Illuminating the New Real:
Art and critical AI literacies

Drew Hemment
Martin Zeilinger
Matjaz Vidmar
Holly Warner

Landscape report 2022

Abstract

The New Real research programme explores astonishing new forms of artistic experience for a world recovering from COVID-19. The pandemic sparked a swift and widespread digital pivot. Our research has highlighted that this transition goes beyond the simple adoption of new formats or technologies, and includes far-reaching changes at cultural, organisational, economic, and infrastructural levels. In this report we see how 'digital native' artists can help to characterise this transition. We present seven case studies of AI art projects that in different ways help illuminate the operations and consequences of data-driven, hybrid systems. This is the first step in our research on strategies in the AI arts to facilitate critical AI and data literacy. We specifically discuss ways in which AI artists intentionally design digital experiences to simultaneously delight and inform audiences. Here we identify and frame this strategy, and ask how it might be adopted more widely by cultural organisations to develop fluency and therefore resilience in the New Real.

Table of Contents

1
Introduction

The Resilience in the New Real research project is investigating innovative forms of artistic commissioning, production and distribution with potential to facilitate and accelerate recovery and resilience in the festivals and cultural sector following COVID-19.

The Resilience in the New Real research project is investigating innovative forms of artistic commissioning, production and distribution with potential to facilitate and accelerate recovery and resilience in the festivals and cultural sector following COVID-19. It set out to surface and articulate strategies from 'digital native' arts and creative fields that can equip cultural organisations newly producing digital and hybrid experiences to navigate the multi-dimensional challenges of technology transition, with a focus on artists working with artificial intelligence (AI).

The landscape of artistic uses of AI technologies in the creation, curation and consumption of online and hybrid experiences is dynamic and diverse (du Sautoy 2019; Cetinic and She 2022). The potential for research and development in direct applications of AI in the creative industries is high (Davies 2020). Here we present and discuss seven case studies of cultural projects involving digital artists and collectives using AI and machine learning. Each of these is presented and discussed in order to understand their particular dimensions and features, and also to surface common strands, themes and practices.

To understand the 'New Real', we need to look beyond increased use of streaming platforms (e.g. Zoom), to the profound ways in which the digital turn is reshaping society. In our research we have seen that communities of digital arts practitioners and audiences can be highly active in political and ethical debates around the implications and consequences of technology, whereas more mainstream cultural communities are less so (Hemment et al 2022a; Hemment et al 2022b). Here we ask what we can learn from digital arts practitioners about the opportunities and barriers associated with the move to networked, online, and data-driven experiences and services. We explicitly explore how the AI arts can help to increase public and professional understanding of the underlying tensions and dilemmas in the New Real.

We began by asking what literacies practitioners need, and where we can find strategies to facilitate those literacies. In this report we see that AI artists are adept at surfacing critical issues and scaffolding human understanding through

the design of digital experiences. We find a field of critical practice in which artists work with AI technologies and data both as medium and as theme, both as tool and as topic. We look at case studies that address not only technical, formal and aesthetic themes but also ethics, politics, licensing, security, and environmental impact in working with creative applications of AI. We reflect on these cultural projects to reveal strategies used by artists and curators to develop and delight online audiences while simultaneously negotiating tensions and dilemmas that arise with AI-fuelled and data-driven experiences.

We conclude that the indicative AI art projects presented below each offer ways to facilitate, through the creative practice and cultural experience, critical literacy and intelligence. In different ways, they help us to illuminate and characterise the 'New Real', and to define critical AI literacy, or critical intelligence. We see how this can help to equip cultural producers with the knowledge and tools to navigate the creative potential of emerging technologies such as AI, the ways systems make use of our data, and how truth and experience are constructed online. Building understanding and literacies in this way can in turn address trust and acceptance factors in emerging technology and formats.

We discuss the potential for these and other strategies identified through The New Real to be tailored and situated for organisations newly producing digital experiences. The report ends with an invitation to take up these forms of artistic production and distribution to reveal culturally and economically viable experiences, formats and models in the cultural sector to enable and support post-COVID-19 recovery.

AI art projects presented below each offer ways to facilitate, through the creative practice and cultural experience, critical literacy and intelligence.

**Background:
The Turn To New Real**

↓

2
Background: The turn to the New Real in the arts

The need for critical literacies on AI and emerging technology in the New Real.

Both in the arts and in society at large, the COVID-19 pandemic has necessitated a swift and large-scale transition to life online. A wider range of cultural workers and companies than ever are exposed to the significant artistic, programming and business opportunities of recent developments in data-driven, networked and immersive media. But with the transition to digital also come core problems, for example with regard to online security, underlying management of IP, and the handling of personal data on underpinning platforms. Multi-dimensional and complex challenges surrounding safety, privacy, transparency, and misinformation can arise in networked environments. A new platform or programme may be found to be unviable, and trust and acceptance of emerging formats can quickly evaporate. Consequently, there is now a need for new literacies and an ability to critically reason about the functions and functioning of a system, to make judgements about whether systems and platforms are safe and ethical, and to make the sector overall more resilient in the face of future system failures. Our research responds directly to this need.

While this is familiar ground for practitioners from sectors such as digital arts, gaming and social media platforms, it represents new and unfamiliar territory for many cultural organisations newly producing digital or hybrid programmes. To enable and support transition – institutional, infrastructural, economic – towards networked, online and hybrid working following the pandemic we turn to a digital native arts field for strategies that can be adopted more widely. Here we adopt a multi-level perspective (MLP; Geels 2006), which is an analytical tool positing that transitions come about through interaction between three analytical levels: niche, regime and landscape. The niche level is the site of radical innovations that can drive change. The regime level represents the current structures and practices characterised by dominant rules, institutions and technologies that are self-reinforcing. The landscape is the exogenous environment, made up of opportunities and threats, such as COVID-19. In The New Real, we turn to AI arts as the niche field to surface and understand radical strategies for transitioning towards data-driven, networked, hybrid cultural and business models, and navigating the period of turbulent transition post-COVID-19.

However, cultural organisations newly producing digital or hybrid experiences have been confronted with the formidable challenge of pivoting towards formats and business models that work in and with networked, online infrastructures. Cultural workers face new and unfamiliar opportunities and constraints in working with artists and engaging audiences (Kloskowski and Kwiatkowski 2021). Difficult questions can arise for curators, marketeers, technicians, all the way through to senior managers and creative directors. Companies and artists require swift acquisition of new concepts and skills, the adoption of new tools and technologies, and access to new networks and resources. This transition goes beyond the simple adoption of new formats or technologies, and includes far-reaching changes at cultural, organisational, economic, and infrastructural levels. We call this 'the New Real.'

