

Mapping the Socially Engaged Arts in Europe

Kirsti Reitan Andersen, Víctor Renza, and Christian Fieseler



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Mobilising the Arts for an Inclusive Digital Transformation

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About Artsformation: Artsformation is a Horizon 2020 Research and Innovation project that explores the intersection between arts, society and technology. Artsformation aims to understand, analyse, and promote the ways in which the arts can reinforce the social, cultural, economic, and political benefits of the digital transformation. Artsformation strives to support and be part of the process of making our communities resilient and adaptive in the 4th Industrial Revolution through research, innovation and applied artistic practice. To this end, the project organizes arts exhibitions, host artist assemblies, creates new artistic methods to impact the digital transformation positively and reviews the scholarly and practical state of the arts. The following report is one part of this ongoing effort.

For more information, please visit our website: www.artsformation.eu

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Executive Summary

Building on the literature review on the social and civic impacts of the arts' undertaken as part of this project, i.e. Task 4.1 (Andersen et al., 2020), this report indexes artworks that address the emancipatory, questionable and/or destructive effects of the digital transformation. We introduce artists and various forms of artist collectives and organisations within Europe that use artistic methods as a way of investigating and understanding the digital transformation and as a catalyst for exploring alternative futures. Starting from an all-inclusive search for artistic practices that explore challenges and opportunities within the digital transformation, this report pays particular attention to artists who adopt socially engaged and participatory art practices in their work. We looked for artworks that aimed to create and foster social interactions through active participation in diverse experimental methodologies, including workshops, social sculptures, social events, and co-created artworks.

The artworks included in this indexing, or mapping, are illustrative of the wide variety of methods developed by artists and artist organisations in their ambition to engage with audiences and communities of people in a constructive dialogue concerning the future of digital technologies. Many of the artworks dealing with the digital transformation explore artistic uses of a given technology while also investigating specific cultural and social impacts of the technological changes we are experiencing today. One such approach is the creation of installations for exhibitions, both indoors and outdoors, which mix the use of digital and analogue technologies. In these artworks the participatory process often includes the use of electronic and digital components in a two-way relationship, demonstrating not only the possible artistic uses of technology but also reflecting on itself. Another approach we evidence here in our mapping is that of participatory artistic performances. The performances included in this report highlight an important aspect of socially engaged art in demonstrating the typically ephemeral nature of such work. Unlike artworks that can last longer over time, socially engaged art is rooted in the involvement of participants, either directly or through digital devices. Another set of examples of artworks indexed here includes the work of artists who use online platforms to strengthen social networks within their communities. These artists focus on issues that mix digital and social aspects, and the platforms they develop are the outcome of constant feedback from interactions between the artists and the participants.

In sum, this report introduces artists who involve their audiences and participants in the creation of the artwork as a means of building bridges between people and ongoing debates about the impacts of the digital transformation, including various forms of artistic organisations working to create more diverse, democratic and equal digital futures. While we have noted that the initiatives included in our mapping tend to be short-lasting, these findings also indicate key themes that have evolved over the years, showing a thread between current affairs and the use of arts as a means of responding to such reality and dilemmas.

Introduction

The first two decades of the 21st century we have seen the ongoing proliferation of digital technologies come to play an ever-increasing role in the everyday lives of more and more people across the world, including an ever-greater impact of such digital transformations on the lives of those who do not even engage with digital technologies on a regular basis (Brandtzaeg, Heim and Karahasanovic, 2011; Mutsvairo and Ragnedda, 2019; Park and Humphry, 2019).

Before exploring the various ways in which art has responded to these 'digital' changes, however, it is first worth specifying more precisely what we mean by certain key terms such as 'digital technology' and 'digital transformation', especially since these terms are often used in rather broad and ambiguous ways:

- *Digitization* here refers to the process of converting information into a digital format (i.e. (zeros and ones) that can be read, processed, and stored by computers.
- *Digitalization* refers to the ways in which social life is organized through and around digital technologies.
- *Datafication* refers to the ways in which 'meaningful' data is derived from behaviours, activities, and processes (Leonardi and Treem, 2020).
- *Digital transformation*, like 'digitalization', refers to a societal and cultural process, defined by Hinings, Gegenhuber and Greenwood (2018, p. 53) as "the combined effects of several digital innovations bringing about novel actors (and actor constellations), structures, values, and beliefs that change, threaten, replace or complement existing rules of the game within organizations, ecosystems, industries or fields".

While bearing these definitions and nuances in mind, when talking about digital technologies we generally think of the great variety of electronic tools, devices, systems and resources that generate, process or store data, most of which are in one way or other connected through the Internet.

Considering that only 0.9% of the world's population were using the Internet in 1996, it remains quite astonishing that we can now barely imagine life without digital technologies and the Internet (Loon, n.d.; Parés, 2014). In less than three decades, digital technologies have made possible the creation of new services and platforms like Airbnb, Instagram and TikTok, further facilitating alternative currencies like Blockchain and Bitcoin and the development of product platforms like Apple and Amazon. The impact of digital technologies at institutional level, for example through customizable modules such as the Wordpress web publishing software and Enterprise Resource Planning systems, is also quite remarkable (Hinings et al., 2018). Digital technologies have made it possible for people and businesses across the world to stay connected, work together and perform transactions at an extent and speed that would have been hard for most people to imagine even at the beginning of this millennium.

In spite of the many opportunities brought about by digital transformation, its wide-ranging impacts on individuals and societies have become the topic of heated debate (Gingrich et al.,

2020) and increasing criticism on account of its lack of inclusivity and diversity and for undermining democratic principles and procedures. According to Gingrich et al. (2020, p. 190), some of the most adamant critics of technology maintain that digital technology has come to “function as a tool to provide capitalism with new modes of abstracting the body from its whole concreteness”. They further criticise the capitalistic exploitation of digital technologies for the “collection and accumulation of huge amounts of personal data in order to predict people’s behaviours for profit purposes” (Gingrich et al., 2020, p. 190) depicting some possible negative scenarios of the digital transformation.

In light of the immense opportunities but also problematic and exploitative design and adoption of digital technologies in our societies, our overarching objective in Artsformation’s Work Package 4 (WP4) has been to explore what role the arts might play in guiding the digital transformation towards a more inclusive, democratic and accessible path of development. In particular, we look here at the potential role that might be played by socially engaged and participatory art (Bishop, 2012), arguing that such art can challenge existing narratives about the digital transformation by offering diverse interpretations of the design, production and adoption of digital technologies while also shedding light on societal undercurrents of the digital transformation more transparent.

This report covers artists and artist organisations dealing with a wide range of aspects of the digital transformation. Many of them present utopian and dystopian futures in which technology is a powerful mediator in our everyday lives. Some are concerned with futuristic dilemmas such as the roles of robots and their relationships with human beings. Other artists deal with important issues such as digital literacy, technological skills and access to new technologies, often involving vulnerable groups of people in their works and paying special attention to the intertwined dynamics and effects of social and digital transformation.

As specific examples of such art we will just briefly mention four works and initiatives here that are included in this report:

- *Bloemenveiling*: an online auction of short videos of tulips generated by GANs, i.e. generative adversarial networks, which explores the use and environmental costs of Blockchain technology.

Sociality: an artistic exploration of issues of intellectual property rights and copyright that highlights the harmful effects that certain patents could have in the future of the digital transformation.

The Institute of Human Obsolescence: an innovative and participatory initiative that addresses the future of labour and the digitalization of work, showing how we as a society face new realities in which human beings are being relegated by machines, AI and other technologies

Radiona: a makerspace that offers another interesting example of artists forming more long-lasting organisations, highlighting alternative ways of working and making an impact over time.

Methodological Parameters for Mapping Socially Engaged Artists in Europe

Our mapping exercise comprised a systematic exploration through desk research of artists, collectives and artistic organisations in Europe working at the intersection of the arts and the digital transformation. Following Berg and Lune (2017), we used a combination of purposive, convenience and snowball sampling as a means of initially identifying artists and artist organisations that were both accessible online and shared relevant characteristics such as working within socially engaged art (SEA) and covering challenges and opportunities related to the digital transformation. From this initial sample we expanded our coverage by identifying other artists who fulfilled the same criteria. Aiming to cover the breadth and depth of socially engaged practices across Europe, we applied the following two key criteria in our search: i) the way in which the artist or artist organisation delivered their artistic practices; and ii) their geographical location.

The data collection process included examining records, digital archives and databases from renowned festivals such as Ars Electronica and Transmediale. We also searched for websites and press releases from different artists, festivals and exhibitions of arts and the digital transformation. Artsformation's partners also provided lists and databases of possible interesting initiatives and artists that could meet our initial inclusion criteria.

Here it should be noted that the timeframe for our mapping was set from 2000 to the present, a period that begins with the dot-com bubble as well as the type of digital transformation challenge that each artistic initiative explores.

The initial results of our mapping, which are not presented here as comprehensive but rather as an invitation to a continuous collaborative process with the readers of this report, include some 170 artists and various artist organizations whose artworks speak in some way to the digital transformation. The coding of the subjects of the initial sample used the following characteristics:

- The name and nationality of the artist/collective
- The type of artist/collective and background
- Collaborators (in cases of multiple subjects)
- Year(s) of the initiative
- Country and location of the initiative
- Name and description of the initiative
- Type of initiative and its self-professed goals
- The particular challenges addressed in relation to the digital transformation
- Other initiative details

Having codified the different artists and organisations, we proceeded to analyse the collected data and to produce this mapping report. We classified the digital transformation issues considered in this report into sub-themes such as 'technological infrastructure', 'practices', 'business and organisation models', 'social and psychological impacts', 'legal and economic frameworks' and 'social activism' (See Table 1 below). We then sought out examples from different countries and different types of artworks and initiatives that could serve to highlight each of these subthemes.

Digital Transformation Challenges	
Technological Infrastructure	<ul style="list-style-type: none"> ▪ Internet of Things ▪ Machine Learning ▪ Human-Machine interaction ▪ Cloud Storage ▪ Computer Vision ▪ Robotics / Manipulation ▪ Artificial Intelligence ▪ Natural Language Processing ▪ Geolocation ▪ 3D-Printing Robotics ▪ Deep Web ▪ Blockchain
Practices	<ul style="list-style-type: none"> ▪ Autonomous Machine to Machine Interaction ▪ Data Collection ▪ Business Experimenting ▪ Trolling ▪ Cryptocurrency
Business/Organisation Models	<ul style="list-style-type: none"> ▪ Sharing Economy ▪ Maker Movement ▪ Digitalisation of work ▪ Future of labour ▪ Technological unemployment
Social/Psychological Outcomes	<ul style="list-style-type: none"> ▪ Access Divide ▪ Skills Divide ▪ Social Media ▪ Human Interaction ▪ Digital Literacy
Legal and Economic Framework	<ul style="list-style-type: none"> ▪ Intellectual, Copyright and Commons ▪ Privacy and Surveillance ▪ Libel/Takedown ▪ GDPR (General Data Protection Regulation) ▪ UBI (Universal Basic Income)
Social Activism	<ul style="list-style-type: none"> ▪ Accountability ▪ Gender, Diversity and Inclusivity ▪ Environment and Sustainability ▪ Censorship

Table 1 Digital Transformation Challenges

The criteria we adopted for selecting which artists and artist initiatives and organisations to include in this report thus included the need for examples of a variety of socially engaged and participatory artistic methods and a variety of ways of organizing from a diverse range of nations across Europe (Andersen et al., 2020).

The three main organisational categories used as criteria in the mapping were:

1. **Artists and artistic initiatives that address digital issues:** This category includes all artists who explore both the positive and the negative aspects of the rapid digitalization of our era by displaying issues related to the digital transformation. This category did not differentiate between the tools implemented by the artists, i.e. both digital and analogue tools/techniques were considered here.
2. **Socially engaged artists and artistic initiatives that address digital transformation:** This category includes artists and artistic initiatives that prioritize the active participation of audiences in their works as a potential means of strengthening social ties among artists and participants while at the same time tackling issues related to the digital transformation.
3. **Artist's organizations that address digital transformation:** The third criteria of inclusion for our mapping includes a category of more organized forms of artistic movements. These artist organisations are also interested in collaborative artwork with communities but are focused on more structured and forms of collaboration that allow them to last over time. Such organised artist initiatives resemble those of social entrepreneurs, though they have their starting point in socially engaged art practices. These institutions as research centres, laboratories and collectives seek to produce scientific and cultural knowledge and look to generate both a social and academic impact that can cut through a wider and more diverse range of stakeholders in the community.

Intended Outcomes

The intention of this report is to begin to capture and map the wide variety of approaches that socially engaged and participatory artists take in their explorations of digital transformation. Accordingly, the indexed cases cover a variety of artistic approaches to different issues related to digital transformation as well as a diverse range of artistic backgrounds in terms of gender, nationality, profession, organisational form, etc. In this way the report lays the foundation for further action and investigation in the upcoming project deliverable, Task 4.3, which will contain a series of case studies allowing for in-depth exploration of the role of socially engaged and participatory art in the creation of diverse and democratic digital futures.

We would further like to consider how this mapping could be used as a tool by other potential stakeholders and audiences, as a source of inspiration for how to use and work with digital technologies. For example, how might teachers of technologies fruitfully rethink the ways in which they teach technology? How might municipalities and other public institutions work beneficially with socially engaged artists in their exploration and implementation of new digital platforms.

Or for artists, how might this mapping inspire new digital transformation topics, new collaborations and/or communities to work with? How can such mapping help us as society to create and/or support organisations that value and leverage the arts in striving for a more inclusive, transparent, accountable, fair and democratic digital transformation?

Artists covering issues surrounding the digital transformation

Cases in which artists explore challenges and opportunities specific to the digital transformation, often using digital tools as a means of exploration and expression.

The artistic initiatives indexed under the category of ‘Artists Covering Issues Surrounding the Digital Transformation’ broadly showcase the works of artists who use or combine digital and analogue methods in their exploration and imagination of our digital futures. For all their individual differences, these artworks all share the aim of encouraging critical reflections on aspects of the relationship between humans, nature, and digital technologies.

