist, on the other hand focuses on the creation of experiences where people are pushed to think about how technology impacts their lives. He is particularly interested in how AI can help us discover patterns and be a reflection of us as a society, offering a mirror and drawing insights about ourselves (Jochim, 2019b).

In September 2019, an exhibition about AI and biases took place at the Milan Osservatorio – Fondazione Prada in Milan, Italy. *Training Humans* was introduced by Fondazione Prada as the first major photography exhibition realised so far which explores how humans are represented and codified by training datasets used by computers to make sense of the world. The show was designed by Kate Crawford, AI researcher and professor, and Trevor Paglen, artist and researcher, who are concerned about understanding the politics within AI systems. The latter, in fact, are increasingly used within our society and are having a great impact in many sectors, ranging from facial recognition to job interviews, etc. The artistic project aims to point out how databases used to train the algorithms can contain biases regularly passed on to machines through the humans who label the data and through those

who design the AI models (Crawford & Paglen, 2019). In particular, the show focuses on the ones embedded in ImageNet (Deng, Dong, Socher, Li, Li, & Fei-Fei, 2009), a visual database organised according to WordNet (Miller, 1995) hierarchy which contains 14,197,122 images and which is widely used in visual recognition software research. Generally speaking, a system recognises images of "foxes", for example, after being trained on a very high number of images labelled as "fox". Among other categories, ImageNet was also trained on thousands of images of people divided into descriptive categories and manually labelled. While some labels are ordinary, others appear to reflect the prejudices of the labellers in terms of age, sex, race, gender, and more: for example, a woman in a bikini is a *slut*, a young man drinking a beer an *alcoholic*, and so on (Rea, 2019). While the discovery of biases in ImageNet has been shocking somehow, it is of great importance because it has pushed the scientific community to face this issue and invest in education.

3. AI Can Expand Human Creativity

How Artificial Intelligence is redefining the concept of human creativity is widely debated (Marks, 2019). In the Creative AI field, artists consider Artificial Intelligence as a tool, a medium, and even a creative collaborator, but not a creator in its own right. AI has brought new aesthetics, expanded the collective imagination and involved the public at a level that goes beyond any expectation (Miller, 2019). AI can create work of great depth, shift attention to issues that are sometimes little discussed but of social interest, and promote a new vision and way of thinking. It also pushes the boundaries of the concepts of art and creativity, triggering an interesting dialogue between humans and machines. I think all these motivations make AI Art an interesting *niche* to watch very closely for the foreseeable future. I analyse here three examples that support the idea of Artificial Intelligence as an opportunity to expand creativity.

As an AI art gallery, we think AI can augment human creativity in different ways and could also be used by traditional artists. One of the obstacles to working with AI is learning to code, so we decided to explore new ways to incorporate the technology in the artistic practice. In the summer of 2019 we conducted an experiment with Mas, a self-taught Italian artist who painted on porcelain tiles *The Triptych* [Fig.1] inspired by the AI pieces of *Residual*, a collection made by the artist collective diavlex about endangered wildlife.

[Fig. 1] *The Triptych* (2019), work in progress. A turtle painted by Mas and inspired by AI images by diavlex. This is one of the three tiles that compose the final artwork. Courtesy of the artist and Cueva Gallery.

At the beginning the artist was disoriented because she was looking at images of animals painted by a machine that learnt to paint using brush strokes. The pieces catch the main features of the animals, but differ from a full painting. Our goal was to find a way to use the output of the machine with respect to the artist. After several discussions, Mas decided to change her approach and not to copy something the human eye could not recognise. Inspired by AI,

her work got a twist in composition and palette, using colour in a freer way (Jochim, 2019c).

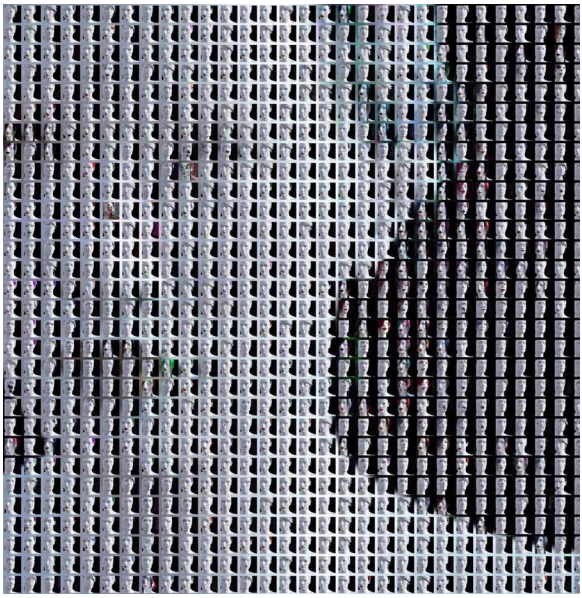
Looking at artists with a technological background, an example of Artificial Intelligence inspiring human creativity can be found in the art of Fabin Rasheed. He is an India-based creative technologist and artist who uses different technologies, including virtual reality (VR), augmented reality (AR) and AI. Investigating the concept of creativity, together with his colleague Sleeba Paul (an engineer from Kochi), he has created *Auria Kathi* (anagram for *AI Haiku Art*), defined by the artist himself as *the first Artificially Intelligent poet-artist living completely in the cloud* (Rasheed, 2019). Auria creates short poems and images that can be used as inspiration for humans. And it is precisely with Auria [Fig.2] as a muse that Rasheed has pushed this project further and hand-painted a collection called *The Augmented Artist* [Fig.3]: an exclusive work inspired by an AI, and then reinterpreted by the artist to create his own physical versions of the art in a true collaboration with Artificial Intelligence (Jochim, 2020d).

[Fig. 2] AI-generated image used as raw material for inspiration.
Image Credit: Auria Kathi. Credits for Auria Kathi to Fabin Rasheed and Sleeba Paul.

[Fig. 3] *Differential*, part of *The Augmented Artist* collection (2019). Hand-painted artwork. Credit: Fabin Rasheed.

Computational and figurative artist J. Rosenbaum, while sometimes missing the materiality of drawing and painting, has chosen to pursue art using technological tools because the machine-generated works have greater depth and potential (Jochim, 2019e). To ground a digital practice, the artist recognises the importance of having an understanding of art history and art creation, but AI allows a different level of expressiveness and investigation, focusing the attention on aspects that traditional art could not surface in the same way. For instance, Rosenbaum's recent work *Set in Stone* explores gender, non-binary gender, and bias, and reaches a new narrative thanks to the use of AI. Through this conceptual artwork, which evolves over time, the artist explores how machines create images of gender and whether in so doing they keep or challenge the bias contained in the training dataset. The artwork is a series of AI-generated marble faces where the neural network learns to create and update its bias on gender [Fig.4]. The system, at first trained on generating masculine marble faces, then adds feminine faces and it learns to change: it becomes a *transgender neural network* which keeps updating its knowledge.

Rosenbaum trains bias into the machine on purpose and then tries to un-bias it in order to understand how the work progresses and if the machine finally learns that there are non-binary genders. (Rosenbaum, 2020).



[Fig. 4] *Set in Stone* (2020). Credit: J. Rosenbaum.

4. A Possible Role for Creative Technologies in Society

AI technology is widespread; indeed, in the last few years, AI has been disruptive and advanced numerous fields and industries, including transport, healthcare, finance, and so on (Davenport & Kalakota, 2019). Based on my interaction with artists and researchers, I am convinced that the interweaving of Artificial Intelligence and art could lead to a deeper comprehension of technologies, and in so doing create a chance for society to improve as a whole. Through art generation we could understand more clearly how

technology works and consequently grasp several aspects of our human being in a world of machines. This is particularly appealing if we think that even researchers sometimes do not entirerly understand how machines function as, for example, in the case of an AI black box (i.e., a device or system whose internal operations are not accessible to the user).

As a practitioner in the AI field, I am wide open to its different aspects. Therefore, I borrow from academia a perspective that illustrates how we could improve our understanding of AI through artistic practice. Computational Creativity[2] is the research field that intersects AI, philosophy, cognitive psychology and the arts. It regards philosophical aspects around the notions of human and machine creativity, and the idea that software could become autonomously creative. Simon Colton – Professor of Computational Creativity in the Game AI Research Group at Queen Mary University of London, UK and in the Sensilab at Monash University, Australia – has written an essay entitled *From Computational Creativity to Creative AI and Back Again*, where he envisions a future in which technology takes some steps away from humans to serve society (Colton, 2019). He thinks comprehension of humans would grow with that of machines if software were allowed to record *its own life experiences*, and if these experiences, which differ from human ones, were used in a creative practice. Following this idea, software should be enriched with *intrinsic motivation, empowerment and intentionality* and stop mimicking human behaviours. This could make computer processing easier to understand. An interesting example provided by the scientist is DeepDream, a computer vision programme designed by Alexander Mordvintsev, engineer at Google (Mordvintsev, Olah & Tyka, 2015). DeepDream creates a dream-like hallucinogenic appearance using a convolutional neural network (or CNN, a class of deep neural networks used to analyse visual imagery) to detect images via pareidolia. Originally generated to help people understand how images were processed, these visualisations very soon came to be

2 https://computationalcreativity.net/home/about/computational-creativity/.

appreciated for their artistic qualities, pushing the research into generative neural networks (or GAN, a class of neural networks designed by Ian Goodfellow and his colleagues, in which two neural networks compete) (Goodfellow, Pouget-Abadie, Mirza, Xu, Warde-Farley, Ozair, Courville & Bengio, 2014). Although Computational Creativity and Creative AI somehow oppose each other, as the first focuses on the big picture of AI, while the second on the quality of the output, for the future Colton hopes the two fields will be able to work together.

5. AI Art is an Opportunity for the Creative Industry

At Cueva Gallery we have become progressively convinced of the great chance that AI art can represent for the creative industry. AI Artists bring to their work a personal touch and vision, exactly like artists in traditional settings, and for this reason every collaboration would be different and unique. In art, AI brings potentially infinite image generation and new aesthetics, with which a human could hardly compete. This happens not only because there is no limit to the new images a neural network can generate, but also because the aesthetics generated by the neural network can vary a lot. This depends on the dataset used to feed the neural network, the algorithm chosen, and other decisions the artist can make. While the final output is somehow unpredictable because the work of neural networks cannot be fully controlled, behind an AI artwork there is always a human mind that curates the work and makes sense of it. I think that promoting a dialogue between AI Artists and other creative industries could lead to new visions, problem-solving and novelty.

Computational artist Robbie Barrat, for example, who is a pioneer in AI art, has also taken a few steps into fashion. Barrat boasts a past collaboration with the Spanish luxury fashion house Balenciaga and a more recent one with Acne Studios. He teamed up with its creative director Jonny Johansson and

worked on the AW20 collection, training a neural network on a dataset with the Swedish fashion house's previous four seasons' collections (Boddington, 2020). His collaboration has also focused on the creation of tools for the designers to use directly, allowing them to modify the garments. While at the beginning Johansson planned to copy the suggestions created by the neural network, he ended up translating Barrat's work into clothes to wear. Acne Studios' identity has been respected and enriched with new features, showing the potential of AI for expanding both the creativity of designers and the realm of possibilities for future collections (Wilkins, 2020).

6. Conclusions

The vignettes stemming from the interviews I conducted with artists have shown that great potential can emerge from the interaction between art and technology. The fact that art based on AI and machine learning mirrors our society offers the chance, first on a personal level and then on a social one, to understand how we interact with technology and how the latter impacts our lives. Having knowledge of how computer systems are trained, make sense of the world, process data and learn can not only help us to spot biases and prejudices embedded in the technology we build, but also potentially offer the opportunity to make better machines and create a more inclusive society. Human-machine interaction also pushes the boundaries of creativity by augmenting the imagination of both the artists and the viewers, offering a chance to create immersive experiences and new ways of thinking. Artificial Intelligence and art, together, can leverage each other's complementary strengths and become an opportunity for creativity and society.

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Claudia Schnugg

Collaborations of Art, Science and Technology: Creating Future Realities with Art and A.I.

Abstract

Artists explore new territories in their work by exploring new media, imagining new futures, contextualizing ideas, creating aesthetic investigations into new environments, or posing questions and leading theoretical discussions. Interaction among art, science and technology can contribute to the creation of future societies – of future realities – on many levels, e.g., it can contribute to communication, create experience, enrich discussions, feed into scientific processes and support personal learning.

Especially when it comes to something influential like current developments in Artificial Intelligence, contributions of artscience collaboration can be essential for designing a positive future reality for our society. Supporting collaborations in organizations through well-structured formats in the organization supports the realization of elaborate art on the topic that contributes to important developments in the organization as well as to an informed discussion with broad audiences and shareholder groups.

Keywords: Art and Science, ArtScience Collaboration, Art and Technology, Artist in Residence, Artistic Inquiry in Social and Economic Development, Corporate Artistic Residency, Art and Innovation, Artistic Strategies in Innovation

1. Three Scenes: Explorations, Future Visions and Questions

ONE: In 1999 *The Laboratorium* took place in Antwerp. As a major artistic event, the exhibition brought together art and science, staging scientific laboratories and experiments in an artistic environment to initiate relevant

interactions between art and science, at the same time addressing a broad audience. One of the experiments presented at the exhibition was *The Talking Heads experiment* by Luc Steels (see Fig. 1). It interrogated the genesis of a cognitive system – like a language – through the interaction of "talking heads", i.e. two interacting artificial systems (computer agents) developing a cognitive system to interact, challenged by inputs from the environment. Scientifically, the project investigated the genesis of a language system. At the same time, it used a bottom-up approach to understand Artificial Intelligence: it is a case study in how an artificially intelligent system can develop.

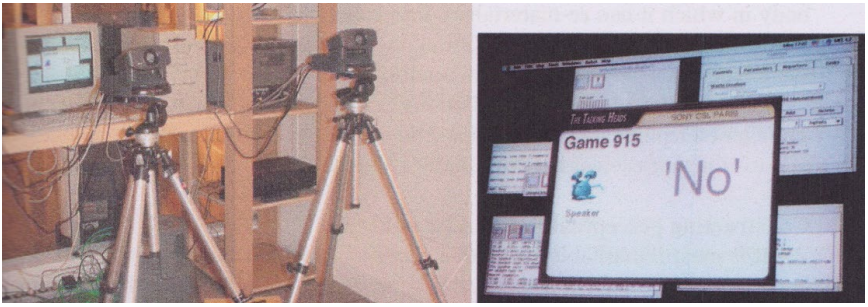

Fig. 1: *Talking Heads Experiment* Installation View at the Wellcome Gallery in London (2000). Left: Talking Heads cameras oriented towards the wall where the input is provided to them to process, in the back the computer system operating the Talking Heads. Right: Outcome projection of the interaction during an ongoing experiment. After a game failed, one of the talking heads says "No" as reaction to the failure. Credit: Luc Steels, 2015: p. 239.

Because of the art-science exhibition situation, the experiment was presented with the support of curators to a broad audience, who were asked to interact with and challenge the artificial system. Afterwards, the project was shown at numerous artistic spaces. Thus, it supported the development of a more informed discussion with a broad audience on A.I. while contributing to the ongoing scientific research. In 2001, scientist Luc Steels teamed up with renowned artist Olafur Eliasson to take the project into an artistically elaborate

presentation with a focus on light and color.[1] The artwork *Look into the Box* developed and was presented worldwide and was shown in exhibitions and workshops on A.I. up until 2019 (see Fig. 2).

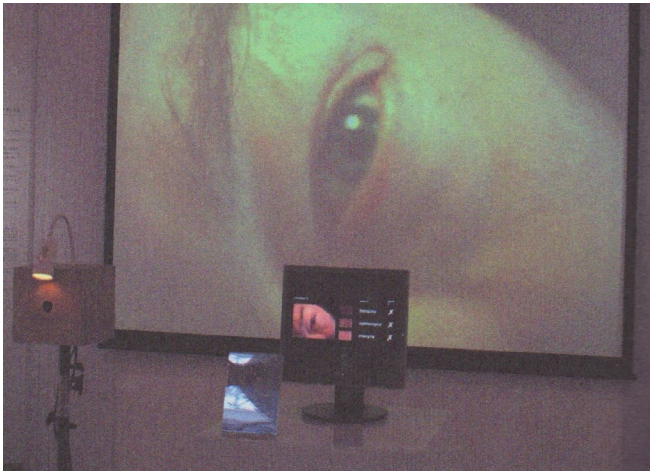

Fig. 2: *Look into the box* (2002) by Olafur Eliasson and Luc Steels, as presented in 2006 at the Tokyo Explorascience Museum, Credit: Luc Steels, 2015: p. 264.