3
Methods

Resilience in the New Real investigates innovation potential for the Festivals sector through digital-first and hybrid cultural engagement during and beyond the pandemic, both facilitating and accelerating transition to recovery through a participatory process of visioning, learning and experimenting.

The early stage results (Hemment et al 2022b) of co-creation workshops in the Resilience in the New Real, have surfaced four challenge themes: 1) Creative AI for good; 2) Human-centred creative AI; 3) Next generation intelligent experiences; 4) Public XAI and socio-technical literacy. Firstly, this report addresses the third of these challenge themes, examining case studies of next generation intelligent experiences, and looks at what we can learn about this theme from a specific area of creative practice: the AI arts. Secondly, the report touches upon the fourth theme, planatary and critical intelligence, as it specifically addresses the first of our three research questions in the Resilience in the New Real project:

Research Objective 1: Understand the strategies used by data arts practitioners and organisations to delight audiences and build critical intelligence in the New Real.

Research Objective 2: Co-design pathways with cultural organisations towards new forms of pandemic-resilient online and hybrid experiences.

Research Objective 3: Synthesise a set of actionable insights, tools, concepts and models that can enable and support post-COVID19 recovery.

In The New Real we have looked at works and practices that engage with emerging AI technologies in the new media art tradition and publicly engaged technologically-mediated art more widely. This is a broad area that can encompass work in visual arts, performing arts, games, publishing, film/TV, and hybrid/online festival events. We also looked at the emergence of novel artistic practices in the current cultural landscape characterised by the ongoing COVID-19 pandemic.

A comprehensive review of the AI art field is beyond the scope of this report. In this report we present and discuss seven case studies (Yin 2009) of international cultural AI projects – both ongoing and past works – involving digital artists and collectives using AI and machine learning. Five of these are individual works, and two are exhibitions in which AI is the curatorial topic. They were selected to illuminate our theme of critical literacies in AI, and to surface strategies by which work in this field can help to facilitate critical AI literacy. Taken together the cases present a diversity of artistic, technological and societal work and themes in the AI art field. In our sample, all of the cases involve creative experimentation with and exploration of relevant AI techniques and tools, and also engagement in societal and ethical themes related to the consequences of these emerging technologies. We do not claim the sample is representative of the entire cultural AI field, and we do not include cases from areas of cultural AI that do not relate to our theme. A number of works from the visual art field are included where there is explicit engagement in societal issues, but we have not included works from the extensive and significant field of AI music where there is less often an explicit engagement in societal themes.

As a jumping off point to future enquiry in The New Real, our discussion of these cultural AI projects reflects on the ways in which these projects simultaneously delight audiences and scaffold human understanding of AI. Our analysis builds understanding on a number of dimensions across these seven projects through which the artistic experiences can be said to contribute to practitioner and public literacies and debates surrounding technology. We go on to further reflect on the theme of critical intelligence, and discuss how such critical artistic practices can help to equip cultural organisations newly producing digital and hybrid experiences to negotiate challenges associated with the transition to digital.

While both the use of AI in contemporary art practices and the focus on AI literacy are gaining prominence, this can still be considered as a niche within the wider cultural sector, and a novelty in the current cultural landscape of the COVID-19 period. We adopt a multi-level perspective (Geels 2006) on socio-technical transition towards networked, online and hybrid working following the pandemic. In this analytical model, the 'niche' is the site of radical innovations that can drive change, the 'regime' represents the current, mainstream institutions and practices, and the 'landscape' is the wider environment, made up of opportunities and threats, such as COVID-19.

In this report we present and discuss seven case studies (Yin 2009) of international cultural AI projects – both ongoing and past works – involving digital artists and collectives using AI and machine learning.

Case studies included here Iluminate our theme of critical literacies in AI and surface strategies by which work in this field can help to facilitate critical AI literacy.

Landscape Review

4
Landscape review: AI art case studies

Artists have experimented with AI since the very early days of the field, and over recent years a rapidly growing field of AI art practice has taken shape (du Sautoy 2019; Miller 2019). Critical attention has given definition to this as 'cultural AI' (Manovich 2019) and 'socio-cultural AI' (Feher and Katona 2021). Beyond the cases discussed in this report, the large number of recent exhibitions dealing directly or obliquely with AI and machine learning are a strong indicator of the increasing focus placed on AI technologies among artists, curators, and audiences alike.

With IT giants such as Google now offering open source access to advanced machine learning systems such as BigGAN, and many smaller-scale neural network architectures and models also becoming available, creative coding communities can adjust existing machine learning protocols, pre-trained systems, and publicly available datasets (e.g. ImageNet) to their individual needs, and begin to incorporate them into their creative methodologies.

The landscape of artistic uses of AI technologies in the creation, curation and consumption of digital and hybrid experiences is dynamic and diverse. Machine learning algorithms serve digital content to us online, and increase the efficiency of production workflows. Cultural and artistic applications of AI now encompass novel forms of art object, event format, collaboration tool and value exchange. In cultural contexts, AI technologies can find many different uses, with artists often building their own tools and datasets. Examples include relatively simple tools designed to augment human creativity (ArtBreeder; Zeilinger 2021a); more complex systems capable of creating quasi-creative expressions autonomously (e.g. Adam Basanta's AI-driven art factory All We'd Ever Need Is One Another; Zeilinger 2021b); or purpose-built, generative AI systems through which individual artists express themselves creatively (e.g. Helen Sarin's 'neural bricolage' and Matthew Plummer-Fernandez' 'cave paintings').

In the recent years, there has been a rapid growth in the field of AI art.

Many exhibitions focusing on AI tend to feature works that foreground interactivity and visual or time-based outputs, and this tendency is reflected in our case studies. For artists working with machine learning algorithms, the interest is rarely only in optimising prediction accuracy. Instead, it is also in the mistakes and the unknowability of the blackboxed process of AI systems, and the poetry (Grba 2022) that can result from these. Art enables humans to experience the surface effects of underlying structures, and reveal those as variously delightful, poetic, troubling and extraordinary (Hemment 2019). This pertains in particular to art forms that work with highly complex emerging technologies such as AI.