Anatomy of an A.I. System

Year: 2018

Type: Map and essay

Artists: Kate Crawford and Vladan Joler / Country: Australia and Serbia

Topic: Artificial intelligence

URL: <https://anatomyof.ai>

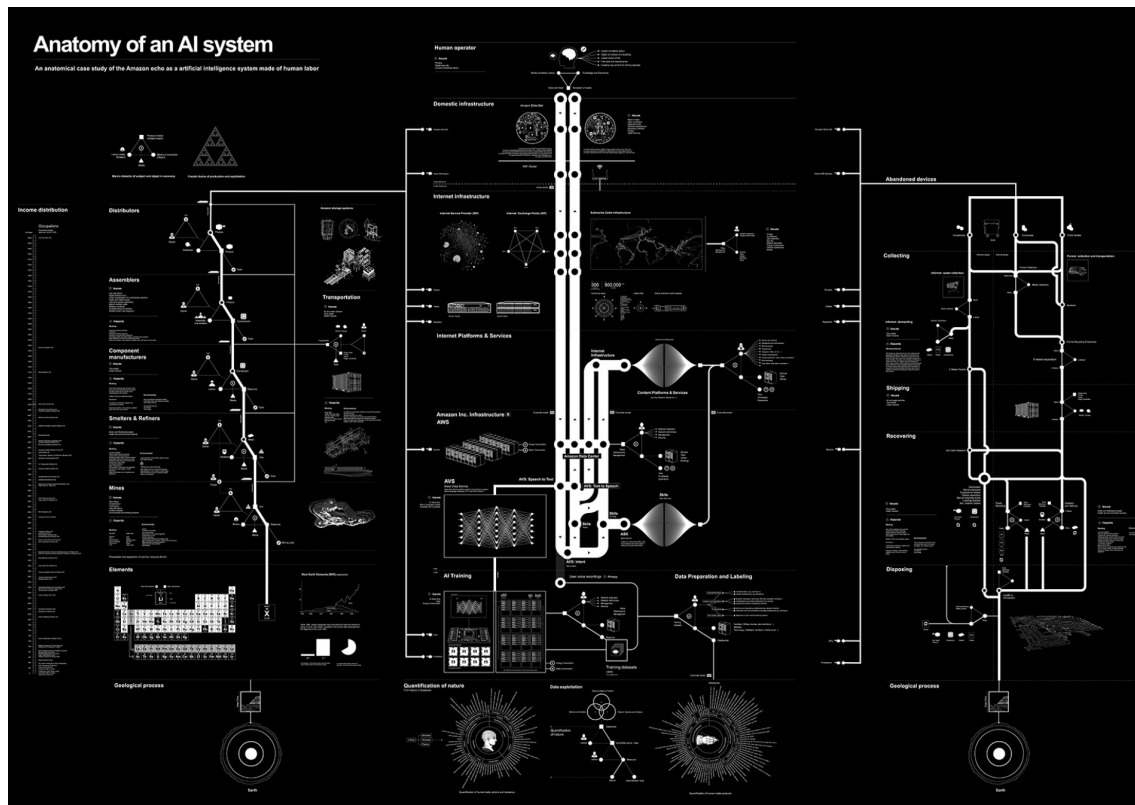


Figure 1: Anatomy of an AI system. Source: <https://anatomyof.ai>

Vladan Joler is an artist, academic and researcher who works at the intersection of numerous disciplines, including data investigations, investigative journalism, writing, data visualization, counter cartography and critical design. Joler is a co-founder of Share Labs and a professor in the New Media department at the University of Novi Sad in Serbia. Share labs is a research and data investigation lab that explores various technical aspects of the intersection between technology and society, including not only the known highways of the electronic frontier but also roads less visible or even hidden, seeking to better understand new challenges to network security, neutrality and privacy-related issues (The Influencers, 2017).

Kate Crawford is a researcher, academic and author whose work focuses on the study of large-scale data systems, artificial intelligence and machine learning. She is also the co-founder of the AI Institute at New York University, which conducts research exploring the social implications of artificial intelligence.

Joler and Crawford created the project *Anatomy of an AI* to investigate and promote discussion about the human labour, data and material resources that go into building and operating digital AI assistant technologies such as Amazon Echo, while highlighting not only the negative but also the potential positive uses of AI. Through the media of a large-scale map and long-form essay, their work illustrates and describes this use of human labour and natural resources as a new form of 'extractivism', highlighting how the social, environmental, economic and political costs of these new technologies still remain largely unknown:

It's necessary to move beyond a simple analysis of the relationship between an individual human, their data, and any single technology company in order to contend with the truly planetary scale of extraction. Vincent Mosco has shown how the ethereal metaphor of 'the cloud' for offsite data management and processing is in complete contradiction with the physical realities of the extraction of minerals from the Earth's crust and dispossession of human populations that sustain its existence. Sandro Mezzadra and Brett Nielson use the term 'extractivism' to name the relationship between different forms of extractive operations in contemporary capitalism, which we see repeated in the context of the AI industry. [...] Thinking about extraction requires thinking about labour, resources, and data together. This presents a challenge to critical and popular understandings of artificial intelligence: it is hard to 'see' any of these processes individually, let alone collectively. Hence the need for a visualization that can bring these connected, but globally dispersed processes into a single map. (Crawford and Joler, 2018).

Amongst other Share Labs projects we indexed are *Mapping and quantifying political information warfare*, *Invisible Infrastructures* and *Facebook Algorithmic Factory*.

Machine learning I, II, III

Year: 2018

Type: Weaving

Artist: Amalie Smith / Country: Denmark

Topic: Machine learning

URL: <https://www.amaliesmith.dk/machine-learning?lang=en>



Figure 2: Machine Learning I, II, III. Photo by David Stjernholm. Source: <https://bit.ly/2S0d5OX>

Amalie Smith has produced several works on the digital transformation, primarily through videos, installations, weavings and books, including the visual artworks *Machine Learning I, II, III*, *Michanikos*, *Enter*, and the book *Thread Ripper*. Her works aim to make us aware of the materiality of the digital and to shed light on the role of women in the history of technology. *Machine Learning I, II, III* was the outcome of a public commission by “Statens Kunstfond” in 2016 to produce a digital artwork for Ørestad High School. To produce this work, Smith photographed hands using digital devices and then ran the images through DeepDream computer vision software instructed only to recognize endangered plants. The output illustrates how machine learning is always ultimately the result of human-made databases. In the motif, the hands and plants and machine vision melt together into an entangled network, evoking the ways that the body, nature and technology exist co-constitently. The flowers crowd the jacquard-woven textile as an ode to the first programmer in the world, Ada Lovelace, who wrote about flowers in her notes on the interconnections between the jacquard loom and the computer. By highlighting how computer technology derives from the punched card system of the Jacquard loom, the work interweaves thousands of years of feminized work with the masculinized computer engineering field while revealing the often-overlooked material history of the computer.

Premium Connect

Year: 2017

Type: Video installation

Artist: Tabita Rezaire / Country: "Franco-Guyano-Danish"

Topic: Access divide

URL: <https://www.d-est.com/premium-connect/>

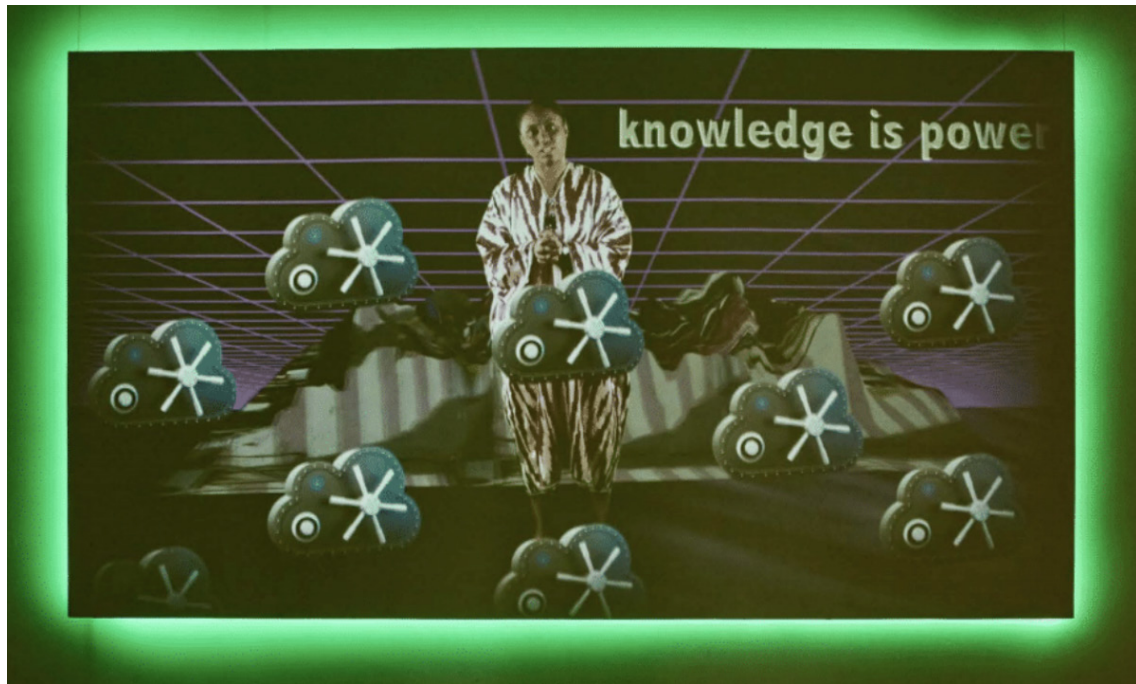


Figure 3: *Premium Connect*. Source: <https://fytafytafyta.wixsite.com/dystopianpleasures/tabitarezaire>

Tabita Rezaire identifies as "Franco-Guyano-Danish". She grew up in Paris and studied there as well as Copenhagen and London, where she obtained an MA from Central Saint Martins College of Art and Design. Tabita Rezaire often works with Alicia Mersy in the artists' duo *Malaxa* based in Johannesburg and Tel Aviv. She is also a founding member of SENEb as well as the Johannesburg-based collective NTU with Bogosi Sekhukhuni and Nolan Oswald Dennis. Tabita Rezaire crosses healing from ancient cultures and yoga with digital technologies through video installations, using glitch aesthetics to tackle the colonial matrix.

Her 2017 work *Premium Connect* rethinks information and communications technology (ICT) by presenting African divination systems such as the Ifa system of the Yoruba people, the fungi underworld, ancestors' communication, and quantum physics, highlighting the ways in which ICT mirrors the organic world, wherein healing and harming is possible depending on its usage. The work thus connects the technological with the organic and spiritual, in stark contrast with biased and Eurocentric thinking. The work was created in conversation with the Nigerian philosopher Sophie Oluwole.

Street Ghosts

Year: 2012–2017

Type: Performance

Artist: Paolo Cirio / Country: Italy

Topic: Data collection

URL: <http://streetghosts.net>



Figure 4: Press image for Street Ghosts project. Source: (<http://streetghosts.net>)

Paolo Cirio is an Italian artist, hacktivist and cultural critic who uses the Internet as a medium to create his artwork. Born in Italy, he now lives in New York, working on hacker ethics such as privacy, surveillance, copyrights, open access, and critiques of economic, legal and political models. By transforming critiques of information systems into artefacts, Cirio visually illustrates and documents those social structures, aiming to make us see, examine and challenge these complex social systems and processes. Cirio's installation art combines mediums such as photographs, video, documents, images and diagrams to engage with a wider audience in experiencing and discovering the issues he takes up for discussion.

One example of such work is Cirio's 2012 *Street Ghosts*, with which he invites us to reflect on the widespread collection of data by corporations without the permission of individuals. In creating *Street Ghosts*, Cirio took photos of individuals collected and made available by Google

on Google Street View and posted them, without Google's authorization, in the form of life-size posters in the same locations where the pictures were taken. In this way, Cirio reversed the act of Google by using the corporation's pictures without their permission. As the artist explains:

The artwork becomes a performance, re-contextualizing not only data, but also a conflict. It's a performance on the battlefield, playing out a war between public and private interests for winning control on our intimacy and habits, which can change permanently depending on the victor. Who has more strength in this war? The artist, the firm, the legislators, the public concern or the technology? (Cirio, 2012).

Capture (2020), a more recent artwork by Cirio, also addresses the question of digital rights, exploring and questioning the potential use and misuse of AI and Facial Recognition technologies by highlighting the asymmetry of power at play (Cirio, 2020). Using public images and facial recognition software, Cirio created a series of photos showing French police officers' faces and displayed the headshots as posters in the streets of Paris, publishing them on an online platform to crowdsource their identity. The Interior Minister of France and the Police Unions responded by enforcing censorship of the artwork, further underlining the asymmetry of power that Cirio strives to bring to our attention.

Towards Disorder (2019)

Year: 2019

Type: Performance lecture

Artist: Anna Lundh / Country: Sweden

Topic: Human-machine relationship

URL: <http://annalundh.com/towards-disorder/>



Figure 5: *Towards Disorder*. Source: <http://annalundh.com/towards-disorder/>

Anna Lundh is a PhD candidate in the “Art, Technology and Design” program at Konstfack University College of Arts, Crafts and Design, and KTH – the Royal Institute of Technology in Stockholm. She gained an MFA from Konstfack, Stockholm, and has studied at The Cooper Union School of Art, New York. She primarily works with algorithms and the development of technology throughout modern times. Lundh works through research with temporality, language and technology in her art through different media, often including lecture performances related to concerns about technology. *Towards Disorder* is a performance lecture and a new treatment of her *Visions of the Now* festival and congress that took place in 2013 in Stockholm. *Visions of the Now* was also a reiteration of the 1966 festival *Visioner av Nuet*, which aimed to discuss the impact of technology on humanity, society, the environment, and artistic practice. *Towards Disorder* was performed at the exhibition *Mud Muses* at Moderna Museet. In this performance lecture, Lundh addressed the ways technology affects our living conditions and suggested new narratives, discussing topics such as “visual synthesis, hamburgers, auditory illusion, clouds, phantom words, virtual social ecologies, FM frequencies, fingertips, feelings, and waffles” (Lundh, 2019).

Amalgama El Prado

Year: 2019

Type: Generative video projection

Artist: Daniel Canogar / Country: Spain

Topic: Human-machine relationship

URL: <http://www.danielcanogar.com/work/amalgama-el-prado>



Figure 6: *Amalgama El Prado*. Source: <http://www.danielcanogar.com/work/amalgama-el-prado>

Daniel Canogar is a Spanish artist mainly working with installations and projected image art. Particularly interested in memory and its loss, Canogar's work explores how the human senses can adapt to the new space-time continuum produced by new digital technologies. As our archives (and memories) transfer from material-based media (e.g. letters) to online platforms (e.g. emails and text messages), knowledge mutates and adapts as if it was made of liquid materials. In his work, Canogar explores and seeks to understand the implications of these technological changes and their effects on our memory.

Finding inspiration in the past and trying to understand who we are today, Canogar often scours junkyards, recycling centres and flea markets for aging technologies to use as part of his work. In the installation *Palimpsesto* (2008), for example, he used 3,400 dead lightbulbs to form a screen and a video projector to cast spots of light upon the screen. The spots of light move randomly across the bulbs, making them light up again and when the public gets closer to the screen before the light converges to form different forms and even follows the spectators' movements. In this way the public's presence seems to 'give' light to the dead lightbulbs.

Tackling the challenges of creating, seeing and circulating art in liquid modernity, Canogar created a generative video projection titled *Amalgama El Pradom* for the Prado Museum's bicentennial anniversary program. The video was created based on ideas inspired by work in the museum. Instead of projecting the paintings as they appear in the museum, however, Canogar created an algorithm that transformed the original images so that it appeared only partially. With this projection, Canogar explores how digital media filters can change our experiences with art.

File Extinguisher

Year: 2005

Type: Online service

Artist: Vuk Ćosić / Country: Slovenia

Topic: Libel/Takedown

URL: <http://www.ljudmila.org/~vuk/file-extinguisher/>

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Figure 7: *File Extinguisher*. Source : (<http://www.file-extinguisher.com>)

Vuk Ćosić is a contemporary Slovenian artist and co-founder of the digital media lab for artists in Slovenia, Ljudmila. Ćosić was one of the pioneers of the net.art movement launched in the mid-1990s.

Net.art grew out of a context of cultural crisis in Eastern Europe. Through their works, net.art artists question the proclaimed democracy of the internet, highlighting how the internet is highly constructed and anything but a neutral and/or democratic platform. Using the internet as a source of publication, thereby disempowering the middle man, net.art questioned established art institutions. In this way, Ćosić also saw net.art as an opportunity to get more immediate feedback on his work by reducing the amount of time between publication and feedback (Rhizome, n.d.).