TWO: In 2019 at *La Biennale di Venezia* artist Hito Steyerl[2] contributed two artworks to the main exhibitions in Arsenale and Giardini: *This is The Future* (Fig. 3) and *Leonardo's Submarine* (Fig. 4). For both installations, the artist used A.I. algorithms and digital media to create imaginative future scenarios, tackling questions of complex interdependencies of social, environmental, industrial, technological and corporate environments. She asked how A.I. systems affect future scenarios and questioned types of connections between stake- and shareholder groups that have the potential of undermining society

1 Steels (2015).

2 For background information on the Biennale exhibits in 2019 by Hito Steyerl see https://www.labiennale.org/it/arte/2019/partecipanti/hito-steyerl.

and culture. With this critical work, Steyerl created something highly experiential that feeds into discussions about societal and cultural developments.

Fig. 3: This is The Future by Hito Steyerl, installation view at Arsenale, La Biennale di Venezia, 2019; photo credit: Roland Aigner.

Fig. 4: *Leonardo's Submarine* by Hito Steyerl, installation view at Giardini, La Biennale di Venezia, 2019; photo credit: Andrea Kurz.

THREE: In the 1960s at AT&T Bell Labs the art and technology program *Experiments in Art and Technology* (E.A.T.) became famous by bringing artists into the laboratories, creating a new generation of interactions leading to iconic artworks. Most recently, with the anniversary of some prominent E.A.T. projects[3] at the end of 2016, the program was revived at Nokia Bell Labs. The goal of the new E.A.T. program is to invite artists into the laboratories, exploring the future of communication and technology from a human perspective. One of the artists-in-residence, world-class beat boxer Reeps One, explored human creative potential through collaborative exercises between his human creativity and A.I. technology[4]. In addition to reaching beyond usual techniques triggered by the unforeseen interaction with the A.I. system, the project explored the role of human-embodied knowledge, human voice and human identity in interaction with communication technologies. The project fostered his own creative process, led to new, unexpected artistic output, and created contributions to the research process by generating valuable experiences. Here is the link to listening:

Fig. 5: Screenshot of the video *v* in which Reeps One develops creative sounds and patterns in exchange with an A.I. which is his Vocal Twin. For true experience of this work, follow the link https://www.youtube.com/watch?v=q981cTdL0_Y and listen to the interaction. Reeps One describes his journey in his own words and gives more examples here: https://www.youtube.com/watch?v=wTMMopLYJn4.

3 For more information about the anniversary of the "9 Evenings", see a series of performances and staged artistic production that marked the beginning of the E.A.T. in the 1960s: http://www.9evenings.org/eat/.

4 For more details see https://www.bell-labs.com/var/articles/we-speak-music-potential-ai-and-how-we-got-here/.

ONE-TWO-THREE. These three scenes show how artists explore the new territory of Artificial Intelligence (A.I.) and leverage their and their collaborators' work by bringing artistic strategies into the exploration of newly-developed technological possibilities. The first scene shows a pure research setting that was enriched by artistic approaches and through interaction with broad audiences. The second scene shows critical reflections produced by an artist interrogating A.I. systems and utilizing them in a political way to create reflective experiences. The third scene shows multiple layers: an organization investigating their core mission in collaboration with artists, learning from and with the artist about the human voice and communication, but also technology, namely A.I. tools, allowing the artist to experience his own very special abilities from a different perspective and thus enabling him to push the limits of his own artistic craft and become more creative. In Reeps One's case the A.I. tool is more than a sparring partner because it allows him to see his own processes and patterns through the AI twin from an outside perspective, which helps him to see underlying principles and even overcome "organizational (inattentional) blindness"[5].

These examples give small glimpses into what is possible by intertwining art, science and technology, in this case art and A.I.: it leads to unexpected outcomes while it helps to actively create future realities, understand the realities individuals and groups/organizations live in, explore new approaches, and introduce critical reflection. Exploring new territories with artists can bear risks for everyone, as logics from different fields and cultural backgrounds meet when the worlds of art, science and technology collide (organizations add another layer with their predominant economic embedding). When we step into uncharted territories, important challenges can be tackled in new ways and contributions will be generated. It is difficult to say in advance

5 Inattentional blindness is defined as something that is invisible to a person although "in plain sight". Organizational blindness can be understood as something that you cannot see anymore because you do it every day or because your attention is focused on something else due to the information you have and your internalized processes.

whether every encounter will be innovative or have a tangible outcome that will immediately make an audience understand why this specific encounter was important. And it is even more difficult to say in advance which specific outcome there will be, but if we knew what the "new" that we wanted to find was, we would not have to search for it. The cases can be seen as footsteps into the unknown, maybe having solved an important puzzle of a later prototype or served as a challenging insight or idea.

To untangle the contribution of interweaving art and A.I. in order to create positive future realities we first point to research on the effects of art in scientific, technologic and economic/organizational environments. Based on this body of research we will be able to look more closely at dynamics that emerge in the interaction of artists and A.I. researchers, engineers and other stakeholders, and by looking at these dynamics we will be able to identify relevant possible outcomes that go beyond typical buzzwords of inducing creativity or producing innovation.

2. Art and Science, Art and Technology Exchange in Society and Economy

Art historians[6] as well as experts in technology[7] have acknowledged the valuable contribution art-technology interactions to the development of their fields. In management science, artistic interventions into organizations have been understood as valuable opportunities to develop diverse organizational aspects by a growing group of scholars[8]. Looking at the potential of art in diverse organizational contexts, a broad range of contributions have been identified[9] that can be located on different organizational levels (see Fig. 6)

6 Shanken (2002), Taylor (2014).

7 Lindgren (1969).

8 Seifter et al. (2010).

9 Edwards (2008), Sköldberg et al. (2016).

and a review of 74 cases has shown the breadth of the asserted effects on these different organizational levels (see Fig. 7).

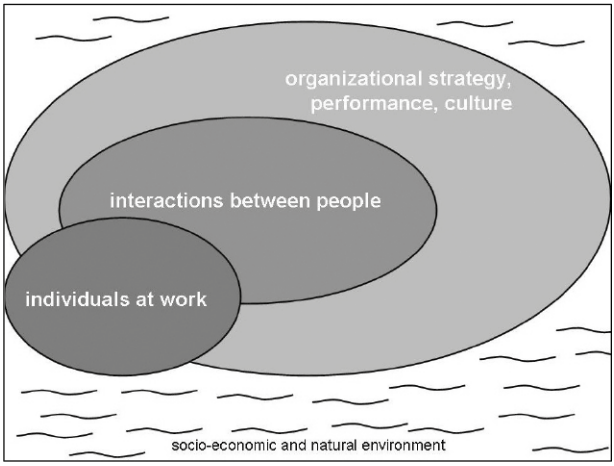

Fig. 6: Where artistic interventions add value in organizations, Antal Berthoin (2009).

It is not possible within the limits of this article to go into depth on all possible effects in relation to art and A.I. processes. With an eye to the creation of future realities through technology and science, not only is art a creative explorer of possible applications of brand-new technologies, but artists are also able to create new contexts, add meaning and investigates stories of future realities. Artworks can create experiences to get in touch with imagined future scenarios through different bodily senses. They can initiate important discussions, allowing a society to contribute to the development of the future reality that society wants and needs. The experience of the collaboration process is important so the collaborating partners can learn, explore new methods and skills, get in touch with new perspectives and create new insights[10]. We must

10 Schnugg (2019).

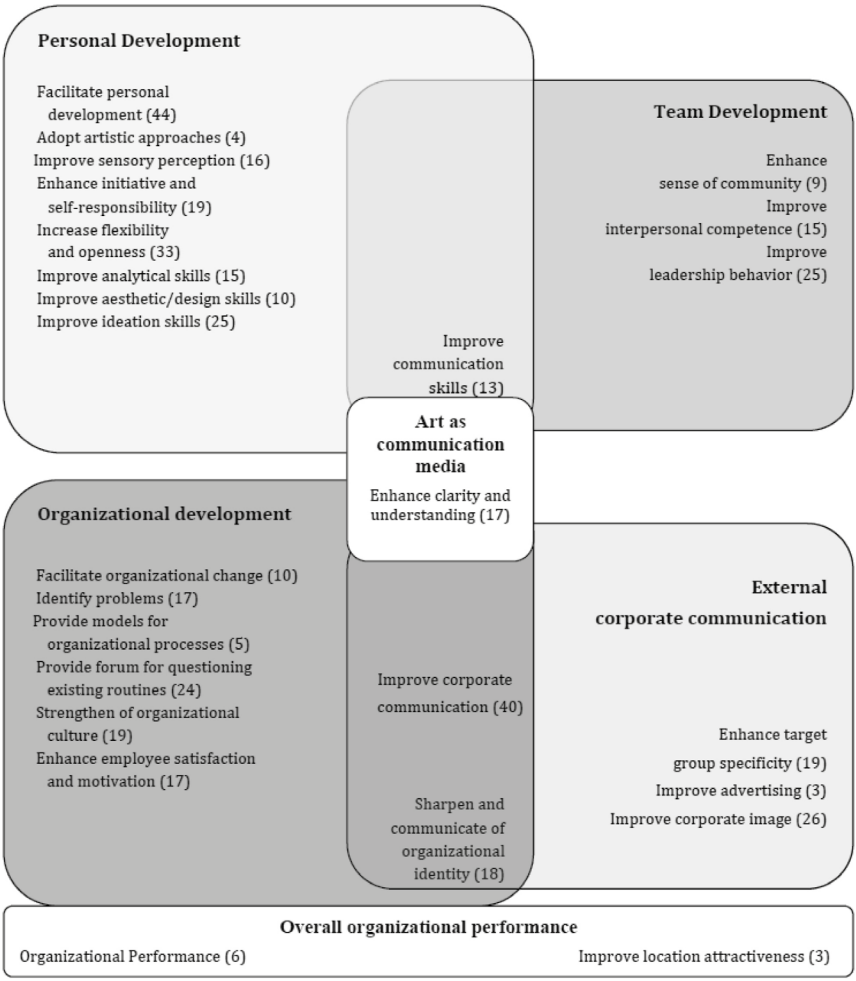

Fig. 7: List of asserted effects of arts-based initiatives in business organizations. Numbers indicate in how many cases out of 74 the specific effect was asserted; Schnugg (2010).

be aware that diverse, real human beings interact with non-human actors, forming a social prototype, a seed for a yet-unknown collective future. The three scenes presented above exemplify some of these dynamics beautifully.

3. What about Art and A.I.?

After a long research phase, tools integrating A.I. are rapidly becoming more capable of solving tasks and are becoming integrated into technologies that affect different levels of society: the labor market, work processes and businesses[11], e.g. digitization and automation incorporating A.I. create new demands on personal skills, responsibilities and collaborative capabilities[12]. At the same time, A.I. tools influence individual experiences, from personalized shopping experiences to security and safety measures in public spaces, and personal exploration of art, like music suggested by algorithms in semantic players. These changes not only challenge users and creators of applications by accustoming them to them or creating a need for new sensemaking and learning systems[13], but they can also lead to problems, for instance enforcement of stereotypes, raise ethical issues[14] or lead to problems through misinterpretation of data in cases of algorithmic overdependence[15].

At the same time the body of research mentioned above shows that integrating art, artistic strategies and artistic processes in organizations, projects and development processes leads to an abundance of possible effects, adding knowledge and feeding into the potential to overcome challenges. **So, how**

11 Frank et al. (2019).

12 Autor (2019).

13 Mesgari (2019).

14 Coeckelbergh (2019).

15 Wei et al. (2017).

can we gain an understanding of the potential of pairing art and A.I. to create future realities?

The three scenes presented above point to the different layers of effects in scientific or research settings, in societal discussions, in corporate organizations and for artistic practice. Depending on the lens we take, it is possible to analyze the impact of the interdisciplinary inquiry among A.I., art and the different actors (e.g., scientists, collaboration partners, audience, engineers). What we are interested in here is how working with art and A.I. can become a platform that enables all these wonderful effects and potential outcome. We will have a closer look at what the potential of the three presented projects is and what the dimension where they contribute is while keeping an eye on the body of literature on impacts of artistic interventions in diverse organizations.

Artists explore A.I. as a tool to create their art, to find new forms of expression or to enhance their creative process as these systems makes suggestions in unexpected ways[16]. In that sense, they can contribute to a broader body of knowledge about skills, new work processes and which possibilities interaction with and application of A.I. systems bear. Going even further, artists approaching A.I. as collaborative partners and investigating the role of the human in the context of A.I./A.I.-powered technology create an understanding of future shared practices, limits of technology and humanizing processes (instead of adapting humans to technology)[17]. Artistic exploration thereby goes beyond understanding a possible interaction process; it also enables learning about humans, individual processes, and needs. It can touch important questions that have been asked without finding definite answers in order to add new layers of understanding. The case of Reeps One at Nokia Bell labs is a wonderful example of this. The A.I. twin of his voice and professional

16 Jochim (2020).

17 Chung (2020).

skills acts as a sparring partner, a mirror and an externalized entity of his embodied skills, which helps to push the professional borders and supports creative processes. Learnings can bring insights into important dynamics and fuel the so-much-needed discussion of A.I. in broader society. This discussion is mainly brought to a broader audience through presentation of the artwork, either in exhibitions or in events, but it can also be embedded in public engagement methodologies, as suggested by toolkits for Responsible Research and Innovation[18]. Although the project also created important dynamics in scientific developments, the Talking Heads experiment is a wonderful example here.

Themed exhibitions presenting artistic work on A.I. and reflecting on historical developments in art, computer science and A.I. can offer new access points to scientific and technological developments. At the same time, artists are in a position to go beyond intellectual discussions of topics by creating an experiential understanding of complex interrelations. This may be an experience of the abstract concept of Algorithmic Overdependence[19] or interaction with robotic systems. In this sense, art makes you feel what you can barely understand. Combining intellectual aspects and embodied experiences can lead to an informed and relevant discussion. Therefore, commissioning artists to explore such issues in their practice supports the creation of a considerable body of artwork that supports social, ethical and economic discussions. The artwork of Hito Steyerl goes even further: it gets under the skin of the participating observer. Her work is highly self-referential, both by enhancing critical discussion through art on social and economic developments and by utilizing the technology that drives these developments in the artwork.

Artistic exploration of A.I. as technology or in social contexts is relevant beyond the outcome that is presented to and discussed by the public. In

18 Sparks Toolkit (2018).

19 Stary et al. (2020).

artist-in-residence programs in organizations, the artistic process carries the potential to become an important contribution to the development process in the organization, bring in new perspectives and help to overcome organizational blindness. The artist herself is the intervention in the social system. The magic happens when, systemically speaking, the two systems positively irritate each other, fostering the emergence of new communication patterns and subsequently carrying forward new meaning. Reeps One mentions that the A.I. system based on his voice gave him a new perspective on his own work, patterns, and processes while suggesting completely new constructions. This inspired him to become more creative and push the boundaries of his (artistic) craft. At the same time, artistic research puts the scientific questions and technological outcomes into broad contexts, asking different questions than scientists, engineers, policy makers and corporations ask. The case of Hito Steyerl is at first sight rather critical, but many projects inviting artistic strategies in contextualization processes and the development of future scenarios bring in new connections of matter and mind, propose valuable development, and show realistic dependencies.[20] Thus, the contribution can be invaluable for those inviting artists to work with them, just as it brings new dimensions to the project, scientific and technological endeavors.

4. Formats Supporting Art-Science-Technology Collaboration Frequently Found in Organizations

So how can these collaborations between art and A.I. be realized and their contribution understood as relevant? I will illustrate these questions concerning the creation of opportunities supporting art-science-technology collaboration.

