Chapter 4
Creativity and Virtual Worlds

Susan Liggett

Abstract The relationship between the real world and the internet is explored. The real and the virtual are separate but intersecting and overlapping worlds as far as audiences are concerned. What is the effect of a work created on the internet on the real world, and vice-versa? The rise of the internet and its effect on creativity is examined. Technology has changed the production and distribution of artworks to audiences. Repositories such as art galleries and museums can exist as virtual entities and enable audiences to view, and interact with, artifacts and artworks. Such repositories can change the ways in which audiences view and perceive artworks.

Keywords Virtual reality · Virtual holography · Artificial intelligence

4.1 Introduction

In recent years, there has been a surge in artists experimenting with new technologies to express ideas, expand audiences, or to problematize and critique the implications that technology has on the future. Through making artworks in the internet age, they have tested the limits of technology to explore notions of truth and accounts of reality.

The ways the internet has influenced creativity is explored and questions how human experiences have been impacted by new technologies. It examines the ideas of theorist and philosopher Boris Groys (b.1947). It asks what does it mean for an original work of art to have what Walter Benjamin called an 'aura'; when today the original artwork may only exist as a computer file?

Examples of artworks that use virtual and augmented reality to create immersive environments are explored. A more in-depth case study of the work of British Romanian Artist Ioana Pioaru is presented. Pioaru has developed virtual holography; a new method for art making.

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4.2 Technology and Places of Creativity

Today the internet is the place where artists produce and distribute artworks. The gap has closed between the space of production and the space of exhibiting art, with many artists using their computing device and no longer needing dedicated studios and specialist equipment. The distribution of artwork on the internet has led to the globalization of the artist/author, with social media helping to grow reputations from the local to the global. The internet allows the viewer to see work in progress and to express judgements on quality thus changing the way in which art is critiqued.

According to the art critic and philosopher Boris Groys (b.1947) in the internet age the institutional power of the Museum has collapsed. In his book "In the Flow" (2016) [1] he gives an account of how museums and galleries no longer determine the quality and status of an artwork. Central to the argument is a reminder that although the internet is a virtual space, it has a fixed reference point—'offline reality'; and it refers back to this reality in every interaction 'including economic transactions, surveillance and military operations' (ibid).

British artist Daniel Buzzo uses the internet as a venue for inspiration, production and the distribution of his artwork. Human computer interaction with the internet is a central theme to his work, as demonstrated in his piece *Signs of Surveillance: Dataset for training machine vision systems*" (Fig. 4.1) [2]. His work emphasizes the internet as a machine of surveillance as exemplified by

> It divides the flow of data into small, traceable and reversible operations, and thus exposes ever user to its surveillance [1].

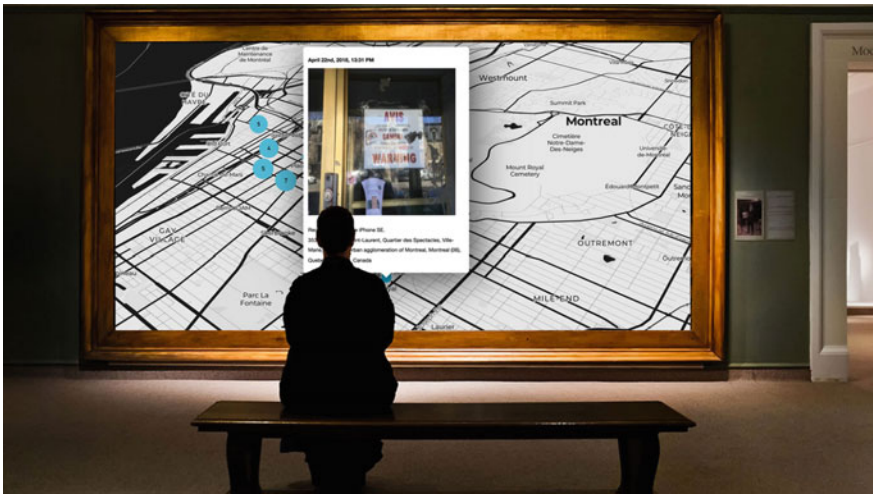

Fig. 4.1 Signs of surveillance, Montreal, Daniel Buzzo. *Copyright* © Daniel Buzzo 2022 and reproduced with permission

A digital image can never be really copied (as it depends on its original context). It is always newly staged or performed and every act of seeing an image or reading a text on the internet is traceable. Buzzo's work acknowledges the impact of this on the status quo, and suggests that secrecy is difficult when one is under constant surveillance, and when the only way we can preclude others is by the use of protected passwords. Groys argues that today subjectivity has become a 'technical construction', and that we have become keepers of secrets; that is by knowing our passwords (ibid).