Ćosić's *File Extinguisher* was first developed in 1998 but not shown until 2005 when it was part of his solo show at ICA's Digital Studio in London. In this project, Ćosić started from a memorandum on distributed communications networks written by engineer Paul Baran, who was a pioneer in the development of computer networks. Ćosić imagines that Baran's document

was published with a massive omission, namely the possibility of deleting files. According to Ćosić, Baran insisted that the last line of defence of any network should be this opportunity to delete files. However, following Ćosić's line of thinking, Baran indicated this function with a red dot in the document, and due to the limitations of black-and-white printing in the 1960s, this key function was not visible in the published version of the memorandum. With the project *File Extinguisher*, Ćosić addresses this terrible mishap by providing us with a totally free file-deleting service. All users need to do is upload the file to the File Extinguisher and the file will be completely deleted.

Life Needs Internet

Year: 2010–ongoing

Type: Installation art

Artist: Jerone van Loon / Country: The Netherlands

Topic: Access divide - including skills divide, social media and human interaction

URL: <https://www.lifeneedsinternet.com>

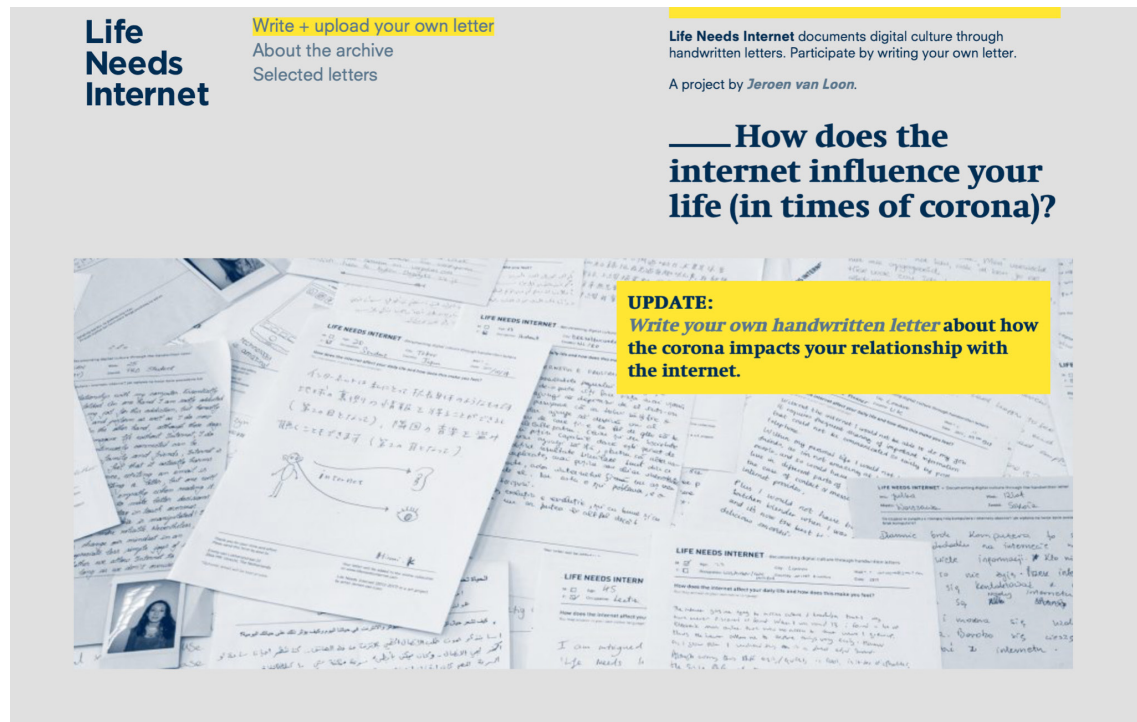


Figure 8: Life Needs Internet. Source: (<https://www.lifeneedsinternet.com>)

Jerone van Loon is a Dutch artist based in Utrecht in The Netherlands who works at the intersection of art and technology, embedding himself in technologies while keeping an open agenda. Through his work Loon explores our understanding of and relationship to digital culture and the new ways of life produced by the digital transformation. He tries to draw our attention away from the immediate and everyday consequences and uses of technology to better understand its broader and longer-term impacts on society. By exploring the acclaimed benefits of new technologies often promoted through government innovation policies and private corporations, Loon offers critical reflections through his explorations of technology's effects on our lives, cultures and climate (Dartel, n.d.).

Life Needs Internet is an ongoing project launched by Loon in 2010 when he started travelling the world to explore the presence and non-presence of the internet. Loon's aim was to generate a representation of the extreme possibilities of access to the internet – access that is still not an option for a great part of the world (Loon, n.d.).

During his travels, Loon talked to all kinds of people and asked them to write letters by hand describing the influence of access to the internet on their daily lives. In this way Loon tried to capture personal stories portraying global digitalization using the traditional technique of handwriting. The 2012 exhibition of *Life Needs Internet* showed eight letters written by a diverse range of people, including a tribe-member in West-Papua with no experience of the internet, an artist in the Netherlands, and an engineer in Singapore who is online nearly 24/7. The letters were combined with video portraits of the people who wrote the letters. Continuing his collection of handwritten letters through the *Life Needs Internet* project website, Loon staged a second version of the *Life Needs Internet* exhibition in 2017. Today the archive has over 1,200 letters from more than 40 countries (Loon, n.d), and Loon continues his collection, currently focusing specifically on stories during the pandemic.

According to Loon, *Life Needs Internet* is not a critique of our increasingly technology-based modern world per se. Rather, the aim is to provoke a discussion about whether this situation is 'good' or 'bad' and leave it open to the public (designboom, n.d.).

Wood Process 1.0

Year: 2010

Type: Sculpture-performance

Artist(s): Carl Johan Rosen, Johan Ekenberg and Evelina Hartwig / Country: Sweden

Topic: Digital Literacy

URL: <http://www.johanekenberg.com/woodprocess/>



Figure 9: Wood Process 1.0. The Process. Source: http://www.johanekenberg.com/woodprocess/01_theprocess.htm

Swedish artist Carl-Johan Rosén currently lives in Stockholm. He holds a BA in fine arts from Konstfack, University College of Arts, Crafts and Design in Stockholm. Eveline Hartwig is a Swedish artist currently based in Malmö. She holds a BA in Art History from Linné University. Johan Ekenberg is a Swedish artist currently based in Malmö. Like Rosén, he holds a BA in fine arts from Konstfack.

WOOD PROCESS 1.0 is a generative wood sculpture that was created during a workshop in Bergen in 2010. Over the four days of the workshop, the three artists worked with computer software that iteratively instructed their process of building through a series of blueprints. Thus, every time the artists were happy with the structure they had built in terms of its likeness to the last blueprint, the difference between the blueprint and wooden structure was the basis for the design of the next generation blueprint. Through this workshop and the creation of the sculpture, the artists aimed to create a dialogue between themselves and the software, exploring the possibilities of construction opened up by such an iterative and algorithmic approach to design. According to the artists, they came to understand “the material ... as well as the software and language of the digital unit that revealed itself through the process” (Rosén, n.d.)

WOOD PROCESS 1.0 is thus an early example of an exploratory hands-on approach to digital literacy and our understanding of software.

Algorithmic Perfumery

Year: 2019

Type: Multi-sensory installation

Artist(s): Frederik Duerinck and Anahita Mekanik / Country: The Netherlands and the US

Topic: Human-Machine Interaction and Machine Learning

URL: <https://www.algorithmicperfumery.com/>



Figure 10: *Algorithmic Perfumery*. Source: <https://www.algorithmicperfumery.com/b2>)

Frederik Duerinck is a filmmaker and artist located in Breda in The Netherlands and also the inventor of *Algorithmic Perfumery*. Anahita Mekanik is the head of scent creation at *Algorithmic Perfumery* and is based in the US.

Duerinck describes *Algorithmic Perfumery* as: “a multisensory installation that integrates machine learning, personal data, and generative perfume design to create individualized scents” (docubase, 2019).

Algorithmic Perfumery started as one of Duerinck’s art projects and an artistic exploration into the potential positive uses of Artificial Intelligence. Today it has evolved into a rather complex business run by a large team based in the Netherlands and the United States. Duerinck and Mekanik have founded ScenTronix to support their attempt to build both the software and hardware for what they want to be the most user-friendly AI bespoke perfumery system in the world.

In contrast to dystopian representations of AI characteristic of much science fiction, Duerinck and Mekanik use AI as a tool like any other tool. In *Algorithmic Perfumery*, the AI works as “perfume education in a machine” to create individualized scents (Algorithmic Perfumery, Nov. 21). According to Duerinck, the aim is to empower consumers by letting people play with the composition of their perfumes and decide for themselves what they think is the ‘best’ perfume for them (Algorithmic Perfumery, Dec. 27).

The Substitute

Year: 2019

Type: Paired Video Installation

Artist: Alexandra Daisy Ginsberg / Country: UK

Topic: Environment and Sustainability and Robotics/Manipulation

URL: <https://daisyginsberg.com/work/the-substitute>



Figure 11: *The Substitute*. Source: (<https://daisyginsberg.com/work/the-substitute>)

Alexandra Daisy Ginsberg is a British artist and designer who explores the relationship between nature and technology. Through curatorial projects, writings and artworks, she investigates the human tendency to “better” the world, bringing a wide range of subjects such as artificial intelligence, biodiversity and evolution to the table. Ginsberg holds a PhD in Design Interactions from the Royal College of Art, London. *The Substitute* was commissioned by the Cooper Hewitt, Smithsonian Design Museum and Cube design museum in 2019 and is now part of the permanent collection of the Cooper Hewitt. In this video installation, Ginsberg investigates the paradox of humankind desperately trying to create new forms of life at the same time as being terrible at taking care of forms of life that already exist. *The Substitute* starts from the death of the last male northern white rhinoceros in 2018, hunted to extinction due to the imagined life-enhancing properties of its horn. In this artwork Ginsberg digitally brings the northern white rhino back to life, informed by developments in the human creation of AI. In doing so she asks us to question whether this “substitute” is real and if we would protect a resurrected rhino after having killed an entire species.

Ginsberg believes that creating provocative projects which ask hard questions, such as her many works that deal with loss, can ultimately make a difference by changing priorities and practices (Waddoups, 2019).

AGNES

Year: 2013–2014

Type: Interactive website

Artist: Cecilé B. Evans / Country: Belgian-American

Topic: Data collection

URL: <https://anthology.rhizome.org/agnes>



Figure 12: AGNES. Source: <http://dismagazine.com/blog/66584/not-your-average-bot-dismiss-presents-agnes/>

Cecilé B. Evans is a Belgian-American artist who lives and works in London. She attended New York University to study method acting and experimental theatre, working as an actress until she started making art. Today she is recognized as one of the most prominent voices of Post-Internet Art – a term covering art practices that engage with the Internet and new technologies.

In her work, Evans investigates how we value emotions and how digital technologies impact the human condition. She argues that digital technologies have come to permeate our lives over the last decade to such an extent that it is no longer possible to distinguish virtual reality from physical reality:

People worry that the real world will disappear ... and it's not like the real world will evaporate and be usurped by the digital. In the best possible scenario it's a collaboration between the two and it becomes a prosthesis for things we are unable to do, as opposed to a substitute. (Louisiana Channel, 2016).

In *AGNES*, Evans explored our relationship with artificial intelligence at a time when public interest in AI was growing but few people had direct experience of it. Taking the form of an interactive website, *AGNES* was commissioned by the Serpentine Gallery in London as part of the launch of their new website in 2014.

While *AGNES* provided information about the artists exhibited at the Gallery, Evans was also eager to collect information about people visiting the museum. She did this by interacting with people through text, content pulled from other websites and even written correspondence — offering observations and questions that ranged from fun and friendly to overly sentimental and even mildly surveillant (Rhizome, 2014). *AGNES* further offered unexpected challenges, asking visitors to prove that they are indeed real by completing reverse Turing tests and answering personal questions. With *AGNES*, Evans also brought into question the tendency to gender AI as a female assistant (O'Higgins, 2014).

URL: <https://www.wildemeyer.com/bitnik.org/r/>

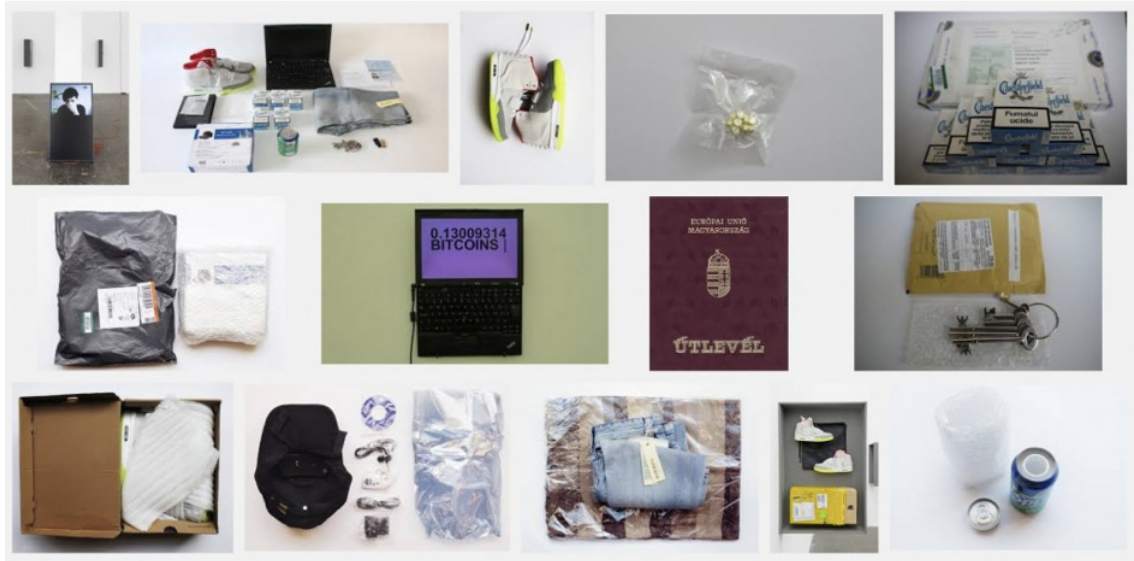


Figure 13: Random Darknet Shopper. Source: (<http://thediagonal.com/2016/01/28/the-random-darknet-shopper/>)

!Mediengruppe Bitnik consists of contemporary artists Carmen Weisskopf and Domagoj Smoljo, who live and work in Zurich and London. The two artists work closely with the London filmmaker and researcher Adnan Hadzi and the reporter Daniel Ryser.

Working on and with the Internet, Weisskopf and Smoljo's practices deal with fundamental questions concerning contemporary issues related to the digital transformation. Starting with the digital, their work frequently affects physical spaces too – often applying a loss of control as a way to challenge established structures (!Mediengruppe Bitnik, n.d.)

One example of such artwork is *Random Darknet Shopper*, an automated online shopping bot which ran from within three exhibition spaces in three different countries between 2014 and 2016. As an automated process running on a laptop, the shopping bot randomly bought stuff online and had the items delivered to the exhibition space. The shopping bot was given a budget of up to 100 USD in bitcoins to spend on Alpha Bay, which was one of the Darknet's largest marketplaces where many dubious and often illegal items and services were bought and sold before it was closed down in 2017. Once the purchased items arrived at the exhibition space, they were unpacked and displayed, with each new object adding to a landscape of traded goods from the Darknet. During the Random Darknet Shopper's first run, from October 2014 to January 2015, some of the things it bought included a Hungarian passport scan, a baseball cap with an integrated spy camera, replica Diesel Jeans, a platinum Visa credit card and extasy pills. The

items were not necessarily visually appealing in terms of being exhibited, but the artwork is intended to make us think twice. One of the most pressing question raised in response to the bot buying illegal goods was that of who is responsible when a robot or a piece of software commits a crime - a question that !Mediengruppe Bitnik made extremely tangible with Random Darknet Shopper (EPFL, nd.; !Mediengruppe Bitnik, n.d.; Mike, 2016).