20 Malizia et al. (2019).

They are often created as collaborations between artists and scientists in A.I. or artists and engineers. Artscience collaboration programs as fruitful platforms for interaction between artists and scientists often take place within organizations[21] and thus must be discussed in a language that organizations currently speak – or at least can connect with. This leads artscience programs to be designed around specific goals like contribution to creativity, innovation, or HR development. Unfortunately, buzzwords like these are frequently used to argue for such programs in communication with the organization, employees, and to stakeholder groups. This communication of goals inevitably leads to evaluation of the outcomes along these major goals. Taking the example of creativity, at the beginning of the discourse artists were brought to corporate organizations in order to add creativity because they are artists: art seen as connected to "the new" in the Western cultural understanding[22] was something scholars and practitioners started to look at to infuse corporations with creativity[23]. In some of these attempts, the creative processes of the organization and the artists were not taken into account, and some programs did not even bother to create a structure for artists and employees, for artists and the organization as such, to interact. When the success of such programs at the end in terms of heightened creativity was evaluated, the outcome was inevitably poor[24]. Artists became a decoration, the desired creative powers stayed isolated, and the possible chaos or breakdown of common ways of thinking, sensing, and acting was eroded.

Nevertheless, these projects have relevant outcomes when viewed from a different perspective, which teaches important lessons: if a program for art and science in an organization is developed for a specific goal, it is important to understand the theoretical concept of the goal (i.e., What is creativity?)

21 Schnugg (2019).

22 McRobbie (2001).

23 Styhre et al. (2008).

24 Raviola et al. (2016).

and how to integrate it into the organizational structure (i.e., management, responsibilities, hierarchies, processes). If planned well with understanding of the organizational, personal, and artistic strategies, programs with art on science and technology in organizations can be successful in many ways. These undertakings require leadership giving explicit approval of and opening spaces for co-destroying and co-creating meaning. Art by definition is not primarily logic but rather combines pre- and transrational as well as rational modes. These are also helpful capacities in business and especially where business is stuck or ready to step onto the next level.

As the three scenes at the beginning of this article show, contributing to scientific research in unexpected ways, inducing critical reflection and discussion of future realities of society, and tackling an organization's important research in a new way while pushing the creativity of the artist by exploring technology in relation to individual knowledge are three completely different outcomes. Curating their process, connecting them wisely to organizational goals and visions, and relating them to strategies to actively create positive futures by following up and managing the different levels of the outcome will lead to positive results for all parties involved[25].

Methods organizations use in their interactions with art, the artistic process, and the artists were clustered into formats ranging from events to consultancy, workshops, and artist-in-residence programs[26]. Artist-in-residence programs are a convenient opportunity to initiate collaboration. Within the limits of this text I will give a taste of these programs and examine the most important preconditions for this popular intervention to bear fruit.

However, artistic residencies do not automatically imply collaboration processes; collaboration must be facilitated and given enough space and time from the organization's side. Artistic residencies are a basic mechanism in

25 Schnugg et al. (2020).

26 i.e. Berthoin Antal et al. (2013), Schnugg (2014).

the artistic community, just like visiting research opportunities in the scientific world. They imply the opportunity for the artist to be hosted by an institution, organization, or place, providing space and time to work on their artistic project. Here are major aspects that influence the procedure of an artist-in-residence project:

- Themed work, collaboration with local individuals, different funding schemes (artist fee, production budget, travel, accommodation): artist-in-residence programs in corporations and scientific organizations range from inviting artists into their premises, giving them access to facilities, commissioning themed artworks, or building up intense interdisciplinary collaboration.
- Regular shorter visits over a long period (from one year up to several years) vs. fixed periods on site (e.g., two or three months, up to a year).
- A residency can be framed differently: some visiting artists receive the status of visiting researchers because the organizational structures cannot deal with them differently; sometimes the format of a fellowship provides more flexibility in terms of interaction and access.
- Art-science collaboration can aim at collaboration in the sense of co-creation (create one shared output, which may be scientific, artistic, product, or somewhere in between). Collaboration does not need to lead to a shared outcome but should feed into the artist's and the collaborating partner's (e.g., scientist, engineer, project group) goals separately through the joint experience and learning process.
- Focus on the process means focus on personal development and experience, broadening the scope of methodologies and engaging in joint research, whereas dealing with the outcome can lead to in-depth discussions, experience of previously purely intellectual concepts, or having experiential entities to reach out to broader audiences.
- Commissioning an artwork on a specific topic related to the organization can be combined with an artscience collaboration process or a residency, but basically it means that the artist will engage in the topic

to develop an artwork. These artworks can be brought back into the organization (which can be a scientific, corporate, cultural, or educational organization) to be discussed or engaged with.

5. Conclusion

Artists investigate scientific and technological developments; they interrogate cultural and societal questions. Thus, a broad audience gets in touch with these topics, and future visions can be generated and discussed. Engaging in art in the process of investigating new technologies – and the social and cultural challenges that they bring – with art is a powerful tool. It is important to approach artscience/art-technology interactions with the full freedom of each disciplinary background, not to push art into more scientific or corporate methodologies, but letting the different worlds **collide as they are**. Moreover, the outcome is less about tangible innovative products and more about critical reflections, elaborating on questions to understand in which way it is important to go forward, and learning processes on personal, interpersonal, organizational, and societal levels. Collaborators should crack each other's shell – on a personal as well as on a systems level. Otherwise new weavings will not occur. By realizing this and supporting the exchange or collaboration in an open way, these interactions can be fruitful for everyone, the process and outcome of the joint experience can reach their full potential, and problematic situations of instrumentalization of art can be avoided.

Bringing these fields together can – and most likely will – be challenging for the acting parties, but whatever interaction or joint exploration is initiated, it will lead to unexpected as well as valuable multi-layered contributions to a sustainable integration of technological opportunities into the creation of shared future realities.

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Sougwen Chung interviewed by Claudia Schnugg

A reflection on Art, Artificial Intelligence and Robots in Society

Sougwen Chung is an internationally renowned artist and a pioneer in the field of human-robot collaboration. In her work she artistically explores and researches ways to work with machines and the potential of artificial intelligence in creative cooperative processes. Chung has been artist-in-residence at distinguished organizations like Nokia Bell Labs, is a former research fellow at MIT's Media Lab and was selected as the Woman of the Year in Monaco in 2019 for achievement in the Arts & Sciences.

Claudia Schnugg: Hi Sougwen, it is a pleasure to chat with you. First of all, thanks for being available during this time of pandemic confinement, social – or better physical – distancing and huge insecurities in the cultural sector. Much of your work is about collaboration, exchange and interaction and involves many actors. Can you describe the role of interaction with human and non-human actors, in person and at a distance? How does the current situation affect your work?

Sougwen Chung: Hi, Claudia. It's my pleasure to chat with you – albeit a bit surreal at the present moment.

So many cultural sectors are navigating uncertainty simultaneously, forced to re-envision existing conventions while adapting to unprecedented circumstances. More broadly, it's been striking to witness these unprecedented shifts in our conception of normalcy.

There's undoubtedly been a shift in the conditions of my practice over the past few months, as many performances and projects have needed to adapt. As a result, I've been creating new works while sheltering in place, with a focus on telepresence and networked robotic agricultural systems.

Schnugg: In your artwork you collaborate with robots. Could you introduce your work, the fundamental ideas and processes?

Chung: My work explores the role of A.I. as collaborator, creative catalyst, and medium for collective authorship.

The practice engages the fields of art and research as components of a multi-modal process in which human, machine, and environment are implicated in feedback loops that explore different interaction models and concepts. My ongoing project Drawing Operations Unit: Generations 1-4 has focused on mimicry, memory, swarm intelligence, and biometrics feedback within the dynamic of collaboration.

I'm interested in developing methodologies of co-creation that expand upon traditional forms of making (drawing, music, poetry) with data science, physical computing and robotics, and machine learning.

Fig. 1: Sougwen Chung: Drawing Operations Duet (2018)

Fig. 2: Sougwen Chung: Drawing Operations Unit: Generation 2 (2016)

Schnugg: What is the role of A.I. in your work?

Chung: The role of AI in my work is centered on the possibilities of co-creation.

For me, co-creation operates as a conditional agent of change. Through the framing of collaboration with AI, it offers researchers and artists alike the opportunity to reflect on the effects and outcomes of human and machine interaction. I define my robotic collaborators by taking an active role in the process of creating bespoke AI systems and working with personal datasets. When I do so, my work speculates on collaborative processes that work toward the co-evolution of both human and machine.

Schnugg: Let's talk a bit more about collaboration. Your work goes beyond collaborating with machines, as you also work closely with others in residencies and in the realization of your projects. Your projects imply a lot of interdisciplinary collaboration and exchange. Can you give us an insight into your

experiences in collaborating as an artist with organizations, technologists, engineers and scientists?

Chung: Interdisciplinary exchange is at the heart of my practice. It stems from a recognition of the fluidity of how we define our work. I have led teams at Nokia Bell Labs, MIT Media Lab and Pier 9 Autodesk with this in mind: involving groups of talented individuals who are open and generous with their abilities and share the belief that practice is porous in nature. I'm excited by what's possible when we break down conventional definitions of art vs. science, human vs. machine. I suspect that by doing so, we can move towards a more symbiotic, creative and adaptive future.

Fig. 3: Sougwen Chung: Omnia per Omnia (2018), residency at Nokia Bell Labs.

Schnugg: Your artistic practice is very much focused on the process, which can also be seen in your focus on human-machine collaboration. Why do you think the process is so important and which of its aspects are interesting to you?

Chung: The process is a way of recognizing uncertainty. For me, the projects that drive the best research involve questions that may never be answered but need continual asking.

Engaging with an expansive process, we can uncover opportunities for critical inquiry. The goal is to create research prompts that expand socio-technical knowledge, collective understanding data sets and the role of locality in the politics of AI.

If technology is the answer, what is the question? In contemporary dialogs about the role of machines and creativity, there is a prevalence of narratives that overstate the role of the machine. The belief that machines have agency, are conscious, and hold intention misses the point. Engaging with machines as catalysts can facilitate alternative ways of thinking, through the demystification of AI. In so doing we create opportunities for creative critical discourse that enable a multi-threaded tapestry in which situated views and knowledge come together. Personal, political, and philosophical investigative processes are paramount in avoiding the trappings of hegemonic approaches to technological development.

Models trained on personal, environmental, and ecological data are common, but bringing the simulated outputs into material contexts via robotics and performance is the bedrock of a contemporary art practice. Critical inquiry recognizes the reality of unconscious bias in data sets and their classification and is part of the catalytic potential of the approach. By recognizing the potentiality of uncovering bias within the system through foregrounding its subjectivity, it is possible to design activations that stimulate creative inquiry within physical space. By instantiating the system within the material reality of drawing, instrumentation and performance, we are able to demystify the authority of the simulation and explore fallibilities of both human and machine.

Schnugg: One last question – your work is especially relevant in the most recent developments around the globe during this pandemic: understanding

collaboration through digital technologies in situations of physical distance between the human actors, but also questions about what AI can really contribute nowadays in a crisis. What do you see happening and what do you recommend?

Chung: In July of 2020, at the time of this conversation, amidst geopolitical shifts and preparations for the second wave, meaningful predictions seem premature. I think our desire for predictions about the future stem from a very human desire for structure and certainty, like finding the eye of the storm.

Predictions aside, we've seen the ever-shifting limitations upon public and private gatherings imposed by social distancing regulations. While necessary, these shifts have contributed to the growing sense of collective uncertainty about the safety of co-located bodies. As a result, it necessitates a renegotiation of what it means to feel, construct, and participate in community, to gather without gathering.

Physical presence mediated through digital screens has become even more prominent in daily life. The screen becomes a layered tapestry through which social, professional, and political rituals were once conducted and information about the pandemic on a global scale is received. A forthcoming performance work I've been developing in lockdown, called Mutations of Presence, explores the potentialities of these interconnected awareness meditations on an interpersonal and interplanetary scale.

It's being developed as it's being performed, experienced as it is constructed. The work is still in flux – as it evolves, it shows the process of thinking and technical development. By allowing the work to evolve with the experience of lockdown, I want to capture the circumstances in which the performance is being created.

Like many artists and practitioners across all fields, I've been asking myself: What is the role of art in navigating increasing scarcity and systemic collapse? What do symbiotic ecologies look, feel, and behave like? How can we create and facilitate communal experiences of care and sanctuary without physical proximity?

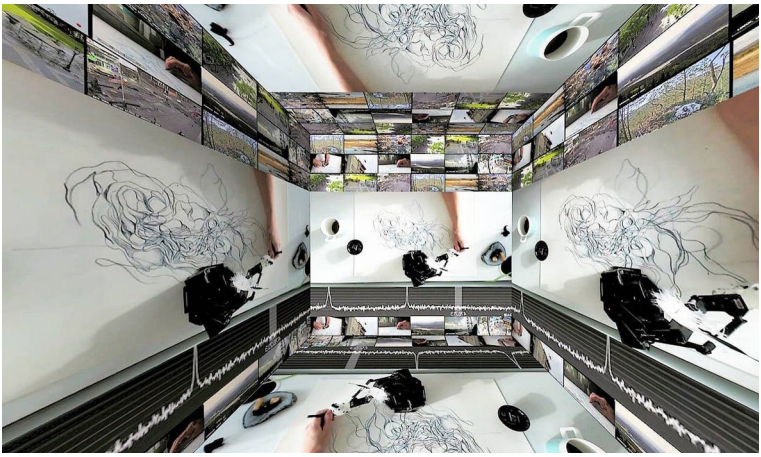

Fig. 4: Sougwen Chung: Mutations of Presence (2020)

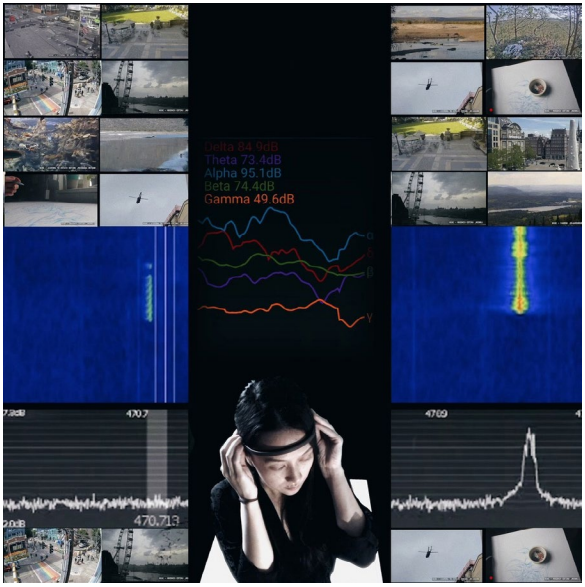

Fig. 5: Sougwen Chung: Mutations of Presence (2020)

Andrea Schueller

Fragments of the Future: Identity, Art and the Artificial

Abstract

How do we create future identity between the human need and desire for visibility and invisibility, having a face and face control? How can humans be supported in the art of becoming between loving eyes and the "Sharp Eyes of the collective"? I discuss how the artistic process can cultivate and carry forward identities and societies in transition which are challenged by advancing digitalization and artificial intelligence. Influence factors are examined, and I pursue the question of how art can help fragile or even splintered existences and how this can happen hand in hand with and also in demarcation to technology.

Keywords: artificial intelligence, art, artistic interventions, containment, interactive body, fragment, becoming from within, identity, meaning maker space, symbolization, technological change, performance

You are in the future
Get ready for the future.
Cyborg

1. Introduction

With the conference title 'ARTificial Intelligence' we[1] have (also) presented a mystery: AI and ART in one phrase – sounds good, but what does it mean? Is it a language game, a striking play on words, or MORE? And if so, then what?

1 My COS colleagues Maria Spindler, Christian Stary, Liselotte Zvacek, Tonnie van der Zouwen and I

This article is on the trail of a solution to the puzzle. The durational performance 'Fragments of the Future', which I conceived with Paola Mineo and realized with the help of Claudia Kaar, Christoph Bawert and Lejla Ibralic, is a lived answer to this question, which has now been put down on paper.