4.3 Creativity and Being Human

Creativity is a human trait and the making of art is one way in which the individual, who is at the center of a continually changing realm of experience, makes sense of the world. According to Carl Roger, the founder of person-centered therapy, reality for the individual is constructed from the way in which this experience is internalized to construct an internal frame of reference. Making art helps understand human experience through empathy. This is

> The state of empathy, or being empathic, is to perceive the internal frame of reference of another with accuracy and with the emotional components and meanings which pertain thereto as if one were the person [3]

For this reason, the computer cannot create genuine artworks as there is no internal frame of reference for it to originate from unless one is created. Unlike the human creative imagination, where fictions can be created and played out through art, the internet cannot create art because it has no capacity to draw on human experience creating dream worlds that inspire art. Internet information is always information about something in, or derived from, the real world; there are no fictional referents [1].

Ali Nikrang, a research artist at Ars Electronica Futurelab, is fascinated by the limitations of AI-based music, and the artificial creation of meaning. He says that AI may be able to generate pleasing music, but it has no creative value or higher meaning [4].

According to Groys, we perceive artworks as real and tangible things, but

> one can say that on the Internet there is no art and literature, but only information about art and literature [1].

The reality found on the internet is a different kind of reality; one that creates different sorts of experiences. Philosopher Walter Benjamin (1892–1940) in his essay "The Work of Art in the Age of Mechanical Reproduction" (1935) said that artworks change once we can reproduce them, the glow of authenticity that he calls their 'aura' falls away when you are not experiencing the original; suggesting the viewer has a diminished art experience [5].

Fig. 4.2 Kate Darling and Pleo—a robotic dinosaur. Photo Lyla Duey. *Copyright* © Kate Darling, 2022 reproduced with permissions

With human behavior adapting and altering rapidly due to the pandemic Covid-19, the pace of change has been accelerated in the adoption of the virtual. The EVA2021 conference held a symposium panel to ask

> how has art, identity and human digital behaviour' been transformed and what will it mean to be human in a post-Covid, post-digital world? [6].

The Massachusetts Institute of Technology (MIT) Media Lab researcher, Kate Darling, argues in her book "The New Breed" (2021) that we would be better prepared for the future if we started thinking about robots and artificial intelligence (AI) as animals; suggesting that comparing them to humans is limited (Fig. 4.2). We need to think creatively about their potential as collaborators and companions [7]. Scientists in Japan are working on robots to locate and detonate mines that look like spiders, caterpillars and crabs [8].

4.4 Virtual Reality Holography a Case Study—Ioana Pioaru

Pioaru developed the original technique of virtual reality (VR) holography between 2016–21 for her Ph.D. study [9]. This new art form synthesizes the qualities of traditional hand-drawing with the features of holography and virtual reality. It enabled

the showcasing of VR artworks outside of VR space, without the need of a headset. To date one of the limitations in VR media is that perceiving the three-dimensionality of VR artworks depends on wearing a headset through which to access the virtual space where the work resides. Pioaru was frustrated by this as it restricts the number of people who can view the artwork at one time, although access to a Cave could have addressed this to some degree. Her work was therefore only accessible to the wider public in a flattened version via an online 2D galleries. To overcome this, she developed VR holographic art; the first in the world at this time that could be displayed outside VR, while at the same time preserving its volumetric presence. Pioaru defines VR art as the type of artistic content created directly inside the VR environment using an application designed specifically for the purpose of art making. This may be contrasted with computer-generated content presented in VR: making it distinctive and different from anything ever seen before. Holograms do not photograph well—they have to be experienced to fully grasp the intimacy of every hand drawn line sculpted and illuminated in space [10].

The internet space references data from the real world, rather than fictional worlds. Ioana Pioaru's virtual holography artworks present the experience of fictional worlds brought into the real world through drawing. This is an attempt to capture something beyond a perfect replica of an object or thing, but seeks to portray an impression that touches our emotions.

Pioaru's work goes beyond the usual hyper real of holography, through an exploration of the boundaries between sculpture and drawing as in the sculptural and print work as seen in Meditation on a Machinic Cube (Fig. 4.3).