TO BE A MACHINE (VERSION 1.0)

Type: Performance, live participatory show (online)

Year: 2020

Artist: Mark O'Connell (author) & Dead (Theatre Company) Centre and Jack Gleeson (actor) /

Country: Ireland

Topic: Multiple, including human interaction and human-machine interaction

URL: <https://www.deadcentre.org/tobeamachine>

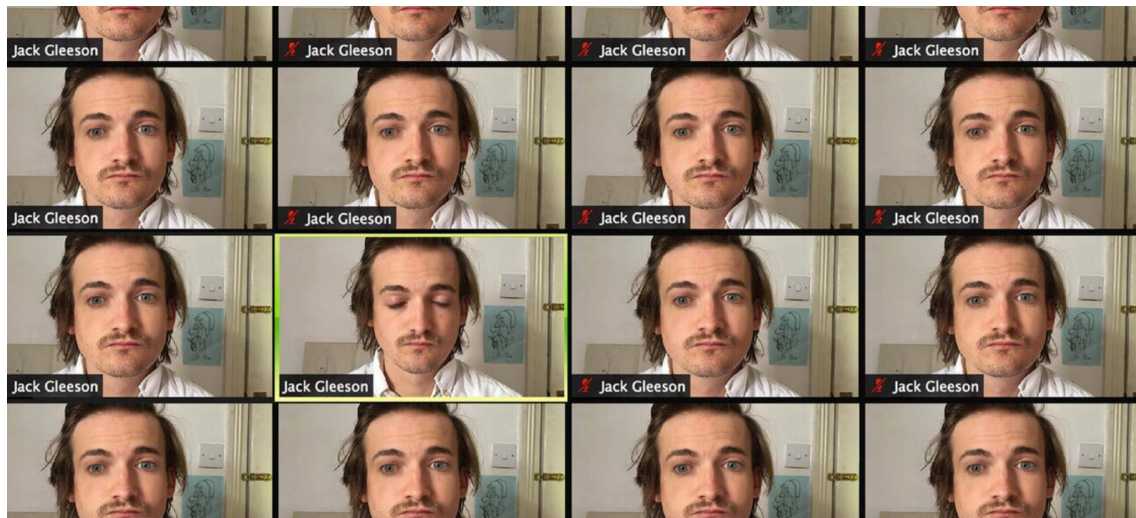


Figure 14: *TO BE A MACHINE (VERSION 1.0)*. Source: <https://dublintheatrefestival.ie/programme/event/to-be-a-machine>

Mark O'Connell is an Irish writer and artist living in Dublin. In addition to *To Be a Machine*, O'Connell has also written *Notes from an Apocalypse* and is a contributor to *The New York Times Magazine*, *Slate* and *The Guardian* (O'Connell, n.d.). Developed during the global pandemic, *TO BE A MACHINE (VERSION 1.0)* took the form of an online live-audience-upload-experience. The show was adapted by O'Connell and the theatre company Dead Centre from O'Connell's book *To be a Machine* and performed by actor Jack Gleeson. This book, which won the Wellcome Prize in 2018, is an exploration of AI and transhumanism, i.e. the global movement of people campaigning for the incorporation of technology into our bodies to make them 'better' and immortal:

In the midst of a global pandemic, where our bodies have become biohazards, transhumanists offer a way into a disease-free digital age. We follow Mark from cryonic storage facilities to basement biohacking labs as he meets the prophets of our techno-future. We use the theatre to hold a wake for the very idea of congregating together in a room, and a meditation on humanity's attempt to solve the modest problem of death. (Dead Centre, n.d.)

The performance *TO BE A MACHINE (VERSION 1.0)* operates at numerous levels, exploring and questioning technology, the limits of live performance and, not least, the transhumanist race to defeat death. The audience members were invited to upload themselves into the virtual

theatre to allow performers and spectators to discover and re-evaluate live performance together (Théâtre de Liège en ligne, 2020).

Bloemenveiling

Year: 2019

Type: Blockchain art

Artist(s) Anna Ridler, in collaboration with David Pfau / Country: UK

Topic: Blockchain and environment and sustainability

URL: <http://annaridler.com/bloemenveiling>

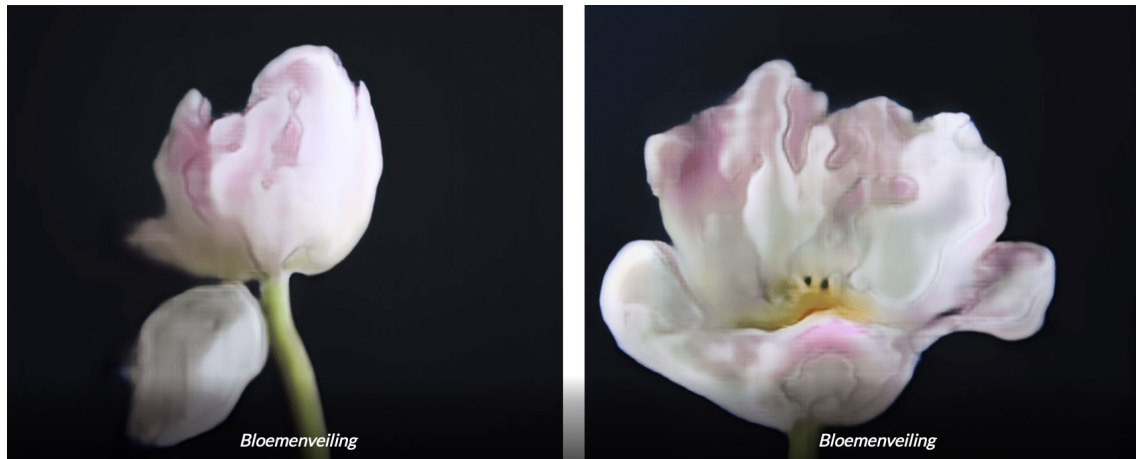


Figure 15 : *Bloemenveiling*. Source : <https://www.clotmag.com/news/insight-bloemenveiling-by-anna-ridler-and-david-pfau>

Anna Ridler is an artist and researcher based in London who holds an MA in Information Experience Design from the Royal College of Art. In her practice she explores systems of knowledge and technology creation as a way to better understand the world. She is particularly interested in ideas around quantification and measurement and how this relates to the natural world (Ridler, n.d.). David Pfau is a senior research scientist at *DeepMind*, a London-based research laboratory founded in 2010. Pfau's primary interest is in the investigation of artificial intelligence and machine learning.

According to Fast Company's Campbell-Dollaghan (2019), *Bloemenveiling* may be "the first great piece of blockchain art". Having previously worked with tech such as AI and machine learning, Ridler saw blockchain as quite a challenge to work with (Campbell-Dollaghan, 2019): "it seemed there was almost an uncanny dullness to it – blandly sleek tech bros droning on about 'distributed ledgers' and 'decentralized autonomous organizations'."

In creating *Bloemenveiling*, Ridler found inspiration in the flower markets of 17th century Holland, where intense demand for tulips set the ground for informal auctions in which people would bid enormous sums on bulbs without necessarily knowing what kind of bloom they would be getting. In collaboration with Pfau, Ridler recreated these legendary tulip auctions in a virtual format. The auctioned tulips took the form of short Generative Adversarial Network (GAN) videos of tulips blooming. The tulips were then sold on the Ethereum network, a decentralized open-source blockchain with smart contract functionality. A new auction puts a tulip video up for bidding on a daily basis. Anyone can bid on the videos, including bots that Pfau and Ridler

created to help drive speculative prices. Having given the highest bid, the buyer receives the unopened tulip video. Once opened, the tulip video will only last for a week, simulating the life of real tulips. This process of decay is managed by the blockchain's smart contract system, which triggers the countdown (Campbell-Dollaghan, 2019; Ridler, 2019).

With *Bloemenveiling*, the artists aimed to discuss and explore the use of blockchain in the production and distribution of art (Ridler, 2019). Moreover, the artwork speaks to the environmental costs of using technologies such as AI and the blockchain. In Ridler's words (Campbell-Dollaghan, 2019): "I've spent months running something that can now create perfect simulacras of nature, whilst all the time using up natural resources in order to create it ... This is a tension that I haven't quite resolved."

In the Eyes of the Animal

Year: 2015

Type: Virtual Reality and 360 experience

Artists: Marshmallow Laser Feast (MLF) / Country: UK

Topic: Human-machine interaction

URL: <http://intheeyesoftheanimal.com/#home>



Figure 16: *In the Eyes of the Animal*. Source: <https://docubase.mit.edu/lab/interviews/interview-with-marshmallow-laser-feast/>

Marshmallow Laser Feast (MLF) is a London-based collective working at the intersection of art and technology. Today MLF is recognized as one of the leading virtual reality creators. Using VR technology, MLF's work primarily explores perspectives that are not accessible to the human senses and the opportunities brought about by technology – for example, the opportunity to come closer to nature.

In the Eyes of the Animal is a mixed reality project using VR and a subpack in the form of a wearable subwoofer that can vibrate on the backs of users and make them “feel” sounds. The original live installation of the work consisted of a series of sculpted VR headsets resembling round diving helmets installed amongst trees in the Grizedale Forest in the UK. The VR let participants experience the forest through the eyes and ears of different animals and insects. According to MLF's co-founder, Barney Steel, the goal of this project was to use VR as a tool to challenge people's perceptions of the inner life of a forest (Brownlee, 2015).

While the live installation has been exhibited around the world, MLF has also developed an online version which, although not as immersive as the VR experience, offers an insight into the different perspectives of animals (MLF, n.d.).

The Normalizing Machine

Year: 2018

Type: Interactive installation

Artist: Mushon Zer-Aviv in collaboration with Dan Stavy and Eran Weissenstern / Country: Israel

Topic: Machine learning and data collection

URL: <http://mushon.com/tnm/>

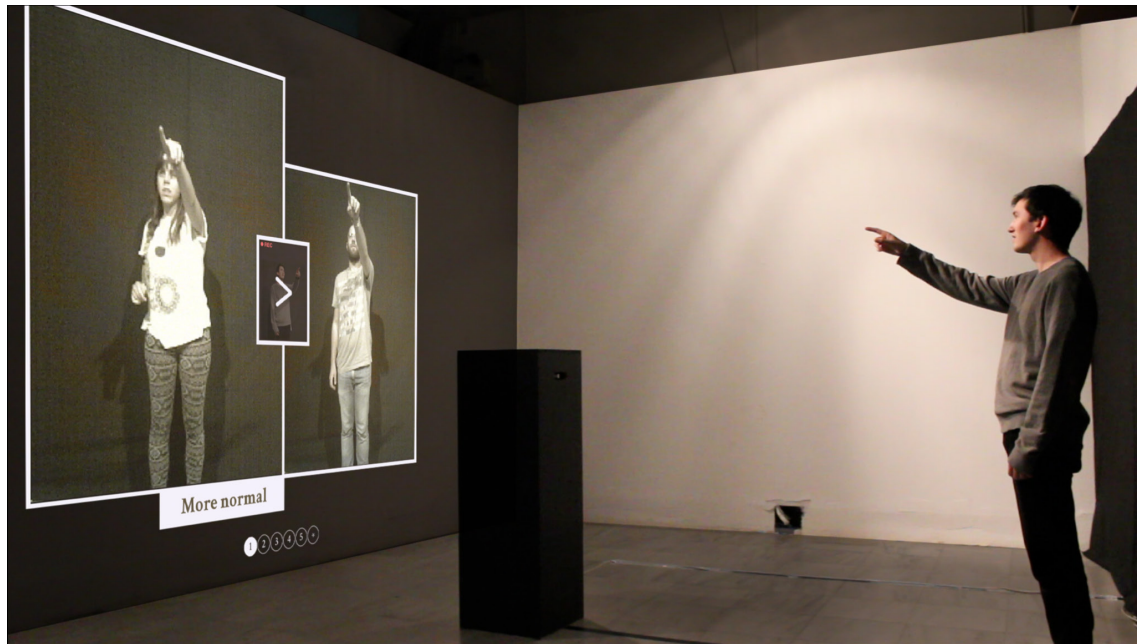


Figure 17: *The Normalizing Machine*. Source: <http://mushon.com/tnm/>

The Normalizing Machine is an experiment in machine learning and algorithmic prejudice. Developed by Mushon Zer-Aviv, in close collaboration with Dan Stavy and Eran Weissenstern, and with the help of Ingo Rudolf (Mushon, 2018), the experiment involves the artists trying to teach the machine what is normal.

Mushon is a designer, researcher, educator and media-activist based in Tel Aviv whose work is informed by his love/hate relationship with data (Mushon, 2018). Artist Dan Stavy works with digital art and is currently particularly interested in projection mapping, data visualization, digital art and performance, and human interactions with depth cameras (Stavy, n.d.). Eran Weissenstern is an artist, musician and engineer especially interested in the boundaries between the imaginary and the real, exploring ways to build bridges between humans and machines (WS, n.d.).

The Normalizing Machine is a further development of Mushon Zer-Aviv and Yonatan Ben-Simhon's work of 2013, *The Turing Normalizing Machine*. Both projects are carried out as experimental research in machine-learning that aims to identify and analyze the concept of social normalcy. Presented at the Ars Electronica Festival in 2018, *The Normalizing Machine* presented with a camera and asked them who they thought looked "more normal" from a line-

up of previously recorded participants (Ars Electronica, n.d.). The machine analysed the participants' choices and added them to its aggregated algorithmic image of what is considered normal (Mushon, 2018).

The Normalizing Machine draws on the history of standardizing, indexing and categorizing the human face, referencing the groundbreaking work of the French scientist Alphonse Bertillon, who developed the first system for categorizing the human face, and the British mathematician Alan Turing, who laid the foundation for computing and artificial intelligence. Within this context, Mushon, Stavy and Weissenstern's installation explores and discusses systemic discrimination driven by current artificial intelligence, aggregated and conveniently hidden behind a "black box" (Mushon, 2018).

Socially Engaged Artists in Europe

The following are cases in which artists employ socially engaged artistic methods to engage participants in exploring the challenges and opportunities of the digital transformation.

This category labelled 'Socially Engaged Artists in Europe' includes a number of indexed artists and initiatives that reflect a wide variety of practices and processes in which artists actively involve their participants to explore and question future technologies. The value of such artwork is understood to lie in the collaborative artistic and creative processes initiated by the artists through which the participants gain new knowledge, skills and critical reflection.