Artists and organisations have undertaken critical enquiry on emerging digital technologies since at least the 1960s (see Taylor 2014; Hemment 2020; V&A n.d.). Increasingly, creative work with AI highlights and seeks to address intractable controversies and problems in the digital economy, and responds to ethical, political and environmental concerns relating to the wide-spread implementation of AI and data systems across all sectors of society (cf. Coeckelbergh 2020; Sinders 2019).

Art enables humans to experience the surface effects of underlying structures, and reveal those as variously delightful, poetic, troubling and extraordinary.

The following are seven cases of AI art projects, where data arts practitioners and organisations design digital experiences that simultaneously delight audiences and scaffold critical literacies in the New Real. Each of these is presented and discussed in order to understand their particular dimensions and features, and also to surface common strands, themes and practices.

Case Studies

Figure 1. Learning to See" installation view at "AI: More than Human", The Barbican, London, UK, 2019; available at http://www.memo.tv/works/learning-to-see/'

Case Study 1. *Learning To See, Memo Akten (2017, ongoing)*

Memo Akten's Learning To See, is a series of interactive installations and moving image works in which artificial but natural-looking images are generated when everyday objects are placed before a camera. In its interactive iterations, the project invites audience members to manipulate simple everyday objects (such as a tangle of USB cables). The resulting shapes formed by the objects are recorded by a webcam, and the live data is then interpreted in real-time by a bespoke AI network, and output as a video feed. In this way, Akten's project allows audience members to observe how the neural network visualises its own interpretation of what it 'sees.'

Akten works with emerging technologies at the intersections between computational art, engineering, and computer science, often creating large-scale moving image works and interactive installations. To realise his projects, Akten implements various generative machine learning systems, image recognition tools, and data visualisation. Many of Akten's projects are designed for non-specialist audiences, and are realised at a high level of technical sophistication. His works tend to be very appealing to broader audiences, because they visualise functionalities of ML and AI in spectacular yet relatable ways. At the same time, because the projects have a high level of technical sophistication, and oftentimes visualise functionalities of ML and AI, they are also highly regarded in specialist communities of AI artists and AI researchers. Akten's AI-driven work has received many awards, including the Prix Ars Electronica Golden Nica (2013), and he has participated in high profile group exhibitions around the theme of AI, including 'AI: More Than Human' described below.

Learning To See explores questions of visual perception and 'seeing' through the multidimensional space of possibilities generated from the externally observed objects.

It gives an audience a direct experience of this so-called 'latent space' of neural networks by inviting them to move objects and see the natural-looking images that result. This visualisation is quite obviously based on training biases derived from the neural networks' computational protocols and infrastructure; in other words, the rendered video output inevitably represents something that was contained in the AI systems perceptual register. In one widely exhibited iteration of the project, for example, the system will always interpret the entangled cables as images of ocean waves and seafoam, because the underlying neural network, having been trained to recognise only such images, is not capable of outputting anything else. As Akten notes in the artist statement, the images generated by the system therefore reflect the fact that "it can only see through the filter of what it already knows. ... In this context, the term seeing refers to both the low level perceptual and phenomenological experience of vision, as well as the higher level cognitive act of making meaning, and constructing what we consider to be truth" (Akten n.d.).

Both thematically and formally, Akten's work has focused on machine vision, machine expressivity, human-AI interfaces, and the simulation of natural phenomena. Many of his works explore the creative affordances of AI and ML, often with the specific aim of making the operational logic, functional limits, and socio-economic implications of these technologies graspable for wider audiences. A common theme in the work is a focus on 'the nature of nature,' which includes phenomena such as seeing, consciousness, and, most recently, the environmental impact of emerging networking technologies. In an artist statement, Akten has noted that he approaches machine learning algorithms ``as a means to reflect on ourselves and how we make sense of the world; what (and who) we choose to value and why; our own self-affirming cognitive biases and prejudices; our inability to see the world from others' point of view and empathise with those that we disagree with; and the resulting social polarisation and gaping wounds in our societies" (AIArtists.org n.d.)
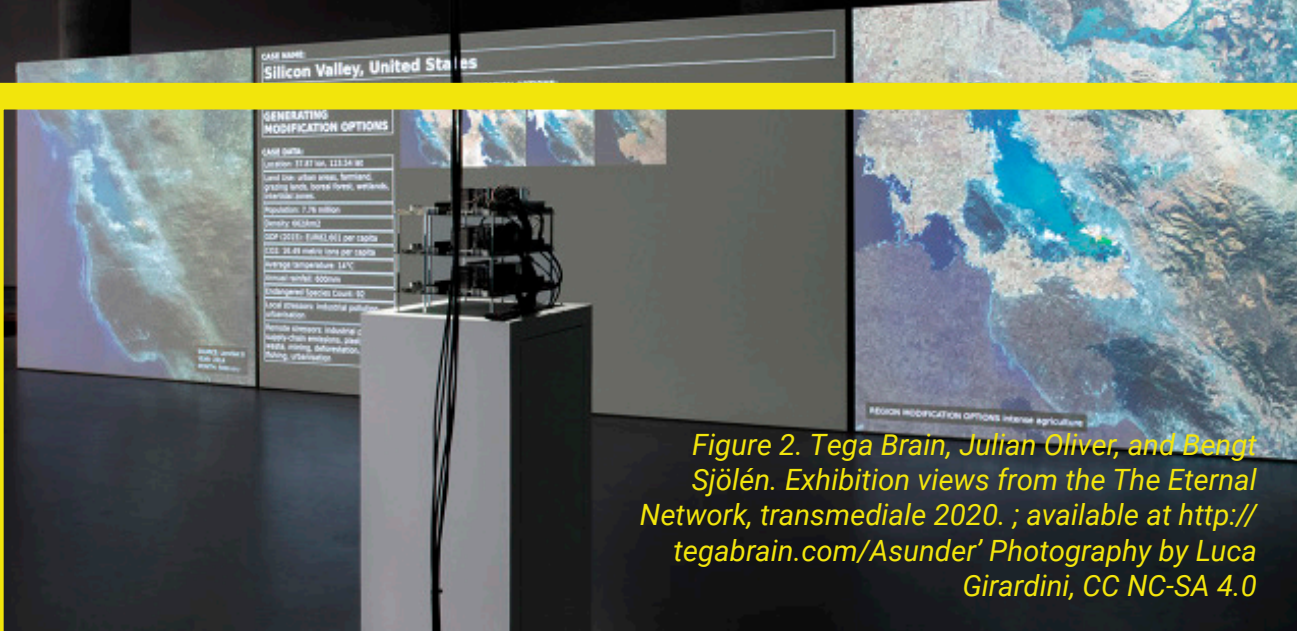
Case Study 2. *Asunder, Tega Brain (2018)*