As an organizational consultant, I focus on the process of experience and integrate artistic interventions for generative change and transformation. I extend this work to other fields, such as this conference. I am moved by the question of what influence the increase in complexity caused by AI, digitalization and virtualization has on people and what people do with it. How can a connection of senses and out-of-body media happen; how is it experienced and processed?
The medium of this experience is the body, which I understand as an interactive experiential process that perpetuates itself as an interaction of evolution (Gendlin 2017[2]). This body, understood in this way, draws meaning from the experience through various symbolizations, e.g. language, thinking, image formation and movement. Art is a symbolization, direct, concretized through different media.

ARTificial is content of and context for the core question the performance revolves around: the fragmented disintegration and rebuilding of identities in the context of advancing digitalization and artificial intelligence. We will highlight this transition and the challenges and opportunities for identity that are associated with it. 'Fragments of the Future' addresses the overwhelming, the uncanny, the challenges and the positive forces associated with this profound change.

In the text I span the arc from inspiration and theoretical considerations to factors influencing identity in transition to the question of how the artistic process can contribute to a future-oriented way of befriending and of living

2 I refer to Gendlin's philosophy and his process theory as elaborated in A Process Model (2017).

and working with new technology. Quotations and photos from the performance are woven into it[3].

Why perform?

Because it was necessary. The performative act has transformative power. First and foremost for the performers. Existential questions like these are answered by experience and action, not by talking or writing. Performing happens as interaction between present people, machines, artifacts, larger fields and times, from which we consciously and unconsciously draw.

My body, the performing medium, lives the multiplicity of this constellation of situations. It holds, processes, limits, gives meaning, carries (itself) further. Identity and ARTificial intersect in it; it is cement and container of manifold intelligences. My body understood in this way is more than just bones, tendons and blood. It is the life process that holds together and carries forward matter and mystery as orders. Perceptible from the inside as well as from the outside.

Sequence of the performance

Start. *After formal check-in, including signing the DSGVO. Duration: 1.5 days, 3 phases. Roles: performer A, performer P, cyborg voice, ruler voice, conference topics, organizer*

Production of the facial plaster fragments. *Participants form fragments in groups of 6, quiet extra room, white. Underneath an oil layer, a piece of gold leaf. Removal of the fragments. First viewing. Three photos at the exit and notation: 1. face + name. 2. face + fragment + word from the moment. 3. fragment + number. Delivery of the fragments. Handing out of numbered cloakroom tickets. Prompt: remember your number, remem-*

3 These are light blue highlighted fields. Find more about and around the performance and the meaning of fragments in: Mineo, Schueller in this issue (pp.1532).

ber your fragment. Digital arrangement of the 3 photos, QR code linked to digital image wardrobe. Number and QR Code on paper are sewn onto fragment.

Entry into the future. *In the morning. Finding partner and intention. Call: Remember your partner. At noon. Invitation to come into the plenary room by cyborg voice.*
P serves at the Wardrobe of Fragments. Show number, receive fragment, find partner of the morning. Cyborg voice and soundtracks rustle, A goes around. Sovereign voices from past, present and future. Chinese babble of voices as a reference to the sharp eyes of the collective.

Encounter and exchange of the fragments. *A and P with face fragment in the center. Encounter, turning away and devotion. Silence. "I want to be seen-I want to be invisible. I see you." A and P exchange fragments. Expansion to the large group, invitation to exchange fragments, share fears, hopes and dreams, show and name the golden Spot of Beauty.*

End. *Stay with your gold. Gold is wound, gift and golden shadow. Participants and fragments disperse.*

Fig.1. Performance I , © Nathalie Aubourg

2. Fragment as a Metaphor for Identity in Transition

Become the carrier of the unborn guise of the future,
holding that which you cannot hold
because it is not only unknown but impossible.
David Whyte

Fragments are parts of a whole that is broken by intentional action or disintegrated by the ravages of time. This happens to buildings, vases, texts, materials, cultures, people and societies. Nothing lasts forever. Seen from the future, fragments are parts of a maybe becoming whole. They represent the becoming, not yet explicit and manifest and the ever fluid. Perhaps they will never become a form, but perhaps the fragment will move something forward in a person or a community that will take shape: The next piece of the puzzle for a problem solution will reveal itself, or a new, hidden, implicit aspect of the self will emerge. Gradually a form emerges which is explicit, viable and worth living. – This change must be experienced awake, not allowing oneself to name something too early before there is an actual physical feeling of arrival and revelation. For only then is it founded in the new life's own possibilities.

At present, identities are being shaken and formed in incredible ways. Artificial intelligence, virtuality and digitalization of many areas of life and work increase the complexity with which people have to cope. Analogue life does not fall away but mixes with newly emerging reality zones and practices in virtual space. The COVID-19 pandemic and climate change are currently adding to this. Habits, affiliations, values, world views, bodies ... Identities develop cracks.

Plaster is our medium for metaphor: It crumbles, softens, is malleable, adapts, binds, hardens, supports and breaks. People use plaster for bodies, art and construction.

Beyond the dialectic of being and becoming, Fragment points to the fragmentation of people and societies as shadows of increasing complexity, man-made but also given as an existential inevitability. When demands become too great – physical, psychological, social, spiritual – the fragile, embodied wholeness breaks up. Temporarily, this can be a cleansing, relieving shredding process, a defragmentation, in order to return to the source of one's own strength and face the world refreshed. When distress becomes permanent and resources or holding relationships are lacking in which fractures would be supported, where processing and learning would be possible, life processes are interrupted, people and systems traumatized. Consequently, parts are split off and become independent. "Fragmented personality" (Shalit 2018, p.109) is the term used to describe people whose personalities are split several times and whose identity fragments lead a life of their own in parallel worlds, sometimes each with an independent existential sound of its own. On a social level, fragmentation expresses itself in division into parallel societies, bubbles that exist next to each other, exclude each other and sometimes explode together or into each other. Not healing and wholesome light but darkness falls into the cracks.

From these considerations we can see that transitions and breaks in life are particularly creative, but also particularly fragile zones. From this we derive the important questions for shaping the future of our lives, work and the integration of technologies. What carries, what holds those who are becoming and those who are fragmented? How do we remain in the implicit, unclear zones until valid steps come from within? What endangers people and the collectives they form and that form them?

This is what the following is about. I concentrate on factors influencing identity under the sign of technology, without claiming these to be complete, but with reference to their interconnectedness.

3. Influences on Identity in Transition

3.1 Image Bombardment

The first facial fragments develop in the womb. Embryos are already interested in faces or face-like structures (Dunn et al. 2007, pp.1825). In evolutionary biology, we need this ability to distinguish humans and animals from other environments and thus to survive. Humans become and recognize themselves by watching other humans. Developmental studies (Erhard-Weiss et al. 2007, pp. 217-241) have repeatedly shown the importance of gazing for the cognitive and emotional development of a newborn baby: The reciprocal gaze between child and reference person, each taking in and answering the other, is the outer umbilical cord through which people can differentiate themselves in relation to each other.

Fig. 2. Performance II, © Nathalie Aubourg

The white room is the conference uterus. She looks into the mirror. She oils her face. She applies the gold. She cuts. She finds the places for the plaster. She takes the water, very much, it runs, she forms it with her hands. Less water. I hear her breath. Is that a heart? What is she doing? The more layers, the more she reveals. Her. Her vibrations mix with those of the others. I'm in there, too. It bubbles in the space of my heart, in my face, neck, out of my eyes, through my crown and feet. That is surely a heart.

Imaging from within is an essential process for healthy mental development (Jung 2009, pp. 129-132). Inner images are symbolization processes through which people become human beings by giving meaning to their experience and acting on it. It is this interaction that carries people in their carrying forward (Gendlin 2017, Wiltschko 2017). The crucial point is a) whether this inherent ability to symbolize is in the focus of a person's awareness, b) whether it is questioned and heard or c) whether the external field sets the pace. With the environment we have created comes a flood of images that can be overwhelming: concentrated image loads on the net, (social) media, taking and posting selfies and other photos. The wound of image abundance is the creation of a double reality. The Jungian Shalit points to this in his studies on transient personality. Inwardness, which is essential for the experience of authenticity and the sense of coherence, which in turn is central to personal health perception, is abolished or even banished by the increasing replacement of inner psychological activity and image creation by external images (Shalit 2018, pp. 85). The inner connection to the depths of the psyche, which is dependent on silence, tracking and the thinking and doing that arise from it, is broken and irritated. This dynamic is intensified by habitual self-recording of what people do and recording by (in)visible authorities. To have an experience becomes identical with taking a photograph, and participation in a public event is more and more equal to viewing it in photographed form (Sontag 2001, p. 24).

These processes are not the same as being conscious and self-reflective, which is a state in which we are connected with ourselves and our experience. A field of alienation or superficiality arises which has to be balanced or integrated into the self.

Seeing human beings as relational beings who bring themselves into being *as* and *through* relationship makes it clear that disconnected practices of individuals also weaken the reflective, self-sensing and self-controlling power of a social body and thus the cultural forces. "Essentially, the camera makes every person a tourist in the reality of other people and ultimately in his own". (Sontag 2001, p. 57). – And tourists do not interfere in the affairs of the state they visit. What a meal for Sharp Eyes.

This is what we oppose! Right at the beginning of the conference, where we feel like strangers. Forming one's own face is a different experience than shooting a selfie or being photographed. Sensual, concrete, related... And of course we take photos. Because it is cool and ARTificially intelligent. And we simulate the Sharp Eyes.

3.2 Sharp Eyes

I want to be seen – I want to be invisible. The Sharp Eyes of the collective are watching you.

The face as an essential identity feature has become a place where digital power struggles are fought. The line between protection and control, even totalitarian surveillance, is very narrow. While we depend on face perception in our development in evolutionary biology and psychology we can debate face recognition by machines and its embedding in artificially intelligent environments. And we have to. Machines are innocent (Donik 2019); the people who own and use them are not.

There are many current examples. Face recognition is the key to cell phones, rooms and buildings and supports security forces. Selfies are used as lifesavers in stroke and heart attack detection by linking AI-assisted facial diagnosis with emergency medicine (Gupta 2019; European Society of Cardiology 2020). However, face recognition in public places and companies, which increasingly demand and use it, is also an invasion of privacy. Far-reaching encroachments on basic rights are considered problematic, especially on the constitutionally guaranteed right to move in public places unobserved and anonymously. Studies show that in the presence of surveillance cameras human behavior changes to avoid sanctions (Heger 2008). In the organizational world, Amazon is criticized for this and again.[4]

I do research. Spying with the goal of extermination also worked without AI. Humans function as extension of the rulers. Informers and informers in the National Socialist regime were the eyes and ears of the persecution apparatus. They penetrated the Reich down to the smallest villages. I read that their written observations went directly to the headquarters in Berlin; they were the basis for the "Reports from the Reich" (Schreiber 2008).

Fig. 3. Performance III, IV, © Liselotte Zvacek

4 https://www.derstandard.at/story/2000121191251/amazon-ueberwacht-mitarbeiter-in-echtzeit-auf-schritt-und-tritt

Where there is a huge shadow, the light wants in. In 1938 Hitler started the Anschluss in Linz. The Nazis were propaganda masters, builders of false bottoms and AS-IF worlds, where the one is great, the other is annihilated. A shadow projection of monstrous proportions, magnified by the war machine. Linz 2020, city of innovation and entrepreneurs, highest patent density in Austria, ars electronica. And: birthplace of Valie Export, pioneer of performance art. Genius loci of our conference. This is where we gather.

Let's jump from West to East and from the past into the future. Mao Zedong brought the Sharp Eyes System into being, based on human eyes that identified and transmitted deviant behavior from the norm of domination and thus delivered it for sanction. The system has been reissued, differentiated and embedded in the explicit vision of achieving world domination through technological leadership: "The Sharp Eyes System is developed alongside a 'social credit' system that will, according to a document released by State Council 'allow the trustworthy to roam everywhere under heaven while making it hard for the discredited to take a single step'." (Mistreanu, 2018) In the context of global surveillance assemblage that is emerging as a constitutive part of smart city initiatives constructed around principles of surveillance capitalism" (Panic, 2018).

Related to our topic of identity formation, the camera eyes represent an external extension of authority under which human developments are enabled and restricted. Humans evolve and identify themselves in waves of fusion, differentiation and integration (Wilber 1995). In early phases of development, we grow largely unconsciously into the control and role field of our family and wider socio-cultural environment and thus acquire implicit cultural knowledge and a sense of belonging we identify with. Rules are linked to membership of a group, clan and culture. The demarcation from this membership comes at different biological stages such as puberty, leading to the point at

which the human breaks out and becomes free to the 'I'. (see further Loevinger 1976).

How the path of the ego succeeds within a culture is determined not only by biology, but also by social conventions and constructions and the ability to break free and remain connected to the social body. Successful "social puberty" is what free societies live on. For the individual citizen it carries dangers. If you question a technology, you also question more and more a certain authority and its regime.

Technology has an (indirect) influence on the intricate and complex formation processes of culture and identities that inter-affect each other in very sensitive moments of evolution.

Identities that have lived out of the collective only, seconded by Sharp Eyes in various manifestations, will create different realities than identities that have transcended the collective and included the I: Questioning the "given circumstances" requires one to become sensitive and notice the surrounding and its impact, which means cultivating one's mindbody and growing from opposition to choice.

Fig 4. Performance V, © Liselotte Zvacek

The soundtrack plays endless loops of the 1938 Anschluss jubilation, mixed with Chinese voices. People are supposed to get out their numbers and pick up their fragments. In between, the light ruler's voice from Chaplin's Grand Dictator and the dark one from Sharp Eyes. I walk around in the sound waves and act AS-IF I were a cyborg.

Let us be clear that lively behavior, self-expression and the flow of connection to others need to cross both the outer and inner thresholds of the Sharp Eyes. The camera-eyes of the authorities are gradually internalized and become the pacemaker of the myth of the sovereignty of power, money and interpretation. The sum of these micro-processes, whether intended or not, gradually forms institutionalized larger fields that are no longer questioned. Habits stabilize into institutions, conformity to rules and roles and form new identities and realities (Giddens 1984). At some point, the pressure to adapt to norms and modes of being generates itself. History will show whether these rules support security and ethics or become a weapon of mass destruction for the soul, because uniqueness and diversity in which identity can be expressed must hold their breath in order to stay alive.

3.3 Human-Machine Interface

Tools, mechanization, electrification and assembly line work, computerization, automation and digitalization point to a long history between man and machine (Raviola 2020). Several industrial revolutions, machine breakers included, brought disruptive change which has always changed the identity of people, the character of work and thus the structure of entire societies.

Ever since Icarus glued on his wings, hubris has led human beings to want to achieve or accomplish superhuman things. Its effects and the therapies for dealing with the shadow cast by these human-technological interventions remain controversial and form a long collective to-do-list. The body is the

landing page for new identifications, becomings and boundaries. It is considered both as the last place of autonomy and self-determination over living and dying and as a romping place of life extension and self-enhancement, a target for ideas of size, an application zone for foreign bodies.

Nowadays the man-machine coupling is complex, from taking a cell phone in one's hand to being surrounded by the Internet of Things to chip implants. Technical prostheses and implants serve to heal, to supplement and as aids for broken or frail bodies. Motoric skills, senses and thinking are strengthened and expanded. Central identity characteristics such as vitality, effectiveness, performance, resource consumption, range, physicality, but also affiliation through the brand of a device or the possibilities of social participation which are opened or blocked by it (Petzold 1993, p.72) are expanded and strengthened. People identify with machines or their functionalities in different ways, becoming more or less through them in terms of self-esteem or vitality (Stary, Spindler 2019). Recent studies show that machines put performance pressure especially on younger people. Having internalized the ideal of the flawless machine makes humans respond with stress and lower self-esteem if the machines don´t work and they cannot fix them (Riedl 2020).

The cyborg voice is born out of necessity. How do we get everyone from lunch on the first floor to the second floor on time? I'm terrified of leading an unknown number of people from A to B, overtaxing my voice and nerves. I want to be collected when the auditorium fills up. I say to Claudia: "Megaphone or can we run a text message?" Claudia: "We'll make a soundtrack!" "Can we alienate my voice?" I ask, boldly shy. Claudia: "Sure!"