Megafone.net

Year: 2004–ongoing

Type: Online platform

Artist: Antoni Abad Roses / Country: Spain

Topic: Multiple, including privacy and surveillance and access divide

URL: <https://megafone.net/site/index>

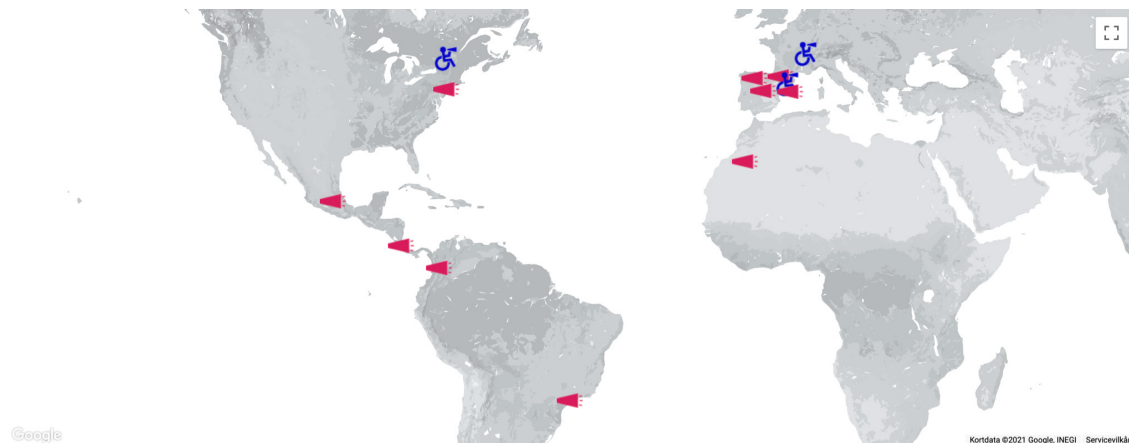


Figure 18: Megafone.net. Source : <https://megafone.net/site/index>

Spanish artist Antoni Abad started his career as a traditional sculptor. Over time, his practice evolved towards video art and later net.art and other forms of new media. He is particularly well known for his creation of community-based artworks using mobile phones.

Well before information and communication technologies were widely used by the general public to make themselves heard, and years before public institutions made any efforts to reduce the digital divide, Abad created megafone.net as a digital platform for the voices and images of people who have been socially isolated for one reason or other. Since 2004, megafone.net has invited people who live on the fringes of our societies to express their opinions and experiences by using their mobile phones to create video, text, and images that immediately gets published through megafone.net. In this way, participants “transform these digital devices into digital megaphones, amplifying the voices of individuals and groups who are often overlooked or misrepresented in the mainstream media” (megafone.net, n.d.).

Today, megafone.net consists of a series of collectively created, geographically diverse, innovative and interdisciplinary works that have received international recognition as pioneering 21st century art and social communication networks (Parés, 2014). Works include motorcycle couriers in Sao Paolo (2007–2015), sex workers in Madrid (2005–2005), and displaced and ex-combatants people in Colombia (2009–2010). It is the participants in the megaphone.net projects who bring meaning to the platform, appropriating the resources made available by Abad.

Forecast

Year: 2018

Type: Interactive installation

Artist: Oskar Koliander / Country: Denmark

Topic: Data collection - Geolocation

URL: <https://www.oskarkoliander.com/forecast/>



Figure 19: Forecast. Source: <https://www.oskarkoliander.com/forecast/>

Oskar Koliander is a Danish architect and artist. He holds a BA in Architecture from The School of Architecture and a BFA in Visual Art from the Visual Arts School of the Royal Danish Academy of Fine Arts, as well as an MA in Sculpture from the Royal College of Art in London. Koliander's works are a mix of design, architecture and visual arts that have been exhibited at numerous festivals, galleries and museums. He has also been a curator on several occasions and has given lectures and public talks addressing issues such as media and surveillance.

Forecast, one of Koliander's most outstanding works, was an installation at the 2018 Roskilde Festival that engaged with the audience in order to move 25 weathervanes fed by data. The weathervanes were not pointing in the direction of the wind but rather the direction of the festival participants, following their data through an app the participants had previously downloaded. The installation used the GPS data processed in a lab at Copenhagen Business School that transformed the GPS signals so that every third minute the installation would receive coordinates for where to move according to the festival participants' positions. Through this experiment, Koliander raised issues such as the interaction and complexity of data collection and analysis and the interaction between devices and human activities.

Den Utopiske By [The Utopian City]

Year: 2020

Type: Workshop, Game Platform

Artist(s): Jens and Morten / Country: Denmark

Topic: Digital Literacy

URL: <https://anotherpublic.com/#about%20%20og%20https://jensog-morten.dk/10163722/den-utopiske-by>



Figure 20: *Den Utopiske By*.

Source: <https://anotherpublic.com/#about%20%20og%20https://jensogmorten.dk/10163722/den-utopiske-by>

Jens and Morten are two Danish artists educated in Norway and Denmark respectively. Together they created *The Utopian City* in a collaborative and artistic experience with young citizens of the Danish island of Funen.

The artists invited the participants to imagine how the cities of the island might look in 50 years and asked them to imagine this through 3D scans, model buildings, sound recordings and digital samplings, together with gaming tools. The results were then transformed into a game platform on which anyone can further develop their city. Jens and Morten are among a number of artists working in close collaboration with their local communities to re-imagine and shape future urban scenarios in Europe. What makes this artwork interesting is the opportunity it brings to youth to imagine the city of their dreams while at the same time addressing digital literacy through democratic discussions on urban planning.

Makrolab

Year: 1997–2007

Type: Installation, Collaborative Workshop

Artist(s): Marko Peljhan / Country: Slovenia

Topic: Big Data

URL: https://monoskop.org/Marko_Peljhan



Figure 21: Makrolab. Source: <http://cargocollective.com/peljhan/>

Marko Peljhan is a Slovenian artist and the co-founder of the pioneering Ljudmila-Ljubljana digital media lab. Peljhan studied theatre and radio directing, and his current work focuses on the intersection between arts, science, nature and society. He has been experimenting with interdisciplinary research, working with the Yuri Gagarin Cosmonaut Training Centre to create spaces for artists with alternating gravity conditions. His work is characterised by his social involvement in the artistic activities he coordinates.

Peljhan started *Makrolab* in 1997 and the project lasted until 2007. This project created a mobile laboratory for artists, scientists and media workers to research migrations, weather, technology, telecommunications and climate change. Capable of hosting up to six people for 120 days in isolation, the module evokes space stations in which scientists have to work together in isolation and reduced spaces. This art-science project took place in different countries throughout its lifespan and was an opportunity to understand the flows and impacts of society, technology and nature through a social experiment that continues to influence artistic practices today. It is particularly interesting to note how issues such as data collection, big data and surveillance were already gaining relevance in the late 1990s and how this project addressed such issues at a time when technological advances were only just beginning to gather pace.

A Tour of Dublin's Tech Infrastructure

Year: 2018–2020

Type: Guided tours

Artist(s): Paul O'Neill / Country: Ireland

Topic: Surveillance, Big Data, Social Media

URL: <https://we-make-money-not-art.com/a-guided-tour-of-dublins-physical-internet-infrastructure/>



Figure 22: A Tour of Dublin's Tech Infrastructure. Source: <https://ars.electronica.art/keplersgardens/en/an-online-tour/>

Paul O'Neill is a Dublin-based artist who holds a BA in International Relations and an MSc in Multimedia from Dublin University. He also obtained an MA in Art in the Digital World from the National College of Art and Design in Dublin. He is currently a PHD researcher at the School of Communications in Dublin City University.

Paul started the guided tours in Dublin to explore the Internet's physical infrastructures in a city that hosts the headquarters of some of the biggest tech companies in the world. According to O'Neill, there is an "Important intertwining between arts, technology and politics and there is not much debate on Ireland's role for hosting these Big Tech corporations and what they do abroad" (*Dublin Inquirer*, 2019). The guided tours (including an online version in 2020) took the participants through the different headquarters of companies such as Facebook and Amazon, with the artist inviting participants to reflect on several issues around digital transformation. The tour groups discussed a range of topics, including the management and processing of our personal data in data centres, internet users' empowerment, the corruption and transparency of Big Tech companies, and social impacts such as the gentrification caused by having these companies in the city. The last Online Tour of Dublin's Tech Infrastructure took place in 2020 and there is no more available information about this project since then.

Human Study #1

Year: 2019

Type: Performative installation

Artist(s): Patrick Tresset / Country: France/Belgium

Topic: Robots, Human-Machine interaction

URL: <https://patricktresset.com/new/project/5-rnp/>



Figure 23: Human Study #1. Source: <https://patricktresset.com/new/project/5-rnp/>

Patrick Tresset is a French artist based in Brussels. His most renowned works comprise performative installations with robots that are able to draw using computational systems. A former painter, Tresset holds an MPhil in arts and computational technologies. He is also a well-known academic in fields such as computational graphics, AI and robotics.

Human Study #1 is an installation centred on interactions between robots and humans. In this engaging piece, humans participate like models in a drawing class of robots. The robots, all of them equal but different in style and personality, then start to sketch the participants in a participatory exercise. The artist conceives his installation as a “performative theatrical installation where each robot represents a stylised drawer” (Tresset., n.d.). The exhibition includes various theatrical aspects that bring some kind of drama into the interaction between the human participant and the robotic drawers, evoking different reactions not only in the person sitting in front of them but also in the spectators. In this interaction, the participant is at the “mercy of the robot's scrutiny but also as an object of artistic attention (Tresset, n.d.). In this way the human participants become objects of study and part of the artwork at the same time.



Figure 24: *Woman by Paul1, Human Study #1.* Source: <https://patricktresset.com/new/project/5-rnp/>

This participatory artwork now includes more than 40,000 drawings such as that shown above in Figure 24. The drawings are produced during live performances and the collections can differ as the artist continuously changes the operative systems of the robots. The project highlights the relationship between humans and machines, switching their roles in an artistic and humorous way. In this installation the human must remain immobile and almost emotionless as an object of study, while the drawing robots behave in different ways that affect their artistic results and even their interactions with the human 'models'.

Sociality

Year: 2018

Type: Platform

Artist(s): Paolo Cirio / Country: Italy

Topic: Intellectual Property, Copyrights and Commons, Digital Access Divide

URL: <https://sociality.today/>



Figure 25: Sociality Installation MIT. Source: https://www.dropbox.com/sh/1teb51x42xqo5e6/AACZQSXIK-nbeGKjo_Ulc45ZGa/Sociality/--Pics-installations/Sociality-inst-MIT?dl=0&preview=DSC_1550.png&subfolder_nav_tracking=1

In *Sociality*, the Italian artist Paolo Cirio presents evidence of more than 20,000 patents of social controlling, manipulative and surveillance technologies for the internet. By taking advantage of the vulnerabilities of the Google Patents platform, Paolo and his team hacked the platform to collect, import, classify and rate relevant data with technological patents that could facilitate manipulation, discrimination, surveillance and control social behaviour. Paolo found that some of the patents dated back to 1998, showing how “humans began to be programmed by machines” (Cirio, n.d.). The patents were later uploaded to the project’s website where everyone could browse, flag and denounce them.

The patents on Sociality’s website are accompanied by graphic compositions such as the flowcharts shown above in figure 25. These flowcharts, which can be printed, coloured and exhibited, contain relevant information on devices of doubtful ethical and legal validity. Both the artist and the participants managed to collect a large number of patents in an aesthetic manner, including methods for target advertisement based on social behaviours, machine learning and psychosocial profiling, techniques for emotion detection, and delivery content on social media. Many of these devices that seek to predict and anticipate the interests, feelings

and characteristics of Internet users and to generate content that can influence their decisions have been or are intended to be patented by big-tech companies such as Facebook, Amazon and Google, as well as retailers like Wal-Mart and Staples. Some of the denounced patents concern Internet users, for example through techniques for predicting the risks of a user developing social tensions in the community or methods to evaluate impulsive behaviour in social media. Many of these denounced patents evidence how our activities are being appropriated and negotiated by corporations, ultimately transforming and influencing the ways we behave, often without our realizing.

Through this project the artist advocates for accountability and regulation of unethical technologies such as harmful artificial intelligence, algorithms and social network surveillance. As a participatory experience, people can engage in collaborative work with the artist to produce visual materials to study and denounce controversial technologies. The graphical pieces of this artwork were exhibited later in the form of printed posters and colouring books for children, informing viewers/readers of the need to regulate and address such ethically questionable devices. The Sociality project leads us to think more deeply about the ethical consequences of technology and the enormous power wielded by Big-tech companies.

Google Maps Hacks

Year: 2018

Type: Installation - Performance

Artist(s): Simon Weckert / Country: Germany

Topic: Big Data- Geolocation

URL: <http://www.simonweckert.com/googlemapshacks.html>

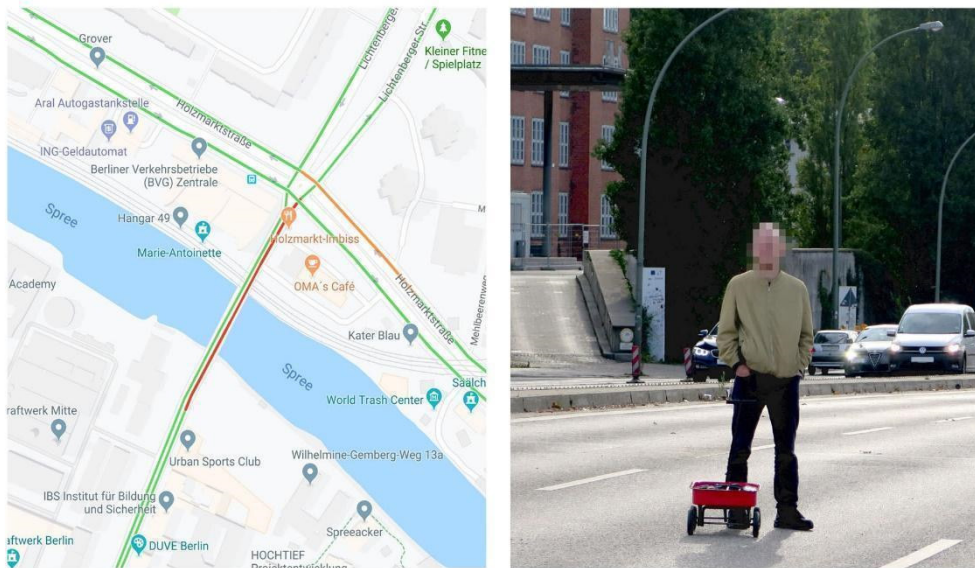


Figure 26: Google Maps Hacks by Simon Weckert. Source: <http://www.simonweckert.com/googlemapshacks.html>

The Berlin-based artist Simon Weckert focuses his work on the digital transformation and its social impacts on future generations. Born in Karl-Marx-Stadt (present-day Chemnitz), he studied New Media Art at the Berlin University of Art in Digital Media. Weckert's artworks have been exhibited in various festivals of art and technology in Europe and around the world, including Ars Electronica and the Japan Media Art festival. Simon's performances have captured the attention of the specialized media, especially his *Google Maps Hacks* of 2020, which stands out as one of his most striking artworks.

The performance aimed to create a fake virtual traffic jam with an impact on the real world, with drivers trying to find different routes to avoid delays on their way to work or home. The idea was inspired by the artist's experience of a demonstration day in Berlin when Google Maps indicated a traffic jam in spite of there being no cars on the street, indicating that the app had been tricked by the smartphones of the demonstrators (Wired, 2020). Weckert went about trying to achieve this same glitch in a much simpler and artistic way by taking 99 phones from random participants, placing them on a little wagon and walking around the streets of Berlin, thereby creating huge traffic jams in minutes. Weckert's interest in exploring the connections between society and technological advances led him to study how our lives are affected and shaped by digital tools such as Google Maps. In his words, he has the feeling that "technology is not adapting to us but the other way around" (Wired, 2020) – a paradox we sometimes ignore.