In her holographic works 'Spectral Figures' (2019) (Fig. 4.4) the viewer experiences every hand drawn line that becomes more tangible as you move closer to it as a physical object. To fully comprehend the work a close scrutiny is needed (ibid). 'Warhol' (2019) (Fig. 4.4) is a holograph smaller than human scale, yet every visible sharp illuminated line leaves an impression of what it must have felt like to be the artist making the work. As your eyes trace the lines, a tactile and visceral experience is evoked when viewing the work.

Comparing the drawing 'The Bronte Sisters' (2022) (Fig. 4.5) to hologram 'Spectral Figures' (2019–2020) (Fig. 4.4), the hologram transports the viewer into the process of the drawing itself; helping an understanding of the very human decision-making process that are often hidden in digital media artworks.

Pioaru first started using the 3D-painting virtual-reality Google Application Tilt Brush in 2017 to produce sculptural drawings (Figs. 4.6 and 4.7). She describes how it offers the user a fully immersive experience that is entertaining. However, for her, it was the 3D design platform Gravity Sketch that proved to be the game changer with the level of editability and precision far superior to Tilt Brush [11]. It was through this that Pioaru adapted her VR art making method to the specificity of holography

> instead of drawing on a white background with black strokes, I realised that a much better result would be achieved by drawing with white lines in a dark environment. This method routes the light energy available from the hologram into the drawing lines more effectively; and since the drawing lines usually occupy a much smaller solid angle in total than the background, the relative brightness of the lines can be much higher (ibid).

Fig. 4.3 Meditation on a machanic cube. Installation, Ioana Pioaru, 2017. AnnArt Gallery, Bucharest. *Copyright* © Ioana Pioaru 2022, reproduced by permission

Fig. 4.4 Ioana Pioaru, spectral figures, (2019) Holograph. *Copyright* © Ioana Pioaru 2022, reproduced by permission

Fig. 4.5 Ioana Pioaru Bronte Sisters, pen on paper (2020). *Copyright* © 2022 Ioana Pioaru 2022, reproduced by permission

Ioana Pioaru makes preparatory drawings (Fig. 4.8) to acquaint herself with the volumetric structure of her subject before converting them to light rather than dark outlines within Gravity Sketch. In traditional drawing a 3D object is rendered in 2D, but in virtual space the 2D sketches create the sculptural drawing (Fig. 4.9).

Two recent exhibitions of her work include Gallery 286, London (2022) (Fig. 4.10) [12] and "Holographic Embodiment", Centre for the Holographic Arts, New York (2019) [13].

The post-processing step is done with the help of the holography company Geola who are developing a tool to help artists with this process of preparing files for printing [14].

> Briefly, this consists of reapplying the correct colours to the volumes, setting up the 'holoplane' (a virtual plane that simulates the holographic plate) and positioning an animated camera at the correct distance from the holoplane using a method described by Brotherton-Ratcliffe and Bjelkhagen [15].

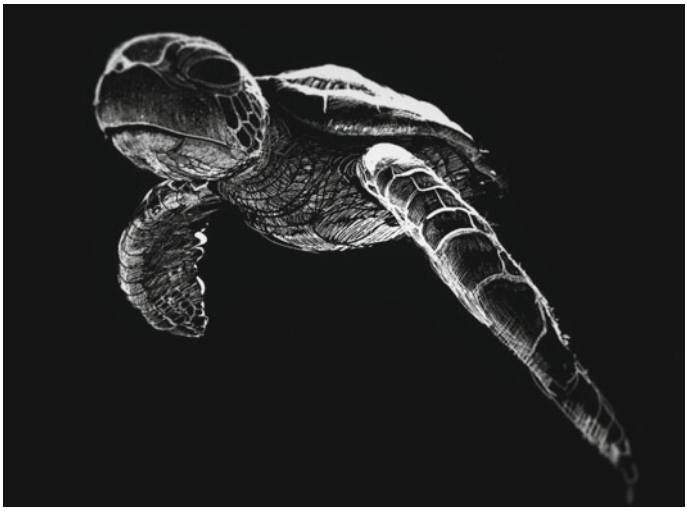

Fig. 4.6 Ioana Pioaru, Tilt Brush snapshot of Sea Turtle. *Copyright* © 2022Image Ioana Pioaru 2022, reproduced by permission

Fig. 4.7 Ioana Pioaru, Tilt Brush snapshot of Pangolin. *Copyright* © Ioana Pioaru 2022, reproduced by permission

More details can be found on this process and how she collaborates with technologists in her comprehensive comparison between SRD and reflection holograms in "Virtual Reality Art Visualised through Surface Relief Digital Holography" [16].