Tega Brain's Asunder is a three-channel video installation that includes satellite imagery and visualisations of AI-driven climate data modelling. The installation is exhibited as a fictional, AI-driven 'environmental manager' tool that evaluates environmental data, proposes planetary-scale changes necessary to keep Earth habitable, and visually represents simulations of the implementation of these changes. This tends to result in impossible and absurd suggestions for required environmental protection measures, which in turn emphasise the divergence between current trajectories of human impact on the planet and sustainable lifestyles. Asunder is thus designed not only to flag up problems with how humans treat the planet, but also to expose problematic assumptions regarding the presumptive neutrality of computational processes. Against the background of arguments "that data driven systems can depoliticize or neutralize decision making," the work shows that AI-driven decision-making can also lead to the ignoring or deprioritising of shared human goals (Asunder n.d.). When Asunder's environmental manager begins to suggest, impossibly, the relocation of cities, combining of nations, straightening of coastlines, or moving of rivers, "the work shifts from humorous to preposterous, from uncannily eco-fetishistic to tediously bureaucratic" (ibid.).

Experienced as a dynamic, screen-based, non-interactive installation, Asunder conveys to its audiences the immense powers of complex AI systems to simulate extremely complex ecologies and to map evolving trajectories of changes that these ecologies may undergo under certain conditions. Likewise in her practice Brain also mitigates the environmental cost of her own artistic infrastructure. But at the same time, Asunder also demonstrates in dramatic fashion that the most complex calculations are worthless when they are conducted in an un-thinking fashion, and when they result in absurd, counter-intuitive outcomes. In this case, many of the terraforming decisions recommended by the AI system to keep the planet habitable are impossible to implement. Ultimately, Asunder suggests that while AI systems may have the power to compute theoretical solutions to even the most difficult problems (e.g. global warming), the very radical nature of the proposed solutions (such as relocating entire cities) is also a stark reminder of the severity of human impact on the planet, which makes the AI systems recommendation necessary in the first place.

Figure 3. Jake Elwes; Zizi & Me; 2020, multimedia - performance & video installation (ongoing) Collaboration with Me the Drag Queen; available at https://www.jakeelwes.com/project-zizi-and-me.html

Case Study 3. *The Zizi Project, Jake Elwes (2019, ongoing)*

Jake Elwes's The Zizi Project is a celebration of the extraordinary or preternatural, that which exceeds what is natural or regular, in AI and drag (Hemment 2019). It is also a critique of bias in machine learning, and an intervention seeking to empower an underrepresented community. The project revolves around the AI-based generation of gender-fluid, androgynous drag portraits, and has been developed by Elwes in collaboration with a south London community of drag performers. Throughout the development of this body of works, Elwes has collaborated with the Experiential AI research group and The New Real project at Edinburgh Futures Institute. The landscape report co-author Drew Hemment was curator and commissioner of a number of these works.

Exhibited as a 135-minute video loop, the first iteration, Queering the Dataset, features generative portraits of fictitious drag artists that continuously morph between recognizable faces and colourful abstraction. This output is achieved through the use of a pre-existing neural network using the StyleGAN architecture, which was trained on Nvidia's open source Flickr-Faces-HQ (FFHQ) dataset. The system was then re-trained on a new dataset of roughly 1,000 portraits of drag performers, which had been scraped from various websites and social media profiles of drag performers. A more recent iteration, The Zizi Show, is an interactive, online work commissioned by The New Real as part of the first digital exhibition of the Edinburgh International Festival. Here, Elwes was specifically concerned with the potential to create a performance work for an online audience, and the data was generated by recording real-life drag performers, providing work for the community during lockdown. The resulting moving imagery produces an exhilarating impression of diversity and difference, while at the same time also conveying a sense of continuity and community across the generated portraits. The critical position ultimately projected by the work is that generative systems synthesising 'new' images of human faces actually amplify

existing biases, and will likely exclude large demographics, simply based on the nature of the training data and the generative algorithms that are being used. It is only by injecting difference into the training data that Zizi can itself highlight the lack of diversity and representation in mainstream AI. Data rights and licensing were a further theme, with Elwes insisting on fair pay for the performers, and use of secure servers for data storage, while the technical implementation created a flash point for a debate on licensing and rights management in digital arts.

The Zizi Project offers a powerful critique of biased assumptions concerning gender identity that are encoded in training datasets commonly used for AI-based image-generation (Hemment 2019; Zeilinger 2021b, 137-141). As a critique of the spectularised 'newness,' 'originality,' or 'creativity' of AI-generated outputs, Zizi suggests that dataset bias will in fact accentuate and perpetuate a normative sameness that is concealed beneath the problematic rhetoric veneer of AI-based, non-human expressive agency. This message takes on an additional critical edge through the project's thematic focus on drag. As a cultural form with an important critical dimension, drag itself draws powerfully on playful techniques of imitation, defamiliarization, and mimicry – techniques that can also be located in the functionality of certain machine learning protocols and generative AI systems. Zizi thus foregrounds a speculative alignment between drag and generative AI, but also emphasises a key difference: while both drag and generative AI might appear to operate by way of amplifying stereotypes and accentuating difference, drag inherently challenges what generative AI reinforces. In the fictitious, morphing portraits Zizi generates, the "permanent becoming of a GAN" resonates with the "fluidity, ambiguity and transition of drag" (Hemment 2019). This highlights how generative AI tools that are framed as capable of generating novel and original outputs may instead merely perpetuate objectionable attitudes encoded in the underlying training data, and, indeed, help to normalise these attitudes.

Figure 4. Fondazione Prada, 2019. IMAGE-NET ROULETTE, "Training Humans" Osservatorio Fondazione Prada. Photo Marco Cappelletti.