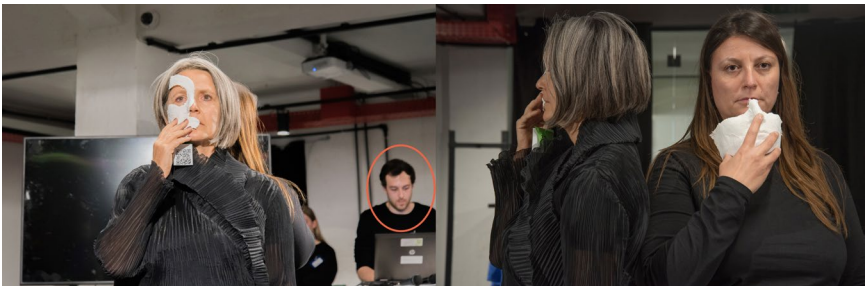

Fig. 5. Performance VI, VII, © Liselotte Zvacek

I am enhanced, amplified, vocally masked, feeling protected, strengthened, progressive and playful. That is ARTificial! Claudia and the cyborg voice I close in my heart. Christoph, too; he has technically realized it. The changed voice carries me and contains me as well.

We are facing the dawn of even greater technical upheavals. According to Kurzweil, head of innovation at Google and leading figure of the Singularity Movement, the fusion of the human brain and the computer is the future. This process has already begun. For example, we externalize a large part of the brain's activity and store it in apps and devices. A great leap will take place when devices are implanted into the brain, which will "computerize" the brain and greatly increase many of its capacities. By 2045, our intelligence is predicted to be multiplied by billions through fusion with the intelligence created by the creators of artificial intelligence, according to the prophecy. This leap is called singularity: "There will be no distinction, post-singularity, between human and machine or between physical and virtual reality." (Kurzweil 2005, p 23).

I mention these prophecies as they cause fear, stir up fantasies of omnipotence, hopes or overtax the average person. And I want to ask what people and societies will do with enhanced senses and bodies. Can we still keep up with our own magnificence? Or will we tire more quickly, become emotionally

flattened, leached or even stultified because our brain is no longer stimulated holistically or surrounded by techno-stress (Sklar 2020)?

When do we switch to our own voice? Convenient to let the soundtrack talk for you. The cyborg voice becomes stale. Kill my voice. Uncomfortable. I kill myself if I don't turn off, although I feel it's time. But what else to do then? – Paola: "And then we exchange the fragments." Ah, for that we need our human voices: See me. – I see you.

Fig. 6. Performance VIII, © Liselotte Zvacek

There is a point where the call needs an answer. And it needs an answer from a counterpart which is a you. That is Paola for me and I for Paola. The canned voice can't do that because it doesn't have living eyes. This dose has a future.

3.4 Abolishing Transience

Becoming, disintegrating and newly developing in a living body is a natural process until we finally die. This last certainty in life as a body is at stake: You will, must live forever, your senses will be enhanced, you have to keep up with the machine setting the pace for your heart. A celebration for neoliberal economic systems.

We fail to see fully that machines are imperfect and ending, too. According to a study of the department for Digital Business und Innovation, University of Applied Sciences in Linz especially younger people are exposed to this paradoxical stress, that machines do not work and so they do not work as humans. A lot of energy is spent on perfecting the technology, not because they adore the machine, but because they fear losing their jobs as a consequence of not being able to keep up with the pace of time (Riedl 2020). Trying to catch up with such high ideals never allows one to become complete in a life allowing vulnerabilities, honoring the grace of endings.

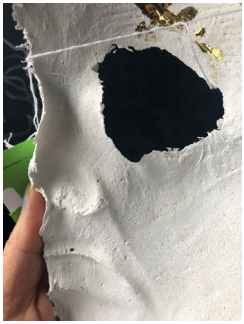

Fig. 7.: Performance IX, © Andrea Schueller

Finally, I am about to see my fragment from the inside. Corner of my mouth down, I have aged. I cannot take away my first impression of myself.

The influence of technology sometimes makes us forget that we age, become weak, have to experience and cope with losses, integrate wrinkles into our existence. The humbling exercise of being finite, mortal, limited is important for cultivating human measure in progress and is an essential shadow work. Where in history, personally and collectively, have people had to leave nothing behind in the process of becoming?

4. What Contains and Carries Forward Identity in Transition

Culturally there is a rich fund of legitimate becoming, for example the pilgrimage, the wandering, the retreat, the quest. In these practices people are recognized as indeterminate and incomplete, and it is trusted that a new form of existence will follow with which the nascent person can identify. Art is a practice which can support nascent beings scattered, scared or attracted and supported by technology, and it is the focus of this last section. I will show how she does her work particularly on the cracks and openings discussed in Chapter 3 and I will conclude with the idea of Meaning Maker Spaces for hosting ARTificially intelligent practices.

4.1 The Artistic Process

Art is filling the cracks of humans and social bodies in transition. AI and technology claim to fill these cracks as well. Art also breaks open. Both do both, but from completely different inner sources and in different ways. Art is culture, man-made, like technology. In this regard they are very similar. When I speak here of art and the artistic process I mean the innate capacity for symbolization and expression, not of contemplation of art, its commercial exploitation or the art business. This clarified, let us focus on the huge potential of the artistic process for generatively coping with disruptive technological change.

Artistic practice can fill the gaps for a healthy identity and connect to the artificial so that we can get the best of both worlds for our future selves and societies.

What our time needs – maybe all times do – is people who can and want to make a holistic contribution as nascent individuals, regardless of which expert corner they come from. This is a fragile process that requires courage, knowledge, skill and above all security in the face of uncertainty. Art and aesthetics can offer much here. They are role models, because they are based on the senses, combine sensual awareness, intuitive and reflective thinking, and act in the openness and uncertainty of the creative process. And we need artists; we can learn from them and become artists of our own lives. Furthermore, art lives not on the edge of the world but in midst of it. Creating art, humans use not only their body and imagination but also material, tools, instruments, technology, artificially mediated realities. Art is therefore by definition a crossover and serves as a serious playground encouraging approach to and experimentation with an alien technology or some of its features.

Artistic work in non-artistic fields, in the working world and in civil society, has been a tradition since the beginning of the 20th century (Trobisch et.al. 2012, p.45; Adler 2015). Beuys' famous saying "Everyone is an artist"[5], which is said is originally from a poem by the female author SARK[6] – refers to the creative potential of people, the world, society, business to understand, to mean and to shape in a creative-interactive way. This way of working is convincing where people and communities want to open up new creative competence areas and need support for the daring journey into something uncertain but inevitable. The manifold contradictions to which we humans and societies and social bodies of all spheres are exposed today and need to identify with in certain ways refuse a linear, quasi-scientific behavior of

5 Wikipedia (2020) Beuys https://de.wikipedia.org/wiki/Joseph_Beuys (18.8.2020)

6 Wikipedia (2020) https://planetsark.com/sark-posters/ (18.8.2020)

perception.[7] In these areas of tension there are zones of indeterminacy or even leeway in which people have to activate all their perceptual potential in order to be able to judge and decide anew again and again. The synthesis between creative and cognitive techniques helps us to use implicit knowledge, to expand patterns of perception and evaluation and thus to promote the ability to organize ourselves and, most importantly, to strengthen our essence.

The creative-critical integration of new technology into living, learning and working in our personal, corporate and societal lives is definitely a challenge where we need all our senses, if not more than that: Making art is a holistic process in which pre-rational, rational and transrational consciousness can be integrated. In creative activity I do not have to separate my thinking from feeling and acting, my hands and the tools or machines; my work holds it all together: instinct, inspiration, rational, logical thinking, emotion, feeling and acting. In it one can process earlier and later stages of consciousness in one execution. Tensions, contradictions, opposites, incompatibilities, the unspeakable, the unendurable and any symptoms can find creative expression all at once.

Let us see how this applies to the interconnected influencing factors described in Chapter 3, how art can absorb the shadow effects but also carry forward what is worth living.

7 Some call it a crisis of numbers which also points out the inflation era of mental consciousness.

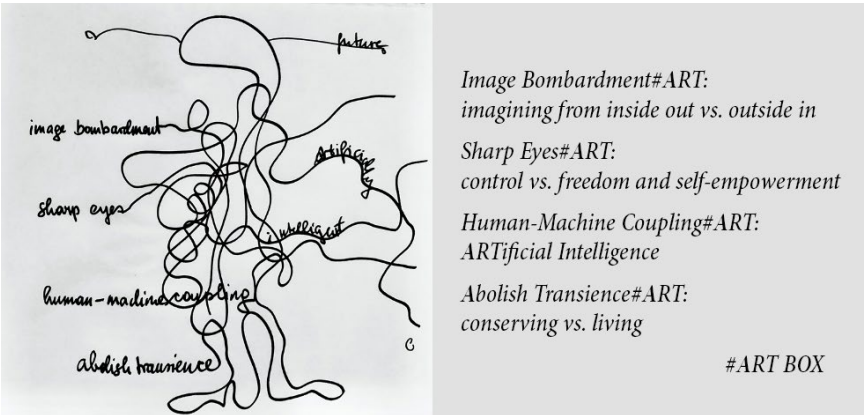

Fig. 8. Art Box

Image Bombardment#ART: Imagining from the Inside Out vs. from the Outside In

What is your image? Which images do you identify with? Artistic practice starts from inside and is directed to bringing out an image or other artifact in its own ways. Source and quantity differ: An image or artifact created from within anchors and strengthens its own being that lives in the situation here and now, dealing with external images and other environments, intentionally or unintentionally. Images from outside will not disappear and they will still be influencing your self-image and identification. But: Through the inner creation of images, a counterforce comes into play through which identity stays close to essence (Helmut Newton[8], Interview Arte).

Imagining, you need to focus on one image at the time, find its bits and pieces, give meaning. Externalizing it, one is forced to concentrate and to stay open simultaneously, to internalize, to stay in tune with the inner space where the new meanings live, waiting to be expressed and delivered. Step by step one

8 The Bad and the Beautiful. https://www.3sat.de/film/dokumentarfilm/helmut-newton-106.html. Documentary by Gero von Boehm, broadcasted on 3sat, 31.10.2020.

continues to conceive and express what is asking, suffering, boiling or simmering from the inside out. Whatever this might be, the riddle of oneself, a difficult topic or a conflict: It carries your own meaning.

The quality of the images changes when they are rooted in experience. This is important cultural cement and crucial for the calming and renewal of a social body to which the individual belongs. Moreover, the psychic energy can be transferred for the benefit of the social collective if the creation of the image is rooted in the common experience and as interaction with the environment. In this way people not only bring themselves a step forward as cultural beings but also weave the social fabric as a living cultural practice.

Without a holistic practice such as art, the cognitive splits off from the somatic and emotional and the inner instances might go into opposition. This might continue as war or conflict in the outside world, or as apocalyptic fears. Therefore, transforming inner images into artifacts serves as a peacekeeping mission, as a medium to bind and ban the apocalyptic – or smaller – fears and as the bridge to "the other worlds" inside or outside oneself that one would not have had access to in the normal, everyday way of life and consciousness. Producing is acting. A space of infinite possibilities, only limited by your boundaries including your tools, opens up for spilling out the unconnectable or giving unprecedented shape. No matter if you find it beautiful or ugly, if you sell it or not, if anyone likes it or not – it is yours. And you can go on with the next image.

Sharp Eyes#Art: From Control to Freedom and Self-empowerment

Freedom and art are considered partners in crime. Even in the Mauthausen concentration camp it could not be killed. Prisoners made drawings to suppress their horror of life and beauty and to confirm each other as human beings[9]. In every system there are gaps and cracks in which art can live and do its work on us and the world.

9 See the permanent exhibition at Mauthausen Museum, Mauthausen, Austria.

How can art protect us from the Sharp Eyes and empower us to look into our own eyes no matter what? It does so from within and from without. A work of art, into which much is interpreted and read out, covers our eyes like a cloak and protects what wants to express itself, does not correspond to the norm or cannot yet be understood by the mainstream. People who in the eyes of others do not exist, or are not allowed to exist, can be in this area of becoming. Borders, behavioral boundaries and external control stop self-movements for many reasons, or they make them invisible. But they also challenge us to grow under, over or against them or to merge with them into a new form. It becomes necessary because otherwise it becomes unbearable. The thin line between security and freedom, control and oppression is walked from within through the creative practice of the tightrope walk. Whether I feel protected or controlled by an app is a question I can only answer myself, and yet we answer it as a collective. Uniformism also means leaving others the sovereignty of interpretation and power of disposal over reality and one's own meaning. This has to do with all sorts of things, including fear, emptiness and inertia. In the creative process, people live, paint, perform; fear can be bound, and inertia must be overcome.

In this paradoxical notch, creative media or technical tools also act as protection against overwhelming life processes and take away their sharpness. This also has its justification. The camera and the process of photographing, the camera in front of the face of a decomposing person or a body that has just undergone surgery and is missing, for example, a leg or a ribcage, can become the link to life where it would otherwise have been interrupted in shock. A personal surveillance camera, so to speak.

In the freedom of the creative process as a lived insight into necessity, we allow openness of interpretation and at the same time receive very specifically meaningful things. It is essential to question and cultivate this world within us. We become our habits, even the invisible ones. Artistic practice becomes the gatekeeper and respirator of freedom and autonomy as well as reason in a

crazy world, so that we can continue to look ourselves in the eye. Sharp eyes as a monitoring and inhibiting medium for the creative process are socialized and become a conscious part of the creative process. Soft Eyes can deal with sharp eyes, even if you cannot be on eye level with them.

Human-Machine coupling#Art: ARTificial Intelligence

Machines and technology are sources of inspiration, reduce our workload and expand us. They do the brainless work and free us for the "really creative parts". Artistic practice promotes sensual perception, which is known as aestheticizing. Aestheticizing means making perceptible and tangible; it is a training of feelings and senses in the direction of reduced stress, in which new experiences and diffuse ideas flow in paths. Aesthetic preoccupation with (one's own) questions about the future often pulls the (first) sting of fear: of one's own truth, technology or an inevitable but diffuse need for change.

ARTificial comes closer as a vision. ARTificial emphasizes the training of opposing muscles, our ability to hold contradictions and tensions and to be sensually sharpened by a tool or instrument. Whether you draw, sculpt, paint or compose or play music, you will come into contact with a blank canvas and yourself, with the intention of creating something, and with a tool. ARTificial for me means training the senses and the tool sense from the connection to the inner source simultaneously, in order to be able to use the one for the other. This is not only a challenging vision but is also recommended by experts: A balance in the use of the body's own and artificial possibilities is recommended by researchers, who have studied the effect of handwriting on cognitive development and comprehension (Böhm 2020). Handwriting makes you understand and develop cognitively, while typing is faster and allows a greater quantity of text to be created. By accepting the creative tension of training both, a new identity climbs up the chimney between ART and artificial into new possibilities, which can remain rooted in your own experience. Strengthened core muscles build confidence in one's own abilities to change and reshape oneself and to shape your future life from within.

Through dosing and distancing from ART and the artificial and recalibration in the body which is the carrier of all that, one's own production connects, maybe reconciles with capabilities, potentials and limits and synchronizes itself with one's own speed and rhythm (and not the pace of the machine).

The senses function, as Macke says, as a bridge between the tangible and the incomprehensible. They are therefore indispensable companions in transitions. ARTificial intelligently speaking, they are not only given permission to unfold in their respective ways, but also have a function for identities in transition. This function could be applied to the senses expanded or enhanced by technology in order to calibrate the dimension of the new, contemporary human being and their technology in a human way. Experimenting with this waking state, i.e. with the senses and thinking, could increase the human range in that it remains radically anchored in feeling.

Completely new systems could be created as a result of this coupling (Luhmann 1990) fostering fresh (professional) identities as the example of the Japanese coffee houses show[10]: the staff, people with disabilities, controls robots which serve the guests. Technology fills people's cracks, technicians connect lay people to the machines, and they serve tea to everyone when their senses need a break from the video call or the assembly line.

Abolishing transience#Art: Conserving vs. Living

Each creator is confronted with the indispensable necessity for shaping a piece of art reflecting their identity in the making: You cannot do it all. Manifesting from the infinite possibilities means you do one; the rest has to die or will be born later. This is practicing borders and humility. And as we aim to embody the new form, which is an expression of the strong life (Macke) which has made it, we must pass this threshold.