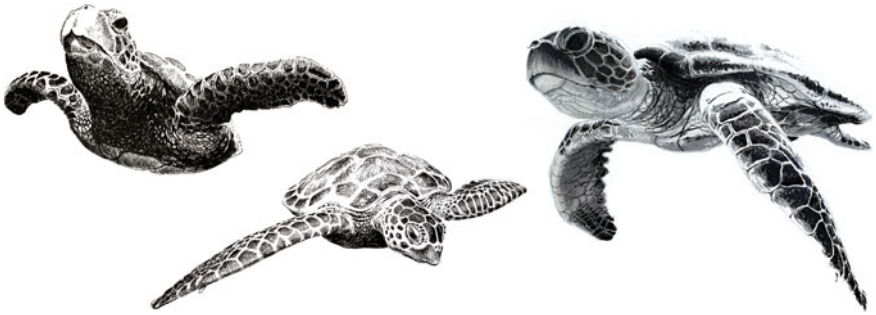

Fig. 4.8 Ioana Pioaru, preparatory ink drawings: Sea Turtle. *Copyright* © Ioana Pioaru, 2022, reproduced by permission

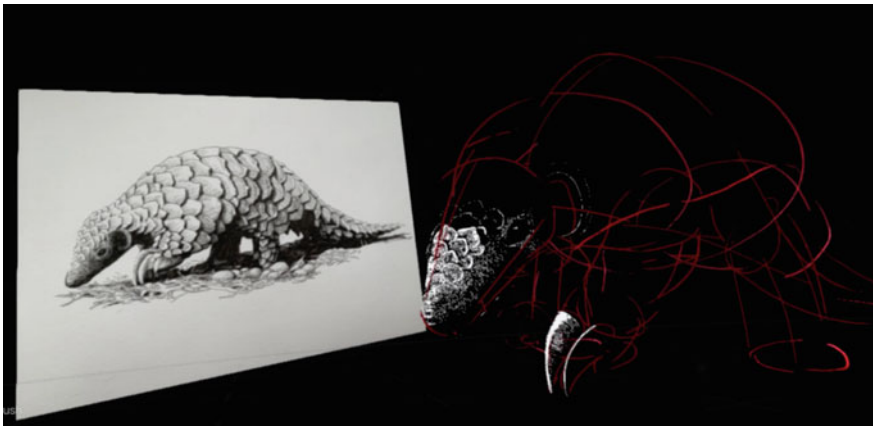

Fig. 4.9 Ioana Pioaru, snapshot from Tilt Brush showing how a 2D sketch is used as a reference for the VR drawing. *Copyright* © Ioana Pioaru 2022, reproduced by permission

The novelty of Ioana Pioaru's work is that it creates VR holographic artworks that can be viewed without the need of a headset, conventionally needed to view all other VR creations (Fig. 4.11).

Creative producer and researcher Luba Elliott, curates AI events and exhibitions including the Machine Learning for Creativity and Design, NeurIPS 2020 Workshop, that brought together artists and researchers together to explore applications of machine learning to creativity [17]. The impact of the fourth industrial revolution on artists and the limits of technology are explored by Frieze [18].

Fig. 4.10 Ioana Pioaru, installation shot, Gallery 286, London (2022). *Copyright* © Ioana Pioaru 2022, reproduced by permission

Fig. 4.11 Ioana Pioaru, 'Spectral Figures: Sea Turtle': two views of the final SRD hologram. *Copyright* © Ioana Pioaru 2022, reproduced by permission

4.5 Conclusions

Artists are attracted to Virtual and Augmented Reality to create immersive experiences. Through experiments with publically available platforms such as Tilt Brush and Gravity Sketch, they have pushed the boundaries of technology to present alternatives for the use of these new technologies. Artist Ioana Pioaru exploits these tools to develop Virtual Reality Holography, a new method for art making.

Artists increasingly exploit and evaluate developing technologies in a range of ways that can lead to new commercial possibilities or in ways that critique its social consequences. They have been inspired by augmented reality, virtual, reality, artificial intelligence and machine learning. An appraisal of these new platforms is both practically and conceptually ongoing more for than two decades since Boris Groys proclaimed in his book a radical shift in our image culture 'from aesthetics to autopoetics'. That is, 'to the production of one's own public self'. As a result of these advances in new technology, artists are working more collaboratively, and in a more democratic way that is decentralized and de-authorized' to reflect and embody our networked selves [19].

Chapter 5 examines how collaborations are generating new ways of working creatively in community spaces to generate new ideas and perspectives on collective rather than individual endeavors.

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