Case Study 4. *ImageNet Roulette, Trevor Paglen and Kate Crawford (2019)*

Developed as a collaboration between the AI researcher Kate Crawford and the artist Trevor Paglen, ImageNet Roulette presents itself as a simple web interface that invites users to upload a photograph of themselves, which is then evaluated and 'classified' by a neural network trained on the extremely widely used ImageNet dataset. The work is highly accessible, and on the surface bears similarity to the many personality quizzes popular on social media platforms. However, users will find that their portraits tend to be labelled with wrong, inappropriate, or outright offensive classifiers. ImageNet Roulette thus serves to expose extreme biases inherent in the underlying ImageNet dataset on which the neural network was trained, and raises awareness of the fact that such bias will tend to be present in all AI applications that use the dataset (cf. Zeilinger 2021b).

The ImageNet dataset consists of over 14 million web-scraped and human-labelled images that range from everyday objects to portraits of individuals; it is widely used for the development of machine vision applications by researchers, government agencies, and in corporate contexts (Kaiyu et al 2019). To users unfamiliar with data labelling practices in machine contexts, ImageNet Roulette makes clear that the initial labelling of dataset contents, customarily carried out by low-paid 'clickworkers,' adds an important element of subjectivity that will later distort the determinations of presumptively 'objective' algorithms trained on the data. A "photograph of a woman smiling in a bikini" might thus be classified as a "slattern, slut, slovenly woman, trollop" (Crawford and Paglen 2019). ImageNet Roulette, by subjecting users to system-inherent biased feedback, thus managed to "challenge popular assumptions regarding the presumptive objectivity and interpretive validity of computational processes; to expose such processes, which are commonly blackboxed or otherwise not human-readable; to raise awareness of the exploitative labor practices behind biased labelling practices; to highlight data mining practices that link machine learning and private user information; and, by implication, to raise ownership issues related to dataset compilation practices and "big data" more generally" (Zeilinger 2021b 52-53). Once ImageNet Roulette was presented to the public, it took less than a year before hundreds of thousands of images and image descriptors had been removed from the ImageNet dataset (see Yang et al 2019; Rea 2019), at which point the project was taken offline.
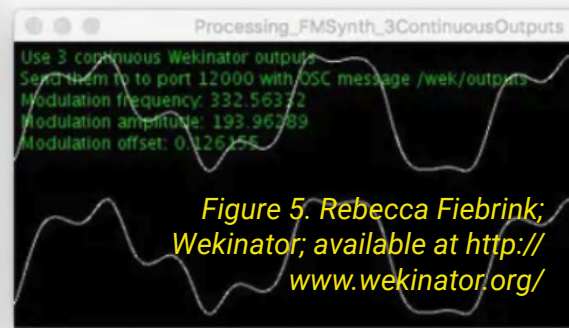
Processing_FMSynth_3ContinuousOutputs
Use 3 continuous Wekinator outputs
Send them to to port 12000 with OSC message /wek/outputs
Modulation frequency: 332.56332
Modulation amplitude: 193.96289
Modulation offset: 0.126155

Figure 5. Rebecca Fiebrink; Wekinator; available at http:// www.wekinator.org/

Case Study 5. *Wekinator, Rebecca Fiebrink (2009, ongoing)*

Wekinator (2009, ongoing), by Rebecca Fiebrink, isn't technically an artwork, but rather ML-assisted software designed as a free tool for those with little or no programming experience wishing to create AI-driven instruments, interactive installations, or artworks involving machine visions. As a fully open source tool complete with in-depth documentation, Wekinator aims to make AI and ML as accessible as possible, for the dual purpose of fostering critical literacy regarding these technologies, and enabling a wide range of users to develop projects using them. Fiebrink has deliberately not set pescriptive parameters concerning the uses of Wekinator. Consequently, the software is being widely used in educational contexts, by emerging as well as established artists, by designers, by digital humanities researchers, and in alternative entertainment contexts. Because many of the projects built with Wekinator are well documented and accessible in downloadable form, the tool is excellent for facilitating fundamental understanding of various machine learning protocols and artificial intelligence principles. It thus serves well to promote an appreciation of AI that goes beyond entertainment and/or consumption. Because Wekinator is free to use and designed to be able to interface with many existing online tools and protocols, it fosters critical literacy not only of AI/ML technologies, but also of the fundamentals of using APIs, exploring the functionality and usability of wide-ranging datasets and online development/design environments, and understanding crucial differences between open and closed source data culture. Accessibility, inclusivity, and participation are thus key terms for the way in which Wekinator posits AI/ML in relation to human-computer interaction and human-centred design.
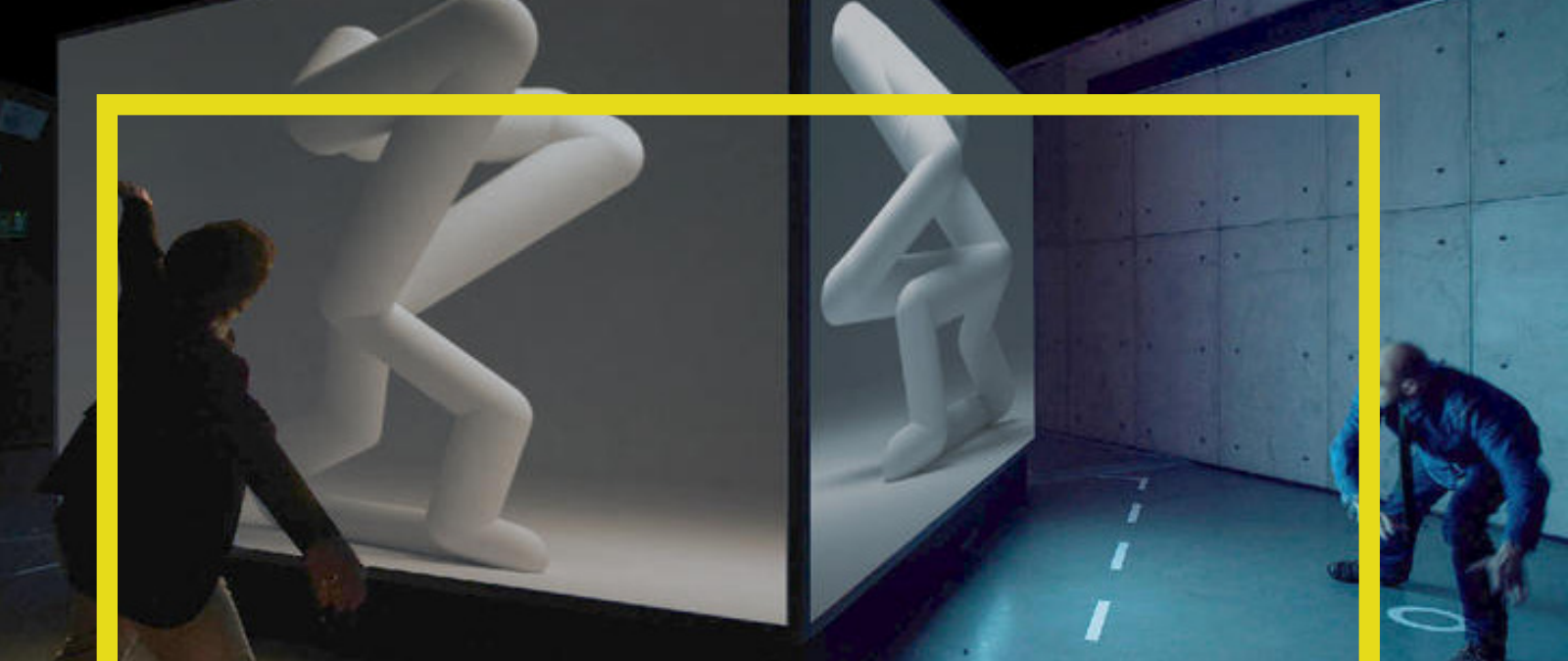
Case Study 6. *'AI: More than Human' – Focus on Education and Visualisation*