10 YouTube (2020) A Pop-Up Japanese Café With Robot Servers Remotely Controlled by People With Disabilities https://www.youtube.com/watch?v=7HB6xLe2f3U (20.9.2020)

The artistic act is transitory; the product can equally well be recorded or stored. Machines work and break down, make mistakes, do not work. Helpdesks can tell you a thing or two about this. Remember, defragmentation can help drop past versions and identifications so neither we nor our machines carry the accumulating weight of all the past forms.

Rather trust that the new form includes within itself and carries forward what serves life. Dying or conserving to immortalize, that is the question. Art and technology allow us to do and become both: Identifying backwards or into the freshness of a new identity.

4.2 Meaning Maker Spaces: Containment for People and Practices serving an ARTificially intelligent future

Where do we meet to experiment creatively with the hottest or scariest machines, become friends with tools for creative expression and share our weirdest experiences with other people? We are on our way, shaking, learning, making meaning, integrating, repulsing. Let us note that neither digitalization nor A.I. arrived with a big bang. Dealing with the fragility and the possibility remains part of the journey. And again, instead of becoming numb with apocalyptical fears or Idealist ideas we can use our freedom to make and mend the future. If the work lacks, the cracks will get bigger and deeper ruptures will become inevitable; identities will get stuck. Let me sketch out some headlines of a containing space for this visionary ambition. I call it Meaning Maker Space (MMS).

The term is inspired by Maker Spaces, which are open workshops with the aim of providing private individuals and individual tradesmen with access to modern manufacturing processes for unique pieces. Typical equipment includes 3D printers, laser cutters, CNC machines and presses for deep drawing or milling, in order to process different materials and workpieces ("make almost everything"). Maker Spaces allow the production of individualized

single pieces or spare parts that are no longer available (Rapid Manufacturing). There is overlap and cooperation with educational institutions such as schools and universities, the open hardware, open source and DIY movement (Wikipedia 2020, FAbLab). [11]

Meaning Maker Spaces are interdisciplinary areas where restrictive right-wrong evaluation schemes are dropped with the help of an artistic mindset, practice and skilled hosts. The space will provide materials, machines, technology and metaphors one can directly use to strengthen the innate need of people to establish close connections between the shock/desire, the respective change work and their own thinking, feeling and experiencing. Next to 3D printers, embodied practices for generating meaning will be provided in order to touch the more intricate questions on how to "manufacture your future" and produce meaning for your own use, how to relate with technology and other parts of society and how to in- or exclude while staying congruent with yourself in changing times (Schueller 2015).

MMS is where creative and technological expertise and clumsiness meet for co-sensing and symbolization from within. People in MMS might …:

- Meet their questions and new content step by step
- Find embodied truth in contact with the tool and the technology, and sound out the limits and the no-limits
- Encourage creative symbolization for social change – in the sense of Beuys´ social plastic related to a joint issue of a group, e.g. the relationship between generation Selfie and the older generation
- Inter-Act create and gain new sensations
- Find new shores between inspiration, shared suffering, fresh ideas and novel ways of humanly relating

11 Our conference took place at a Maker Space, the Grand Garage. Makers come for the abovementioned reasons, as we could see during the conference.

The power of containment is in providing a safe but also challenging space allowing you to be as you are without the stress of double reality floors, external control, exaggerated, disembodied senses affecting human bonds. At least it can be trained there and from there instill the process of acculturation and civilization. Such shared spaces for dialogue and contemplation are needed for…

- letting new experience steep until fresh meaning comes
- recapturing and rebalancing the outer narratives by inner narratives in a diverse group

What for? The sovereignty of interpretation of a small caste of experts might be that "the ruling opinion" contains the material for division and subjugation. Joining an expert opinion is a tightrope walk. Sessions in Meaning Maker Space could revolve around the shared experience of experts and laypersons and invite their symbolization with artistic means, a double permission to experiment with the potential of staining each other (Schnugg 2020; Braumann, Zvacek 2020).

I know, it is a vision. As we are all laymen in something we are united in the unknown, in potential dependance on others, in the split, in the bubbles, in the fear and the creativity.

Hosts will be needed. Humans with ARTificially intelligent capabilities, especially grounded in the art of holding uncertainty and ability till they become al dente. A new professional identity at the dawn.

5. Thirty-three Fragments

The body is the end of the outer journey.
Only when we have fully experienced an experience
do we come to an end.
We are on a journey without a name
and come to a name at the end of the journey.
David Whyte

The people who build machines, create technology and help others to deal with it play a fundamental role in shaping the future. They are the bridge to the users, and users are the bridge to the technicians. Humans make the connections to other humans and the machines. Art is a process of inviting them all in and transforming critical zones into playgrounds, using all senses, challenging and cultivating them, to deal with technical implementation and thus to shred technological leaps in a humane way and integrate them into a life that serves life. I live to contrast technological progress with a deeper anchoring in my own body. In the tension we can meet and branch off between meaning making and alienation, drive around, get lost, arrive.

Art is neither sacred nor absolute. But it heals, connects and moves forward, primarily the person who makes it, I believe with Christo[12].

Through creating the performance and inter-acting it met my unwillingness and resistance to deal with foreign topics in a playful and interactive way.

12 https://de.wikipedia.org/wiki/Christo_und_Jeanne-Claude#Christo

Fig. 9. Performance X, © Andrea Schüller

As much as I do not care at all what those present find in the moment of me performing or if there is something for them as essential is their presence, would I have felt equally seen and become newborn in front of screens or a robot audience?

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Paola Michela Mineo and Andrea Schueller in dialogue

Fragments as media of time

Andrea: Paola, we designed the performance for the Conference together[1] and are now zooming to reflect and carry its meaning forward. Fragments stand for disintegration and establishment of identity and also for traumatizing fragmentation in transitions, especially disruptive transitions such as the one we are currently experiencing. A fragment is both message and messenger. But there is another layer of meaning in your work which I would like everyone to be aware of. How do you understand fragments and what is their value in your artistic research?

Paola: From a cultural-historical point of view there is a massive bibliography related to the concept of fragments; the precise area that has most influenced my education is archaeology. I graduated in architecture from the Polytechnics of Milan and Athens, and since those years my love for Greek sculpture, which has reached our eyes in incomplete form, has become stronger and stronger, leading me to understand the fragment as a starting point for new meanings. I have also begun to rework body representation through the human plaster cast technique; I had already been passionately enthusiastic but I still considered fragments to be worthless, until I realized that I could not only use them as "copies" of bodies, sculptures or architectural structures, but also as a valuable element itself, as a medium of a story or a moment[2]. The fragmented cast is for me the portrait of a human identity.

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1 For more details see: Schueller, A.: Fragments of the Future. Identity, Art and the Artificial in this journal.

2 The plaster copies of Lord Elgin's marbles, still exhibited at the British Museum in London after being taken from the Acropolis (1801-1812), played a fundamental role in all the European art academies in the spread of neoclassicism.
"The Echo of Marbles. The Parthenon in London: A New Canon of Classics" - Farinella Vincenzo; Panichi Silvia

Andrea: Why did you choose the human being as the main subject of your artistic research?

Paola: What attracts me incredibly, which then becomes my creative lever, is the exploration of the human soul. To do this, I practice empathy, I build the relationship with people to the point of contact with their bodies. The body it is the best Full-HD recorder for every single emotion and change; it is in my opinion the best device ever built in the world, the most powerful hard drive ever developed. We have cellular memory from conception to death. The body reveals the identity of people to me by bringing the inside out at the very moment creation happens.

Andrea: Creation happens before the very eyes of the beholder, who is both the person observing and the person being observed. The experience becomes relational, as do art and identification. The cast serves as protector and midwife for the identity in the state of becoming.

Let me highlight a subtle aspect I find crucial, having performed together with you: Through the suggestion to choose a part of one´s face or body one might experience permission to feel whole and healed, and at the same time to be partial. Holding this paradox implicitly frees one from the need, internalized belief, habit, false sense of truth, or stolen images of beauty, of shaping the full form all at once. We leave an open space for fragility, imperfection, vulnerability, clumsiness, tenderness, craziness … all the qualities which are oftentimes dismissed and thrown into the shadow part of ourselves, thereby adding to the collective shadow. We cannot dismiss these aspects of identity; they will show up and return to us in and from the most unexpected places or present themselves as apocalyptic fears. Uncertainty automatically calls these helpers on stage. In this sense, the fragment becomes the faculty of forming the new version of us which needs to breathe into a holding space where it can be seen and recognized with open, loving eyes. This can be a relationship, a community and of course one´s body sensed and, if you will, seen from within. That´s why we invited the people to identify with their fragment and took pictures of

their face with the fragment while asking them to let a word come from the felt sense of their momentary being, which is connecting image and cognition.

Paola: Yes, exactly. Over the years of my research I have come to understand how people were pleasantly shocked by their own three-dimensional form, seen from another point of view. The example of our voice makes it clearer: we are used to hearing ourselves "from within" our body. When we listen to the recorded voice "from outside" it is very different. When we take a part of our body off with a cast, as happened in the performance with the fragment of the mask, we have a different perception. This experience also works when I guide people to create it on themselves, which I have experimented with in my workshops for four years. People, in the dimension we have experienced together, become the artists, the models and the audience itself.

Andrea: Let´s talk about how we fit our work into this delicate socio-historical moment. Especially to you and also more generally: what is the role of an artist and contemporary art in these times?

Paola: I am a relational artist and I use the performing arts as a visual language: in my long creative process, space, body, time and audience are integral parts of the work, just as pencils, brushes, paints, canvas or carpet pad are frames for a painter. Since the dawn of time the artist has been an active and representative witness of his own time, and I believe that multi-disciplinary languages like mine are suitable in this complex, multi-layered, super-fragmented society. I would like to share Barbara Boninsegna's thought (Artistic Director of Centrale Fies) to explain this:

"We think that a process that brings one closer to performance art is also a way of developing critical thinking, a non-conventional perspective, a multiplicity of viewpoints. Because contemporary arts have always been not simply a blueprint for the future, able to describe society with its collective imagination, its obsessions, fears, needs, desire, injustices and struggles, but

they have also, and most importantly, revealed its autonomous narratives, which are diversified and complex as compared with the mainstream narrative flow imposed by a particular historical era. We have to provide different instruments, stir up reflections by opening doors that are not accessible in everyday life and that lie outside official, mainstream narratives, make ourselves documents for tomorrow of what we are today."

Andrea: If we consider the role of artists and art particularly in the lockdown, we have all witnessed the contradiction between words and deeds of governments when it comes to allocation of resources related to the stipulated vital necessity of art for human life: artists were one of the last groups to be given financial help; other industries came first. Nevertheless, artists found ways to go on and share their ways of creating and touching people in these difficult moments. How did you manage to go on with life and art on a more personal level?

Paola: Art for an artist is not only a job, so "the show must go on", always! At this moment in history, we are all deprived of the physical relationship, and empathy training is becoming more and more complex digitally. But my artistic approach has been developed in various fields in the last four years, from schools to purely cultural activities (museum – corporate activities), so I think I could play an important role on various levels in the near future, when all of us will have to be "re-educated to contact". That's why we worked together to understand how my research can connect with other professionals like you who work in fields other than art but integrate art as a valuable practice to achieve important goals.

Andrea: Through artistic interventions I carry out in different fields I invite the whole person, with the whole brain, to sense, interact and express while facing uncertainty and complex challenges, with the aim of creating or learning something fresh and meaningful. Artistic interventions catalyze and carry unholdable qualities, emotions, tensions and players. People can

and would easily get stuck or lost in one truth or brain. Secondly, the creators identify with the piece they produce in one way or the other. It is their creation. The artefact is or can serve as the representation of the solution they are looking for: the next step, the new vision, a new blossom of consciousness on the edge of being embodied or simply trash they throw away because now they can see, sense, feel and touch it because they have gone through the experience, as we did in Linz. So, for me digital and virtual workspaces offer a lot but also enhance the need to engage the other senses and to invite people, for example, to a Zoom or other type of online meeting. Use the flat screen but don´t become one. We need to counterbalance the fragmenting forces of digital communication by daring ourselves into the virtual space with all our senses and allow all the above mentioned to happen in the oftentimes seemingly "clean" and flawless technical world. I see the need to share experiences at the workplace and take it from there. The truth is, machines are not flawless, we might project this on them. Ask any technician.

Paola: Fragment for the Future was born in August 2019 and was a fluid four-handed design. When you look at it now, it really seems like a premonition of what was going to happen from February onwards.

Andrea: Yes, due to the engraved image of having a white fragment, a mask on the face, and all of a sudden, we are wearing MMM masks in everyday life and the Sharp Eyes of the collective knock on our doors. Since then we have been walking the fine line between protection and surveillance.

Paola: Yes, wearing the mask, being numbered, listening to the artificial, authoritarian voices[3], sensing their impact, staying with oneself and the external challenge was a training session for the soul: dichotomy between human

3 The negative, authoritarian voice was part of a soundtrack we used in the performance. Its purpose was to spray the shadow of power and technology into the atmosphere: its abuse. See also Schueller, A.: Fragments of the Future. Identity, Art and the Artificial.

and artificial, between visible and invisible, protection and revelation, inside and outside, intimate and collective. I believe our intention to make people think critically about everything and particularly about the importance of becoming aware of our true and solid human identity has been perceived.

Andrea: I didn´t know, but I fully trusted the arrow would land somewhere. I know for sure that I needed to perform, whether anybody liked it or not, made sense of it or not, in this exact way. Dedication to my truth freed me and the freedom deepened my dedication. I think this is the best I can give to the world and to myself, an attitude which is best expressed in the words of Carl Rogers: The most personal is the most general. When the personal story clicks with the human quest, you have two options: follow the call or fall back into sleep or cynicism. The human quest is open 24/7, not only now.

The click happened when I got inspired with the idea for the conference project. My colleagues said GO for it and all of sudden I had forgotten all of it: NO. I noticed I had crossed the threshold as a person refusing the call. Yet, the felt sense of it had stayed. From that position of refusal with the YES, I dug deeper into the topic of AI and digitization. Facing a lot of resistance, with many head- and heartaches, due to new, interesting, overwhelming content to deal with, I continued on my learning journey, something like: I chose the project, but I didn´t choose digital transformation and AI to confuse my life. Good, I didn't walk alone, a simple and again profound truth provided one can accept it. Through our connection, your work and readiness to expand into something new, the empty, creative space was back and enlivened me. The tech-learning became more interesting and meaningful and I got a taste of why and how art and artificial can join and live inside and between. And so our future evolved. Looking back, I have learned a lot and left with inner clarity and ease.

Paola: In the performance we exchanged the mask to enhance empathy and to elevate each other. Now it would be dangerous but, paradoxically, wearing

the mask we protect the other. So the Covid 19 can serve as a wonderful empathy lesson. perhaps the "I" dimension is over and we are all moving together towards the direction of the "we".

Andrea: Imagine, if we would change our breathing masks – we could kill each other… and we will die anyway. And yes, exchanging our masks was a powerful moment. We called each other into existence then, fully, and carried each other forward in fresh ways. I recall the poignancy of this moment.

Paola: I want to be seen – I want to be invisible. I see you.

Andrea: Do you remember, our last words in the performance: Stay with your gold. I would like to unfold our purpose and the meaning of the gold in the performance and in the context of culture and consciousness development.

Paola: The most ancient civilizations already had an extraordinary mastery of the art of gilding. In the history of art, the value of this "treatment" has always been purely decorative, adding preciousness and light. I have always been fascinated by gold leaves. Fragile extracts of a powerful solid mineral whose value has never been questioned for millennia in the most varied civilizations of the world. When, in the course of my research, I discovered that people are surprisingly "better". I wanted to add this symbolism, especially when it is not me who makes the cast but when I guide people to it, as in Fragments of the future. When I open the gold leaves box and ask people to look for their point of maximum beauty, it is always a very exciting moment. We are often bewildered to express our beauty with such a strong and synthetic gesture. The awareness of our beauty, as sense of value, strength and balance, is one of the key points of my relational research, which, as I was saying, is expressed through a visual language – as well as strongly sensory, of course.