This performance is a witty and artistic call to think about how digital tools that are important in our daily lives are easily fooled by the same users in practical ways. Weckert exposed the vulnerabilities of big data processing without delving into algorithms or conducting any advanced hacking. With this work, Weckert also highlighted the connection of issues related to the digital transformation, such as data collection, privacy and the transparency of Google Maps with the impacts of these technologies on urban life, such as shaping the traffic flows in our cities. For Weckert, virtual maps are just another form of reality that shapes our behaviour. The performance is a response that strives to shape virtual reality in accordance with our own behaviours and desires (Artnet, 2020).

Memopol 3

Year: 2018

Type: Installation - Participatory

Artist(s): Timo Toots / Country: Estonia

Topic: Surveillance, Privacy and GDPR

URL: <https://www.timo.ee/memopol3/>



Figure 27: Memopol 3 entrance. Source: <https://www.timo.ee/memopol3/>

Timo Toots is an Estonian artist who explores the virtual and technological facets of our daily routines. Born in the former Soviet Union in a family of academics, he became interested in technology at an early age. His curiosity led him to start building devices in an era when DIY was the only option. Timo holds a BA in Photography, but though he started his artistic career in this field, he rapidly changed to other types of works in which he used technology both as a tool and as a source of inspiration for his works. His exhibited pieces have an impact on the participants, revealing in meaningful and touching ways how our lives are changing constantly due to rapid technological acceleration.

Toots presented some of the utopias and dystopias of the technological future in his *Memopol* series, showing how tech improvements can bring both hope and fear to our society. Memopol presents a dystopian future inspired by Orwell's Big Brother in which everyone is under surveillance, with technology turned into a tool to watch every step that citizens take. *Memopol 3* is the last installation of the Memopol Series that Toots started in 2010. In this project the participants physically experience surveillance based on existing technology, starting at the gates of Memopol-3 where they must identify themselves with personal ID before being scrutinized with biometric scans and having their smartphones thoroughly inspected, with all data downloaded to a local server. The data is then analysed by an algorithm which uses neural networks to create an animated graphic of each participant's personal life. The visualization of

each participants' data graphic is later presented privately, though each participant can invite friends to see their results.

With this installation, Timo seeks to draw attention once again to how everything we do in real life is constantly monitored, processed, analysed, transferred and even negotiated behind our backs. In the Memopol series and Memopol-3 itself, the artist offers an abusive experience to the participants to provoke them to reflect on their past and possible futures and how they will handle their digital traces. Memopol is an artistic repose that makes use of a dark aesthetic to expose how current technology could be used in future imaginaries, evoking memories of repressive periods and wonder as to what could happen if those times return.

Biological Labour and Data Production Labour – The Institute of Human Obsolescence

Year: 2015

Type: Participative workshop

Artist(s): Manuel Beltrán / Country: Spain

Topic: The future of labour, technological unemployment and the digitalisation of work

URL: <http://speculative.capital/> & <https://dataworkers.org/>

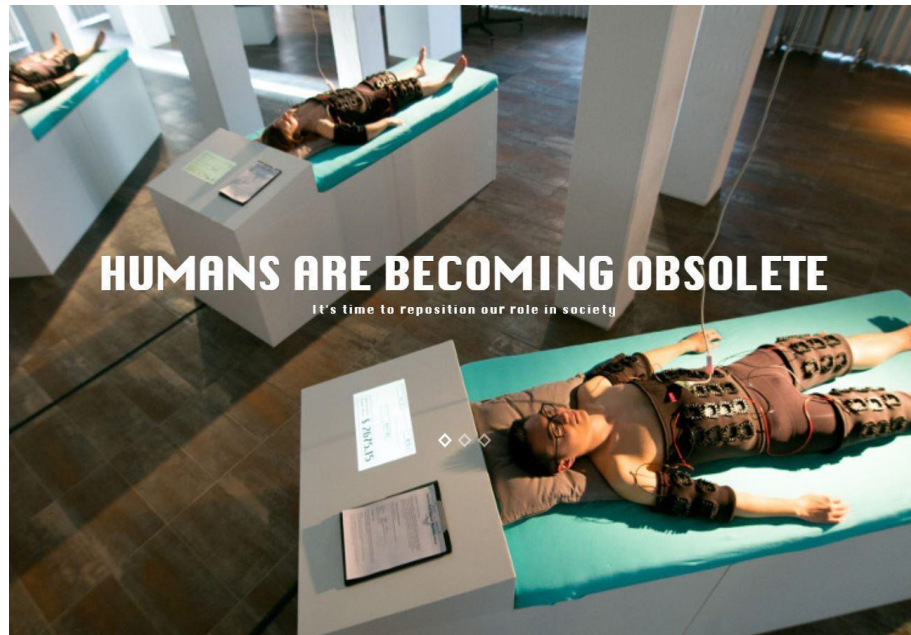


Figure 28: Institute of Human Obsolescence. Source: <http://speculative.capital/index.html>

The Spanish artist, researcher and activist Manuel Beltrán is the founder of the Institute of Human Obsolescence. His artworks explore the social, economic and political impacts of technology and the future of labour. Beltrán's projects are a call for labour rights for workers in the digital transformation, inviting participants to reflect on how human beings are gradually losing their space in the labour market. In *The Institute of Human Obsolescence*, the artists and researchers try to make sense of how technological advances, automation and AI are affecting humans not only in physical and intellectual labours but as subjects of exploitation in a hyperconnected reality. According to Beltrán, we have a “blind belief in technology without thinking of the ethical implications and blowback consequences” (Wirehead, 2019). He believes this transformation is bringing new and invisible ways of working and that humans are turning into 24/7 workers rather than becoming obsolete. This perception is the source of inspiration for the projects delivered at the Institute of Human Obsolescence.

One of Beltrán's projects is *Biological Labour* (2015), an experiment in which humans were hired to harvest their residual body heat through special suits to produce electricity for mining cryptocurrency. For periods of three hours in a row, different workers participated to feed the computers with their residual energy. With this project, the artist questions the future of work by using human bodies to produce capital in a modern utilitarian version of human work.

Likewise, in his *Data Production Labour* project Beltrán presents the production of data as a new form of work in which we produce data at all times. This data has a value that is exploited, but we do not accrue any benefits from this and it renders us invisible workers in a billionaires' industry. In the *Data Production Labour* installation, the participants have to perform shifts using tools such as their personal devices, voices and even biometric scans. According to the artist, a complete non-stop invisible working shift is coming and he wonders if we are producing data only at individual levels or collectively – and who now owns that data.

In an attempt to (re)claim ownership of the data we produce on a daily basis, Beltrán and his team started the Data Workers Union as a space that demands an end to data exploitation. This socio-political movement is a response to the “capitalistic surveillance business”, denouncing those who benefit from data produced collectively, including personal data, and showing how we have the capacity to shift this reality. The organisation is a result of the projects delivered at the Institute of Human Obsolescence and engages with people in workshops, assemblies and artistic projects around Europe and the world. The Union has also delivered a Declaration of Data Labour Rights, thereby showing the positive impacts of an artistic initiative on people's learning processes in a completely digitalised world.

Future Kiss

Year: 2008

Type: Performance - Participative

Artist(s): Lenka Klimešova / Country: Czechia

Topic: Human-Machine, relationships shaped by technology

URL: <https://vimeo.com/2468588> & <https://archive.aec.at/prix/showmode/14859/>



Figure 29: Future Kiss Performance. Source: <https://www.kontejner.org/en/projekti/touch-me/touch-me-festival-2008-osjecaj-se-bolje/performansi-osjecaj-se-bolje/lenka-klimesova-cz-poljubac-buducnosti>

The Czech artist Lenka Klimešova received a BA in Intermedia Art from the University of Ostrava and a Master of Arts from the Interface Culture Programme of the Linz University of Arts. Her project *Future Kiss*, which received an Honorary Mention from Prix Ars Electronica in 2009 explores forms of human interaction mediated by technology in an era of extreme healthcare where all bodily contacts are avoided. The participants were provided with masks that mediated their physical interaction. Each mask had a chip that could detect kisses, and the participants had to find their “other half” by interacting, i.e. kissing. The mask would then detect the kiss and produce a vibration, inducing not only a sensual but also emotional experience in those couples that found their partner. In a simulation mixing fantasy and science-fiction, the artist invited the participants of this project to think about a future time in which human contact is restricted and emotions can only be experienced through the mediation of a technological tool (Ars Electronica, 2009). This *avant-garde* project displayed the use of a technological device to find the ideal partner in dystopian realities where physical relationships are restricted by situations such as the current COVID-19 pandemic. The project was an interactive experience that allowed its participants to reflect on their own feelings and on how technology could play a definitive role as an intermediary in very personal aspects such as the choice of a partner and the sensations perceived in an act of intimacy like a couple’s first kiss .

Loro (Them)

Year: 2019

Type: Instrumentation

Artist: Krzysztof Wodiczko / Country: Italy - Poland

Topic: Surveillance and Privacy

URL: <https://www.krzysztofwodiczko.com/instrumentation#/loro-them/>



Figure 30: *Loro (Them)*. Source: <https://www.krzysztofwodiczko.com/instrumentation#/loro-them/>

The Polish artist Krzysztof Wodiczko is known for his artworks using video projections on facades that involve the participation of marginalized groups. He has a long career not only as an artist but also as an academic and speaker on the intersection of arts and societal issues. His artworks have been exhibited in different venues around the world. In his recent works, the artist has been collaborating with refugees in Europe and the United States. *Loro (Them)* is a collaborative piece from 2019 in which Wodiczko worked together with immigrants settled in Milan, aiming to explore and visualize the challenges they face in an increasingly hostile environment. The artwork consisted of images and sound recordings from the immigrants displayed on drones flying over the audiences of the Milano Photo Week. The images of eyes and voice recordings of intimate accounts from the immigrants were presented to the audience to evoke reflections on social issues around the tragedy of migration of refugees in Europe. To the artist, drones are usually the symbols of privacy violation and surveillance and have been used to track refugees, becoming a symbol of fear among those who intend to enter the European continent in an irregular way. With this collaborative project, Wodiczko aimed to turn the drones into symbols of hope and mediums for the immigrants' voices to be heard, displaying the eyes of the participants to create a stronger connection with the audiences below the drones. A second part of this project was delivered in New York in 2020 when the artist collaborated with immigrants from Central and South America, raising issues such as labour exploitation, racism and privacy among vulnerable groups.

Addicted Products – Brad the Toaster

Year: 2012

Type: Interactive

Artist: Simone Rebaudengo / Country: Italy

Topic: Machine learning, Human-Machine interaction

URL: <http://www.simonerebaudengo.com/project/addictedproducts>



Figure 31: Addicted Products: Brad the Toaster. Source: <http://www.simonerebaudengo.com/project/addictedproducts>

Simone Rebaudengo is an Italian designer of futuristic and interactive products. His work focuses on exploring the future through experimental processes to understand the impacts of living in an interlinked world full of smart and autonomous devices. Simone addresses the impacts of AI and machine learning through the analysis of human-machine interactions and the Internet of Things. Throughout his career, Rebaudengo has worked in different collectives and labs and his works are published in diverse journals and magazines such as *Wired*. His artworks show in an artistic and ironic way the possible wonderful and dark futures of human interactions with machines and robots. His pieces are inspired by issues such as AI, Big Data collection, the ethics of digital transformation and accountability.

Rebaudengo is a member of Automato.farm, a design and research studio based in Shanghai that consists of a group of designers from various backgrounds exploring the future of human-machine interaction. His interest in the Internet of Things and interconnectivity and how it affects the way we interact with objects led him to create *Brad the Toaster* as part of his *Addicted Products* project. In this work he investigated how connectivity could change objects from simple tools into agents with their own behaviours, feelings and reactions towards humans. Rebaudengo aimed to explore how people would react to a device that has its own motivations

and feelings in a fictional real-life world in which toasters could only be requested and hosted but not bought. If the toaster was happy with its host in the way it was used, as compared to other devices, it would stay with its host providing toasted bread. On the other hand, if it was feeling unused, forsaken and unsatisfied, it would put pressure on the host or ultimately find a new host from a list of applicants. Through this successful experiment with a sentient toaster, Simone wanted to make the participants reflect on consumerism in a hypothetical world where we can only try to keep things with us but cannot buy them.

Organisations and organised movements

Cases in which artists form persistent organisations and organised movements that primarily employ socially engaged artistic methods to engage communities in topics related to the Digital Transformation.

The cases indexed under the category 'organisations and organized movements' reflect a number of artistic organisations that use socially engaged artistic practices to cultivate social good and social change (Andersen et al., 2020). The cases included identify as art collectives, research labs, art and technology centres, maker spaces, and charitable organisations. While organized in different ways, these artistic driven organisations tend to exist and persist more than most forms of socially engaged arts.

Demonstrating a variety of approaches in their engagement with people, the indexed organisations seek to promote stronger connections within local communities that enable reflection on how digital transformation affects our daily lives and also contribute to the transformation of our societies into ones that are more aware, adaptive to and integrated with and through technology.

Human Ecosystems Relazioni/HER She Loves Data

Year: 2013–ongoing

Type: Cultural Research Centre

Country: Italy

Topic: Data collection – Psychological outcomes

URL: <https://www.he-r.it>



Figure 32: IAQOS project in Torpignattara, Rome. Source: <https://www.he-r.it/?s=IAQOS>

Human Ecosystems Relazioni/HER She Loves Data is a research and cultural centre for socially engaged art practices addressing topics related to digital transformation. The centre was founded in Italy in 2013 by the artists Oriana Persico and Salvatore Iaconesi, who work with digital inclusion, participatory arts, hacking, robotics, design and big data. As such, they illustrate a novel way in which artists are organising themselves to use art as a mechanism to put society in the focus of scientific research and face issues related to a digitalised world together. The Centre can be thought of as a big data generator, aiming to transform local communities into nodes that have the power to create cultural changes while producing big data using computation, AI, complex algorithms and available data. In this way, the founders' intention is to use the arts as a "catalyser" for imagining different social outcomes. The projects use communal co-working and production of big data to generate transformative processes with an impact in social areas, including areas not only related to technology and computing. Below we present three projects organised at HER She Loves Data that are relevant for socially engaged art: *Obbiettivo*, *IAQOS* and *ToFakeorNotToFake*.

Obbieitvo

Obbieitvo is the first artwork part of HER's Datapoiesis project, an 18-month project that explored how data could raise awareness of social phenomena and how produce new artistic objects to stimulate social debate. *Obbieitvo* is an art object that uses data as a source: a "lamp animated by data" that will not turn off until the extreme poverty level worldwide reaches less than 500,000 people. The artwork collected data from reliable sources such as the UN, the World Bank, OECD and the World Poverty Clock, aiming to announce the start of a new world that is more just and within which resources are distributed more evenly. This artwork was later acquired later by the Farnesina Art Collection.

IAQOS

IAQOS – Intelligenza Artificiale di Quartiere Open Source [Artificial Intelligence of the Open Source Neighbourhood] – is another project incubated at HER. This AI collected big data and used art and design to transform it into useful data to solve problems in the neighbourhood. This AI featured a child that would help strengthen relationships among the inhabitants of a neighbourhood in Rome aiming to help in the urban regeneration of the area. IAQOS looked to study the cultural ecosystems within the neighbourhood, later providing valuable data to further continue in an interactive process in the community through workshops and artistic installations to face issues affecting the *quartiere*, the neighbourhood of Tor Pignattara.

ToFakeOrNotToFake

ToFakeOrNotToFake is an artwork that deals with the impacts of disinformation in a digital era where immediate access to news is the norm. This project uses data to explore the impacts of such disinformation on psychological, social and political fields. The work aims to raise awareness of such phenomena through artistic methods, including a "macro-data theatre performance" and a "data-powered exhibition". Both artworks offer an arena for discussion that also has an aesthetic character.