'AI: More than Human' is a large-scale group exhibition addressing itself to mainstream audiences. The exhibition premiered at The Barbican in 2019, and continues to tour to large cultural venues, including the Groninger Forum in the Netherlands (2020), Tate Liverpool (2021), Fernán Gómez Centro Cultural in Spain (2022-2023), and the OCT Art & Design Gallery in China (dates to be announced). The exhibition aspires to offer cultural experiences that both educate and delight its audiences. To this end, throughout the exhibition, information panels on the history of AI development are included alongside practical implementations of AI tools, AI-related artefacts from popular culture, as well as both interactive and non-interactive AI-driven artworks. To date, all instantiations of the exhibition have also been accompanied by educational lectures, as well as educational web-based information resources. In its various iterations, the exhibition includes projects by established AI artists (including Alexandra Daisy Ginsberg and Memo Akten, whose work have been discussed detail above) and design studios (including Universal Everything and teamLab). While the exhibition's efforts at educating audiences has been highlighted as a successful element, it has been reviewed rather less favourably with regard to the cultural/artistic offerings on display (cf. Jones 2019 and Barrie 2019). Where 'AI: More than Human' succeeds is in its thought-provoking presentation of the intertwined practical, theoretical, and creative histories of AI development. These are presented in interesting pairings of state-of-the-art AI implementations in mainstream culture, consumer products, and media art. On the downside, despite its inclusion of educational elements, the exhibition focuses on spectacular visualisations of the powers of AI, and fails to offer rigorous facilitation of an in-depth critical literacy of AI.

Case Study 7. *'You and AI: Through the Algorithmic Lens' – Focus on Critical Aesthetics*

A more recent online exhibition project focusing on AI technologies is 'You and AI: Through the Algorithmic Lens,' which was curated by Irini Mirena Papadimitriou in collaboration with FutureEverything, and sponsored by the Athens-based Onassis foundation. The event describes itself as a festival featuring an exhibition, online events, and lectures exploring AI in relation to creativity and ethics. The aim is to investigate "how algorithmic systems are constructed and defined, and by whom, and how they impact and reshape society and our perception of the world" (Future Everything n.d.). At the heart of the project is a large group exhibition featuring international AI artists including, among many others, Stephanie Dinkins, Jenna Sutela, Kyriaki Goni, Memo Atken and Jake Elwes (discussed further above). In contrast to the Barbican exhibition, this group exhibition addresses itself to audiences who are already familiar with experiencing contemporary art and media art. It accepts AI art as a given, rather than introducing it to mainstream audiences, and places its focus on showcasing experimental approaches to working with the underlying technologies. Whereas 'AI: More then Human' emphasises AI's generative capabilities (which can emulate or mimic human creative expression), this exhibition places a strong focus on showcasing critical and artistic responses to wide-ranging practical applications of AI, including facial recognition, predictive analytics, and algorithmic governance. Where the Barbican's 'AI: More Than Human' shows that AI, deployed in cultural contexts, is just as capable as human artists to delight audiences, the Onassis foundation's 'You and AI' foregrounds that artistic experiments with AI can also serve to critically interrogate many of the new uses to which the technologies are being put.

5
Discussion: Towards a New Real curatorial practice

We see in these cases highly imaginative artistic forms and novel modalities of experience.

The range of projects here offers a glimpse of diverse practices, aesthetics, and strategies that are being used by AI and data arts practitioners. They reveal the extraordinary potential of artificially intelligent technologies used in creative and artistic contexts. In each one we see a different configuration of artistic, technological, societal and environmental work and themes.

Closer consideration of the case studies suggests that even when there is a diversity of technologies, practices, aesthetics, and target audiences at play, common threads, approaches, and characteristics can be identified.

In the sample of works discussed here, a common aspect is that the artists and curators address multi-dimensional challenges and controversies – to do with ethics, politics, licensing, security, and environmental impact – alongside technical, formal and aesthetic themes when working with creative applications of AI. Moreover, we see in some of our case studies an intent and a strategy by new media artists and producers to simultaneously develop and delight online audiences while negotiating the profound and complex challenges that arise with AI-fuelled and data-driven experiences.

Our case studies reveal a range of strategies and approaches. One is to make AI and machine learning functions and operations explicit or tangible so that they can be reflected on or discussed; another is to use AI to convey something 'about' AI. Topics include critical engagement with how systems make use of user data, with the ways in which truth and experience are constructed online, and with the exclusions that are created by AI technologies. The presentation of these works and exhibitions – often accompanied by essays and talks – creates spaces and fora for engagement with these significant issues.

Critical AI practice can help to equip cultural organisations, practitioners, audiences and funders to negotiate the complex challenges and controversies in the digital economy.