Andrea: I loved you bringing it in! Gold is the hook for our un-conscious to lift our submerged greatness and unlimited creative potential, which Carl

Jung called the Golden Shadow. We can discover our Golden Shadow in intense admiration of other people, mostly with those we fall in love but also with gurus, politicians, artists, technicians, robots, machines… . So far, when we spoke of shadow and identity, we focused more on the dark, shameful aspects of ourselves that we have disowned. The gold is the symbol reminding the super-senses to bring home our greatest light, which we also might disown. Both shadows may – could, should find entrance in the cracks of our faces, minds and hearts. That´s the work. In this time where people lack security of who they are and what to do they tend to feel either too weak or too small or too strong or too big it is so important to resist the temptation to see all the good and shiny in the others, leaders, technology, external authorities as well as all the bad and horrible. Let´s see each other with dark spots and gold and help each other on the way.

Paola: Hey, partner, an image says more than …

Andrea: Words? Ok a mask then. Did the new collection arrive in Italy?

Fig. 1 Andrea No. 33-6

Fig. 2 Paola No. 0

Paola: Yes sure, obviously I have a lot of masks!

Fig. 3 Andrea & Paola

the self
as truth perception
of masked and unmasked layers
challenged by
protective devices
and deadly objects, we become and refuse.
revealing time as own pace of becoming
human identity

PLAY NOW

Fig. 4 Soundtrack

Christian Stary, Claudia Schnugg

Algorithmic Overdependence: Fostering Awareness through Digital Facilitation and (Re-)Construction

Abstract

This contribution intends to raise awareness of connectedness in the continuous digitization of society and organizations. It suggests points of reflection when being tracked by Internet-of-Things systems, which in turn encourage or discourage behavior. The question arises: How much digital facilitation is necessary and when does algorithmic overdependence dominate? Concerns related to the invasive expansion of digital technologies and their 'smartness' (through algorithms and artificial decision-making) to direct behaviors of all kinds can be represented and experienced by art installations. We suggest promoting constructive awareness by offering a scenario in such an installation. It allows subjects to experience algorithmic influence and subsequently encourages regaining control through individual capacity building for individually coherent (and transparent) design. The proposed installation enables new forms of governance based on experiential learning and digital artefacts for personal mastery of collective intelligence.

Keywords: Internet of Behavior, predictive analytics, artificial decision-making, behavior control, governance, opacity, digital literacy, design-integrated engineering, citizen participation, accountability

1. Caught in the Web of Behavior Due to Digital Intelligence?

According to the renowned research and advisory company Gartner, by 2023, individual activities will be tracked digitally by an "Internet of Behavior" to

influence benefit and service eligibility for 40% of people worldwide. This Internet of Behavior will link a person digitally to their actions.[1] For example, linking an image as documented by facial recognition with an activity such as purchasing a drink from a vending machine can be tracked digitally. The resulting understanding of an individual's or group's behavior can profit various actors. For example, not only vending machine providers and drink producers will track individuals' behavior for arranging their offerings model; insurance companies will also track individuals' behavior for determining a corresponding pricing model.

Tracking and applying knowledge about behavior will not only link individuals to their preferred actions and always provide their preferred drinks in the vending machine, nor only help companies to create the best pricing models. The Internet of Behavior can also be used to encourage or discourage behavior. Algorithmic processing of data enables navigation and synthetization of large amounts of data. Based on identifying patterns from all the data, it allows conclusions to be drawn in a time-efficient way: The tailored efficiency of algorithms can shift attention to a limited choice. For instance, an observing individual's behavior in a certain situation might provide the best inference results for similar situations but lack other opportunities when algorithms do not capture alternative viewpoints on activities. Results may differ among those individuals an algorithm deems to have certain properties, e.g., walking on the right side of a street. Contextual information, such as the street environment or the country of origin, can shed light on the meaning of artificial conclusions. 'The danger of such reliance on algorithms is that, despite the benefits and assumption that algorithms are efficient, logical, and data-driven and therefore unbiased, algorithms are not infallible and oftentimes carry biases of their own or of their creators.' (Wei et al., 2017, p. 3)

1 https://www.gartner.com/smarterwithgartner/gartner-top-strategic-predictions-for-2020-and-beyond/

Once providers or users depend too much on algorithm-generated information they become algorithmically overdependent (Banker et al., 2019). Then, information generation and exchange are increasingly handled autonomously by digital systems, leading humans to give up control unwittingly and losing track of process-steps they are held accountable for.

The technological drivers of such developments are the Internet-based communication system and the increasing set of objects that can be connected, mutually and with people, by utilizing the Internet protocol stack. Internet technology operated as part of so-called Internet-of-Things (IoT) applications allows the connection not only of people but also of physical objects of various kinds. It enables the integration of various sensors, actuators, and objects so they can communicate directly with one another without human intervention (cf. Lin et al., 2017). Such digitalized objects can track the state of humans and their level of awareness (to their environment), and guide them to achieve their objectives, such as finding a location. Others can intervene in certain situations, e.g., stopping a car to prevent an accident. Information is collected by sensors and combined to trigger either actuator or human behavior. Originally passive or observing elements such as sensors can become active ones (Shaev, 2014).

The enrichment of communication and interaction between humans and artefacts of all kinds linked with IoT-based networking developments converge physical, digital and the virtual elements 'to create smart environments that make energy, transport, cities and many other areas more intelligent' (Vermesan et al., 2013, p. 8). This intelligence is based on algorithmic decision-making tools, which are increasingly used by government and private bodies. Artificial decision-making is applied to various forms of data, often relying on the algorithmic analysis of personal information. As a result, a new wave of policy concerns has emerged (Zarksy, 2015) questioning the legitimacy of algorithmic decision-making and asking for accountability (cf. Binns, 2018, Hutchens et al., 2017, Bovens et al., 2014). So far, they have not

been satisfactorily resolved, although individual notice and consent has become commonplace – cf. the video camera sign when entering public places like train stations. Rather, troubling implications for democracy and human flourishing are expected, when self-interests of companies or public bodies determine the use of collected data and oversee their future use (Yeung, 2017).

Overdependence has nurtured the discussion of a *scored* society (cf. Citron et al., 2014) and *algocracy* (cf. Danaher, 2016). It underlines the need to understand overdependence on an analytical level while on the basic level, vast reactions and actions with respect to the detriment of individuals occur. On an analytical level, the nature of these concerns is linked to the way the decision-making relies on biased and inaccurate datasets, the opacity of applied algorithms, the lack of thorough review, and/or opportunities to intervene from a design perspective.

An awareness of this analytical understanding of overdependence of all actor groups needs to be raised. We elaborate on algorithmic data processing and on (re)gaining control through active design intervention and introduce the concept of an experiential learning support installation. By creating experiences, especially artistic installations can help different audience groups to understand complex theoretical ideas and explore technological concepts through sensemaking construction (Schnugg, 2019). Entering the proposed installation provides a feeling of getting 'caught' in the Internet of Behavior by providing a feeling of opacity and lack of transparency. Based on data measured with IoT components interlinked with decision-making algorithms, the scenario also physically limits the person passing through. At the end, the results of the algorithmic interpretation of behavior and prescriptions will be generated and handed out to each person. These results are expected to trigger demand for (re)gaining control of IoT system behavior. Hence, a second part of the installation includes a novel governance scheme with digital design facilities that allow for learning and exploration. In this way, the feeling of oppression is modulated towards actively engineering IoT-spaces.

2. Algorithmic Overdependence – Opening Space for Intervention and Facilitation

Algorithms form the core of machine intelligence since their processing leads to computer-interpreted data and decisions. Those can be used to influence human behavior and to direct human coexistence. A recent example concerns social relations that undergo significant changes in everyday life and sociality due to pervasive and perpetual mediated presence of friends by social media (cf. Thulin et al, 2020): Not only the emergence of novel constraints of coupling with other interactors (e.g., becoming 'friends') and the recoupling of social interaction can be observed, but also modified rhythms of interaction in terms of increasing frequency and insistency. Both finally affect human foreground activities due to the continuous stream of online contacts, including their structuring. Such 'domestication' processes of digital media are based on role shifts. Individuals shift from being passive receivers and consumers of technology to highly active interactors. Novel forms of (social) networking driven by interactors' behavior shape technology's meanings, functions, and representations. The material artefact and its algorithmic capabilities shape the individuals' sensemaking of digital systems, as well as how their actions affect individual sensemaking (Mesgari et al., 2019).

But do algorithms incorporate these factors and categories of information? Wayingwe (2019, p. 6.) explains:

> 'Conclusively, algorithms intend to present an avid manner in which artificial intelligence skills could be applied in organizational decision-making sections. However, its actual use to guarantee improvements in consideration to those who are both directly and indirectly affected by the resultant decisions is inevitably jeopardized by the variations in considerable factors so as to ensure a positive change (The New York Times, 2018, par.19). It is evident that algorithmic approaches are entirely dependent on the users' mastery of computer skills such as coding, instructional discernment, and the capacity to execute the encoded guidelines (Danaher 2016, p. 256). Furthermore, overdependence on the algorithmic requirements deters

> user organizations and individuals to consider mental capacities, situational changes and the relevant needs of data contributors and decision-making beneficiaries. Therefore, algorithms can be improved by frequent changes and improvements in relation to the systemic requirements to give a sensible meaning to decision-making organizations and individuals.'

The ever-increasing application of algorithms to decision-making in a range of social contexts has prompted demands for algorithmic accountability: Accountable decision-makers must provide their decision subjects with justifications for their automated system's outputs (Binns, 2019). So far, it is still open what kinds of principles such justifications can be expected to appeal to. Moreover, accountability needs to be based on a common concept understanding. Bovens et al. (2014) explains accountability of a party A to another party B in case A has an obligation to provide B with some justification regarding a certain conduct. If B finds A's justification to be inadequate, A may face some form of sanction. This has important implications for algorithmic decision-making and the actors involved.

Imagine a community deploying an IoT surveillance system is held accountable by a citizen who is denied access to a public service by the system. Accountability in this scenario might consist of a demand by the citizen that the community provides justification for the decision; a response from the community council with an account of how the surveillance system works, and why it is appropriate for the context; and a final step in which the citizen either accepts the justification or rejects it, in which case the community council might have to revise or reprocess the decision with a human agent, or face some form of sanction. Such a situation serves well as input for experiencing algorithmic overdependence, particularly the impact of opaqueness with respect to directly affected stakeholders.

In our example, one way for the community council is to provide evidence of prior effective algorithmic decision-making, e.g., meeting public demands for security. It could also provide proof of methodological and/or scientific rigor in the development of algorithms for decision-making. Finally, (possibly) affected

stakeholders could be invited to participate in explanatory features, or more proactively to the redesign of the IoT application and co-create transparent algorithms for automated decision-making with the development team. Such a move not only avoids *a posteriori* resolving of misunderstandings and resulting conflicts, but also addresses a major challenge to accountability (cf. Zarsky, 2015). Allowing affected stakeholders to scrutinize and hold to account the exercise of algorithmic design of decision-making strengthens the commitment to share responsibility for dependence on algorithmic decision-making.

Tackling transparency as a problem for socially consequential mechanisms can concern several forms of opacity (cf. Burell, 2106): '(1) opacity as intentional corporate or state secrecy, (2) opacity as technical illiteracy, and (3) an opacity that arises from the characteristics of machine learning algorithms and the scale required to apply them usefully'. We recognize that increasing technological literacy could help to uncover algorithmic decision-making and reflect on its purpose. Moreover, audit trails to the algorithmic process or interactive modeling allow individuals to gain a better understanding of how their actions impact upon the algorithmic response (Citron et al., 2014). Recognizing the distinct forms of opacity that may come into play in given applications is key to determining which technical and non-technical solutions can help to prevent harm.

Transparency can help restore accountability. Even when sophisticated algorithms are inherently opaque, algorithmic decisions preferably become more understandable, either to be interpreted ex post or to be interpretable ex ante by responsible and affected stakeholders (cf. Le Laat, 2017).

3. Immerse Experience and Facilitation Design for Re-Weaving the Web of Behavior

We term the suggested installation *Digitized* as it starts with experiencing the algorithmic overdependence based on IoT components and triggers the use of

digital facilities for (re)designing IoT settings to regain control over digitized systems. Capacity building is driven by personal experience of algorithmic decision-making and by creating an understanding of IoT system components and their interplay. The desired outcome is an individual's (re)gained confidence in dealing with complex systems in an analytical and constructive way. Such experiential design is understood as artful in the context of business innovations (Cain, 1998) and can be connected to artistic elaboration of the installation. Through experience it reduces the semantic gap between non-familiar systems or objects and affected stakeholders.

Fig. 1. Momentum-based experiential design

Figure 1 gives an overview of a possible instance of the *Digitized* installation to be located on a usually crowded part of a university campus or a similar public place. The interactive experience is based on 4 momentums. Starting with conveying the feeling of oppression (Momentum 1) and that of overdependence of algorithmic decision-making for behavior en- or discouragement (Momentum 2), the momentums cumulate in design-centered engineering of an IoT application when developing component understanding (Momentum 3) and behavior control (Momentum 4).

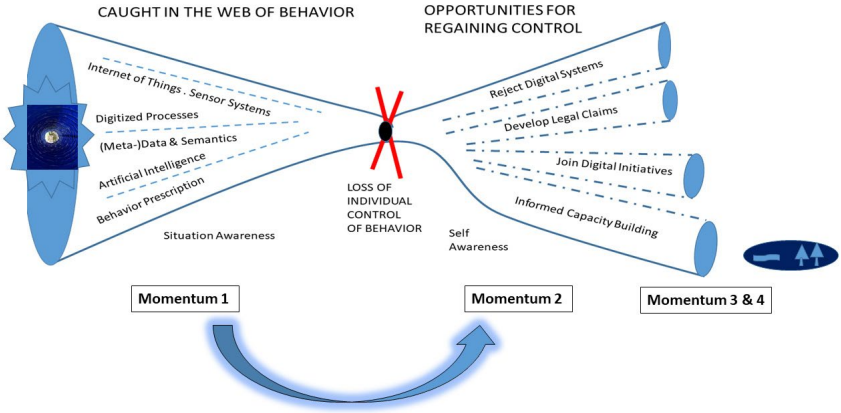

Fig. 2. Options-generating Momentum 1

Figure 2 overviews the prepared topics in the Digitized tunnel approaching some point of decision-making after experiencing the loss of individual control of behavior. Walking through the small entry several options (right-hand side of Figure 2) become available. When aiming for encouragement (Momentum 2), Momentum 3 introduces design-centered engineering of an IoT application for regaining behavior control in Momentum 4. Each momentum is described in the following.

Momentum 1: Feeling of Oppression

Making the increasing invisible restriction of behavior explicit: The interactive experience starts by passing through a tunnel that is getting smaller so that participants begin to feel uncomfortable, until at the end of the tunnel a small outlet is available. This needs to be passed to continue the interactive experience. The participants walk towards the end of this narrowing tunnel, leaving digital finger- and footprints until they leave the tunnel through a small outlet

with an algorithmic decision displayed on their future behavior regulations, making the invisible parts of the IoT system visible in terms of conclusive behavior prescriptions. Navigation and deep links to content and background information on the domestication and development of IoT systems are provided along the tunnel wall by IoT components, interactive stations, and QR codes. The visual, acoustic and spatial experience becomes more intense the more data is collected and the lower the range of opportunities by algorithmic decisions-making becomes. Hence, the feeling of oppression is triggered through multiple channels, regardless of whether the behavior conforms to expected patterns or leads to regulating a participant's behavior.

Figure 3 shows the concept of the tunnel design. The tunnel is equipped with information and interactive stations on the IoT (i.e. the system context), showing some of the sensor systems physically. The tunnel system collects sensor data and processes them using decision-making algorithms on the behavior of each participant. Movements, time, navigations paths followed on the screens on the walls of the tunnel, etc. are recorded and reflected to the participant as part of that process.