Catch

Year: 2017 - ongoing

Type: Centre for Art, Design and Technology

Country: Denmark

Topic: Multiple, including Diversity and inclusivity

URL: <https://www.catch.dk>

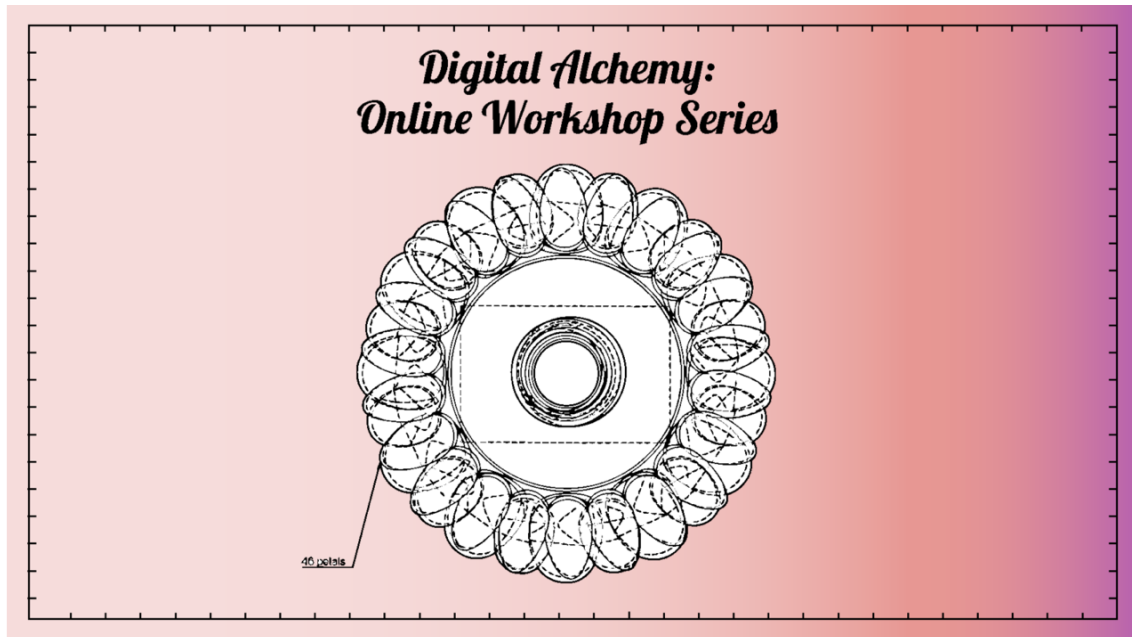


Figure 33: Digital Alchemy: Online Workshop Series. Source: <https://www.catch.dk/digital-alchemy-workshop-series/>

Catch is a Centre for Art, Design and Technology led by Program Manager Majken Overgaard, who has a background in art history and technology. Located in Elsinore, Denmark, Catch was launched by Elsinore Municipality in 2017 with the aim of attracting and promoting innovation, creative entrepreneurship, and education.

Catch sees itself as an enabler of artists, creatives, designers and makers working within the area of socially engaged art, participatory art, art entrepreneurship and activism. It facilitates collaborations between different stakeholders such as artists, citizens, firms, and public institutions. Catch takes a practice-based and open-door approach to learning. For example, it offers year-round workshops, institutional and independent collaborations, a makerspace and co-working space, public exhibitions, and on-site and off-site programming.

Inspired by the global art and maker community, Catch has a strong emphasis on skill sharing a policy of open access to information. Catch aims to foster diversity and inclusivity by engaging in collaborations that take account of how technology, art and design influence and are influenced by society at large. Accordingly, Catch is also committed to supporting democratic and feminist ideals by bringing together artists of diverse genders, ethnicities and cultural backgrounds (Catch, 2021)

Catch addresses numerous digital transformation challenges in its work, including machine learning, cloud storage, the Internet of Things, 3D printing, robotics, trolling, data collection, the skills divide and the access divide, as well as aspects of responses to these challenges such as the maker movement. In this report we showcase three initiatives that are representative of the type of artistic work that Catch enables and take part in: *Digital Alchemy: Workshop Series*; *Greater Spaces*; and *Collaborative Learning*.

Digital Alchemy: Workshop Series (2020-2021)

The "Digital Alchemy: Workshop Series" was a series of online workshops created in relation to the exhibition "Digital Alchemy: Future Technology Products Inspired by Diverse Voices in Science Fiction" created by Mirabelle Jones (2020–2021). This project was supported by the EU through the Feral Labs project.

The exhibition itself explores works of science fiction written by a diverse body of authors, including women, LGBTQAI* folx, and writers from different ethnicities, with the aim of realizing diverse futures through the creation of fictional technologies. Situated at the intersection of product design, speculative fiction, maker culture and intersectional data feminism, Mirabelle Jones selected some of the devices and technologies mentioned in these works and realized them as interactive product prototypes.

The exhibition comprised four workshops that took place in February and March 2021: The Future Gallery Text; Hackathon: Diverse Voices in Science Fiction; When Things Speak: Giving Voice to Objects; and The Future Composer. The workshops were created to explore and understand the role of artistic processes and science fiction in facilitating a more democratic and diverse digital transformation. In the invitations to the workshop it was emphasized that no previous tech skills were required and that the aim was to enable people with no or few existing skills to gain an understanding of useful techniques and concepts like creative coding, which was the focus of the workshop "When Things Speak: Giving Voice to Objects".

The four workshops worked with different digital platforms and technologies but shared a common approach in being hands-on and discussion-based. The hands-on part of the workshop was used as a starting point for conversations about challenges and opportunities for diversity in both digital technologies and science fiction. In this way the workshops aimed not only to teach skills such as using Arduino online software but also to start ethical discussions about the technologies we use.

Greater Spaces

Catch started the blog "Greater Spaces" together with designer Vanessa Carpenter in March 2020 at ing.dk, the largest Danish tech site.

Overgaard and Carpenter's aim with the blog was to explore how we might broaden our understanding of what technology is, who creates it, and the many different ways in which technologies affect us in our everyday lives. The blog specifically speaks to the fact that the technology we engage with is most often developed by technicians who represent only a small demographic – namely, Middle-class white men.

By posting interviews with people identifying as queer or non-binary and women, Overgaard and Carpenter celebrate the diversity of people who do inspiring and ground-breaking things with technology.

Collaborative Learning

Collaborative Learning is an upcoming project that will take place in autumn 2021. In this project Catch is engaging with artist Jakob Tækker in a collaboration with a new youth job centre and young people in Elsinore. The aim is to help the participants build their knowledge about technology and creativity as a way of increasing their chances of employment.

Under Tækker's guidance, a group of young people from Elsinore will contribute to the design and decoration of the newly established Youth Job Centre. The design and production of the furniture and decoration will make use of digital production and video documentation. The aim is to create environments that have an organic quality and reflect the young people's wishes, the function of the rooms, as well as Tækker's artistic approach.

In building this creative learning environment the project's aim is to create a sense of process and inclusiveness as well as offering new creative tools and skills during their schooling years. The project has been designed to ensure that the participants learn all aspects of the creative process, from the idea stages to artistic production or product desing (Catch, 2021).

RADIONA

Year: 2011–ongoing

Type: Makerspace

Country: Croatia

Topic: Multiple, including Diversity and inclusivity

URL: <https://radiona.org>



Figure 34: Radiona. Source: <https://radiona.org>

Radiona.org / Zagreb Makerspace is an NGO association for the development of ‘do-it-yourself’ (DIY) culture set up to “enhance the visibility of makers’ open source culture and self-sustainable production with the aim of connecting all possible fields of art, science and technology” (Radiona, n.d.). According to its co-founder, Deborah Hustić, Radiona’s focus is on STEAM, i.e. science, technology, engineering, art, and mathematics, with a strong social aspect that differentiates Radiona from most other makerspaces (Max, n.d.).

Radiona started as a media lab in 2011, but soon changed its status to a makerspace. The founders felt that taking this label brought better visibility and was better aligned with Radiona’s ambition to be a place where everyone feels welcome. Today, Radiona is a rather unique space exactly because of the diversity of its community, in part because Radiona created a Code of Conduct that members and non-members alike are obliged to follow. This Code declares, for example:

Our lab is a safe and welcoming place for everyone, regardless of gender, gender identity and expression, sexual orientation, disability, physical appearance, body size, age, race, nationality, ethnic minority, subculture, geographical region, knowledge, marital status, family status, social status or religion (or lack thereof), or technology choices. (Radiona, n.d.).

Grounded in such core values, Radiona develops interdisciplinary and innovative projects centred on co-creation, community-building, participation and knowledge transfer. Central activities include education, artistic projects, residencies, research processes, repair community activities and social awareness related issues (Radiona, n.d.).

In an interview with MakersXchange, Hustić has explained that the aim of Radiona is to bridge the divide between artists and tech experts:

...to be a human interface between these areas in order to decrease the communicational gaps and misunderstanding between diverse professions and points of view. As a makerspace we like to demystify technology, so people who are not tech savvy are not so much afraid of it. (Max, n.d.).

Working at the intersection of art and technology, and with diversity at the heart of its organizational culture, many of the projects run under the umbrella of Radiona explore and speak to a more democratic, diverse and equal digital future. For example, Radiona is part of a number of Erasmus+ projects that relate to topics such as makerspaces, museums, inclusion and critical thinking, as well as running workshops for people with special needs. Radiona is also part of the Feral Labs project co-funded by the Creative Europe programme of the European Union. In addition to Radiona, project partners include the Project Atol Institute (project coordinator), Schmiede, the Bioart Society, Catch, and Makery.

Building on the objectives and characteristics of makerspaces – including DIY, free and open exploration, and creating and sharing with an emphasis on the social and communal aspects of learning – Feral Labs places even more emphasis on the creative process., claiming that “the important events are those that are more about making than presenting and thus do not focus on end-products, but better address the paths and processes” (Veber, 2021, p. 7).

Radiona’s project partners thus argue that what is needed for creativity, innovation and learning to happen are environments in which information can easily flow and which are characterized by freedom to experiment, fail, reflect and change focus. It was to make such environments available that the project partners established Feral Labs (Veber, 2021, p. 7). The environments created by Feral Labs are temporary and might be understood as a kind of hybrid of laboratory, festival and artist-residency in which people from all professions and cultural backgrounds come together to create and exchange knowledge over a number of days. While apparently only of short duration, these events aim to foster the creation of communities that last well beyond the event itself. According to Uros Veber, the coordinator of the Feral Labs Network:

Limitations in duration articulate the power of these non-hierarchical peer-to-peer learning-while-doing activities. This does not entail that programmes are completely unstructured; but the programme might as well be considered as self- assembled. The constrained period effectively catalyses the power of self-organisation of the proceedings according to the actual demands and capacities of the participants. (Veber, 2021, p. 9)

As part of Feral Labs, Radiona has been hosting an online artist-in-residence programme, albeit online due to the global pandemic. In January 2021, the artist, researcher and critical maker Stefanie Wuschitz took part in this programme. During the residency, Wuschitz explored the topics of “ethical hacking in the context of women*/trans hackerspaces around the globe, community building, open-source technology and peer production, the concept of authorship in open-source media art and all the “nerdism” or “geekism” characteristic for the hacking scene” (Radiona.org Diary, n.d.). In line with Radiona’s objectives, Wuschitz also explored the issues of

technologies and artists often being on different sides of the spectrum and lacking a shared language to be able to join forces.

Wuschitz documented her activities during the artist-in-residence programme in her work, *Radiona's Elektro Diary*. Here we quote one of her posts in full as an example of how Radiona explores ways to engage a broader audience in discussions of future technologies through inclusive and open-minded reflections and communication of its work:

Dear Diary,

It seems that we live in times that are finally exposing the entanglements and merging zones between human and non-human.

Right now, most of us - at least myself for sure - have turned into "see" horses. See horses who need to passively wait for the next warm flood to arrive at their desired destinations. No active navigation possible. And although see horses are beautiful, amazing animals (non-binary, faithful and dance floor loving), they are a little short sighted. I wish our conservative government would finally open the borders to refugees, listen to their concerns and needs. Like in a hack lab, people who are present, belong to the lab, can decide on things concerning the lab and voice their critique. This is the way information keeps flowing and a community can survive. If people are now in Europe, even if in camps, they belong to Europe, they must get access to public infrastructure, food, shelter, health services, education. How can we measure the degree of digitization in the amount of apps we've got on our phones, we much rather, dear diary, need to have a close look on the amount of decentralization and democratization of media to see if we made "progress" or if some folks just made profit instead.

Yours,

Sea/see horse (Radiona.org Diary, January 25, 2021)

Art in FLUX

Year: 2016– ongoing

Type: Charitable organisation, Platform

Country: United Kingdom

Topic: Multiple, including access and skills divide and human interaction

URL: <https://www.artinfluxlondon.com>



Figure 35: AYA H Workshop. Source: <https://www.artinfluxlondon.com/workshops1.html>

Art in Flux was founded in London in 2016 by artists María Almena, Olive Gingrich, and Aphra Shemza with the aim of increasing the visibility and recognition of artists from underrepresented spectra of society by serving as a bridge between media artists and established art institutions (Keener, 2021). Art in Flux makes space available for collaborations between artists and organizations and brings these ideas to the wider public through a wide range of activities, including audio-visual performances, art and technology workshops, exhibitions of contemporary media artists, and talks focused on topics in media arts (Art in Flux, n.d.).

The AYA H – *Sign* workshop and exhibition is an illustrative example of the kind of work facilitated under the umbrella of Art in Flux. This initiative came about from a collaboration between the co-founder of Art in Flux and the artists Oliver Gingrich and Sara Choudhrey, whose art practices are centred on Islamic Digital Art. During this workshop, participants of all ages had the opportunity to get a hands-on experience with and understanding of some of the fundamental methods and techniques of Islamic artistic practices. The work of the participants was then digitized and animated by Gingrich, resulting in a collaborative digital animation artwork. According to Gingrich et al. (2020, p. 191), the workshop and exhibition exemplify the way in which art can be “a vehicle for social engagement, a forum for local communities to come

together, to collaborate, to engage with one another creatively, but also to learn about cultural practices” and thereby take on “a societal function that is hard to measure.”

Illutron

Year: 2007– ongoing

Type: Collective

Country: Denmark

Topic: Multiple, including data collection

URL: <http://www.illutron.dk>



Figure 36: Explosion Village. Source :<http://illutron.dk/Explosion-Village>

Illutron is a collaborative and interactive art collective based on an old industrial barge in the harbour of Copenhagen whose members' main interest lies in exploration with digital materials. Situated at the intersection of art, design and technology, Illutron describes itself as a hacker-like environment. In contrast to traditional hackerspaces, which have a tendency to work with technology for the sake of technology itself, Illutron works with technology with a mind-set of creating for and with participants (Hobye, 2014, p. 136).

In the first year of its existence, the founding members of Illutron created a manifesto to put into words some of the motivations behind the organization, including an emphasis on the "importance of having a space where people could tinker collaboratively". In line with the value it placed on drawing inspiration from society, the manifesto declared an ambition to "give back to society by encouraging people to build upon {their} works and by releasing the concepts of the installations and the source code under Creative Commons licenses" (Hobye, 2014, p. 134).

Illutron has a participatory approach to making and art. According to Hoby (2014), many projects created under the umbrella of the collective have taken the form of collaborative conversation pieces, providing people with the opportunity to become participants rather than spectators or consumers of the art by inviting them to participate in the making of these projects.

One example of a project in which Illutron actively engages with its audience is the performative installation *Terms of Agreement*, part of the DrivingIT conference in Copenhagen in 2014. This installation was based on a fictive company called Unison, which had a stand at the conference where it enticed conference participants to sign up for a membership card in return for various membership advantages, including access to the VIP lounge and free drinks. When signing up for membership, the participants had their pictures taken and gave away private information such as their names, email addresses and job titles. The participants also readily checked the box marked “terms of agreement”, thereby giving away all rights to their personal data. When trying to use the membership card that they had received to get access to the VIP lounge, the Unison system was activated and peoples’ data and pictures appeared on screens as commercials (Illutron, 2014), with speech bubbles appearing to recommend a particular brand of toilet paper or political party. The spectacle highlighted how the people signing up for VIP membership had so readily granted Unison the right to use their personal data for whatever purposes Unison chose. What was particularly interesting about this experiment was that the majority of conference attendees were IT professionals and thus unusually tech-savvy. In spite of this, the experiment demonstrated that by using professional looking roll-up banners, membership cards, RFID-chips and promises of easy access to the “top of the pop”, people often willingly sign away their personal data without much reflection on the potential consequences (Boye, 2014). Through their performative installations, and by directly engaging their audience in their work, Illutron thus successfully managed to create grounds for and trigger debate about our willingness to give away personal data and privacy in return for free benefits.

Other projects include *Industria* (2020), an interactive art and performance experience on Illutron’s barge that invites participants to reimagine life in the Copenhagen shipyard at the time of the industrial revolution, and *Explosion Village* (2008), an interactive drumming installation created for the Roskilde Festival that explored the possibility of creating a huge audience participation.

Interestingly, although the intention of the Illutron has always been to engage with the broader public *through* making, the collective itself acknowledges that the expertise required to actually work with the technology and the materials it tends to work with have resulted in an involuntary exclusion. As a consequence, those who do not have the expertise required or a solid foundation of knowledge to build upon tend to become ‘visitors’ to the barge instead of participants in the making (Hoby, 2013, p. 149). Nonetheless, Illutron has had great success in engaging the broader public in their artwork, including through total theatre and active engagement with various installations.

Zemos98

Year: 1998–ongoing

Type: Collective

Country: Spain

Topic: Multiple, including skills divide

URL: <http://zemos98.org/en/2020/03/03/the-results-of-the-hackcamp-the-city-is-ours/>



Figure 37: Hackcamp “The City is Ours”. Source: <http://zemos98.org/en/2020/03/03/the-results-of-the-hackcamp-the-city-is-ours/>

Zemos98 is a Spanish collective based in Sevilla that has a strong focus on working with its local community but also reaches out at national and international level. The main goal of the collective is to foster relationships between society, academics, NGOs and the public sector. Their work is based on participative experiences aimed at supporting the development of critical citizens. Describing themselves as a “cooperative that is dedicated to cultural production and social research”, the methods employed by Zemos98 go beyond the traditional academic methods, combining practice based works with artistic and creative techniques.

As part of Horizon 2020 ‘Creatures’ project, which explores creative practices to promote social and ecological sustainability, Zemos98’s projects embody alternative values that address the impacts of technology on the ways we relate and develop in society. One example of such a project is MediaActivism, which highlights and questions the living conditions in cities resulting from neoliberal politics. In this way the project is part of the increasing number of movements across the world organizing to struggle against those who privatize areas of cities and worsen

the living conditions of citizens. MediaActivism thus aims to produce “an impact on the social awareness about housing and public space, connecting what happens at local, national and translocal levels”, thereby aiming “to produce transformations in the cities we live in” (Zemos98, n.d.).

One of the initiatives run by Zemos98 under the umbrella of the MediActivism project was the hackcamp “The City is Ours”. The hackcamp took place in the Alameda Cinema of Seville and brought together thirty participants with backgrounds in activism, media, academia and art to prototype communication campaigns around the idea of people’s right to the city. By exploring narrative strategies aimed at enabling a genuine sense of participation on the part of a more diverse group of city representatives in relation to topics such as housing, public space, gentrification and touristification. The hackcamp also helped the participants to learn how to navigate and produce media content related to processes of dispossession currently happening in cities throughout Europe (Zemos98, 2020). While the overarching aim of the project was to support city activism, the tools used in this process also strengthened the digital literacy of the participants.

dgtl fmnsn

Year: 2016–ongoing

Type: Network & Digital Feminist Festival

Country: Germany

Topic: Multiple, including diversity and inclusivity and skills divide

URL: <http://www.digitalfeminism.net/2020x/index3.php>

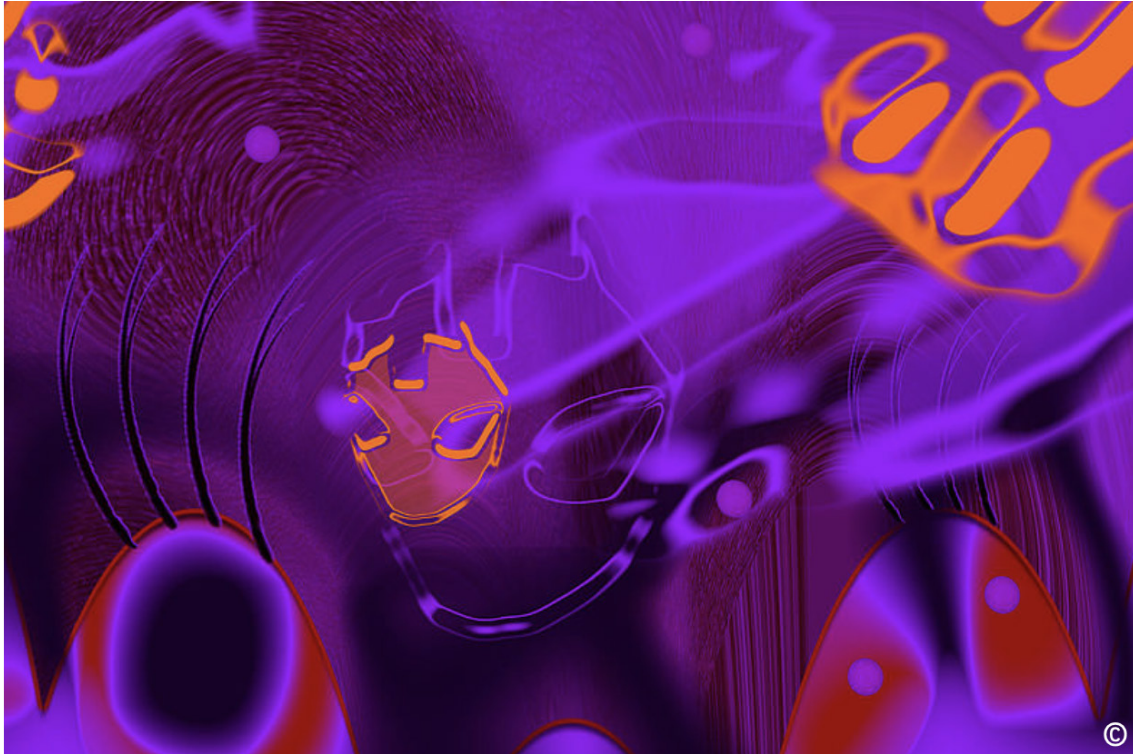


Figure 38: dgtl fmnsn / HAU FACE your Filter. Source: https://www.hebbel-am-ufer.de/en/programme/pdetail/dgtl-fmnsn-face-2/?fbclid=IwAR180UKLIsORsvrO3Wg1C01g-wWEdQpoZakphJEONwjyO-__8b17jcnea_s

dgtl fmnsn is a network and digital festival of independent queer feminist artists and groups established in Dresden, Germany, in 2016. The network primarily focuses on the emancipatory opportunities offered by technology and feminism through performances, visual arts, videos, installations, discourses and workshops

Through its activities, dgtl fmnsn encourages participants to think in completely new ways about the ways in which we use digital technologies in our everyday lives, often asking participants to use their bodies as a meaningful form of expression in their exploration of digital technologies.

As an example of dgtl fmnsn's approach, the FACE series of workshops and desktop shows organised by dgtl fmnsn in collaboration with HAU Hebbel am Ufer in 2020 included three workshops: Face your Filter; Face Swap; and Face Tuning (HAU, n.d.). Targeted at young people aged 16 and over, this workshop series dealt with the politics and technology of the face – specifically of face recognition software, digital culture and digital ego. While most participants

participated online, some had the opportunity to take part in the workshop on-site at HAU's studio in Berlin.

dgtl fmnsn's aim with this workshop series was to teach and explore how we can use digital technologies to express the spectrum of our personality multidimensionally. Together with the workshop participants, the network wanted to explore how we can play with the "I", i.e. how we can transform, develop and challenge it by setting up different faces on the Internet thereby also offering participants the opportunity to learn how to use these tools autonomously and politically (Facebook, dgtl fmnsn, 2020).

FACE your Filter was an Instagram-filter workshop for beginners run by Philisha Kraatz from the dgtl fmnsn collective together with media artist Alla Popp. According to the workshop invitation, face filters "are a harmless entertainment instrument, political tool and artistic medium at the same time" (HAU, FACE your Filter, n.d.). The workshop aimed to provide basic knowledge for developing and creating face filters while also discussing the political, aesthetic and technical issues surrounding Instagram filters.

The workshop series illustrates how dgtl fmnsn takes an optimistic view of the potential of digital technologies while highlighting the urgent need to understand how they work, how we can change the ways they impact us, and how we can shape technologies of the future.

Discussion: The Digital Transformation through artists' lenses

This report maps artists and various forms of artist collectives and organisations that explore challenges and opportunities related to the digital transformation. Starting from an inclusive search for artworks within this field, the report pays particular attention to socially engaged and participatory artworks. In doing so, we see several emerging themes concerning artistic explorations of the digital transformation and ways of organizing. To summarize, we point to four potential avenues of inquiry regarding how artists in Europe are approaching and taking leverage of the arts to address some of the digital transformation challenges.

Artists as Mediators

In line with the findings of the first Artsformation's report on 'The Social and Civic Impact of the Arts' (Task 4.1.), the mapping we have presented in this report has showcased artists who embrace important and sometimes difficult questions through involving communities in their own practices. In this way, artists working with digital tools and the digital transformation also take on the role of mediators, building bridges and raising awareness to explore alternative uses of new digital technologies. Likewise, artists also try to identify problematic issues often by denouncing the misuse of such technologies and how they affect society as a whole or as individual groups. Through the interpretation and work of artists, new digital technologies can be rendered more visible, accessible, understandable and within reach/tangible —even taking on a new life unimagined by their creators. While some artworks operate at more abstract and/or speculative levels, others take a very practical and hands-on approach to conversations about possible futures, for example by taking an artistic approach to teaching tech skills.

Artistic Approaches to Tech

The artists mapped in this report tend not to work with technology for the sake of technology itself but rather as a means to an end, for example by using digital technologies with the ultimate goal of exploring musical composition. This approach is dominant in the indexed workshops, such as Zemos98's hackcamp "The City is Ours", which aimed to help create the foundation for city activism by using tools that strengthened participants' digital literacy, and the "Digital Alchemy: Workshop Series", in which participants were introduced to various digital tools and platforms as a means of introducing more diverse voices on Wikipedia.

Artists bring new perspectives to the technologies they work with, using them as tools in their own work while also investigating their emancipatory and/or exploitative features and uses. In addition to applying their creativity and curiosity in the use of new technologies as artistic methods, the artists indexed in this project also strive to incorporate these technologies in meaningful works that have an impact on people who may not have the same levels of digital literacy. In doing so, these artists are leading their communities to reflect on the evolution and use of technologies and the positive and negative impacts of technologies on people's daily lives.

Art and Design

The indexed artworks are illustrative of the rather blurry line between art and design. For while many of the artworks included in our mapping are created by people who identify themselves as artists, some are made by people who identify as designers or as both artists and designers and others still are the result of collaborations between artists, designers, creatives and communities of people. What all of the indexed artists and artists organisations have in common, however, is that they use their ideas, concerns and excitement about digital technologies and possible futures as tools "to better understand the present and to discuss the kind of future people want, and, of course ones people do not want" (Dunne and Raby, 2013). In this sense, therefore, their goals matter much more than how they define themselves. From this we conclude that the artistic practices of socially engaged art are more about the creation and strengthening of social relationships and the reflections provoked by their art than any particular kind of material work or design objects. Such art thus takes the form of social interactions, corroborating the evidence provided in our report on 'The Social and Civic Impact of the Arts' (T4.1).

Scaffolding

Many of the artworks indexed in this report operate at the borders of recognized art institutions. However, our mapping also includes a number of more organized art initiatives, including Radiona and Catch, which cater to artists operating at the intersection of art, design and technology. While some artists are successful in making an impact on their own, the various research labs and art, design and technology centres included here seem to serve to amplify artistic voices and thereby set the ground for artists to have a greater and more lasting impact. In this way these artistic organisations seem to offer various forms of scaffolding for socially engaged artists who are less recognized in the institutionalized art system and may struggle financially as a result.

While not included in this mapping of artworks, it is important to mention organisations such as the *Transmediale Festival for Art and Digital Culture* and the *Ars Electronica Festival for Art, Technology and Society*, both of which have played a central role in the exploration of art and technology over recent decades. These kinds of organisations will be included in our next report, where we will go deeper in exploring cases of importance to the development of the socially engaged arts and their intersection with the digital transformation at European level.

Conclusions and future steps

The mapping undertaken for this project constitutes a first step towards understanding the role of socially engaged and participatory art in bringing about a more equal, diverse and democratic digital future. While offering an initial outlook on the various ways in which artists and designers address and raise questions about our digital futures, the indexed artworks also set the ground for further inquiry into arts-based change and its possibilities for having an impact at different levels of society.

From our desk research for this mapping exercise, we soon found that there is little empirical information available about the various artworks in which we are most interested here. This lack of evidence made it quite challenging to describe the individual artistic processes and outputs

in detail (cf. Gingrich, 2020), let alone to capture the impacts of such art. In the case of artistic driven workshops, for example, the documentation we had to work with was often limited to the open invitations issued for these events. This lack of knowledge raises a number of questions. For example, what motivates artists to work with issues related to the digital transformation? In what ways do artistically driven tech workshop differ from other approaches to teaching digital technologies? What is the impact of these artworks? Such in-depth knowledge about the motivations, methods, processes and impacts of the work of socially engaged artists is crucial as a foundation for developing better systems of support or scaffolding that can leverage the impact these artists hope to have.

The next step of WP4 is therefore to conduct a series of in-depth case studies exploring the processes of socially engaged artists and the ways in which their work might set the ground for more diverse and democratic digital futures. As part of Task 4.3., we will explore how the arts are currently being used for making sense of the digital transformation and how the arts can be leveraged by individuals to express their own voices about this transformation. Our case studies will include interviews with artists and artists' organisations as well as the people, communities, and institutions with whom they work. In this way, Task 4.3 will also investigate the current ecosystem of socially engaged art as a starting point for a discussion about how to leverage the value of the work of socially engaged artists in creating more just digital futures.

Endnote

This is an open, ongoing and collaborative indexing of socially engaged artists and artist organisations working within the field of the digital transformation. The index will be updated throughout the course of the project. If you would like to be included in the mapping, please contact us. If you know of a project that could be part of the project, please let us know by emailing us at: kra.msc@cbs.dk

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