We see in these case studies that interactive experiences can:

a. demonstrate capabilities/limits of the technology

b. aid in rethinking key elements of computational art and generative practices that can otherwise be difficult to grasp for audiences

c. illuminate or challenge the social factors and implications of emerging technologies, such as bias and inherent power structures

d. engage users/audience such that their input forms a key part of the aesthetic experience, and sometimes also becomes a key critical literacy element

e. foreground the significance of the datasets underlying AI-driven and generative art works (from artist-created custom datasets, to the anonymous labour of machine learning 'clickworkers')

f. call for new curatorial approaches that can accommodate works in which 'creative' elements are 'blackboxed' in algorithmic systems and not immediately evident in the experience as such.

We propose that these diverse practices represent a field of critical art practice in which artists work with AI technologies and data both as medium and as theme, both as tool and as topic. That is to say, AI technologies provide both the medium in which the artworks are executed, and the theme for the project and the inquiry that surrounds it. In other words, these are data-driven and algorithmic creative practices and art forms in which the data used bears conceptually on the aesthetic and cultural experience created, and which feature a literacy aspect relating to the underlying technologies. We name this critical AI art.

We conclude that this practice can help to equip cultural organisations, practitioners, audiences and funders to negotiate the complex challenges and controversies in the digital economy.

In particular, the study, commissioning, presentation, evaluation and preservation of such work is a curatorial practice for the New Real, that can address a range of multi-dimensional challenges:

☐ to expand artistic uses of AI and to explore new creative applications of AI.

☐ to nurture the human and machine agency to flourish in the face of transformative change today.

☐ to leverage the power of the arts to strengthen societal resilience through this and future crises.

Future work
↓

6
Future work

These case studies form part of the early stages of The New Real project. This has combined desk research, workshops with festival and technology organisations, and interviews with practitioners from data arts and digital platforms.

We use a co-creation framework called Open Prototyping (Hemment et al, 2020) to facilitate new commissioning and to broker relationships between artists, technologists, festivals, funders and researchers. Open Prototyping describes six steps to structure co-creation research, which in The New Real we combine in the following three project phases:
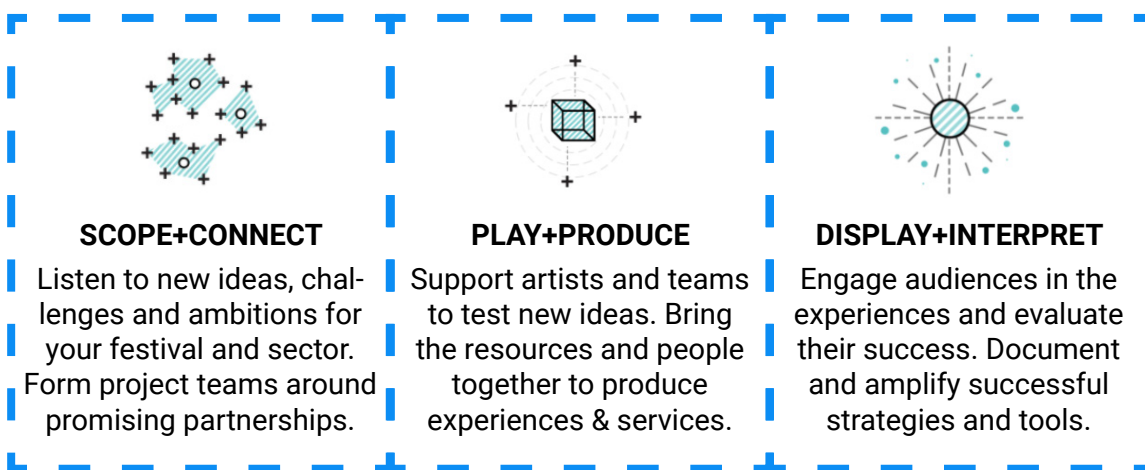

SCOPE+CONNECT
Listen to new ideas, challenges and ambitions for your festival and sector. Form project teams around promising partnerships.

PLAY+PRODUCE
Support artists and teams to test new ideas. Bring the resources and people together to produce experiences & services.

DISPLAY+INTERPRET
Engage audiences in the experiences and evaluate their success. Document and amplify successful strategies and tools.

Figure 8: The Open Prototyping co-creation journey this report will inform.

The New Real is underpinned by our novel 'Experiential AI' (Hemment et al, 2019) approach, which develops new theory and practice around reconfiguring algorithms, data and situations as experiences. This brings together different disciplinary viewpoints and approaches to address themes such as the lack of fairness, accountability and transparency in AI and machine learning technologies, and trust and acceptance factors in emerging technology and formats, in an exploratory, creative manner. Elsewhere we ask how this can help to answer questions for AI science.

Current work includes co-creation pilots that explore innovation potential by testing transformative new forms of artistic experience fuelled by AI, the processes by which cultural organisations can commission and present these experiences, and how technologies and practices in cultural organisations can be re-configured to improve resilience. Future research will investigate how these forms of artistic production and distribution can reveal economically viable experiences, formats and models to enable and support post-COVID-19 recovery.

7
Conclusion

In this report, we turned to the AI arts to understand how the design of digital experiences can both delight audiences and build critical intelligence and literacy surrounding the profound challenges of technology transition.

This report asserts and underlines that technology alone is not a solution when considering the transition to digital-first and hybrid formats, that it is necessary to equip cultural producers to negotiate political, licensing, security, ethical and environmental controversies and challenges in the digital domain, and to consider trust and acceptance factors in emerging technology and formats. Cultural organisations, meanwhile, need to understand how the sector may be transformed, especially in light of the widespread pivot to digital engagement in the cultural sector after COVID-19.

Through our case studies we have looked at strategies of AI artists to address complex and multi-dimensional societal issues alongside aesthetic and technical themes when working with creative applications of AI. We have seen that for some AI artists there is an intentional strategy of making AI systems and their implications and consequences transparent and intelligible to users through novel forms of artistic production and distribution. This can shed light on important factors that influence trust and acceptance in emerging technologies and formats.

Our discussion of these case studies enables us to identify and articulate how cultural works can contribute to practitioner and public literacies and debates surrounding technology. We point to the potential for cultural organisations producing digital and hybrid experiences to learn from and adopt this strategy to equip practitioners and audiences with the skills and literacies to navigate this space.

We conclude that innovative forms of commissioning, production, and participation in the AI arts can offer valuable insights for the wider cultural and creative sector. Lessons from the AI arts can help to equip cultural organisations and audiences to navigate temporary or permanent transitions to networked, online cultural and business models in the arts field and society at large.