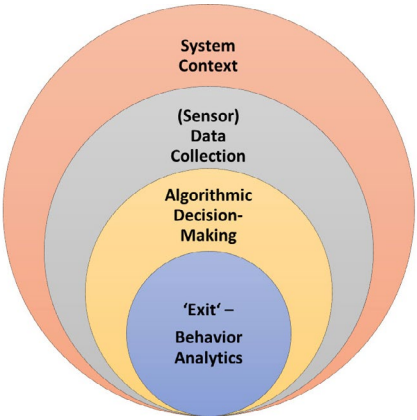

Fig. 3. Structuring the tunnel experience (Momentum 1)

Momentum 2: Experiencing Algorithmic Overdependence

Confrontation with the system that incrementally restricts behavior based on artificial decision-making: Passing through the small exit, each participant receives information how their behavior in the installation shapes and constrains future behavior, e.g., by restricting access to information, resources, services, social contacts and settings. It is a manifestation of algorithmic overdependence in an IoT environment for an individual who is part of a community. For instance, a student is denied access to certain services, while being nudged to adapt to certain ways of behavior, such as booking courses earlier to individualize course designs. Figure 2 captures typical behavior patterns that can result from experiencing algorithmic decision-making. It shows that besides informed capacity building based on the intention to (re) gain control of IoT technologies, other strands of action can result from the tunneled experience.

Momentum 3: Regaining Control

Zooming out & zooming in, actively exploring the system: After having received the interpretation of individual behavior data, the participants are guided to a learner-friendly location nearby to start actively (re-)designing an IoT application. This set of activities aims to explore a variety of design opportunities. They have a digital baseline, i.e. the 'digital twin' of themselves in the installation. The digital twin is prepared on a tabletop system (Oppl et al., 2014) (see Figure 4). It represents all IoT elements the participants were able to experience through algorithmic decision-making in the *Digitized* tunnel in the form of abstract block elements and their relationships. In this way, participants can physically generate of model of IoT components, including sensor systems and software components processing collected data (see Figure 5 and Figure 6). In addition, algorithms (encoded in hard- or software) can be decomposed to explain step-by-step computational intelligence.

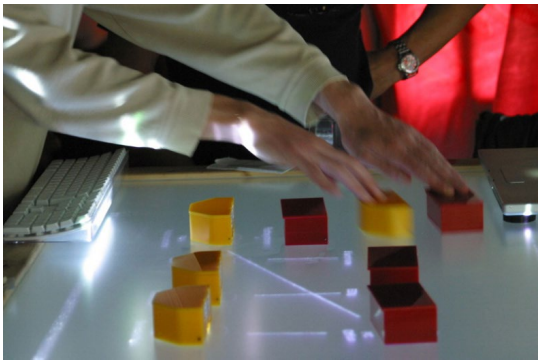

Fig. 4. Modeling the digital twin on a table-top system

Momentum 4: Self-efficient Digital Capacity Building

In-depth understanding leading to action: The model created in Momentum 3 needs to be instantiated by IoT elements and synchronized by a specific operation logic (algorithmic decision-making procedure). For capacity building, so-called Nerd Trees (see Figure 5) have been designed (Stary et al., 2020). They contain simple and combined IoT components. Participants can grab one or more IoT components, namely IoT-(i.e. M5Stack©) elements in each of the boards (layers) and compose applications according to their model. Since these components have inherent behavior, their coupling makes the IoT system operate according to participants' individual needs as represented in their model. The implementation allows monitoring of the generated data and the flow of information for decision-making. Figure 5 shows the top-down and bottom-up drivers to explore IoT systems and their components. The layered approach of the Nerd Tree supports middle-out capacity building, in particular for visitors who are familiar with combined sensor systems including temperature and movement measurement and who want deeper knowledge, either in technologies or application development. The M5Stack control element contains various ways to plug in sensors and combine them to create intelligent application system behavior. It also provides

basic functions for display, navigation, and control. For complex interaction, M5Stack-applications can be operated from mobile phones. They reside on top of the Nerd Tree.

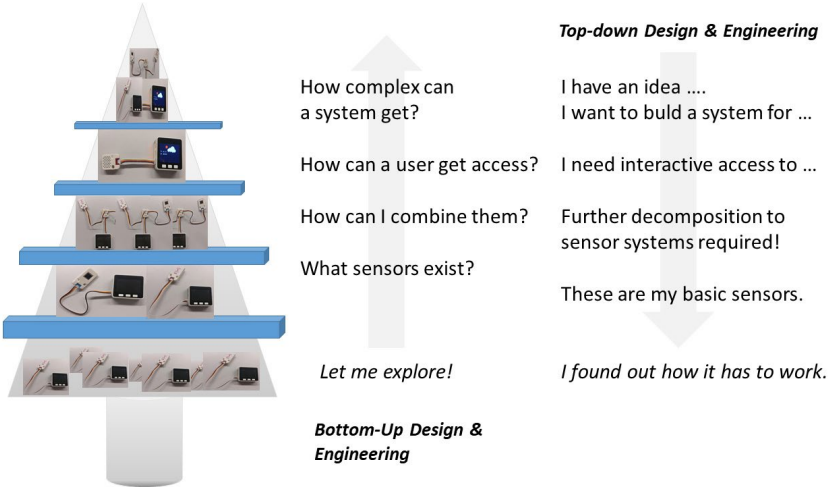

Fig. 5. Variety of IoT system components – A NerdTree

Figure 6 zooms into programming the behavior of M5Stack© applications (cf. M5Stack.com) using Blockly. On the left, the M5Stack control component with several sensors for securing the access to rooms (including a keyboard to typing in keys) is illustrated. On the right, a screen shot of UIFlow (when programming in Blockly) is shown, processing an event and (re)acting based on recognized sensor data. The creation of IoT application behavior through Blockly is based on the language JavaScript supporting block-based visual programming. According to its concept, Blockly features structured (de) composition of IoT components (represented as units) and handling of events in an IoT environment. In this way, not only can each block of the digital twin be mapped to one or more operational entities, but also the successive passing of information along algorithmic computations can be experienced and operated in real time.

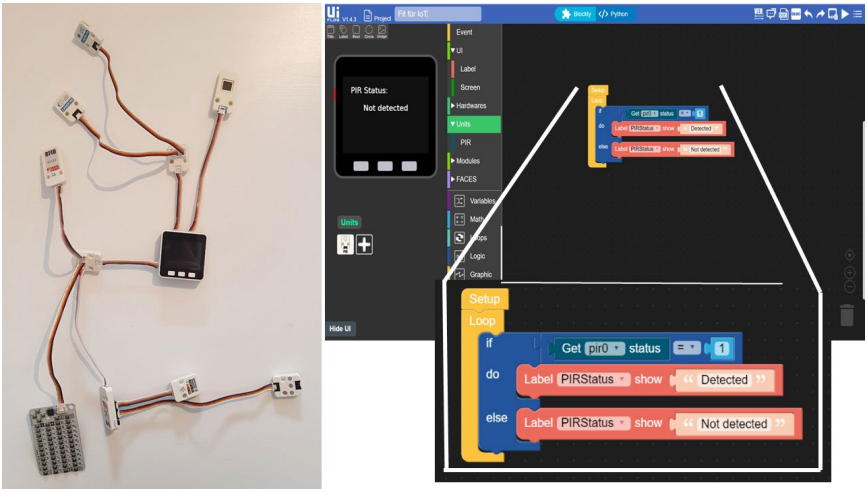

Fig. 6. Design-oriented engineering utilizing M5Stack© elements, and Blockly programming in UIFlow©

4. Conclusion

More and more data are captured through IoT sensor components, and often users as well as other adopters tend to depend too much on algorithmically generated information, so much so that they may even select inferior products and services to their own detriment or restrict their own free moving space. We refer to this as algorithm overdependence. Rather than 'surrendering to technology' in modern digital environments we suggested experiential design for stakeholders to develop an understanding of the complex systems to create agency.

The proposed installation *Digitized* aims to trigger reflective practice for (concerned) stakeholders in continuously digitized environments. It promotes awareness by offering scenarios of concern and triggers to allow transparency

and design for mutual use for users and providers of digitized systems. For the physical parts of the installation a digital support system is available so participants can regain intelligent control.

Digitized is an individual, however, socially grounded and co-created artistic protocol of space perception and (re)design. Based on the interactive experience of artificial decision-making, constructive interventions can be set through physical experience even for intangible elements including algorithmic processing.

Due to its partly interactive character and educational elements the installation enables active reflection on and testing of IoT and develops methods of behavior capturing and regulating. Artistic mediation showcases anchors of digitization in different fields ranging from explicit access control to indirect control of behavior. It uses audio, visual arts (drawing, video, visualization) and edutainment (crafting intervention, workshops). These elements will be explored in situ and insights might vary from individual to individual.

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Johannes Braumann interviewed by Liselotte Zvacek

Why didn't you stay until Sunday's brunch?

The idea of our conference was to enable people from different thematic and content-related backgrounds to exchange ideas, to introduce managers and consultants to the topic of AI, and to bring new ideas into the world together with technicians.

In addition to the discussion of AI, the conference concept included two streams: Art and Research. Artistic interventions should connect participants from different backgrounds and encourage inspiring things to happen. The main part of the artistic work was done by Paloa Mineo and Andrea Schüller: first, through the production for each participant of plaster cast fragments of their own face; and second, through a playful (remember your number), tangible and perceptible performance addressing the other side of artificial intelligence – threat through surveillance. The research stream was represented by students of Avans University through a performance on the last day.

In general, the conference design was structured in such a way that the results of participants' experiences and insights were processed together in dialogic processes on Sunday, the last day of the conference. Interestingly, almost exclusively managers, consultants, artists and students were present on Sunday, while participants from the technical world did not make it to the brunch.

A look at the round table on Sunday morning made it clear that we were more or less among ourselves, a moment of realization that surprised many participants in the dialog.

How did this come about, what hypotheses are possible explanatory patterns and what forces might have been at work here?

The world of technicians is still predominantly male, but the understanding of roles has changed – fathers of the younger generation take their role seriously and limit themselves to the essential, content-rich parts of the conference and spend the evening and the advanced weekend with their children.

But this was probably not the only reason, and Liselotte Zvacek, one of the conference chairs, reflected together with one of the keynote speakers, Prof. Johannes Braumann, and found some explanations that we would like to share in the following.

LZ: Prof. Braumann, what were your impressions of the COS-ARTificial Conference 2019 in the tobacco factory?

JB: My background is architecture, so I'm used to other formats of conferences, formats where you passively let yourself be sprinkled by presentations; here the interactive exchange format surprised me. This might be a first hypothesis – especially in the IT industry conferences are huge with several thousand participants* (*or were before the COVID crisis) and therefore much more impersonal. At these conferences, the contact to other conference participants is established through holding one's own lectures or workshop, which is often problematic. If you have your slot later in the conference, then you lose valuable time when you could be addressed by others or make contacts, because nobody knows or addresses you until then. At the COS Conference it was completely different; through the dialog groups you already got in contact in the first few minutes and were forced to overcome your shyness, because the talking stick (a 3D-printed ARTifish) came closer and closer and you had to contribute. This interactive format may have put some people off, although I liked the fact that people were more or less forced to raise their voice and contribute. You're not so used to getting in touch with other participants in the first few minutes, so you might prefer to stay in the background

and if the last day is completely in dialog format, that might be even more of a reason to stay away.

LZ: You mean that some participants were taken out of their comfort zone and thus reacted in a more reserved fashion?

JB: Yes, I can imagine that, certainly not consciously but on the unconscious level.

LZ: In the 1970s Edgar Schein made a long-term study of how careers develop and divided graduates into eight different categories, one of which is technical-functional competence – which is increasingly found in areas of technology, i.e. concentration on content, connections, deep diving and getting involved professionally. With this potential, social-communicative skills are subordinate to technical skills and are not practiced in this way. This also could possibly have contributed to being "taken out of their comfort zone".

JB: Another hypothesis would be that the subject of interdisciplinarity was not perceived in this way by the technicians. They saw themselves more as AI experts and not as contributors who, like the other researchers and artists, met and broke new ground together. The scientists from the AI side have an eloquence in their vocabulary which others who have taught themselves the skills cannot quite keep up with.

LZ: Do you think it's like when native speakers get together with those for whom it's a second language, or who have just started to develop their vocabulary?

JB: Yes, it may be that we didn't meet on the same level. It may have been more like AI masters meeting AI learners, and yet both learned from the encounter.

LZ: … and the encounter on the artistic level unfortunately did not fire up the process as much as we would have wished, although inspiring encounters, especially in the performance, occurred here. For our target group, the consultants and managers, it was very worthwhile to dive into the topic. The exchange format, which was rather familiar, was an energizer for them. It also became clear that there is no solution, that questions remained open until the end and that the exchange, awareness and mindfulness in dealing with the topic of AI are all particularly relevant.

JB: Perhaps you are also too critical. Consider the aspect we have at all conferences: The first day is very busy, the second day is also busy and then it flattens out. Conferences also should not be measured by the last day. Therefore, always take the group photo on the first day, remembering the usual patterns. If I take myself as an example, I had some interesting meetings and took some contacts with me; I think this is also true for those others who did not stay till the end.

LZ: Thank you for the interview.

About the Authors

Johannes Braumann heads Creative Robotics at the University of Art and Design Linz. He is co-founder of the Association for Robots in Architecture and the main developer of the intuitive robot programming environment KUKA | prc, which is used by more than 100 universities and 50 companies worldwide. The focus of his work is the development of methods of robotics for new user groups. Thereby, Creative Robotics cooperates closely with the Innovation Center Grand Garage and develops innovative robot processes for (and with) SMEs and craft businesses.

Sougwen Chung is an internationally renowned artist and a pioneer in the field of human-robot collaboration. In her work she artistically explores and researches ways to work with machines and the potential of artificial intelligence in creative cooperative processes. Chung has been artist-in-residence at distinguished organizations like Nokia Bell Labs, is a former research fellow at MIT's Media Lab and was selected as the Woman of the Year in Monaco in 2019 for achievement in the Arts & Sciences.

Elisabetta F. Jochim is creative AI lead at Libre AI and co-founder at Cueva Gallery. She has a background in Arts and Humanities and extensive experience in project management working with heterogeneous teams in dynamic environments. Finding her passion in the intersection of technology and art, she explores how artificial intelligence can enhance human creativity. Her interests focus on digital aesthetics, human-computer interaction, human and machine creativity, and society.

Paola Michela Mineo is an Italian visual artist: her research is rooted in relational art, but she uses an interdisciplinary language that ranges from performance art to photography, from the purest sculpture to installations. She graduated in Architecture at the Polytechnic of Milan and Athens; she reinterprets the concept of human cast and fragment, transforming them from

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Elena Raviola is Professor in Business and Design at the university of Gothenburg. She is recipient of the Tortsen and Wanja Söderberg Professorship in Design Management at the Academy of Design and Crafts Gothenburg and Director of the Business and Design Lab. Her research incorporates artificial intelligence and design, and its implications of work processes, most importantly on creative work. Her main research interest lies in understanding the role of technology and other material artifacts in organizing professional work, especially in news production. She was visiting researcher at Stanford, Bocconi University, Harvard, and Sciences Po, and worked at Jönköping International Business School and Copenhagen Business School.

Claudia Schnugg is independent researcher and curator in the field of art and science. Her work focuses on analyzing the effects of art in organizational and social settings, including change processes and new technologies. As advocate of artscience collaboration, she has been the catalyst for numerous projects. Claudia is working with leading scientific institutions, tech corporations and cultural partners. She researched at JKU in Linz, Copenhagen Business School, UCLA Art|Sci Center+Lab, and at European Southern Observatory, Chile. She headed the Ars Electronica Residency Network and was first Artistic Director of Science Gallery Venice. Her most recent book is "Creating ArtScience Collaboration" (2019).

Andrea Schueller is an independent business consultant, executive coach and lecturer at various universities specializing in generative change and transformation, organizational design, systemic identity, social innovation, creative emergence. Over the years she has qualified in various fields and applies her work shapeshifting in different contexts pursuing the red line of fostering embodied consciousness development through fresh presence and

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Liselotte Zvacek is management consultant, leadership coach and lecturer at different universities in Austria; teaching trainer (train the trainer) of OEGGO (Austrian Society of Group Dynamics and Organisational Development) and member of the board of OEGGO (2000-02 and 2012-18); facilitator at the Graduate School of Business of Stanford University (USA) 2011-15; member of the faculty of the Hernstein Institute; member of NTL (National Training Laboratories Institute, USA), photographer. She is a co-founder of COS Collective.
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