Resilience will be strengthened by new cultural, social, and economic models in the festivals and cultural sector that are artistically novel and also viable, sustainable and fair. This report finds that artistic practice can be deepened and enhanced through engagement in these critical issues as well as by access to significant science and technology. We invite you to join us in investigating how these strategies can reveal culturally and economically viable experiences, formats and models to facilitate and accelerate recovery and resilience in the festivals and cultural sector.

Innovative forms of commissioning, production, and participation in the AI arts can offer valuable insights for the wider cultural and creative sector.

References

Asunder.earth. n.d. https://asunder.earth/.

AIArtists.org. n.d. Memo Akten. https://aiartists.org/memo-akten.

Akten, M. n.d. Learning to See. http://www.memo.tv/works/learning-to-see/.

Barrie, T. 2019. .This exhibition is proof that robots will destroy us all. GQ. https://www.gq-magazine.co.uk/article/barbican-ai-more-than-human-exhibition-review.

Cetinic, E. and She, J., 2022. Understanding and creating art with AI: Review and outlook. ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM), 18(2), pp.1-22.

Coeckelbergh, M. (2020). AI Ethics. MIT Press.

Davies, J. (2020). The art in the artificial, London: Creative Industries Policy and Evidence Centre and Nesta. https://pec.ac.uk/research-reports/the-art-in-the-artificial

Feher, K, and Attila I. K. (2021). Fifteen shadows of socio-cultural AI: A systematic review and future perspectives. Futures 132. https://www.sciencedirect.com/science/article/pii/S0016328721001269.

FutureEverything. (2021). You and AI: Through the Algorithmic Lens. https://futureeverything.org/portfolio/entry/you-and-ai-through-the-algorithmic-lens/.

Geels, F. (2006). Multi-Level Perspective on System Innovation: Relevance for Industrial Transformation. In Olsthoorn X., Wieczorek A. (eds.) Understanding Industrial Transformation. Environment & Policy, vol 44. Springer, Dordrecht. https://doi.org/10.1007/1-4020-4418-6_9.

Grba, D., (2022). Deep Else: A Critical Framework for AI Art. Digital, 2(1), pp.1-32.

Hemment, D. (2019). Preternatural: An Exhibition of Works by Jake Elwes. Edinburgh Futures Institute. https://efi.ed.ac.uk/wp-content/uploads/2019/09/Preternatural_Curatorial_Statement_2_August_2019.

Hemment, D., Aylett, R., Belle, V., Murray-Rust, D., Luger, E., Hillston, J., Rovatsos, M. and Broz, F., (2019). Experiential AI. AI Matters, 5(1), pp.25-31.

Hemment, D., Bletcher, J., & Coulson, S. (2020). Open Prototyping: A framework for Combining Art and Innovation in the IoT and Smart Cities. In Eds. Hjorth, L., de Souza e Silva, A., Lanson, K. The Routledge Companion to Mobile Media Art. London: Routledge. pp,.270-283. ISBN 9780367197162.

Hemment, D. (2020). Reordering the assemblages of the digital through art and open prototyping. Leonardo (Vol. 53, No.5). Cambridge, MA: MIT Press. p.529-536. DOI: 10.1162/leon_a_01861.

Hemment, D., Murray-Rust, D,Belle, V., Aylett, R., Vidmar, M., Broz, F. (2022a) Experiential AI: Enhancing explainability in artificial intelligence through artistic practice. Preprint.

Hemment, D., Vidmar, M., Sinders, C., Koppel, K., Warner, H., Hill, R. (2022b) Emerging from the Covid-19 Crisis into the New Real: Scenarios and challenge themes for the festivals sector. Preprint.

Jones, J. (2019). I've seen more self-aware ants!' AI: More Than Human – review. The Guardian. https://www.theguardian.com/artanddesign/2019/may/15/ai-more-than-human-review-barbican-artificial-intelligence.

Kloskowski, D. and Kwiatkowski, G., (2021). Events and Festivals in Times of Uncertainty. European Research Studies, 24(2B), pp.469-487.

Manovich, L. (2019). AI Aesthetics. Moscow:

Strelka Press.

Miller, A. I. (2019). The Artist in the Machine: The World of AI-Powered Creativity. Cambridge, MA: MIT Press.

du Sautoy, M. (2019). The Creativity Code: Art and Innovation in the Age of AI. Cambridge, MA: Harvard University Press.

Rea, N. (2019). How ImageNet Roulette, an Art Project That Went Viral by Exposing Facial Recognition's Biases, Is Changing People's Minds About AI. Artnet.com. https://news.artnet.com/art-world/imagenet-roulette-trevor-paglen-kate-crawford-1658305.

Sinders, C. (2019). Making Critical Ethical Software. In The Critical Makers Reader: (Un)learning Technology. Eds. Loes Bogers & Letizia Chiappini. Amsterdam: Institute of Network Cultures. https://ualresearchonline.arts.ac.uk/id/eprint/14218/3/CriticalMakersReader.pdf#page=88.

Taylor, G D. (2014). When the Machine Made Art: The Troubled History of Computer Art. London: Bloomsbury Academic.

Victoria & Albert Museum. n.d. A History of Computer Art. http://www.vam.ac.uk/content/articles/a/computer-art-history/

Kaiyu, Y., Klint, Q., Li, F., Jia, D., and Russakovsky, O. (2019). Towards Fairer Datasets: Filtering and Balancing the Distribution of the People Subtree in the ImageNet Hierarchy. http://image-net.org/update-sep-17-2019.php.

Yin, R. K. (2009). Case study research: Design and methods (4th Ed.). Thousand Oaks, CA: Sage

Zeilinger, M. (2021a). Generative Adversarial Copy Machines. Culture Machine 20(1). https://culturemachine.net/vol-20-machine-intelligences/generative-adversarial-copy-machines-martin-zeilinger/.

Zeilinger, M. (2021b). Tactical Entanglements: AI Art, Creative Agency, and the Limits of Intellectual Property. Lüneburg: meson press. https://meson.press/books/tactical-entanglements/.

The New Real is developed
in partnership with:

Edinburgh Futures Institute
A new institute within University of Edinburgh to pursue knowledge and understanding that supports the navigation of complex futures.

Experiential AI
Experiential AI is a group at University of Edinburgh that conducts research on AI futures, science, art and ethics through collaborations with artists, festivals and the AI community.

The Alan Turing Institute
The Alan Turing Institute is the national institute for data science and artificial intelligence, headquartered at the British Library.

Acknowledgements: